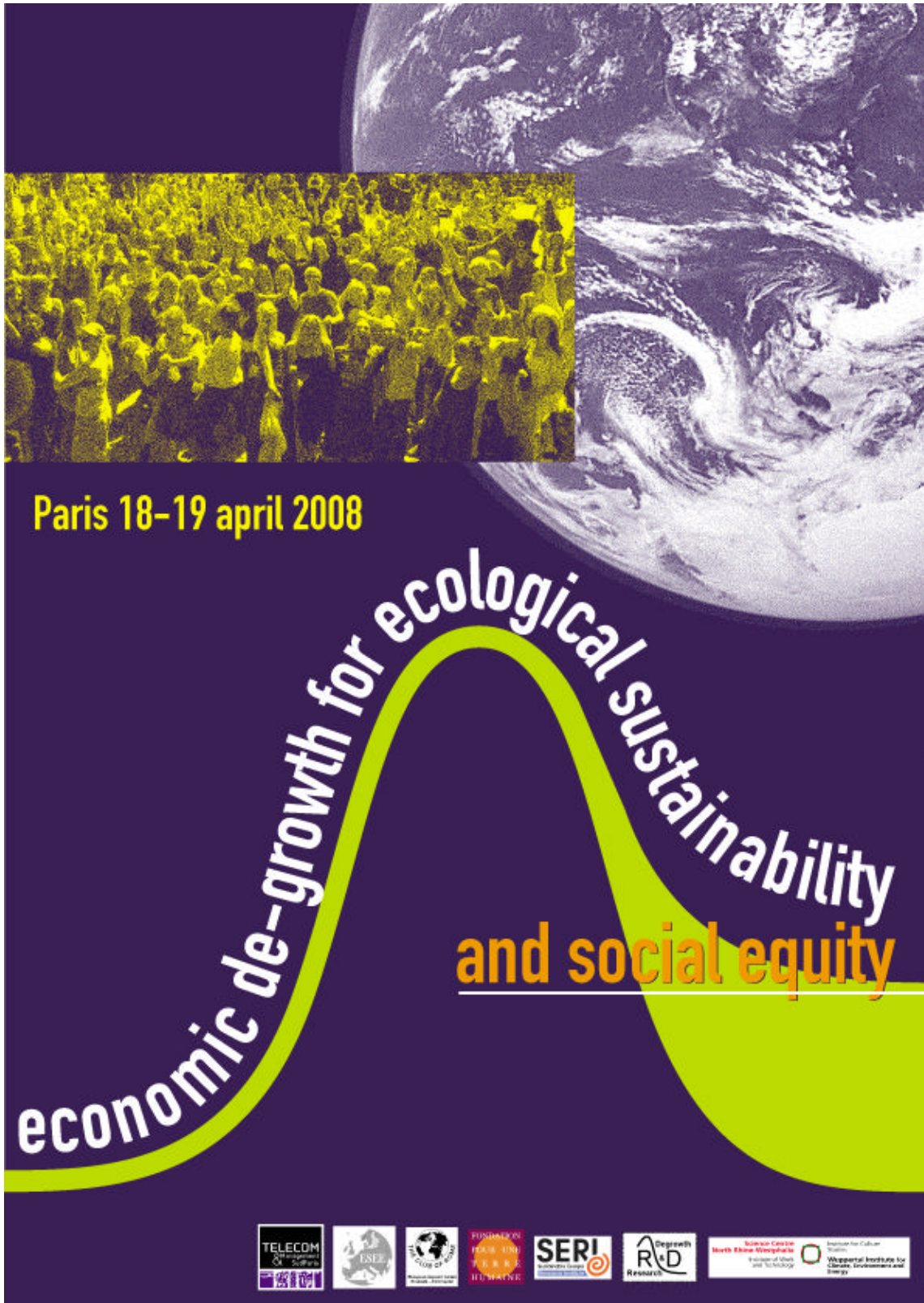


Proceedings of the First International Conference on

Economic De-Growth for Ecological Sustainability and Social Equity

Paris, 18-19 April 2008



Paris 18-19 april 2008

**economic de-growth for ecological sustainability
and social equity**

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Energy

Editors: Fabrice Flipo & Francois Schneider

Web sites

Content and information about the conference on the web site of INT

<http://events.it-sudparis.eu/degrowthconference/>

Web site of Research & Degrowth

<http://www.degrowth.net>

Contact

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Acknowledgements

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We greatly thank co-organisers

Joan Martinez-Alier & Hali Healy of UAB & International Society of Ecological Economics

Sylvia Lorek & Fritz Hinterberger of SERI

Wolfgang Sachs of the Wuppertal Institute

Thomas Schauer & Raoul Weiler of the Club of Rome, European Support Center, and Brussels EU Chapter and all volunteers

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Goals of the conference

Dear readers of the proceeding of the Degrowth conference for Sustainability and Equity

The first international conference on degrowth took place in Paris in April 2008. It is the first time in an international academic setting that economic degrowth pathways were under scrutiny. The motivation of participants, organisers and volunteers has been amazing as was the level of response and commitments. 130 scientists and civil society members from many generations and backgrounds joined together. We wish to thank the organising committee composed of Research & Degrowth, Institut Telecom, European Support Centre and Brussels-EU Chapter of the Club of Rome, Wuppertal Institute, ISEE, SERI... we thank the scientific committee of the conference for its important involvement.

The conference was a first attempt on the subject of Degrowth, but nevertheless outcomes have been worthwhile, let us quote a few:

- Degrowth has become an international concept challenging growth while opening new pathways, basically a new paradigm shift
- Growth politics was challenged as enabling and favouring the eating up of social and environmental improvement through macro-rebound effect
- The conference has developed academic credibility of the subject of degrowth, this idea was until now mainly supported by civil society coalitions, it is now also a research subject
- Degrowth appeared as a common denominator transversally joining those that wish to collectively survive through possible crises and those that wish to collectively manage a soft landing
- It supported international convergence and network of those, scientists and society citizens, that wish less and different consumption and production level and patterns
- Right sizing at the world level was identified as a desired goal in the declaration of the conference, meaning degrowth among affluent and influent parts of the world and post-development in the global South
- The old debate on steady state vs degrowth was overcome, degrowth was seen as a transition to a dynamic and diverse equilibrium steady state
- Sustainability and equity within democratic frameworks were identified as important goals and conditions of degrowth

As organisers we very much thank all contributors for this success, looking forward to further projects and actions. The association Research and Degrowth is looking forward to the continuation of degrowth network build-up.

Following the conference a certain number of papers were collected reflecting the variety of the contributors, we wish you a very nice reading.

With our sincere thanks

The editors: Francois Schneider & Fabrice Flipo

Introductory words to the conference

This conference sets global objectives of ecological sustainability, social equity, well-being, and economic sustainability within the framework of human rights and participatory democracy.

This conference does not intend to develop further analysis of the current situation but wishes instead to focus on the search for global solutions.

We have taken as an hypothesis that societies today are neither equitable nor sustainable and that the reduction of global material, energy and land use (physical degrowth) is necessary. Also we acknowledge that GDP is not a proper measure of environmental or human well-being. However having said this is not sufficient.

The idea of the conference is:

- to explore the hypothesis of absolute degrowth of the collective capacity of affluent countries and affluent layers of human population to exploit and take possession of the world's materials, energies, lands, and living beings (including humans).
- to explore the hypothesis of voluntary degrowth of affluent economies in a way that would achieve economic sustainability and avoid major economic recession.
- to question the supremacy of growth economics, not excluding the possibility that a sustainable economy might require a significant change in economic institutions.
- to develop degrowth research in order to open new perspectives for true progress.
- to explore economic degrowth as long-term risk prevention: the immaterial economy is at risk of becoming material again, sequestration of carbon runs the risk of actually releasing carbon... The only real prevention could be degrowth.

Goals

- Overview of the state-of-the-art of degrowth research, debates and movements
- Encouraging degrowth research and identifying gaps in degrowth research
- Exploration of tools that would help the campaign for equity and sustainability
- Position/Statement on growth and degrowth

Organisers: Francois Schneider & Fabrice Flipo & Denis Bayon

Scientific committee

The scientific committee is under the supervision of **Friedrich Hinterberger**, president of SERI. Fabrice Flipo is vice-president.

Members :

Mauro Bonaiuti teaches at l'Università di Modena e Reggio, important thinker in the area of degrowth in Italy

Alain Caillé, Professor of economy and sociology at Paris X university (Nanterre). Founder of the MAUSS journal (Anti-utilitarian movement in social sciences) and president. Auteur, notamment, de : Critique de la raison utilitaire, La Découverte, 1989 ; Don, intérêt et désintéressement, La Découverte, 1994 ; Anthropologie du don, Desclée de Brouwer, Paris 2000.

Maurie Cohen is Associate Professor of environmental policy at the New Jersey Institute (USA) and Reader with the Sustainability Research Institute at the University of Leeds (UK). He is also the editor of Sustainability: Science, Practice, and Policy and the editor (with Joseph Murphy) of Exploring Sustainable Consumption: Environmental Policy and the Social Sciences (Elsevier, 2001).

Herman E. Daly, Ecological economist and professor at the School of Public Policy of University of Maryland in the United States. Previously Senior Economist in the Environment Department of the World Bank. Co-founder and associate editor of the journal Ecological Economics. Author of numerous books, including "Steady-State Economics" (1977; 1991), "Valuing the Earth" (1993), "Beyond Growth" (1996), "Ecological Economics", "the Ecology of Economics" (1999), and "for the Common Good" (1989; 1994).

Richard Douthwaite, economist and co-founder of Feasta: The Foundation for the Economics of Sustainability, an Irish based economic think tank. Author of "The Growth Illusion" (1992), "Short Circuit" (1996) and the "Ecology of Money" (1999).

Fabrice Flipo, Maître de conférences en philosophie, TELECOM & Management SudParis, Laboratoire CEMANTIC / Groupe de Recherche ETOS. Auteur de Justice, nature et liberté, Parangon, 2007; Le développement durable, Bréal, 2007; Ecologie des infrastructures numériques, Hermès, 2007.

Jean Gadrey, emeritus professor at University of Lille 1. He published in 2006, with F. Jany-Catrice, "The new indicators of well-being and development", Palgrave-Macmillan

Alain Gras, Professeur de sociologie, directeur du CETCOPRA Paris 1, auteur de *Le choix du feu*, Fayard, 2007; *Les macrosystèmes techniques*, PUF, 1997 ; *Fragilité de la puissance - se libérer de l'emprise technologique*, Fayard, 2003.

Jacques Grinevald, Professor of Global Ecology and Sustainable Development at the "Institut des Hautes Etudes Internationales et du Développement", Geneva. Philosopher and historian of technological and scientific development. Disciple and translator of Nicholas Georgescu-Roegen (*La Décroissance : entropie-écologie-économie*, 1979, 1995, 2006). Member of ESEE.

Bernard Guibert, Statistician (INSEE), qualified at école polytechnique, Doctor in Economy. Member of the green party.

Friedrich Hinterberger, Friedrich Hinterberger, born in 1959, was trained as an economist at universities of Linz and Giessen. He is founding President of the sustainable Europe Research Institute (SERI) and heading SERI's Vienna office. He has vast experience in the research of ecological economics both in national and international projects. He worked as a Senior Economist and Officer in Charge of the Department of Material Flows and Structural Change at the Wuppertal Institute for Climate, Environment and Energy and has published on Environmental and Ecological Economics as well as on Social Policy. He is also a visiting lecturer at various universities.

Roefie Hueting, advisor of the Foundation SNI Research, is the founder of the department of environmental statistics at Statistics Netherlands (1969). He brought out the 'Methodology for the calculation of sustainable national income (SNI)' (1992), together with Bart de Boer en Peter Bosch. He wrote about 150 articles and papers and three books. He was amongst other things in the 1980's a contributing member of the UNEP-World Bank 'Working Group Environmental Accounting for Sustainable Development' and contributed to the collection with the same title (WB, 1989). He received the UN Global 500 Award, is Officer in the Orde of Oranje Nassau (a royal honour) and was nominated by Jan Tinbergen for the Sasakawa Prize.

Serge Latouche, Emeritus Professor at the University of Paris XI, Author of "le Pari de la Decroissance" (the bet of Degrowth) and many other publication on the subject of degrowth.

Fred Luks Dr. rer. Pol., degree in social economy and economics. He studied economy at the Hamburg University for Economics and Politics and at the University of Hawaii at Manoa. Further research undertaken at New York University, the University of California at Berkeley, freelance work for the Wuppertal Institute for Climate, Environment and Energy, a substitute professorship at the Hamburg Open University and several national and international lectures. Member of SERI.

Sylvia Lorek, Researcher and policy consultant for sustainable consumption since 1993. From 1998 to 1999, she worked as a researcher at the Wuppertal Institute for Climate, Environment and Energy, and Project Coordinator for the German Federal Environmental Agency on "Priorities, tendencies, and indicators of environmentally conscious consumer behaviour." Since

2000 she is working with the Sustainable Europe Research Institute on studies and as consultant for national and international organisations. (OECD, EU, EEA, Wuppertal Institute, ProSus Norway etc.)

Joan Martinez-Alier, Professor Dept Economics and Economic History at the Universitat Autònoma de Barcelona. He is the author of *Ecological Economics: Energy, Environment and Society* (1987) and *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation* (2002). Founding member and President (2006, 2007-8) of the International Society for Ecological Economics.

Oksana Mont, Associate Professor at the International Institute for Industrial Environmental Economics at Lund University, Sweden. She has been working in the area of sustainable production and consumption in the last 10 years.

Inge Ropke, Associate Professor at the Technical University of Denmark, Department of Manufacturing Engineering and Management. Her research concerns the development of modern ecological economics as well as changes in everyday life, technology, and consumption in an environmental perspective.

Christer Sanne, has been working with future studies in many fields: traffic and town planning, care and health systems and work and the use of time. I am now retired from a post as teacher/researcher at KTH (Royal Institute of Technology in Stockholm) but keep up some work. My latest book (2007, in Swedish) is called "Keynes grandchildren" with reference to his vision of a society which has solved "the production problem" allowing us to enjoy our leisure rather than spoiling the earth by overproducing. <http://goto.glocalnet.net/christersanne>

François Schneider, Co-founder of Research and Degrowth; SERI Member. Worked at INSA-France, CML in Holland, IIO and SERI in Austria, Estonian Nature Fund, INETI-Portugal.

Wolfgang Sachs, President of Research Unit at the Wuppertal Institute. He coordinates the Project "Globalization and Sustainability" and PhD Collegium "Environment and Fairness in the World Trade Regime" in the Wuppertal Institute.

Joachim H. Spangenberg, ALARM-Projekt / Biozönoseforschung, Socio-economics in biodiversity/Dept. of Community Ecology, Helmholtz Centre for Environmental Research - UFZ

Sigrid Stagl, SPRU, University of Sussex. She's an evolutionary/institutional economist who works in the interdisciplinary field of ecological economics. She got the first PhD in Ecological Economics worldwide. She's vice-president of ESEE.

**CONFERENCE' ORIGINAL CALL FOR ABSTRACT
(CLOSED IN NOVEMBER 2007)**

ECONOMIC DE-GROWTH FOR ECOLOGICAL SUSTAINABILITY AND SOCIAL EQUITY

International Interdisciplinary Scientific conference

Paris – 18-19 april 2008

The responsibility of the dominating economic model in the present world environmental crisis and social inequity is subject to more and more attention. "De-growth" is increasingly debated in France and elsewhere. The question is asked: can we actually overcome social and environmental problems in the context of economic growth in the developed countries? On the contrary, should not economic degrowth be considered in those countries? Would this economic degrowth require new economic institutions?

The defenders of the status quo consider that an efficiency drive would lead to a model of ecological sustainability without putting economic growth into question. The possibility of a "decoupling" of fossil fuel consumption (or natural resources in general) and increased economic production would make the latter ecologically acceptable.

The description of a "rebound effect" in the scientific literature and its link with economic growth constitute a major objection to the thesis of decoupling. While economic growth remains the top priority of public administrations, growth of the energy efficiency does not prevent growth of the consumption of energy and material flows on a global level. Economic gains of efficiency are likely to be reinvested in new energy or material consumption. Thus, in spite of undeniable progress regarding energy efficiency in the field of transport, habitat, and industrial production, the consumption of energy in the EU has increased at a relatively regular pace since 1975, by 40% in the last thirty years. We are far from the major adjustment required in the North in order to reach ecological sustainability and world equity. For many authors, the functioning of our economic institutions must therefore be questioned more deeply.

The emergence of the terminology "economic de-growth" is understood as the search for a collective reduction of our capacities of appropriation and exploitation of natural resources (to exclude the possibility of the rebound effect). The categories shaping production processes, wealth exchange or economic value can then be questioned. The field of research opened by this prospect is immense and can be summarized as follows: Is economic de-growth as defined above possible in the context of existing economic institutions? Which economic institutions would enable "economic de-growth" in order to reach an ecologically sustainable and fair economy? Under which conditions would this be socially acceptable?

The objective of this seminar is to gather in Paris researchers of a broad range of disciplines and countries that have contributed to research in these fields.

Abstract: 400 words, conditions of acceptance:

- Scientific research presented should not be limited to an analysis of the current situation.
- It will approach the necessary actions and transformations by taking into account the problem of the rebound effect.
- It will assume that societies today are neither equitable nor sustainable and that physical de-growth is necessary in the North.
- Social equity and ecological sustainability should form part of the objectives within a democratic and human rights framework.

Deadline for abstracts : 30 november 2007 (send to contact@degrowth.net)

Program

Day 1 Friday 18 April 2008 - Visions of degrowth by themes *The first day is about a partial / sector-based visionary perspective of de-growth*

9.00 - Opening, by Organisation and Scientific Committee

Fabrice Flipo – *Institut Telecom SudParis*

Joan Martinez-Alier – *UAB*

Sylvia Lorek & Friedrich Hinterberger – *SERI*

Thomas Schauer/ Raoul Weiler - *Club of Rome, European Support Center, and Brussels EU Chapter*

François Schneider & Denis Bayon - *Research and Degrowth*

9:30 - First Panels

Backgrounds	Historic panel: From growth critics to degrowth
Chair: Friedrich Hinterberger Keynote of the chair person De-growth as a solution to 'uneconomic' growth - <i>Philip Lawn</i> Macro-Rebound effect - <i>François Schneider</i> Crises with growth-as-usual - <i>Richard Douthwaite & David Korowicz</i> De-growth or recession? - <i>Daniel O'Neill</i>	Chair : Joan Martinez-Alier Keynote of the chair person Introduction to Georgescu-Roegen and Degrowth - <i>Jacques Grinevald</i> eSNI early growth critics - <i>Roefie Hueting</i> Conceptual roots of degrowth - <i>Fabrice Flipo</i> Nascent History of Steady State Politics - <i>Brian Czech</i> To shortcut a third rail issue - <i>Christer Sanne</i>
<i>Contributors that could not attend the conference</i>	
The ecological crisis needs a revolution in service economy - <i>Jean Gadrey</i>	

11:15 - Special applications (10 minutes each with questions)

Special applications I	Special applications II
Chair : Sylvia Lorek Waste degrowth - <i>Alexander Duran-i-Grant</i> Degrowth of living spaces per person: Co-housing - <i>Matthieu Lietaert</i> Speed reduction - <i>Frédéric Heran</i> Gastronomic sciences : slow food revolution versus gene revolution - <i>Bruno Scaltriti</i>	Chair : Tim Jackson From supermarkets to relocalised production and consumption - <i>Tommaso Venturini</i> Demographic questions - <i>Joan Martinez-Alier</i> Tourism degrowth - <i>Bourdeau et al.</i> Gold unsustainability - <i>Leire Urkidi Azkarraga</i> Media & degrowth - <i>Dalma Domeneghini</i>
<i>Contributors that could not attend the conference</i>	
Reducing land degradation and the alienation of productive land for urban purposes - <i>Nigel Lawson</i> Degrowth of Haber-Bosch process - <i>François Schneider</i>	Degrowth in real estate - <i>Sònia Vives et al.</i> Agro-industry degrowth - <i>Jordy van den Akker</i>

14:00 / 15 : 15 - Second Panels session (1 hour 15 minutes)

Panel 1 New indicators for economic activity/well-being/ecology	Panel 2 Complementarity of Degrowth and Steady-State?	Panel3 Debound-effect	Panel 4 Southern perspectives
<p>Chair: David Woodward</p> <p>Degrowth and indicators - <i>Arnaud du Crest</i></p> <p>The System of Accounting for Global Entropy Productions, (SAGE-P) - <i>Anthony Friend</i></p> <p>Emergy: a currency for achieving sustainability and equity in times of descent? - <i>Daniel Bergquist</i></p> <p>A Simplified Index of Sustainable Economic Welfare for France - <i>Brent Bleys</i></p>	<p>Chair: Christian Kerschner</p> <p>De-growth toward an optimal steady State - <i>Brian Czech</i></p> <p>Growth and sustainable development - <i>Joachim Spangenberg</i></p> <p>The Steady-State Economy & de-growth: Contradiction or compatibility? - <i>Christian Kerschner</i></p> <p>GDP growth : an inevitable lock-in ? - <i>Tommaso Luzzatti & al.</i></p>	<p>Chair: Alcott Blake</p> <p>IPAT and rebound effect - <i>Alcott Blake</i></p> <p>De-Growth for challenging Earth survival - <i>Raoul Weiler</i></p> <p>Material efficient production systems without rebound effects - <i>Willi Haas</i></p>	<p>Chair: Peter May</p> <p>Is there a way out of the contradictions between growth and sustainability? Learning from the BRICS - <i>Peter May</i></p> <p>Is the economy (de)materializing? A comparison of Germany, China and Spain. - <i>Vincent Moreau & Gregor Meerganz von Medeazza</i></p> <p>Perspectives from India - <i>Singh Supriya</i></p>
<i>Contributors that could not attend the conference</i>			
Bonheur de la décroissance - <i>Claude Llana</i>			

15:30 / 16:45 - Roundtables (1 hour 15)

Sustainable De-Growth : From Academia and Civil Society to policy	Socio-economic degrowth processes
<p>Chair : Joan Martinez-Alier</p> <p><i>Short introduction of different representatives of degrowth movements</i></p> <p>Leida Rijnhout, VODO Belgium Sara Vegni, ASUD Italy David Woodward, (formerly nef), UK</p> <p>Bravo Elizabeth, Accion Ecologica, Ecuador Leire Urkidi, UAB</p> <p>Gregor Meerganz, UAB, Spain abstract - ppt presentation - paper</p> <p>“Degrowth” to build convergence for a fair and sustainable world - <i>Francois Schneider, R&D, France</i></p> <p>Policy: Sara Kjellstrand, Research Programme Officer in the European Commission’s Directorate General Research, Sustainable Development Unit</p>	<p>Chair : Christer Sanne</p> <p>Economic localisation - <i>Friedrich Hinterberger</i></p> <p>The issue of degrowth and SCP policy agenda - <i>Arnold Tukker</i></p> <p>Sharing work - <i>Christer Sanne</i></p> <p>Redistribution - <i>Maurie Cohen</i></p>

17:15 / 18:30 - Third panel session (1 hour 15 min)

Panel 1 Consumption degrowth vs other sources of well-being	Panel 2 Sharing work	Panel 3 Production degrowth	Panel 4 Redistribution	Panel 5 What statutes for economic actors?
<p>Chair: Sylvia Lorek</p> <p>Italy : issues in dematerialization and environmental load displacement - <i>Valeria Andreoni & al.</i></p> <p>Sustainable Consumption: Collection of Perspectives from the institutional actors in Europe - <i>Nguyen et Khan</i></p> <p>From Eco-modernism to Socio-ecologism - <i>Eva Friman</i></p>	<p>Chair: Christer Sanne</p> <p>Degrowth and universal revenue - <i>Baptiste Mylondo</i></p> <p>Degrowth professional orientation - <i>Arnaud du Crest</i></p> <p>A human rights based political economy - <i>Manuel Couret Branco</i></p>	<p>Chair: Oksana Mont</p> <p>The Contribution of Precaution for Design - <i>Cucuzzella Carmela</i></p> <p>IT as Facilitator of Material Degrowth and the Problem of Rebound Effects - <i>Thomas Schauer</i></p>	<p>Chair: Maurie Cohen</p> <p>The Nascent Policy Debate on Rationing - <i>Maurie Cohen</i></p> <p>Understanding the effect of demographic trends and labour market institutions on the demand for public environmental protection - <i>Lisa Magnani</i></p> <p>Multiple benefits of localisation - <i>Nicolas Louchet & Jean-Marc Deltorn</i></p> <p>Is localisation of economy a step towards degrowth ? Case study in France - <i>Pierre Courjault-Rade</i></p>	<p>Chair: Friedrich Hinterberger</p> <p>Economic De-growth as Corporate Competitive Advantage? - <i>André Reichel</i></p> <p>Perspectives for a new redirected competition in a de-growth-economy - <i>Volker Mauerhofer</i></p> <p>De-growth as structural change: an institutional evolutionary approach - <i>Gerardo Marletto</i></p>
<p><i>Contributors that could not attend the conference</i></p>				
	<p>The labor question in problematics of transition - <i>A. Arnaud & al.</i></p>			<p>What monetary resources for a degrowth economy ? - <i>Denis Bayon & Hélène Blanc</i></p>

20:00 – End of the day

DAY 2- Saturday 19 April 2008 - Socio-economic processes and democracy for degrowth

Dealing with societal values and economic degrowth as a whole

9:15 - Panels on macro socio-economic processes

Culture change panel	Change of economic institutions?
<p>Chair: Fabrice Flipo</p> <p>The difficult path towards degrowth within involutive development of the West - Pascal van Griethuysen</p> <p>Opening negotiation - Grégoire Wallenborn</p> <p>Less is more: The effects of high aspirations on well-being - Astrid Matthey and Nadja Dwenger</p> <p>Psychological barriers to de-growth... and how to overcome them - Thompson & Abdallah</p> <p>Degrowth and « anti-utilitarianism » - Onofrio Romano</p> <p>Moral values of degrowth - F. P. Piguet, J. Van Niel et C. Lavallez</p>	<p>Chair : Joachim Spangenberg</p> <p>Is de-growth possible? Co-evolution and control - Peter Bodø et al.</p> <p>Measures for collective reduction of material acquisition capacity of affluent countries - Joachim Spangenberg</p> <p>Why growth ? Causes, welfare fallacies and how to repair them - Gjalt Huppes</p> <p>De-growth: Addressing Cultural and Institutional Constraints - Igor Matutinovic</p> <p>Politics and actual de-growth in the era of the services economy and global financial power - Maurizio Ruzzene</p> <p>On the Way towards a De-growth Society: A Review of Transformation Scenarios and Desirable Visions of the Future - Schrieffl & Exner</p> <p>Searching for a shared imaginary. A systemic approach to degrowth and politics - Mauro Bonaiuti</p>
<i>Contributors that could not attend the conference</i>	
<p>System challenges in addressing sustainable consumption and production: growth, speed, and profit - Robert Nemeskeri et al.</p>	<p>The de-growth economy and lifestyles - Brian Davey</p> <p>Evaluation des conditions et possibilités de création d'une Centrale Economique - Luquet J.-M. & Gilles</p>

14:00 / 15:45 - Forum and workshops

Democracy for Degrowth	Workshop 1 Conference statement	Workshop 2 Degrowth research
<p><i>For the inclusion of de-growth as a possible option of the democracies, about the importance of democratic and participative processes at all levels (economic, social, environmental, local and global level...) for de-growth</i></p> <p>Chair : François Schneider</p> <p>Degrowth and democracy. Towards a post-developmental politics - Marco Deriu</p> <p>Forces and relations of production = the structure of power - Willem Hoogendijk</p> <p>Democracy for degrowth - Toby Quantrill</p>	<p>Hali Healy</p> <p>Earlier conference statements against growth : CASSE / ESEE, Tilburg, Brussels...</p> <p>Documents for workshop</p>	<p>Fritz Hinterberger & Fabrice Flipo</p> <p>Relaunch of the Sustainable Europe theme ?</p> <p>Documents and forum for workshop preparation</p> <p>Main conclusions</p>

16:15 /18:15 - Forum and workshops

Political Measures for Degrowth
<p>Chair : Frederico de Maria</p> <p>Policy and Technology Options for Reducing Resource ion in a Degrowth Economy - Katherine Trajan & Kealan Gell</p> <p>Degrowth as transition - Yannick Rumpala</p> <p>Why denial and inaction? - Yves Cochet</p>

18:30 - Conclusion – Reports from workshops - End of the conference

Introduction to Georgescu-Roegen and Degrowth

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While my contribution to the historical panel chaired by Spanish economist Joan Martinez-Alier (an old Catalan friend of mine and ex-president of the International Society for Ecological Economics) at the Paris De-Growth Conference, on 18 April 2008, was an oral presentation in French, my only mother language (a king polyglot acting as interpreter for the English-speaking participants), I will try for these conference proceedings (published essentially in English) to retrace in a few words the main arguments of my informal talk. (Poor and defectuous English is mine, sorry!)

My speech was illustrated by several slides (not reproduced here), most notably to present my two favourite graphs associated with the double threat of climate and oil in the new Anthropocene epoch of the Earth's Biosphere (Grinevald, 2007) :

- *the Keeling curve* : continuous record since 1958 of the variations of atmospheric CO₂ concentrations from the Mauna Loa Observatory in Hawaii – a sort of Rosetta stone for the scientific discovery of global warming...
- *the Hubbert curve* : the bell-shaped curve of crude oil extraction – or a mineral resource production cycle – emphasizing the first growth phase and the second depletion phase ; the historical turning-point between the extraction growth rate and the decline or depletion rate being named Hubbert's peak, after the works of U.S. geologist Marion King Hubbert (1903-1989).

First applied to the United States domestic production, the Hubbert model was extended to the peak of world crude oil production, now simply named Hubbert's peak or the Peak Oil.

The coming global oil crisis is now probably the best argument developed by de-growth movement, notably after the warning of British petroleum geologist Colin Campbell (author of *The Coming Oil Crisis* in 1997), the principal founder of ASPO (Association for the Study of Peak Oil and Gas) in 2001 (see Campbell, 2005, in which Georgescu-Roegen's *La Décroissance* is cited).

A picture of my three paradigmatic heroes was also presented with slides. The iconic heroes of my story (not a chronological history but a socio-epistemological reconstruction with a heuristic and pedagogical meaning) are the visionary funding fathers of some very important but not yet fully recognized « scientific revolutions ». These three heroes and related scientific revolutions are :

Sadi Carnot (1796-1832) - thermodynamics

Vladimir Vernadsky (1863-1945) - biogeochemistry

Nicholas Georgescu-Roegen (1906-1994) - Bioeconomics
(a main source for ecological economics and industrial ecology)

These long neglected historical figures and scientific paradigms are all in disagreement with the Newtonian science of modern Nations-States of the West, but now amalgamated, at least, in my academic teaching and transdisciplinary framework. It is a proposal for a new global ecological worldview, a new Biosphere cosmology, a new *Weltanschauung* for the decline of the world-wide militaro-industrial Western civilization.

Of course, the choice of Carnot (not to be confused with his father Lazare, a military engineer too), Vernadsky and Georgescu-Roegen is mine. They are symbolic heroes for a series of unwelcome or invisible scientific revolutions (ignored by standard economics and experts in international politics and world affairs), a series reconstructed (tinkered if you prefer) after my passionately reading in 1972-74 of Thomas S. Kuhn's *The Structure of Scientific Revolutions* and my personal study of the life and work of Sadi Carnot, my first hero. Like his eminent colleagues, T. S. Kuhn, a physicist turned historian and philosopher of science, was totally ignorant of biogeochemistry and bioeconomics (me too at that moment), but he was a remarkable specialist in history of thermodynamics, from the seminal work of Sadi Carnot (and his engineering precedent) to Max Planck, who was instrumental in the transition between thermodynamics, heat radiation theory and the revolutionary discovery of quanta. Philosophy and history of modern science, notably physics, were a prerequisite to understanding Georgescu-Roegen, and also Vernadsky, both using thermodynamics as paradigm.

My transdisciplinary trilogy forms a sort of conceptual « novelty by combination », to use Georgescu-Roegen's terminology.

This combined epistemological framework, with a historical slant (from the development of thermodynamics to the thermodynamics of development) is, of course, not yet commonly shared and explicitly adopted by our compartmentalized academic establishment, except perhaps for some forerunners of the Earth system perspective within the new research fields of ecological economics and industrial ecology.

The methodological proposal of the Carnot-Vernadsky-Georgescu paradigm is in line with the new concept of the Anthropocene, adopted within the holistic and interdisciplinary Global Change international scientific community. My Biosphere ecological quest (Polunin and Grinevald, 1988) was converging with the first fundamental steps of the International Geosphere-Biosphere Programme (IGBP), Earth System Science and Gaia theory (with the result I became a member of the Geological Society of London Gaia : Earth Systems Science Group).

In reality, the chronological order of the names Carnot, Vernadsky and Georgescu-Roegen was not exactly that from my intellectual biography. We must note here that my original research about Vernadsky's life and Biosphere theory, the birth of biogeochemistry (including the study of biogeochemical cycles altered by human action) and Vernadsky's hidden influence (together with Lotka) on the post-WWII systems ecology, was essentially made after my works together with Nicholas Georgescu-Roegen and the first publication of *Demain la décroissance* (Georgescu-Roegen, 1979).

My personal awareness of the overdevelopment of the West and the biosphere limits of world economic growth, which was contemporary with my growing awareness of the importance of the Vernadskian idea of The Biosphere (Grinevald, 1987, 1988 ; Polunin and Grinevald, 1988), came slowly and not without difficulties. This work was developed after my first socio-epistemological and historical studies (in touch also with Michel Serres and other historians of Western science and technology.

The concept of the Carnotian revolution (Grinevald, 1976) was coined to emphasize the break of the thermo(dynamic)-industrial revolution, a break with the long neolithic cyclic worldview of traditional agrarian societies, which was well illustrated by the forgotten Vitruvian paradigm of « hydraulic architecture » (Bélibor) of Enlightened Europe (pre-industrial and pre-thermodynamic world of James Hutton, John Smeaton, James Watt, including the classical economists like Adam Smith and Thomas Malthus). After the French Revolution and Napoleonic Wars, the silent Carnotian revolution was a real bifurcation in the historical evolution of Western civilization, not yet well recognized, before the works of Georgescu-Roegen, Michel Serres and some others. My concept of Carnotian revolution, quickly adopted by Georgescu-Roegen, since our first meetings in 1974-75. Of course, it was congruent with Georgescu-Roegen's work on entropy and economic development. It was in line with the new environmental studies emphasizing the anthropological and ecological paradigm shift of the modern fossil-fueled civilization.

Georgescu-Roegen's bio(spheric)economics became, in my mind, convergent with the thermodynamic framework of global ecology, the Vernadskian science of the Biosphere (Vernadsky, 1998) revived by the Gaia hypothesis of James Lovelock and Lynn Margulis (Grinevald, 1987 ; Schneider and Sagan, 2005).

The new perception of the limits of the Earth's Biosphere, of global human habitability of our little living planet, dangerously altered by modern economic growth since the thermo-industrial revolution) was itself in flux. Reworking some Vernadskian and Teilhardian ideas about the Noosphere (or the Anthroposphere), and some precedents in geological thinking or Natural History (Buffon, Stoppani...), the theme of the human impact on the face of the Earth became more and more central (see Naredo and Gutiérrez, eds., 2005). I have adopted immediately the new concept of the Anthropocene Grinevald in Naredo and Gutiérrez, eds., 2005, p.15-90 ; 2007), coined in 2000 by Paul Crutzen and Eugene Stroermer to distinguish the current accelerated man-made-geological epoch from the steady-state 10.000-year-old Holocene epoch (Crutzen, 2002 ; Steffen, Crutzen and McNeill, 2007 ; Zalasiewicz et al., 2008). It is a very useful evolutionary framework to think about the Peak Oil, Global Warming and the necessity of downshifting.

Those who are familiar with our current concern with economic growth criticism and the « de-growth » alternative, probably agree already with the opinion that « *la décroissance* » (as we say in French, translating Georgescu-Roegen's term decline, the English term used as different from growth and steady states in Adam Smith's

Wealth of Nations) have its main historical and epistemological seeds in Georgescu-Roegen's bioeconomic revolution (see Grinevald, 1980, 1992, 2006, and my Introduction in Georgescu-Roegen, 1995). My presentation and translation (with Ivo Rens) of Georgescu-Roegen's first bioeconomic essays, was published in Lausanne, Switzerland, in 1979, under the very title *Demain la décroissance* (Georgescu-Roegen, 1979). A second new revised and expanded edition, entitled (without *Demain*) *La Décroissance*, was published in Paris sixteen years later, just after the passing of the great Georgescu-Roegen. This 1995 second edition, which was not without effect in France (see Bernad et al., eds., 1993 ; Latouche, 2006 ; Mongeau, ed., 2007) was reissued, with an up-dated bibliography, in 2006.

Now, several decades after the seminal « limits to growth » debate and « the environmental revolution » (Max Nicholson) of the early 1970s, Georgescu-Roegen's *La Décroissance* is perhaps not a bestseller but a leading radical ecological-economics manifesto !

According to me, the most prophetic part of this little book was the proposal of a « minimal bioeconomic program ». This iconoclastic anti-growthmania platform is part of the chapter entitled « Energy and economic myths », a lecture first delivered on 8 November 1972 by the author of *The Entropy Law and the Economic Process* (Georgescu-Roegen, 1971) within the series *Limits to Growth : The Equilibrium State and Human Society* at the Yale School of Forestry and Environmental Studies (Georgescu-Roegen, 1975a ; see also Wade, 1975), and on numerous other occasions elsewhere. It was part of Georgescu-Roegen's lecture given on 6 June 1974 at the University of Geneva Department of Econometrics. I was present and I remember the moment as very exciting, at least for my mind. It was the very first time I met professor Nicholas Georgescu-Roegen. I was here, with pencil and paper, because I was in charge of the University of Geneva Information and Press Office (see my press release : Grinevald, 1974), but also because a theoretical physicist of my alma mater, Josef Maria Jauch (deceased at 60 on 29 August 29 1974) has lend me (while I was completing my master in philosophy on the entropy notion a copy of Georgescu-Roegen's *The Entropy Law and the Economic Process* (a difficult encyclopaedic book which I just cited in a footnote in my 1973 memoir on *La notion d'entropie dans la pensée contemporaine*). So, when I first see and heard professor Georgescu-Roegen, I was not completely unaware of his 1971 great book on entropy and economics, contrary to the other participants of Georgescu-Roegen's lecture at the University of Geneva in June 1974.

Later, I considered Georgescu-Roegen's minimal bioeconomic programme as one of the most practical by-products of the new philosophical and scientific perspective proposed by the eminent Romanian-born mathematician and French/English-educated statistician turned development expert and mathematical economist in the United States. I learned from himself that he was the « darling » of U.S. mathematical neoclassical economists after his emigration first at Harvard in 1948, after his previous residence at Schumpeter's Harvard Department of Economics in 1934-36, then as full professor at Vanderbilt University, Nashville, Tennessee (for 27 years).

Ever since my first encounter in Geneva, Nicholas Georgescu-Roegen appeared to me as a sort of heretical Galileo of modern times. Thanks to all our meetings (including at his home, and mine, too), and the reading of all his papers, he became the most inspiring transdisciplinary epistemologist among my personal encounters with outstanding thinkers, like Jean Piaget, Michel Serres, Edgar Morin, Ilya Prigogine and many others.

Fortunately, just a week after our first meeting at the University of Geneva, I met again Georgescu-Roegen in Paris during the CNRS-Ecole Polytechnique colloquium commemorating the 150th anniversary of Sadi Carnot's *Réflexions sur la puissance motrice du feu* (see the proceedings – including papers of both Georgescu-Roegen and Grinevald – published under the title *Sadi Carnot et l'essor de la thermodynamique*, Paris, Editions du CNRS, 1976). As far as I know, it was the first international and interdisciplinary conference including a section on thermodynamics and economics. Nevertheless, the intellectual situation of a dissenter like Georgescu-Roegen was dramatic! I was realizing how the author of *The Entropy Law and the Economic Process* was one of the most heretical scholar within economics and philosophy of science, because his peculiar application of the Second law of thermodynamics to understanding of economic activity and environment-development problématique, was a very unwelcome epistemological perspective, as well as the unexpected discovery of entropy within Newtonian science of the Western thermo-industrial revolution and its imperial expansion.

Georgescu-Roegen's modest bioeconomic proposal was in line with his invisible scientific revolution of Vernadsky's biogeochemistry and Biosphere concept, ignored or rejected by the mainstream in statistical physics, earth sciences, molecular biology, economics and international politics. The fate of Georgescu-Roegen's paradigm shift, which later inspired the promoters of Ecological Economics and Industrial Ecology, seems practically similar with Vernadsky's biogeochemical perspective of the planet Earth's Biosphere during the Stalinist regime.

Thanks to my crazy entropy addiction, the year 1974 was a turning point in all my intellectual life. If I was fortunate enough to be instrumental in the seminal iconoclastic idea of « la décroissance », in the sense of Georgescu-Roegen, many years before the rise of the new countercultural movement of the same name, it was mainly thanks to my encounter and close friendship with Nicholas Georgescu-Roegen. It was my greatest privilege to be named « dearest of all dear friends of mine », as Nicholas writes me in a letter of 15 February 1981. Always I think of him with an immense gratitude and respect. Remember Nicholas Georgescu-Roegen as the father of a new ecological-economic philosophy of the enjoyment of life and way of living : « la décroissance ».

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Why environmental sustainability can most probably not be attained with growing production

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Abstract

The concepts of welfare, economic growth, production, environmentally sustainable national income, environmental sustainability, environmental function and asymmetric entering are defined, because of the confusion about these concepts that hampers sound information. Based on these concepts an enumeration is given of the arguments why it is plausible that environmental sustainability most probably cannot be attained with a growing production level (NI) and why broad acceptance of de-growth of production will make attaining this goal much easier. Some consequences of unsustainable development are given and the alleged conflict between employment and environment is refuted. The conclusion is that our planet is threatened by a wrong belief in a wrongly formulated growth.

Keywords: Environmental function; Environmentally sustainable national income; Asymmetric entering; Environmental sustainability

1. The concepts of welfare and economic growth

The view now accepted by the mainstream of economic thought is that the problems of choice arising from scarcity together form a logical entity, irrespective of the end for which the scarce means are employed. This is referred to as the formal or indifferent concept of welfare, a term probably introduced by Rosenstein-Rodan (1927). It was Robbins (1952) and Hennisman (1962, 1995), who elaborated the formal concept of welfare and formulated its consequences for economic theory. For these authors, the subject matter of economics is demarcated by the criterion of scarcity. In Hennisman's view economic activity can serve all kinds of ends. The ends themselves are meta-economic and are not for economists to judge. They cannot be derived from economic theory, but must be taken as given, as data. Maximising or even just increasing national income should therefore not be considered a necessary end that can lay claim to logical priority. In the same vein, Robbins writes: "There are no economic ends as such; there are only economic problems involved in the achievement of ends".

Proceeding from the work of these authors, Hueting (1974) posits the following. All economic activity is aimed at the satisfaction of wants (welfare), and consequently the term

'economic growth' can mean nothing other than increase in welfare, defined as the satisfaction of wants derived from our dealings with scarce goods. Welfare is not a quantity that can be measured directly 'from outside'; it is a category of individual experience. It is for this reason that the statistician focuses in practice on charting trends in factors that *can* be measured and that can plausibly be argued to influence welfare. These factors will not generally be strictly proportional to welfare but must at any rate satisfy the condition that they tend consistently in the same direction as the welfare they are indicating, positive or negative. Some important welfare-influencing factors are: (1) the package of goods and services produced, (2) scarce environmental functions, (3) time, i.e. leisure time, (4) the distribution of scarce goods, i.e. income distribution, (5) the conditions under which scarce goods are acquired, i.e. labour conditions, (6) employment c.q. unemployment, (7) future security, to the extent that this depends on our dealings with scarce goods, and specifically the vital functions of the environment.

These factors are often in conflict with one another, although this is not always the case. For scarce goods it holds by definition, however, that more of one is less of another, for a good is scarce when something else has to be sacrificed in order to obtain it (sacrificed alternative, opportunity cost). Nowadays environmental functions are scarce goods. All other things remaining equal (including the technological state of the art), more production therefore means less environment and vice versa. When preference is given to the environment over production and a government imposes controls on production processes and consumption habits that lead to a smaller volume of goods and services produced, there will be an increase in the overall satisfaction of wants obtained by means of scarce goods. ***A decrease in production will then lead to greater welfare.*** It is therefore misleading to identify growth of national income with an increase in welfare, economic growth and economic success, as is still common practice even today. This terminology is fundamentally erroneous in its implications, to the detriment of the environment, and it should therefore be outlawed, in much the same way as discriminatory language against women.

2. The concepts of environmental sustainability, eSNI and environmental function

Environmental sustainability is defined as the situation in which vital environmental functions are safeguarded for future generations. So the issue at stake is that the *possibilities* to use them remain available.

Environmentally sustainable national income (eSNI) is defined as the maximal attainable production level by which vital environmental functions remain available for future generations, based on the technology available at the time (Hueting and De Boer, 2001). Thus the eSNI provides information about the distance between the current and a sustainable situation. In combination with the standard national income (NI), the eSNI indicates whether we are approaching environmental sustainability or drifting farther away from it. Because of the precautionary principle, future technological progress is not anticipated in the calculation of eSNI. When constructing a time series of eSNI's,

technological progress is measured after the event on the basis of the development of the distance between the eSNI and standard NI over the course of time.

The theory of and the necessary statistics for an eSNI has been worked on since the mid 1960's at the department for environmental statistics of Statistics Netherlands, founded by the author. A first rough estimate of the SNI for the world in 1991 by Tinbergen and Hueting (1991) arrives at fifty percent of the production level of the world: the world income. The Institute of Environmental Studies estimate for The Netherlands in 2001 also arrived at fifty percent of the production level or national income of The Netherlands (Verbruggen et al., 2001). That corresponds with the production level in the early seventies. Estimates for the years 1990, 1995 and 2000 show that in the period 1990 - 2000 the distance between NI and eSNI increased by 13 billion euros (10%) (Milieu- en Natuurplanbureau, 2006).

In the theoretical basis for the calculation of sustainable national income, the environment is defined as the non-human-made physical surroundings, or elements thereof, on which humanity entirely depends, whether producing, consuming, breathing or recreating.

In our physical surroundings, a great number of possible uses can be distinguished, which are essential for production, consumption, breathing, et cetera, and thus for human existence. These are called environmental functions, or in short: functions (Hueting 1969, 1974, 1992). As long as the use of a function does not hamper the use of another or the same function (by overuse), so as long as environmental functions are not scarce, an insufficiency of labour (that is: hands and brains, intellect or technology that increases traditional productivity) is the sole factor limiting production growth, as measured in standard NI. As soon as one use is at the expense of another, though, or threatens to be so in the future, a second limiting factor is introduced. The emergence of competition between functions marks a juncture at which functions start to fall short of meeting existing wants. Competing functions are by definition scarce and consequently economic goods, indeed they are the most fundamental economic goods at the disposal of humanity. In the situation of severe competition between functions, which prevails today, labour is not only reducing scarcity, and thus causing a positive effect on our satisfaction of wants (welfare); but it is also increasing scarcity, thus causing a negative effect on welfare. The same holds for consumption.

The availability of functions, or, in terms of the System of National Accounts (SNA), their volume, decreases from 'infinite' (abundant with respect to existing wants) to finite, that is falling short. As a result, the shadow price of environmental functions rises, and with it their value, defined as price times quantity, from zero to an ever-higher positive value. *This rise in value reflects a rise in costs.* To determine the extent of the loss of function, in order to estimate the eSNI, we must know the value of the function. Since environmental functions are collective goods that are not traded on the market, supply and demand curves have to be constructed. For, according to standard economic theory, determination of value is impossible without data on both preferences (demand) as well as on opportunity costs (supply).

The estimated costs of measures necessary to restore functions, that rise progressively per unit of function restored, can be seen as a supply curve. We call this the cost-effectiveness curve or the elimination cost curve, because it refers to measures that eliminate the pressure on the environment. Except in the case of irreparable damage, this curve can always be constructed.

Preferences for environmental functions (demand), on the contrary, can only partially be determined, since these can be expressed only partially via the market, while willingness to pay techniques cannot yield reliable data precisely for vital functions (Hueting, 1992). Therefore, it is not possible to construct a complete demand curve. Expenditure on compensation for loss of function and restoration of physical damage resulting from loss of function, however, constitute revealed preferences for the availability of functions, so that some impression of these preferences can be obtained. One example is the additional measures for the production of drinking water as a result of the loss of the function 'drinking water' because of pollution (overuse of the function 'water as dumping ground for waste'), Another example is the restoration of damage caused by flooding due to excessively cutting forests etc. (overuse of the function 'provider of wood' etc.) that consequently are losing their function 'regulation of the water flow'.

Because individual preferences can be measured only partially, shadow prices for environmental functions, which are determined by the intersection of the first derivatives of the constructed curves for demand and supply (see Figure 1), cannot be determined. Consequently, these shadow prices remain unknown. This means that the *correct prices for the human-made goods* that are produced and consumed at the expense of environmental functions remain *equally unknowable*.

However, to provide the necessary information, assumptions can be made about the relative preferences for environmental functions and produced goods. *One* of the possible assumptions is that the economic agents, individuals and institutions, have a dominant preference for an environmentally sustainable development. This assumption is legitimate since governments and institutions all over the world have stated support for this. Another possible assumption is that the economy is currently on an optimal path that is described by the changes in the standard NI. So *both the SNI and the standard NI are fictitious* in the context of what is at issue in economic theory and statistics, namely to provide indicators of the effect of our actions on our welfare.

When assuming dominant preferences for sustainability, the unknown demand curves must be replaced by physical standards for sustainable use of the physical environment. The standards are scientifically determined and in this sense objective. They must, of course, be distinguished clearly from the subjective preferences for whether or not they should be attained. Examples are: the man-made rate of extinction of species should not exceed the rate at which new species come into being, for safeguarding the many functions of ecosystems; the emission of greenhouse gases has to be reduced by 70 to 80 % in order to let the life support systems restore the climate; the rate of erosion of topsoil may not exceed the rate of formation of such soil

due to weathering, for safeguarding the function: 'soil for raising crops'.

From an economic perspective, sustainability standards approximate demand curves that are vertical in the relevant area of a diagram that has the availability of functions measured in physical units on the x -axis and the demand for functions and their opportunity costs on the y -axis. The shadow price for environmental functions based upon the assumed preferences for sustainability then follows from the intersection of the vertical line and the marginal cost-effectiveness curve. In this manner the distance to sustainability, denoted in physical units on the x -axis, is translated into monetary units. This is shown in the well-known figure taken from *New Scarcity and Economic Growth, More Welfare through Less Production?* (Huetting, 1974). Figure 1 (annex) shows the relationship between economy and ecology.

For a correct approximation, such calculations have been done with the aid of a general equilibrium model, which also generates the shadow prices for produced goods in a sustainable economy. From this, the level of sustainable national income follows.

3. The phenomenon of asymmetric entering (asymms)

Producing is, according to standard economic theory, adding value. National income (NI) equals the sum of the values added. So NI measures - the fluctuations in the level of -production. It does so according to its definition and according to the intention of the founders of its concept to get an indicator for one of the factors influencing welfare - and a tool for quite a few other purposes. See Tinbergen and Huetting (1991) (Nobelist Jan Tinbergen was one of the founders of the concept of NI and its quantification)

This value is added to the non human-made physical surroundings. Consequently, environmental functions remain outside the measuring of standard NI. This is logical and easy to understand, because water, air, soil, plant and animal species and the life support systems of our planet are not produced by humans. So losses of functions, caused by production and consumption, are correctly not entered as costs. However, expenditures on measures for their restoration and compensation *are* entered as value added. This is asymmetric. These expenditures should be entered as intermediate, as they are costs.

This asymmetry is often defended by the remark that these expenditures contribute to welfare and generate income (De Haan, 2004; Heertje, 2006). This is of course self-evident, counting from the moment at which the loss of environmental functions and the consequential adverse effects have already occurred. However, the production factors, used for the measures, do not add any value counting from the moment that the functions were still available. With respect to that situation there is consequently no increase in (1) the quantity of final goods produced and (2) the availability of environmental functions. Opposite to the income earned with carrying into effect the measures there stays consequently no increase in production volume (= final goods produced) with respect to that situation. By entering these expenditures as final instead of

intermediate, the growth of production is overestimated, thus obscuring what is happening with both the environment and the production.

Asyms (asymmetric entries) can relate to events in the past, to events in the current financial year (e.g. oil spills) and, as prevention, to events expected in the future due to loss of function; that does not make any theoretical difference. It always boils down to undo the effects by production growth that should not contribute to the same growth. Asyms are clearly in conflict with the original intention of the founders of NI, such as Jan Tinbergen, as a measure of fluctuations in the level of production (Tinbergen and Huetting, 1991).

4. Arguments why environmental sustainability can most probably not be attained with growing production and without broad acceptance of de-growth

The official policy of all countries in the world is that standard NI, that is: production, must increase in order to create scope for financing environmental conservation and thus attain a sustainable situation. The theoretical mistake of this reasoning is shown by Huetting, 1996. Of course, the future cannot be predicted. But the *plausibility* of whether (a) the actual production level and (b) environmental sustainability will develop in the same direction *can be examined*. This is a minimum prerequisite for assuming a causal relation. On the grounds of the data discussed below such development is extremely unlikely. We feel the opposite is more plausible for the following seven reasons.

(1) Theoretically, the possibility that growth of production and consumption can be combined with restoration and maintenance of environmental quality cannot be excluded. However, such combination is highly uncertain and scarcely plausible. It would require technologies that:

- (i) are sufficiently clean,
- (ii) do not deplete renewable natural resources,
- (iii) find substitutes for non-renewable resources,
- (iv) leave the soil intact,
- (v) leave sufficient space for the survival of plant and animal species and
- (vi) are cheaper in real terms than *current* available technologies, because if they are more expensive in real terms growth will be reduced.

Meeting all these six conditions is hardly conceivable for the whole spectrum of human activities. Especially simultaneously realising both (i) through (v) *and* (vi), which is a prerequisite for combining production growth and conservation of the environment, is extremely difficult. To give one example: as a rule, renewable energy is currently much more expensive than energy generated using fossil fuels. The costs of implementing renewable energy throughout society are high, and this substantially lowers production growth. Internalising the costs of eliminating the emissions of burning fossil fuels will reduce the production level considerably. Anyhow, technologies necessary for the combination of production growth and full conservation of the functions of the environment are not yet available. Anticipating on their future availability conflicts with the precautionary principle, and consequently with sustainability.

As explained above, in this application of the precautionary principle no future technological progress is anticipated.

(2) An analysis of the basic source material of the Dutch national accounts shows that roughly one third of the activities making up standard NI (measured as labour volume) does not contribute to its growth. These activities include governing, the administration of justice and most cultural activities. One third contributes moderately to the growth of NI, while the remaining one third contributes by far the largest part to the growth of production. Unfortunately, this latter part consists of activities associated with production and consumption that cause the greatest damage to the environment in terms of loss of nature and biodiversity (by use and fragmentation of space), pollution and depletion of resources. These activities include the oil and petrochemical industries, agriculture, public utilities, road construction and mining. These results are almost certainly valid for other industrialised countries and probably valid for developing countries (Huetting 1981; Huetting *et al.* 1992).

(3) The burden on the environment as represented in standard NI equals the product of the number of people and the volume of the activities per person. Reducing this burden by decreasing the population lowers growth or leads to a lower production level.

(4) Applying technical measures has a negative effect on growth of production because they enhance real prices: more labour is needed for the same product. The research for the estimates of eSNI's has shown that environmental sustainability cannot be attained solely by applying technology. In addition, direct shifts, such as from car to bicycle and public transport and from meat to beans, also are necessary. From point (2) above it follows that these shifts also reduce growth or lead to a lower production level.

(5) A price rise resulting from internalising the costs of the measures which restore the environment means, like any price rise in real terms, a lowering of production growth. Depending on the situation, this decreases the production level. For a given technology, product costs will rise progressively as the yield (or effect) of environmental measures is increased. Of course, technological progress leads to higher yields. As production increases further, however, so must the yield of the measures increase in order to maintain the same state of the environment, while the fact of progressively rising costs with rising yields remains unaltered.

(6) An unknown part of the value added in standard NI consists of asyms and should therefore not be considered as a contribution to its volume, see above and Huetting, 1974. This part will increase considerably because of the expenditures on (1) measures to eliminate the source of the climate problem (caused by damaging the functions of the life support systems due to production growth) by reducing the emission of greenhouse gases and on (2) measures to compensate the effects of climate change, e.g. by building dikes and moving to higher situated regions.

(7) A sustainable production level with available technology is about fifty percent lower than the current level, both for the world (Tinbergen and Huetting 1991) and for the Netherlands (Verbruggen *et al.* 2001). From this it follows that eSNI has to grow more than twice as fast as NI in order to reduce the

distance between NI and eSNI. This seems to be an almost impossible task for the environmental technology, which is the only means for increasing eSNI.

5. Some consequences of unsustainable development

There are several regions in developing countries today where desire for production in the short term over production that can be sustained in the long term already has led to production levels that are most probably much lower than sustainable levels. Thus deforestation has contributed to flooding, causing loss of harvests, houses and infrastructure, and to erosion leading to loss of soil (UNEP, 2002). Restoration of the damage constitutes costs and consequently a decrease in production. Deforestation has also caused reductions in local rainfall, thus contributing to drought (Silveira and Sternberg, 2001). Overgrazing and salination have led to decreases in the yield of agriculture (UNEP, 2002). Excessive fishing and destruction of coral reefs by using dynamite have led to lower catches (UNEP, 2002). These developments have partly been caused by companies from the rich countries.

To the extent that members of fish species are still present, catches are often well below the levels that would have been realised, had fishing activities remained on a sustainable footing. The North Sea cod fishery is currently on the brink of collapse, and the current catch of cod is less than 20 % of what would have been possible, had fishing remained sustainable (Nakken, *et al.*, 1996; Parsons and Lear, 2001). This exemplifies a more general problem. There is now convincing evidence that the current stock in the seas of large predatory fishes is about 10% of the pre-industrial level (Myers and Worm 2003). That is raising prices sharply.

6. There exists no conflict between employment and environment

The main stumbling block on the way to environmental sustainability is the alleged conflict between environment and employment. However, the production and consumption of the same amount of goods requires more labour with safeguarding the environment than is required without. Therefore, there is, under the most logical conditions, not such a conflict. The opposite holds true. The refutation of this alleged conflict can be found in Huetting, 1996.

7. Conclusions and recommendations

The arguments given above lead to the following conclusions and recommendations.

- (1) Our planet is threatened by a wrong belief in a wrongly formulated growth.
- (2) Environmental sustainability cannot not be attained with a growing production and without a broad acceptance of de-growth of production, that is NI ex asyms.
- (3) The NI's in all countries should be supplemented by a series of NI's ex asyms and a series of eSNI's.

(4) The construction of these two series should be supported by the current de-growth conference, e.g. in a declaration. This declaration might include a denunciation of the fact that the promise by the Dutch government to the Dutch Parliament to provide means for further eSNI research and establishing eSNI's in other countries, including developing countries, has not been fulfilled.

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Annex

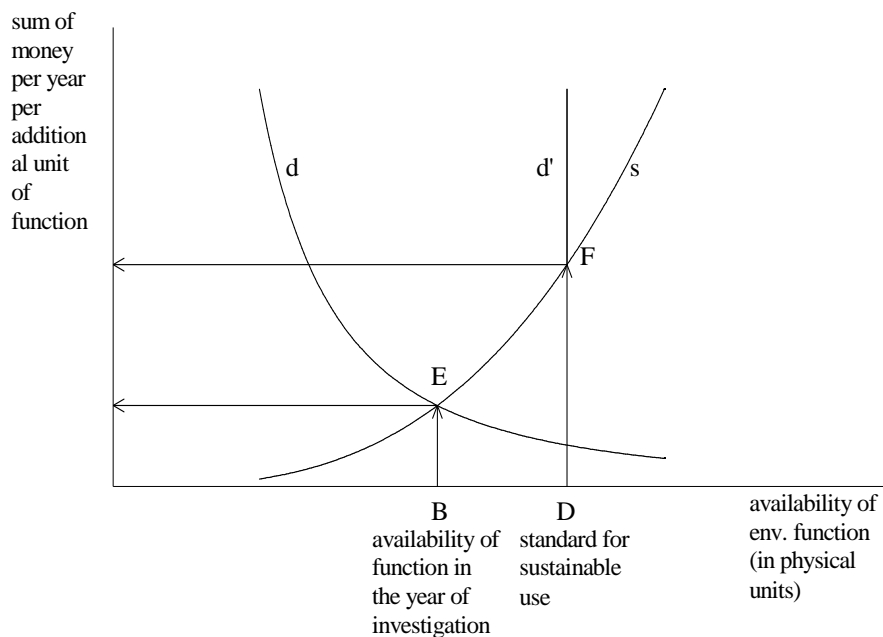


Figure 1. Translation of costs in physical units into costs in monetary units: *s*=supply curve or marginal elimination cost curve; *d*=incomplete demand curve or marginal benefit curve based on individual preferences revealed from expenditures on compensation of functions, and so on; *d'* = 'demand curve' based on assumed preferences for sustainability; *BD* = distance that must be bridged in order to arrive at sustainable use of environmental functions; area *BEFD*=total costs of the loss functions, expressed in money; the arrows indicate the way in which the loss of environmental functions recorded in physical units is translated into monetary units. The availability of the function (*B*) does not need to coincide with the level following from intersection point (*E*)

Conceptual roots of degrowth

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1. Introduction

Degrowth: the term challenges, raises questions, is found in improbable places and catches many people unaware. Here we trace a small descriptive panorama of it, prior to entering into the detail of these issues, which are on the conference agenda.

2. Increasing audience

Degrowth is gaining an audience on the left. This term, used by J. Grinevald to translate the title of the work of Nicholas Georgescu-Roegen¹, whose original title, "The Entropy Law and the Economic Process"², was known only to groups of experts when the newspaper "Decroissance", first published in March 2004, re-launched this concept to the public. The newspaper prints 45,000 copies, of which 25,000 are sold. It has doubled its frequency of publication, becoming a monthly. Several web sites are devoted to degrowth: Decroissance.info is a site self-managed by local groups; Decroissance.net is the official site of the Institute of Economic and Social Studies for Sustainable Degrowth, with the same approach as the newspaper "La Decroissance"; Ladecroissance.org is the web site of the journal "La Decroissance. Several "marches for degrowth" have happened in various places (from Lyon to Magny-Cours in June 2005, in Loire-Atlantique, in Nord-Pas-de-Calais and in Charente-Maritime). Others are planned.

Degrowth even has its own party: the Party for Degrowth (le Parti pour la Décroissance - PPLD), founded on April 8 2007 in Dijon. It calls for a "degrowth based on equity, sustainability and values that are humanist, democratic, republican, non-violent, defending human rights and fighting all forms of discrimination and totalitarianism". Many small newspapers support this idea of degrowth: "l'âge de faire", "Silence", etc. Degrowth circulates undercover to a large degree, it generates debates which support a symbolic reappropriation of our surroundings. The engineer Nicolas Ridoux has synthesized an overview of the elements of degrowth in a small, well done book³.

Degrowth is not limited to the small or medium circulation press. The 25th of March 2006 edition of *Le Monde* 2, a supplement of the daily newspaper, devoted its cover and

principal article to degrowth⁴. This topic has been the object of several articles in *Le Monde* and elsewhere. One can find files on the subject in places as improbable as *TGV Magazine*. The wave is deep and give the impression that it will last.

It has started to touch the large political parties. Yves Cochet has pushed this idea within the Greens, but he didn't win the nomination for the presidential race. The "Utopia" motion, led by Frank Pupunat, is the first to have called the religion of growth into question within the PS. It obtained 1,05% of the votes at the Mans Congress November 2005. The network of objectors to growth, who are not exclusively partisans of degrowth, has been very active around the unitary candidacy of the geft. Nicolas Hulot, advised by, among others, Jean-Paul Besset, was introduced by "Politis" as the crusader of degrowth⁵ - and was denounced by "La Decroissance" as an "écotartuffe". Corinne Lepage has refuted this idea, which she considers too negative, and Domenica Voynet prefers "decrease of the ecological footprint", which is very different.

The magazine "Entropia" was launched in the presence of some fifty people in November 2006 at the French National Assembly, to help give theoretical substance to the idea of degrowth. The editorial board is composed of Jean-Paul Besset⁶, J. - C. Besson-Girard⁷, François Brune⁸, Alain Gras⁹, Serge Latouche¹⁰ and Agnès Sinai¹¹. The magazine is presented as a "magazine of theoretical and political study of degrowth" - "Entropia falls within a long tradition of examining ideas and action, a place favouring expression of a growing collective thought, working itself out in the passage of time. A reflection on the crest of the fundamental questions of our time, for the expansion of awareness an unprecedented human condition, for the enrichment of theoretical, poetic and political imaginary of after-development"¹². The title of the journal, "Entropia", does not refer to entropy in a physical sense, this concept raised to a fad in economics by Nicholas Georgescu-Roegen, but to the Greek "entropè", action to be turned over, to look beyond oneself in order to contemplate the path travelled, and to take time to wonder whether it wouldn't be better to change.

For Entropia, "all thoughts which refuse self-criticism are no longer thoughts, but beliefs. They leave the earthly grounds of clarity for the mirages of hope. For more than

⁴ Peut-on continuer comme ça ? Pollution-inégalités-énergie, la théorie de la décroissance revient, 25 mars 2006.

⁵ Edition du 9 novembre 2006

⁶ Ancien rédacteur en chef du Monde, coordinateur du « Pacte écologique » de Nicolas Hulot, auteur de « Comment ne plus être progressiste... sans devenir réactionnaire » chez Fayard

⁷ Paysan, artiste, auteur de « Decrescendo Cantabile » chez Parangon

⁸ Auteur de « Les médias pensent comme moi », « De l'idéologie aujourd'hui » etc.

⁹ Professeur d'anthropologie à Paris 1-Sorbonne, auteur de « La fragilité de la puissance » chez Fayard

¹⁰ Economiste, auteur du « Pari de la décroissance » (Fayard, 2006), « Survivre au développement » et bien d'autres ouvrages

¹¹ Journaliste, co-auteure de « Sauver la Terre » avec Yves Cochet

¹² Entropia n°1, novembre 2006.

¹ Demain la décroissance: Entropie-écologie-économie, foreword and translation of I. Rens and J. Grinevald, Lausanne, Pierre-Marcel Favre, 1979, 2nd ED. magazine and [supplement], La Decroissance, Paris, Sang de la terre, 2006.

² Harvard University Press, 1971.

³ N. Ridoux, La Décroissance pour tous, éditions Parangon, 2006.

fifty years, "growth" and "development" have stuck by this irrational and dogmatic rule. In the Seventies, however, some heterodox researchers unfrightened by perspicacity (Illich, Georgescu-Roegen, Ellul, Partant, Castoriadis...) drew up themselves against this dictatorship of economics and provided the foundations for a framework for degrowth. Disturbing thought that it is. Since a only few years ago, and especially since conference: "Demolish development to remake the world" (UNESCO 2002), publications like "Silence" and "The Ecologist", the newsletter "La Ligne d'horizon, les amis de François Partant", gave him a growing space in their columns. The bi-monthly "La Décroissance" has contributed, for three years, to accentuate its iconoclast and provocative character. Because this concept of degrowth indeed upsets the signs and the lines: the theoretical and symbolic signs of recognition like the lines of traditional political cleavages. This situation can generate theoretical and political skids and drifts which require the greatest vigilance in thought and practice."¹³

And in fact skids happened. Texts from degrowth theorists have been found on sites in Greece, whose links with the extreme-right are notorious. That threw some confusion into the ranks of degrowth proponents, a little less so with respect to the theorists. Greece is indeed usually the salvager of ideas without the awareness of authors, the journal MAUSS having already had this experience in the past.

Beyond false polemics, there is lots of work to do. Degrowth building sites are as numerous as the ways of using this term or referring to it. A "shell-word", for those like Paul Ariès¹⁴, used to break down unfavourable conceptual frameworks, which cannot imagine any future beyond that of growth, degrowth can also be elevated to the rank of a concept, in particular in the field of economics. Degrowth also designates way of being, which one sometimes finds under the term "voluntary simplicity".

The exchanges between Herve Kempf¹⁵, Nathalie Kosciusko-Morizet¹⁶ and Sylvia Pérez-Vitoria¹⁷ in the broadcast "Du grain à moudre" on France Culture last February 1 showed the extent of the debate opened by degrowth well. Herve Kempf put the deluxe question into the public place. Basing himself on the economist Thorstein Veblen, he put forward the hypothesis that behavior is driven by ostentation [ostentatious consumption] rather than by needs, and also that the spread of the Western model in the world is the key to the global ecological crisis. We Westerners should thus practise sobriety as soon as possible, starting with richest. The Deputy of the Essonne, while recognizing this urgency, minimized the responsibility of the rich. Supported by the journalist Brice Couturier, who lost his duty to be neutral, she sought to

show that growth benefitted the poorest, because the phase of growth of pollution gives way to a phase of stabilization then of reduction of impacts, while economic growth benefits a growing number of people. Las ! Well documented, Herve Kempf supported all criticisms, the innocence of the rich person was not proven, nor the tendency of economies to dematerialize themselves nor the capacity of growth to reduce the numbers of the poor. Like Sylvia Pérez-Vitoria reminded them, growth is especially the growth of inequalities and the exploitation of the majority by an increasingly rich minority. The journalist Brice Couturier was irritated, while Mrs. Kosciusko-Morizet relied very largely on scientific and technological progress, even while she stated her wishes for a cleaner growth, "made in moderation".

The debate testifies to the embarrassment of the elite before the ecological question. The old concepts, through which the global crisis has arrived, seem impotent. Degrowth spills the beans, like the MIT report and that of the Club of Rome before it¹⁸. Whereas growth is called upon everywhere as the solution to all problems, in the North as in the South, a veritable universal "open sesame", it asserts a scandalous conclusion, and not exactly well founded, namely that on the one hand growth does not have a future since it does not solve the ecological problem, and on the other hand since it doesn't have the universality that one supposes.

Growth is the result of a whole range of policies and initiatives. Few countries in the world know if a whole range of policies and initiatives such that growth is accompanied by a reduction of inequalities. It is rather the opposite. And on a historical scale it is even more obvious. The countries which have experienced strong growth rates for a long time are those which had the highest ecological impact, aside from a few nuances. The "dematerialization of GDP" is only apperent, because the most polluting countries have largely devolved the most destructive links in the chain of production which serves to maintain their standard of living. China and Brazil do not hesitate to remind us that most of the environmental impacts of their countries are the direct result of gargantuan demand from Western countries. And even if ecological problems didn't exist, the mental pollution generated by productivism, whose supreme symbol is growth, should raise questions. Degrowth thus points to the de-economisation of spirits, which comes back to a fresh look at the program of MAUSS¹⁹.

These questions are not entirely new. They are for the most part them of the environment movement. We have to note however, that the ecologists did not succeed in their seduction. They nevertheless tried: ecology of right, left, neither right nor left, NGO ecology, business ecology.

¹³ Entropia n°1, novembre 2006.

¹⁴

http://www.decroissance.org/index.php?chemin=textes/Un_mot-obus.htm

¹⁵ Journaliste au Monde, auteur de « Comment les riches détruisent la planète » paru chez Seuil en 2006.

¹⁶ Députée UMP de l'Essonne.

¹⁷ Economiste et sociologue, membre de « La ligne d'Horizon », auteure du « Retour des paysans » chez Actes Sud.

¹⁸ Là aussi la traduction est instructive : le rapport original s'intitulait « The limits to growth », que Fayard avait traduit par « Halte à la croissance ». Le rapport 2003 du Club de Rome endosse toujours les conclusions du rapport de 1972, voir D. Meadows, J. Randers & D. Meadows, Limits to growth – The 30-years update, Chelsea Green Publishing Company, 2004.

¹⁹ A. Caillé, Critique de la raison utilitaire – Manifeste du Mauss, Paris, La Découverte, 2003, Ed. orig., 2003. Le Mauss (Mouvement Anti-Utilitariste en Sciences Sociales) a été fondé en 1981.

Nothing happened, the stakes are worse and the remainder of society always finds reasons to dismiss the ecological stakes as from an imaginary environmentalist whom they see as detached from reality - and all that in spite of the innumerable more and more official reports. Catherine Larrère speaks about "sociocentrism"²⁰ in connection with this astonishing incapacity of our societies to other things in the environmental crisis that their problems of relations. Ecology would be first of all the problem of the ecologists. Téliorama, astonished by the intellectual vacuum existing in the field of the ecology²¹, testified as much to this tangible reality, as well as its own ignorance on the matter, although the theoreticians indeed exist. Our societies seem to always have to find a reason not to take the ecological stakes seriously. "The ecologists" were too ecological, then too "social" when they started to take into account the social stakes, in short never "as it should be". Because ecology continues to disturb, and in the face of ideas which disturb, the ostrich policy ensures that obscurity remains the tested recipe.

The very broad range of opponents to degrowth on the left gives an idea of the political and theoretical importance of the problems that this term raises on a conceptual and political level. The idea of degrowth is unbearable to all those and all those which see in the mediation of the market the social link par excellence, one that is based on the contract or on planning. For many, it is modernity which is in question. It is perhaps that indeed. But it would be necessary to go further ahead and to show that modernity thus understood still has something to bring to the world, or more exactly to the planet. Modernity is too often put forward as a standard without further arguments, all that are opposed to it are reactionary or obscurantist. Ecology poses from the beginning the question of knowing how to "no longer be progressive without becoming more reactionary" as the pretty formula in the title of the work of Jean-Paul Besset says²². Degrowth irritates the majority of economists - and calls into question their domination. Economists have already, for a long time, been on bad terms with the ecologists. The interest in these exchanges is that degrowth resists all attacks very well. The objections raised are familiar to ecologists: degrowth would be relativistic (J.-M. Harribey²³), it would be a backward step, a return to obscurity, an idealization of nature and "traditional" societies²⁴ and of course blackmail over jobs.

The existing answers are robust, and for this reason the debate goes on. Does degrowth confuse "development" and "growth", as Rene Passet²⁵, as well as many others suggest?

²⁰ C. & R. Larrère, *Du bon usage de la nature*, Paris, Aubier, 1997.

²¹ W. Zarachowicz, *Ecolos cherchent intellos*, Téliorama n° 2970 - 16 Décembre 2006.

²² J.-P. Besset, *Comment ne plus être progressiste, sans devenir réactionnaire*, Paris, Fayard, 2005.

²³ J.-M. Harribey, *Une conception de la richesse non-marchande pour sortir du faux dilemme croissance / décroissance*, E. Berr & J.-M. Harribey (dir.), *Le développement en question(s)*, Presses Universitaires de Bordeaux, 2006, pp. 265-288.

²⁴ G. Duval, *Décroissance ou développement durable ?*, *Alternatives économiques*, Hors-Série « Le développement durable », 1er trimestre 2005, pp. 53-55.

²⁵ R. Passet, *Querelles byzantines autour de la croissance -*

And if it was the economists who confused "common good" and "development", they never had a reduced vision, narrowly economic, of common good? Although Passet insists on the qualitative, it doesn't exist, and as a result, neither does an economic theory of the qualitative. As a result, how does he contribute to the debate? That remains fuzzy. To put the management of the common good in the hands of computers and economic materialists, will ensure sure that one will remain on the level of management, and that one will never rise above the level of projects. There is generally a teleology under current with the analyses of developpementists, moreover Passet once again takes the example of the child who grows up to explain the difference between growth and development. Are underdeveloped countries children? Such paternalist attitudes we thought had been relegated in the dustbins of the history. How can we not see that this analogy is a structural design of development, an underlying anthromorphism which should be denounced with the same vigour that certain analysts use to put down the idea of nature in the discussions of ecologists? Among those who unceasingly denounce natural law and those who resort to the development, the more naturalist of the two is perhaps not that which one would believe. The partisans of degrowth thus can retort to Rene Passet that it is he who has mistaken the adversary, by giving credence to the dominant naturalist thesis. Indeed, to again take the term "development" can be compared to support for the practices which accompany this term. Starting from such naturalism, how can one think of an opening to the world? How to reawaken our imagination? These questions, which are at the base of criticisms resulting from degrowth, are not taken seriously, the objections thus fall a little flat.

There too, the criticism was made and well made by MAUSS. The economic discourse is a discourse on the means, which hardly leaves space for the debate on ends. While refusing to leave space for discourse on the ends, economists block the free-exercise of politics. They act as if they already had the answers. Let's take a survey: is the difference between growth and development perfectly clear in the minds of the public? We'll wager it's not. In any case it is clear that the media world does not make a difference and identifies one with the other. Wanting to show the difference between the two raises the "Byzantine quarrel", even if the experts agree amongst themselves to give the lesson to the good people who understand nothing. To make a difference between economic development and well being, the recourse to a term which differentiates both is clearly necessary.

3. Conceptual roots

Degrowth is not a unified doctrine. Sharp tensions between the newspaper *La Décroissance* and the current editorial board of *Entropia* accompanied the emergence of the theoretical magazine. The creation of the PPLD did not achieve unanimity, that's the least one can say, and tensions appeared from the beginning amongst the directors. Disagreement on the use of the term "degrowth" as a watchword or as the heading for a political programme. The "degrowth of the ecological footprint" adopted by the

Greens does not have the same range at all as degrowth per say, it's quite a different choice which was taken. Others prefer after-development, others want to avoid slogans (Sylvia Perez-Vitoria), still others prefer sustainable degrowth (Vincent Cheynet and Bruno Clémentin).

Beyond the foam of the storm that shakes the mind, we think it's possible to characterize degrowth as situated at the junction of five sources which cross, without being necessarily competitive nor even convergent.

The first is the culturalist source. Coming out of anthropology, led by Serge Latouche, a reconverted Marxist; his principal thesis being that homo economicus is contingent, dependent on "his" representation of the world and of history. If one wants to open new possibilities, one needs to reinvent or rediscover our nature. This thesis is distinguished from the Marxist thesis which today still remains largely dependent on the imaginary economist and productivist. Degrowth represents a means of taking the opposite course to development on the project of "socially [imaginative] meanings", to use the vocabulary of Castoriadis²⁶, and thus to reach an [instituted] society in order to make it evolve, to open a breach, a passage to the [instituting] society. Serge Latouche notes that "the other possible world" is that in which it's necessary "to decolonize in our imagination" these economic and developmentist meanings to be able to reach it²⁷.

The democratic source results from the analyses of Ivan Illich. A major component of the approach of Vincent Cheynet, it is based on the collapse of links which are under the weight of the market. Consequently what counts is to revitalize the links, which pass via relocalization, which is not a return to the good old days of the villages, which one knows were not always so good. This source is attached to the quality of the public discussion, and is differentiated clearly from the Marxist analyses which tend to make the symbolic a simple reflection of the relations of production, even if the demand for a maximum acceptable income shows clearly that preoccupation for social justice is present. The abolition of privileges is a major stake for democratization in our societies which cannot use means which are not in themselves democratic without simultaneously going against the stated principles. Here degrowth is a term used to provoke debate, it is there virtual performative key-word, which revitalizes the passions needed for the existence of a public space. Degrowth is also a logical economic consequence of this revitalization which must result in a strong economic deceleration. Indeed to discuss takes time, also the market relations which extend in space without worrying about the existence of a strong public space to support them and to domesticate them they should be strongly restricted, even prohibited, because of concerns over "stowaway" behavior.

²⁶ C. Castoriadis, *L'institution imaginaire de la société*, Paris, Seuil, 1975.

²⁷ S. Latouche, *Survivre au développement*, Paris, Mille et Une Nuits, 2004. S. Latouche, *Décoloniser l'imaginaire – la pensée créative contre l'économie de l'absurde*, Lyon, Parangon, 2005. Voir aussi F. Partant, *La fin du développement – la naissance d'une alternative ?*, Paris, Actes Sud, 1997 ou G. Rist, *Le développement – Histoire d'une croyance occidentale*, Paris, Presses de Sciences Po, 1996.

The third source is environmental, attached to the ecosystems and to respect for the living. For this tendency, degrowth is the inevitable consequence of any ecological policy taken seriously. To reinforce ecological productivity to the detriment of economic productivity will lead to a reduction of mechanization, which itself will result in a reduction of the GDP. The indicator of ecological footprint shows that the world uses 125% of the Earth's renewal capacities²⁸, the Millenium Report on Ecosystems shows that 60% of ecosystems are degraded or used in a non sustainable manner²⁹. A recent FAO report FAO indicates that if removals continue to intensify at the current rate, then the oceans will be exhausted, all fisheries [confused], by 2048³⁰. Desertification touches 1/3 of world land, domestic biological diversity broke down from 50 to 75%, species disappear at a rythme 100 to 1000 times faster than the preindustrial rythme, etc. All the signs of fast and massive degradation of ecosystems are there. However ecosystems are all that we will have when the fossil and consumable resources disappear. Thus We have largely dug out the ecological debt for the generations to come. The environmental argument doesn't consist of an accounting argument, but of a new relationship with nature, a rapport which would no longer be based on exploitation but on respect and coevolution. Mankind has dominated nature, they must now not submit themselves, but admit that they are not the center of all. Ecology has developed analyses close to the previous current in the form "of ecology of the spirit"³¹, "ecosophia"³², "natural contract"³³ or "of comunicipalism"³⁴. Degrowth is also a decrease of the influence on nature, which is not reputed to belong to us, and consequently should be withdrawn from appropriately.

The fourth source is related to the crisis of direction which runs across industrialized societies. Who says crisis of direction says spiritual opening, the life of the spirit, and it is this step which led Pierre Rabhi³⁵, for example, towards degrowth. The topic which is developed here is the non-sense of a life passed "always running more" (of titles, money, things) whereas harmony with nature, humans and living things in general passes rather by meditation and listening. The interior revolution is a necessary precondition to put an end to the increasingly disordered states which agitate the world. Non-violent and [deliberate] action, along the lines of Ghandi's precepts, is the only way of restoring progress which is no longer that of the blind forces of technology. Voluntary simplicity, after François d'Assise, is not a way of depriving oneself, but a way of

²⁸ WWF, *Rapport planète vivante*, 2006.

²⁹ Millenium Assessment Report, *Living Beyond Our Means : Natural Assets and Human Well-Being*, 2004. <http://www.millenniumassessment.org / www.maweb.org>

³⁰ B. Worm & al., *Impacts of Biodiversity Loss on Ocean Ecosystem Services*, Science, 3 nov 2006, vol. 314, pp. 787-790.

³¹ G. Bateson, *Vers une écologie de l'esprit*, Seuil, 1990, Ed. orig. 1972.

³² F. Guattari, *Les trois écologies*, Paris, Galilée, 1989.

³³ M. Serres, *Le contrat naturel*, éd. François Bourin, Paris, 1990.

³⁴ M. Bookchin, *Pour un municipalisme libertaire*, Lyon, Atelier de Création Libertaire, 2003

³⁵ P. Rabhi, *Du Sahara aux Cévennes*, Paris, Albin Michel, 2002.

becoming lighter in order to let a major direction come into oneself, less superficial than that which drives the ceaseless ballet of ordinary things. There, where poverty finds dignity, misery is chased away³⁶ and people can take steps for a better future.

The last source can be called "bioeconomist". It is an old source, like the others, but some authors are regarded as having put the question on the agenda. If ecology starts with living, the bioeconomy speaks about human organization having to manage constraints such as the limits of ecosystems ("load capacity") and the limited availability of certain resources. With the Club of Rome, it was Nicholas Georgescu-Roegen who could be regarded as a precursor, having written in 1971 that the end of the industrial phase will be all faster as the economic level of development reached is raised³⁷. Each car produced is at the cost of cars to come³⁸, each weapon manufactured is a ploughshare less. Degrowth is inevitable, it is a geological consequence, as Yves Cochet said³⁹. It is a question from now on of managing scarcity, the economy becomes a "normative management under constraint"⁴⁰. Georgescu-Roegen shows, like many other economists before him, that we must urgently turn to renewable resources because they are the only ones able to ensure the future, the others having to run out whatever progress might be achieved by science and technology. But renewable resources are also limited, which is why Hermann Daly, one of the founders of "Ecological Economics", showed a long time ago that the stake of a sustainable economy also concerns the question of size, and not only of composition⁴¹. The ecological economy is basically ambiguous: is it about ecologising the economy or economizing the ecology? In all cases, the living and ecosystems are apprehended by an instrumental mode. The limits which are posed can be technical or ethical-political. Ecology can be used to exploit nature more quickly, as well as for protecting resources

The five approaches lead in a relatively independent way to the conclusion that degrowth is one of the essential elements for a better future. Beyond, there are tensions between these five approaches, which are found in exchanges between partisans of degrowth as well as between partisans and opponents, but the fact that they are found around this term are remarkable and testifies to the centrality of the concept of "growth", which plays a much wider societal role than the simple accounting definition behind which national accountants cut themselves off to maintain their objectivity. A good part of these debates is known in political ecology: is degrowth of the right or the left? left? Can it be reduced to voluntary simplicity ("small gestures")? etc. The connaisseurs will only see there a [bis repetita], degrowth being by all evidence one of the first consequences when one takes ecology or the exit from economicism seriously. However the term has at least

partially succeeded in regenerating a debate which seemed to have sunk.

It is true that topicality has helped. It is indeed at the beginning of the years 2000 that the question of climate change finally seems to be taken seriously. The Stern Report⁴², the reports of the GIEC⁴³, the Millenium Ecosystemes report⁴⁴ and many other reports have once again showed that the things are worsening. Even if significant sectors of humanity experience a richness up to this point unknown, inequalities increase and the material base of this richness melt like snow in the sun.

Degrowth has become a symbolic element that is impossible to circumvent. "Les Echos", not a newspaper susceptible to fantasies from the economic point of view, made degrowth one of the three economic paradigms likely to take us out of "ready-made thinking" in this domain⁴⁵. The left, in need of new ideas, should grab onto the subject. One has seen committees of "future Desires" engage in public discussions around degrowth. Will it go to the end?

³⁶ M. Rahnama, *Quand la misère chasse la pauvreté*, Paris, Actes Sud, 2004.

³⁷ N. Georgescu-Roegen, *La décroissance*, Sang de la Terre, 1994, Ed. orig. 1971, p. 66.

³⁸ *Ibid.*, p. 67

³⁹ Y. Cochet, *Pétrole apocalypse*, Paris, Fayard, 2006.

⁴⁰ R. Passet, *L'économique et le vivant*, Paris, Payot, 1979.

⁴¹ H.E. Daly & J. Cobb Jr., *For the Common Good*, Boston, Beacon Press, 1989.

⁴² Stern, *Stern Review on the Economics of Climate Change*, 2006.

⁴³ IPCC, *Summary for policymakers – working group 1*, 2007.

⁴⁴ *Op.cit.*

⁴⁵ *Sortir du prêt-à-penser économique*, décembre 2004.

Macroscopic rebound effects as argument for economic degrowth

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Abstract

The rebound effect could be defined as the increase of consumption linked to the reduction of limits to use a technology. These limits might be monetary, temporal, social, physical, energetic, spatial, and organisational.

Consensus develops on the existence of primary and secondary rebound effects. An example of the direct rebound effect is increasing distances in time-efficient modes of transport. An example of secondary rebound is households energy saving reallocated to holiday spending. The size of the rebound effects is still subject to much discussion. This is especially the case when we deal with macroscopic rebound effects (economy-wide equilibrium shifts and transformational). These types of rebound effects are more difficult to describe and lead to much differences in analysis. But their existence is supported on the theoretical level and on the practical level explaining the incapacity of global efficiency increases to enable global reductions of environmental impacts.

The rebound effect in its widest understanding was quoted from the start of the wider degrowth debate in 2002 in France as an important argument for the idea of economic degrowth. Although economic growth is considered by some authors as independent from rebound effect, we defend here that the problematics of growth and rebound effect are closely related. Even Growth of an immaterial economy has the potential of a reallocation to the material economy.

The fact that there is not degrowth but growth (or even steady state) leads to actual or potential rebound effects. The result from this is that technological solutions, but actually also sufficiency solutions (and eventual demographic ones) would not function to their full potential if our economies do not degrow accordingly. For example material efficiency will not lead to dematerialisation if there is no decrease of raw material acquisitions, and in general there is no guarantee that we would avoid recoupling if the collective capacity to acquire natural resources increases with economic growth.

It follows a discussion on different measures for degrowth: the idea is to have a "debound" effect in link with an economic degrowth for sustainability and equity. Ecotaxes for example would not give space to a rebound effect if they manage to reduce problematic activities (and in the long run the associated taxes) and support a process of redistribution and transition.

1- Introduction

Would improvement of techniques applied at a large scale be the solution to our environmental, social and economic problems? Although efficiency solutions have been widely applied, we are confronted with crisis: flows of material & energy have increased in an uneven manner leading to environmental and social crises; shortage of natural resources, including food & land, and high debts lead to social crises and prospects of wider economic crises. We have more and more evidence that the efficiency strategy is ruined by a wide rebound effect, so-called Jevons paradox or Khazzoom-Brookes postulate (Jevons 1865, Saunders 2000, Sanne 2000, Greening et al. 2000, Binswanger 2001, Alcott 2005, Dimitropoulos 2007...). We will develop that the rebound effect is made possible by economic growth policies and non acknowledgements of limits to consumption and production (Schneider 2001). As long as economic means encourage us to gain natural resources far above the sustainable levels, as long as our infrastructures open spaces to more cars on the roads, more planes, more trucks, more industrial processes and products, as long as the advertising industry is having so much influence on our strategies, there is a risk of failure. Even sufficiency solutions (Alcott 2008), negative demographic growth, or other preventive and specific policy solutions may lead to rebound effect. We will support the idea that all types of solutions may be ruined by the continuation and development of strategies, policies and institutions that favour elasticity, we could say unfulfilling, of demand. Jevons knew about the macro-rebound in 1865. It is now time to question the supremacy of growth economics and growth objectives, and design and implement degrowth economics as well as degrowth policies and strategies in the Northern countries, in general in affluent and influent parts of the world (Schneider 2002, 2003, 2003b, Schneider & Bayon 2006). In addition post-development (Rist 2000) challenging the western lifestyles appeal in the global South is required for a right-sizing of the economy (Degrowth conference declaration 2008).

2- Micro-rebound effect and rebound strategies

Rebound Effect in Micro-economics (direct and secondary rebounds according to Greening et al. typology)

The micro-rebound is easily understood; it enables to grasp the phenomenon. It may be considered in order to analyse more thoughtfully the impacts of a given action. It is often mentioned at the level of personal behaviours. Let us consider the rebound effect at the use phase: a car that consumes less gasoline per km leads to financial savings that may be spent on longer car distances if the travel budget remains the same or increases. A so-called secondary rebound exists when a house is better insulated and that reduced expenditures on heating are reinvested in buying a second car or travelling by plane. Efficiency basically creates revenue that can be spent on the same (primary rebound) or other commodities (secondary rebound). Let us imagine that improvement in the production system leads to reduction of resources use leading to savings in production costs per unit of production. At the same level of sales, the production can then increase in terms of units. As the thickness of plastic

bags reduce, producers reduced the costs of producing each unit of plastics bags, they may then sell more for the same price... This may also occur at the waste stage: an incinerator is economically more efficient to treat waste, we may then increase the amount of waste processed, possibly increasing in the same time some of the adverse impacts of this type of technology.

Different types of limiting factors lead to rebound

Rebound effect can exist with other limiting factors than the economic one: more generally the rebound effect could be defined as the increase of consumption linked to the reduction of limits to use a technology. These limits might be monetary, temporal, social, physical, energetic, spatial, and organisational (Schneider 2001). For example, rapid means of transport create the potential to save time, but very often the time saved in faster transportation is used to travel greater distances (Binswanger 2001, Jalas 2001). We will develop in part 5 that the understanding of these limiting factors may help for the design of appropriate preventive policy measures.

Different types of impacts illustrate rebound

Often dealing with energy issues, the rebound effect may actually deal with other types of impacts: time loss, social impact, environmental pollution, traffic jam¹, carbon consumption, stress...

Different types of solutions rebound

Rebound occurs with efficiency², it may also occur with other types of “solutions³”: in addition to efficiency rebound we may have:

- Sufficiency⁴ rebound (Blake 2008); an air ticket to Dakar would be affordable with the savings made by heating less a house....
- Birth Decrease rebound; we could argue that having fewer children in a family liberates revenues to increase the material or energy consumption per person.
- Rationing rebound⁵; the rationing of a product may create rebound of consumption of another product.
- Caps rebound; Carbon caps may lead to uranium consumption and radioactive waste.
- Quotas rebound; a quota on iron imports and extraction may lead to use of renewable resources or extraction or import of Al.

- Reserve rebound; a natural reserve in one area may not prevent more extraction of resources in another unprotected site
- Laws rebound; laws preventing growth may be circumvented.

Rebound has secondary impacts

There are secondary impacts associated to rebound effect. For example an increased consumption due to rebound effect may cancel the expected benefits of energy saving but it may also bring other problems. For example the efficient car can travel further with the money saved which affects the environment with pollution, noise, accidents... Information technology leads to a greater consumption paper and transport (Schneider 2001). Among positive effects, a rebound could potentially represent a wealth transfer for social more justice⁶ (see Alcott 2008a for a full study of this aspect).

Size of micro-rebound

A very important question concerning the rebound effect is its size. Different authors have come to very different conclusions. In the context of microeconomics, the rebound effect is seen as a small problem. Dimitropoulos talks of less than 30% for most energy services typically. Greening et al report rebounds between 0 and 50% linked energy efficiency solutions in residential end uses. Some question the phenomenon of Rebound like Lovins. In any case a more complete picture of rebound is only taken into accounts in the context of dynamic macroeconomics.

Rebound strategies may be part of growth strategies

Very often the increase of consumption linked to rebound effect is a planned effect of a company strategy. The development of the fast and efficient trains TGV in France for example has been accomplished with the clear goal of increasing travels between cities. The intention is then to remove limits to increased consumption. The demand for a product will be limited if it is too expensive, too time consuming, if it is too dangerous, if it requires too much effort, if it ruins our health, if it uses too much space, if it weighs too much, if it is too complicated to use. Usual innovation tend precisely to reduce all these limitations and to promote it in advertisements. The products become cheap, fast, safe, without effort, healthy, light and small, easy to use or good for the environment but secondary impacts are certainly not prevented. Similarly, economies of scale are often not designed for ecology but to sell more simply, to gain market shares.

We call all the strategies designed to reduce limits that exist to consumption or production in order to gain market shares or in order to develop new markets, the “rebound strategies”. We will now deal with implications of rebound effect on the global economy and policies in general, savings due to solutions are very likely to reallocated to new spending.

¹ Schneider et al. 2002

² Impact per unit

³ We will continue using this terminology in the next chapters

⁴ Units per person

⁵ Alcott 2008 argues that solutions directed at impact reduction directly, the so-called « left side solutions » (directly dealing with Impacts I) in reference to the IPAT equation, would prevent the rebound occurring with right-side solutions (leading to efficiency, sufficiency and birth decrease rebound). We argue that left side solutions may also suffer from potential rebounds, but they deal with point sources easier to identify on the large scale.

⁶ This is why we consider degrowth as differentiated see annex on EDSE

3- Macro-rebound effect and growth policies

Two types of macro-rebound effects may be considered: Economy wide & Transformational effects (Greening)

The economy wide rebound effect results from application of economic theory to a static situation but at the level of economy as whole with price and quantity readjustments: increased energy efficiency leads to reduced prices and increased demand use of energy and demand.

The transformational effect is defined as changes in technology that have the potential to change consumer preferences, alter social institutions, and rearrange the organization of production (Greening et al.). As our economy is a complex adaptive system, the global production and consumption system will rearrange (Polimeli & Polimeli 2006). For example, buying a car supports the road network, which has the effect of a reorganization of society and for example will encourage supermarkets in place of small businesses and may create more consumption by the creation of this socio-technical system.

Jevons in 1865 is considered the first economist to analyse a macro rebound effect phenomenon: *"it is a confusion of ideas to suppose that the economical use of fuel is equivalent to diminished consumption. The very contrary is the truth."* Jevons described a rebound effect of more than 100% in the area of coal extraction and use. The increase of coal consumption has notably exceeded the compensation of efficiency improvements. This type of rebound has been identified as "backfire" (Saunders 2000). A more recent example concerns the growth in the sector of computers which lead this sector to become a major contributor of environmental concern: instead of minimizing the impacts of the sector, the major efficiency increase from first computers to the last mini laptops enabled an explosion of number of computers units produced. If the degrowth of the sector would follow the increase of efficiency we could avoid the rebound, but this would be a very different societal choice. Such cases of clear backfires open the question of the size of the rebound effect in general considering the economy as whole, possibly with its dynamic properties.

Identifying the causal relation between efficiency and the rebound effect is not an easy task in our complex and globalized economy. Compiling different studies dedicated to this task Dimitropoulos cites for example estimates ranging between from 15% to 350%. Dimitropoulos concludes that there is a lack of sound theoretical framework that can explain sufficiently the complex interactions that accompany energy efficiency improvements in the macro level and inconclusive historical, empirical and econometric evidence. In most research on rebound experts have thus tempted to separate the responsibility of efficiency and the responsibility of structural changes or demand trajectories to evaluate the share of rebound effect. Binswanger mentions for example "the growth in economic activities is not necessarily connected to efficiency improvements due to new technologies. The growth effects may be due to structural changes and a general growth tendency of market economies" (Binswanger 2001). This is then the task of rebound analyses to evaluate the share of efficiency in the

growth effect. A reduced price of energy like the reduced price of coal in Jevons case enables the development of new coal consuming processes by making added value possible. The development of coal processing is caused by demand for the function it fulfils (for example transport by train) and by the cheap availability of coal: costs reduction and benefit increase are both reasons for the existence of coal processing.

We suggest here that it is inappropriate to say that efficiency in general or even more sufficiency (or other solutions) are "responsible" of the rebound effect. The existence of the rebound effect has led some experts and citizens to question the general solution of efficiency, and sometimes even sufficiency (and may question other solutions). The point is: the general dismissal of efficiency or other solutions is only made possible by setting growth as a precondition. What has been missing is the questioning of rebound strategies and policies and growth policies (which include rebound policies). The rebound should not lead to general dismissal of efficiency, sufficiency, birth control, or preventive policies as solutions, but growth should. Solutions within the framework of IPAT could be successful if we had degrowth (steady state at this stage is not enough). The rebound effect is favoured by rebound strategies and policies and fundamentally made possible by growth policies through infrastructures and creation of demand. Rebound effect is sometimes so much awaited that the avoidance of rebound within growth strategies sometimes leads to crises as it happens when demand is not fulfilled. We thus suggest that in addition to being impossible, it may be inappropriate to evaluate the share of the rebound effect in the growth effect. However favouring some efficiency types or other solutions is sometimes actually parts of growth strategies and policies. We will argue that we need degrowth policies, and above all economic degrowth policies, which should include a selection within types of solutions in addition to acknowledgement of limits to production and consumption.

4- Challenging rebound and growth policy with voluntary rebound and degrowth

The choice of solution has a strong relation with the demand elasticity. Some technologies are definitely more prone to rebound than other and also contribute to transformational effects towards growth. Different strategies of efficiencies or sufficiencies are not at all equivalent. One important question: what type of solution are we talking about? Is it suppressing limits to consumption (and create rebound) or is it acknowledging limits? We know that services like car-sharing or bicycle tend to reduce the number of kilometres travelled; the effect will be different with efficiency in the airplane industry for example.

Avoiding the use of a product or service, or using an ecological product or service can create other limits on consumption and thereby create a "debound" effect this time. The sharing of automobiles tends to reduce their use. Efficiency solutions consisting of sharing a product does not induce multiplication of products, everybody has a share, all needs are fulfilled, and includes by itself a limitation in use. Activities such as gardening, hiking, long

meals, bicycling are extremely environmentally friendly because their slowness reduces the time available for other more polluting activities, they create a time rebound. Buying products of good quality, or healthy as organic products may even make our budget useless to purchase products of poor quality and pollutants. Broadly speaking, all activities that acknowledge limits are best to avoid the rebound. The question that one is entitled to ask is how to convince companies to leave aside their strategies to grow ever more consumption (whether products or services) because it seems their basic way to operate.

Growth policy is here generally defined as policy centred at increasing the capacities to exploit natural resources.

Growth policies favour the risk of a rebound effect with any solution. True efficiency (like other solutions) is preventive, and really creates a reduction of costs, which can be reallocated to new consumptions destroying the awaited environmental benefits. It is then necessary to have an adjustment of the monetary mass to avoid this rebound effect. From the start of the discussion in France the rebound effect was thus used challenging the myths of green or sustainable economic growth. And what is true for financial capacity to consume is true for other limiting factors.

Global degrowth is a reduction of the collective capacity to exploit resources, it would definitely prevent the macro rebound effect. Actually we have two possibilities:

- Either the price of raw materials increases drastically, which will hit the disadvantaged first, it would be an enormous inflation, with high risks of important social inequity, social and economic crisis
- Or it is a reduction of the purchasing power of raw materials where the affluent and influent parts of the world decide to decrease a lot their purchasing power to allow resource availability to the disadvantaged.

This second scenario represents the result of so-called degrowth policies. It would be the so-called Economic Degrowth for Sustainability and Equity (EDSE, see Annex). We are talking about a degrowth of the total purchasing power, which should preferably be initiated by a reduction of the purchasing will (also called voluntary simplicity) in the same time than the reduction of production. The development of immaterial goods or "relational goods" is in general not a solution, first we transform social relations when they are paid for, and the immaterial source of revenues would not stop its concentration and a reallocation to material consumption later: a trainer of personal development might still buy a swimming pool.

5- Economic Degrowth for Sustainability and equity (EDSE)⁷ with rebound strategies and degrowth policies: insights of degrowth pathways

Debound strategies for Degrowth (the bottom-up approach)

Rebound strategy is the direct growth strategy, the bottom-up pendant of growth policy. It includes: choosing and

developing the right product without consumption limits, lobbying, advertising, socio-green washing...

Debound strategies is the opposite of the rebound ones, it consists of identifying and discouraging specific efficiency solutions (or others) that are prone to micro and macro-rebound, or favouring solutions in general that create rebound. Debound strategies imply to favour techniques and strategies that do not have the property of creating new needs: like the "convivial tools" of Ivan Illich. The different solutions leading to rebound in the context of rebound strategies and growth policies are important to adopt within IPAT solutions. When it comes to efficiency it is important favouring those types that do not create an important socio-technical system: local sharing, reuse, compost, renewable energy, public transport... We find also the 8Rs of Serge Latouche.

Degrowth policies for Debound (the top-down approach)

Growth policy includes: cash availability, promotion of demand, policies to favour products and services with higher consumption potentials, policies favouring longer working hours and later retirement, growth planning, reduced environmental and social standard, in general institutions that favour economic growth...

After giving up growth policies as suggested by Spangenberg 2008, Degrowth policies consist of understanding the limiting factors and adjusting them in order to prevent the rebound effect. It consists of policies for EDSE, which includes dealing limiting factors to exploitation of natural resources (which also includes ourselves in this interlinked economy). Understanding limiting factors enables also to develop the social constructive vision described in Vatn 2005.

Limiting factors to be dealt with are:

- Financial limiting factor

The idea is to develop policies to reduce the collective financial capacity to gain natural resources. This would represent a post Keynesian degrowth policy that is based on budget and currencies to reduce the demand instead of increasing it, reducing the monetary mass while distributing wealth more evenly. It is a reduction of the financial capacity to exploit.

- Awareness limiting factor

A second limiting factor is conscience: Information would be vital to increase the conscience. This rebound effect that destroys the ecological progress should be documented and disseminated, including information or ways to develop information on more environmentally and socially friendly choices per Euro to spend or per hour of activity. Greening has noted that awareness of rebound could reduce it. It is a conscious reduction of exploitation will. This would involve some kind of containment of advertising industry.

- Time limiting factor

Another limiting factor is the time to consume. This implies measure to limit speed (see Heran 2008), increase possibilities for convivial encounters or other time "non-consuming" habits. The idea is to reduce the time that we dedicate to consumption. The decrease of working time can reduce income and therefore consumption, while making

⁷ Economic Degrowth for Sustainability and Equity

possible self-production. It is about time reduction for consumption, or said differently reduction of time for exploitation of natural resources.

– Physical limiting factor

Limiting physical space to consumption. We will obviously lower consumption of natural resources if there is no more to exploit (includes materials, space and energy).

– Infrastructures limiting factor

Reduction of infrastructures to consume and produce more is possible for example by maintaining levels of reduced capacity on roads or in promoting the local level in communications and trade. It is also about reducing extractive tools.

– Ownership or property limiting factor

Property rights on biota, soil and minerals are certainly a strong limiting factors. They fundamentally represents rights to exploit. See the discussion of Griethuysen 2008 on this issue.

Since the idea is to avoid developing new alternative on top of the rest, the simple development of alternatives eco-tax on polluting techniques or subsidies on alternatives is questioned if it does not involve an adjustment of limiting factors.

Example of the eco-tax

The ecological tax or ecological contribution is a solution but does not work well in the context of growth policies. If the ecological tax is so successful that a polluting, an energy intensive technique is replaced by an energy saving technique or is followed by a reduction of use of this technique, there are two positive aspects: on one hand the energy intensive technique reduces with its adverse effects and the rebound effect will be negligible since there would be no tax income to be reallocated. The result is a reduction of the global costs: all the direct and indirect costs linked to the technique reduce, the alternative, including not fulfilling this service at all is preferred. We have a net gain in terms of environmental impacts. However this all supports degrowth. On the other hand if the tax does not manage to reduce the use of the energy intensive taxed good or service, then the energy intensive technique does not reduce and it makes only more attractive other techniques that come on top of the rest and the tax money is creating a rebound. For growth supporters this is perfect: growing money flows can find uses, but the eco-tax is counter-productive in terms of global environmental impacts, even if it may still improve the situation in specific sectors, time frames and locations.

6- Discussion

Rebound resembles the failure of individualist thinking, partial solutions alone, missing the inputs of social constructivism with appropriate deliberative participative institutions (Vatn 2005).

Limits are often seen as restraints to liberty. But our planet is limited, we share a common good (Sachs 1999), and collectively agreed limits might be liberating when we

share a common good⁸. Let us not forget that limiting factors are limits to exploitation of nature which includes exploitation of each others. However limits need to be designed by the right participatory processes, setting up the right institutions (not in the meaning of institutional bodies). We need participatory institutions to deal with limits, dealing with questions such as: how do we set limits? What are needs? how shall we organize? What is the right level of natural resource extraction? This in includes the discussion on usage that should be free and mis-usage that should be costly according to Paul Ariès.

This includes lots of debates and involvements that are not included in today's democracy. There are real steps of collective thinking to install (Rumpala 2008). Resolving the question of needs cannot come from so-called normal science. Deliberation about needs may demand so-called "post-normal science" (Funtowicz and Ravetz, 1991) which includes civil society involvement. Degrowth process towards dynamic and inhomogeneous equilibrium steady state should not occur by constraint, it would take some homogeneous character. Participative processes are required to deal with the central question of needs motivating actions (Rosenberg 2001) where degrowth develop a context of possible cooperation (Wallenborn 2008).

The causal chains linked to rebound effect, in particular feedback loops, need to be studied to make the right choice of solutions in order to reduce the pressure building towards growth policies. Deliberative processes may sometimes be complemented with some kind of formal approaches, why not mediated modelling techniques and social multi-criteria assessment (Antunes et al.).

Another question concerns development. Are we going to give more space or less space to consumption of natural resources? How do we measure exploitation of nature and humans? We agree that sustainability is the goal, but development is too often interpreted as following the western model of high consumption (Sachs), which is impossible for everybody on earth. The dream of western lifestyle of the lifestyles of the richer ones (Veblen 1899, Kempf 2007), is a strong motor for rebound.

Could sometimes Rebound effect participate to the transfer of wealth? We definitely need to work on the process of wealth transfer, we should certainly look into different models of development: post-development. Self-limitation by the West would give other societies room to explore their own political space and develop appropriate systems of production and social organization (Sachs 1999).

Another issue concerns the deep analysis of solutions (efficiency, sufficiency, preventive policies...) and limiting factors at different scales in complex systems (in the line with e.g Giampietro et al approach to complex adaptive systems).

⁸ For example a car free city opens space for pedestrians, children, other means of transportation creating more liberty for the majority.

Conclusion

Economic growth is seen as a solution more than a problem, when it could be seen as a general failure of efficiency on a larger scale. Continuous growth outstrips gains of efficiency, this is not bad luck, it is the result of growth strategies and policies at the micro and macro level.

We should really deal with what blows the balloon, and deblow it, or degrow it, instead pressing one side: another side inflates even more. We need just, fair, eco, right-sizing of the global economy that would give everybody its sufficient share. In the OECD, it would mean absolute reduction of material, energy and land use taking into account a cradle to grave vision, in the Global South this would mean post-developments (Rist 1997) away from the present affluent and influent consumption and production model. Because of the rebound effect we cannot limit goals to physical degrowth, economic degrowth, EDSE is needed. More than a good analysis, the rebound effect is a central argument for economic degrowth: degrowth of environmental impacts cannot be obtained without an economic degrowth of industrial countries, it also gives an approach to understand the implication of specific policies and technical choices for growth or degrowth. Economic degrowth could be seen as long term risk prevention: immaterial economy is at risks to become material again, sequestration of carbon is at risks of liberating carbon... The only real prevention could be degrowth.

The present growth paradigm involves rebound strategies inducing growth and these are reinforced by growth policies that promote rebound strategies again. For degrowth paradigm shift we suggest instead pathways combining rebound strategies supporting degrowth policies and degrowth policies supporting rebound, taking into account of limits to consumption and production and adjusting limiting factors.

Real societal benefits are actually prevented with growth or would be enabled with degrowth. The rebound effect or so-called Jevons paradox is the failure of attempts to reduce exploitation of natural resources. We intended to reduce this exploitation of natural resources while neglecting the degrowth of capacities to exploit those.

Capacities to exploit natural resources require among other things:

- time available for production and consumption
- willingness to produce and consume
- property rights on biota, soil and minerals
- transport, transformation, distribution and storage infrastructure
- transaction facilities and cash availability

The degrowth of capacities and the prevention of rebound effect implies to succeed in reducing one or more of these requirements in addition to typical measures consisting of efficiency, sufficiency, birth rate decrease and possibly caps, rationing and quotas (we should deliberate about that). Localised or specific measures fail when collective limiting factors are unchallenged.

Jevons knew already. But growth has not been challenged as political and societal objective and it has not been

challenged since then. Time has passed enough. The triple crisis makes it now an absolute necessity. Further degrowth research and action are needed in order to open new perspectives of true progress.

The realisation that rebound limiting factors are not restricted to today's economics should make us aware that it may exist many other systems that still develop natural resource exploitation, that would be the ultimate rebound: the "paradigm shift rebound effect"! So let us be sure that we evolve towards a society that puts forward a degrowth of the collective capacity to exploit natural resources.

Thanks to all degrowth conference participants.

Thanks to Blake Alcott, looking forward to more discussions.

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Annex

EDSE (Economic degrowth for sustainability and equity) has been formally described by Research and degrowth in 2006, see www.degrowth.net

De-growth can be described as a process involving:

- a switch of cultural paradigm
- diverse personal and collective physical and economic processes at local and global levels
- less quantity, more quality
- democracy at all levels
- reduction of global imbalance and unfulfilling of basic needs
- avoidance of recession
- transition towards a sustainable society

Achieving de-growth will also require innovation and understanding of global implications

In general, de-growth is the state of that which "de-grows", i.e. reduces.

More specifically, de-growth presents two aspects:

1 - As a slogan which calls into question the consensus for growth (including economic growth).

It is a question then of a key word to defy, amongst other things, economicism (merchandisation of nature and human relations) and the growth fetish (the belief that any economy should increase the value of its exchanges and production to avoid crisis or disaster).

The goal today is to launch a debate in society.

2 - As a concrete and voluntary process toward a just *and* ecologically sustainable society. To expand:

De-growth represents a multitude of individual (voluntary simplicity) and collective steps, based on the reduction:

▸ of direct appropriation, or via intermediary products or services, of natural resources, i.e. of materials, energy and space (physical de-growth)

▸ of the capacity for appropriation of natural resources (economic de-growth). It is too risky that a capacity for appropriation of resources be transformed into an effective appropriation in the form of a “rebound effect”.

As a political project in the broad sense, de-growth is directed at individual, local, regional and world levels, and is understood at the same time as sustainable, balanced, democratic, convivial, ecological, social, positive, cultural, equitable, innovative, diversified, targeted, local, global and transitory.

Let us elaborate: sustainable (supportable) growth in a finite world leads us either to crises or general collapse, to a “modern feudalism”, with an increasingly smaller privileged minority continuing “to grow”, while misbelieving it will protect itself from crises, from environmental damage and from the poor majority. The idea of this intentional sustainable de-growth is to avoid these unbearable recessions and feudalism, while safeguarding human rights and ecosystems, through;

- balance (in harmonious proportion). To avoid crises, and so that no one is excluded, three processes must combine simultaneously: reduction of consumption (of the “desire to purchase”), reduction of production, and sharing (of work in particular);
- democracy (empowerment of all humans). Reorganization at various levels of society and sharing require more democracy: more participatory and more direct.
- conviviality (taking account the interests of others as much as one’s own), ecological (respect for ecosystems), social (respect between humans), positive, cultural (...) Physical and economic de-growth must leave space for many other growths (mainly qualitative): disinterested relations, time for oneself and for others, equity, minimal public services, health, human rights, women’s and minority rights, non-violence, human warmth, nature, security, art, perception of the world surrounding us, poetry, empathy and all this in large variety...
- equity (from the Latin *oequitas*, equality). It applies in the first place to the 20% most favoured of this world mainly based in industrialized countries, but concerns everyone when it is a question “of decolonizing the imaginary” linked to consumerist and productivist models. It is about a differentiated de-growth, in order to move towards a more just society in industrialized countries and universally;
- innovation (introducing novelties). It is about a questioning of the current situation (with for example motorways and nuclear power plants..), in order to live

with a minimum consumption of resources. Innovation thus integrates the concept of limits, rather than attempts at withdrawal. Innovations should be the object of democratic debates and can be refused if they suppress ethical or ecological limits (as may be the case with GMOs, nuclear, arms, nanotechnologies, cloning, etc...).

- diversification. The goal of de-growth is to reach a sustainable society where each lifestyle is unique, while being potentially generalizable. The urgency and gravity of our eco-social problems implies steps with diverse scopes and time frames. Diversity also includes ideological or spiritual beliefs or non-beliefs, without any one being favoured;
- targeted intervention. It does not imply de-growth on all levels taken separately. Instead sustainable alternatives (for example organic agriculture, renewable energy, or sustainable transport (bicycles, public transport...)) should grow, but by creating a greater reduction of the unsustainable portions of the economy (e.g.: chemical agriculture, nuclear or fossil fuel energy, automobile or air transport...);
- local and global foci. Based on open local economies (“neo-localism”) with local diversity of cultures, but including understanding at higher and global levels. For this reason local de-growth which involves growth elsewhere, or in the future, is not de-growth;
- transition. De-growth constitutes a stage toward a sustainable, just, ecologically lasting, democratic, participative, responsive to human needs, localised, everywhere culturally, ecologically and ethnically diverse, global, open society - whose capacity of appropriation of natural resources is stabilized on a viable level which allows their renewal. This sustainable society constitutes a “realizable, renewable, constantly renewing Utopia”, whose specific characteristics are readjusted repeatedly.

Decrecimiento sostenible– sustainable degrowth

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No debemos jugar con las palabras ni decir mentiras. Sabemos que Decrecimiento Sostenible significa un decrecimiento económico que sea socialmente sostenible. En cambio durante veinte años, desde 1987 y el Informe Brundtland de las Naciones Unidas, el slogan ortodoxo ha sido el Desarrollo Sostenible, que significa crecimiento económico que sea ecológicamente sostenible. Sabemos sin embargo que el crecimiento económico no es sostenible ecológicamente.

¿Por qué el crecimiento económico no es ecológicamente sostenible? Por las dos siguientes razones. La economía industrial agota los recursos y hace desbordar los sumideros de residuos. Se acerca el pico de la curva de Hubbert, a los 90 o 100 millones de barriles por día. La concentración de dióxido de carbono en la atmósfera ha estado creciendo en los años 2000 a 2 ppm por año, y a este ritmo llegaría a 450 ppm solo en treinta años más. La crisis de sobre-oferta de viviendas del 2008 en Estados Unidos, Gran Bretaña, España financiadas por crédito fácil (deudas que crecen exponencialmente) se une a una crisis por el lado del costo de las materias primas al mantener la OPEP sus límites de extracción, al haber aumentado la demanda en la China e India, y con la ayuda de la escasez física a más largo plazo por la llegada inminente al pico de Hubbert. Por tanto, en el 2008 y 2009, las emisiones de dióxido de carbono de algunas economías disminuirán, pero la tendencia ha sido creciente en la década anterior tras Kyoto. Habría que bajar las emisiones a la mitad pero la trayectoria ha sido de aumentarlas al doble en 25 años!

La energía no es reciclable, y los materiales son reciclables en la práctica solamente en parte. De ahí la continua búsqueda de nuevas fuentes de energía y de materiales en las “fronteras de la extracción”, para sustituir la energía y los materiales que han sido disipados y para asegurarse nuevos suministros. Eso da lugar a movimientos de resistencia en esas fronteras.

Es cierto que aumenta la eficiencia en el uso de energía (los automóviles viajan más kilómetros con los mismo litros de gasolina) y también cambian los materiales, de manera que la economía puede crecer gastando en proporción menos energía y menor tonelaje de materiales. Sin embargo, este mismo proceso de aumento de la productividad de los recursos naturales, puede desencadenar lo que se llama la Paradoja de Jevons o el “efecto rebote”. Jevons en 1865 había señalado que la mayor eficiencia de las máquinas de vapor abarataba para los fabricantes el costo del carbón lo cual llevaría a una mayor demanda de carbón. Este es un punto sobre el cual los partidarios del Decrecimiento Sostenible insisten mucho.

Ahora bien, ¿qué es lo que debe decrecer? Sin duda: la economía. Pero, ¿cómo describir la economía? Recordemos aquí el trabajo de los últimos quince, veinte años sobre el

Metabolismo Social de Marina Fischer-Kowalski en Viena, de Robert Ayres y otros autores. La Ecología Social, la Ecología Humana, la Economía Ecológica proporcionan resultados sobre los indicadores físicos de la economía, como son:

a) Flujos de Materiales

- No existe la desmaterialización, no hace falta continuar discutiendo la reducción de materiales por un factor 4 (como propugnaba el Wuppertal Institut hace unos años), menos aun por un factor 10. Ojalá estuviera ocurriendo eso pero no es así. Conocemos las cifras en Europa y fuera de Europa gracias a la investigación de los últimos años. Esas cifras son ahora estadísticas oficiales de Eurostat, lo serán de la OCDE.
- En la mayoría de países, no solo aumenta la cantidad absoluta de materiales sino incluso la intensidad material de la economía, es decir, el cociente Toneladas de Materiales / PIB. Así ocurre en países con un boom en la construcción como ha sido el caso de la España hasta 2008 pero también en países de América latina con gran exportación de minerales. Lo mismo en la India, cuyo sistema energético depende tanto del carbón mineral.
- La cantidad de materiales en la economía (divididos en Biomasa, Minerales para Construcción, Otros Minerales, y Combustibles Fósiles) es un indicador de presión sobre el medio ambiente.
- La convergencia a un promedio europeo de 16 toneladas por persona (solo materiales, no contamos aquí el agua), multiplicaría los Flujos de Materiales en el mundo (con la población actual) por lo menos por un factor de 3.
- Es posible caracterizar las economías del mundo por esos Flujos de Materiales. Vemos las tendencias históricas, las transiciones, podemos también analizar las pautas de comercio exterior. Por ejemplo, América Latina exporta seis veces más toneladas que importa mientras la Unión Europea importa cuatro veces más toneladas que exporta. Hay por tanto una *Raubwirtschaft*, un comercio internacional ecológicamente desigual.
- Podemos entender los conflictos socio-ambientales típicos de tal situación: los conflictos por la extracción de minerales o de petróleo, o los conflictos causados por el uso muy desigual por persona de los océanos como sumideros de dióxido de carbono o de la atmósfera como depósito provisional.

b) Energía.

- Sabemos que el uso de energía por persona está aumentando. La convergencia hacia un promedio de 300 GJ (gigajoules) por persona/año (inferior al de Estados Unidos) significaría multiplicar por 5 el uso actual de energía en el mundo. Si se usa en proporción más carbón, aumentará todavía más la producción de dióxido de carbono. Si se usa energía nuclear, hay un obvio peligro de proliferación de su uso militar.
- El EROI está bajando (es decir, el rendimiento energético del insumo de energía) al recurrir (por el

pico en la curva de Hubbert) a extracciones de arenas bituminosas como las de Alberta en Canadá o a petróleos muy pesados (como los del Orinoco venezolano) o a los agro-fuels.

c) La HANPP (Apropiación Humana de la Producción Primaria Neta de Biomasa).

- La HANPP también está creciendo, por el crecimiento de la población y también por la pavimentación del suelo, el aumento del consumo de carne por persona, y los agro-fuels.
- ¿Qué indica un aumento de la HANPP? Cuánto mayor es la HANPP, menos biomasa está disponible para otras especies, por tanto es un indicador de pérdida de biodiversidad.

Hay quienes prefieren un solo número. Por razones opuestas se impacientan con esos indicadores físicos, ya sea porque son economistas que no los entienden y prefieren describir la economía en términos monetarios como el PIB o un PIB “verde”, o porque piensan que más vale un solo número socialmente impactante que resuma la presión física sobre el medio ambiente al estilo de la Huella Ecológica.

- Ha habido intentos bien intencionados de conseguir un PIB “verde”, en lo que llamamos en la economía ecológica el marco de la “sustentabilidad débil”. Esos intentos fueron útiles par las discusiones de los años 1980, pero han sido descartados porque requieren supuestos que no todos aceptan y que son arbitrarios. Roefie Hueting propuso deducir del PIB los gastos de ajuste de la economía a los límites ambientales fijados por un consenso científico y social (por ejemplo, reducir las emisiones de dióxido de carbono el 50%). Otras propuestas son el PIB “verde” de Daly y Conn que se llama el ISEW (índice de bienestar económico sostenible) y el GPI (índice de progreso genuino), muy parecido en su procedimiento de cálculo al ISEW.
- De lado físico, está la Huella Ecológica (que yo enseño a calcular a varias licenciadas de Ciencias Ambientales de la UAB en 1998 lo cual convirtieron en inofensiva profesión a nivel municipal durante unos años). La Huella Ecológica suma en hectáreas por persona, a) la superficie para los alimentos, b) la superficie para producir madera que se usa en la construcción o pasta de papel, c) el espacio edificado, o para calles, carreteras, parkings, d) la superficie virtualmente necesaria para absorber el dióxido de carbono producido por la quema de combustibles fósiles. El autor de la idea y de los primeros cálculos fue el ecólogo de Vancouver, William Rees (1992), desarrollando ideas del *ghost acreage* de G. Borgstrom, es decir la “superficie fantasma” fuera de Europa que se usaba para alimentar animales en Europa con harina de pescado importada del Perú en los años 1960 y 1970; también las ideas de espacio ambiental de Hans Opschoor. La Huella Ecológica ha sido después popularizada por Mathis Wackernagel, quien hizo su doctorado con William Rees.
- La Huella Ecológica correlaciona estrechamente con las emisiones de dióxido de carbono per capita, no da una información muy distinta. No hay ningún mal en

usar la Huella Ecológica pero es mejor usar varios índices de presión ambiental. ¿Por qué usar un solo número? Esos índices son los derivados de los Flujos de Materiales, uso de Energía, uso de Agua, y la HANPP.

- Además, el juicio sobre si la Huella Ecológica de los humanos es excesiva requiere una previa decisión humana colectiva sobre cuál debería ser la HANPP. Si reservamos la mitad de la NPP para las especies silvestres, entonces una huella ecológica humana no muy grande, ya será excesiva. Si pensamos que los humanos tienen derecho (¿por qué?) al 90 por ciento de la NPP, entonces la Huella Ecológica puede viablemente ser mayor.

Todo esto nos hace entender que hay *Descripciones No-Equivalentes de una misma Realidad Económica*, una expresión que inevitablemente me recuerda las enseñanzas de Mario Giampietro, quien estudió durante años con David Pimentel en Cornell University en temas de energía y agricultura, estuvo presente en Barcelona en 1987 en la reunión que precedió la fundación de la Sociedad Internacional de Economía Ecológica y es ahora investigador del metabolismo de la sociedad en el ICTA de la UAB. En las Facultades de Economía, se enseña a los estudiantes que la economía es como un carrusel o tío-vivo (un *merry-go-round* decía Georgescu-Roegen) entre los consumidores y los productores. Ambos se encuentran en los mercados de bienes de consumo y en los mercados de servicios de los “factores de la producción” (por ejemplo, vendiendo horas de trabajo a cambio de un salario). Se forman precios y se intercambian cantidades. Esto es la Crematística. Las cuentas macro-económicas (el PIB) agregan esas cantidades multiplicadas por sus precios.

La economía puede ser descrita de manera diferente, con lenguaje físico, como un sistema de transformación de energía (que procede sobre todo de recursos agotables) y de materiales (incluida el agua) en productos y servicios útiles, y finalmente en residuos. Esto es la Bioeconomía (como la quiso llamar Georgescu) o la Economía Ecológica como la llamamos ahora. Hitos son los artículos o libros de N. Georgescu Roegen 1966, 1971, Herman Daly 1968, A. Kneese y R.U. Ayres, 1969, Kenneth Boulding, 1966 (anteriores al informe para el Club de Roma de *Los límites al crecimiento* de 1971 que tuvo mayor éxito de público y que por cierto esos proto-ecologistas ecológicos recibieron muy favorablemente).

La visión ecológica de la economía tiene antecedentes. Resulta interesante preguntarse porqué demoró tanto la llegada de la economía ecológica al árbol de las ciencias. Tal vez la tajante distinción entre ciencias naturales y ciencias sociales fue un factor en contra. O deberíamos preguntarnos si lo que falló fue la falta de grupos y movimientos sociales (como hoy son los movimientos ecologistas y la Vía Campesina, una red internacional) que quisieran usar las ideas de la Economía Ecológica.

¿Cuáles fueron esos antecedentes? ¿Quiénes son los abuelos o los padres de la Economía Ecológica, anteriores a la década de 1960? Muy brevemente, sigue una lista incompleta. Entre los primeros que vieron la economía en términos del flujo de energía destaca el médico ucraniano S.A. Podolinsky, quien en 1880 calculó el EROI of

agricultura. Por su lado, el biólogo escocés, Patrick Geddes, influenciado por John Ruskin, entró en una polémica contra el economista León Walras en 1884. Geddes presentó los principios de una tabla input-output física de la economía, señalando la parte de los inputs que se iba perdiendo, disipando, antes de llegar al producto final. Patrick Geddes fue después urbanista, precursor del urbanismo ecológico. Años más tarde, el discípulo neoyorkino de Geddes, Lewis Mumford, iba a marcar una línea parecida desde la década de 1920 hasta la de 1980. Volviendo a Europa, el químico Wilhelm Ostwald publicó en 1909 una interpretación de la historia económica en términos de dos tendencias contrapuestas: el uso cada vez mayor de energía pero también la mayor eficiencia del uso de energía. En vez de apuntarse a esta interesante propuesta susceptible de investigación empírica, el sociólogo Max Weber muy empeñado en preservar la separación de las ciencias naturales y las ciencias sociales, le hizo una crítica despiadada. Mientras tanto, Alfred Lotka introdujo la diferencia entre el uso endosomático y el uso exosomático de energía en la especie humana, y se preguntó qué límites tenía el uso exosomático. Otro químico, Premio Nobel, Frederick Soddy, experto en radioactividad, propuso en un libro publicado en 1922 que había una gran diferencia entre las finanzas y la verdadera riqueza, citando a John Ruskin. Resumiendo: las deudas podían aumentar exponencialmente, por lo menos durante un tiempo, mientras la economía física, la verdadera riqueza, decae entropicamente. Sin olvidar además la polémica entre Otto Neurath de un lado y von Mises y Hayek de otro, acerca del cálculo económico en una economía socialista en los años 1920 que fue una discusión sobre la insuficiencia de los precios de mercado para señalar la escasez y asignar intergeneracionalmente los materiales y energía, donde Neurath llevaba razón.

Ya más tarde, en los años 1960 y 1970, hubo una eclosión de lo que ahora llamamos Economía Ecológica. En los años 1970, a principios, los Meadows publicaron *Limits to Growth*, y H.T. Odum, *Energy, Power and Society*. Unos y otros asistieron como ponentes de honor a congresos de Economía Ecológica a partir de 1990 mientras Roefie Hueting quien había publicado un libro, primero en holandés y después en inglés, proponiendo más bienestar con menos crecimiento económico estuvo, como también René Passet, en la reunión inaugural de lo que iba a ser la Sociedad Internacional de Economía Ecológica en Barcelona en 1987. En Italia había Enzo Tiezzi, Giorgio Nebbia, en España, José Manuel Naredo ya en los años 1970, y en Japón la llamada “escuela de Entropía” con Tamanoi, Tsuchida y después con Kozo Mayumi. También en los 1970 escribían sobre economía y medio ambiente desde perspectivas muy críticas autores muy conocidos como Ernst Schumacher, Ivan Illich, André Gorz, Barry Commoner, Murray Bookchin (quien había empezado muy pronto)... y claro está, K.W.Kapp, K. Boulding, N. Georgescu-Roegen, H.Daly.

Todos ellos veían la economía físicamente y atacaban a los economistas. Muchos dieron recomendaciones de cambio social. Sería absurdo ponerse ahora a pelear acerca de ¿quién dijo qué primero que los demás, en qué idioma europeo o no europeo?

Todos esos autores era escritores, intelectuales, pero también un político importante, Sacco Mansholt, de la

Comisión Europea, dijo en 1972 que había que parar el crecimiento económico mientras que los Verdes alemanes, fundados en 1980, en su primera aparición en el Bundestag ya criticaron el PIB sin que los partidos mayoritarios hicieran caso de tal extravagancia.

Ahora en el 2008 en Europa esas ideas no son ya nuevas aunque su formulación va mejorando. Lo que es nuevo es el movimiento social por el Decrecimiento Sostenible, un slogan o “palabra-bomba” inventada en Francia y en Italia con explícitas raíces en Georgescu-Roegen. Vean por ejemplo el libro de Serge Latouche, *La apuesta del decrecimiento*, Icaria, Barcelona, 2007.

Jacques Grinevald, cuando era un muy joven asistente de la Universidad de Ginebra (aunque él es francés) conoció a Georgescu-Roegen a principios de los años 1970 durante una visita de éste a la ciudad. Grinevald ha tenido buenas ideas en su vida: popularizó (en francés) la Biosfera de Vernadsky antes que cualquier otro en Occidente, escribió una historia intelectual del cambio climático ya en 1990, había introducido en los años 1970 la denominación “Revolución Termo-Industrial” para la Revolución Industrial, remitiendo así a Sadi Carnot y a la potencia motriz de la combustión de carbón de piedra en la máquina de vapor. Grinevald vino a Barcelona el 1987 a la reunión fundadora de la Sociedad Internacional de Economía Ecológica y aunque sabe inglés, prefirió dar un breve y brillante discurso en francés como suele hacer (similar performance en el congreso de París de Sustainable De-Growth en abril 2008) causando la irritación de bastantes estadounidenses. Uno de ellos, Robert Herendeen, le contestó durante unos tres minutos en noruego. Me tocó poner paz y regresar al inglés común a todos. Los ingleses mismos no suelen protestar cuando alguien habla francés en Europa en una reunión o en un congreso – se sienten culpables porque el francés que estudiaron en la escuela no les alcanza, además saben que su reina habla francés. En cualquier caso, los franceses universitarios jóvenes ya han aprendido a hablar el inglés de conferencia internacional que los de otros países aprendieron a hablar desde hace décadas.

Por Grinevald, un hombre que ha sufrido pero que se ha mantenido en una línea investigadora y personal coherente, Naredo y yo tenemos amistad, una *faiblesse* por él desde hace treinta años. En 1979 con Ivo Rens, también de la Universidad de Ginebra, publicó una introducción y selección de textos de Georgescu-Roegen con el beneplácito del autor y el título *Démain la Décroissance* que va ahora por la cuarta o quinta edición y se llama ya simplemente *La Décroissance*. Ese es el origen del uso actual de esta palabra.

Ahora bien, Georgescu-Roegen, que era duro con sus discípulos, había criticado en los años 1970 la idea de Herman Daly (que se remonta a Stuart Mill) del “estado estacionario” argumentando que eso no era suficiente para una economía como la de Estados Unidos que consumía ya en exceso. Debía haber un retroceso del consumo. Georgescu tenía razón. Pero no se puede negar que Herman Daly ha sido un abierto partidario del Decrecimiento aunque la palabra, en inglés, sea de uso muy reciente.

Herman Daly dijo claramente que el Crecimiento Sostenible era una contradicción, un oxymoron, muy poco

tiempo después de la publicación del Informe Brundtland de 1987, y dijo que aceptaría la expresión “desarrollo sostenible” solamente si la palabra “desarrollo” se redefinía (de manera muy extraña) como “no-crecimiento”. Daly está con el Decrecimiento desde 1968 cuando tenía apenas 30 años, desde entonces ha publicado decenas de libros y artículos contra la economía ortodoxa. Daly también ha tenido razón en insistir en la importancia de la demografía.

Decrecimiento sí, pero ¿de qué y de qué manera? Si decimos que la economía debe decrecer, pueden preguntarnos: ¿debe decrecer la economía en su descripción crematística o como ecología humana? La respuesta es muy clara: la economía debe decrecer físicamente tal como la miden los indicadores antes explicados, es decir, en términos de las toneladas de los Flujos de Materiales, de la Energía, de la HANPP, y también del uso de agua. En principio existe ya un acuerdo social en Europa que las emisiones de dióxido de carbono deben decrecer 50 por ciento en las próximas décadas con respecto a las de 1990. Pero también deben hacerlo otros indicadores físicos de presión sobre el ambiente.

Sin embargo, dada la estrecha relación entre el uso de materiales y energía y el crecimiento económico (en bastantes países incluso aumenta la intensidad material y energética del PIB), dado que también la HANPP aumenta no sólo con la presión demográfica sino con el crecimiento económico (por el consumo de carne, el consumo de madera y pasta de papel, y por los agro-fuels), entonces puede suponerse que reducir las magnitudes de los indicadores físicos llevará también en muchos casos a un decrecimiento del PIB, es decir, de la economía medida crematísticamente.

El decrecimiento económico causará dificultades sociales que hemos de discutir para que nuestra propuesta pueda ser socialmente aceptada. Si la productividad del trabajo (por ejemplo, el número de automóviles que un obrero produce al año) crece 2 por ciento anualmente y si la economía no crece, eso llevará a un aumento del desempleo. Nuestra respuesta es doble. Los aumentos de productividad no están bien medidos. Por ejemplo, si hay una sustitución de energía humana por energía de máquinas, ¿los precios de esta energía tienen en cuenta el agotamiento de recursos, las externalidades negativas? Sabemos que no es así. Además, hay que separar más que actualmente el derecho a recibir una remuneración del hecho de que uno tenga empleo asalariado. Esa separación ya existe en muchos casos (niños y jóvenes, pensionistas, personas que perciben el seguro de desempleo) pero debe ampliarse más. Hay que redefinir el significado de “empleo” (teniendo en cuenta los servicios domésticos no remunerados, y todo el sector del voluntariado) y hay que introducir o ampliar la cobertura de la Renta de Ciudadano.

Otra objeción. ¿Quién pagará la montaña de créditos, las hipotecas y la deuda pública, si la economía no crece? La respuesta debe ser: nadie. No podemos forzar indefinidamente a la economía a crecer al ritmo del interés compuesto con que se acumulan las deudas. El sistema financiero debe tener reglas distintas de las actuales. No se puede poner como objetivo el hacer dinero para los accionistas y otros acreedores a través de un crecimiento que es ficticio.

Pero también se objetará que si un país no crece económicamente, los capitales emigrarán a países donde las tasas de ganancia son mayores porque sus economías crecen. La respuesta es que el razonamiento es exacto, y que al fin y al cabo no es mala idea que el ahorro de un país rico que no quiere crecer más se traduzca (más allá de la reparación y amortización del capital físico propio) en inversiones y donaciones incorporadas en tecnologías que sean ambientalmente lo menos dañinas posible, hacia países pobres que deben crecer todavía, vigilando sin embargo cuál es la marcha de sus indicadores físicos que finalmente deben dejar de crecer. El movimiento del Decrecimiento Sostenible debe ser internacional.

No solo hay razones ecológicas para el Decrecimiento. Hay otras razones. En primer lugar, tal como el movimiento feminista mostró hace décadas, el PIB no valora lo que no está en el mercado como el trabajo doméstico no remunerado y el trabajo voluntario. Una sociedad que sea rica en tales bienes y servicios “relacionales” tendrá un PIB más bajo que una sociedad (horrible e imposible) donde las relaciones personales estuvieran siempre mediadas por el mercado. El movimiento del Decrecimiento Sostenible insiste en el valor no-crematístico de los servicios locales y recíprocos. Imaginen un slogan publicitario (inspirado por Castoriadis): prefiero una nueva amiga o amigo a un nuevo Mercedes Benz. Pero la publicidad es financiada solo por los productos que dan dinero. Tal vez la Mercedes Benz saca un anuncio diciendo: “prefiero una nueva amiga con un Mercedes Benz”.

En segundo lugar, hay economistas –o mejor dicho, psicólogos- que han averiguado con métodos de economía experimental que la felicidad no aumenta con el aumento del PIB per capita. Mejor dicho, sí que aumenta a niveles muy bajos pero no ya después. Estas investigaciones renuevan los trabajos sobre lo que se conoce como la Paradoja de Easterlin.

Malthusianismo y Decrecimiento

Hay amplio acuerdo en el movimiento del Decrecimiento Sostenible en favor de parar el crecimiento de la población humana mundial. En el siglo XX la población se multiplicó por cuatro, de 1,500 millones a 6,000 millones. En algunos países debería disminuir. Puestos a escoger, preferimos a Paul Ehrlich (*La bomba de la población*, 1968) que a demógrafos y economistas como Alfred Sauvy, Colin Clark o el Papa y otros fundamentalistas religiosos. La economía de un mundo donde la población humana aumente todavía hasta 9,000 millones de personas hacia el 2050 (como es posible) tendrá, a igual nivel de vida, un peso físico doble que la economía de un mundo con un decrecimiento de la población hasta 4,500 millones de personas.

En Europa se oye a veces una objeción algo ridícula: ¿quién pagará nuestras pensiones? Hay que responder como Serge Latouche. Supongamos que para pagar la pensión de una persona anciana hace falta dos trabajadores en activo, dentro de unos años hará falta cuatro trabajadores para pagar la pensión de los dos anteriores, y años más tarde hará falta ocho. No podemos hacer descansar el pago de pensiones en una “pirámide” de población que crezca continuamente.

Ha habido distintos tipos de malthusianismo. Malthus era muy reaccionario pero el neo-malthusianismo europeo y

americano de 1900 era feminista, radical, proto-ecologista, como muestran los trabajos de Francis Ronsin en Francia y Eduard Masjuan en España. Eso señala el camino a seguir.

- El malthusianismo de Malthus.- La población tiene un crecimiento exponencial a menos que sea frenado por la guerra y las pestes, o por la castidad y los matrimonios tardíos. Los alimentos crecen en menor proporción que el trabajo disponible debido a los rendimientos decrecientes en la agricultura. Por tanto, habrá crisis de subsistencias.
- El neo-malthusianismo de 1900.- Las poblaciones humanas pueden regular su propio crecimiento mediante la contracepción. Para eso es necesaria la libertad de las mujeres para elegir el número de hijos. Esa libertad es deseable en sí misma. La pobreza tiene por causa la desigualdad más que la sobrepoblación pero hace falta una "procreación consciente" para impedir los salarios bajos y la presión sobre los recursos naturales. Este movimiento de base tuvo éxito en Europa y América (Estados Unidos, Argentina...) contra los estados (que querían más soldados) y contra las iglesias.
- El neo-malthusianismo tras 1970.- Una doctrina y una práctica impulsada por organizaciones internacionales y algunos gobiernos que ven el crecimiento demográfico como causa principal de la pobreza y de la degradación ambiental. Por tanto, los estados deben imponer los métodos contraceptivos incluso sin el previo consentimiento de las mujeres.
- El anti-malthusianismo.- Existe todavía entre algunos economistas. Suponen que el crecimiento de la población no amenaza el ambiente natural y que lleva al crecimiento económico.

Los movimientos de Justicia Ambiental

En conclusión, para que el Decrecimiento Sostenible tenga éxito, debe ser internacional (Norte y Sur) y debe hacer frente a preocupaciones muy concretas de la gente. Debe haber una confluencia de todos estos grupos:

- conservacionistas o ambientalistas preocupados por la pérdida de biodiversidad y por el aumento de la población humana,
- los que se preocupan por el cambio climático, por sus amenazas a ciertas zonas del mundo, los que tienen interés en proponer nuevos sistemas energéticos renovables,
- los socialistas y sindicalistas que quieren más justicia económica y que entiendan que el crecimiento económico no puede aplazar ya las demandas de redistribución,
- los eco-localistas y autonomistas neo-rurales y urbanos (como los okupas – véase la tesis doctoral de Claudio Cattaneo del 2008 en el ICTA-UAB, *The Ecological Economics of Urban Squatting in Barcelona*)
- los pesimistas (o realistas) acerca de los riesgos e incertidumbres del cambio tecnológico,

- y los movimientos del Ecologismo de los Pobres que piden la conservación del ambiente por las perentorias necesidades de su propia subsistencia.

Escribo la última línea anterior teniendo presente que en el 2007 y 2008 he viajado a algunas de las fronteras de la extracción de materias primas. Estuve en Orissa con Leah Temper y con Felix Padel escuchando la antigua sabiduría y la cansada indignación de B.P. Rath en Rayagada. Él es un socialista gandhiano seguidor de Rammanohar Lohia. Fuimos a Kucheipadar a escuchar a los que han resistido contra la Alcan y Utkal, subimos a las Niyamgiri Hills, un bellissimo bosque de Sal (*shorea robusta*) con altares y pequeñas capillas que pertenece a los Dongria Khond y que será arrasado por la minería de bauxita para aluminio. En Ecuador, una vez más, estuve metido en la defensa del Parque Nacional Yasuní contra Petrobrás, Repsol y los que vendrán, y ayudé un poco a Pablo Fajardo y a Luis Yanza junto con Acción Ecológica en la valoración de los daños de la Chevron-Texaco para el juicio en Lago Agrio que llegará pronto a una sentencia.

Hay tantísimos lugares de lucha donde no he viajado, de donde no tengo tampoco información. Una ONG italiana, A-Sud, está tratando valientemente de recopilar y poner al día noticias de conflictos ambientales en todo el mundo.

Puede parecer a primera vista que los países del Sur tienen muy poco que ganar y bastante que perder con el Decrecimiento en el Norte porque tendrían menos oportunidades de exportación tanto de materias primas como de manufacturas, y también recibirían menos créditos y donativos. El 0.7% del PIB del Norte será menor en términos absolutos cuánto menor sea el PIB. Sin embargo, la Justicia Ambiental y el Ecologismo de los Pobres son las mayores fuerzas del mundo en favor de una economía sostenible. Se expresan en acciones como las siguientes.

- Las quejas contra la contaminación desproporcionada de los ricos tanto local como globalmente. Reclamo de la Deuda Ecológica desde el Sur, especialmente la Deuda por Emisiones de Dióxido de Carbono - www.deudaecologica.org
- Las protestas contra la exportación de residuos líquidos o sólidos del Norte hacia el Sur (por ejemplo, el porta-aviones "Clemenceau" a Alang en Gujarat).
- Las protestas por la Biopiratería.
- Las protestas por la *Raubwirtschaft*, es decir, el comercio ecológicamente desigual, la destrucción de la naturaleza y de la subsistencia humana en las fronteras de la extracción.
- Las reclamaciones de pago de pasivos socio-ambientales de compañías transnacionales como la Oxy en Perú, Chevron-Texaco en Ecuador, FreeportMcMoRan en Papúa Occidental, Unocal y Total en Birmania...

Los movimientos de Justicia Ambiental y del Ecologismo de los Pobres del Sur son de hecho los mejores aliados del Decrecimiento Sostenible del Norte.

Les services ne sont pas « la » solution à la crise écologique

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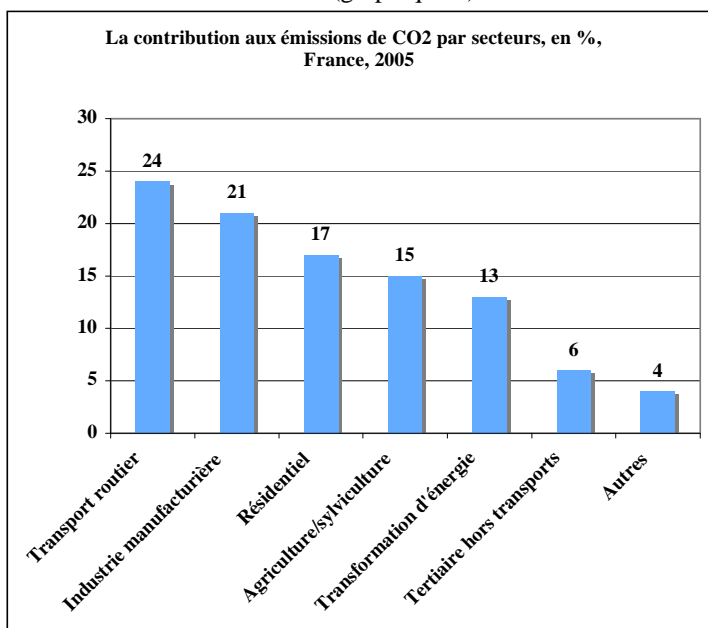
Résumé

Ce texte est un résumé d'une contribution au colloque « Services et développement durable », Poitiers, mars 2008.

1. Introduction

La réflexion sur le rôle des services dans une perspective de durabilité (au sens environnemental du terme) peut débiter en opposant deux types de chiffres, conduisant à des diagnostics radicalement opposés. Pour les premiers, les services seraient des activités étonnamment « vertes », pour les autres, les économies de services seraient les plus consommatrices de ressources naturelles et les plus polluantes.

Premiers chiffres : en France, les données sur les émissions de CO₂, qui font partie des grands marqueurs de pression écologique associés aux risques de changement climatique, sont publiées par secteurs d'activités humaines. On obtient alors les résultats suivants (graphique 1).



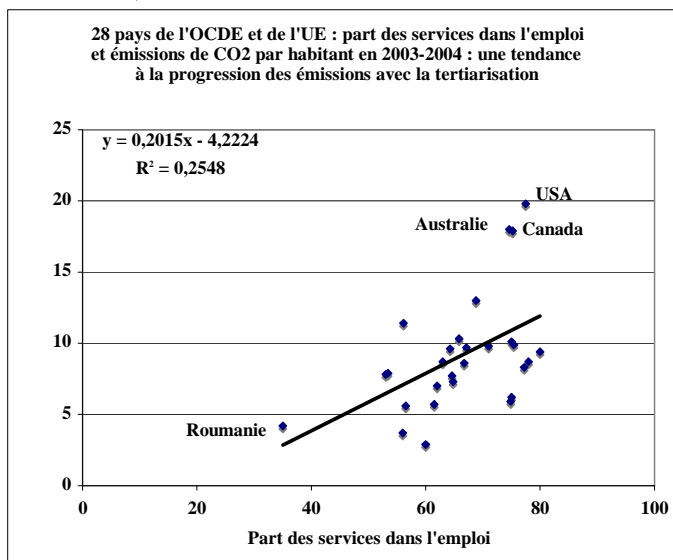
Graphique 1. Source : Citepa 2007

http://www.citepa.org/emissions/nationale/Ges/Emissions_FRmt_GES.pdf

Un tel graphique semble donner un avantage déterminant aux services (hors transports) : ils représentent, en 2005, 71,5 % de l'emploi en France, et ils ne contribueraient que pour 6 % aux émissions, une performance écologique apparemment remarquable au regard de celles des autres secteurs d'activité (le « secteur résidentiel », celui des

habitations, n'étant pas un secteur d'activité mais un secteur de consommation).

Seconds chiffres : si les services sont écologiquement très « légers », on pourrait penser que les pays dont l'économie est la plus « tertiaire » se comportent mieux sur le plan de leur pression écologique par habitant. Reprenant la variable des émissions de CO₂ par habitant, et la croisant avec le poids des services dans l'emploi, on obtient le graphique 2 suivant, pour 28 pays de l'OCDE et de l'Union européenne (quelques pays manquent à l'appel parce que les données font défaut) :



Graphique 2. Sources. Emploi dans les services : OCDE et Eurostat ; émissions : PNUD, 2006

Sans être très forte, la corrélation est significative, et la tendance est visiblement à ce que les pays les plus tertiaires soient les plus pollués selon ce critère, les records étant détenus par trois pays qui ont refusé de signer le protocole de Kyoto, dont les États-Unis. L'Australie, ravagée par la sécheresse et les incendies, est revenue en 2007 sur ce refus.

Les constats empiriques précédents, en forme de contradiction, invitent à creuser la question de la pression écologique des services et de sa mesure (section 1), avant de traiter celle de l'avenir de l'emploi tertiaire sous contraintes environnementales (sections 2 et 3).

1. La matérialité des services et de leurs externalités, dimension essentielle de leur économie écologique¹

L'idée selon laquelle nous assistons à une « dématérialisation de l'économie » qui aurait notamment à voir avec l'expansion des services est une contrevérité. Un service est peut-être, comme on l'a écrit sur un mode plaisant, « un produit qui ne vous fait aucun mal quand il vous tombe sur les pieds », mais sa production et sa consommation font parfois autant de mal à la planète que celles des autres produits.

La relation de service et son environnement matériel doivent faire l'objet d'une analyse écologique complète

¹ Cette section doit beaucoup à des échanges avec Fabrice Flipo et Jean-Marc Jancovici.

La « relation de service » et la « coproduction » des services ont fait l'objet, à juste titre, de beaucoup d'attention et de travaux de la part des socio-économistes des services. Mais ils ont eu tendance à oublier la matérialité de ces « rencontres ».

Les trois composantes principales de cette matérialité de la relation de service sont les suivantes :

1) *le déplacement des personnes, indispensable à la fourniture du service* : déplacement des prestataires dans certains cas (services à domicile, consultants...), des usagers/clients dans d'autres cas (de loin les plus nombreux : élèves et étudiants, patients, clients du commerce ou des hôtels et restaurants...), et, parfois, déplacement des deux catégories d'acteurs de la relation : accompagnateurs de voyages, taxis et conducteurs de bus... mais aussi déplacements des salariés du tertiaire vers les bureaux des administrations ou les lieux de prestation des organisations de services. Les services ne peuvent pas être rendus sans une multitude de déplacements que l'on a tendance à oublier lorsqu'on se limite à leurs « facteurs de production » classiques. Et la matérialité des déplacements n'est pas seulement celle des flux (émissions des véhicules et des transports collectifs, énergie consommée), c'est aussi celle des stocks des véhicules et des infrastructures, pour la part qui revient à la production et à la consommation des services.

2) la matérialité des espaces de la relation : bureaux, salles d'enseignement, hôpitaux, guichets des banques, etc. Il faut des ressources naturelles pour les construire (le stock), et d'autres (des flux réguliers) pour les entretenir, les chauffer, les éclairer,

3) la matérialité des outils techniques d'appui à la relation, au guichet, au comptoir, et plus encore à l'hôpital, ainsi que la matérialité du « back-office », qui peut être très « lourd », en stock et en flux.

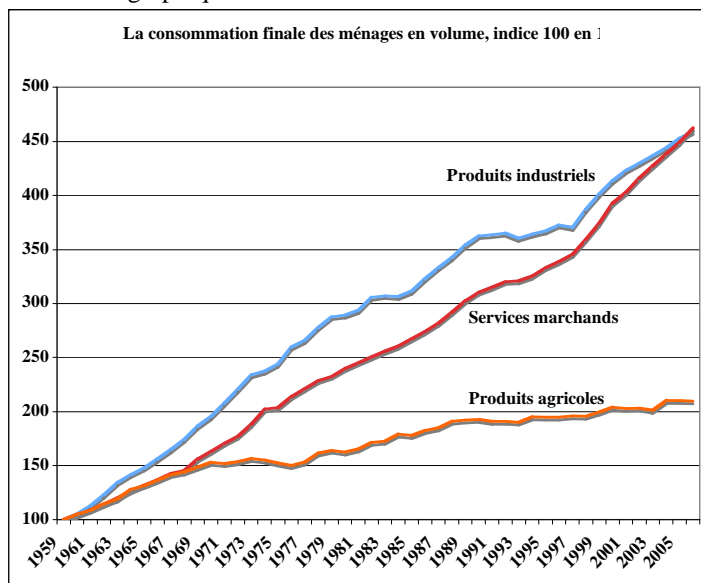
La principale explication de l'avantage considérable que détiennent les services dans les données d'émissions de CO2 par secteur (graphique 1) est que l'on n'y compte que les flux d'émissions associées au chauffage et à l'éclairage des bâtiments, et accessoirement à d'autres utilisations de l'énergie pour les outils techniques. Il ne s'agit que d'une fraction minoritaire de l'usage de ressources matérielles pour produire et consommer les services.

Par exemple, dans le bilan carbone effectué en France par l'ADEME pour la chaîne de supermarchés Casino, près de 40 % des émissions de CO2 tous domaines confondus correspondent aux déplacements des clients. Ce chiffre serait-il très différent pour le bilan carbone d'un campus universitaire ou d'un centre hospitalier, compte tenu de l'ampleur des déplacements quotidiens induits par les activités « immatérielles » de l'enseignement, de la recherche, et des soins médicaux ? Serait-il très différent dans le cas des spectacles et des concerts ? Les chercheurs, si attachés à l'organisation de colloques « de haut niveau », de préférence internationaux, ont-ils conscience de la contribution de leur production « immatérielle » de savoirs au réchauffement climatique ?

Le bilan écologique des services doit tenir compte de la consommation de ressources naturelles des prestataires

On a tendance à oublier un fait majeur : la croissance des services n'a été possible que parce que, d'un côté, les prestataires de services pouvaient disposer d'un niveau de vie comparable à celui des autres actifs pendant que, d'un autre côté, les consommateurs pouvaient dépenser de moins en moins (en proportion de leur budget) en biens matériels de base, et devenir acheteurs de services (c'est ce qu'on appelle parfois la « loi d'Engel »). Cela s'est produit parce que la composante de biens matériels de base de ce niveau de vie (se nourrir, se loger, se vêtir...) a fait l'objet de fantastiques gains de productivité « brute », lesquels ont été obtenus, surtout au cours des cinquante dernières années, en surexploitant les ressources naturelles et en émettant des déchets et des GES au-delà de ce que la nature peut régénérer selon ses propres rythmes. Pour le dire d'une façon très provocatrice, *la « société de services », telle en tout cas qu'elle s'est développée, en s'appuyant sur un productivisme « insoutenable » appliqué dans les autres secteurs, mais aussi parfois dans les services, est sans le savoir une société anti-écologique, hyperindustrielle et hypermatérielle.*

Ajoutons un argument. Si l'on examine uniquement les chiffres d'emploi, on obtient, quelle que soit la conjoncture économique, une progression considérable aussi bien de l'emploi total dans les services que de son poids relatif, au détriment de l'agriculture et de l'industrie. Le tableau est bien différent en ce qui concerne les quantités produites ou consommées (les « volumes », au sens statistique). Si l'on prend par exemple les grands postes de la consommation finale des ménages (hors services publics non payants), on obtient le graphique 3 :



Graphique 3

Depuis 1959, le volume de biens industriels consommés par les ménages a été multiplié par plus de 4,5, tout comme celui des services marchands. Quant aux produits agricoles consommés, la progression de leur volume est certes bien plus faible, mais ce volume a néanmoins plus que doublé. En conséquence, même ceux qui assimileraient la progression de la matérialisation de l'économie à l'importance accrue de la consommation de produits industriels et agricoles devraient considérer qu'un tel graphique supporte l'idée que les « économies de services » (sous l'angle du poids dominant de ces activités dans

l'emploi et dans la valeur ajoutée) sont des économies de plus en plus « matérielles ». Dans « les économies de services », on produit et on consomme de plus en plus de « biens matériels ».

2. La tendance à la progression de l'emploi tertiaire sera affectée voire inversée

La tendance historique observable (au moins à partir du 19^{ème} siècle) à la progression de la part des services dans l'emploi et la valeur ajoutée sera affectée, et peut-être inversée dans les pays développés, tout comme la tendance à la croissance économique et à celle de la productivité, *telles qu'elles sont définies et mesurées aujourd'hui*. Notre hypothèse est la suivante : de nombreuses transformations nécessaires de la production (de biens ou de services) s'accompagneront d'une *réduction de la productivité du travail, telle qu'on la mesure actuellement*. D'éventuelles mesures alternatives ne sont pas à exclure, mais elles n'existent pas encore. Et bien que tous les secteurs soient concernés, l'agriculture, l'énergie, le bâtiment et une fraction de l'industrie seront aux premières lignes. Cela viendra renforcer la tendance à ce que leur poids dans l'emploi cesse de régresser, d'autant qu'une partie des besoins correspondants sont fondamentaux, de sorte que la demande restera forte. Ce poids devrait même progresser nettement dans certaines branches de la « production matérielle ».

L'explication résumée est la suivante : les produits durables, « propres » ou « verts » (biologiques, recyclables, de plus longue durée de vie, impliquant moins de transport et d'énergie, etc.) exigent et exigeront plus de travail par unité produite que les produits pollués ou polluants issus des procédés productivistes. Ne plus surexploiter la nature et gérer ses « services » avec précaution est bon pour l'emploi (au moins dans certaines branches où la demande ne devrait pas faiblir) mais mauvais pour la productivité du travail « brute », celle qui n'enregistre pas les gains ou les pertes de qualité écologique des produits.

Au total, selon les hypothèses que nous allons explorer, les services ne seront plus les seuls grands « gisements d'emplois » du futur, même si certains d'entre eux conserveront cette qualité en réponse à des besoins sociaux de proximité faisant l'objet d'innovations de durabilité.

Commençons par développer un exemple majeur. L'emploi devrait croître globalement dans l'un des grands secteurs que tous les raisonnements classiques condamnaient à un déclin inexorable sous l'effet des gains de productivité : l'agriculture².

L'agriculture : une révolution verte créatrice d'emplois en grand nombre, pour contrer la crise alimentaire mondiale en respectant l'environnement

Dans le passé, la principale façon de faire croître la quantité de production économique (telle qu'on la mesure

² Avec une nuance : certaines productions agricoles ne sont pas appelées à suivre cette tendance moyenne. Par exemple, pour des raisons qui tiennent à sa forte empreinte écologique, l'élevage des bovins devrait connaître à terme une forte décroissance car il s'accompagne d'un haut niveau d'émissions de gaz à effet de serre.

actuellement) a été la réalisation de gains de productivité du travail, qui se résument par la formule : produire plus *des mêmes choses* avec la même quantité de travail. Jean Fourastié avait montré par exemple que s'il fallait autour de 200 heures de travail pour produire un quintal de blé de l'an 1000 jusqu'au 18^{ème} siècle, avec de fortes variations selon les années, il n'en fallait plus que 30 vers 1950. On en est aujourd'hui à 2,5 heures avec les techniques les plus « productives », en comptant le temps de travail nécessaire à la production des machines et des « intrants » de la production³. Remarquable contribution à la croissance ! Dans les pays « riches », 2 % à 3 % d'actifs suffisent à nourrir tous les habitants, et parfois plus si le solde du commerce extérieur est positif ! Oui, mais...

Le raisonnement de Fourastié, repris par d'autres économistes, repose sur une hypothèse centrale : la tonne de blé moderne est « la même chose » que la tonne de blé ancienne. En apparence, tel est le cas, et l'on peut même probablement invoquer certaines propriétés physico-chimiques attestant de la supériorité des méthodes modernes, si l'on s'en tient aux grains de blé ou à la farine.

Or le blé moderne est issu d'une agriculture de plus en plus intensive qui produit, en même temps que le blé, de considérables externalités négatives. Elle utilise massivement des intrants chimiques, pesticides et autres, dont on commence à évaluer les impacts négatifs sur la santé, sur la mise à mal des écosystèmes, et sur la disparition d'insectes pollinisateurs pourtant essentiels pour bien d'autres productions. Elle contribue (avec d'autres) à épuiser et polluer les nappes phréatiques et à accentuer la désertification, ce qui réduit les deux principales ressources de la production agricole : les terres arables disponibles et l'eau. Elle a remplacé l'énergie humaine par de l'énergie « mécanique » à base de pétrole : c'est cette substitution du capital (et du pétrole) au travail qui explique la plus grande partie de ses gains de productivité. Les plus gros tracteurs ou moissonneuses batteuses ont une puissance de 500 ch et des moteurs d'une cylindrée de 10 à 12 litres. Tout cela s'accompagne d'émissions de CO₂, et le pétrole est en voie de raréfaction. Enfin, comme la distance s'accroît entre les lieux de la production agricole à grande échelle et les lieux de transformation et de consommation, le blé ou la farine modernes exigent du transport, lui-même gros pollueur.

Donc le blé intensif « incorpore » toute une série de caractéristiques négatives au regard de la durabilité. *Les mesures de la productivité et de la croissance les ignorent*. Pour en tenir compte, il faudrait déduire de la valeur de ce blé « pollueur » la valeur estimée des nombreux dommages collatéraux que sa production et son transport entraînent, et tenir compte de la « valeur d'option » (valeur attribuée aux usages dans le futur) des ressources non renouvelables utilisées (le pétrole surtout). C'est délicat, mais c'est envisageable. Qu'obtiendrait-on ? Difficile à dire en l'absence regrettable de tels travaux, mais, en s'inspirant des différences de prix entre l'agriculture intensive et l'agriculture biologique, on peut grossièrement estimer que la productivité ainsi « corrigée » de l'agriculture intensive serait divisée par deux ou plus par rapport à sa valeur brute, en fonction du mode d'évaluation des dégâts écologiques et de la déplétion du pétrole. Ses « véritables » gains de

³ <http://www.jean-fourastie.org/temoin1.htm>

productivité dans la période récente, celle où elle a le plus malmené la nature, seraient probablement faibles ou nuls. Plus généralement, selon des indicateurs existants de « PIB verts », la « croissance corrigée » aurait été nulle depuis 1970 aux États-Unis, et les fantastiques taux de croissance de l'économie chinoise pourraient être divisés par deux ou plus...

Si l'agriculture industrielle était convertie par étapes en un système durable, on n'en reviendrait pas pour autant au Moyen-âge. Il s'agirait même d'une « modernisation » exigeant des innovations, mais il faudrait envisager un retournement inattendu : l'emploi dans l'agriculture, qui n'a cessé de décroître depuis la révolution industrielle (il ne représente guère plus de 3 % de l'emploi total en France, contre 27 % en 1954), devrait augmenter pour satisfaire une demande durable, avec des « prix durables » (plus élevés) incorporant les exigences nouvelles. Il en irait de même de la valeur ajoutée de ce secteur : son poids dans le PIB progresserait nettement. Cette hypothèse concernant la production repose implicitement sur une seconde hypothèse relative à la demande : les ménages augmenteraient leur « coefficient budgétaire » pour ces produits alimentaires devenus à la fois plus chers et durables, ce qui suppose de réfléchir à une notion de « pouvoir d'achat durable » et de réduire les inégalités de revenu pour que ces produits durables restent accessibles à tous.

On aurait alors une forte baisse de la productivité, *mesurée selon les méthodes actuelles*, mais l'emploi progresserait, à production donnée en quantités brutes (par exemple les quintaux de céréales). Croissance zéro (dans ce secteur), emploi en hausse ? Cela semble difficile à croire. C'est pourtant possible si l'on tient compte des nécessaires gains de qualité et de durabilité, nouveaux grands gisements d'emplois du « développement durable ». En réalité, si l'on était capable d'intégrer les gains de qualité et de durabilité dans les mesures des variations de prix et de productivité, il est probable que l'on assisterait non pas à une baisse de la productivité, mais plutôt à des gains.

En France, une agriculture durable et de proximité, avec pour objectif un haut degré de souveraineté alimentaire, ce qui ne veut pas dire le protectionnisme intégral, pourrait représenter à terme entre 1,5 et 2 millions d'emplois contre moins d'un million aujourd'hui⁴. Il n'y a en France que 1,7 % de fermes biologiques contre 9 % en Autriche. Il faudrait passer à 10 ou 20 fois plus. Par ailleurs, l'exploitation raisonnée et durable de la biomasse (l'une des multiples énergies renouvelables, dont fait partie le bois-énergie)

⁴ Objection : le remplacement progressif de l'agriculture intensive par une agriculture durable, plus riche en emplois, orientée vers des marchés plus proches, n'est-il pas contraire à l'impératif de nourrir une population mondiale croissante ? Non, au contraire. D'abord, nous n'avons pas vraiment le choix, car sans de telles mesures, la population mondiale souffrira de catastrophes liées au dérèglement de l'environnement, et les plus pauvres seront aux premières lignes. Ensuite, la FAO elle-même affirme le rôle essentiel d'une agriculture durable pour nourrir l'humanité et maintenir des emplois « au pays » (<http://www.fao.org/newsroom/fr/news/2007/1000550/index.html>), ce que confirme le beau livre de Bruno Parmentier (*Nourrir l'humanité*, La découverte, 2007), qui défend la souveraineté alimentaire comme un droit pour chaque peuple, contre le productivisme mondialisé.

pourrait à elle seule exiger 150 000 emplois agricoles nouveaux.

Deuxième exemple : les énergies renouvelables et les activités d'économie d'énergie devraient créer, vague d'innovation à l'appui, des centaines de milliers d'emplois dans l'agriculture, l'industrie et les services

On commence à disposer de scénarios de bonne qualité concernant la montée en puissance des énergies renouvelables, en France et dans beaucoup d'autres pays. Le scénario 2006 pour la France de l'association négaWatt⁵ (110 experts et praticiens) combine 1) le recours croissant à des technologies de production d'énergie propre (les renouvelables), 2) la recherche d'efficacité énergétique (des bâtiments, des appareils : consommer moins de Kwh pour un même usage, par exemple moins de Kwh pour une température donnée des bâtiments), et, 3) la sobriété énergétique (réduction des gaspillages). Ce n'est pas un scénario de régression, au contraire : entre 2000 et 2050, l'usage de l'électricité doublerait à consommation de Kwh stabilisée (efficacité et sobriété), la mobilité (transports) progresserait de 15 % (moyennant un doublement de l'usage des bus et des trains). Les émissions de gaz à effet de serre liées à la production et consommation d'énergie seraient divisées par plus de 4 par rapport à 2000.

Dans ce scénario, l'emploi augmenterait nettement dans le bâtiment (construction et surtout réhabilitation), la fabrication de composants et de matériaux, les études technico-économiques, les services énergétiques et la maintenance. Surtout si l'on aide ces branches naissantes par des investissements publics et par une fiscalité incitative du côté de la demande.

Le programme de réhabilitation des logements créerait plus de 100 000 emplois à temps plein, l'éolien créerait plus de 200 000 emplois d'ici 2050, le photovoltaïque 150 000 et l'exploitation raisonnée de la biomasse permettrait de maintenir en activité 150 000 agriculteurs. Ces emplois, pour la plupart non délocalisables, contribueraient au développement local. Cela fait autour de 600 000 emplois ajoutés.

Mais qu'en est-il, dans ce scénario, des gains de productivité et de la croissance, tels qu'ils sont actuellement mesurés ? La croissance de l'emploi et la stagnation du nombre de Kwh produits conduiront à enregistrer une nette baisse de la productivité et une croissance zéro du volume de la production, comme dans le scénario précédent pour l'agriculture. Mais de tels calculs passent à côté de deux facteurs essentiels. Le premier est qu'avec un Kwh, on peut obtenir deux fois plus d'usages (ou de « service final »), or ce sont ces derniers et eux seuls qui comptent dans le « bien-être matériel » lié à l'énergie. Le second est qu'un Kwh « propre » n'est pas un Kwh « sale » : le premier ne produit pas les externalités négatives du second. Pour pouvoir refléter ce qui compte vraiment en termes de bien-être durable (la valeur d'usage durable), il faudrait que la mesure des gains de productivité (et donc des prix unitaires, du pouvoir d'achat, etc.) soit capable d'enregistrer le « volume » de l'utilité finale et les gains de durabilité écologique (par exemple les coûts des dommages évités à long terme). C'est une piste à creuser. Il existe des indices

⁵ <http://www.negawatt.org/>

hédoniques, sans doute très imparfaits, qui permettent de tenir compte du fait, par exemple, qu'avec un ordinateur actuel on « en a plus » (d'usages, de fonctions, de puissance, de rapidité, etc.) qu'avec un ordinateur d'il y a dix ans. On pourrait tenter de subvertir cette méthode, moyennant des conventions, pour qu'il soit possible de rendre commensurables un Kwh propre et un Kwh sale, et bien d'autres produits et services à « verdir » et à mieux utiliser : productions agricoles polluantes contre productions peu polluantes, kilomètres x passagers propres ou polluants dans les transports, etc.

Comme le cas de l'énergie et de l'agriculture ne sont pas isolés, on peut faire l'hypothèse que parmi les principaux gisements d'emplois utiles de l'avenir, on trouvera, dans tous les secteurs les gains de qualité, d'efficacité d'usage, et de durabilité écologique (diminution des externalités négatives). Dans de tels cas, les mesures actuelles des gains de productivité et de la croissance offriront une image biaisée du « progrès », voire afficheront une décroissance qui n'en serait pas une si l'on pouvait tenir compte de toutes les composantes bien réelles et évaluables d'une « valeur ajoutée d'usage durable » des biens et des services.

La proximité comme gisement d'emplois durables

Il est désormais évident pour tous ceux qui s'inquiètent de l'état actuel et futur des ressources naturelles qu'il faut privilégier autant que possible des activités économiques de proximité, économes en transports, plus riches en liens sociaux, rapprochant non seulement physiquement la production de la consommation, mais aussi les réseaux de producteurs, de distributeurs et de consommateurs, en y faisant fonctionner de la coopération territorialisée. C'est ce que certains appellent la « relocalisation », et elle concerne aussi bien l'agriculture que l'industrie, le bâtiment, l'énergie, et la plupart des services. Nous verrons que les services peuvent jouer à cet égard un rôle de toute première importance : à l'opposé des approches qui ont fait de l'internationalisation des services un moteur de leur expansion, c'est leur relocalisation et la proximité qui seront sans doute leurs principaux atouts.

3. Retour à l'emploi tertiaire : services gagnants, services perdants

Que viennent faire les réflexions de la section précédente dans une analyse prospective des services ? D'abord, de façon élémentaire, si certains grands secteurs qui ont connu un déclin continu dans le passé doivent retrouver un poids bien plus élevé dans l'emploi, cela laisse mathématiquement moins d'espace pour l'emploi tertiaire. Argument toutefois insuffisant, car dans les secteurs primaire et secondaire, on trouve certes des branches appelées à se développer, mais, pour d'autres, le déclin est pratiquement assuré à terme. Dans le secteur primaire, la pêche déclinera (raréfaction simultanée des ressources halieutiques et du pétrole), mais aussi, entre autres, l'élevage de bovins. Déclin aussi, par exemple, pour toutes les activités (industrielles ou de service) liées à la « société de l'automobile, du camion et de l'avion » et aux infrastructures correspondantes.

Les services gagnants

Nous avons vu que la proximité, à la fois technique et sociale, allait devenir une composante essentielle de l'organisation sociale de la production et de la consommation durables. Il semblerait donc que les services (hors transports) détiennent sur ce point un avantage comparatif considérable, puisque la plupart d'entre eux sont fournis dans le cadre de « relations de service » impliquant la coprésence des prestataires et des usagers. Mais nous avons également pu critiquer sur un plan écologique cette vision un peu idyllique, qui a tendance à oublier, entre autres, les déplacements induits, mais aussi la matérialité de la « force de travail » des prestataires et de leur empreinte écologique.

Il reste qu'entre la pression écologique des « services de proximité » et celle de la production de biens industriels et agricoles dont les composants parcourent des milliers de kilomètres avant de parvenir sur leurs lieux de mise à disposition et d'usage, il existe en moyenne une nette différence écologique, même si l'on manque de chiffres précis, en particulier sur l'ampleur des déplacements liés aux services. En réalité, les services territorialisés sont très divers, et les transports et externalités négatives qu'ils génèrent dépendent de choix d'organisation et de localisation. La grande distribution n'a pas la même empreinte écologique que le petit commerce de quartier organisé en coopératives liées à des coopératives de producteurs proches. Les services publics qui, sous des « impératifs de productivité », suppriment des bureaux ou agences de proximité pour concentrer leur production dans des centres regroupés, augmentent leurs atteintes à l'environnement tout en diminuant leur utilité sociale. Les services à domicile aux personnes âgées induisent bien plus de déplacements que les lieux de vie ou maisons de retraites de quartier, etc. L'organisation spatiale et sociale de tels services est donc plus importante que leur qualificatif commun de « services de proximité » pour un bilan écologique.

Mais l'avenir de l'emploi dans les services dépend aussi, très largement, d'une évaluation des besoins à venir, en portant un jugement sur l'utilité sociale et écologique de ces besoins, sur leur universalité, et sur leurs modes alternatifs de satisfaction. Il ne fait aucun doute, par exemple, que des besoins légitimes immenses existent en direction des personnes âgées et de la petite enfance, même si les réponses (par exemple à domicile ou non) n'ont pas la même valeur sociétale durable, et dépendent des souhaits des personnes elles-mêmes et de la qualité des options, qualité humaine comprise. Il en va de même dans nombre de services publics. Pour avoir, en France, la densité⁶ suédoise de « services sociaux » (éducation, santé, action sociale, services aux personnes âgées et à l'enfance, collectivités publiques), il faudrait trois millions d'emplois supplémentaires (soit bien plus que le nombre de chômeurs), et de bien meilleure qualité ! Ce chiffre ne signifie pas que l'on peut copier des modèles nationaux, ni que les services suédois en question soient tous écologiquement viables, mais il indique une marge de

⁶ Au sens de leur poids dans l'emploi, mais aussi au sens de leur diffusion sur tous les territoires et de leur accessibilité à tous.

création d'emplois utiles dont l'écologie devrait être étudiée.

Se pose ici la question de l'égalité d'accès à ceux des services, très nombreux, que l'on peut associer à des droits universels existants ou à conquérir, sous contraintes écologiques (un autre droit). Si la densité des « services sociaux » est plus forte dans les pays nordiques, c'est aussi parce l'on y considère que tous doivent pouvoir y accéder, quitte à ce qu'ils soient gratuits ou très peu chers pour les personnes à bas revenus.

On estime par exemple qu'un grand service public de la petite enfance exigerait de créer en France un million de places dans les 15 ans à venir et d'ajouter ainsi 150 000 emplois. Si l'on ajoute les besoins, nettement plus importants, relatifs aux personnes âgées (aide à domicile, mais aussi et peut-être surtout lieux de vie conviviaux bien insérés dans la cité, les quartiers et territoires), on ne dispose pas d'estimations de ce que produirait l'affirmation d'un droit universel, mais il est certain que cela se chiffrerait en centaines de milliers d'emplois de proximité.

D'autres services publics ou universels de proximité, associés à des droits à affirmer, devraient être considérés, notamment pour le logement (avec des emplois à la clé dans les trois grands secteurs), moyennant des bilans écologiques en stock et en flux. Plus généralement, les services publics ont contribué, non sans défauts, à nourrir les territoires. Leur affaiblissement et la disparition de services publics de proximité, outre leur impact écologique négatif, dévitalisent les régions rurales (régions dont les stratégies de durabilité auront besoin) et les périphéries urbaines en crise sociale, renforçant le double mouvement de polarisation des activités dans certaines zones et de désertification pour les autres.

Enfin, dans un contexte peu favorable sur le plan des financements publics, l'emploi dans l'économie sociale et associative, qui est essentiellement une économie de services (recoupant partiellement celle des services de proximité aux personnes), a progressé de 15% depuis 2000 et représente 10 % de l'emploi total, plus très loin de l'industrie avec ses 13,8 %. La qualité de l'emploi y est inégale et souvent faible, leur écologie est peu prise en compte, mais leur utilité sociale fait peu de doute dans la plupart des cas.

Les services perdants

En tête des services perdants, on trouve les transports routiers et aériens (et, de façon désormais non négligeable, le transport maritime, dont les émissions ont été récemment réévaluées), et avec eux nombre d'autres services et activités agricoles et industrielles qui en dépendent fortement. Il n'est pas besoin d'explicitier les causes de ce déclin annoncé, entre l'envolée du prix des carburants, les taxes à venir sur l'énergie, et l'absence d'alternatives technologiques dans des délais prévisibles et à un niveau suffisant de réduction des GES. D'importantes incertitudes existent, mais le compte n'y sera pas, et d'ailleurs même l'agence européenne de l'environnement (EEA en anglais) vient de l'admettre⁷, en reconnaissant 1) que les explications de l'incapacité de réduire les dommages écologiques de ces transports tenaient à l'organisation, en

amont, de secteurs inducteurs de transport (dont les services, mais aussi l'organisation urbaine) et de choix politiques les concernant, et 2) qu'il faudrait envisager leur décroissance. Ce rapport note que de 1995 à 2004, le trafic aérien de passagers a augmenté de 49 % et celui par voitures individuelles de 18 %, la part des déplacements de personnes en voiture s'étant élevée à 74 % en 2004 dans l'Union européenne.

Parmi les services les plus dépendants des transports, le tourisme international et le tourisme d'affaires fondés sur le transport aérien vont sombrer, entraînant dans leur chute certaines économies qui en ont fait le pivot de leur développement, sauf si des reconversions sont organisées rapidement. Mais d'autres secteurs seront touchés, dont le courrier, certaines formules de distribution à forte empreinte carbone, etc. L'organisation internationale de nombreuses activités (dont la recherche...) sera également affectée par ces contraintes. En revanche, un meilleur avenir est promis aux transports les plus doux, y compris le transport ferroviaire des personnes et des marchandises.

⁷ http://reports.eea.europa.eu/eea_report_2008_1/en

Increasing solid waste flows and the emergence of new transnationals

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Abstract

To face the problem of increasing municipal solid waste flows disposed on nature, waste recycling becomes a high priority. However, in the European Union, the development of recycling is still slow regarding landfill and incineration. On the other hand, a large part of the sector is now controlled by large private firms and no longer managed by local and regional administrations. Given these two trends, the purpose of this paper is to address the question of growing waste disposal on the environment and discuss the role of waste management private firms on the technological path and its potential lock-in. The focus of the investigation has been put on waste policy and on private operators. A significant concentration in few firms has been observed in the last two decades and the sense of most of their innovation efforts tends towards end-of-pipe treatment methods. Given this background, in order to face such uncontrolled technological change, there is a need for encouraging and diffusing valid eco-innovations.

Key words: Waste management, technological lock-in, recycling, eco-innovation, transnational firms

1. Introduction

Material flow accounts show us that western societies have constantly increased their throughput in the last decades (Bringezu and Schütz, 2001; Carpintero, 2003). Material inputs have a significant impact on the environment not only during their use but also at the origin, the so-called hidden flows. As a consequence of the increasing throughput, on the other side of the socio-economic metabolism, we have waste flows which have also been increasing considerably. From 1995 to 2004, municipal solid waste (MSW) per capita in the European Union increased approximately 15 %, parallel to GDP per capita (graphic 1, Annex). In absolute terms it represents an even larger amount as population has also increased extensively. In some regions, total waste amounts increased over 50% in a decade (e.g. the Mediterranean Arch Euroregion).

Contrary to the standpoint of standard economics which considers waste as an externality of the economic system which is, in turn, a closed system, Ayres and Kneese (1969) contributed in a great way to change this point of view. For them, waste is an unavoidable joint product of the socio-economic process that grows at the same time as

production, with different proportions depending on the context. Moreover, as Georgescu-Roegen (1971, 1979) indicated, the economic system is necessarily an open system that draws energy and materials from its environment and inevitably disposes waste on it.

Modern municipal solid waste is composed of a mix of materials that, due to the organic matter contained in it, can react by developing leachates which have toxic consequences on the environment. MSW presents an artificial and material state that represents a potential irreversible disruption on the ecosystem that could put in danger the natural support system on which our welfare and, even more, our survival in the long term depend (O'Connor, 1993). On the other hand, given the material and special limits of the ecosystem, the growth of MSW cannot be for an indefinite time. Besides, the current increase in stocks of waste in the environment is amplifying the scarcity of the assimilation function of the ecosystem over its carrying capacity.

The increase of waste flows is presently being subsidized by the extensive use of end-of-pipe treatment techniques (i.e. landfill and incineration), thus increasing the stocks of artificial waste on nature. Landfill entails the burial of waste for an indefinite period of time while with incineration, waste is burnt releasing a large part of gases and leaving a smaller part of matter which also has to be managed, usually in special landfills. The main motivation for end-of-pipe techniques has been their cost-effectiveness. Indeed, the short term financial costs are relatively weaker than for other integrated technologies.

However, end-of-pipe treatment techniques represent a transfer of waste management in space and time. In space because pollution is externalised onto other geographical sites and communities when discharging waste and ashes but also by the different gases released into the atmosphere. In time because, taking into account that landfilled stocks of waste and ashes have to be managed during long periods of time, the transfer exists due to the fact that the "problem" of waste will have to be dealt with later on by future generations. The underlying reason is that most modern waste does not reintegrate artificial human-made materials into the natural geophysical cycles.

End-of-pipe techniques are extensively used (see graphic 2, Annex) because they are alleged to be less expensive for societies and so they allow them to devote more resources to other activities, including further consumption. Therefore, the assumed higher productivity or efficiency of end-of-pipe techniques entails the reduction of the economic cost. However, this also means that societies can devote further parts of their surplus to transformation and consumption, thus eventually generating larger amounts of waste. In a certain level, a greater efficiency of end-of-pipe techniques could be exceeded by the emergence of the Jevons' paradox phenomenon as in absolute terms waste flows would not diminish.

2. Waste policies and the role of waste management private firms

In order to face increasing waste amounts, two main policy alternatives come into view. Firstly, waste prevention

which aims at the non generation of waste from the very beginning. Secondly, minimization of waste which seeks to recover and recycle material flows. In the first case, policy measures are taken at the design, transformation and consumption stages of the commodities' life. In the second case, more emphasis is put on the recovery of waste streams and their reuse or retransformation. The economic rationale of both policy alternatives is especially antagonistic. While on the former the need is on a reduction of material consumption and therefore of a part of the economic activity and of waste flows, on the latter many economic agents profit from the increasing recovery and recycling waste flows. Indeed, transformation industries as well as waste collectors, waste treatment facilities and recyclers all profit from increasing material flows. For them, waste is not a problem but a source of economic activity and, of course, taken as a whole it is part of the increase of the national's GDP.

But, contrary to standard economics, the role of the firm and its technology cannot be viewed as a profit maximizer, technology neutral and ever-optimizing entity. The standpoint on the firm that we are going to adopt here is that of Schumpeter (1942) and Nelson and Winter (1982). The foundation of their approach is that economic agents are not perfectly rational. They have, on the contrary, a bounded rationality by which agents cannot explore the whole range of options but only a part of these. Firms cannot deliberate on the whole possible options but only on those that they have some knowledge. Therefore, firms cannot attain an optimum, an equilibrium. In addition, their exploration or research process is that of a routine and their selection criteria is that of satisficing (*sic*) pre-established conditions (March and Simon, 1958). As agents are not perfectly rational but act by steps, in a procedural way, market prices do not symbolise the total coordination of agents' actions. Markets are not in equilibrium and agents cannot anticipate the future. Risks are not entirely probabilistic as in the neo-classical approach but they are uncertain. If they could be anticipated, market prices would not reflect any oscillation because all agents would have anticipated the other agents' actions. Moreover, if innovations transform the characteristics of the market, probabilistic forecasts and analysis are questionable.

In this evolutionary approach, firms can achieve a diversity of performances and the market can maintain this structure without structurally changing it in long periods of time (Nelson and Winter, 1982). This is excluded by neo-classical models. In fact, technology adopted by firms is dependent on the past decisions and there is no automatic re-equilibrium. The competitive environment is a process of selection of the best innovations adapted to the social, environmental and economic context, just as in ecology natural selection leads to conserve certain mutations. The process of innovation is, as Schumpeter (1942) affirms, the source of equilibrium disruptions in the market while at the same time they are the answer to previous equilibrium disruptions. Firms foresee a potential profit, inevitably created by an imbalance in the market, i.e. companies that profit from a monopolistic position. Therefore, firms choose to innovate and thus create a new equilibrium disruption. This is the process of creative destruction of market structures. The main idea is that firms are constantly seeking a monopolistic rent position and they must find

innovative solutions to attain it. The market is not in perpetual equilibrium and therefore the analysis cannot be static but dynamic and prospective, considering the continuous and expected changes in time taking place in the economy.

From this point of view, firms working in the waste management sector cannot be considered neutral when they choose a certain technique. As firms cannot re-equilibrate their technology mix automatically and the research process is usually "local" – that is to say, they will first obtain new information from the knowledge area they already are acquainted with and afterwards from other external sources of information – the adoption of a technique can entail ultimately a technological lock-in. In the case of waste technologies, the adoption of an end-of-pipe technique can imprison the firm within a technological path not being able to exit without large investments.

Once at this point, in the following sections our purpose will be to address the question of the growing amount of waste being disposed on the environment and discuss the role of waste management private companies in the non diminishing use of end-of-pipe techniques.

3. Material studied

For the purposes of this paper, the main materials that have been analysed are reports and statistics from public institutions as well as business reports from 14 privately owned firms in three states: Germany, France and Spain. The activity of most of these companies is beyond their national borders. They offer their waste management services to over 140 million inhabitants all over the world.

In the case of company reports, data is mainly obtained for the years 2004 and 2005. Company reports also comprise environmental and "sustainable development" reports where important quantitative and qualitative data is published. The significance of annual reports as a research object is that they contain fundamental company principles and strategic orientations that serve as a basis for future developments of the corporation. Besides legal requirements, annual reports contain information about business concepts, strategies, performances, R&D policies and technological structure of the company. They are also an ex-ante statement of visions, ideas and goals of what the managers are aiming to do.

4. Results

Nowadays we are attending a process of externalization of waste management activities on private companies in most European countries. Complexity of waste treatment methods is becoming an insurmountable obstacle for publicly owned operators. Technical know-how and expertise are built on a historical basis that no public company possesses nowadays. The high level of technical complexity and capital requirements needed for new waste facilities has favoured the materialization of many public procurement processes all over Europe. Some countries like France or United Kingdom have a long tradition in this. On the other hand, the application of the extended producers' responsibility in the EU packaging waste policy, has

favoured the emergence of many voluntary agreements encouraging the concession of waste collection and treatment to private operators. For instance, in Germany the *Duales System Deutschland* (DSD) has represented the privatization of the whole flow of packaging waste. As a result, a large part of local administrations have partly or entirely privatised or externalised their MSW collection and treatment services. For example, the main cities in Spain are all under private companies' services (OCDE, 2000, p. 151). In France, as for waste treatment, 92% of the market is controlled by private operators (OCDE, 2000, p. 86).

This externalisation trend has favoured a process of concentration and the rise of large transnational firms based on a profit seeking rationale. In France, the market is dominated by three large enterprises: Veolia Propreté, Suez Environnement and Coved which represent almost 75% of the private market in waste collection and are present in more than 80% of French municipalities (Pizzorno Environnement, p. 42).

While the emergence of these large corporations was based initially on the horizontal or geographical expansion within a country and on the previous experience on bidding for public contracts (usually they were firms originally specialized in another public service sector. E.g.: water in the case of France, construction and public works in Spain, etc.), nowadays we are attending a period of transnational expansion and vertical integration.

Private firms in waste management were chiefly present in the phases of collection and treatment by end-of-pipe techniques. In only some cases, waste sorting was a significant part of the firm. Vertical expansion means that waste firms are acquiring and merging other firms upstream –e.g. engineering, consultancy– and above all downstream –sorting plants, recycling activities, marketing of secondary raw materials, etc.– in order to control the group of processes needed to obtain new commodities out of waste and to reduce transaction costs.

Regarding innovation efforts in waste incineration and landfills, most of the companies tend to adopt end-of-pipe changes, including landfill closure, in order to have their installations in accordance to European standards. In the case of incineration, important investments have been made to reduce the emission of toxic gases to re-use residues as construction materials and to improve energy generation from waste incineration methods. Most of the firms state re-using ashes and clinkers as construction materials, thus considering the incineration system as a “zero waste” technique. In the case of landfills, many of them have invested in reducing environmental impacts as leachate filtrations and methane emissions. A great number of the firms have installed techniques that allow recovering methane to transform it into energy. This is a general trend among firms working with landfills towards biogas re-use. Technological diffusion in this field has been quite fast.

5. Discussion

MSW private firms are growing in size and attaining a strategic position on the whole waste stream. The consequences of this fact are not negligible regarding local

and regional public administrations. Large firms possess an increasing power to negotiate and impose technical conditions, apart from the customary problem of asymmetric information in fixing prices and costs evaluation. On the other hand, larger firms can capture legislation or the political agenda and can determine the future availability of their own alternatives against other options that could be superior (Faucheux *et al.*, 1997). By these means, larger firms can influence the technological path and set up a blockade which may take a long period of time to break through. Waste facilities are considered as sunk investments operational for over 20 years. Furthermore, the largest firms are investing considerable resources in research and development but this is predominantly devoted to end-of-pipe techniques, efficiency gains and the avoidance of externalities like water pollution or gas emissions.

From this point, to deal with the question of how to increase the waste recycling quota, we have to answer the other question: why do private firms prefer to invest their resources in end-of-pipe techniques and not in other integrated technologies such as sorting and recycling? Is it only a matter of cost?

A first answer comes from the fact that the results from new techniques are not certain and are still embryonic. That is to say, due to the complex composition and variable amounts of waste, one cannot establish a likely outcome. Undeniably, discharging and incinerating waste are very old techniques that go back some thousands of years (De Silguy 1996) and the results are visible and quantifiable. A second one is the lack of socio-economic incentives to carry out such activities to cover the whole waste stream. While high rates of recycling have been attained in Germany where there exists a stringent legislation that includes zero waste in landfills without pre-treatment, it has also been possible thanks to the design of a profitable and competitive system for private operators.

In order to face these problems, there appear to be some means for enhancing recycling quotas. First of all, in a first group of measures, there is the need for rapid diffusion of eco-innovations, independently of the property structure of the firm. Indeed, many cost-effective techniques for waste sorting and recycling already exist but they are mostly unknown and not well promoted. Many of them are developed by small and medium enterprises that have not the market power to sell their new ideas and processes. Some others are already available by large firms but the institutional framework in one country could not stimulate sufficiently the transfer of the best available technologies.

Diffusing technical and social eco-innovations entails the use of different instruments. Among the most remarkable are:

- a) Research and development agencies exclusively dedicated to waste management. There is an evident insufficient allocation of resources to this issue in most European states. R&D agencies are not only in charge of developing new effective methods but also of diffusing knowledge within the waste sector.
- b) Regional waste agencies should encourage the reduction of asymmetric information in the waste market. That is to say, take part as an observer of the market and

develop quality certification in material flows. Good quality material exchanges can encourage the reduction of insufficient quality offer of sorting facilities to recyclers or to avoid the so-called “lemons” (Akerloff, 1970).

c) The separation into different concessions for different waste streams by materials or by type of waste. The fact that one single firm is able to collect all waste flows can allow them to arbitrate between the different techniques depending on the quantity of input or on the profitability of the process at that stage.

On the other hand, against the lack of a market pull –except for certain secondary materials– there is a need for a regulatory push that encourages a change in paradigm from the current view of waste as an abnormal externality towards waste as a resource. This can be established by the inclusion of ecological issues in the industrial policy. Certainly, it is a highly political issue subject to many other conditions, stakes and interests. Moreover, it depends on old social and scientific traditions and visions of human beings and of waste within nature. The regulatory push has the goal of driving change into the industrial activity of the waste sector towards a more sustainable pattern represented by transformation of matter and not predominantly by its transport and disposal.

Finally, a second group of measures could be established where the purpose is to reduce the profit seeking rationale and thus develop a better quality waste management, not so dependant on cost efficiency but on environmental standards. Here, an important question is the type of property structure of the firm. The externalization process of the last years has encouraged, as we have pointed out above, the concentration of waste activities in fewer private firms. It has been the result of a historical process that has taken in most cases only a few decades. The hypothesis that profit seeking firms are economically more efficient is not based on sound scientific grounds but on ideology and on social and political interests. Since most waste management activities are now driven by capitalistic profit seeking firms, other dimensions of the sector are thus left in oblivion. The current role of public administrations could be then to encourage by socio-economic incentives the diffusion of eco-innovations but, moreover, to avoid the dependency on large firms and the instability of short concessions. Other more cooperative structures as public private partnerships, municipal enterprises, enhanced public participation or collaboration with local small and medium enterprises should be facilitated.

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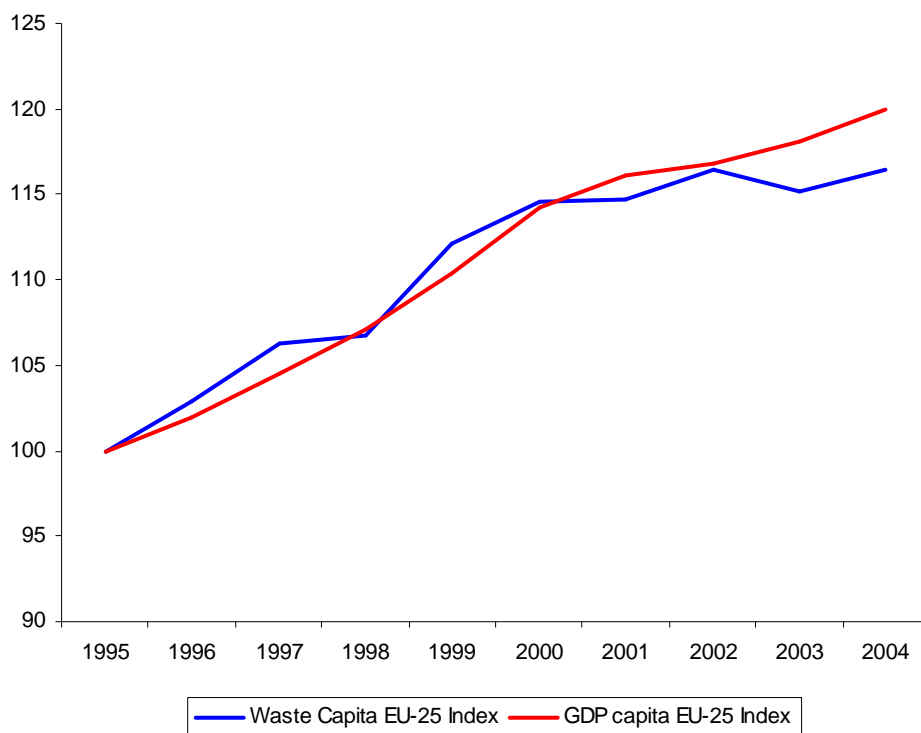
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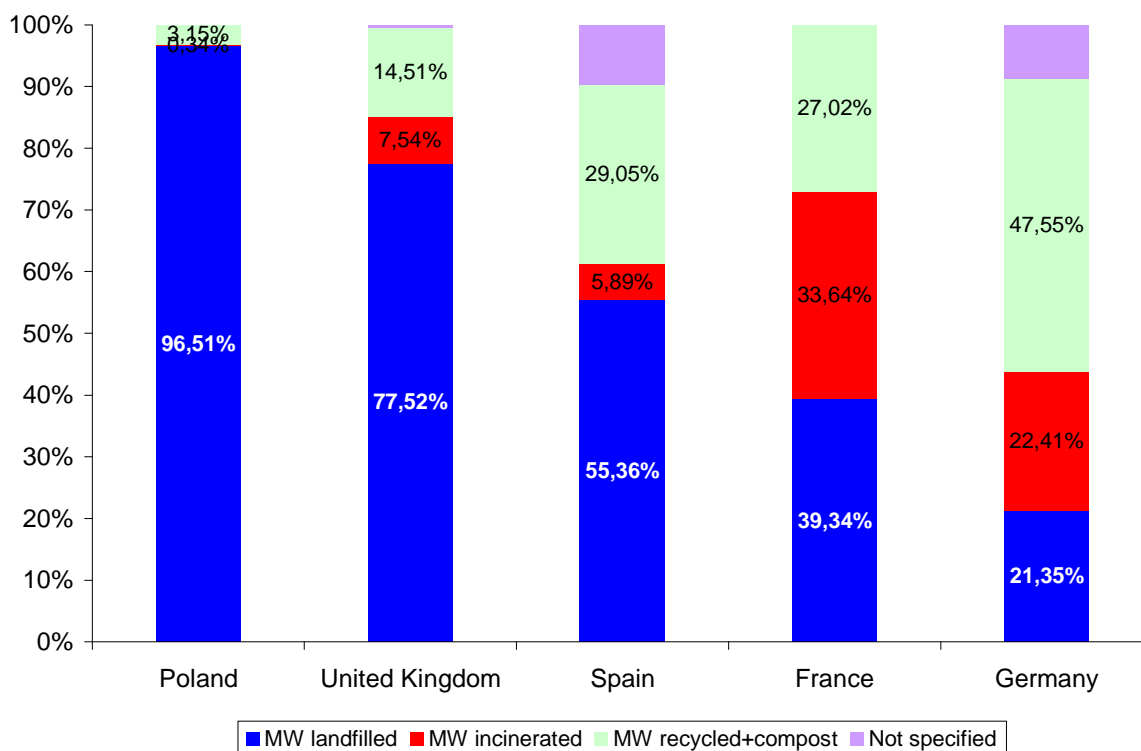
Annex

Municipal waste and GDP per capita (1995-2004). Index 100 = 1995



Graphic 1. Municipal solid waste and GDP per capita (1995-2005). Source: Eurostat

MSW treatment techniques in 2002



Graphic 2. Share of treatment techniques for municipal solid waste in selected countries in 2002. Source: Eurostat

Le mythe des effets positifs de la vitesse en agglomération

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Résumé

The conventional approach to economics considers that in open country just as in the urban setting, the advantages of speed far outweigh the disadvantages. If in the short term speedy commuting helps us "save time", in the long run it allows us, mainly, to go farther and thus have access to a more varied number of destinations. This expansion of the "universe of choice" allows for a more adequate and favorable balance between supply and demand in all markets. With this advantage we can deduce that productivity, income and wealth should increase while unemployment should decrease with growing cities and access to numerous destinations (see, for example, the recent report by the Council of Economic Analysis by Didier and Prud'homme in August, 2007). In summary, all policies limiting "mobility", such as reducing the number of vehicles, favoring means of transportation which are less rapid than the automobile, or reducing investment in highways would hurt the economy and increase the nuisance factor.

We will show, to the contrary, that on the whole, the advantages of speed are overestimated while the nuisance factor of speed is grossly underestimated. When speed increases the dimension of commuting, it will strongly contribute to reducing the density of cities, thus causing urban expansion. With low density, even if there were a flowing traffic speed, downtowns would be, in reality, two or three times less accessible from the periphery. When all factors are considered, speed actually reduces accessibility. Beyond this general conclusion, it is incorrect to assert that expanding the choice of destinations is vital for the economy, for today we have entered a "hyper-choice society": in the numerous markets, choice has become so extensive that disoriented consumers end up slowing down their decisions and transactions, and sometimes even failing to consummate their purchases. From this point on, in the balancing between supply and demand, factors other than choice begin to play a prominent role, notably in the quality of the relationship between those who supply and those who demand. In a word, speed is the cause of many nuisances, beyond noise, pollution, or accidents.

With urban and suburban sprawl and its reduction of density, speed engenders a heavy consumption of space, a loss of pleasantness in public transportation, the elimination of non-motorized means of transport, and in the end, dependence on the automobile. This also contributes significantly to the creation of social segregation: gentrification in centrally located neighborhoods, the

pushing out of the middle class into periphery areas, and the poor placement of public housing projects.

Speed is far from representing a radiant future for our cities. On the contrary, today keeping speed under control is crucial, not only for reducing nuisances and encouraging alternatives to the automobile, but also, perhaps most importantly, for encouraging density, proximity, and diversity, thereby creating economic and social relations that are less damaging to the environment.

1. Introduction

L'accroissement des vitesses de transport en agglomération est généralement présenté par les économistes et bien d'autres spécialistes à leur suite comme un progrès considérable de multiples points de vue : gains de temps ou au moins accessibilité croissante, choix de destinations plus large source d'efficacité économique, desserrement urbain évitant la promiscuité, accès au foncier et aux biens de consommation à coût réduit en périphérie pour les ménages à revenus modestes... La liste des bienfaits de la vitesse est impressionnante et à côté ses nuisances semblent avoir bien peu de poids. Dans les années d'après-guerre, les villes européennes ont ainsi multiplié les plans de circulation, les voies rapides urbaines et les transports collectifs lourds, et plus récemment quelques unes ont même opté pour des péages urbains, l'objectif étant toujours de limiter la congestion et d'accroître la mobilité.

Pourtant, depuis quelques années, de nombreuses villes se sont lancées dans des politiques de modération de la circulation et particulièrement de la vitesse, en instaurant des zones 30 dans tous les quartiers, non seulement en centre-ville mais également en périphérie (CERTU, 2006), en transformant les pénétrantes en « boulevard urbain » limité à 50 km/h, en réduisant fortement la construction de voies rapides, ou même en instaurant des « autoroutes apaisées ».

Ces politiques qui ne cessent de se répandre apparaissent en contradiction manifeste avec celles plus traditionnelles qui tentent de profiter des bienfaits de la vitesse. Les villes qui les adoptent font-elles fausse route, comme certains l'affirment (Baumstark, 2003 ; Didier et Prud'homme, 2007, chapitre VI) ? Elles n'ont pourtant pas du tout l'air d'en souffrir et le recul semble désormais suffisant pour en juger. Des villes comme Amsterdam, Berlin, Munich, Copenhague, Berne ou Portland à l'étranger, Nantes, Strasbourg ou Grenoble en France, engagées pourtant dans des politiques de modération de la circulation depuis plus de 10 ans, ne connaissent aucun déclin bien au contraire. Même Paris, ville capitale, s'y essaye depuis peu avec détermination, suscitant de vifs débats.

Cet article voudrait revenir sur quelques arguments justifiant la vitesse en agglomération, en commençant à chaque fois par les rappeler en détail, puis en s'interrogeant sur leur réalité. Il apparaîtra alors que les effets positifs de la vitesse sont certes réels mais très surestimés et qu'il y a effectivement place aujourd'hui pour des politiques de modération de la circulation sans impact négatif pour l'activité économique.

1. Des gains de temps illusoirs

La vitesse a un avantage immédiat que chacun peut immédiatement percevoir : elle fait « gagner du temps ». Et « le temps, c'est de l'argent ». Tout projet d'infrastructure de transport est encore aujourd'hui principalement justifié par ces gains de temps qui représentent couramment 80 à 90 % des avantages mesurés par les évaluations socio-économiques des grands projets (Boiteux, 2001 et Ministère des transports, 2004).

Or, à long terme, ces gains de temps sont complètement illusoirs, tout le monde en convient. Car on sait depuis les travaux de Y. Zahavi (1973) que tout le temps gagné à aller plus vite est en fait utilisé pour aller plus loin. Depuis au moins les années 50 – et sans doute depuis que les villes existent, mais aucune statistique ne permet de le confirmer – chacun consacre en moyenne à peu près une heure de temps par jour à se déplacer : c'est la « loi de constance des budgets temps de transport ». Ainsi, la vitesse permet en réalité d'augmenter la portée des déplacements dans un temps donné et donc le nombre de destinations accessibles¹. Cet impact est réputé vérifié y compris en milieu urbain où l'urbanisation est pourtant loin d'être homogène : la densité – mesurant le nombre de destinations accessibles sur une surface donnée – étant très différente entre le centre et la périphérie.

C'est pourquoi, J. Poulit – un ingénieur des ponts et chaussées au parcours prestigieux² – est parvenu à inciter le ministère des transports à préconiser, dans son instruction-cadre de mars 2004, un calcul des « gains d'accessibilité » (et non plus des gains de temps) réalisables grâce aux projets d'infrastructures. Mais ce calcul – par ailleurs assez lourd à réaliser et de fait peu pratiqué – ne change pas vraiment le choix des investissements, car la méthode préconisée par cet expert, on va le voir, sous-estime fortement l'impact de la vitesse sur la réduction de la densité à long terme. Autrement dit, avec la « méthode Poulit », un nouveau projet d'infrastructure augmente au moins aussi sûrement l'accessibilité qu'il réduit les gains de temps et la plupart des projets trouvent aisément leur justification, comme auparavant.

2. Une accessibilité en réalité réduite

La vitesse aurait donc surtout le mérite d'accroître l'accessibilité. J. Poulit explique ainsi que, dans les agglomérations, le nombre de déplacements, tous modes confondus, n'augmente pas, restant autour de 3,5 à 4 par jour ; le temps consacré aux déplacements non plus, se limitant à environ une heure par jour ; seule la portée des déplacements augmente et avec elle la vitesse. Aussi, « le territoire s'épanouit », et le nombre de « destinations

convoitées » s'accroît. Certes, la vitesse favorise l'étalement urbain et tend à réduire globalement la densité, mais le bilan resterait largement positif. Ainsi, dans le cas de l'Ile de France calcule J. Poulit, entre 1976 et 2001, l'augmentation des vitesses accroît l'accessibilité 4 fois plus vite que la densité ne baisse (+ 2,8 % par an contre + 0,7 % par an). Bref, la vitesse serait bien plus efficace que la densité.

L'urbaniste F. Ascher en est également convaincu (1998, p. 112). Mais la plupart des auteurs qui se sont penchés sur le sujet sont plus prudents et récusent ces calculs qu'ils jugent trop mécanistes et simplistes. Ils estiment cependant que les effets de la vitesse et de la densité sur l'accessibilité seraient équivalents (Massot et Orfeuill, 1995 ; Beaucire, 2006 ; Wiel, 2007). Et c'est aujourd'hui presque un lieu commun que de l'affirmer.

Le raisonnement de Poulit souffre en fait de deux simplifications abusives qui tendent à gommer l'impact de la dédensification sur l'accessibilité. La première est de considérer toute l'agglomération sans distinction de zones. La seconde est de retenir un temps d'une heure de déplacement pour comparer le nombre de destinations accessibles.

Si à court terme la vitesse accroît assurément l'accessibilité, à long terme, il en va tout autrement : la vitesse contribue si fortement à dédensifier l'agglomération, que l'accessibilité finit par être au moins deux fois moindre en périphérie qu'au centre. Le premier à l'avoir remarqué n'est autre que J. Poulit lui-même. En 1972-73, il rédige une note sur *L'approche économique de l'accessibilité* où il présente l'« exemple d'application » suivant :

« Considérons une agglomération de structure traditionnelle comportant une concentration d'emplois et de services au centre et des zones résidentielles peu denses en périphérie. Vaut-il mieux du seul point de vue de l'accessibilité résider au centre ou en périphérie ? A priori, le centre apparaît moins accessible que les autres zones de l'agglomération. Les difficultés de circulation y sont en effet bien plus importantes. En fait, le calcul d'accessibilité de chaque zone vis-à-vis de tous les biens et services de l'agglomération montre que ce sont les zones centrales qui offrent la meilleure accessibilité. Si les vitesses de déplacement y sont plus faibles, les distances à parcourir pour bénéficier des choix souhaités y sont également plus faibles. L'accessibilité au total y est supérieure. Si l'on fait abstraction des facteurs d'environnement et des charges de viabilisation, le centre apparaît ainsi comme un lieu de résidence privilégié. C'est aussi un lieu d'emploi privilégié. Ce résultat explique d'ailleurs l'importance des charges foncières qui y sont constatées » (1973, p. 9)

Certes, Poulit ne mesure pas cette différence d'accessibilité selon les zones. Mais, son subordonné, G. Koenig – célèbre pour avoir théorisé l'accessibilité (Koenig, 1974) – s'en charge. En 1977, celui-ci, présente les résultats d'une étude sur l'accessibilité urbaine à Marseille en utilisant les données de l'enquête ménages de 1966. Il y démontre que : « les résidents des zones centrales bénéficient d'une meilleure accessibilité que ceux des zones périurbaines » (p. 13). Ainsi, sur un total de 28 zones, les 5 zones les plus centrales ont une accessibilité en voiture 4 à 5 fois supérieure aux 5 zones les plus périphériques.

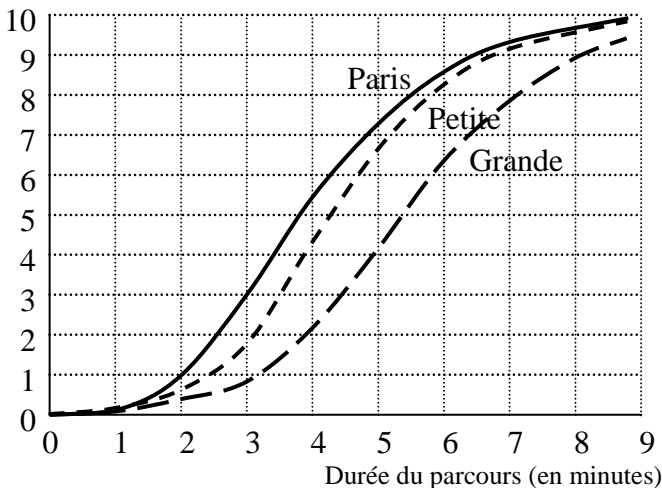
¹ Cette accessibilité est classiquement évaluée par la densité en habitants + emplois (ou « densité humaine ») multipliée par la surface accessible en un temps donné. Pour chacun des motifs de déplacement, cet indicateur est une approximation acceptable, car il est à peu près proportionnel au nombre de lieux accessibles pondéré par leur importance.

² Préfet, ancien directeur régional de l'équipement d'Ile de France de 1994 à 1996, directeur de l'Institut géographique national de 1997 à 2002, aujourd'hui conseiller du directeur de la recherche au Ministère des transports et de l'équipement.

Plus récemment, R. Prud'homme et L. Chang-Woon (1999) ont calculé l'accessibilité au marché de l'emploi francilien selon la localisation résidentielle et parviennent à des conclusions semblables. Développant leurs travaux, S. Wenglenski (2002) explique : « Pour l'ensemble des actifs et quel que soit le mode de transport, il existe de fortes disparités entre Paris et la Grande couronne » (voir le graphique ci-dessous). Ainsi, pour une durée de parcours domicile-travail de 30 mn, les Parisiens accèdent déjà à plus de 30 % des emplois de l'Ile de France, alors que les habitants de Grande couronne ne peuvent rejoindre que 8 % de ces emplois. Pour un temps de parcours de 45 mn, ces proportions sont respectivement de 65 % et 30 % et pour une heure elles sont de 85 % et 62 %. Ces courbes ont le mérite de bien montrer que les écarts se creusent puis se réduisent quand les temps de parcours s'allongent. Quand on retient un temps d'une heure comme le fait J. Poulit, les écarts s'estompent déjà fortement.

Accessibilité à l'emploi francilien par type de localisation résidentielle selon le temps de parcours, tous modes confondus

Part de l'emploi régional
(en %) [emploi 1990]



Source : RGP 1990 et DREIF 1990. Graphique extrait de Wenglenski, 2002.

A Lyon, on constate à peu près les mêmes écarts de vitesse et de densité qu'à Paris selon le centre (c'est-à-dire les communes de Lyon et Villeurbanne) et les premières et deuxième couronnes (Godinot et Nicolas, 2007). Aussi, tout porte à croire que les rapports entre les nombres de destinations accessibles selon les zones sont du même ordre qu'en Ile de France.

Bien d'autres vérifications seraient souhaitables, mais le résultat ne fait aucun doute : en contribuant à créer de vastes zones périphériques peu denses, la vitesse réduit bel et bien l'accessibilité de ces zones par rapport à celle du centre. Il est en général plus intéressant de vivre et de travailler en zone dense, si on tient à profiter d'un maximum de contacts. Et c'est bien pourquoi tant de ménages et d'entreprises souhaitent continuer à s'installer dans le centre, malgré des déplacements plus lents et des coûts fonciers très élevés. Ce résultat est fondamental, car il démontre la supériorité de la densité sur la vitesse pour

noyer des contacts. Autrement dit, densité et vitesse ne sont pas des alternatives équivalentes³.

3. Un choix de destinations plus large mais de moins en moins utile

En augmentant l'accessibilité, la vitesse élargit le choix des destinations possibles, non pas le nombre de destinations qui reste stable à 3,5 à 4 déplacements par jour, mais la diversité des destinations atteignables. Dès lors, le choix peut devenir plus pertinent. Or, les agents économiques – consommateurs et producteurs – ont une « préférence pour la variété » et sont donc prêts à profiter au maximum de ce choix élargi. L'adéquation entre offre et demande en est améliorée sur tous les marchés et il en résulte une efficacité économique accrue dans tous les domaines.

Ainsi, le consommateur bénéficie d'un éventail de biens et services plus large correspondant mieux à ce qu'il désire, y compris dans le domaine des loisirs. Les actifs peuvent trouver plus facilement un emploi correspondant bien à leur formation professionnelle et les employeurs des salariés adaptés à leurs besoins. Les entreprises accroissent le nombre de leurs clients potentiels et finalement leurs débouchés, et elles trouvent plus facilement les fournisseurs adéquats.

En poursuivant l'analyse, il est possible d'en déduire que la productivité et donc les revenus et la richesse devraient augmenter et le chômage se réduire selon le nombre de destinations accessibles et donc selon la taille des villes (Poulit, 2005). Mais peut-on affirmer que c'est la vitesse accrue des modes de transport qui permet tous ces bienfaits ? L'auteur le laisse clairement entendre sans jamais toutefois prétendre que ce serait le seul facteur explicatif. R. Prud'homme et L. Chang-Woon (1999) arrivent à des conclusions similaires en étudiant plus particulièrement le marché du travail et s'estiment même capables de chiffrer ce qu'apporte un supplément de vitesse.

Pourtant, l'argument d'un élargissement de l'univers des choix comme facteur essentiel de compétitivité et directement lié à l'accroissement des vitesses apparaît triplement critiquable. Il suppose implicitement, d'abord que l'effet de ce choix élargi est toujours bénéfique, ensuite que la variété est recherchée plus que tout autre avantage et enfin que c'est forcément en allant plus vite et plus loin que l'on peut profiter d'un tel choix.

Aujourd'hui, le choix est souvent déjà très important et son élargissement n'apparaît plus aussi décisif. Certes, sur bien des marchés, cette diversité s'avère encore fort utile. Mais il existe d'autres situations où elle n'apporte aucun avantage particulier. Et elle peut même, dans certains cas de plus en plus fréquents, se révéler nocive : le choix devient si considérable qu'il perturbe l'ajustement entre offre et demande. L'agent perd du temps à s'orienter dans cet « hyperchoix », ce qui peut même parfois le décourager à réaliser l'échange (Schwartz, 2004).

³ Ce résultat rejoint les conclusions d'une récente table ronde de la CEMT qui se demande si ce ne serait pas finalement « la densité de population, et non la taille des villes, qui serait le principal déterminant de l'efficacité de la production » (2006, p. 8).

Les agents sont censés forcément rechercher un choix plus large. La « préférence pour la variété », l'« intérêt pour la diversité » des consommateurs comme des firmes sont jugés en quelque sorte évidents, naturels. En l'absence d'alternative, on ne voit pas en effet ce que ces agents peuvent souhaiter d'autre. En réalité, le choix porte généralement entre la diversité ou la spécialité, les gains de variété ou d'échelle, une multiplication ou un approfondissement des échanges et la réponse est souvent un mélange de ces deux aspects. Il ne suffit pas d'établir des relations entre offreurs et demandeurs, il est au moins aussi crucial, sinon plus, de les construire dans la durée, en fidélisant les clients ou en instaurant des partenariats avec les fournisseurs. Or, si la diversité des contacts est favorisée par des déplacements de portée accrue, la construction des relations suppose au contraire le renouvellement des mêmes déplacements, ce que facilite la proximité.

Quant au rôle de la vitesse dans l'accès à un choix élargi, s'il est bien réel, il n'est pas le seul moyen d'y parvenir : la densité est une autre solution dont on vient de voir la plus grande efficacité par rapport à la vitesse.

Sur le marché du travail, le problème pour un employeur n'est pas simplement de choisir entre un certain nombre de candidats, mais d'abord de définir correctement ses besoins en personnel et de comprendre qu'ils peuvent fortement varier en fonction de l'organisation du travail adoptée, des formations assurées, de la dynamique de développement imaginée. Pour attirer les talents ou retenir les bons salariés, offrir de bonnes conditions de travail, des perspectives de carrière, un travail enrichissant et valorisé peuvent s'avérer plus déterminants qu'une bonne accessibilité. Une localisation médiocre peut souvent amener l'entreprise à développer d'autres facteurs de compétitivité qu'elle aurait autrement négligés. Pour les demandeurs d'emploi, la qualité d'un dossier (connaissances, savoir-faire, savoir-être, parcours...) est sans conteste bien plus importante que la multiplication des candidatures, comme le soulignent depuis longtemps tous les spécialistes de l'insertion professionnelle, y compris pour les cadres (voir les recommandations de l'APEC). Il n'est donc pas forcément crucial d'avoir accès à un très large marché de l'emploi. Une accessibilité correcte suffit le plus souvent, ce que l'on trouve en périphérie comme au centre.

Sur le marché des biens et services, le consommateur bénéficie déjà, dans la plupart des cas, d'un choix considérable : « Nous sommes entrés dans une ère d'hyperchoix. » et « tous les secteurs et toutes les catégories de produits » sont concernés, car, soit les marchés sont saturés et les offreurs multiplient les nouveautés pour attirer le client, soit les marchés sont en plein essor et les offreurs sont soumis à des demandes foisonnantes, expliquent des experts du CREDOC (Larceneux et Berger, 2006). Face à cet hyperchoix, le consommateur serait de plus en plus dérouter, incapable de s'informer efficacement et de choisir, allant même parfois jusqu'à renoncer à son achat (Schwartz, 2004). Dans ces conditions, accroître indéfiniment l'accessibilité des territoires n'a plus autant de sens. Seul un nombre réduit de biens et services en profiterait réellement.

Bref, un choix élargi n'est intéressant qu'en cas de rareté de l'offre sur l'aire de marché accessible. ce qui se passe souvent pour les compétences de haut niveau ou très

spécialisées, ou pour certains biens intermédiaires. Mais en cas d'abondance comme sur le marché des biens et services de grande consommation, élargir le choix n'est pas pertinent et peut même provoquer des effets pervers.

4. Un étalement urbain

Au cours des 19^e et 20^e siècles, l'accroissement des vitesses et son accès à moindre coût (la « mobilité facilitée » selon l'expression de M. Wiel, 1999) a joué un rôle positif considérable dans le desserrement des villes en réduisant la promiscuité et l'insalubrité, tout en rendant possible leur énorme développement. L'expansion du cheval, puis de la bicyclette, du tramway et du train, et enfin de la voiture a permis aux villes de s'étendre sans rompre leur unité, du moins jusqu'aux années 70 (Studený, 1995).

Chacun peut désormais profiter à la fois des aménités urbaines et d'un espace de vie confortable et agréable en périphérie, en devenant propriétaire d'une maison individuelle avec jardin. Les sociologues ont bien décrit cette révolution des modes de vie qui a séduit des millions de personnes (Urry, 2000). De même, chaque activité économique peut se développer sur un vaste terrain tout en améliorant son accessibilité. La grande distribution l'a bien compris qui a choisi d'installer ses hypermarchés, grandes surfaces spécialisées et multiplexes dans de grandes zones commerciales en frange d'agglomération à proximité des nœuds du réseau routier rapide pour capter à la fois les habitants des centres-villes et de la grande périphérie (Beauvais, 2000).

Mais en augmentant la portée des déplacements, la vitesse accrue des transports est directement à l'origine de l'étalement urbain et l'explique pratiquement à elle seule, comme le démontre C. Enault (2004) qui s'appuie sur de nombreux travaux de recherche. L'histoire urbaine montre, en effet, au moins en Europe, qu'à chaque époque les grandes villes ont toujours été à peu près à l'échelle du mode de déplacement courant le plus rapide pour aller d'un bout à l'autre de la ville en une heure hors encombrements (Newman et Kenworthy, 1996). Plus que les transports, c'est d'abord leur vitesse qui a façonné les villes.

Plus généralement, il existe une très solide relation inverse entre vitesse et densité (Godinot et Nicolas, 2007). Tout se passe comme si, d'une part, la vitesse ne pouvait augmenter en milieu dense, à cause du danger et des nuisances qu'elle provoque (insécurité routière, bruit, effet de coupure...) et que, d'autre part, toute densification ne pouvait que générer des flux plus complexes et de la congestion, conduisant inévitablement à réduire la vitesse devenue de toute façon inutile⁴. En ce sens, vitesse et densité sont bien des alternatives, car on ne peut avoir en même temps l'une et l'autre (mais elles ne sont pas forcément équivalentes du point de vue de l'accessibilité qu'elles procurent).

Bref, quoi qu'on fasse, la vitesse génère inévitablement de l'étalement urbain, c'est-à-dire de faibles densités peu propices aux échanges.

⁴ « Si nous avons la densité, la vitesse devient vite nuisible, et si nous avons la vitesse la densité n'est plus nécessaire. » (Wiel, 2007, p. 171) « Ceux qui veulent plus de densité, quelles que soient les raisons qui les motivent, doivent savoir qu'il leur faudra brider la vitesse. » (ibid., p. 139)

5. Un accès au foncier et à la consommation en périphérie pas si attractif

La mobilité facilitée et diverses incitations financières permettent aux ménages à revenus plutôt modestes d'accéder à des terrains et à des logements bien moins coûteux en périphérie et d'échapper ainsi aux grands ensembles. Cet argument, souvent invoqué, a pris beaucoup de poids avec la hausse des prix de l'immobilier. De même, ces ménages profitent de l'essor de la grande distribution en périphérie qui a su mettre à leur disposition des biens et services à prix réduits, leur permettant d'accéder aux standards de consommation du centre.

Tout cela suppose l'usage obligatoire d'au moins une voiture par ménage et souvent de plusieurs (plus de la moitié des ménages de Grande couronne parisienne sont multimotorisés). Aussi, toute politique visant à limiter son usage peut être considérée comme une atteinte aux populations modestes (Ascher, 1998).

En réalité, habiter en grande périphérie plutôt qu'à proximité du centre est à peu près aussi coûteux. Le foncier est certes moins cher, mais les coûts de transport bien supérieurs absorbent la différence, à cause des distances à parcourir accrues, de la nécessité d'utiliser une voiture et de la multimotorisation du ménage souvent indispensable. Du fait de leur mauvaise connaissance des frais de transport, les ménages arbitrent mal entre localisation du logement et coûts du transport et privilégient ainsi à tort l'éloignement. Ils y sont en outre encouragés par la pénurie de terrains en proche périphérie, par les dispositifs d'aide à l'accession sociale (prêt à taux zéro...) et par les établissements financiers prêteurs qui ne s'intéressent qu'à la part du budget consacré au logement.

En Ile de France, une étude montre ainsi que les dépenses de logement + transport selon les zones de résidence sont équivalentes (Polacchini et Orfeuil, 1998). Pour les accédants à la propriété, le budget mensuel moyen par personne consacré au logement et aux déplacements est tout à fait semblable en proche banlieue et en Grande couronne. Ce résultat s'explique uniquement par l'importance bien plus grande des frais de transport en grande périphérie (et non par les dépenses de logement ou par la superficie disponible par personne). Pour les locataires du secteur privé, ceux qui vivent en Grande couronne conservent un faible avantage. La situation n'a pas fondamentalement changé depuis lors (DREIF et ADIL 75, 2005) et d'autres travaux sont venus confirmer pour l'essentiel ces résultats (Orfeuil, 2004).

Acheter à moindre coût dans les grandes surfaces périphériques est également un calcul beaucoup moins avantageux qu'il y paraît. Car, d'abord, l'écart de prix entre les grandes et moyennes surfaces s'est nettement atténué, suite à des améliorations dans la gestion des supermarchés et au développement rapide des hard-discounters en zone plus dense (Desse, 2001). Ensuite, les consommateurs sous-estiment fortement les frais de transport nécessaires pour accéder aux grandes surfaces (Beauvais, 2003), ainsi que le temps passé à accéder aux zones commerciales, à déambuler dans les vastes parkings et les allées du magasin et à attendre aux caisses. Enfin, les clients qui acceptent de se rendre à pied ou à vélo dans les commerces de proximité

peuvent aussi limiter le nombre de leurs déplacements en optimisant le transport de leurs achats courants par des moyens de portage simples : caddy pour les piétons, sacoches voire remorque pour les cyclistes (Héran, 2004). Ces solutions, qui paraissent encore incongrues en France tant les achats sont supposés nécessiter une voiture, sont très répandues dans les villes européennes les plus accueillantes aux modes non motorisés. Pour les achats particulièrement lourds ou encombrants, la solution classique de la livraison à domicile est un complément efficace, d'ailleurs en plein essor avec le développement de l'e-commerce.

* * *

Au terme de cette étude critique, la vitesse en ville est loin d'apparaître aussi bénéfique que l'affirme la théorie standard. Si la mobilité facilitée a incontestablement joué un rôle positif au départ en réduisant la promiscuité, en améliorant l'accessibilité et la taille des marchés, les acquis sont maintenant largement suffisants. D'abord parce que les gains de temps sont illusoire, tout le monde en convient. Mais aussi parce que les réseaux actuels de transport rapide contribuent si fortement à dédensifier les agglomérations (d'un facteur 12 en Ile de France entre le centre et la Grande couronne) que l'accessibilité s'en trouve réduite au moins de moitié en périphérie par rapport au centre. Et enfin parce que l'impact globalement positif d'une diversité croissante des destinations accessibles tend à se réduire, à cause des effets pervers de l'hyperchoix.

De plus, la vitesse ne permet pas un accès au foncier à moindre coût quand les coûts de transport finissent par dépasser les coûts du logement, ni même aux biens de consommation, alors qu'en revanche l'étalement urbain et l'accroissement des trafics qu'il génère provoque un cortège de nuisances bien réelles et, en fait, largement sous-estimées. Si certaines sont aisément perceptibles et correctement évaluées, comme les accidents, le bruit et la pollution (Merlin, 2004), d'autres sont bien plus difficiles à appréhender, restant « invisibles » (Wiel, 2006), comme la ségrégation sociale (Berger, 2004), la consommation d'espace, la perte d'attractivité des transports publics, la disqualification des modes non motorisés (Héran, 2000) ou la dépendance automobile (Dupuy, 1999)... Ainsi, la densité, la proximité – et la modération de la circulation qui leur est indispensable – apparaissent comme les seules à permettre à la fois une diversité et un approfondissement des relations, tous deux le plus souvent sources de productivité pour les activités économiques et de satisfaction pour les populations.

Autrement dit, la situation actuelle n'a plus grand chose à voir avec celle d'il y a un siècle. Si, à l'époque, le desserrement urbain et l'amélioration des transports étaient une nécessité urgente, désormais, la vitesse est devenue au contraire excessive et l'étalement urbain qu'elle provoque est désormais source de dysfonctionnements : baisse de l'accessibilité et nombreuses nuisances. Il est temps de revenir à une ville plus dense, un peu moins rapide et donc plus accessible, moins dépendante de l'automobile et moins gaspilleuse de ressources non renouvelables, offrant finalement une meilleure qualité de vie et une plus forte attractivité.

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Gastronomic Sciences: Slow Food Revolution versus Gene Revolution

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Abstract

1. Introduction

The present world agrofood system is a complex set of economic activities, exchanges, human behaviours, that definitely affects the life conditions of the planet and of its inhabitants. Today the agrofood production is strictly connected to the main questions put on the agenda of the big international institutions: Uno, Wto among the others. The agrofood system causes international strains between allied countries too, such as USA and UE, and at the same time popular riots in quite steady nations like Egypt in April 2008 (Gamal, 2008).

Due to its world spread and its political implications, the agrofood system has been the target of many actions to deeply weigh on the production and consumption of food, sustained by governments and involved companies. For example the second half of the XX century was characterised by the so-called Green revolution especially in Asia and Latin America (Gaud, 1968), which together with some advantages such as the increase of productivity, caused heavy consequences. In fact the higher usage of inputs derived or dependent by oil (fertilizers, pests, fuels for machineries), the choice of concentrating the productions on a few plants especially to feed animals, caused damages to environment, biodiversity, economic survival of small farmers etc.

On the end of the XX century, another revolution burst on the scene, daughter of the previous one, but perhaps more insidious: the so-called Gene Revolution, which would like to upset the agrofood system by the genetic engineering. New seeds, a different supply chain management in favour of the patentees, no precaution principles considered, seem to be the hinges of this revolution.

Maybe the world doesn't need other revolutions, but it needs a re-evolution, that is an evolution with other principles. In this short contribute I would like to define it as Slow Food Revolution, an incorrect expression, but borrowed from the title of a book on the Slow Food Movement. This expression in this short paper comprises a set of realities, as the organic agriculture movements, the farmers' markets, the Amap (in France), the CSA (in USA) etc. and has as least common denominator a LESS vision of the agrofood system. LESS vision means less inputs, less waste etc. In this vision the Slow Food revolution is connected with the theme of the economic degrowth; think about the agrofood system only in terms of productivism (we can call it a MORE vision) appears unsustainable for

the environment, unequal for the society and also not attractive from a sensory point of view (Schneider, 2006).

2. Gastronomic sciences and degrowth

At the beginning of the third millennium, according to the western calculation of time, in an age of transition, the gastronomic sciences were born or better develop, giving a multidisciplinary approach, partly humanistic and partly scientific indeed, on the agrofood system. In 2005 the first University in the world devoted to Gastronomic Sciences was born in Pollenzo (North of Italy) thanks to the fundamental contribution of the Slow Food Movement, in the meantime other prestigious Universities activated courses focused on agrofood system in a multidisciplinary way: degree in Agroecology as in Berkeley or ecogastronomy in New Hampshire. In reality the role of the gastronome has a long history, if we think that in the XIX century Auguste Antelme Brillat Savarin wrote "The physiology of taste". But the time for the attribution of scientific dignity to the interest on food was far, so that we will wait until 2005 for the birth of the first degree in Gastronomic Sciences as I wrote before. I would like to rely on that famous ancestor with two quotes (Brillat Savarin, 2000): the first one is "Animals feed, men eat. Only men of distinction know how to eat (the art of eating)"; while the second is the following: "The destiny of nations depends on the manner wherein they take their food". I don't know how much consciously, but with this two references Brillat Savarin put the bases for a modern approach to the agrofood system. On one hand there is a private dimension, which deals with the consumption, the behaviours of purchase, the choices, the life styles, preferences etc.; on the other hand there is another dimension, the social one, that is national or international, that deals with the agricultural and food policies of the governments and of the international institutions, with the global connections, the concept of welfare and wellbeing etc. Today these two dimensions are strictly connected; today in a globalized world the consequences of the mistakes have a global impact:" Does the Flap of a Butterfly's Wings in Brazil set off a Tornado in Texas?" the meteorologist Edward Lorenz wondered.

The commodities price soaring, the pollution increase, the food scarcity for an increasing number of people, are all problems, questioning everybody, no one excluded. The Gastronomic sciences deliver this message, that nobody can avoid to consider these problems and offer a new point of view, using scientific tools, but also using the humanistic thought; then the gastronomic sciences don't despise the material knowledge of the producers, of the farmers, because as Wendell Berry claims "eating is an agricultural act" (Berry, 1990).

The Gastronomic Sciences offer a vision of the agrofood system with three key words: good, clean and fair. Each word refers to fundamental concepts, which are the quality (good) meant mainly as sensory quality, that contributes to the human happiness, the environmental sustainability (clean) and the social equity (fair). On the base of these reasoning, I would like to claim that the *trait d'union* between gastronomic sciences and degrowth is made of two main parts. The first one is that the three key words of the

gastronomic sciences join with the concept *in se* of degrowth, explained by the title of this conference. Both gastronomes and degrowth scholars think about the world in terms of happiness for men and women, sustainability for the environment and equity for the society. We could say that other approaches have the same aims, but the strategies to achieve them could be very different. And this is the second part of the *trait d'union*: the strategies to achieve the objects are LESS strategies, instead of MORE strategies (Schneider, 2006). As I explained in the introduction and as I will explain in the following paragraphs, Less (or More) is referred to the decreasing (or the increasing) of negative externalities or negative inputs in the agrofood production.

I would like to describe briefly the object of our study, the agrofood system and then present an example of More strategy, the Gene Revolution and one of Less strategy, the Slow Food Revolution.

3. The Agrofood system

The first scholars that considered the various steps of the agrofood production as one unique system were Davis and Goldberg in 1944 with the famous book "A concept of agribusiness" where they defined the Primary Agribusiness Triaggregate as a set of the three activities, Farm supplies, Farming, Food Processing and Distribution. In Europe the concept of "*filiere*" (supply chain) introduced by Malassis (1979) is more common and introduces also the consumer as an active player. A huge set of analysis has enriched more and more the frame, adding the territory factor in the agrofood system, especially in the works of Mediterranean economists (Italy first) until the re-introduction of the concept of Marshallian industrial district, retrieved first by Becattini (1987) and then in the agrofood field by Jacoponi (1990) and other scholars (Cecchi et al., 1992; Saraceno, 1992; Brunori 1999; Pacciani, 2003, among the others).

After the Triaggregate of Davis and Goldberg, the agrofood system developed following the changes in the life style of consumers, in their habits and in their purchase behaviours. In fact nowadays in the developed countries, it's impossible to talk about agrofood system without quoting the ho.re.ca. sector (hotel, restaurant and catering). The number of outdoor meals is increasing more and more. Nomisma, an Italian Research institute claims that almost 61 billion of outdoor meals are consumed in one year. Another aspect is that the tourism, according to the Wto forecast is going to be the first world industry in 2050. We can observe that this forecast probably don't care about the peak oil or the terrorism, but anyway it's clear that a discussion on food can't forget the outdoor consumption.

In the agrofood system drawn above, two are the weak points. The first one is farming, or better the farmers, which are price-takers, that is they undergo the market price. Usually they undergo the decisions of food processing industry or the distribution, which, thanks to the bug size of the companies, can impose the price taking in no consideration the agricultural costs of production. The second one weak point are the consumers, which are goods takers, because they can't totally wield their power: they can accept what retailers (not very often) or distribution (more often) supply. Their power of choice is narrowed

behind the supply of goods made by retailers and distribution.

The Slow Food Revolution aim is to build an alliance between farmers and consumers, considering them as a new economic player, the co-producer, creating favoured relationships between the world of production and the world of consumption, in order to determine on one hand an improvement in the farmers' incomes and on the other hand an improvement of the sensory or environmental or ethical characteristics of the food for the consumers. In the following paragraphs I will try to explain how this alliance between producers and consumers, keystone of the Slow Food Revolution, can positively affect the agrofood system and vice versa how the Gene Revolution can cause heavy consequences.

4. MORE Strategy: the Gene Revolution. Some figures to think about it.

Usually, when people talk about Gene Revolution, we are in presence of a real ideological fight between people in favour and people opposed (Lockie, 2006). In this paragraph of my contribute I will try to explain the motivations that support my critic position on Gene Revolution. At this moment the main commercially available kind of GM plants are two: the RR plants and the Bt plants. The RoundUp Ready® plants (soybean for example) are produced to increase the tolerance of the herbicide RoundUp produced by Monsanto. The Bt plants were thought to produce in the behind a toxin usually produced by the *Bacillus thuringiensis*. There is a third kind of GM plant, the so-called second generation GM plants, like the Golden Rice, set to produce β carotene, the pro-vitamin A. This is an example of what is called nutraceutical, because it gathers up food characteristics with pharmacologic characteristics. Specifically, the lack of pro-vitamin A is a cause of eyes diseases and also blindness. Unfortunately the problem is that one should eat at least 10 kilograms of Golden rice to intake enough pro-vitamin A to prevent the arise of eyes diseases. Vandana Shiva claimed that adding curry to traditional rice you get a bigger amount of pro-vitamin A rather than eating Golden Rice (Shiva, 2004).

Productivity

Usually it's said that the use of genetic engineering in agriculture would be useful to increase the productivity and consequentially it would be useful to reduce world starvation. The increase of productivity is a sort of prerequisite to start every discussion on Gm plants. But as Charles Benbrook claims (2004) "no genetically modified plant in USA was modified to increase the productive potential". He underlined that Bt soybean in USA shows lower yield with a decrease of 4-8% in respect of traditional plants and that in general the increases of Gm plants are almost negligible. Other studies confirmed what, until some months ago, seemed only a rumour without scientific bases, for GM plants in general (Fernandez-Cornejo, J. and Caswell, 2006), for RR soybean (Gordon, 2007, Elmore et al, 2001) and for Bt maize (Ma & Subedi, 2005). So the prerequisite is not so strong as it seems. But let's talk about the consequences on environment, society and humans.

Environment

Some studies (Benbrook, 2004) showed how more treatments fall on some GM plants (RR soybean for example) in respect of conventional plants, therefore the environment has no benefit. The fact that RR soybean is tolerant to the herbicide Roundup produced by Monsanto induces the farmers to exceed in the herbicide treatments. In the case of maize Bt there are other problems, with the so-called non-target species. Bt plants produce a toxin, that is poisoning for insects; the pollen is able to kill for example the European corn borer, the maize pest, but a research demonstrated that the pollen can hit other species too, the not target one, as the monarch butterfly (Losey, 1999). The biologic hazard is not impossible, and we don't know at the moment what consequences could occur in the ecosystem; not for chance Usda, the Department of agriculture of United States, considers Bt maize as a pesticide and not as plant and so people find on the table a pesticide or animals fed with pesticides. Last, the introduction of Bt plants could induce resistances in insects, damaging all the plants not only the Bt plants.

At the end of this subparagraph I can claim that these are the first motivations why I consider the Gene Revolution a "More" strategy for the agrofood system, because it's clear that we have MORE pollution and MORE ecological risks, without the certainty of a higher production.

Society

In the Gene Revolution social consequences are present too. Without forgetting the results of the Green Revolution in developing countries, such as the increase of productivity, I would like to remember that both Green and Gene Revolution cause an increase in the farmers exchanges, because in the case of Green Revolution it should be considered the purchase of fertilizer, herbicides and pesticides, machineries, fuel etc. in the case of Gene Revolution it should be considered the purchase of the seeds, protected by patents. In both cases the farmers run the risk of getting into debt. On one hand it means that only farm with more than 6 ha can survive, on the other hand it undermines the stability of farmers, uploading them with debts not even solved. Farmers' suicides are not infrequent in developing countries and it's not for chance that the idea of micro credit took root in a rural country such as Bangladesh, thanks to the activity of Muhammad Yunus and his Grameen Bank (Yunus, 2003); but micro lending can't cover the big exchanges for the industrialized agriculture inputs.

For these reasons I can claim that the Gene Revolution cause MORE social inequity, MORE marginalization of small farmers.

Human happiness and wellbeing (sensory quality of food)

The GM seeds commercially available are mainly maize, soybean, canola and cotton. They are commodities, with a low level of biodiversity. In reality if we think about maize, Mexico, the area from whom the maize comes, exist at least 100 corn varieties, threaten by the coming of just one variety of GM maize (Fitting, 2006). Also the 160 potatoes varieties of Latin American could be threaten, without considering India and China, which are a huge repository of

world biodiversity (Kala et al., 2006). The productivistic agriculture, and the Gene Revolution too, consider as weed what is a source of medicinal principles and oligoelements useful for metabolism of local populations (Shiva, 2004). The case of Golden Rice in India, showed above, is quite helpful to understand which is this approach in respect of the delicate balance of food intake for local populations. The standardization of plants is a loss for the environment (Altieri, 1999), but the standardization of food is a loss for human happiness and wellbeing; the food is standardized when it's supplied in many different markets for different people; it's the same food in all the world (Cantarelli, 2004): it's food without particular smell or taste not to be rejected by anybody. This kind of perspective finds some opposition in the geographical indications, especially in Europe, which were born to safeguard the biodiversity and the origin of food. Food is not the same everywhere seems to claim European Union with the Regulations on geographical indications (CE, 510/2006 is the last one of a set started in 1992).

The Gene Revolution is synonymous indeed of MORE plant and food standardization.

5. Less strategy: the Slow Food Revolution. Some examples

Now I would like to explain some aspects of the so-called Slow Food Revolution, in terms of human happiness, social equity and sustainability for environment.

Human happiness and wellbeing

The sensory quality is a concept strictly connected with the happiness. Happiness and economy have a complex relationship, so that scholars talk about "the happiness paradox", that is a non-linear ratio between economic growth (for example Gnp) and subjective wellbeing (Easterlin, 1974 and 2001). The relationship between economic growth and happiness provoked a huge debate, which involved for instance Daniel Kahneman, who was awarded Nobel Prize in Economic Sciences in 2002.

Talking about food we can claim that the sensory quality doesn't increase proportionally together with the income, because at a certain time people start to consume other kind of goods such as expensive cars, travels etc. Paying more to eat a better food (not for a bigger amount of food!) is not a priority of our society. Usually we pay more for convenience in food instead of sensory quality: the technologic content of food increases (fresh-cut vegetables, for instance) but not the sensory quality. In this sense the effort of Slow Food Movement to safeguard local food, with local breed and varieties, traditional methods of production, gets two important results. The first one is to protect good food threaten by the modernity of productivistic agriculture; the second one is to protect the biodiversity and indeed the environment. These products are called Slow Food Presidia and have an economic role in keeping some marginal rural areas alive (Antonioli Corigliano et al., 2002). Slow Food Presidia are 200 products in all over the world: guarantying the survival of plants and animals means in some cases to avoid destruction, but also in other cases to restart the use for economic purpose. Red and white cows in Val Padana in

Italy were extinguish themselves because they were substituting more and more by Frisian cows in the Parmigiano Reggiano cheese productions. Now the survival is guarantee. The same happens with plants or artisan food. This is the reason why we can say that the Slow Food Revolution is a vision with LESS food standardization.

Social Equity

As we said before, farmers and consumers are the weak point of the agrofood system. To get them closer, to build connections it's possible to make the supply chain short, to make the place where food is produced closer to the place where food is consumed or at least where is bought. A very good example of this aspect is the farmers' market, a place where food producers sell their own products. The short supply chain give advantages both to producers and consumers: the producers can get higher incomes, because he jumps all the distribution, retailers steps and the consumers can buy fresh food at a reasonable price. In the United States in twelve years the number of operating farmers markets starting form 1.755 in 1994 has arrived to 4.385 in 2006, with an increase of 18,32 % (Usda, 2007). The same happens with the raw milk vending machines in Italy. Farmers put the raw milk, filtered and refrigerated, in the vending machine every morning and they can sell milk at higher price instead of selling to the milk processing industry. And the consumers can drink a very good product rich in oligoelements and vitamins that are lost during the pasteurization process. Then the price is lower than milk price at the supermarket. Raw milk vending machines can be positioned in crowded places like Stazione Centrale of Milan or Piazza Sordello in Mantova or directly in the farm as it happens in many others small villages. Nowadays raw milk vending machines in Italy are more than 600.

Together with the economic aspects, make the supply chain shorter means also to reduce the packaging and to reduce the food miles, that is less pollution and less consumption of fossil fuels. Other examples of short supply chain are of course all the set of movements, which try to build relationships between consumers and producers: CSA in USA, AMAP in France and obviously the tei-key movement in Japan. The consumers engage in buying products in a certain farm and farmers engage in producing in a certain way (organic for example). The local dimension of the exchange contributes to build a sustainable economy (Curtis, 2003).

At the end of this paragraph we can say that the Slow Food revolution propose Less marginalization for farmers and less social inequity.

Environment

As we said before, the short supply chain has positive implications for environment. I would like to take another example of the sustainability of short supply chain. Restaurants, which are getting more and more important in the present agrofood system, due to increasing number of outdoor meals, can adopt strategies to make the supply chain shorter. Coldiretti, an Italian farmer trade union, together with some restaurant owners, worked out a project called "Menù a chilometro zero" (zero kilometres menus) to sustain local and seasonable consumption. A "zero kilometres menu" provides food that is local and seasonable, to reduce food miles and fuels for green houses.

Other restaurants in other parts of the worlds are working out similar strategies of eco-cooking, with attention to energy consumption, the recycling of waste, the water use, environmentally friend materials and the supplier management. A good example is Bordeaux Quay in Bristol (UK).

I don't want to forget the organic agriculture movement (Ifoam, Soil Association etc.), because it's a perfect example of LESS strategy: less input in agriculture, less oil consumption, less air and soil pollution. The demand is increasing and it's good news also for extra food commodities as cotton. Organic agriculture has an economic consequence too. Using less inputs, farmers have less exchanges and so they have less problems in borrowing money especially in those country with worst bank systems with difficulties in finding money at a good interest rate.

Also in the case of environment the Slow Food Revolution proposes a LESS strategy: less pollution, less fuel consumption, less waste.

6. Conclusions

The present agrofood system is not able to supply good food for everybody, assuring sustainability for environment and social equity for people. Someone claims that the Gene Revolution, a MORE strategy, can change the agrofood system to improve this situation. But there are other perspectives. The Gastronomic sciences approach, with the three key words good, clean and fair, propose the Slow Food Revolution, a LESS strategy.

Increasing the awareness of consumers and producers, in a bottom-up approach, could be a right way to achieve the aim of the Gastronomic Sciences, which is in common with the degrowth theory: happiness for men and women, sustainability for environment and social equity.

Sitography

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Decroissance des procédés Haber-Bosch

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Résumé

Une démarche réellement préventive face aux dégâts environnementaux liés aux produits azotés (algues vertes, nitrates dans les eaux potables, pluies acides, smog, pollution de l'air, destruction des paysages et des saveurs) impose de réduire à la source l'extraction industrielle de l'azote de l'air et l'importation d'ammoniac et d'engrais chimiques. Cette démarche impose de prendre en compte les consommations indirectes de produits azotés au cours du cycle de vie des produits. Elle nous entraîne à envisager une décroissance des unités industrielle de production d'ammoniac qui sont principalement basées sur le procédé Haber-Bosch.

Les activités humaines entraînent l'extraction du milieu naturel d'une quantité considérable de matière. On parle de plus de 50 milliards de tonnes¹. Ces extractions de matières sont à la source des problèmes environnementaux car elles se transforment à terme en déchets et pollution (après quelques rares recyclages). Elles sont à la base aussi de problèmes sociaux par l'inhomogénéité des niveaux de consommations. Une généralisation des modes de vie des pays riches et des classes riches du sud est inaccessible pour la grande majorité de la population mondiale à cause des limites de l'espace environnemental mondial. Des experts en environnement parlent ainsi depuis dix-quinze années de la nécessité de réduction globale d'un facteur 10 des extractions² directes, ou par l'intermédiaire de produits importés, des pays industrialisés.

Nous nous porterons tout particulièrement sur l'importance de réduire l'extraction de l'azote de l'air³, ou azote atmosphérique (N₂), extraction qui ne pose aucun problème de raréfaction de ressources (les réserves d'azote atmosphérique sont immenses), mais engendre par contre d'énormes problèmes environnementaux par le biais des dérivés azotés (ammoniac, nitrates, NO_x, N₂O...).

La pollution par les nitrates entraîne une eutrophisation des milieux (rivières, lacs et bords de mer) : les eaux sont tellement chargées en nutriments azotés que des algues vertes prolifèrent. Les teneurs en nitrates des eaux de surfaces et des eaux souterraines rendent l'eau impropre à la consommation. La Bretagne avec ses élevages industriels de cochons s'est rendue célèbre de ces types de pollution.

¹MOSUS, policy recommendations, Hinterberger, Giljum, Kassenberg and Swierkula, Dec 2005 www.mosus.net

²Friedrich Bio Schmidt-Bleek, The Fossil makers, 1993 ISBN 3-7643-2959-9 Birkhäuser, Basel, Boston, Berlin

³Schneider F, Niza S, Development of Input indicators based on extraction equipments, Workshop Quo vadis, MFA? „Material Flow Analysis – Where do we go? Issues, Trends and Perspectives of Research for Sustainable, Resource Use“ Wuppertal, Germany, 9–10 October 2003

Notons au passage que les systèmes de traitement des eaux arrivent difficilement à des taux de dénitrification de plus de 50%⁴ quand un tel traitement est mis en place et fonctionne. Les flux de substances azotées amènent aussi une acidification des terres et des lacs (pluies acides). Un autre type de pollution lié à l'azote est l'augmentation des concentrations en gaz hilarant (N₂O) entraînant une moins risible contribution à l'effet de serre. Citons aussi la pollution de l'air par les NO_x créant de l'écotoxicité, notamment par leur contribution à l'oxydation photochimique produisant l'ozone troposphérique. Cet ozone entraîne maladies respiratoires et cardiovasculaires, effet de serre, dégâts aux cultures... De plus le transport, la production et le stockage de l'ammoniac et de nombreux dérivés pose des problèmes de sécurité aux conséquences tragiques. Tous ces problèmes sont de plus susceptibles de s'aggraver au niveau global si les modes de vie générant de tels flux d'azote (principalement au sein des pays industrialisés) se généralisent, ce qui est en phase de se produire.

L'azote atmosphérique N₂ compose 78% de l'atmosphère. Sous cette forme l'azote est totalement stable et sans impact. Il existe un cycle naturel de l'azote : les bactéries Rhizobium en symbiose sur les racines de légumineuses (haricots, fèves, soja, lentilles...)⁵ décomposent l'azote de l'air en composés ammoniacés transformés par les plantes pour produire des acides aminés (protéines) qui sont assimilés par les animaux qui les mangent. Lors du compostage des plantes ou des animaux morts, les bactéries dénitrifiantes transforment en retour les protéines en azote atmosphériques et la boucle est bouclée.

Or ce cycle naturel est rompu par l'arrivée de processus artificiels d'extraction de l'azote dont:

- Les combustions (liées aux transports, à l'industrie et à la production d'électricité, au chauffage), elles transforment de manière involontaire l'azote de l'air (N₂) en oxydes d'azote (NO_x) très polluants.
- Le procédé industriel, volontaire lui, « Haber-Bosch ».

Développé par Fritz Haber et Carl Bosch au début du siècle et commercialisé dès 1913, le procédé Haber-Bosch est considéré par certains comme la plus grande invention du 20ème siècle par sa contribution à l'agriculture industrielle et aux explosifs notamment militaires. Son arrivée sur le marché a permis de prolonger la première guerre mondiale de plusieurs années en renouvelant les stocks d'explosifs. Au niveau mondial, plus d'une centaine de millions de tonnes d'azote⁶ sont maintenant extraites de l'air par ce procédé. Ce processus industriel a supplanté tous les autres. Il a permis de doubler le taux de fixation de l'azote de l'air. Il a été évalué qu'un tiers de notre corps est maintenant composé d'azote de synthèse issu de ce processus industriel. Ce procédé produit de l'ammoniac (NH₃) à partir d'azote atmosphérique et d'une grande quantité d'énergie sous forme de gaz naturel. Le procédé Haber-Bosch

⁴Baccini P., Brunner P.H., Metabolism of the Anthroposphere, Springer 1991

⁵citons parmi les phénomènes naturels la formation de NO_x lors d'orages mais leur contribution aux flux azotés reste marginale

⁶Chiffre de 1996, Febre domene LA & Ayres RU (2000) Nitrogen's role in industrial systems, Insead working paper

consomme 1% de l'énergie dans le monde. L'ammoniac est à la base de toute la chimie de l'azote. Le procédé Haber-Bosch permet par l'intermédiaire de NH_3 de produire les engrais artificiels azotés (500 millions de tonnes par an), les explosifs ainsi que quelques menues applications comme des plastiques, des colorants et des herbicides/pesticides dont le méthyle isocyanate qui s'est rendu lors de l'accident de Bhopal en 1984. Ce procédé a même pu servir à produire le Zyklon B utilisé lors de la deuxième guerre mondiale, et le nitrate d'ammonium dont une partie des 300-400 tonnes stockées sur le site AZF ont explosé à Toulouse en 2001⁷. 85-90 % de l'ammoniac sert à produire des engrais chimiques.

D'après une étude hollandaise d'Ester van der Voet⁸, l'agriculture serait responsable pour 57% des pluies acides azotées et de 90% des nitrates dans les eaux souterraines. Pour les pollutions côtières par les nitrates, une large part, par contre, est à attribuer aux eaux usées domestiques. Mais si nous remontons aux « origines ultimes » des émissions azotées c'est à dire jusqu'aux extractions de l'azote de l'air, 52% des pluies acides azotées sont à attribuer au processus Haber-Bosch et 35% aux combustions (d'énergie fossiles principalement) ; 79% de la pollution des eaux souterraines est à attribuer au procédé Haber-Bosch et 7% aux combustions. Pour les pollutions côtières, 2/3 sont attribuables au procédé Haber-Bosch.

Nous le voyons, pour agir véritablement à la source des problèmes, il nous faut réduire l'extraction artificielle d'azote de l'air. Bien sûr, la mise en place partout de systèmes de compostage et de traitement biologique sont à favoriser. Ils permettent de relarguer en partie l'azote sous forme atmosphérique et sans dommages pour boucler le cycle de l'azote et d'autre part ils permettent d'éviter l'usage d'engrais artificiel en rendant une partie de l'azote à nouveau disponible pour les plantes. Cependant ces systèmes de dénitrification naturelle ne parviendront pas à endiguer l'apport massif d'azote artificiel. Une démarche préventive implique d'agir au niveau d'une réduction à la source de ces procédés Haber-Bosch dans une large part et au niveau des combustions dans une moindre part. Trop souvent les mesures palliatives ne sont que des transferts de problèmes consistant à stocker des déchets dans le temps ou à délocaliser les industries problématiques. L'azote finit alors par rejoindre le milieu sous une forme polluante.

Les installations Haber-Bosch existent lorsqu'il y a de la demande d'ammoniac. Mais comme ces gigantesques installations (il y en a cinq en France) doivent être utilisées à pleins régime pour être rentables, il semble important de réduire le nombre de ces installations dans le monde (et pas simplement de ne pas les vouloir « dans son jardin » tout en continuant à consommer des produits issus de l'agriculture conventionnelle). Une telle politique est-elle envisageable ? Cette décroissance des procédés Haber-Bosch et des importations d'engrais n'est malheureusement pas d'actualité, nous voyons au contraire ces installations se

développer dans les pays du tiers-monde. Un exemple récent est l'énorme installation déployée au Trinidad axée sur l'exportation. Une réduction de ces installations aurait de plus pour conséquence heureuse de diminuer la production d'autres extracteurs de ressources naturelles et d'armes : les explosifs (TNT...) ainsi que de nombreux produits chimiques problématiques tels les pesticides.

Pour réduire la demande deux mesures sont à prendre : réduire de manière importante l'utilisation d'engrais azotés et l'élevage intensif qui impose un apport massif de substances azotées et génère une grande inefficacité de l'agriculture en général. Ester van der Voet⁹ a ainsi montré que de telles mesures étaient les seules réellement efficaces pour réduire la demande en azote artificiel et notamment la pollution des eaux souterraines par les nitrates.

Cela implique de réduire la consommation de produits agricoles produits à partir d'engrais. Favoriser l'alimentation végétarienne.

Pour compléter le tableau, une action préventive au niveau des combustions implique une réduction de l'extraction et de l'importation des combustibles fossiles. Pour réduire la demande il s'agit de réduire

- le nombre de véhicules et les distances de transports
- les centrales thermiques et la consommation d'électricité
- l'utilisation de combustibles fossiles en général pour le chauffage notamment

Les démarches palliatives consistent à une amélioration des processus de combustion et un traitement des fumées, mais celles-ci n'empêchent pas un transfert de problème et un effet rebond¹⁰ (un accroissement de la combustion lié l'augmentation de l'efficacité de la combustion).

Conclusion

L'identification des « origines ultimes » des flux d'azote est fondamentale (combustions et procédés Haber-Bosch). Pour résoudre les problèmes de pollution liées à l'azote, les mesures prises doivent influencer les origines ultimes de manière directe ou indirecte : l'extraction artificielle d'azote doit décroître. Réduire l'extraction de l'azote par le procédé Haber-Bosch est d'une certaine manière assez simple en raison de la concentration extrême des lieux d'extraction.

Annexe

Voir le site bien fourni de la Société Française de Chimie : <http://www.sfc.fr/donnees/mine/nh3/texnh3.htm>

⁹Ester van der Voet (1996), Nitrogen pollution in the European Union.

¹⁰Schneider F, Mieux vaut débondir que rebondir, dans Objectif Décroissance, Ed Parangon, 2003 ; Schneider F, L'effet Rebond, l'Ecologiste, Edition française de The Ecologist, n°11 Octobre 2003, Vol 4, n°3, p45 ; Schneider F, Hinterberger F, Mesicek R, Luks F, ECO-INFO-SOCIETY: Strategies for an Ecological Information Society, 7th European Round Table for Cleaner Production (ERCP) 2001, Lund, Sweden

⁷D'après Domene & Ayres, 47 millions de tonnes de nitrate d'ammonium ont été produites en 1996 dans le monde, ce qui donne une petite idée de l'ampleur du danger que représentent ces substances en regard de la quantité stockée à Toulouse.

⁸Ester van der Voet (1996), Nitrogen pollution in the European Union, Chaper 8, In: Thèse de doctorat, Substances from cradle to grave: CML, Leiden, Pays-Bas.

1- Procédés Haber-Bosch en France.

Extraction d'azote atmosphérique en France : 1 120 000 tonnes de N₂.

Les procédés Haber-Bosch en France se concentrent dans cinq usines et trois compagnies (Yara, Grande Paroisse et BASF). Ces unités de production d'ammoniac extraient chacune les quantités suivantes d'azote atmosphérique (en tonnes de N de capacités annuelles).

Grand Quevilly (Grande Paroisse) : 328 000 t

Grandpuits (Grande Paroisse) : 330 000 t

Le Havre (Yara France) : 400 000 t

Ottmarsheim (Grande Paroisse et BASF) : 180 000 t

Pardies (Yara France) : 100 000 à 200 000 t, destiné en majeure partie à des applications hors engrais.

2- Importation directe ou « cachée » d'azote

Mais la France importe aussi 700 000 tonnes d'azote sous forme d'ammoniac. D'énormes quantités d'azote sont importées par l'importation de sous-produits contenant de l'azote (engrais notamment). De plus de nombreux produits importés, comme les légumes produits à l'autre bout de la planète mais consommés en France, contiennent ce qu'on appelle des « flux cachés » d'azote car leur production a nécessité sur place l'usage d'engrais azotés et a donc requis à l'origine de l'extraction artificielle d'azote atmosphérique.

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Enabling degrowth at the neighbourhood level. Analysis of the cohousing movement

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Abstract

In a context of ever faster globalisation, urban citizens are clearly put under pressure. In short, they have to face problems such as an increasingly flexible labour market, the change in the family structure, the hyper-isolation of individuals, the mobility problem, the rise of stress level, and the aging population. If one has to pay attention to this sad but true reality, this article does not want to focus on this gloomy picture.

To the contrary it stresses how the cohousing model brings some relevant answers to some of these problems, and fits perfectly well with the new economic theories of the degrowth movement. Cohousings are neighbourhood developments that creatively mixed private and common dwellings to recreate a sense of community and useful networked relationships, while preserving a high degree of individual privacy. If life in cities appears to be a nightmare or an impasse for many, the cohousing movement brought some fresh air and showed that urban citizens can not only work together to solve some of their problems, but have fun at the same time too. Moreover, it clearly shows how human beings can, and have a huge advantage, to work among themselves without passing through a market relationship. In fact, existing cohousings show that cohousers tend to develop Local Exchange Systems of all sorts instead of using the consumerist way of life as first and unique alternative.

Far from being just a theory, the cohousing phenomenon that started in Scandinavia 30 years ago is now spreading in the Anglo-Saxon world since the 1990s, and more recently in the rest of Europe and in Japan. This success is mainly due to its high degree of flexibility, making it possible to adapt each cohousing in relation to its particular cultural context, and the specific group of cohousers themselves. The article will also stress some of the problems that the cohousing movement is facing, and that should be taken into consideration, to make this housing model potentially spread to the mainstream in the coming decade.

1. Introduction¹

In a context of ever faster globalisation, urban citizens are clearly put under pressure. One answer to face some of the

¹ This article was first presented at the degrowth conference in Paris, 18-19 April 2008. It is the result of a study in 14 cohousings, in Denmark, Sweden, Holland, and Belgium. Interpretation and mistakes are me own responsibility. A DVD on the cohousing issue has been realised by the author and is available at <http://notsocrazy.net>.

problems they face is cohousing. These are neighbourhood developments that creatively mixed private and common dwellings to recreate a sense of community, while preserving a high degree of individual privacy. This movement clearly shows how human beings can, and have a huge advantage, to work among themselves without passing through a market relationship.

The strength of cohousing is that it is far from being just a theory. It originated in Scandinavia 30 years ago and it is now booming in the Anglo-Saxon world since the 1990s, and more recently in the rest of Europe and in Japan. This success is mainly due to its high degree of flexible bottom-up approach, making it possible to adapt each cohousing in relation to its particular cultural context.

I argue in this article that cohousing is strongly related to degrowth, especially at the microlevel of urban neighbourhood. The article is structured as follow. First it analyses how community is disappearing in urban contexts. Second, it tells what cohousing is and where it comes from. Finally, it gives some concrete examples of how cohousing does change the life of people and fosters degrowth by increasing the quality of social relations; the efficiency of the daily time management; and group consumption patterns.

2. Context: life in a hyper-individualistic market society

To start with it is essential to stress that the cohousing model did not arise by magic. Instead it can be described as a grassroots and innovative answer to very specific problems that many citizens are increasingly facing, mainly in northern western society. Cohousing has helped people to recreate village-like communities in impersonal urban contexts.

Neoliberal globalisation

If there is no doubt that the rise of the capitalist society, followed later by the first and the second industrial modes of production, deeply influenced the relationship between human beings and their environment. In the mid 1970's, economic historians noted a paradigm shift from the Keynesian economic model, based on the state intervention to regulate the market economy for social purpose, to a neo-liberal or monetarist economic model, based on a progressive – and sometimes radical - withdrawal of the state to let the free market economy operate by itself².

For the last three decades the so called freedom of the market economy has become a religious faith for politicians who are more obsessed to increase the GDP, the competitiveness of economic actors, the flexibility of the job markets, than to focus on better living standard for the most, and to protect the environment. The main fallacy of the market theory is to believe that the market is self-regulated and that there is no reason to worry about social and environmental problems... However, one can easily see the fundamental contradiction between an economic model fostering *unlimited* growth rates, and environmental and human resources which are by definition *limited*³!

² Plehwe, D. et al. (eds) (2006), *Neoliberal hegemony: a global critique*, London: Routledge

³ UNDP report 2007; Latouche, S. (2006), *Le Pari de la*

On the basis of governmental statistics from the EU and the US, a school of economists⁴ corroborated the clear link between higher economic growth and *lower* individual happiness by including non-economical elements in their analysis. The collapse of individual happiness is a deep structural change of our time which testifies the sharp increase in consumption of tranquilisers and narcoleptics to face stress related diseases, what the World Health Organisation highlights to be the most widely spread disease in the 21st century⁵. Governments all over the EU are already concerned about the fact that workers increasingly take days off due to psychological illness⁶. At a time when competitiveness and growth are the two buzzwords of the political elite⁷ it is then useful to recall what Keynes once said about the trickle down effect: "In the long run we are all dead"⁸.

Changing cities and crisis of the community

As said above, cohousing is a deliberate urban or semi-urban housing model and a few words must be written on the city here. Cities have always been considered as one of the main achievements of the western civilization and many great thinkers dedicated part of their life to analyse cities as places of vibrant and rich interpersonal relationships and where people felt protected⁹.

What to think about the city today? Just like firms, states and any institutions from the school to the church, cities are put under pressure of powerful global dynamics¹⁰. This in turn does influence the life of citizens on a daily basis. The city has hence become like a centaur: on the one hand, it is just fascinating most by its 'beauty', available work, cultural and social activities; on the other hand, cities are dangerous place to live as they simply swallow people's time and energy, forcing them to rush all the time to make ends meet. And the rate of people living inside cities but left outside of the market system is growing every day more¹¹.

Working distance, flexible working conditions and above all rising individualism were factors that made hard time for communities to survive in urban context since the 1980's. Even the family, that one could define the closest

community to an individual, was far from being protected and it is not a coincidence if the number of single parent families and singles are in sharp increase in urban contexts¹². As cohesion inside communities was slowly but surely decreasing, the community buffer soon appeared inefficient to defend individuals from the outside threats as much as before. The city had shifted from being a place for protection, social life and happiness to a place for production, competition, stress and *tele-* rather than face-to-face communication. One of today's main consequences of this is that loneliness is a main characteristic of urban life¹³.

3. Cohousing, a part of the solution

What is cohousing?

Cohousings are neighbourhood developments where private and common facilities are combined, to provide answers to the social and the practical needs of contemporary urban citizens. It makes life more fun and easier while preserving the privacy of each individual, both adults and children. The magic is that nothing is rigid in such a place: it all depends on what the community can afford and wants to create! What is fundamental is that cohousers themselves are the driving force behind the process. Cohousings gather on average between 15 to 35 families, that is 50 to 100 people, in order to work optimally. Smaller or bigger ones tend to create problems¹⁴.

An important characteristic of these particular housing models is that they are set in an urban or semi-urban context. In that sense, they are not like ecovillages, which are generally built in the country side and developed following a more intense community cohesion and environmental respect. By being an urban phenomenon, cohousings have shown constructive alternative to stop the growing atomisation and loneliness of individuals in large cities.

6 fundamental characteristics of Cohousing¹⁵

1 - Participatory process:

Cohousers are managing the whole process from scratch. They can be helped by experts (lawyers, architects, facilitators, etc) but they are in the driver seat. This requires much time and tough weekly meetings for years and years.

2 - Intentional neighbourhood design:

The design of the cohousing site is fundamental as paths, green zone, houses, benches, parking have major influence on the quality of the community glue.

décroissance, Paris : Fayard

⁴ Layard, R. (2005), *Happiness: Lessons from a new science*, London: Allen Lane; Frey, B. & Stutzer, A., (2002), *Happiness & Economics*, Princeton University Press

⁵ http://www.who.int/occupational_health/publications/en/ohstress.pdf

⁶ http://www.euro.who.int/occhealth/stress/20050405_1

⁷ http://en.wikipedia.org/wiki/Lisbon_Strategy; Begg, I. (2002), *Urban Competitiveness*, Bristol: Policy press

⁸ Keynes, J-M (2000 [1923]), *A tract on monetary reform*, Prometheus Books

⁹ Aristotle (1999), *Politics*, Oxford University Press; Weber, M. (1958), *The City*, New-York: Free press

¹⁰ Strange, S. (1996), *The Retreat of the State: diffusion of power in the world economy*, Cambridge University Press

¹¹ For a similar argument, see Merrifield, A & Swyngedouw, E. (ed) (1995), *The Urbanization of Injustice*, London: Lawrence & Wishart; Brenner, N & Keil, R. (eds)(2006), *The Global Cities Reader*, London: Routledge; Smith, M P (ed)(1992), *After modernism : global restructuring and the changing boundaries of city life*, New Brunswick: Transaction

¹² Kroger, T & Sipila, J. (eds) (2005), *Overstretched : families up against the demands of work and care*, Oxford: Blackwell; Kaufmann, F (ed) (2002), *Family life and family policies in Europe*, Oxford university Press

¹³ Bugeja, M (2005), *Interpersonal divide : the search for community in a technological age*, Oxford University Press; Stivers, R. (2004), *Shades of loneliness : pathologies of a technological society*, Lanham: Rowman & Littlefield

¹⁴ McCament, K. & Durrett, C. (1993), *Cohousing: A Contemporary Approach to Housing Ourselves*, Ten Speed Press; www.cohousing.org

¹⁵ McCament, K. & Durrett, C. (1993) op. cit.; Meltzer, G. (2005), op.cit.; www.cohousing.org

3 - *Extensive common facilities:*

Seen by many as the heart of the cohousing, common facilities and activities must be given a crucial attention. Experienced cohousers even say that it is much more important than the private dwelling where cohousers spend statistically less time than they originally thought.

4 - *Complete resident management:*

It is fundamental that cohousers meet on a regular basis to take decisions. Decisions can be taken either by consensus, by voting or by hybrid approach. Each cohouser should get a voice, for fairness and to avoid time-bombs¹⁶. The use of small working groups for the daily management of the cohousing is required.

5 - *Absence of hierarchy :*

The existence of rankings and leaders is acknowledged by cohousers as these are human processes that naturally occur in communities. However, clear mechanisms are created to ensure that everyone gets a fair opportunity to express their ideas during meetings.

6 - *Separate income:*

A cohousing is not a commune and in that sense every cohouser has to find a way to earn money by itself. In some cases, community rooms can be hired as office or some cohousers can be paid for occasional work.

Origin in liberal societies

Cohousing started 30 years ago in Denmark, and similar housing models are now booming all over the globe, mainly in the US and in the EU¹⁷. The first cohousing for 27 families was built in 1972, close to Copenhagen, by a Danish architect and a psychologist. The trigger was an article by Bodil Graae where she argued that children should have one hundred parents¹⁸.

The result in the form of (semi-)urban communities was not a new concept. In fact, life had been organised in small communities in the pre-industrialised societies. What was new, however, was to implement this old idea to a *new context* and in a new way: in post-industrial societies, people rarely work where they live and the cohousing enables not only to recreate social links between neighbours, but also to ease the burden of daily life.

The concept rapidly spread and it reached the Netherlands, where the first cohousing was completed in 1977. Sweden, which already had a strong community history since the 1930, followed too and the cohousing model became institutionalised and recognised by public authorities in 1980. In the last 15 years, cohousing conquered the USA, the UK, Australia, New-Zealand, Canada, and Japan¹⁹. Today one can estimate that there are over 1000 cohousings in operation and around the same number who are in the

¹⁶ Leafé Christian, D. (2003), *Creating a Life Together: Practical Tools to Grow Ecovillages and Intentional Communities*, New Society Publishers

¹⁷ McCament, K. & Durrett, C. (1993) op. cit.; Meltzer, G. (2005), op.cit.

¹⁸ Bergamasco, F & Canossa, G, *Sostenibilità e Integrazione*, chapter 3, BA thesis in architecture, University of Venezia, Italy.

¹⁹ Meltzer, G. (2005), op.cit.

process of been finished²⁰. An interesting indicator of the boom in the USA is the phenomenon of yahoo groups²¹. Internet is in fact a crucial source of information that North American cohousers have skilfully used to spread awareness and to share experience²². Recently, the idea of the cohousing model also reached new European countries²³ where some projects started in Italy, France, Belgium and Spain.

Recreating villages in the city

Instead of accepting passively the problems related to contemporary urban life, the cohousing movement stresses that it is possible to develop new institutions that help citizens to enjoy their daily life. Of course it would be pretentious to claim that cohousing is *the only* answer available or that it is the answer to *every problem*. Nonetheless, we argue it should be seen as an important element that can put neighbourhood on the track towards degrowth.

Values of cohousers are in fact far from the ones which the market society tends to spread. As Birgit puts it: *“the important thing and the idea with this building was to create a village-like community where you know your neighbours, where you have the security of having relations, some social capital if you wish”*²⁴. And this was confirmed by Randi when she explains why her family decided to move in a cohousing: *“when we married, we thought it was very nice to move from our village to Copenhagen. It was like starting a new life! But then after a while, and when we started to get children, we started missing the good things about the smaller communities. We missed the social network where it was easy to talk with other people when you came home from work, and where it was easy for the children to run around and play with other children.”*²⁵

In that sense cohousing is chosen by many because it provides an answer to the rise of hyper-individualism and the breakdown of community which we mentioned above. The meaning of the original Danish name for cohousing, called *bofaelleskaber*, means literally ‘living community’²⁶ and it was designed for two main purposes: to increase the quality of cohousers’ social life and to lower the burden of every day life, while increase the free-time at home.

4. Practical examples of neighbourhood degrowth habits

In this final subsection, we want to place the stress on some practical ways how Cohousers managed to increase their standard of living by reducing the “market solution” but by

²⁰ Meltzer, G. (2005), op.cit.

²¹

dir.groups.yahoo.com/dir/Cultures___Community/Groups/Intentional_Communities/Cohousing

²² <http://lists.cohousing.org/mailman/listinfo/cohousing-l>

²³ Lietaert, M (2007). *Cohousing e Condomini Solidali*.

Florence: AAM Terra Futura; Lietaert, M. (2008) *Cohabitat: reconstruire des villages en ville*, in La Revue Nouvelle, February

²⁴ Interview with Birgit, Rio Cohousing, Stockholm, Sweden

²⁵ Interview with Randi, Trudeslund cohousing, Copenhagen, Denmark

²⁶ McCament, K. & Durrett, C. (1993) op. cit

developing neighbourhood relationships. The first point is related to the habit of sharing with others, the second is the optimisation of the cooking system; and finally the education of the children.

The habit of sharing goods and services

The first point we would like to stress is related to the way cohousing can influence daily consumption habits, mainly shifting this behaviour from an individual to a more collective action. This is important because it does not only enable to save money and to increase contacts with the neighbours, but it also reduces the environmental footprint. A recent publication by the European Environmental Agency urges for more sustainable household consumption patterns²⁷. A 2008 report by Dr Jo Williams at the University College of London argued that cohousing tend to cut CO2 emissions by 50%.

By the same token, Dr Graham Meltzer²⁸ argues that even if most cohousers already tended to respect 'green' values before joining a cohousing, yet they often manage to behave in an even greener way thanks to the stimulus and the coordination inside the community. Cohousers above all create sharing systems (and therefore reduce their consumption) of small items such as tools for gardening, maintenance, cleaning tools, cooking, small furniture, camping, etc. They also often share cloth for babies and children. And they are pretty well organised to share middle size devices such as freezers, wash machines, lawn mowers, etc. The daily use of cars is also diminished for example, while they increase the use of bicycle and the carsharing. When the car-sharing system is well organised, then one can see a drop in the possession of car. As Jytte tells: "I think we have 6 or 8 cars, and if we hadn't these cars that families can share, then we calculated that we should have 40 cars more!"²⁹.

The sharing of goods and services requires an efficient organisation of the common spaces too. As Helen explains, a cohousing is structured in a way that makes this sharing habit easier: "Downstairs there is a place with the washing machines. I have my own machine but if you do not have one you can use this one. There is also a room for kids full of cushions so that they can play what they like. On the other side, there is a bar and an empty room with a floor so you can dance, or meditate or doing yoga. This room can also be rented by people from outside. Upstairs there is also a hobby room where there are all sort of tools and wood and every body can make use of that"³⁰. In some spaces such as Munksogard or Lebensgarten, cohousers also organize a small organic food shop for the community. This enables not only to create a direct contact with local farmers and with neighbours from outside, but it also gives the possibility to have quality products much cheaper and in a much greener way than what one can find in supermarkets.

²⁷ EEA report, *Households Consumption and the Environment*, November 2005
http://reports.eea.europa.eu/eea_report_2005_11/en/EEA_report_1_1_2005.pdf

²⁸ Meltzer, G. (2005), op. cit.

²⁹ Interview with Jytte, Munksogard Cohousing, Copenhagen, Denmark

³⁰ Interview with Helen, Aardrijk cohousing, Holland

My cooking turn is in three weeks. Today I can relax...

If cooking is a great activity that many love, one must recognise that it can rapidly deteriorate to a "horror movie" when it is put in the context of a rushing life: shopping for food, take care of the kids after school, cook, and lay the table and clean the dishes become complicated to do after a tiring day at work. Moreover, the strong gender inequality tends to increase the sense of frustration linked to cooking. In anyway, that we love it or hate it, assuming that the daily time that one needs for the cooking activity is 90 minutes on average, 45 hours monthly are needed. This is nothing else than one week of full time work...

All this changes in a cohousing. On average in a community of 25-30 households it is common to cook not more than once or twice monthly. As Uffe from Trudeslund puts it: "you have to cook once every 5 weeks. And you are put together with someone new each time. There is a rotation. You can see here who is going to cook for the following month. And if you have been put on and you see you cannot make it, you are responsible yourself to find another one to take your shift"³¹. And as Caecilia explains: "And for me, as I have a full time job, it saves me cooking sometimes. So sometimes I have to cook for the whole group but the other days I can just relax and sit down when it's done"³². Hanne also adds: "you can have "quality time" with your children from 4 to 6 PM instead of cooking and horrors hours, when the adults are stressed and the children are stressed. You can do whatever you like and just go and eat at 6 O'clock". Moreover, as the privacy is an important side of cohousing, the organisation of the cooking activity does not mean that a cohouser is forced to eat with the rest of the community. In fact, one can take their dish and eat it in their own dwelling if they wish so.

Children education: easier for parents; more fun for the kids!

One of the main demographic changes in our western society is the radical collapse of birth rate since the 1960s³³. From our interviews, it appears clearly that life in cohousing helps parents a lot with dealing with a new born baby. As Jonas explains: "there were a lot of single mothers who moved here. For a reason I suppose. The kids knew each other and they were perfectly safe or comfortable with other grown-ups as a natural thing. It was a bit like a liberation movement. You were not stuck in your own little compartment in a double meaning. It was very much "give and take" with other people"³⁴. Henning also stresses that "it was a great help to have other families around us. We always had people to look after the children if we had to go to a meeting or to pick them up in the kindergarten when we came late from work"³⁵.

³¹ Interview with Uffe, Trudeslund Cohousing, Copenhagen, Denmark

³² Interview with Caecilia, Wandelmeent cohousing, Amsterdam/Utrecht, Holland

³³ Rothenbacher, F. (2005), *The Population in Europe since 1945*, New-York: Palgrave

³⁴ Interview with Jonas, Rio Cohousing, Stockholm, Sweden

³⁵ Interview with Henning, Dreierbanken cohousing, Odense, Denmark

If isolation is already an important problem for many, children are also seen as another factor of greater isolation, at least in the first 30 months of the baby. This tends to create some difficulty to have the same social life as before indeed. Cohousing is useful too as Ingrid tells: *“if you live together with other families which have children you can look after their children and expect them to look after yours if you need it. And just for the company because when you have children you can’t go out in town as much as you did before. You have to have the social life at home because the children go to sleep at night”*³⁶.

If cohousing is of great help for the parents, kids like it too. Instead of being locked up alone in four walls after school, the cohousing environment offers large spaces in the common areas as well as a big community of children and teenagers to play with. Maja, a teenager from Trudeslund puts it clear that *“there are always people around you. You have a lot of neighbours. You can’t go to school without seeing 1, 2 or 3 persons you know. That’s the best thing. And you know everybody here. We know each others”*³⁷. By the same token, Bjorn explains that *“a whole bunch of adults, that had grown up their childhood at this place, had a speech where they told what was the best part of growing up here. Many of them talked about the corridors and how they just grab their mattress at home and went over to which ever friend they wanted to sleep over with”*³⁸.

5. Conclusion: when cohousing fosters degrowth at neighbourhood level

At the dawn of the 21st century, when half of the world’s population lives in cities, it is paradoxical to note that an increasing number of human beings are locked up in lifestyles that are often exhausting, asocial and environmentally damaging to many aspects. Unfortunately, prospects in the near future are not bright at all! In fact, there is no evidence that long-term public policies are being implemented to reduce the existing high level of stress, competition and housing price or to favour better quality of interpersonal relations. To the contrary, hyper-individualism keeps growing at a fast pace and it is even reaching non western societies known hitherto to have had strong community glue.

Assuming that degrowth is a crucial steps towards sustainability, it would like to finish off the article by stressing two more points. One of my assumptions in this article was that the dominant ideology of unlimited growth is directly linked to the media advertisement and myth about hyper-individual freedom. The market society has developed all strategies possible since WW2 to ensure that each individual could access all goods and services available on the market. To give an example, we are recalled daily by the media to buy the new car model, laptop, wash machine, to change furniture every five years, to travel by plane every summer, and so on so forth. While this model of life requires ever more growth and energy

consumption, I argue that cohousing communities, in comparison, enable the spread of “efficient sharing” habits. Carsharing becomes feasible at home; wash machine and tools are shared; toys and cloths for children are reused several times; services are offered between the members of the cohousing and outside neighbours, and so on. In other words, cohousing is a constructive step towards degrowth at the family and neighbourhood level.

Another conclusion behind this article is that the lack of public spaces in cities requires an unlimited growth. In fact, the main place where urban citizens nowadays “meet” is ironically the supermarket and other consumption places. The lack of spaces where people can interact and build alternatives leads to a system where individuals are atomized and don’t think to create sustainability with their neighbours to meet their needs. Consumption increases growth, but it is a massive waste at different levels. In a cohousing, the several common spaces available offer a great potential to go beyond the market economy and recreate social and practical links among people.

³⁶ Interview with Ingrid, Rio Cohousing, Stockholm, Sweden

³⁷ Interview with Maja, Trudeslund cohousing, Copenhagen, Denmark

³⁸ Interview with Bjorn, Stoplyckan Cohousing, Linchoping, Sweden

Our Daily Bread - Eataly and the Reinvention of Supermarket

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Abstract

Often and not without reason, modern distribution is accused of being one the engines behind the excesses of occidental societies. In the view of several observers, the development of the supermarket-system both created and occupied the gap between production and consumption, hence obtaining a growing influence on both. According to this model, modern distribution networks are to be held responsible for imposing industrialization on producers and consumerism on citizens. Such claim is probably oversimplifying, yet it has the advantage of highlighting the existence of a sharp opposition between modern distribution and traditional production/consumption practices. Especially in the agro-food sector, the very reasons of the overwhelming success of distribution industry (namely, the vocation for scale economies, the logistic perfectionism, and the price competitiveness) seem impossible to conciliate with the rhythms of traditional communities. Too often, the expansion of modern distribution occurred at the expense of traditional food systems.

Any reflection on economic de-growth in the North is therefore inevitably confronted with the tangle of modern distribution and with the problem of linking production and consumption other than by a relation of mutual escalation. Original alternatives are more and more needed to restore a richer sense to the link between the two ends of the food market. Farmer markets, community-supported agriculture, consumers purchasing groups and other experiments in disintermediation and re-localization are developing precisely to provide such alternatives.

Although noteworthy, these initiatives seem still unable to compete against the power of modern distribution networks. Their example, however, is beginning to inspire some innovative larger-scale projects. A particularly interesting example is Eataly Srl (www.eataly.it). Eataly is a newly founded Italian distribution company whose objective is to use the most advanced logistic tools to create a connection between small traditional producers and modern consumers. What is most remarkable, this project refuses to limit itself to niche markets and is firmly intentioned to challenge mainstream supermarkets on their own ground. Far from addressing a handful of happy few, Eataly is meant to build a real network of mass distribution, competitive in offer and prices. Will it succeed? Only time will say. In any case, this project offers an extraordinary opportunity to question the very logic of modern distribution. Is it possible to transform such logic and make it compatible with the demands of de-growth? Can modern logistic be put in the service of traditional food

communities? Or will Eataly turn out to be just another marketing trick to push consumption and bind production?

This paper will explore a rather startling idea: the idea that modern supermarkets might be enrolled in degrowth movement. Of course, we will not ignore or hide the central role that supermarkets play in growth society. Still, we will argue that, like it or not, there is no way to reverse the mounting unsustainability of modern agro-food sector without messing with mass distribution systems. To avoid marginality, de-growth movement will have to mess with supermarkets and decide whether to oppose them or to turn them into allies. In this article we will recommend doing both. By analyzing a newly founded Italian distribution chain named Eataly and its relationships with the eco-gastronomic movement of Slow Food, this paper will try to show how de-growth initiatives could (and should) fight supermarket ideology and compromise with their practices at the same time.

“There should be no difference between theory and practice and that this is true in theory, but false in practice” - Yves Cochet at Paris De-growth Conference

Supermarkets are a tricky subject to raise in a symposium on de-growth, especially if one wish to devote them some attention and interest and not just denounce or blame them.

Indeed, few things are more distant from de-growth thinking that modern supermarkets. If growth society has a belly, that is certainly supermarkets. In the last seventy years, supermarkets have restlessly grown to become *the* interface between industrialized production and mass consumption. And not a neutral one. Supermarkets did not merely adjust to growth society. To a large extent, they crafted it. Every articulation of modern distribution systems has been thoughtfully organized to absorb and fuel the increasing productivity of agro-food industry and to promote a parallel escalation of household consumes¹. Taking charge of distribution, supermarkets allow producers to concentrate on production and consumers to focus on consumption². To the former, supermarkets guarantee that there will always be outlet for their productive surpluses. To the latter, supermarkets assure that there will be abundance for their buying desire. In a sense, supermarkets accomplish a function that is not dissimilar from that of money³, assuring a generalized match between demand and offer⁴ (or, at least, that the first will never limit

¹ On the history of the supermarkets' rise (in United States) see Strasser: 1989.

² Consider, for example, how the introduction of shopping carts (together with the dislocation of supermarket outside the city centres where parking is easier) resolved the problem of allowing consumers to buy more than what they can carry in their hands (Grandclément and Cochoy: 2006).

³ On money as a universal mediator see Luhmann and De Giorgi: 2000.

⁴ To be sure, such match is not always convenient for the parties: producers are often forced to undersell their stock and consumers are often compelled to buy at a price they can afford or at a quality they do not desire. Still, the very logic of modern distribution systems guarantees that there will always be room for more production and for more consumption.

the second and vice-versa). Before supermarkets, distribution was a residual function: people turned to markets to sell or buy the few things they were not able to consume or produce themselves. With supermarkets, distribution becomes an economic sector in itself and its management is developed to perfection. The very reasons behind the success of modern retail chains (namely scale economies, logistic perfectionism and price competition) lock the relation between production and consumption in a cycle of mutual escalation. Because supermarkets need large quantities to maximize their efficiency, producers and consumers are actively pushed to trade more and more.

And that's not all: not only supermarkets made growth possible, but they also made it thinkable. All over the world, retail chains are among the biggest advertising spenders and most of these expenses are invested in nurturing the ideology of growth, broadcasting the idea that "more is always better". Think about it: supermarkets' advertising is substantially different from the promotion of specific agro-food brands. Brands generally use advertising to persuade consumers that their products are worth buying because of specific qualities (they are testier, healthier, happier...) and despite of their prices. Supermarkets use advertising to persuade consumers that their products are worth buying because of their price and despite of their quality⁵. Even more than advertising, the very practice of shelf-comparing trained consumers and producers in using price and quantity as baseline variables for individual and collective choices. To be sure, this does not mean that price is the only purchasing criterion, nor that consumers are only interested in maximizing quantity⁶. Still, as they have no chance for tasting or getting informed on production, consumers are inevitably led to rely on price, disposition and packaging to navigate inside supermarket⁷. And, inside supermarkets, everything is carefully arranged to boast consumption: from the display of products to the interior design, from the light effects to the sound ambiance, everything is carefully calculated to invite clients to buy more and more⁸.

For these and other reasons we have not time to discuss, supermarkets have steadily occupied the center of modern collective life. They do not simply mirror, support or symbolize economic growth: they *are* growth in its purest manifestation. This is why de-growth movements have long tried to replace supermarkets with alternative distribution forms. Farmer markets⁹, community-supported agriculture¹⁰, consumers' purchasing groups¹¹, self-production¹² and other experiments in disintermediation and re-localization developing precisely to provide such alternatives¹³. All these remarkable and appealing initiatives build on the idea that the agro-food sector can be renovated only by shortcutting modern distribution and recreating a direct connection between farmers and citizens. Establishing and occupying a gap between producers and consumers, supermarkets hinder de-growth efforts both practically and ideologically. On a practical level, modern retail chains have often proved to be economically and organizationally unable to handle smaller and more sustainable trades¹⁴. Supermarkets mechanisms have been painstakingly developed to manage industrialized production and mass consumption and are therefore hard to conciliate with the logic of reduction and specialization proclaimed by de-growth movement. On an ideological level, the interface of modern distribution contribute to hide each side of the agro-food sector most of the perverse consequences of growth¹⁵, thereby contributing to conceal the crisis of modern industrial agriculture. This is why the disintermediating efforts we mentioned are so important. Though scattered and ephemeral, these initiatives go in the right direction, restoring a richer sense to the link between the two ends of the food market. In the long run, it is to be hoped that they will be able to integrate and give birth to a system of local distribution networks alternative to supermarkets.

The legitimate criticism toward modern distribution and the commitment toward future alternatives, however, should not impede a realistic assessment of the current situation. Although noteworthy, disintermediating efforts seem still unable to compete against the power of modern distribution networks. At least in the short period, farmer markets, community-supported agriculture, consumers purchasing

⁵ How many time have you seen a retail chain advertising on the quality of its products? And how many time on the price? Despite all its technical subtleties, supermarkets' advertising is still largely based on a "take more, pay less" philosophy.

⁶ To discover how complex and multi-layered consumers' behavior can get in supermarket, see Dubuisson-Quellier: 2006.

⁷ For a sociological analysis of the tools used by supermarkets to guide consumers' navigation see Barrey: 2007 and Cochoy: 2007.

⁸ For a detailed explanation of how retailer can use the so-called 'merchandising' to guide consumer navigation through supermarkets, see Dioux and Dupuis: 2005 (pp. 305-340 and 343-364). Let me quote some few lines from this book (which is meant as a textbook for distribution manager) to show how subtle and sophisticated 'merchandising' techniques can get: "Among the numerous grouping criteria, we can mention the impulsive purchasing; the planned purchasing; the confessional or ethnic products; the complementarity of use; the originality; the fashion; the visibility in the store; the alphabetical order; the packaging type (box, bag, pack...); the display style (flat, hanging, face view, side view, loose, in box, in tray); the selling modalities (in self or assisted service)" (p. 333, our translation).

⁹ On farmers markets phenomenon see Corum, Rosenzweig and Gibson: 2001.

¹⁰ On the philosophy and organization of a farmers market, see Henderson, Van En: 1999

¹¹ On the history on consumers' purchasing groups in Italy, see Valera: 2005.

¹² On the self-production philosophy, see the example of the yogurt jar in the *Manifesto della Decrescita Felice* (www.decrescitafelice.it).

¹³ For a wide-ranging review of the alternatives to modern distribution systems see Steffen, 2006 (in particular pp. 51-57).

¹⁴ For a modern supermarket, handling the transportation of frozen fish from the other side of the world is simpler than dealing with a small fishing cooperative unable to guarantee daily deliveries.

¹⁵ When they purchase a beef steak, for example, consumers have no clue of the dramatic impact of industrial breeding on water, fuel and soil, as they have no perception of the inhuman life conditions of industrial livestock. Similarly, when they spray their crops with all sorts of pesticides, many farmers are not fully aware of the consequences that they may have on consumers' health.

groups have few chances to deviate the mainstream of agro-food sector. Like it or not, supermarkets occupy a central position in modern collective life and (at least in the short period) there's no doubt that they will keep the lion's share¹⁶. According to Euromonitor statistics, in 2007, hypermarkets supermarkets and discounters accounted for more than an half of global grocery sales (59.49%)¹⁷. In modern collective life, supermarkets are simply too important to be overlooked or just blamed. If degrowth movement do not want to be relegated to marginality, it will have to deal with supermarkets and find ways to turn them from enemies to allies. But, is this possible? Is it possible to detach modern distribution networks from their deep-rooted association with growth culture and enroll them, or part of them, in de-growth movement?

Most readers will probably find the idea of mixing supermarkets and de-growth startling, if not blasphemous. Nonetheless, some interesting experimentation is being carried out in this direction. About one year ago, Slow Food, the celebrated movement for the safeguard of traditional food communities, announced that it was going to support the foundation of a new global, large-scale supermarkets chain. Such announcement, obviously, raised a harsh debate within Slow Food and among its partners. To understand why this debate was so animated, readers should consider that Slow Food is currently one of the most active international movement in promoting de-growth and re-localization in agro-food sector. Few lines from the homepage of Slow Food official website will suffice to illustrate the position of this association in the growth/degrowth controversy¹⁸:

“Slow Food is a non-profit, eco-gastronomic member-supported organization that was founded in 1989 to counteract fast food and fast life, the disappearance of local food traditions and people's dwindling interest in the food they eat, where it comes from, how it tastes and how our food choices affect the rest of the world” (www.slowfood.com).

That is why many were shocked to hear that Slow Food, a movement that had always fought for sustainable production and conscious consumption, had decided to support some supermarket enterprise¹⁹. And still, in January 2007, Slow Food blessed the foundation of a new retail chain named Eataly, accepting to stand as its consultant and

guarantor. Had Slow Food sold its soul to the devil? Or, to use some more academic terms, is it possible to defend traditional gastronomy and compromise with modern distribution? To support small-scale, local productions and mess with global, large-scale retail chains? To tackle these questions let's take a closer look at Slow Food - Eataly alliance.

The first thing we notice when considering Eataly project, is that Eataly is certainly a modern distribution chain, but not a mainstream one. As all distributions chains, Eataly operates on a large scale. The first supermarket, opened in Turin about one year ago, occupies an area of 11,000 square meters and hires more than a hundred of employees. During the first year, the sale volume of this first superstore exceeded 30 millions of euros and plans have been made to open new shops in Milan, Bologna, Naples, New York and Tokyo in the next few years. Yes, Eataly is certainly a large-scale distribution chain.

At the same time, though, Eataly has made a number of choices that clearly distinguish its project from that of mainstream supermarkets. First of all, Eataly decided to strictly abide by Slow Food principles. No food is sold on Eataly shelves that is not compliant with Slow Food mantra of “buono, pulito e giusto” (good, clean and fair), which means: “that the food we eat should taste good; that it should be produced in a clean way that does not harm the environment, animal welfare or our health; and that food producers should receive fair compensation for their work” (www.slowfood.com)²⁰. Secondly, Eataly tries to reduce transport costs by offering a range of products that is as local as possible. This means that all fresh products and most preserved products are produced within a reasonable distance from supermarkets. Thirdly, Eataly and decided not to distribute national or global food brands and to favor traditional, little-scale, craft-made productions. Ignored by mainstream distribution, these productions have survived at the margin of modern food sector and enjoy today a new vogue, due to the mounting discontent with industrial low-quality. On the one side, consumers searching for quality, sustainability or equity are more and more fascinated by traditional productions. On the other side, traditional communities have demonstrated to be unexpectedly resistant to modernization processes. Disregarded by mainstream retail chains, these demand and offer for traditional productions need new distribution channels to meet and Eataly intends to provide them.

After all we said, can we still define Eataly as a modern distribution chain? What is most interesting about Eataly is that you are tempted to give a different answer whether you look at the philosophy of the project or at its practices.

As for ideology, Eataly makes no concessions to the culture of industrialism and consumerism. The walls of its supermarkets are literally plastered with panels and posters explaining why seasonal food is tastier and healthier; why packaging and other wastes should be reduced to a minimum; why local products are to be preferred; why we

¹⁶ For a discussion of the concentration trends in European food retailing see Dobson, Waterson and Davies (2003).

¹⁷ In particular, hypermarkets accounted for 19.09%, supermarkets for 32.83% and discounters for 7.57%.

¹⁸ In the web-page dedicate to the ‘philosophy’ of the movement, the commitment of Slow Food is made even clearer “We believe that everyone has a fundamental right to pleasure and consequently the responsibility to protect the heritage of food, tradition and culture that make this pleasure possible. Our movement is founded upon this concept of eco-gastronomy – a recognition of the strong connections between plate and planet... We consider ourselves co-producers, not consumers, because by being informed about how our food is produced and actively supporting those who produce it, we become a part of and a partner in the production process”.

¹⁹ Let's put it this way: Slow Food inaugurating a supermarket chain is as shocking as Green Peace launching a whaler!

²⁰ On the good, clean and fair mantra see also the homonymous book by Carlo Petrini (2005), founder and president of Slow Food International.

should eat less, but better. Every day, tasting and educational activities are organized for kids and adults, inviting consumers to taste and understand before shopping. In addition, selling personnel is specifically trained to know and explain the organoleptic features and the productive history of all the commercialized products. Unlike traditional supermarkets, Eataly make significant efforts to draw clients' attention to the whole productive chain of agro-food products²¹. Even classic advertising is used to promote the values of eco-gastronomy. As these few examples illustrate, Eataly is not afraid of challenging mainstream supermarkets on ideological ground. To industrialist and consumerist culture, Eataly opposes Slow Food philosophy: a diametrically opposed utopia and yet capable of raising the same enthusiasm and of mobilizing the same energies. On the level of ideology, the gap couldn't be wider; the clash could not be harsher.

On the other hand, when it comes to practice, Eataly turns out to be much more pragmatic. Recognizing the overwhelming influence of supermarket in modern societies, Eataly refuses to limit to niche distribution channels (such as farmers' markets or consumers purchasing groups) and is firmly intentioned to challenge mainstream supermarkets on their own ground. Far from addressing to a handful of happy few, Eataly is meant to build a real network of mass distribution, competitive in offer and prices. Instead of refusing the entire repertoire of modern distribution techniques, Eataly builds on the idea that some of these techniques may be diverted, hijacked, separated from the ideology of growth and bent to a different logic.

To be sure, we are not saying that supermarkets are neutral tools, impartial instruments that can be used for whatever end. Modern distribution systems developed in symbiosis with growth society and they can be separated from it only through a radical renovation of their organization. There are several components of mass retail that, being impossible to conciliate with eco-gastronomic principles, must be dumped and with no regrets. For example, Eataly will not be able to warrant the same array of products always and everywhere; it will not be able to offer a shelf range as rich as that of mainstream supermarket; it will not be able to compete on discount prices and it will have to renounce to some those products that have no traditional equivalent (precooked or frozen food, snacks...). At the same time, compromises will be necessary on the eco-gastronomy side too. Eataly will not be able to distribute ultra-small and ultra-traditional production such as those who are safeguarded by the Slow Food Presidia²². There is a scale below which the organization of supermarkets cannot arrive and that's why alternative distribution mechanisms should

be developed as soon as possible. The fact that Slow Food endorse Eataly project, for example, does not mean that the movement do not maintain its commitment in promoting farmer's markets²³, purchasing groups²⁴ and self production²⁵. In fall 2007, Eataly itself organized and hosted several farmer markets to give consumers the possibility to buy fruits and vegetable directly from their producers²⁶.

Have no illusions about that: not every supermarket practice can be reoriented to eco-gastronomy and not every eco-gastronomic aim can be reached through supermarkets. Still, Eataly's example suggests that supermarket techniques, once separated from growth ideology, are not incompatible with de-growth objectives. The extraordinary efficiency attained by the logistic organization of modern distribution chain is not unsustainable *per se*, it becomes unsustainable when it is led by growth philosophy. If disconnected from this philosophy and bended to an opposite ideology, supermarket organization can positively contribute to de-growth campaign. Let me just give you a last example. Returning to a more locally-based diet is certainly a desirable objective. There is no real advantage in eating transcontinental vegetables or selling frozen fish at the other side of the world (other than pumping the growth of transportation industry)²⁷. Still, some foods exist that, because of their rarity and easy transportability, have always been traded on an international scale: spices and wine for example. Now, what is crazy in wine international market is not that wine continues to be transported on long distances, but that it is transported within bottles. For every 750 grams of wine, we also ship about 600 grams of glass. All over the world, we transport, trash and recycle millions of bottles that we could just reuse an infinite number of times (given the perfect sterility of glass). To contrast this senseless cycle, Eataly bought two excellent traditional wineries in Piedmont and now is selling their wines from

²³ Slow Food has recently initiated a new project called "Mercati della Terra" (earth markets) meant to organize more than twenty farmers markets in 2008. Besides, all main Slow Food events ("Salone del Gusto", "Cheese", "Slow Fish") involve the presence of small quality producers selling their products directly to consumers.

²⁴ Many Slow Food Convivia (the local branches of the international movement) are currently organizing little purchasing groups to open a direct trade channel between traditional food communities and modern consumers.

²⁵ Since 2006, Slow is organizing in Italy and other countries the Orti in Condotta (school gardens) initiative. The idea of this project is that of promoting the opening of vegetable garden in elementary and primary schools in order to familiarize children and families with the possibility of self-growing their food.

²⁶ The farmers' markets were organized every Sunday of September in the square in front of the Turin supermarket, according to the following rules:

- 1) producers had to be local (from Piedmont or Liguria);
- 2) producers had to sold only their own production;
- 3) products had to be fresh and of high quality;
- 4) prices had to be sustainable;
- 5) producers had to be present at the marketplace.

²⁷ On the growing globalization of food markets and on the transport cost that this globalization entails, see Halweil, 2004 (pp. 23-40).

²¹ The entrance of the Turin superstore is dominated by a huge poster with the famous Wendell Berry's saying "eating is an agricultural act".

²² The presidia were created in 2000 by Slow Food to safeguard excellent traditional productions, help traditional food community, stabilize and enhance their productive techniques and guarantee them a viable future. Presidia are "small-scale projects protect traditional production methods by supporting producers *in situ* and helping them find markets for traditional foods" (www.slowfood.com). Currently, Slow Food Foundation for Biodiversity is supporting more than 270 projects all over the world.

cask, asking consumers to bring their own bottles from home. This initiative goes certainly in the de-growth direction, but is it traditional or modern? Once again it is both. It is traditional because it resumes a traditional selling techniques and it concern traditionally produced wines. It is modern because it utilizes modern technologies and modern procedure to produce and distribute wines as efficiently as possible.

To be sure, no one can say today if Eataly experiment will be successful or not. It is still to early to understand whether Eataly will be capable of facing the competition of mainstream supermarkets without deviating from its eco-gastronomic ideology; whether it will be capable to renovate both modern distribution and traditional productions to make them compatible; whether supermarkets will be enrolled in de-growth. In any case, Eataly's experience is interesting because it reveals that, (at least in the retail sector, modern ideology and modern practices are not inseparable²⁸ and that we can fight the first while compromising with the second. Successful or not, Eataly's lesson is crucial for de-growth movement for it shows the importance of not confusing utopias and techniques, ideologies and practices. The efficacy of de-growth movement depends crucially on the capacity of maintaining such distinction. We cannot oppose practical and reasonable reforms to growth fanaticism²⁹ and we cannot oppose philosophical principles to growth daily routines. We cannot be pragmatic with ideology and idealistic with practice. Challenging the *momentum* of modern growth society, de-growth movement has committed to a goal that is as worthy as difficult. The only chance to succeed is being as coherent as possible, opposing to growth culture with an opposite utopia capable of the same ideological appeal and making any effort to compromise and reform modern practices turning them from adversaries into allies.

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²⁸ For a general discussion of the difference between modern culture and modern practices, see the groundbreaking work of Bruno Latour, *We have never been modern* (1991).

²⁹ This lack of utopian vision is for example what Nordhaus and Shellenberger (2007) reproach environmentalism for: "the problem is not that people don't see the nightmare, but rather that they do not allow themselves to dream" (p. 271). On the same idea, see also Latour 2008.

Tourisme et Décroissance : de la critique à l'utopie ?

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Résumé

Ce texte rend compte d'une étape d'un travail de « déconstruction » du fait touristique à l'aide de la notion de Décroissance soutenable. A son stade actuel, notre travail ne se réfère pas à une définition formelle de la notion de Décroissance, mais repose plutôt sur sa dimension de slogan agissant comme « mot-obus » (Ariès, 2005) ou « bombe sémantique » (Cheynet, 2008) mettant en cause l'économisme, le croissancisme, et la marchandisation de la nature et des rapports humains. La Décroissance est mobilisée ici non comme position militante, mais comme grille de lecture permettant une ré-interrogation critique des fondements, des évolutions, des discours et des débats qui prennent le fait touristique pour objet. En effet, par une radicalisation d'exigences éthiques, sociales, culturelles et environnementales, la perspective de la Décroissance ne manque pas de renouveler et d'accentuer le débat sur le statut et les pratiques du tourisme. Ce processus s'opère par une interpellation d'« évidences » constitutives du fait touristique contemporain comme la mobilité, l'exotisme, le travail, le loisir, la consommation, la publicité, la marchandisation, la technologie... Mais il s'opère aussi par l'énonciation d'une utopie basée sur l'inversion des codes dominants du tourisme : la proximité, le quotidien, l'autonomie culturelle, la frugalité, l'autoproduction récréative, la réduction des dépenses, la lenteur des déplacements et l'engagement dans le temps se voient ainsi attribuer a contrario un sens et des valeurs positives. Dans le même temps, au delà de sa dimension culturelle et privée, le tourisme est replacé dans un cadre politique local et global par une remise en cause qui va des pratiques individuelles aux politiques d'aménagement, de transport et de développement économique.

Comme l'ont fait avant nous d'autres chercheurs en sciences sociales (Cf. bibliographie), il s'agit donc de dépasser le consensus sociétal et scientifique dominant sur les « bienfaits » du tourisme et sa « nature » supposée a-historique et apolitique. Cette démarche¹ s'appuie en ce qui nous concerne sur des travaux antérieurs sur la pensée critique du tourisme (Bourdeau, 2006), le post-tourisme (Bourdeau, 2007) et les itinérances récréatives (Berthelot et Corneloup, 2008 à paraître). Elle cherche à établir des relations entre des approches empiriques sectorielles (tourisme de montagne, rapports ville-nature, itinérances...) et un essai de généralisation plus spéculatif. A cet effet elle mobilise un corpus d'écrits au statut très variable (ouvrages et articles scientifiques, essais et littérature de voyage,

¹ Elle s'inscrit aussi dans un cycle extensif de séminaires impliquant des chercheurs, des observateurs (journalistes), des militants, des ONG, des opérateurs touristiques et des citoyens afin de favoriser une hybridation des interrogations, des savoirs et des expériences. C'est aussi dans ce cadre qu'a été conduite en 2007 une enquête exploratoire sur les représentations et pratiques de la relation entre tourisme et Décroissance.

presse professionnelle ou grand public). De même, elle renonce à un effet de synthèse pour privilégier quelques orientations thématiques considérées comme saillantes au regard d'un débat scientifique et citoyen à poursuivre.

1. La Décroissance : un potentiel pour dé-penser le tourisme

L'idée clé que nous retenons de la notion de Décroissance est la réfutation de l'économisme et du productivisme comme finalités des sociétés humaines, qui passe entre autres par réduction de l'appropriation –et de la capacité d'appropriation– directe, ou par l'intermédiaire de produits et services, des ressources naturelles, qu'il s'agisse de matières, d'énergies et d'espaces². Appliqué à l'univers du tourisme et de la récréation (loisirs sportifs, espaces récréatifs...), ce projet d'ordre physique et économique agit comme un puissant potentiel de questionnement et de mise en porte-à-faux des fondements structurels et du sens du fait touristique, que nous esquissons à titre d'hypothèse.

Le tourisme comme étendard de la société du travail

La première question majeure posée par le cadre critique de la Décroissance est celle du statut même de la récréation au sein d'une perspective qui cherche à « en finir avec la société du travail » (Ariès, 2005). En effet, même si la diffusion du tourisme et des loisirs a contribué à la relativisation des valeurs du travail (Viard, 2000 et 2006), ceux-ci restent profondément ancrés dans la culture du travail en fonctionnant à la fois comme rupture compensatoire et revitalisation de l'énergie productive. Le mot anglais « travel » aurait d'ailleurs la même origine étymologique que le mot « travail » (Urry, 2000). Dans le cadre de l'« industrie de la consolation » (Leclair, 2004) que constitue le tourisme, la notion de « vacance » se trouve de fait bien remplie dans la mesure où le modèle dominant véhiculé par les médias, la publicité et les opérateurs économiques tend à privilégier des comportements orientés vers un activisme forcené et une sur-consommation de ressources (énergie, eau, paysage...), de biens et de services³. Mais du point de vue de la Décroissance, si le temps libre « ressemble de plus en plus à la journée de travail »⁴, ce n'est pas seulement parce que les loisirs marchands restent fondamentalement du temps aliéné. C'est aussi parce que le loisir, le tourisme et le voyage apparaissent soumis à un utilitarisme qui se banalise. Les « terrains d'aventure » (payants et lointains) qui remplacent les terrains vagues des villes (gratuits et proches) sont non seulement inspirés des parcours d'entraînement militaires, mais sont aussi souvent utilisés à des fins éducatives et de *training* en tant que métaphore de la vie sociale et professionnelle. De même, les voyages de jeunesse qui se réfèrent à la mythologie du « grand départ » des routards des années 1960-1970 s'entendent désormais comme crédits reconnus par des formations supérieures, et

² Source : Association « recherche et Décroissance », www.degrowth.net.

³ Le poids de ce modèle de comportement peut cependant être relativisé dans la mesure où le repos constitue la principale activité de nombre de vacanciers.

⁴ Source : S. Gaschke, Die Ziet, cité par Courrier International n°896, janvier 2008, p. 29.

comme références de *curriculum vitae* destinées à prouver l'esprit d'aventure des futurs cadres... De telles observations rejoignent le point de vue du situationnisme sur le tourisme et les loisirs, considérés comme « marchandise spectaculaire » par excellence. Pour Guy Debord, le non-travail qui sous-tend les loisirs ne constitue en rien une libération d'un monde façonné par le travail : l'humanisme de la marchandise qui s'empare des loisirs contribuerait au contraire à la prise en charge de la totalité de l'existence humaine par le « reniement achevé de l'homme » (Debord, 1967). On notera que loin d'être cantonnée à une minorité radicale, cette conception du tourisme est si communément admise qu'une radio grand public peut annoncer en toute banalité que « les forçats des vacances sont sur la route », à propos des premiers embouteillages provoqués par les départs estivaux⁵.

Le tourisme au cœur des mésusages de la mobilité

Dans un deuxième temps, il est possible de relever l'objectif de « relocalisation généralisée » (Ariès, 2005) auquel vise la Décroissance à partir du réinvestissement de l'espace et du temps par la lenteur. On constatera alors *a contrario* que le tourisme s'inscrit depuis deux siècles dans le cadre d'une idéologie « moderne » de rapport dominant à l'étendue, qui en fait un des principaux vecteurs de diffusion de valeurs et de pratiques de mobilité à l'échelle planétaire. A cet égard, la multiplication des déplacements récréatifs et l'éloignement des lieux fréquentés apparaissent comme des facteurs-clés de rentabilité symbolique sur fond de dévaluation globale des espaces de proximité – notamment urbains – comme « lieu de non-sens » (Piolle, 1993). Ce qui est en jeu dans ce processus c'est la relativisation, voire l'inversion, de ce qu'Abraham Moles appelle « la loi d'airain » de la proxémie, à savoir la primauté axiologique de l'« ici » et l'effet atténuateur de la distance sur la pratique et l'investissement de l'espace éloigné (Moles et Rohmer, 1998). A tel point qu'il est fréquent de constater que l'« ailleurs » peut désormais remplacer l'« ici » dans sa fonction identitaire (Equipe MIT, 2002). Pourtant, malgré l'ampleur et la diversité des phénomènes de déplacement de population concernés (tourisme, migrations), l'idée de mobilité généralisée reste largement un slogan (Allemand, 2004) au regard des processus de néo-sédentarité et de relégation d'ordre économique, social et culturel dont les « oubliés des vacances »⁶ constituent une dimension emblématique. Cela n'empêche pas les « objecteurs de croissance » de récuser l'idéal de fluidité de circulation incarné par les élites cinétiques (Cresswell, 2004) en dénonçant le fait que « se déplacer est devenu une injonction »⁷, et en annonçant comme horizon la « sortie de la civilisation de l'automobile » (Cheynet, 2008). Au-delà même de toute question d'impact environnemental et social, ils pointent les dérives d'une sur-mobilité qui leur semble vidée de sens, en l'interprétant comme une figure de fuite impossible de l'enfermement dans un monde clos – « une planète pleine et sans espace » selon la formule de Zigmunt Bauman (Baumann, 2000). Le tourisme jouerait donc un rôle de

premier plan dans la diffusion d'une « junk mobility »⁸ dont l'exemple le plus caractéristique est représenté par des pratiques commerciales consistant à offrir un trajet pour l'achat d'un autre produit ; citons par exemple : « un mobile Samsung acheté : un aller-retour à New-York offert » (Publicité Samsung 2007).

Ce qui semble en jeu dans la contestation des mésusages (Ariès, 2007) de la mobilité, c'est d'abord une inversion de sens et de valeurs entre culture légitime et culture contestataire par rapport aux années 1960-1970. Dans une société alors dominée par la rigidité et la sédentarité, l'idéal de mobilité s'inscrivait dans un projet de démarcation ou de rupture notamment incarné par la figure du routard. Mais dans la société contemporaine qui s'empare de la mobilité comme instrument économique, projet de management et horizon idéologique de la mondialisation libérale, cette perspective se renverse. C'est ainsi qu'en réponse à l'affirmation selon laquelle « Dans un monde qui bouge, l'immobilisme est un désordre » (M. Lévy, PDG de Publicis)⁹, les militants de la Décroissance revendiquent « Alors soyons le désordre ! » (Casseurs de pub, 2004).

Le tourisme, secteur-clé de croissance pour le capitalisme de production culturelle

Face à la « décolonisation de l'imaginaire » (Cheynet, 2008) que revendique la Décroissance vis-à-vis l'économisme et du consumérisme, le champ du tourisme et des loisirs offre un terrain complexe car animé de manière exemplaire par une tension permanente entre une logique d'autonomie culturelle (un sens intrinsèque) et une logique d'hétéronomie économique (un sens qui découle de finalités économiques). Mais la prééminence de cette dernière dans les discours et politiques sur le tourisme paraît si forte qu'elle tend à occulter ses dimensions géohistoriques et culturelles fondatrices. C'est pourquoi le poids majoritaire occupé par le secteur non-marchand dans les pratiques récréatives et les hébergements est considéré comme un handicap à surmonter, et non comme une richesse. De fait, après avoir été longtemps négligé par les grands opérateurs et observateurs économiques, le tourisme accède à une pleine reconnaissance de sa contribution à l'affirmation d'un capitalisme de production culturelle (Rifkin, 2000) : première activité commerciale d'exportation avant les hydrocarbures, l'automobile ou l'armement, il représente selon l'Organisation mondiale du Tourisme 40 % du commerce mondial des services et 12 % du PIB Mondial, soit environ 250 millions d'emplois. Le tourisme fait donc figure de « moteur de croissance pour l'avenir » (Frangioli, 2007) et constitue à ce titre un domaines-clés d'application de l'Accord général sur le commerce et les services (AGCS), même s'il fait d'ores et déjà figure de secteur économique le plus libéralisé (Caire et Rouillet-Caire, 2003). En France, les Assises nationales du tourisme de 2008 ne manquent pas de reprendre ce leitmotiv avec pour slogan « le tourisme au cœur de notre croissance »¹⁰.

En écho à cette montée en puissance économique, on observe une dépendance de plus en plus marquée du

⁵ France Inter, journal de 13 heures du 5 juillet 2008.

⁶ Thème d'une campagne du secours populaire français destinée à permettre le départ en vacances d'enfants défavorisés.

⁷ Source : collectif bordelais pour la Décroissance, www.forum.dcroissance.info, consulté le 10/12/2007.

⁸ Cette « mobilité pourrie » se réfère à la notion de « junkspace » proposée par l'architecte Rem Koolhaas, souvent cité par les penseurs de la Décroissance.

⁹ Le Monde, février 2004.

¹⁰ Source : www.assises-tourisme.fr, consulté le 10/07/2008.

tourisme vis-à-vis d'opérateurs industriels mondialisés (tours opérateurs, transporteurs aériens, chaînes hôtelières, parcs de loisirs, sociétés de remontées mécaniques, promoteurs immobiliers...). Ce qui renforce le risque de voir les pratiques et les lieux de voyage et de vacances transformés en produits standardisés, « brandés »¹¹ et banalisés, dans lesquels l'expérience vécue par les « consommateurs » paraît réduite, au delà des poncifs, à un fort conformisme comportemental et relationnel alors que le patrimoine naturel et culturel local est dégradé, artificialisé, muséifié ou folklorisé. Bien sûr, une telle hypothèse ne doit pas conduire à négliger ou nier les capacités de prise d'autonomie des individus dans un cadre contraint, qui font partie des compétences basiques du touriste (Ceriani et Al., 2004). Et sur un registre complémentaire les sciences sociales (Urry, 2000 ; Viard, 2000 et 2006) ne manquent pas de rappeler la participation déterminante du tourisme à la mutation des valeurs et des modes de vie dans les pays « développés » : modifications profondes du rapport au corps, aux autres, à la nature ; initiation à de nouveaux comportements alimentaires, vestimentaires et sexuels ; apprentissage d'une certaine autonomie vis-à-vis des contraintes productives, sociales et religieuses. Mais ces acquis potentiels ne sont-ils pas désormais dépassés par une subordination fonctionnelle à un marketing de plus en plus sophistiqué et à ses corollaires : publicité, *branding* des espaces naturels et des pratiques ? De multiples observations tendent ainsi à illustrer le fait que le tourisme est considéré par les opérateurs et les experts comme un rituel consommatoire ayant perdu tout sens culturel intrinsèque, dont l'animation reposerait de plus en plus sur un pilotage par l'offre. Dès lors, l'imaginaire touristique tendrait à se réduire à un argumentaire de vente : « persuadez vos clients indécis que les dunes sont l'opposé du stress urbain, une cure d'apaisement psychologique : silence, lenteur des méharées et lignes pures » (Revue professionnelle l'Echo touristique, 2006). Ceci pendant que le « Droit au voyage » ne serait plus qu'un slogan commercial –en l'occurrence celui du tour opérateur Marmara– évacuant toute idée d'émancipation sociale et culturelle. C'est dans ce contexte que la question du sens du tourisme et du voyage donnent souvent l'impression de passer au second plan vis-à-vis du rôle croissant de la technologie (matériel, orientation, transport, information et communication...) dans l'expérience touristique. Pour illustrer ce phénomène, on citera le hors-série du Monde « vivre en 2020 » (mars 2007), qui fait l'impasse sur la dimension imaginaire et culturelle du voyage et offre du tourisme une vision quasi-exclusivement technologique –en l'occurrence des voyages « propres » grâce à l'innovation high-tech.

Cette mutation va de pair avec la banalisation d'une référence aux stations touristiques comme « usines à rêves » (Organisation mondiale du tourisme, 2004). On retrouve alors la perspective de l'industrie culturelle hollywoodienne de l'*entertainment*, mobilisée par une conception des lieux touristiques non comme espaces publics à caractère territorial, mais comme entreprises, voire même parcs de loisirs privés. Au delà des facilités de langage et de la volonté de légitimer le sérieux de l'activité touristique en faisant

référence à son caractère industriel, pourtant très discuté (Dewailly, 2006 ; Bourdeau, 2007), ce processus conforte son rôle de porte-drapeau d'une mondialisation ludique. La touristification généralisée annoncée par des observateurs avertis (Urry 2000, Viard, 2006) prendrait ainsi des airs de « disneylandisation » du monde (Brunet, 2006).

Le tourisme, vitrine des inégalités sociales et de l'asymétrie nord-sud

En poursuivant l'examen *a priori* du statut du tourisme au regard des thèses de la Décroissance, la question des inégalités sociales et économiques retient particulièrement l'attention. Dans un pays comme la France, 4 personnes sur 10 ne partent pas en vacances chaque année, le taux de départ annuel des cadres et professions intellectuelles supérieures (90 %) étant presque deux fois plus élevé que celui des ouvriers (48 %). Et dans le cas des sports d'hiver les inégalités sont encore plus fortes puisque moins d'un français sur 15 accède aux stations de ski chaque année, et que parmi eux 2 à 3 % des skieurs « consomment » 70 à 80 % des journées de ski. De telles disparités sont évidemment inscrites dans l'histoire aristocratique et bourgeoise du tourisme, mais elles ont été pondérées dans les années 1960-1980 par le projet –ou le mythe ?– du « tourisme pour tous ». Celui-ci s'est traduit, politiques et mutations socio-économiques à l'appui, par une diffusion effective de la pratique touristique, le taux moyen de départ en vacances passant en France de moins de 40 % en 1965 à 62 % au début des années 1990. Mais depuis une décennie ce processus ne semble plus d'actualité : les opérateurs et destinations touristiques privilégient désormais une stratégie de croissance en valeur (montée en gamme, augmentation des prix...) sur une croissance en volume de fréquentation, ce qui accentue le caractère élitiste des pratiques touristiques et l'effet de niche de clientèle qui en résulte. Dans le même mouvement, la plupart des formes de tourisme social (colonies de vacances, classes de neige...) se trouvent de fait exclues des sites touristiques, renforçant les phénomènes de non-départ et les néo-sédentarités.

Les inégalités d'accès au tourisme observées dans les pays du Nord sont largement accentuées à l'échelle planétaire, puisque selon l'Organisation Mondiale du Tourisme (OMT) seulement 3,5 % de la population mondiale, concentrée dans les pays « développés » a accès au tourisme. Ce constat s'accompagne d'un bilan critique du tourisme dans les « Suds » aujourd'hui bien documenté, même s'il ne constitue qu'une rubrique supplémentaire à l'inventaire des formes de domination économique et symbolique exercée par le « Nord ». Si ce thème constitue un sujet à part entière qui dépasse largement notre propos, la littérature disponible permet de pointer quelques clés de lecture critique des phénomènes en jeu¹² :

- des inégalités extrêmes dans le « droit » à la mobilité qui instaurent un contraste brutal entre « le défolement des nantis et le refolement des démunis » (Hillali, 2003) ;
- une double asymétrie entre d'une part la localisation de la demande et des opérateurs au Nord et celle des destinations au Sud ; et d'autre part entre un produit

¹¹ De l'anglais « brand » qui signifie marquer (au double sens de *transformer en marque commerciale* et de *marquer au fer*).

¹² Principales sources : Krippendorf (1987), Cazes (1992), Hillali (2003), Cazes et Courade (2004), Alternatives sud (2006).

- touristique « élastique » en amont (demande au Nord) et « rigide » en aval (offre au Sud) ;
- une captation des profits financiers au profit des entreprises du Nord qui valide l'adage « voyages au sud, profits au Nord » (Hillali, 2003) ;
 - une accentuation de l'endettement de nombreux pays pour la réalisation d'investissements touristiques effectués au détriment d'autres secteurs économiques et sociaux ;
 - une ségrégation dans l'accès aux espaces, aux ressources (eau, énergie...) et aux services dédiés au tourisme ;
 - un processus de désappropriation pratique et symbolique qui fonctionne par acculturation et détournement d'usages, de valeur et de sens des lieux : à la fin des années 1990, une série de publicités du voyageur FRAM décline ainsi l'affirmation selon laquelle « le monde est à tout le monde »... en l'occurrence aux visiteurs occidentaux ;
 - la reproduction d'images mystifiantes (Cazes, 1976) et folklorisantes, qui confinent au néo-colonialisme dans les postures et situations mises en scène par la publicité touristique ;
 - l'exploitation et la précarisation des personnels locaux, s'accompagnant d'exploitation sexuelle (Michel, 2006), et même parfois de déplacements forcés de population pour la réalisation d'opérations d'aménagement touristique ;
 - la très forte compatibilité du tourisme avec des régimes politiques autoritaires ou totalitaires.

A bien des égards, ce bilan lapidaire érige de nombreuses destinations en « nouvelles colonies de vacances » (Cazes, 1992) des pays les plus riches, au point de susciter régulièrement des campagnes de mobilisation citoyennes sur le thème « les vacances des uns font le malheur des autres »¹³. Cette lecture « à charge » a pour pendant l'instrumentalisation idéologique mise en oeuvre par l'Organisation mondiale du tourisme, pour laquelle le tourisme incarne une « libéralisation à visage humain »¹⁴ référée pêle-mêle au cycle de Doa de l'AGCS, au objectifs du Millénaire pour le développement de l'ONU, et aux principes du développement durable : « Nous, membres de l'O.M.T. (...), marquons notre volonté de promouvoir un ordre touristique mondial (...) dans un contexte d'économie internationale ouverte et libéralisée »¹⁵. C'est notamment dans ce cadre que l'OMT s'est engagée dans une série de campagnes de réhabilitation du tourisme comme « source d'enrichissement » (2003, 2006) et vecteur de « lutte contre la pauvreté » (2004). Le tourisme y est mis en exergue comme générateur de nouveaux revenus, d'amélioration des conditions sociales, de stimulation d'esprit d'entreprise, d'encouragement de l'égalité hommes-femmes, de transfert

de richesse, de technologie et de compétences, d'amélioration de services publics, d'injection de revenus dans les communautés locales, de renforcement de l'identité culturelle, de préservation du patrimoine, de diffusion des valeurs interculturelles, particulièrement au bénéfice des pays les plus pauvres (OMT, 2006). Plus qu'un simple enjeu de communication, c'est donc bien une confrontation idéologique entre des visions divergentes du monde qui se joue autour du tourisme.

Si les inégalités d'accès au tourisme accentuent au Nord comme au sud les contradictions conduisant à sa mise en cause structurelle et fonctionnelle, la question environnementale n'est pas en reste. Ainsi, les travaux les plus récents sur l'analyse des émissions de gaz à effet de serre dues aux déplacements du tourisme et de loisirs¹⁶ relèvent que 5 % des touristes français contribuent à 50 % des émissions de GES dues aux déplacements touristiques nationaux, les 10 % les plus actifs en émettant presque les deux tiers. La même étude montre que les pratiques les plus émettrices sont clairement associées aux destinations lointaines et aux hébergements les plus confortables (hôtels haut de gamme), ainsi qu'aux modes de transport les plus coûteux et rapides (avion) qui caractérisent les comportements des catégories socioprofessionnelles les plus favorisées : cadres, chefs d'entreprises et retraités de ces catégories. Dans le cas du transport aérien, selon la même source, ce phénomène est encore accentué en cas de voyage en première classe ou classe affaire, avec un bilan d'émission de gaz à effet de serre 3 fois plus élevé qu'en classe économique. Le tourisme constituerait ainsi une illustration caricaturale du processus par lequel « les riches détruisent la planète » (Kempf, 2007). Sans lui consacrer de développement spécifique, nous n'omettons donc pas tout à fait la question de la prédation environnementale, qui apparaît comme une constante dans l'appareil de pensée critique offert par la Décroissance, et peut être illustrée dans le cas du tourisme par le thème de « la destruction ordinaire des littoraux en temps de paix (Homs, 2006).

2. Approche empirique : au delà d'un jeu de miroirs classique entre « tourisme » et « voyage », une difficile mise en pratique

Après avoir énoncé les principales hypothèses d'une déstabilisation des évidences du fait touristique à l'aide de cette notion, nous proposons d'examiner les premiers résultats d'une enquête exploratoire sur les représentations et pratiques de la relation entre tourisme et Décroissance. Cette première approche cherche avant tout à saisir les discours sur les pratiques touristiques contemporaines portés par des personnes sensibilisées à la notion de Décroissance¹⁷. Nous en proposons une mise en perspective

¹³ Exemple de la campagne n°56 de l'ONG française Agir ici : « Pour un tourisme responsable », décembre 2001-mars 2002.

¹⁴ Source : www.unwto.org consulté le 23/05/2006.

¹⁵ Source : code mondial d'éthique du tourisme (1999), http://www.unwto.org/ethics/full_text/en/pdf/Codigo_Etico_Fran.pdf, consulté le 9 /07/2008.

¹⁶ Source : Déplacements touristiques des français : hyperconcentration des comportements les plus émetteurs de gaz à effet de serre. La lettre de la Direction des études économiques et de l'évaluation environnementale, Hors-série 11, février 2008, Ministère de l'écologie, du développement et de l'aménagement durables.

¹⁷ Du fait de la taille de l'échantillon, 150 questionnaires traités comme du mode de diffusion qui a privilégié « l'effet boule de neige » notamment dans les réseaux militants et leur entourage. Ce qui explique qu'environ 80% des personnes interrogées affirment avoir une opinion « très favorable » ou plutôt favorable de la

considérant les discours recueillis en tant qu'éléments révélateurs d'une critique du fait touristique, en privilégiant comme grille d'analyse la distinction entre « touriste » et « voyageur » qui en constitue un des résultats les plus saillants. En effet, à la question « faites-vous une différence entre « voyageur » et « touriste », 83% des répondants ont répondu par l'affirmatif¹⁸, et il est possible de constater une symétrie quasi-parfaite entre les qualificatifs négatifs attribués aux « touristes » et ceux nettement plus positifs attribués aux « voyageurs ». Ainsi, selon les résultats obtenus :

1/ Alors que le touriste « consomme, profite, envahit et détruit » (42 %), le voyageur « découvre, s'adapte, échange et respecte » (41%),

2/ Si le touriste est « suiveur et passif » (12,5%), le voyageur est « baroudeur et actif » (18%),

3/ Le touriste est « égoïste, recherche son plaisir personnel, fait une découverte superficielle » (19%) contrairement au voyageur chez qui il existe « un état d'esprit, une éthique, des objectifs au voyage » (12,3%),

4/ Enfin si le voyageur aime et se permet de « prendre son temps » (9%), le touriste est pour sa part « minuté » (8%).

Bien que ces oppositions semblent caricaturales, elles sont révélatrices des critiques contemporaines du fait touristique, et s'inscrivent dans trois des quatre hypothèses préalables déjà examinées. En effet, les deux premières symétries « consomme, profite, envahit et détruit » *versus* « découvre, s'adapte, échange et respecte » et « suiveur et passif » *versus* « baroudeur et actif » correspondent à la critique de la dérive économiste et consumériste du tourisme et des loisirs. La seconde symétrie « égoïste, recherche son plaisir personnel, fait une découverte superficielle » *versus* « un état d'esprit, une éthique, des objectifs au voyage » renvoie entre autres au tourisme comme vitrine des inégalités sociales et de l'asymétrie nord-sud. Et enfin l'opposition « prendre son temps » *versus* « minuté » coïncide avec une lecture du tourisme comme étendard de la société du travail.

Ainsi, seule l'hypothèse du tourisme au cœur des mésusages de la mobilité ne transparait pas dans les résultats de l'enquête. Ne pourrait-on pas lire dans cette absence, l'impasse ou plutôt la peur d'une remise en question trop profonde de la pratique touristique ? Comme le souligne Bertille Daragon « faire le deuil du déplacement n'est pas aisé, tant sont puissants les rêves et les émotions rattachés à l'exploration du vaste monde »¹⁹. Plus généralement, ce constat souligne s'il en est besoin les contradictions entre les intentions ou positions volontaristes et les pratiques concrètes. Même si l'action la plus citée par les enquêtés pour parvenir à une décroissance touristique soutenable est « une politique incitative, des aménagements ou des innovations pour développer les mobilités douces », et que la principale forme et pratique du tourisme et de voyage qu'ils désignent comme étant à préserver est le « tourisme de proximité », 66% d'entre eux partent en

décroissance soutenable

¹⁸ Seulement 11, 5 % des répondants considèrent que si cette distinction existe, elle est élitiste voire purement intellectuelle.

¹⁹ Intervention au séminaire « tourisme et décroissance », octobre 2007, MSH-Grenoble.

voyage ou vacances « plusieurs fois par an » et utilisent de manière prédominante les moyens de déplacement motorisés (61% « transport routier motorisé » et 26% « l'avion »).

Pourtant, si la mobilité semble absente de l'opposition explicitée entre « touriste » et « voyageur », sa remise en question est présente lorsque que l'on interroge « les formes et pratiques de tourisme et de voyage à préserver » ou au contraire, celles « qui doivent être freinées ou découragées »²⁰ :

– « Tourisme de proximité » (21,5%) et « voyager par des transports alternatifs » (17%) sont respectivement les premier et troisième items sur quinze proposés comme forme à préserver ;

– « Transport polluant et individuel » (18,9%) et « séjours lointains mais courts » (18,2%) sont quant à eux en troisième et quatrième positions sur treize des pratiques à décourager.

Ainsi, parler de « tourisme » en général et non plus de « touriste » ou « pratiquant » pourrait permettre une mise à distance « nécessaire » pour ne pas remettre en question directement sa propre pratique, tout en introduisant la question de la mobilité dans le débat sur l'application de la décroissance aux pratiques touristiques. Enfin, si l'on examine les formes attribuées par les personnes enquêtées à un projet de décroissance touristique²¹, il en ressort le classement suivant :

– « Voyager moins, mais mieux » (63,3 %)

– « Echapper à la marchandisation des voyages » (56,5 %)

– « Voyager autour de chez soi » (31,3 %)

– « Voyager sans voiture » (30,6 %)

– « Organiser soi-même ses vacances » (25,9 %)

– « Echanger mais pas forcément payer » (23,1 %)

– « Organiser ses vacances avec une structure militante » (22,4 %)

En laissant libre cours à l'imagination des personnes enquêtées²², on obtient pour les items au-dessus de 10% :

– « Voyager, se déplacer via les mobilités douces » (33,3%)

– « Voyager, s'organiser, visiter avec des structures militantes » (13,1%)

– « Pourquoi pas, mais pas d'idées concrètes » (10,1%)

²⁰ Ces questions étaient posées sous forme de questions ouvertes et ont été recodées en questions fermées à choix multiples.

²¹ La question posée était la suivante : « quelle est la formule qui résume le mieux un projet de décroissance touristique », question fermée avec 8 items proposés.

²² La question ouverte posée était la suivante : « Dans votre pratique personnelle du voyage ou du tourisme, quelles solutions concrètes de décroissance, souhaitez-vous expérimentées ? », elle a été recodée en question à choix multiples avec 15 modalités proposées.

- « Recours à des hébergements alternatifs / échange de maison / chez l'habitant » (10,1%)

Malgré ses limites, cette première enquête exploratoire illustre donc le fait que la représentation d'un projet de décroissance appliqué au tourisme passe bien par une remise en question de certains piliers fondateurs du fait touristique, tout en soulignant logiquement les contradictions. Le tourisme étant par définition « un loisir impliquant migration » (Boyer, 1982), la question de la mobilité apparaît sans surprise comme la plus épineuse de ces contradictions pour le citoyen enclin à adopter des pratiques compatibles avec les options de la Décroissance. A cet égard comme à d'autres, l'opposition entre « touriste » et « voyageur » fait figure de constante dans la critique du tourisme massifié, et même souvent de trompe-l'œil dont les illusions ont déjà été discutées par de nombreux auteurs. Elle appelle donc de futures investigations réflexives et empiriques, qui ne pourront pas négliger les apports substantiels du travail réalisé depuis 20 ans sur les approches réformistes et alternatives du tourisme : écotourisme, tourisme durable, solidaire, responsable, éthique, équitable, indigène...

3. Conclusion. L'après-tourisme a commencé

« Voyagez tant que vous pouvez maintenant car le coût des voyages en avion va devenir exorbitant !²³ ». Ces propos d'un expert de l'Agence Internationale de l'Energie rapportés en mars 2008 dans le journal *Libération* illustrent bien les menaces et les dérives qui pèsent sur le secteur touristique. Dans le même temps, les médias interrogent de plus en plus souvent les professionnels du tourisme sur le thème « faut-il se priver de vacances pour épargner la planète ? »²⁴. Ce qui n'empêche pas l'Organisation Mondiale du Tourisme de maintenir invariablement ses prévisions de croissance du tourisme international du début des années 2000, qui annoncent un doublement du nombre de touristes d'ici 2020. De même, la croissance effrénée des vols à bas coûts et leur proclamation comme levier de politique publique permettant « l'augmentation du pouvoir d'achat » (Beigbeder, 2007) ne semble guère cohérente par rapport aux mutations annoncées par les observateurs et experts dans le double contexte du changement climatique et de l'après-pétrole (Céron et Dubois, 2006). La contradiction apparaît donc de plus en plus flagrante entre le sentiment d'incertitude et de crise qui pèse sur le tourisme et l'apparente euphorie technique, économique, financière et immobilière dans laquelle semble baigner ce secteur sur fond de « profitabilité durable »²⁵ : aménagements pharaoniques (Dubai, Macao, Bahamas, Suisse...), préfiguration du tourisme spatial, fascination décomplexée des opérateurs touristiques pour le créneau du tourisme de luxe...

Alors que le tourisme s'est longtemps voulu « hors champ » vis-à-vis des affres du monde de tous les jours avec ses

²³ Interview d'Eduardo Lopez, expert de l'Agence Internationale de l'Energie, *Libération*, 11 mars 2008.

²⁴ Source : « Le tourisme actuel est-il une espèce en voie de disparition ? ». Michèle Laliberté, <http://veilletourisme.ca>, 8 octobre 2007, consulté le 10/07/2008.

²⁵ Thème du 11ème Symposium International du Tourisme, 2-4 février, 2009, Zermatt (Suisse), www.idealp.org.

conflits, ses souffrances et ses injustices, cette posture paraît de plus en plus relever du mythe, au sens de parole dépolitisée et soustraite à l'histoire (Barthes, 1957). A ce titre, l'utopie et l'histoire touristiques atteignent leurs limites, ce que tendent à confirmer de multiples signaux convergents, ici et ailleurs, qui témoignent de la rupture amorcée dans le statut du tourisme. Par souci de concision, nous nous limitons à trois indicateurs majeurs de cette perte d'« innocence » du tourisme :

Les conflits sociaux se multiplient dans le champ touristique, comme le montre la suite de grèves inaugurales recensées depuis le début des années 2000 : première grève des employés de remontées mécaniques dans les stations de sports d'hiver françaises (février 2004), suivie quelques mois plus tard (juin 2004) d'un conflit social très médiatisé dans les palaces de la Côte d'Azur à l'occasion du Festival de Cannes ; première grève des salariés d'offices de tourisme (septembre 2005) ; première manifestation des travailleurs saisonniers à Chamonix (mars 2006) ; première grève des salariés du siège du voyageur FRAM (en 60 ans !) en mai 2008... On peut noter à ce sujet que le tourisme est devenu une nouvelle terre de mission pour les organisations syndicales face à des problèmes récurrents notamment liés au travail saisonnier : précarité, travail illégal, conditions de logement, bas salaires...

Le sentiment anti-touriste se répand dans le monde entier. Confronté au slogan « tourist go home »²⁶ lancé dans des villes européennes ou à la banalisation des attentats et prises d'otages depuis la fin des années 1990 (Denécé et Meyer, 2006), le visiteur découvre avec embarras qu'il n'est plus nécessairement le bienvenu partout et en tout temps ;

La critique du tourisme fait figure de thème établi, et même si ses travaux fondateurs (Burgelin, 1967 ; Laurent, 1973 ; Krippendorf, 1987) sont peu utilisés, de nombreux auteurs et journalistes en alimentent la chronique, non seulement sous l'angle réflexif ou militant (Cazes et Courade, 2004 ; L'offensive, 2007), mais aussi sur le registre romanesque (Boëlle, 2003). Le registre le plus répandu reste toutefois celui du marronnier médiatique saisonnier : « le tourisme de masse des hôtels-clubs enferme l'homme dans des loisirs préfabriqués » (*Libération* du 9/08/2006) ; « la planète malade du tourisme » (*l'express* du 26/07/2007) ; « le tourisme est-il biodégradable ? » (*La Tribune* du 13/02/2008) ...

La crise du tourisme est globale (énergétique, climatique, démographique, sécuritaire, sanitaire, identitaire), et n'est pas sans conséquences sur l'imaginaire et les pratiques récréatives. A des degrés divers, le sentiment de responsabilité –voire de culpabilité– qui se fait jour, ou la relance du caractère anxiogène de l'altérité, se traduisent par des comportements de moins en moins anecdotiques : évitement ou renoncement au tourisme en totalité ou sous certaines formes, recherche de prétextes professionnels, militants ou humanitaires pour voyager sans se sentir « touriste », émergence de pratiques récréatives urbaines et de proximité, relance de formes d'itinérance non-motorisées, migrations d'agrément qui reposent sur le choix

²⁶ Source : Indymedia Barcelona, consulté le 17/10/2005.

d'un lieu de vie en fonction de critères récréatifs et non plus professionnels...

Il est évidemment possible d'interpréter ces mutations comme autant de manifestations d'un *tourisme de crise* qui frapperait en priorité une fraction minoritaire des classes moyennes culpabilisées et inquiètes, tétanisées dans une posture de « désistement » ou d'« absentéisme » vis-à-vis du consumérisme touristique et de ses prédatations. Mais il est aussi possible de le comprendre comme l'amorce d'un processus de dépassement des impasses du tourisme, y compris dans leurs déclinaisons « durables » cantonnées dans une position d'horizon maximum de réforme possible dans le cadre du modèle dominant.

« Moins d'infrastructures, moins de vitesse, plus de liens conviviaux » : cette proposition de François Schneider²⁷ montre qu'entre *tourisme de décroissance* et *décroissance du tourisme*, un vaste champ est ouvert pour renouveler l'imaginaire de la relation « Ici »-« Ailleurs ». Une telle perspective appelle un certain nombre de discussions et de réflexions, sinon de précautions idéologiques et rhétoriques, dont les observateurs comme les militants ne peuvent pas faire l'économie dans la mesure où le tourisme s'avère au final être un sujet « sensible », ce qui confirme si besoin est sa dimension éminemment politique. En effet, comme le rappellent ses animateurs, la Décroissance soutenable est « une pensée sur la crête » qui doit se prémunir contre des dérives susceptibles de faire sombrer la relocalisation de l'économie dans l'autarcie et le rejet de l'universalisme (Ariès, 2005 ; Cheynet, 2008). Alors que l'approfondissement d'une pensée critique du tourisme ne peut plus être un sujet tabou, il ne saurait non plus être abandonné à une « touristophobie » ou à une « diabolisation de l'ailleurs » dont la teneur élitiste et les risques de repli ont déjà été soulignés par plusieurs auteurs (Urbain, 1998 ; Lévy 2004 ; Equipe MIT, 2002 ; Knafou et Stock, 2003). Si le tournant critique dans la pensée du tourisme se doit d'être sans concession, il gagne donc à s'emparer du projet émancipateur et humaniste dont est porteuse *malgré tout* la culture touristique. Ce qui suppose aussi de dépasser les contradictions portant sur le statut même du loisir dans une société de Décroissance qui « relâcherait la contrainte du travail »... Des travaux pionniers (Michel, 2003 et 2005 ; Christin, 2005 et 2008) esquissent à cet égard des pistes prometteuses, qui convergent avec l'irruption latente d'un néo-situationnisme dans la sphère du tourisme et des loisirs (Bourdeau, 2007). Car face aux enjeux d'autonomie et d'altérité culturelle qui animent la sphère du tourisme et des loisirs, c'est plus que jamais la relation entre récréation et re-création²⁸ qui semble féconde. A suivre.

Le tourisme vu par les objecteurs de croissance : fragments de discours

Même s'il est peu mentionné en tant que tel par les théoriciens de ce courant de pensée, les objecteurs de croissance ne sont pas en reste dans la critique du tourisme, qu'ils cherchent à le mettre à nu dans son essence en détournant une affiche publicitaire du Club Méd : « CLUB Médical pour soigner une vie vide de sens » (casseurs de pub 2003), ou qu'ils s'en prennent à ses attributs les plus emblématiques : « Ski : Démontons les stations » (La Décroissance, 2004) ou « l'été sans bagnole » (La Décroissance, 2006).

Les quelques débats militants sur cette question que nous avons pu repérer sur l'Internet en 2007 et 2008 oscillent le plus souvent entre des pistes d'abrogation du tourisme (« regarder à sa porte », « changer de lunettes pour redécouvrir sa ville », pratiquer « le voyage immobile » « en ramenant de la spiritualité d'ailleurs »)²⁹ et la recherche de formes « intelligentes » de voyage célébrant la communication interculturelle, la découverte et l'humanisme³⁰. *In fine*, les références citées comme les formes concrètes de tourisme envisagées au titre d'une Décroissance ne sont pas très éloignées des pratiques réformistes et alternatives de tourisme existantes : écotourisme, tourisme solidaire et même tourisme durable. A partir d'une base documentaire aussi étroite il n'est donc pas aisé de faire la part des choses entre ce qui relèverait d'une part d'un pragmatisme de terrain, et d'autre part d'une diversité de lecture quant à la manière de situer la notion de Décroissance par rapport à celle de développement durable –pourtant sans cesse rappelée vigoureusement par les théoriciens et militants du mouvement.

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²⁷ Intervention au séminaire « tourisme et décroissance », octobre 2007, MSH-Grenoble.

²⁸ Nous reprenons librement à notre compte cette proposition de plusieurs auteurs, parmi lesquels les géographes du groupe Mobilités, itinéraires, territoires de l'Université Paris 7 (Equipe MIT, 2002).

²⁹ Source : www.forum.decroissance.info, consulté le 10/12/2007.

³⁰ Voir par exemple le compte rendu de la réunion du 02/05/2007 du Groupe Décroissance Toulouse sud-ouest sur le thème « tourisme et Décroissance ». Source : <http://decroissance.vspider.net> consulté le 21/05/2008.

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Gold unsustainability

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Abstract

It's estimated that more than 80 percent of all the gold extraction has been carried out in the XX century. The proliferation of this activity in the last decades hasn't been thanks to greater exploration or richer veins, but because of using technologies that allow exploiting low grade rocks. And if gold mining has always been risky, this decrease in the grade increases the socio-ecological impacts per gold unit.

The perception of those environmental impacts, taken in conjunction with the few profits that communities near mines get, has generated local resistance movements to gold mining all around the world. Latin America, one of the regions more explored for gold nowadays, is the backdrop of many of them. In fact, this paper focuses on the environmental conflict of Pascua Lama, a gold mining project in the Chilean frontier with Argentina. The dynamics of this conflict reflect the power imbalance between a community against mining and "transnational capital's and Chilean State's symbiosis". The imposition of an extractive activity in their water sources caused a protest movement that crystallizes the local risk perception and the injustice of locating, deliberately, dangerous projects near disempowered social groups.

Those problems around mining make us think about the existence of alternative gold sources. Because of its longevity, there are great superficial gold deposits as private or public investments. Even if the end of the Gold Standard opened the option of selling metal from these deposits, the gold market has prevented it attending to economic interests. The possibilities of mobilizing superficial gold, encouraged by a public will, could reduce the pressure over its extraction and over many communities and ecosystems that suffer it.

Finally, besides discussing supply alternatives, we can also look into the other part of the material chain: gold demand. For this metal and for its principal use, jewellery, the unsustainability of the West meets the East. The Indian subcontinent, with its high consume of gold per capita, is one of the great examples from the East. In fact, the actual main gold demanders are peripheral regions of the global capitalist economy. Which are gold cultural meanings for these disempowered countries? Should we think about gold just as a superfluous matter or take into account other values? Are our cultural needs comparable to the industrial or material ones?

Key Words: gold mining, local resistance movements, superficial gold deposits, jewellery, India.

1. Introduction

There are two current dynamics that are affecting the environmental impacts of gold mining. First of all, total gold extraction is increasing continuously. Second, impacts per gold unit extracted are also growing.

The 20th century has been the most productive with regards to gold mining. It is estimated that 80% of all the gold extracted throughout history (about 142.000 tones), was obtained in this century.

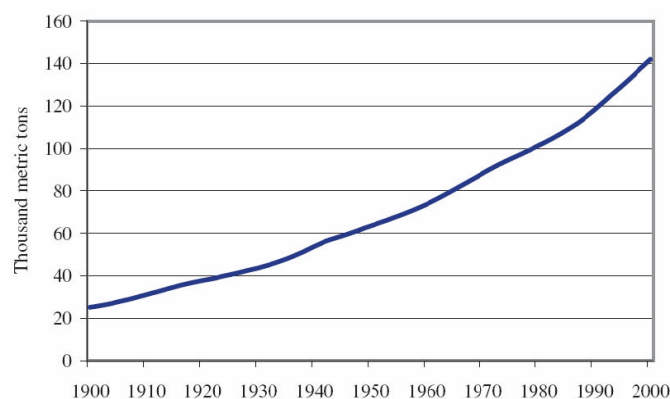


Figure 1: Accumulated world gold mine production, U.S. Geological Survey, several years.

As we can see in Figure 2 (see Annex), South Africa, dominated the supply in this century, having its peak in 1970 with an extraction of 1000 tones. Since then, inflation and labour conditions improvement (and possibly the exhaustion of most accessible deposits) reduced its profitability.

For the rest of the countries (excluding the ex Soviet Union), there were two gold booms in this century: first, since 1934's price hike (it increased in a 69%) before the Second World War; second, since the 80's, thanks to a price and demand recovery and to new technologies such as carbon-in-pulp applied to cyanide leaching.

"These factors led to more exploration, focused initially on previous gold producing provinces, along with the development of many new gold mines around the world. These mines have often been based on open cut mining techniques, which allow more complete extraction and processing of all gold-mineralised ore. The economics of gold mining were radically re-defined during this period." (Mudd, 2007)

2. Implications of grade diminution

So technological improvements meant more exploration but also facilitated extraction from lower grade sites. There are different studies corroborating the idea of a general gold grade diminution, especially in last 30 years. Slater and Ward (1994) calculated that, as heap-leach, carbon-absorption technology spread rapidly in the 1980s, the average ore head grade in the United States decreased to 1.5 g/t in 1991 from 3.6 g/t in 1981.

But, what are the consequences of the exploitation of lower ore grades? According to Mudd's study of 2007, this

decrease means at least: the use of greater amounts of cyanide for the benefit process, the generation of greater solid wastes and the construction of more open pit projects. These facts are directly correlated and have important social and environmental impacts, carrying out an increase in the negative environmental impacts per gold unit extracted.

According to Vaughan (1989) “environmentally and socially, there is not any industrial activity more devastating than open-pit mining”. Just earth movement supposes the disappearance of great cation reservoirs, which causes soil and water acidification. Moreover, metals such as gold, silver and copper appear to be associated to sulphurous minerals, so leaving uncovered tones of these minerals (both in the crater and in the waste mountains) where these get in touch with the air and the water, produces sulphuric acid and acid drainage. The pH of the waters receiving this drainage can fall to 4, which is a very unfavourable environment for plants and animals. Furthermore acidification unleashes other processes such as toxic metals dissolution from rocks.

One of the most important dimensions of this impact is the temporal one because it continues acting a long time after the extraction finishes. It's estimated that the effect of Golden Sunlight (Montana) mine's drainage will extend for thousands of years.

According to the impacts of cyanide technology, we can examine its associated risks. On the basis of three different sources¹, Roger Moody (2006) reports numerous cyanide spills only since 1992. The Rainforest Information Centre 2004 lists tens of tailings dam collapses and transport accidents for the 2002-2004 period. Robert Moran also records, during various years and for the Mineral Policy Center, different cyanide contaminations.

3. Opposition to gold mining in Latin America

From 1993 to 2002, Latin America and Asia were the regions with the greatest growth in gold extraction, while Africa and North America were the ones with the biggest decrease. And from 2002 to 2006, Latin America was the region with the biggest augment (+4%).

According to USGS' data, gold was by far the most explored mineral between 1995 and 2004. Regionally, Latin America was the first receiving exploration during the 90's, due to, among other things, the Canadian and American mining restrictions and due to Ex-Soviet Union, Asia and African social instability. “In the United States, for example, gold mining exploration investment halved in the 90's, possibly because of the perception of mining companies that this country's environmental regulations increase costs and extend licence achievement times. That is why gold exploration investments have focus on developing countries” Butterman W.C. & Amey E.B. (USGS, 2005).

¹ “This list is compiled from three main sources: World Information Service on Energy (WISE) Chronology of Major Dam Failures, 9 May 2006; R.Moody, *Into the Unknown Regions* and ‘Proposal for a Directive of the European Parliament and of the Council amending Council Directive 96/82/EC’ ” in Moody, R. (2006).

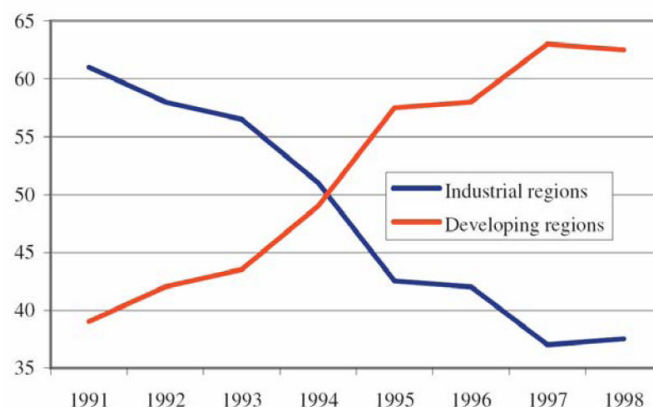


Figure 2: World exploration budgets for non oil by-products, non ferrous materials. Wilburn, 1998 y 1999 in Amey and Butterman, 2005.

Because of its important impacts, claims against gold mining are multiplying all around the world. In Latin America in particular, due to the exploration and exploration increase, there are more and more communities protesting, with more and more network links between them. Some opposition movements, thanks to popular mobilizations and public plebiscites, are achieving to stop gold mines (Tambogrande in Peru, Esquel in Argentinan Patagonia, etc.).

In this case, fieldwork in environmental mining conflicts was developed in the north of Chile regarding the Barrick Gold Canadian company's gold mining project. The mine, an open-pit project with a cyanide leaching recovery process, is situated in the Chilean frontier with Argentina, at an altitude of more than 4500 meters, and affects the valleys on both the Chilean and Argentinean side of the border. One of the key issues in the opposition discourse is that the mine would be above some mountain glaciers. The Chilean slope valley (Huasco Valley), situated in a semi-desert area, survives thanks to these glacier's thaw and to mountain snowfalls. Lots of local inhabitants see the Pascua-Lama project as a great threat for the survival of their agriculture and peoples.

Authorities, local and national, defended the Pascua-Lama project unconditionally, leaving local opposition in a disempowered position in the face of Barrick Gold. In fact, this conflict clearly reflects the power imbalance between a community against mining and the symbiosis of transnational capital with the Chilean State.

The glacier issue could be the particularity of a case that, on the other hand, has lots of similarities with other anti-mining movements. Socio-environmental impacts of transnational mega projects, of open-pit mining and of risky technologies such as cyanide leaching are more and more often rejected, even (and mainly) in developing countries.

4. Already extracted gold

In analysing all of the conflicts and impacts related to mining, our first question would be if it is possible to match the metals' demand with the amounts that have already been extracted. In fact, gold has a very long life so there is nowadays a great reserve of extracted gold. A USGS' study in 2005 estimated that (speaking about 2000th data): from

the 140.000 gold tones extracted in History, just 5% have been lost or dissipated. From the rest, about 11.000 are the irrecoverable part of some products. So there exist 122.000 tones of accessible gold for the market. This is divided in: 33.400 in official reserves, 25.200 in private investments and the other 63.000 in jewellery and coinage.

Even if selling gold from public deposits and recycling from jewellery can have technical or profitability problems, these suppose a little handicap comparing with the corporate interest of maintaining high gold prices and gold extraction. We would suggest that only a public determination could encourage *superficial* gold mobilization. This could reduce the pressure over its extraction and over many communities and ecosystems that suffer from it.

5. Comments about demand

Finally, besides discussing supply alternatives, we should also look into the other part of the material chain: gold demand. A deeper question could be: do we need the gold we demand? 88% of gold which annually enters the international market is assigned to fabrication and the rest to investment, to bar making for example. In official statistics *fabrication* is the name for designated uses such as jewellery, electronic, dentistry or official coin and medal making. Jewellery represents the largest use, making up 84% of the total gold demanded for fabrication in 2002. This dominance has had and continues to have a tendency to increase.

The fabrication gold quantity has quadrupled from 1980, mainly due to the growing demand of the South or Periphery. Fabrication in these regions first exceeded that of the north in 1988 and by the end of the 90's they were using two thirds more gold than the industrialized countries. This occurred mainly due to jewellery. Anyway, we cannot forget the double use that gold has in Asia and the Middle East. Quite often, jewellery in places as India is used as *investment jewellery*: gold has a very interchangeable use between jewellery and investment. For example, investment gold is sold to goldsmiths when price is rising.

By countries, India, United States, and China would be the most important gold jewellery final consumers, with India being by far the first one. Moreover, if we look at jewellery purchase by Gross Domestic Product unit, we see that "apart from the wealthy Gulf economies, the highest consumers of gold are relatively impoverished developing countries" (Ali, 2006).

Let's concentrate our attention on the case of India. The fast Indian consumption growth in the 90's was mainly related to gold's deregulation, but it also reflects the subcontinent's gold ornamentation's deep cultural roots. It is related to marriage dowries and is also one of women's few property forms. "In her recent book *'Dowry Murder: The Imperial Origins of a Cultural Crime'*, Veena Oldenburg has argued that the commoditisation of dowry, particularly gold occurred during the British Raj, when land tenure became the unit of capital accumulation for Indians instead of the traditional practice of land use and access rights [29]. Since property was essentially allocated to male heads of household and the use of land became "subservient" to

ownership, women were essentially disempowered". (Ali, 2006)

Is it an occidental view which brands gold uses as superficial? Gold is labelled as a luxury good, as a *wallersteinian preciousity*, because it doesn't enter into the industrial metabolism. But are there cultures and social groups, for whom can be a basic good? Not only social or prestige values, possibly Indian women assign to gold material values, like a material safety in precarious times. And even if gold doesn't practically take part in the industrial metabolism, it does in the social one (and in different ways in the different cultures). So, from the culturalist paradigm, gold's banality is called into question. Is the cultural metabolism comparable to the industrial one?

Anyway, gold mining's huge impacts constitute a fact that is beyond interpretations or relativizations. These impacts occur both in the Orient and in the Occident, although they are greater where there are fewer restrictions. In short, gold is also one of these points where occidental and oriental cultures' unsustainability, the unsustainability of the rich and the not so rich, meet each other.

Gold has its own dynamics that, in a certain way, move further away from the schema of mining accumulation in economically impoverished countries. Anyway, what we can effectively say is that the ecologically inequitable model does fit auriferous mining. According to the "No Dirty Gold" Campaign², initiated in 2004, more than 50% of gold is extracted from indigenous lands. We can see the North American and South African cases. In the former, lots of indigenous groups and rural communities have denounced human and indigenous rights violations and great contamination episodes³. The latter is the country in which more gold has been extracted throughout history and even if official statistics place it between developed countries, who are the gold mining sufferers in this First World Country?⁴ Inequality towards marginalized social groups (rural communities, ethnic minorities, etc.) is very present in gold mining allocation and development.

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² www.nodirtygold.org

³ Californian Quechan against Glamis Gold project; Occidental Shoshones fight in Nevada; etc. More information in: www.minesandcommunities.org; www.nodirtygold.org; www.miningwatch.ca.

⁴ South African Mining summit's declaration responds indirectly to this question, underlining gold mining's economic and ecologic damages towards black communities, mine-worker's health and women.

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Annex

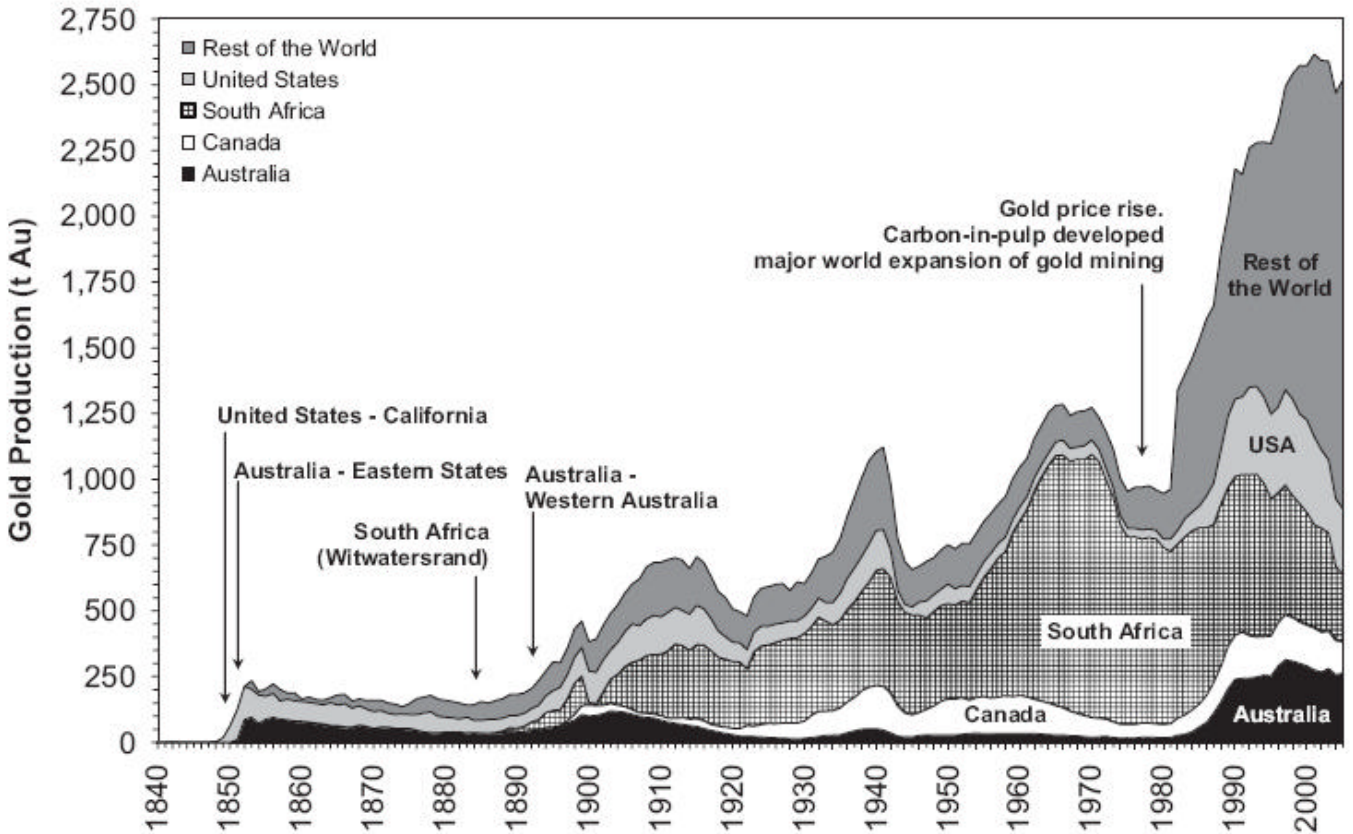


Figure 3: World gold production 1840-2005 (in Mudd, 2007)

What will be the indicators for tomorrow?

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Abstract

A society of infinite growth is impossible in a finite world, but one cannot all the same consider the "society of de-growth" as an objective, above all if there are not more limits to de-growth than to growth. De-growth is a process. The question of indicators poses that of the phases, of which they are an image.

To be understood, an indicator gains by being expressed in a known unit that can be put into relationship with concrete consequences. The aggregate indicators are the addition of data of a different kind but reduced to abstract indices on a scale of 1 to 100. The human development indicator (HDI) combines life span, years of study, and a level of production. It allows countries to be classified, but does not express their situation.

We consider as synthetic indicators the cumulative indicators of the different dimensions but translated into a common concrete unit, an expression of a general equivalent: monetary value, global hectare, ton of carbon equivalent, etc.

Proposals for alternative indicators abound. We propose three structure indicators, i.e. the situation of the planet at a given time, from the triptych of sustainable development, according to the relationships between the three pillars (and not according to the state of these three pillars). Three indicators for three relationships:

- Social/economic: Time spent on non-commercial activities/time spent for paid work*
- Social/environment: Space occupied for human needs/space dedicated to other species*
- Environment/economic: Ecological footprint (EF), the equivalent surface area used by humans for their needs and the absorption of their waste.*

The EF finds itself caught under the fire of contradictory criticisms as to its ethical fundamentals (to favour man or nature?); misunderstood on the model (it is a model of representation, not forecasts, but which can be used for simulations); at the hub of discussions on the technical aspects of emission rates and carbon sequestration.

The criticism is useful and necessary to improve the model, to highlight the weaknesses. In particular, the EF is limited today to the notion of flows of matter and energy over the year, without taking account of the effects of this flow on the state of the heritage and the natural capital. This modification in the quality of the heritage would only appear subsequently, on the basis of the findings of real production. It is one of the paths for possible improvements. Yet, as it stands, the EF remains a favoured instrument for making people aware of the ecological stakes involved.

1. Introduction

Economic de-growth is a process

Even if one accepts that a society of endless growth is not feasible in a finite world, one still cannot sensibly think of a "de-growth society" as being an objective, primarily because there is no intrinsic limit to de-growth any more than there are limits to growth. De-growth is a process and a means to an end. The goal might be that of creating a fairer, simpler, less materialistic society, with more rewarding human relations, ... And yet, to us it does not seem possible to define any society by its state since it is never static: a state of equilibrium is merely arrested disequilibrium (Morin), and an ideal state of society cannot but be totalitarian. One might define a society by its system or structure (market, kinship, classes, etc), by its political goals (socialism, liberalism, etc), or through its processes. The question of the level of definition clearly takes logical precedence over that of indicators.

The question of indicators raises that of phases. De-growth is a process; not a state. Indicators must be suited to the phases they are to reflect. Thus, we can identify three phases:

- today's society: a society of quantitatively-based, measurable growth,
- the society of tomorrow, some of which will have already adopted a way of life that is simpler but shows greater respect for man and his environment, a society of heightened awareness, of choices. Simpler, yes, but maybe more difficult to depict,
- and the transitional phase between the two – which we should not assume will be stable – a phase of economic de-growth.

This paper comprises two distinct parts: the first is a general survey of indicators, suggesting possible areas for work. The second is a critical review of proposed indicators, which has the advantage of having been published ten years ago, of the ecological footprint; a critical review that might serve as a template for other indicators.

GDP: an indicator of society

For today's society, GDP is a guiding indicator that summarises our goal as a statistic: that of increasing output every year in order to be able to consume a little more. GDP is monetary: it reduces everything down to a monetary value; as such, it is unable to depict other values, such as utility value. It's a sum of added values, and hence of annual production: as such it is able to capture neither the current position nor trends in stocks, commodities (raw materials), water, air, etc. It's a deceptively simple indicator, yet its calculation is based in part upon approximations. The added value of unremunerated services is treated as being equal to the value of staff salaries in those business sectors. The most severe criticism made of GDP is that it deals only in absolute values – it has not as yet succeeded in coping with relative numbers (save at the most elementary level). Thus, repairs after an auto accident, cleaning up an oil slick, faulty workmanship, etc, are *added* to the value of the car, fuel shipped, building constructed, even though they are really negative values,

since society would be better off if they were reduced or eliminated.

Our society, based upon industrial growth, has adopted GDP as the indicator of change in monetary transactions. It's a good indicator of a process, even if not of the economy's state of health, but is less satisfactory when extended from the commercial sphere to transactions that are not yet monetarised, such as services to grandparents, access to woodlands or beaches, or which did not exist at all (decontamination systems, spread of supplementary private tuition courses). That said, we do not believe for all that, that changing activities over from a non-monetary (i.e. social) to a monetary status (i.e. market) inevitably means loss of liberty¹.

To us, the use of GDP as an indicator of de-growth appears untenable, for two reasons:

- it's a process indicator, appropriate for a goals of a growth-oriented society, not those of a society committed to a process of de-growth,
- it's an indicator whose composition positively masks those very processes it enshrines, such as growth in volumes of monetarised transactions and extension of the scope of such transactions, values that can be treated as positive (housing, education) and those one might regard as negative (taking care of accidents on the road, people and goods affected by pollution, workplace accidents, etc).

2. The choice of a general equivalent

To create an indicator means creating a tool that must be:

- meaningful
- intelligible
- calculable,
- and whose mode of expression is positive.

The issue of the unit of measure

In order to be intelligible, it seems to us this needs to be expressed using a familiar unit and, in order to be meaningful, it needs to be related to practical consequences. That's the strength of GDP, which is expressed as a monetary value (and in particular variations in GDP as a %), and be related explicitly to changes in jobs and purchasing power, notwithstanding the many criticisms that can be levelled at it, including its tautological construction in relation to its use in services (Gadrey). In our analysis, we shall be distinguishing *aggregated indicators* from *summarising indicators*.

Aggregated indicators are cumulated data that differ in nature, but which are reduced down to abstract indices using a scale of 1 to 100. An IHD (human development index) combines years of life (longevity), years of study (education) and level of output (GDP). HDI facilitates classifications of countries, but does not convey their situation, and has little relevance in terms of temporal change. One might compare alternative indicators and

GDP, yet show they fail to convey wellbeing; this remains the economist's task.

If we wished to convert HDI into a more concrete unit, we might look at converting it into years, but it would be necessary to calculate the cost of one year of life, and adding everything together would produce lives of more than 100 years. One might convert everything into a value by calculating return on years of study (Becker's Human Capital theory), with a "return" for longevity?

Aggregated indicators can only provide a benchmark for comparison with other countries at a given point in time, or an indication of change that can be compared against other indicators. But yet: why be at such-and-such a benchmark at all? Or be compared against an indicator whose composition is not accepted, such as GDP, which greatly restricts its relevance? To all these limitations, we must add the technical problems: choice of variables, their weighting, calculations of the lower and upper markers for variables.

Other potential indicators are even more complex and unwieldy than HDI, which at least has the virtue of simplicity. These indicators are seen by us as an intermediate phase of the study and criticism of traditional indicators, which are certainly necessary but cannot be an end-result.

We shall not deal here with aggregated indicators devised specifically for budget control, such as hospital- or social-spending budgets. However, a variation in these indicators by several points is highly significant - and highly concrete.

Summarising indicators

We regard as summarising those indicators that add disparate dimensions together, but convert then into a common practical unit. Various units that express a general equivalent of output or wealth are used: monetary value, global hectare (Hag), equivalent tonnes of carbon (TeC), etc.

The unit may be monetary, as in the case of GDP², or physical, relating to stocks (resources, areas) or a flow (resources, emissions such as greenhouse gases). If we seek a unit of a finite and hence physical nature, and by expressing an aspect of global sustainability, hence a stock, we inevitably end up with a stock of area that is physical, i.e. the ha, or weight, i.e. the tonne. We have not found any indicator that is expressed as a volume, volumes of gas being converted into mass in order to render them comparable.

The ecological footprint, with Hag as its general equivalent, tells us more than just the carbon level, since it has the same meaning everywhere. Of course the Hag itself covers multiple dimensions, such as value. Value has several meanings: exchange value, work value, utility value, and produces the added value (difference between the cost of work and the created by that work), profit (difference between the production cost and exchange value of that output).

The Hag serves to represent both human consumption and potential production, based on immediate return levels, that

¹ Louis Dumont, *Homo aequalis*, ed. Gallimard, Paris, 1977

² This indicator is that of an infinite world (Jancovici), as it is expressed in monetary unit, which is without limits

is to say without taking any account of change in the land's potential, also the change in ability to capture greenhouse gases. Thus, we may say there exists an ephemeral (i.e. synchronous) Hag, and a sustainable (i.e. diachronic) Hag, that takes deterioration and depletion of the earth's resources, water, etc, into account.

Since the unit enables us to express both annual output, through potential or actual production, as well as wealth, we might be tempted to use it for both, even though the measure of ha wealth will ultimately be made by taking account of deteriorating potential biocapacity, as Redefining Progress has started to do.

The difference between the two is the rate of usage, deterioration, depletion of stocks and wealth. No matter what its shortcomings, it is easy to see the power of this indicator which makes it possible to say we are consuming the planet 2, 3 or 5 times over, whereas our target must be to hit 1.

The question is therefore one of establishing whether we might find another indicator, which would be expressed as this general equivalent, or some other, in order to shift the trend in society towards a more sustainable condition, applying a process of positive de-growth.

Summarising indicators produce a result that may turn into a target (OPL, mass extracted, etc).

Positive expression

An indicator will be adopted only if it tells us something useful, and if changes to it appear to be positive. A reduced standard of living cannot be a *widely* shared objective – but an increase in leisure time, or open spaces preserved, can indeed be viewed positively.

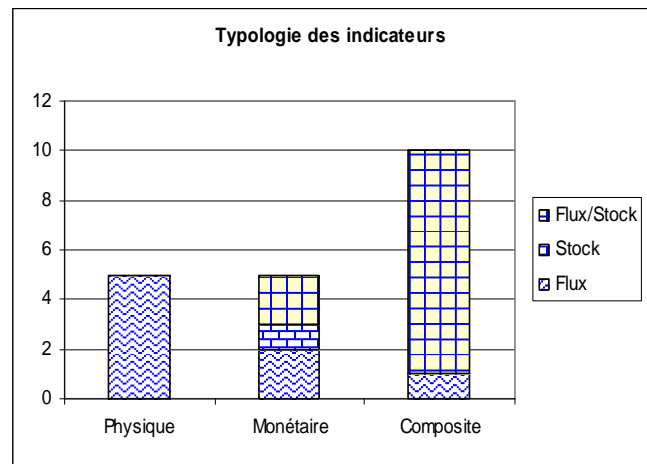
The change may also tend towards the symbolic, such as a ratio of 1 between the ecological footprint and biocapacity, notwithstanding a negative trend in the numerator, the ecological footprint in the strict sense.

Typology test

Suggested indicators are popping up everywhere. For an initial marker, we classify them by their measuring unit (physical, monetary or index) and their contents (flows or stocks). This enables us to show that of the 20 indicators used, indicators of a physical unit are all flow indicators; monetary indicators may be indicators of either flows, stocks or a mixture, while composite indices are all flow & stocks, save for one mixed indicator.

We show below our preference for indicators as an identifiable unit rather than as an index. At this point we shall add our preference for physical indicators, to the extent that monetary indicators appear generally as changes in GDP, whose construction we do not seem to have adopted as such, where conversion into a monetary unit presupposes that everything is convertible into an exchange value, whereas the option of physical units presupposes that everything can be converted into a utility value, which seems to us more appropriate.

Refer to detailed table appended.



3. Three indicators

We propose three structural indicators, namely the state of the planet at a given point in time, from the time-honoured triptych of so-called sustainable development³, driven by *relationships* between the social and the economic, the environmental and the social, the environmental and the economic (and not depending on the state of those three cornerstones, which would bring us down to an indicator of state, not one of structure).

Relationship between the social and the economic

A society whose goal is to contain expansion in the commercial sphere in the domains of both natural wealth and in interpersonal relations needs to set indicators that will express the process used, in this instance for example patterns in social bonds as opposed to economic relations, or trends in social capital/change in monetarised transactions; yet as of now we do not know how to calculate and measure the strength of social bonds⁴, nor their quality, save by highly tendentious indices, such as newspapers read, support for associations, visits to neighbours, etc.

An equivalent that is common to these two domains might be time, that is *time spent on unpaid activities/ time spent on remunerated production*. Without prejudging the quality of such time, and by setting a fixed (and no doubt arbitrary) distinction between time spent on unpaid domestic tasks that are essential and those done voluntarily (shopping, cooking, cleaning, DIY, car manufacture, child education, care of elderly relatives, etc). Whether unpaid work can be considered voluntary or not will depend on the way in which it is done: is the market-hall a more social meeting-place than the supermarket; food preparation takes time and may require calling on family labour and may aid the transfer of culinary knowledge and encourage conversation; whereas how could the act of popping deep-frozen food in a microwave ever be a means of knowledge transfer? The

³ Whatever we can think about the expression « sustainable development, we will use it here for two reasons. First to be easily understood by a public at large. Second for the application on the analysis of the relationships between the three “pillars” give us more sense than the pillars themselves.

⁴ Robert D. Putnam, *Democracies in Flux*, Oxford University Press, New-York, 2004

INSEE's occasional surveys might enable us to create and measure such an indicator.

The social /environmental relationship

The relationship between the social and environmental is very much more complex; it's an issue of man's relationship with nature, which swings between two diametrically-opposed poles – that of man as subject to nature, i.e. deep ecology⁵, whereby man is just one of many species, and what is essential is to become part of our planet and all the species inhabiting it today. At the other extreme are the creationists⁶, in whose eyes Earth was created by God for Man; this is its ultimate purpose. These two strands of thought are deeply embedded in the American psyche, whereas the division is less clear-cut in Europe. Once it is acknowledged that Man is part of nature, though admittedly a most unusual part, we need a way to measure his place on Earth, and what he should leave free for other species, not out of any ideology, but out of a simple concern for survival. Here we are not concerned with man's impact on the planet, merely his proper place. We know how to measure land consumed in catering to human needs, independently of production, absorption of greenhouse gases, or resource depletion. The principle for present purposes is that no one species can monopolise the entire surface at his pleasure without exhausting it and eventually perishing. This is why a start has been made on creating nature parks, also terrestrial and marine wildlife sanctuaries.

The environmental/economic relationship

While we have succeeded in finding a single dimension for the first two relationships (activity time and space occupied), a good definition of the dimension between economy and environment still eludes us: it raises the issue of drawing on resources for economic activity, of ecological pressures. We shall elaborate on this below, explaining why the ecological footprint seems to us to be a useful indicator.

In summary: three relationships, three indicators:

Relationships	Indicators	Dimension
Social/ economic	Time spent on non-business activities/ time spent on remunerated work	Time
Social/ environment	Area taken up in catering to human needs/ areas set aside for other species	Space
Environment/ economic	Ecological footprint: equivalent space used by man for his needs and to absorb his waste products	Space/ time

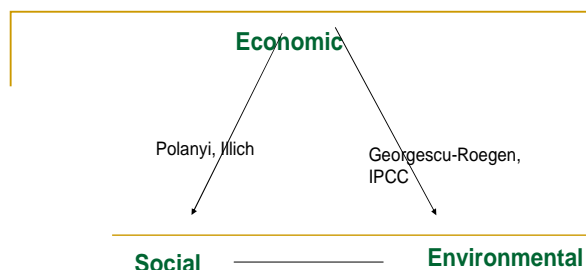
The economic bases of these relationships

Hence, this typology is a method of depicting the relationships between the three cornerstones of sustainable development, and not the cornerstones as such. These relationships can be documented in analyses of the

⁵ Illustrated for example by *Ishmael*, novel by Daniel Quinn, ed. J'ai lu 1992, Paris

⁶ Harun Yahya, *Atlas de la création*, ed. Global, 2007

social/economic relationship produced by Karl Polanyi (the disembedding of the economic from the social) or Ivan Illich (social interactions), on the economic/environmental relationship by Georgescu-Roegen (the bio-economy), plus all the work done by IPCC, and - where man's relationship with nature is concerned - they readily fall back on the use of ethical or religious precepts, but actually call for a quite different type of approach.



From disembedding to bio-economy

4. The ecological footprint

At this point we shall turn to the second part of our discussion by focusing on one of the proposed indicators.

Literature on the ecological footprint (EF) is abundant in the English-speaking world, much less so in French; and if one wants to understand the newly-appeared article in *Futuribles*, we need to place it in the context of all the reviews issued on this subject. To dispense with an inordinately lengthy review of these works, we shall get our bearings from three articles⁷, those in *Futuribles* and by a Danish Institute on one hand, and two researchers at *Redefining Progress* on the other.

Definition

We shall not describe ecological footprints at any great length here; reference can be made to the bibliography for that purpose. But we should give a reminder of its definition and method of calculation:

It is the equivalent of land required each year to:

- produce the necessities of human life,
- and to absorb human wastes (including Greenhouse gases).

⁷ Sources: **VT** Net Primary Productivity as a Basis for Ecological Footprint Analysis, Jason Venetoulis, Ph.D., John Talberth, Ph.D., *Redefining Progress*, 2005, Oakland, California ; **IM** Assessing the Ecological Footprint, Andreas Egense Jørgensen, Dorte Vigsøe, Anders Kristoffersen, Olivier Rubin, 2002, Institute for Appraisal of the Environment, Copenhagen, Denmark ; **PB** Frédéric Paul Piguët, Isabelle Blanc, Tourane Corbière-Nicollier, Suren Erkman, *L'empreinte écologique, un indicateur ambigu* (The ecological footprint: an ambiguous indicator), *Futuribles*, no. 334, October 2007.

At national level, the GFN calculates data for four types of consumption: food, housing, transport, goods and services

	Production	import	export	stocks	Consumption
Food					
Housing					
Transport					
Goods and services					

and converts these into five types of ground: Fields, Prairie, Forests, Built-up areas, Sea, Energy (forests).

	Fields	Prairie	Forests	Built-up areas	Sea	Energy (forests)
Food						
Housing						
Transport						
Goods and services						

Conversion is done by applying coefficient factors:

$EF = \text{consumption (or waste)} \times \text{conversion factor in ha} \times \text{local ha/ worldwide ha return factor} \times \text{equivalence factor for a single type of land.}$

Conversion factor: calculation of average worldwide overall productivity by type of land

For waste products: average retention capacity of forests, with an adjustment of the retention factor for oceans, depending on the proportion absorbed by oceans

Return factor: conversion of a ha of land in a given country into an average ha of land worldwide.

Equivalence factor: conversion of a given ha of a plot of land into 1 ha of average land (FAO factors by Gaez).

Criticisms

The EF has come under fire, with mutually-incompatible criticisms over its ethical foundation (does man take priority over nature?), with an intermediate position, poorly captured by the model (it's an illustrative, not a predictive model, though it can be used for simulations); at the heart of debate over the technical aspects of emission levels and carbon retention.

Criticism is useful and necessary in order to improve the model and highlight its weaknesses. In particular, the EF is currently restricted to the notion of flows of materials (annual output) and of energy over a year, without taking any account of the effects of those flows on depletion (or why there is no improvement) in wealth, and of natural capital such as the quality of water and land resources. Changes in the quality of wealth would emerge only *a-posteriori*, on the basis of findings on actual output (but not in terms of bio-capacity, since this is calculated on potential). This is an area with potential for improvement. Yet, even at its current state of advancement, the EF is a

favoured instrument for awareness-raising on ecological challenges.

Ethics

Man or nature ?

The first criticism is that the EF is predicated on an anthropocentric mindset, which treats space needed by man in the same way as CO²-capture space for the purposes of ecological balance. These criticisms come from the advocates of a more radical ecology.

Criticisms

Areas excluded from bio-capacity are the oceans as a whole, also less productive land (i.e. 36 billion ha, in other words 3/4 of the earth's surface). This therefore amounts to not taking any account of the interdependence of other components of ecosystems by counting only those areas actually colonised by Man⁸. Another criticism is its failure to set aside areas for species other than Man: the EF reflects an anthropocentric choice by excluding potential bio-centred variables, such as signs that species are facing extinction, or the collapse of ecosystems. In calculating an EF, man might theoretically use up 100% of bio-capacity with a supposedly sustainable EF, something that is nonetheless manifestly unsustainable. It is estimated that man uses around 32% of the planet's NPP (Net Primary Productivity), and 89% to 96% of the NPP of areas accessible to humans. Lastly, the use of potential agricultural production as an equivalence factor has the advantage of being available over the entire areas specified for the entire planet, and of being independent, at a given time, of the actual use of the land. Yet this too has two serious drawbacks: it measures only production that can be used (directly or indirectly) for man, and it cannot take account of areas considered as marginal (oceans and deserts).

Propositions

The first proposition is to *restrict* the scope of calculation, by not taking account of areas that produce biomass for humans, but only the carbon footprint that threatens all ecosystems, since it is this that constitutes the disequilibrium in the system. Thus, we exclude the question of land-occupation; we will treat Man as being one component of the system, just like the others. But Man is a most unusual species, who has it in his gift to preserve or destroy the planet, and really has to take some account of the way in which he occupies land. An alternative proposition is to *expand* the biomass-producing areas taken into account to cover the entire globe, using NPP and not potential production (outputs).

Potential production: What we are trying to get at in EF is bio-capacity; potential biomass production. Sources are given: equivalence factors, making it possible to calculate potential production, are derived from the FAO's index of Global Agro-Ecological Zones for 2000, and are calculated by comparing the productivity of the area under consideration against average world productivity, all areas taken together. Thus, it is indeed a measure of maximum

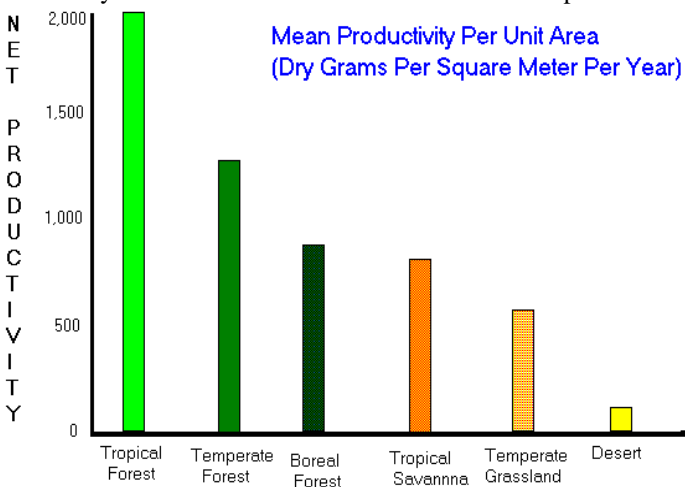
⁸ Whereas oceans (as a whole) are taken into account for the purposes of CO² absorbing capacity, since it is believed they capture 35% of CO² emitted.

potential production under existing conditions, culminating in a footprint that is globally balanced through construction, since one is reporting production at an area, without taking any account of the depletion or exhaustion of resources⁹.

A given area might be a vital place of sequestration (retention) while producing little biomass directly (oceans), a sequestration area that makes no use of biomass produced (inaccessible forests), and we can measure production by gathering either its potential yield (the agricultural option), or through the amount of carbon converted (the measure is then identical for production and sequestration).

NPP: Venetoulis and Talberth (noted VT later) propose expanding the area taken into account from areas that produce biomass to cover the entire globe, using NPP and not potential production. Potential production is confined to areas earmarked as being productive for man. Net Primary Productivity (NPP) enables us to take account of the world's entire surface, including oceans and deserts, which do not *a-priori* yield any harvest that can be used directly by man, but are valuable to other species.

NPP represents the growth in total biomass through photosynthesis over a year, and thus carbon capture after allowing for respiration (CO² discharges). *Total biomass* means we are concerned not solely with harvesting for humans, but natural conversion. For example, in the case of savannah and grassland, growth includes production above the ground, roots, plus losses brought about by the death or decay of vegetable matter over a year. It's therefore a broader definition than that of the yield, also more appropriate for getting a handle on carbon conversion, and not only in relation with its use for human consumption.



Comparisons of NPP and potential production

	Potential production	Net primary productivity
Areas	Cultivated land, prairies, fishing grounds, forests	Cultivated land, prairies, fishing grounds, forests Unproductive land, deserts, oceans (as a whole)
Biomass	Harvested	Harvested, plus underground, plus decaying or dead
Unit	T/ha	Peta Carbon/ha

⁹ This is also confirmed by the most recent FAO report on the subject: Earth potentially has the ability to feed 9 billion humans using bio-techniques.

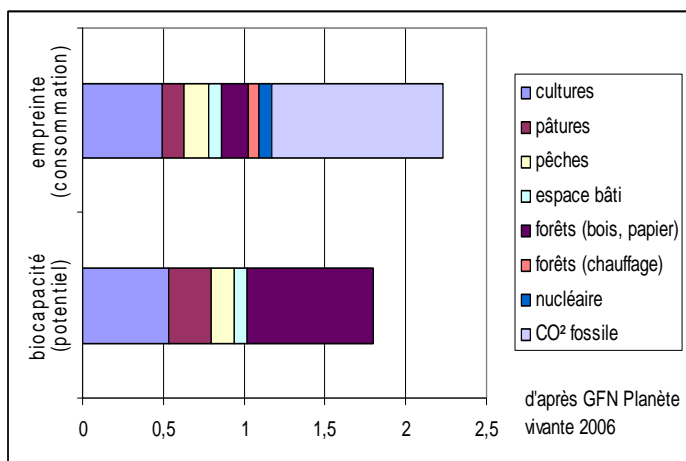
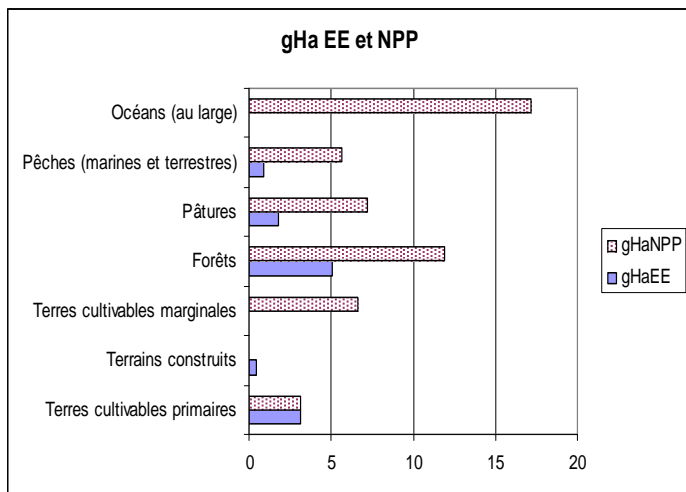
NPP usage alters the equivalence factors: the inclusion of oceans and less productive areas changes the global balance of equivalence factors from actual ha into global ha. Without going into the fine detail of the calculations here (these can be found in the cited article): because we multiply the earth's surface by 4, and oceans have a low capacity compared with typical terrestrial areas, all the other factors increase, save those for cultivated, stable land, while those of inhabited areas whose actual NPP are plainly very low, being estimated at the same level as that of oceans. However, the comparison of global ha does show two important points:

- the preponderance of oceans in carbon sequestration, i.e. 33% of total ha under this model (with 35% in the EF, the models are consistent); however, it is known that the latest scientific work on this topic shows a disquieting decline in sequestration capacity due to water acidification,
- the Hag decline in built-up areas, but this is marginal in relation to the area involved.

Bio-capacity		NPP (IPCC)			EF GAEZ (FAO)
		Planet	Oceans	Terrestrial areas	
Carbon-sequestration capacity	Gigat C/an	3	2.3	0.7	2.2 terrestrial + 35% of oceanic emissions
Areas	10 ⁹ ha	51	36.7	14.4	11.2
Average carbon sequestration rate	tC/ha/an	0.06			0.95 (only forests)
Footprint of one tonne of carbon (ha area required)	Ha	16.65			1.05 (only forests)
Bio-capacity	gHa / inhabitant	15.7 (of which 8.2 carbon)			1.9
Footprint	gHa / inhabitant	21.9			2.2
Footprint /bio-capacity		1.4			1.2

That means a footprint/ha 16 times greater, since when averaged-out over all parts of the world instead of being calculated strictly on forests, but with an absorption area 14 times greater, as it includes all areas, not just forests.

The excess is 1.4 instead of 1.2, brought about principally from the portion set aside for other species (13% of 21% discrepancy), a reduction in carbon-sequestration capacity, and by taking account of actual productivity rather than potential.



The comparison of footprint and biocapacity might lead one to think that each compartment is in equilibrium - save that of energy emissions. They are balanced in terms of mass produced, not in terms of energy. CO² emissions are to be assigned to each type of consumption.

NT proposes to set aside an area of 13.4% of each type of area in the EF for other species, which would allow 55% of species threatened with extinction to revive to numbers sufficient for them to survive. Here we have an interesting comprehensive proposition, to a point where today where we do not know to specify biodiversity.

Nature or Man?

The second criticism of an ethical nature believes the EF puts nature ahead of man, that it presents a radical-ecology option (strong sustainability), with an excessively limited view that excludes economic and social aspects. This is the view of the supporters of sustainable development. This lobby, which cannot cast doubt on the unbalanced nature of the current situation, sets great store by advances in science and technology, and is expressed primarily in criticisms of the type of model, which is too static, something we shall expand on below.

Criticisms of the model

A static model

The EF is a static concept that fails to incorporate future changes, either in terms of energy technologies and

consumption¹⁰, or in terms of natural wealth and resources. Still, time is there, but only minimally, things being equal in other respects: technology, consumption and the state of wealth and resources: *today we're using resources required by future generations*. The question of establishing whether this imbalance will worsen (depletion of wealth > technological advances) or improve (depletion of wealth < technological advances) is a subject of public debate. Criticisms of the footprint's static nature come from two opposing standpoints.

Technological progress

For the advocates of technological progress, the EF is a conservative concept that fails to take due account of potential technological advances. EF does not take account of the *possibilities* of renewable energies: this is indeed the case. But neither does it take any account of change in per-capita energy consumption, nor of the increase in population, the pace of which is currently much faster than that of improvements in energy-efficiency.

Nuclear CO² emissions were estimated up till 2008 as being equivalent to emissions from oil, for reasons that were left unexplained, but which rely on uncertainty over the effects of nuclear waste, and on the social effects of this technology: this undoubtedly overestimates the CO² effects of this energy source.

This state of affairs will change after the imminent publication of the WWF's Living Planet Report (expected in autumn 2008): the ecological footprint of nuclear-generated electricity will be treated as zero (i.e. gHa 0), whereas it has hitherto been treated as being the same as oil (i.e. 1.5 gHa in the case of France). This decision is the outcome of a considered review by a group of Global Footprint Network experts.

Impact on stocks and wealth

The advocates of a radical ecology target their criticisms at the fact that the EF is a model of flows, which fails to take account of changes in stocks (capital in the form of water, land, air, biodiversity, fish stocks, etc).

EF is indeed a model of flows that does not take account of changes in stocks (capital in the form of water, land, air, biodiversity, fish stocks, etc), and hence of unsustainable use of aquatic or terrestrial ecosystems. EF does not take any account of products or procedures that damage the biosphere (emissions of plutonium, PCB, CFC, etc), nor of the preservation of areas that are needed to preserve biodiversity. The EF does not measure whether a given area is used sustainably or not.

Thus, in 2004 the non-carbon EF was 0.94 gHa and average worldwide biocapacity of 1.74 gHa, i.e. the notional capacity for a doubling of food, fibres, timber and fish consumption without exceeding ecological limits, whereas depletion of fish stocks has in fact reached a critical level, and the level of salinisation of vulnerable soils is rising.

The EF measures a relationship between an output and a biocapacity, assessed under existing conditions. It's a indicator at a given point in time that conveys an sense of

¹⁰ To take account of the rebound effect of the increase in consumption of lower-energy products in a uniform way.

the sustainability or otherwise of our economic system, but it's not a forecast, extrapolation, nor a projection of potential biocapacity. At this point we have another dimension to add to the model. It's no good expecting a normal barometer to record *changes* in pressure: you must add a recording drum and pen. Would it be necessary to calculate biocapacity changes as a function of attacks from corrosives or decomposing agents, and to simulate the EF pressure accordingly? This would not alter the footprint (production) but rather the change in biocapacity. On this point, the EF's inventors note that¹¹ "The area used fails to take account of equivalent areas used or neutralised by pollution resulting from that output, e.g. nitrates or pesticides used in intensive farming, for want of data (not due to methodological issues). This underestimates the pressure on resources".

And then there is confusion about the indicator itself. The sustainability of usage depends on the ground's capacity; the indicator is a potential. Is it really a biocapacity value that we could assign to a depletion factor?

Nonetheless, the EF has two useful aspects for present purposes:

- it shows imbalances among countries; the EF of many countries exceeds their biocapacity, even for the non-carbon component, and it is these that need to intensify their efforts,
- worldwide, EF reaches almost double the biocapacity. Come back in a year and we'll have made great strides; it'll then be time to plug in the effects of stock-depletion. It is pointless needlessly to complicate an indicator that already makes it possible to set targets that are known to be hard to hit. To include stock effects would render the indicator unintelligible, and the target even more difficult to achieve.

A model unsuited to territorial use (application to a limited geographical area)?

According to its critics, when applying EF to geographical areas within a country¹², problems arise over the geographical expression of EF. Firstly, there is a problem over data that make the calculation reliant on individual or national data and allow nothing to emerge where specifically local factors would need to be known. The second follows from the first: it concerns the impracticability of separating out effects of policies pursued by local authorities, which weakens its strategic potency.

We are dealing above all with a theoretical criticism, but geographically-based achievements show that the footprint retains its academic relevance in characterising various

types of habitat (Midi-Pyrenees), lifestyles, production processes (the food industry in Brittany), providing that the method is explained and a process of clarification is undertaken.

Technology-based criticisms

Carbon-sequestration levels

Stabilisation of CO₂ levels is calculated only through the lack of absorption area by forests, which would result in a decrease in other areas and fails to take account of other technologies.

The issue raised by the Futuribles article is the method of converting CO₂ emissions into Hag. GFN believes that net emissions of fossil C are 5 Gt/year, i.e. 6.8 GT emitted, less 1.8 captured by the oceans. GFN believes 3.6 billion ha of forests have a sequestration capacity of 1 TC/ha/year, based on an average cut rotation of 100 years, i.e. 3.6 TC /ha/year.

The article's authors think this level is overrated, as it takes no account of emissions of CO₂ through the decay of organic matter, nor timber (and paper) products that are discarded after use. According to the authors, terrestrial sequestration capacity is put¹³ at 1.2 Gt / year, i.e. 24% of net emissions or an equivalent of 0.25 Hag, equal to a third of the forest's biocapacity. In a footnote, they value the sequestration rate of the earth's forests at 0.3 TC/ha/year, by relating the sequestered C to the forested area (1.2 GT / 3.6 Hag = 0.33TC/ha/year). Thus, it's three times less than GFN.

Our authors then address the total footprint by adding together the resource footprint calculated by the GFN and the carbon footprint, which in fact represents the requirement for forested land that is not used for resources under GFN's methodology. In perturbing the sequestration rate by a factor of 10, as the carbon footprint represents half the total footprint, we change the latter considerably. From this, they conclude that the EF is unreliable, since it is over-dependent on the calculation of sequestration rates... while this rate is at the very heart of the debate on our planet's future, and will determine the effects of the carbon footprint even more, and is a major element in maintaining the dynamic equilibrium of System Earth (see James Lovelock¹⁴).

In the view of some authors, the choice of forests as reference-point for carbon sequestration in itself invites deforestation. It is true that the basic assumptions might lead one to reckon that conversion of a ha of forest into a ha of cultivated land would increase its biocapacity, since we are taking the yield into account, and if a forest is capable of producing on average 1 to 4 tonnes per ha per year, at a cut every 10 years, in Europe one ha of cereals will produce on average 6 T/ha (or 60 hundredweight in normal units), and a ha of potatoes 80 tonnes (though the amount of inputs is not the same). Yet this criticism makes a convoluted use of the EF: the authors of the EF do indeed note that "This approach does not mean CO₂ sequestration is a solution to climate change. It illustrates what increase in the global

¹¹ National Footprint and Biocapacity Accounts 2005: The underlying calculation method, GFN, Mathis Wackernagel, Chad Monfreda, Dan Moran, Paul Wermer, Steve Goldfinger, Diana Deumling, Michael Murray, 25 May 2005.

¹² The ecological footprint: a new indicator but old approach ? Perspective and geographically-based analysis of the ecological footprint, Antoine GOXE, *Université de Lille 2, CERAPS*; Sandrine ROUSSEAU, *CLERSE, Villeneuve d'Ascq*, international symposium on geographically-based indicators of sustainable development, 1 and 2 December 2005, Maison Méditerranéenne des Sciences de L'Homme (MMSH) (Mediterranean Home of Human Sciences), Aix en Provence.

¹³ Millennium ecosystem assessment synthesis report: ecosystems and human well-being. Washington DC, Island press, 2005, vol 1, p 362

¹⁴ James Lovelock, *La terre est un être vivant* (The Earth is a living organism), ed. Flammarion, 1993

dimension would be required under a CO² sequestration scenario, even though sequestration's biological potential is constrained by space (i.e. available areas) and time (and forests planted are net sinks for several decades, until they have matured and they lose their absorption capacity)."

The notion of the Hag effectively does away with the purpose of production.

Table 1: Equivalence Factors (2001)

Bioproductive area	global hectares/ha
Cropland (overall)	= 2.1
Primary	= 2.2
Marginal	= 1.8
Pasture	= 0.5
Forest	= 1.4
Fisheries	= 0.4
Built-up area	= 2.2*
Hydropower area	= 1.0
Fossil Fuels (Forest)	= 1.4

* Note that built-up area is assumed to be located mostly on prime agricultural land. Hence built-up area has the same equivalence factor as primary cropland. For more explanations see Sec. IV in the text.

By pursuing such a use of equivalence coefficients, we might also claim that EF promotes the conversion of pasture into forests or, taking things to the absurd extreme, fishing zones into cultivated land...

Thus, the complexity is that adding biocapacities to differing types of land does not result in total substitutability. Plainly it is necessary to retain a certain diversity in types of land usage, between cultivation, pasture, forest and built-up areas. Yet again: interpretation requires calm reflection. Should we include in the EF an indicator for diversity itself or for maintaining the diversity of types of land? This might be done in an analysis, but this is not intrinsic to the indicator itself.

The question at issue is therefore the validity of the sequestration level used, not the method, as these authors assert.

Calculating biocapacity

In the EF, the equivalence factor for inhabited areas is the same as that for cultivated areas as these are, broadly speaking, created using previously-cultivated land, hence the potential (but not the production) of the area is valued at its original value.

What we are concerned with here is seeking consistency in the calculation for all areas, even if it is known that built-up areas will never return to their original state as long as there is a large human population. Its impact is low, since built-up land represents only $0.08/2.23 = 4.5\%$ of total EF.

With regard to oceans, the fishery level (inshore areas) seems overvalued against the reported change found in stocks; the assessment for fisheries is nearly in balance (7% deficit). Subject to more in-depth research into the detail of the calculations, something we have not gone into, the explanation undoubtedly lies in the principle used for EF calculations: fishery potential includes marine mammals, also a species of algae: it is calculated using trophic levels¹⁵, and thus includes biomass produced at the first

levels, which are not those that are under threat from over-fishing, which affects primarily the "higher" species. Lastly, consumption takes account only in part of fishing for fish that are then used as fish-meal. Here again we have a discrepancy over method, over the representation of the difference between potential and actual yields at a given point in time.

5. Conclusion

An indicator could be related with two purposes : describe on a way as scientific as possible the complexity of reality, and so have to take account of flows and of stocks variations, and/or explain to a population at large the situation of the planet, with some liberty with academic constraints. a pure scientific indicator you cannot simply explain is useless if you have to convince people in charge of public affairs. Better is to get a simple indicator, as the conclusion is the same, we have to reduce our consumption.

These ethical, technical and ideological criticisms demonstrate that the EF lies at the core of debate over our mode of development, that it reveals the players' strategies, favouring either a trust-in-technology view (progress will save the planet), or in favour of a radical ecologically-based option (Man is merely one species among many). Like any indicator, the EF is not all-embracing; it's oriented towards a partial target; it can be improved, provided it remains intelligible. It involves making choices that are not only technical, for example on the impact of nuclear energy, or over taking inaccessible areas into account. It enables us to set out the options available.

¹⁵ A trophic level is a state in the food-chain. The sardine, which is eaten by the cod, is therefore found at a lower level than

the cod. The footprint is calculated as a function of biomass tonnage and trophic level, since the productivity of each level increases tenfold with each change in level. Thus, a tonne of cod (trophic level 4) has a footprint 10 times greater than a tonne of sardines (trophic level 3).

Annex

	Unit	Stock flow	
Unique unit			
Ecological footprint	Physical, Hag	Flow	GFN
Energy / Carbon audit	Physical, TeC	Flow	Ademe (Energy Efficiency Office)
Eco Indicator 99	Eco-point	Flow	The ecological footprint ratio / Eco-Indicator 99 is set at 30 m ² year/ Eco-point for most products
MIPS (Material Input per Service Unit), Material-Flow Analyses	Physical, Tonnes	Flow	Application: DMC, Domestic Material Consumption). French DMC was 14.9 tonnes per capita in 2001; compiled by EUROSTAT
Green GDP	Monetary unit	Flow	It would incorporate environmental impacts incurred by subtracting the loss of natural wealth brought about by human activities, also the costs incurred in remedying those impacts, from GDP.
True saving	Monetary as % of GDP	stock	Published by the World Bank since 1990 for 140 countries, this index is equal to Gross Saving (households, companies, government departments), plus education costs, less damage to natural assets (reduced stocks of energy, minerals and forests; impacts of CO ² emissions).
Indicator of genuine progress (IPV) by Redefining Progress	Monetary	Flow & stock	IPV represents GDP, corrected to take account of "negative" growth (resource depletion and spending on the prevention of criminality) by opposing "positive" growth.
Indicators of sustainable economic well-being (IBED or ISEW), 1989	Monetary	Flow	It is based essentially on the following formula: IBED= Domestic Market Consumption (base or point of departure for the calculation) + domestic work services + public spending (not defensive) - private defensive spending - costs of environmental degradation - depreciation of natural capital + creation of productive capital. The calculation is then corrected for inequality changes (Gini coefficient) and by taking account of the difference between the monetary value of durable goods consumed by households and the value of the services they provide.
Standard-of-living indicator by Fleurbaey and Gaulier	Monetary unit	Flow & stock	GDP per capita, corrected as function of six items such as leisure time, life-expectancy while in good health, unemployment, composition of the household, etc. Each of these items is converted into an "equivalent income" for each country.
Multiple units			
NAMEA	Amount of GREENHOUSE GASES emissions and wastes...	Flow	European Commission (EUROSTAT) and by IFEN19 in France
Life-cycle analysis	("kg of CO ² equivalent for the greenhouse effect", "kg H+ equivalents for acidification", etc) and	Flow	The methodology is settled international standards of the ISO 14040 series,

	Unit	Stock flow	
	physical flows ("MJ of non-renewable energies", "of everyday waste", etc.		
Composite index			
Index of Economic Wellbeing (IBEE or ISEW, Index of Sustainable Economic Wellbeing)	Composite index	Flow & stock	Initiated in 1989 by Daly and Cobb, and subsequently perpetuated by the Friends of the Earth: the average of four indicators: consumption, stocks of wealth, inequalities and economic insecurity. Devised in 2001 by researchers at the Universities of Yale and Columbia, with the support of the World Economic Forum (Davos) Friends of the Earth and Wuppertal Institute during the 1990s. Refined in the USA in 1995 by Redefining Progress. Entails subtracting environmental and social costs from GDP, and the value of voluntary work, domestic work, education, etc, to it. Published by the PNUD (UN Development Programme) from 1990. Presented in 1996 in the magazine Challenge by the Fordham Institute, USA. France New Economic Foundation published with Friends of the Earth.
Environmental Sustainability Index	Weighted index of 76 variables		
Ecological space	Composite index		
Index of Genuine progress (IPV or GPI, Genuine Progress Indicator)	Composite index		
Human Development Index	Composite index		
Index of Social Health	Composite index		
BIP40	Composite index of 60 variables		
Happy Planet Index	Index calculated using 3 components : life-satisfaction index, ecological footprint and longevity.		
Qualitative survey			
Life Satisfaction index	survey	Stock	

Source: according to data compiled by Thierry Thouvenot / WWF, Ecological Footprint Newsletter, no. 2, November 2007 supplemented by those of the Centre of strategic analysis, Monitoring note no. 91 February 2008.

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Economic de-growth analysed in Georgescu-Roegen's theoretical framework of the Economic Process with special reference to the System of Accounts for Global Entropy Production, SAGE-P.

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Abstract

This Paper is in response to questions raised at the ESEE Conference on Economic De-Growth for Ecological Sustainability and Social Equity (Paris, 18-19 April 2008) about the efficacy of employing Georgescu-Roegen's Flow-Fund Model for the analysis of the Conference theme. The Paper is in the form of notes on the analysis of complexity, methods, and data that the author had examined in the development of an accounting language for the System of Accounts for Global Entropy Production, (SAGE-P), (Friend, 2006). Essentially, the Paper should be viewed as an outline on research notes for a Project which applies the Second Law of thermodynamics to the problematique of economic de-growth. The leitmotif is to identify of symmetries between the economic and ecosystem production function, which can then be conflated into a index number of global entropy production. De-growth can thus be reduced to a qualitative measure of entropy efficiency per unit output, defacto a use-value measure of services (an abstract accounting object) derived from the consumption of the physical stocks of low entropy. The formalism of the G-R flow-fund model is proposed as a higher order logic representation of the economic production, consumption, and capital accumulation, function fully contained within a larger-scale global ecosystem production function. The corollary is futility of examining the properties of de-growth in the language of the first order logic embedded in the System of National Accounts. The argument that degrowth is a necessary condition for ecological sustainability and social equity is left undecided by linear equation, and quantitative methods, of neoclassical economics, (Stern, 2007). It has been amply demonstrated that the model of complex systems, non-linear processes, and recursive algorithms, represent better the empirical observations of natural systems, than the metaphysics of the mechanics of utility and self-interest. This is the argument of the Paper.

1. Introduction

Historically, economic de-growth is associated with the world-wide economic collapse of the 1930s, as well as temporary conditions of recessions and/or economic mismanagement. The idea for a policy directed at 'de-growth' would, *a priori*, seem irrational until one takes a close look at what Kenneth Boulding had to say in 1949:

I shall argue that it is capital stock that we derive satisfaction, not from additions to it (production) or subtractions from it (consumption): that consumption far

from being a desideratum, is a deplorable property of the capital stock which necessitates the equally deplorable activities of production: and that the objective of economic policy should not be to maximise consumption or production, but rather minimise it, i.e. to enable us to maintain our capital stock with as little consumption and production as possible. It is not the increase in consumption or production that makes us rich, but the increase in capital, and any invention which enables us to enjoy a given stock of capital and a smaller amount of consumption and production, out-go or income, so much the gain. (Boulding, 1949: 79)

That satisfaction is derived from the service flow from stocks, an abstract duration measure of material goods life-cycle, was first proposed by Irving Fisher (1906) as the proper measure of income, (see **note 11**). The ethical principles, and the urgency of *economic de-growth*, underpinning this argument has greater currency today than 60 years ago (Daly and Cobb, 1989). The observed data on the exponential growth of the global (economic) production function and the known fixed limits to the global Commons has placed in the center of long-term economic planning the 'conditions' for sustainable economic systems, (WCED, 1987). Kozo Mayumi (2001) proposed that the only meaningful sustainable development objective is to develop appropriate policies for the minimum *rate of entropy production* that are 'socially acceptable,' and one may add here, cultural-valued, *given* the state conditions of an economy, (Friend, 2004). The circulating capital model, the theoretical foundation for Boulding's argument, has roots in the classical concept of a 'provisioning economy,' to wit:

To maintain and augment the stock which may be reserved for immediate consumption, is the sole end and purpose both of the fixed and circulating capital. It is this stock which feeds, clothes and lodges the people. Their riches or poverty depends upon the abundant or sparing supplies which those two capitals can afford to the stock reserved for immediate consumption. So great a part of the circulating capital being continually withdrawn from it, in order to be placed in the other two branches of the general stock of society; it must in its turn require continual supplies without which it would soon cease to exist. These supplies are principally drawn from three sources, the produce of the land, of mines, and of fisheries. These afford continual supplies of provisions and materials, of which part is afterwards wrought into finished work, and by which are replaced the provisions, materials and finished work continually withdrawn from circulating capital, (Smith, 1994:307).

De-growth, in its modern garb, is normally presented by the economist not as a desirable objective in itself, unless one subscribes to Schumacher's "Small is Beautiful," but as a necessity for long-term survival, *albeit* couched in the more agreeable language of sustainability, (Schumacher,1973, WCED, 1987). While the debate continues with respect to the 'technological fix' associated with the weak sustainability argument, the existence of limit functions have sufficient scientific currency for policy analysts to consider the development of an ecological footprint database which mirrors of the System of National Accounts (SNA). The author has proposed such a system of

accounts under the acronym, SAGE-P, the System of Accounts for Global Entropy Production, (Friend, 2006).

De-growth's strong argument is based on a paradox, the counter intuitive proposition, that material-energy efficiencies tend to increase, through a technology-income loop, the *entropy production* for the whole system, (Polimeni *et al*, 2008). Originally argued by Stanley Jevons (1865) in his prescient analysis of the consequence of the exhaustion of coal reserves in Britain -the *low entropy stocks* to power the machinery of the Industrial Revolution. What he noted as data was a growth population (quadrupled from from the beginning of the 19th Century), and the accelerator of the machine, (the consumption of coal increased sixteen fold over the same period). While the prediction of 'de-growth' for British economy was proven wrong historically, although perhaps only postponed, the paradox embedded on technical solutions is that of the time delay feedback loop. Indeed, Hardin's fable of the herders on the commons, individually motivated by personal gain, results not in the expected sum-zero at the limit, but in the unexpected, but tragic, sum-negative for all herders, (Hardin, 1968)¹.

2. Bioeconomics: method for the analysis of de-growth in an Economy

Georgescu-Roegen, henceforth G-R, invented bioeconomics not to further elaborate the Marshallian Mecca², but as a new discipline which combines the elements of evolutionary biology and conventional economics within a generalized analytical framework of an entropic process. While economics is concerned with an (optimum) allocation and access to *unevenly located* and *unequally appropriated resources*, bioeconomics is concerned with the emergence of 'novelty,' and inequalities that motivate, often in unpredictable ways, the evolutionary

¹ A real-world sum-negative result is the collapse of free access, open, fisheries exemplified by Newfoundland's cod fisheries. This event occurred despite the policies to control the annual catch at a sustainable yield. This is a story of 'indicators,' (i.e., fishing effort) providing a false signal for policy decision on quotas. One explanation, and perhaps the most plausible, is that the technological efficiency of fish catch increased, (e.g., installation sonar detection devices in fishing vessels), disguised the real event signals of the reproductive recruitment cycle. The policy was based on the maximum sustainable yield principle applied to steady-state systems. In a complex system a small, perhaps even unnoticed, change in one factor of production, in this case a few degree drop ocean temperature, amplified the effect, in this case the the code fisheries nutrient cycle. The false signal resulted in an over estimation of allowable fish catch, with the dire consequence of 'over fishing.'

² *The Mecca of the economist lies in economic biology rather than economic dynamics. But biological conceptions are more complex than those of mechanics; a volume on Foundations must therefore give a relatively large place to mechanical analogies; and the frequent use of the term "equilibrium," which suggests something of a statical analogy. This fact, combined with the predominant attention paid in the present volume to the normal conditions of life in the modern age, has suggested the notion that its central idea is "statical," rather than "dynamical." But in fact it is concerned throughout with the forces which cause movement: and its key-note is that of dynamics, rather than statics.* (Marshall, 1947: xiv).

process of *production, consumption* and *capital accumulation*. The central thematic is adaptation of the individual, the community, and the governing institutions not only to the increasing complexities, and scale factors exemplified in the 'exosomatic revolution,' but to the closely correlated limit function of the global ecosystem. The economic process, G-R insists, cannot be grasped by the sharp arithmomorphic schematization of mechanical laws described by the neoclassical theories of competitive markets and prices, but by the ephemeral penumbra of dialectical processes governed by the memory of the initial conditions (historical processes) and by the irrevocable Second Law of thermodynamics.

The G-R ontological argument, is that the fundamental economic distinction between the producer, consumer, and capital accumulator are not in themselves observable phenomena but socially defined. In contrast, the natural scientist collapses these socially-defined functions into a single process exemplified in an ecosystem composed of producers, consumers and decomposers, (Odum, 1975). What, indeed, is observed are *structural change*; the way objects are organized, *qualitative change*; the way objects evolve and *quantitative change*; the way objects change in population, size and volume. The general dynamics of systems is the study of complexity, (Bertalanffy, 1973). At the time G-R wrote the **Entropy Law and the Economic Process, (1971)**, the theory of complexity had not sufficiently evolved, particularly in the social sciences, to provide the necessary heuristics for an explanation of the economic process in terms of '*... emergence of new properties of dissipative structures far from equilibrium,*' (Prigogine and Stengers, 1984)³. In the absence of a well-developed science of complexity, G-R employed the dialectics of the Hegelian logic:

"... the boundaries of actual objects and, especially, events are dialectical penumbras. Precisely because it is impossible to say, for example, where the chemical process ends and where the biological process begins, even natural sciences do not have rigidly fixed and sharply drawn frontiers. ...everything tends to show that the economic domain is surrounded by a dialectical penumbra far wider than that of any natural science," (Georgescu-Roegen, 1971: 317)

³ While complexity science did not enter the language of the social sciences until a decade or so later after the 'Entropy Law...' G-R anticipated the new direction as follows: "*For I believe that what the social sciences, nay, all sciences need is not so much a new Galileo or a new Newton as a new Aristotle who would prescribe new rules for handling those notions that Logic cannot deal with... A historical precedent already exists: physicists and scientific philosophers had for a long time denied that "scientific laws" exist outside physics and chemistry, because only there did they find rigidly binding relations. Today they work hard to convince everybody that on the contrary the laws of nature are not rigid but stochastic and that the rigid law is only a limiting, hence highly special, case of the stochastic law.*" (Georgescu-Roegen, 1971:41). This new science has indeed emerged from the work of Prigogine and his colleagues, the Santa Fe Institute and has become generalised in the formalisms of the science of complexity. In this paper we use the term Second Order Logic to distinguish it from the formalisms of the First Order Logic of the Newtonian Sciences. The approach we take is to apply the concepts of mapping of functions on functions described in 'Category Theory, (Lawvere and Schanuel, 1997).

3. Entropy Production: a proposed method to measure the index of de-growth

The entropy concept, and its proxy of information decay, act both as a heuristic and a common denominator for the integration of natural and social processes. The equivalent coordinator in the conventional economic analysis is the price mechanism. The theory of the General Equilibrium System requires not only the metaphysics of the "*mechanics of utility and self interest*," but abstract formalism of *values* that are conserved-in-exchange, (Gowdy, Erickson, 2005). While this self-referencing, and bounded, system provides the powerful heuristic argument for the SNA's accounting concepts, identities, and balances, it is nonetheless disconnected to real-world events described by entropic processes.

Entropy production is a precise accounting concept of the entropic process in an isolated system. Net entropic production, while not as precise, measures the efficiency of any well-defined open thermodynamic system. The entropy concept provides a qualitative state, and change of state, measure of low entropy stocks. The net entropy production equations represent the difference between the *rate of consumption* and the *rate of production* over some well-defined time integral of the low entropy stocks, generalized for an economy as circulating capital. Note that fixed capital can only be consumed, or partially recycled, at some well-defined *rate of entropy production*, (i.e., the rate at which a low entropy stock is ultimately exhausted). The objective function, and the one central to the measure 'de-growth,' are the relative rates of *entropy efficiencies* among different economies. Note that all output of an economy that is durable is a stock of low entropy products. The nondurable output, (i.e., services), employing the Fisher-Boulding concept of income, is an abstract measure of the efficiencies of the consumption function -the equivalence of the 'utility function' in the general equilibrium system.

G-R introduced the concept of the Second Law of thermodynamics as follows:

The significant fact for the economist is that the new science of thermodynamics began as a physics of economic value and, basically, can still be regarded as such. The Entropy Law itself emerges as the most economic of all natural laws. It is in... the primary science of matter that the fundamental nonmechanistic nature of the economic process fully reveals itself (Georgescu-Roegen, 1971: 3)

While the ecosystem-economy integration is implicit in the entropy law, G-R points to the dependency of human well-being on the qualities of 'ecosystem fund' firmly anchored to the fixed area of the Earth's surface and the capacity to capture the influx of solar energy, (i.e., primary productivity of the biosphere). The *nonmechanistic nature of the economic process* is revealed in the higher order logic of the evolutionary and qualitative descriptions of the 'fund' in which the 'economy' draws from, and replenishes, at its rate of consumption, (i.e., entropy production).

The statistical coordinates of the System of National Accounts, (SNA)⁴ are based on first order logic systems,

⁴ Here, it should be noted, that the SNA is a purpose-driven set

(i.e., linear equations of a homogeneous function of the first degree)⁵. The Stone stock-flow method employs comparative statics in the flow matrices, and net-valued balance sheets in the stock matrices, to assess qualitative changes in an economy, (UN, 1968)⁶. At the core SNA is the I/O matrix, a mapping of objects on objects. The coefficients of the production function is the ratio of inputs, to the outputs, valued at the gross revenue of the industry column. Thus, represented as the economic process is a set of linear equations of the coefficients expressing material inputs, factors of production, land, labour and capital and a gross, market-valued, output. The net industry product is the measure of 'surplus' of an economy, and given the moniker, value added. This linear organization of the data, primarily economic statistical time series, was brilliantly conceived by Stone as a series of balance sheets on production, consumption, accumulation and trade with the rest-of-the-world. Given the data processing capacities of the of the period, circa 1950s and 60s, this comparative statics of the economic process was a great achievement, and for which Richard Stone received the Noble Memorial Prize for Economics, (1984).

The data restriction to the Stone matrix no longer holds. Dynamic system modeling can now be feasibly represented

of accounts, rather than a neutral statement on the prosperity and well-being of the Nation. Indeed, the method provides support for the 'ideology' of the market economy, serving the interests of both government and business. Along the same vein as the System of Material Product Accounts (SMPA) served the interests of the central planner in the former socialist countries. The language used in interpret economic statistics as depicted in the national aggregates of GDP is deeply propagandist with the flagrant claim that 'business' create wealth, jobs and the good life. It was Schumpeter who noted, although he was certainly not the first, think of Malthus, Ricardo and Marx, that economic growth is a complex creative-destructive process, (Schumpeter, 1934). The equations representing zero-sum result are simply left out of the SNA balances. The data, at least on the environmental side, are relegated to the System of Environmental and Economic Accounts, (SEEA), (UN, 2003). The latter, despite its reference as an 'integrated system' of economic and environmental statistics, are simply a set of modular accounts of uncoordinated coefficients, (Bartelmus, 2004, Friend 2005).

⁵ G-R distinguished the linear, from the non-linear, equations in the economic growth model. While the latter change form over time, and are thus 'qualitative' in nature, the former merely expands/contracts the same phenomenon over time, and thus 'quantitative' in nature, (Georgescu-Roegen, 1971:105). The importance of this distinction arises in combining the quantitative (change-in-size) variable with the qualitative variable (change-in-form), to describe a complex process of change in qualities. This observation contradicts the traditional linear assumptions of being 'better-off' in growth-in-income, and indeed reflects the reality that change-in-form is a change in the qualitative states in the system. Whether one is better, or worse, off can only be decided by ordinal measures of a set of indicators, which by their very nature are non-aggregative.

⁶ It should be noted that the SNA data represent price-values assigned to material goods and immaterial services. In entropy accounting the latter represent *abstract objects* that are consumed the instant produced, whereas the former represent *physical objects* that are consumed over a time interval. The equivalent value-added is the efficiency measure obtained by the difference between rate of consumption (i.e., service flow from stocks) and the rate of entropy production, (i.e., least cost of entropy per unit of consumption).

by algorithms for mapping of natural systems real space-time events on formal systems, (Rosen, 1991). While familiar with weather mapping, these computerized, automated, systems can be extended to any data processing of real-time, continuous data streams⁷. The exponential growth computerization of data has changed the very nature of statistics and large-scale modeling of macro-events, among which is the global climate change model constructed from ice-core data, historical readings of temperature change, remote sensing data, as well as social and economic databases. While the *digital economy*, the *age of networked intelligence*, is part of the day-to-day language of business and governments, the SNA is still constructed from the old analog method of surveys and questionnaires.

4. De-growth and the analysis of quantitative/qualitative change in an economy

The neoclassical analysis of 'de-growth' assumes the linear (monotonic) inverse function of economic growth. Ecological economics analysis combines the quantitative volume measure of economic activity, (i.e., the goods and services produced by an economy) with a measure of the non-linear, qualitative, change-in-form of an economy. This is represented analytically in terms of *ordinal values* and connected to *formal causes of change*, for instance

⁷ The concept of a continuous data stream is indeed what happens when one enters information that can be meaningfully interpreted and organized by the reading head of a computer and stored in memory. The *Turing machine*, a mathematical object invented by Allan Turing (1936), enables by means of an algorithmic feedback loop prediction (output) of the next piece of data in the input time series. It was contended that these prediction were equivalent to human intelligence, insofar as the answer from the machine and the human was indistinguishable. The study of mathematical methods to predict the next value in the data series is known as 'algorithmic learning theory: "*The basic situation studied by algorithmic learning theorists is simple. The learner is situated in an environment that presents a potentially unending stream of inputs. Computer scientists often think of a learner as a Turing machine. We do not have to make this assumption. A learner which is not a Turing machine is called a general learner. Some question is posed (the theory does not ask how). In interesting empirical questions, the right answer is not known in advance because the learner does not know in advance which input stream he, or she, is receiving inputs from, although he, or she, might have some background knowledge about its nature. A learning function maps finite sequences of inputs to possible answers to the question (or, more generally, to degrees of belief in possible answers). The learning functions entertained may be restricted either by feasibility (e.g., Turing computability) or by method (e.g., production only of answers consistent with the current data). Any such restriction is called a strategy. A learning function converges to the truth in an input stream just in case it stabilizes, in some specified sense, to the state of producing the right answer to the question in that input stream. An empirical problem consists of a choice of question and knowledge. A learning function solves a given problem according to a given sense of convergence just in case it converges (in the specified sense) to a correct answer in each input stream that satisfies background knowledge. Solutions to a problem can also be compared by efficiency, measured in terms of number of errors, number of mind-changes (changes of output), or total elapsed time prior to convergence to the truth, an idea already proposed by Putnam. That's all there is to it!"* (Friend: 2007)

change of behaviour of consumers either spontaneously or as a result of policies. The measures of quantitative change are cardinal values associated with *material causes*, for instance effect of climate change, and/or *efficient causes*, for instance the effect of technological change. It should be noted that the Aristotelian hierarchy, the *final cause* is reserved to the metaphysical realm of abstract objects, such as values, ethics, aesthetics and purpose-driven motives -the mechanics of utility and self-interest⁸.

The proposition that *de-growth* is a measure quantitative/qualitative measure of an economy requires further elaboration. The SNA, as already noted above, is a strictly cardinal measure of the economy. The qualitative measures enter the analysis of the SNA aggregates as associated, and in some case correlated, social and environmental indicators. By employing the conventional statistical methods, it can be demonstrated that additional quantitative growth in an economy leads to qualitative decline in the human welfare function and, with even stronger scientific evidence, the degradation of ecosystem functions. The problem, and the one that has plagued the argument for de-growth, is that association, even with strong sortions, are probability functions, and from the perspective of an political electoral agenda, are not sufficiently compelling to introduce policies (i.e., formal causes) to change-the-form of the economy. This may indeed happen, as it usually does, by forces external to the economic plan.

SAGE-P integrates, or more accurately, conflates the quantitative/qualitative statistical data series into a higher order functional form. In other words, a space-time mapping of economic data (quantitative) on environmental and/or social data (qualitative). While the methods are based on complex algorithms which map recursive functions on recursive functions, the critical distinction between cardinal and ordinal accounting is in the formalism of statistical time series, (Rosen, 1991)⁹. The latter are

⁸ Note that the *final cause* in the neoclassical analytical framework, while purpose-driven, relies on metaphysics embedded in rational choices, that include, *inter alia*, the individual utility function, or even the more ephemeral social welfare function. The rationale for economic behaviour requires the invention of the *Homo economicus* and the complex statistical mechanics of the Hamiltonian field equations, (Mirowski, 1989). The latter, adopts the energy efficiencies from the Newtonian least action equations and represents these as the conserved value principle embedded in *prices* of a competitive market economy. There is indeed an 'entropy trap,' referred to as the Jevons paradox, in the deductive logic of conservation principles applied to the rates of material-energy consumption per unit output, (Polimeni *et al*, 2008). In SAGE-P eschews the mechanical efficiencies of the neoclassical for the holistic concepts of *entropy efficiencies* of any well-defined economic process. Thus, value-conserved is entailed by *entropy production* per unit output. Moreover, while the neoclassical import as endogenous variables the efficiency criteria in the the general equilibrium system, entropy production is endogenised in the economic process matrix itself.

⁹ Robert Rosen explains the statistical chronicles as follows:

To the (applied) mathematician, and to the statistician, a chronicle is simply a time series. It is thus a way of associating events, or attributes of events, with numbers (instant of time)... In formal terms a chronicle is a mapping from numbers to events, or their attributes; for simplicity, we can even suppose it to be a completely formal mapping from numbers to numbers, (Rosen,

ordered observations of measured events, identified to specific time intervals, such as the week, the month, the year or a decennial census, whereas former are chronicles of ordered events which change form over time and space. The critical assumption of the traditional time series, and rarely true, is that the 'event' measured is the same as in the past, and will continue to be the same in the future. While traditional time series will continue to be part of the database of SAGE-P, the introduction of chronicle time series, such as remote sensing data from Landsat, permits the integration of quantitative/qualitative data into any well-defined dynamic process.

While measures of de-growth are usually associated with decline in material-energy consumption of an economy, the measure of economic activity includes accounting objects that have no material content. This component of the SNA is referred to as the tertiary sector, or services, in which the output is an abstract, non-material accounting object. In classical analysis the non-tangible output is assigned the non-productive, *albiet* necessary component part of an economy¹⁰. The argument that since services are consumed the instant produced, (i.e., no duration) then it could not be measured in either the fixed, and/or circulating capital of the 'provisioning economy.' SAGE-P resolves this problem by making a very clear distinction between *abstract* from *physical* accounting object. A concept that can be extended to functions, or example education, the passing from one generation to the next of knowledge. The accounts can be ordered in such a way as to group the physical objects at one extreme of the I/O accounting matrix, (e.g., primary production), the abstract objects at the other extreme, (e.g., service production) and the rest with varying degrees of abstract/physical objects in the middle, (i.e., manufacturing). Entropy production accounts returns to the classical conception of services, where only the *material causes* should be counted into the national product.

The abstract output of an economy does not disappear into the void of entropy accounts, but reappear in the hierarchical structure of *efficient* (instrumental), *formal* (policy) and *final* (purpose) *causes*. Thus, while the accumulation of financial capital is a purely abstract accounting object, it represents the capacity to change the state of the environment by instrumental means. The allocation decision of the owners of capital for their investment portfolios is assigned in the entropy accounts as

1991:69).

¹⁰ Adam Smith, while clearly understanding the qualitative dimension of 'services' in an economy, could give it no value in the national dividend -which is composed only of material goods. In his words: "*The labour of some of the most respectable orders in society is, like that of the menial servants, unproductive of any value, and does not fix or realize itself in any permanent subject, or vendible commodity, which endures after labour is past, and for which an equal quantity of labour can be procured. The sovereign, for example, with all the officers both of justice and war who serve under him, the whole army and navy, are unproductive labourers.... In the same class must be ranked, some both of the gravest and most important, and some of the most frivolous professions; churchmen, lawyers, physicians, men of letters of all kinds; players, buffoons, musicians, opera-singers, opera-dancers, &c. ... Like the declamation of the actor, the harangue of the orator, or the tune of the musician, the work of all of them perish the very instance of its production,*" (Smith, 1994:361).

a *formal cause*, and motivation, to increase the accumulation of financial assets, is assigned a *final cause*. The outcome of this analysis suggests that while a de-growth must be a measure of the *material causes*, in the classical sense of the term, the policy must be directed towards the higher order causes, *efficient, formal and final*.

5. The Entropy Law and the analysis of the de-growth function in an economy

G-R deep insight, and revolutionary idea, is to see the symmetric relationship of the entropy law, (physical concept), as a basic value law of economics -the *irrevocable hand* of Nature on the economic process. The condition for this to work requires that the boundaries of the analytical frame to be drawn on the principles, and regulatory processes, of thermodynamics. The classical theory of value is based on the transformation of bound to kinetic energy (work). While initially articulated as the labour theory of value, later expanded by Marx to include the material foundation of social organization, G-R extended the entropy value-law to the analysis of innovation, evolution, and time. The latter being treated as a *factor of production* for non-tangible (economic) objects, (i.e., the inflow/outflow of services in any well-defined thermodynamic productions function).

The economic process, like all living organism, feeds off negative entropy, (i.e., low entropy stocks), which indeed may be represented as a local reversal of the entropy at some unknown cost of a greater degree of *entropy productions* in the universe as a whole. Also, entropy being an ordinal, rather than a cardinal, measure of organization of an entropic system, of the economic aggregates assumes a qualitative dimension. In other words, the transformation of GDP from a cardinal, to and ordinal measure. Thus, while entropy is a precise measure with respect to absolute temperature in an isolated system, it has been generalized for the measure of the qualitative state conditions of the system, such as productivity and robustness in face of stress factors. The accounting of low entropy stocks, in the words of G-R is: "*... an index of the relative amount of bound energy in an isolated structure or, more precisely, how evenly the energy is distributed in such a structure. In other words, high entropy means a structure in which most, or all energy is bound, and low entropy, a structure in which the opposite is true,*" (Georgescu-Roegen, 1971:5).

Described in the G-R Flow-Fund Model is a system of partial processes, constructed from still more elementary processes, which are a dependent function of the 'Fund.' The latter is an analytical construct of any well defined *low entropy stocks* - natural capital (N), composed on non-renewable (N') and renewable (N'') natural resources, land as space with various qualities (L), human-made capital (K), and Homo sapiens (H). The boundary conditions of the process define the *inflow* -non-renewable natural resources (n'), renewable natural resources, (n''), human-made material products, (e), non-material products, or services (e'), and ecosystem services (e''') and the *outflow* - waste residuals, (w), and desired product output (q), which is composed of tangible product, (q') and non-tangible product, (q''). The Fund, in its largest state condition, is the

Earth itself with the inflow of solar-energy and the outflow of heat dissipation.

The entropy production space (S) defines an organized, dissipative, structure (or entity), identified by its accounting *objects, functions*, and, depending on the study objectives, higher order *purpose*, for instance policy analysis. The latter implies a purely abstract analytical frame of *formal/final causes*, (e.g., national economy) whereas the former implies an 'entropy production space define by *material/efficient causes*. An open thermodynamic system, defined by its boundary conditions of a partial process, exchange matter and energy with its ambient environment¹¹. This may be expressed as a definite flow quantity, over a time interval, across some well-defined boundary, $d_e S(t_0 - t_1)$, and distinguished from the entropy produced within the system, $d_i S(t_0 - t_1)$, over the same time interval. The difference between $d_i S$ and $d_e S$ describe the net rate of dissipation of system structure, which can be positive, or surplus, $d_i S - d_e S > 0 (t_0 - t_1)$, negative, or deficit, $d_i S - d_e S < 0 (t_0 - t_1)$, or steady-state or equality, $d_i S - d_e S = 0 (t_0 - t_1)$.

Entropy production of any analytically-defined economic process may be distinguished by *internal coefficients*, characterized as circulating capital, land, labour and capital, these also represent the *factors of production* and by *external coefficients*, characterized as *inflows* of materials and energy consumed and *outflows* of products produced + waste residuals. Here, it should be noted that during the process of production the output is classified to the category of high entropy products, once finished, the end-product of the process, the output is classified to the category of low entropy stocks. In this way the output replenishes the stock of used-up circulating capital. While the internal coefficients of 'entropy production' are accountable in the SNA as payments to factors of production, wages, rent, royalties, interest and the cost of material and energy, the external coefficients represent the externalities of production are ignored. Thus, the category of pollution loads, natural resource depletion and the feedback loop of the consumption function on land-use change, energy and material consumption are given as external to the production function as depicted in the SNA. Entropy accounting endogenise the pollution, resource, land-use variables through associated external coefficients. In other words, the production function (neg-entropy) and the consumption function (entropy) conflate into a single partial process in the Flow-Fund Model.

If the total quantity of entropy production of a given partial process is given the value 1, then ratio between the internal

and external coefficients, $d_i S/d_e S$, becomes a function of the boundary conditions. Ultimately, at the limit, the global economy's 'entropy production' is internalized in the larger-scale ecosystems, and the balance equations expressed as a steady-state rate of inflow of *solar energy*, and rate of outflow of *heat dissipation*. Indeed, climate change, the so-called greenhouse effect, implies a human-contributed component to the balance equations of the solar inputs and heat dissipation output. The problem, and indeed a great deal of confusion arises in the public mind, from the dichotomy between natural, and human-controlled process. The position taken in entropy accounting is to assume a dialectic penumbra representing at one end the primary production functions, agriculture, forestry, fisheries and mining, and, at the other, service industries. While the latter has no direct physical entropy production, *albeit* subject to information decay, associated with the *formal and/or final causes*, there exists entropy production function associated with the *material and/or efficient causes*, such as the heating-cooling of buildings, travel to work, maintenance of computer equipment and so forth, which is the internal input function independent of output, $d_i S$.

6. The G-R Flow-Fund Model, (FFM), a method of representation of de-growth in the production function

The neoclassical concept of the production function, as expressed by Samuelson, is that of a catalogue of all recipes found in a cookbook of the prevailing state of the art for obtaining a *given* product out of *given* factors (Samuelson, 1947). G-R observed that this static vision, while a useful heuristic device for developing the Leontief I/O matrix of an economy, had no explanatory value qualitative change of the *production process*. The latter are *given* as exogenous variables in the analytical framework. A production function envisaged in FFM is defined as the *process* that *participates* in the Fund. The concept of participation is that of an *entropic process* (i.e., active elements) to describe the Fund's change in its state condition. Note that the Fund itself, is a stock of (available) low entropy, and thus represents analytically the *passive element* of the production process¹².

The G-R representation of *process* is exactly that of Samuelson's cookbook of the list of ingredients and its quantities, but expands the concept to include combinations, mixing, cooking time and heat temperature. While these properties of *process* can be described by the external inflow/outflow equations (i.e., list of ingredients) and the internal qualitative change of the entropy algorithm,

¹¹ The condition that the 'process' must be partial is necessary for analytical purposes. It is obvious that the 'whole' by definition has no boundary, (i.e., an entity in itself). However, since we are concerned here with hierarchical structured systems, what is a whole in one analytical order, becomes a component part in another analytical order and so forth into an infinite regress. While in straight (or linear) taxonomic systems the objects are clearly defined by rank order, such as the standard industrial classification (SIC) of the SNA, the analytical order in complex, non-linear systems, the taxonomic, such the hierarchical structure of global ecosystems, are best described as 'process' networks where 'rank order' is merely an analytical device related to the scale of the analysis.

¹² The concept of 'passive' is merely analytical. G-R conflates flow into the fund by defining *flow* as a *stock over a stretch of time*. This is consistent with Fisher's concept that the fund is a stock at instant in time, and flows represent the abstract 'services' from the fund over period of time. This is made explicit in Fisher's theory of income: "Income has already been defined as a *flow through a period of time and not, like capital, as a fund at an instant in time, and as consisting of abstract services and not, like capital, of concrete wealth. The income from any instrument is thus the flow of services rendered by the instrument. The income of a community is the total flow of services from all its instruments. The income of an individual is the flow of services yielded to him from his property*" (Fisher, 1906)

the residual 'black box' is the real-time molecular-chemical processes of cooking which changes the qualities of the finished product¹³. However, the size of the black box is relative to the analytical description of the boundary conditions of the process, the smallest unit being the elementary process in which the inflow and outflows can be recorded. For the analyst the choice of elementary process depends not only on the data, but appropriateness to the component parts of the analytical (entropy) space. SNA defines the elementary processes by the standard industrial classification, and the accounting objects by the standard commodity classification. The 'entropy space' to be analysed is thus the national economy as defined by the national statistical office.

A partial process is defined by its *flow elements* $E_i(t)$, the boundary conditions which separate the part from the whole, and by the participation of the *low entropy stocks*, $S_\alpha(t)$ defined inside the process boundaries. The latter, represent the *agents* of the process, referred to in the traditional context as the factors of production, labour, land and capital, and the former the *elements* acted upon. The participation of a fund is not necessarily continuous stream, as for example a weather system, and may be characterized with periods of idleness, periods of different intensities and, above all, periods of different qualities. The labour fund, for instance, may be characterized by the average work week and holidays, the daily hours of work, periods of involuntary full, or partial, unemployment and differential skills and motivation factors such as average earnings. This general concept of elements (i.e., objects) participating in a fund, (i.e., functions) allows for an analytical representation (a) which may expand, contract, and change in qualities, yet represent the same process over some well-defined time integral.

Processes may also be defined at different levels of the hierarchical structure of any well-defined complex adaptive system, $S_\alpha(t)$. The *flow elements* are increasingly endogenised in the analytical representation as it expands horizontally over geometric space and/or vertically over hierarchical structured space. The exogenisation of the flow elements represents a reverse process as the system contracts geometrically and/or is simplified in its complexity of structures. Shown in **Figure 1**, is the representation of $S_\alpha(t)$ as the whole Earth with one inflow element, solar radiation, and one outflow element, heat dissipation. **Figure 2**, illustrates equivalencies in spatial-hierarchical structures. Column 1 represents horizontal structure classified to biological processes, starting with the basic element of the cell and ending holistic complex structure of the Biosphere. Column 2,

while more arbitrarily defined, shows a hierarchical nested structure of ecosystems.

G-R presented the essence of the analytical coordinates of a *partial process* as follow:

While the *flow elements* enter, and exit, the *fund element* efficiency remains intact during the process. Specifically, we can represent the participation of a fund C^α by a single function $S_\alpha(t)$ showing the amount of services of C^α up to the time t . $0 \leq t \leq T$. The analytical presentation of a process can thus be written: $[E_i(t); S_\alpha(t)]$ i subscript represents input or output and α represents both inputs and outputs.

At this juncture, analysis must make some additional heroic steps all aimed at assuming away dialectical quality. Discretely distinct qualities are still admitted into the picture as long as their number is finite and each one is cardinally measurable. If we denote the elements that may cross the boundary of a given process by $C_1, C_2, C_3, \dots, C_m$, the analytical description is *complete* if for every C_i we have determined two non-decreasing functions $F_i(t)$ and $G_i(t)$, the first showing the cumulative input, the second, the cumulative output of C_i up to the time (t) . Naturally, these functions must be defined over the entire duration of the process which may be always represented by a closed time interval such as $[0, T]$. The question of whether this analytical model is operational outside paper-and-pencil operations cannot be decided without an examination of the nature of the elements usually found in actual processes. Such an examination reveals that there exists numerous elements for which either $F_i(t)$ or $G_i(t)$ is identically null for the entire duration of the process. Solar energy is a typical example which is only an input for any terrestrial process. The various materials ordinarily covered by the term "waste" are clear examples of elements which are only outputs. In all these cases, we may simplify the analytical picture by representing each element by one coordinate only, namely, by

$$(1) \quad E_i(t) = G_i(t) - F_i(t)$$

For an output element $E_i(t) = G_i(t) - 0$; for an input element, $E_i(t) = -F_i(t) \leq 0$. The sign of $E_i(t)$ suffices to tell which is actually the case. (G-R,1971:215)

G-R further distinguishes $E_i(t)$ which are (basic) elements necessary to maintain the production cycle at steady-state, (e.g., seeds \varnothing crops) and $E_i(t)$ which are (non-basic) elements that are surplus available for consumption, $E_i(t) = G_i(t) - F_i(t) \geq 0$.

¹³ The process boundaries are well-described by the flow variables as follows: "Because analysis must renounce the idea of including in the description of the process what happens either inside or outside it, the problem of describing the happening associated with a process reduces to recording only what crosses the boundary. For convenience, we may refer to the elements that crossing the boundary from the environment as an input and to any element crossing it the opposite direction as an output." (Georgescu-Roegen, 1971:215).

Some concluding remarks with respect to employing FFM as the analytical frame for 'de-growth.

Kyoto Targets:

A major error of the Kyoto Accord was to formulate climate change policy on compliance to target reductions of GHG, or the *material cause* rather than target reductions of *entropy production* or the *efficient cause*. While the former focuses on the the *production functions* and the responsibility of the producers to design the low 'carbon economy,' the latter focuses on the consumption function and directs responsibility to change of behaviour of the consumer.

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Bonheurs de la décroissance

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« *Est pauvre celui qui n'a personne* » - Proverbe wolof - Sénégal

Dans les faits l'économie ne s'intéresse que de très loin au bonheur. Ce dernier doit être le résultat d'une optimisation des pratiques de production et de consommation des acteurs. En fait, l'économisme ne prend en compte l'humain qu'à travers ses fonctions économiques. L'approche néo-classique de l'économie a réduit l'homme à un "Homo economicus". Un peu comme si la consommation devenait le palliatif à la perte des valeurs humaines : « produisez, consommez et vous serez heureux... ! ».

La pensée économiciste s'inscrit, en effet, autour des hypothèses suivantes :

- tous les agents économiques agissent rationnellement ;
- de manière égoïste, ils recherchent leur satisfaction personnelle et l'addition de ces intérêts particuliers doit permettre l'intérêt général ;
- l'avantage propre et la rationalité sont un acquis partagé par tous ;
- Or, de nombreuses études psychologiques et sociologiques ont montré que tous les agents économiques :
- n'agissent pas toujours rationnellement ou que la poursuite effrénée de la rationalité peut entraîner l'irrationnel écologique et social qui nécessite une réaction vers une société de décroissance ;
- ne cherchent pas seulement la maximisation de leur avantage matériel propre et que des préférences sociales peuvent prévaloir...

Face à ce constat, le bonheur est tout autre chose : c'est un état d'esprit. Une capacité individuelle à réagir, à positiver, à influencer sur une réalité matérielle pas toujours idéale. Le bonheur ne se décrète pas, il se vit. Il est la réponse à ce besoin d'humanité qui est chevillé à notre mortalité.

Alors quels sont les liens entre économie et bonheur ?

On sent bien que l'absence de moyens économiques réduit l'humain à de nombreuses difficultés et notre connaissance des Country en développement en est le meilleur éclairage. Mais en même temps, l'existence et plus encore l'abondance de moyens financiers ne constitue pas pour autant une garantie de bonheur. Dans les Country développés, la maison la mieux équipée n'assure pas, à elle seule, l'existence d'un bonheur partagé. Au contraire, elle peut-être la matérialisation d'une remise en question des valeurs humaines fondamentales (amour, respect de l'autre...).

Enfin, l'économie ne semble affecter le bonheur que de manière indirecte. En effet, l'argent permet d'acquérir :

- Une maison mais pas un foyer
- Un lit mais pas le sommeil
- Une montre mais pas le temps
- Des livres mais pas la connaissance
- Un plaisir sexuel mais pas l'amour
- Un repas mais pas la convivialité
- Un service mais pas l'amitié...

En un mot, il permet de tout acquérir sauf l'essentiel ! Bâtir une société sur cette illusion est le tour de force du capitalisme qui n'a pas hésité à utiliser les médias et la domination symbolique pour l'imposer.

Alors, face à cette relation très ambiguë entre économie et bonheur, je vais développer 2 exemples que j'ai rencontrés lors de mes pratiques professionnelles. Exemples de terrain qui montrent combien la relation entre économie et bonheur est complexe. Ces deux exemples formeront l'ossature de ma présentation :

Etude sur le quartier populaire Paul Valéry à Montpellier en 2000 dans le cadre d'un enseignement à l'Institut Régional des Travailleurs Sociaux (IRTS) du Languedoc Roussillon

Création de l'atelier des savoirs populaires à l'Université populaire Montpellier Méditerranée en 2007

Etude sur le quartier populaire Paul Valéry à Montpellier en 2000

En 2000, avec une quinzaine d'étudiants de l'Institut Régional des Travailleurs Sociaux (IRTS) j'ai mené une étude sur le quartier Paul Valéry à Montpellier.

Il s'agissait de montrer comment les habitants de ce territoire se déplaçaient.

Or, à première vue, les études statistiques préliminaires nous révélaient une situation peu reluisante. Si l'on ne prenait en compte que la perception économique du quartier, il n'y avait pas de doute : ce territoire était sinistré... Si l'on s'en tenait à cette lecture, il n'y avait pas de doute, la population manquait de l'essentiel puisque ses revenus étaient des plus précaires : + de 40 % de chômage, fort pourcentage de minimas sociaux...

L'économiste ne pouvait y voir que de la déprime et le citoyen le renforcement de ses représentations concernant les quartiers populaires.

Mais une observation plus fine nous a montré que la réalité était toute autre.

Nous nous sommes installés à partir de 7h du matin à la sortie des immeubles. Nous y avons observé un déplacement important d'hommes relativement jeunes avec des glacières bleues qui se rendaient sur des chantiers extérieurs à la cité.

Vers 9 h, un groupe d'hommes en bleus de travail accueillait des automobiles pour des réparations réalisées sur le parking de la cité.

Après une période plus calme, autour de 16h, un coiffeur informel est arrivé avec sa mallette. Les jeunes présents

l'ont suivi. Ils se sont rendus en sous sol dans un garage aménagé en salon de coiffure. Tous n'étaient pas là pour se faire coiffer mais, pour rencontrer les copains et échafauder « des plans » pour la soirée à venir. Les déplacements ne pouvaient, en effet, se concevoir individuellement. Les jeunes du quartier ne s'accordaient le droit de sortir de la cité que de manière collective. Le groupe et la reconnaissance qu'ils accordaient à chacun était la meilleure garantie pour traverser les territoires jugés hostiles qui entouraient la cité.

Un peu plus tard dans la soirée, nous avons rencontré une vieille dame au minimum vieillesse qui a pris le temps de nous raconter son vécu. Elle vendait des glaces aux enfants de la cité depuis des années. Elle faisait, elle-même, les produits glacés et les écoulait à un prix très attractif. Cela lui permettait certes d'arrondir ses fins de mois mais le plus important est qu'elle retrouvait dans cette pratique ce qui lui manquait le plus c'est-à-dire la reconnaissance. « *Ici, tout le monde me connaît me salue ; il faut dire que c'est moi qui leur vendait les glaces quand ils étaient petits* ». De cette reconnaissance naissait le bonheur de vivre dans une communauté où elle avait trouvé sa place. L'argent gagné grâce à cette activité informelle était réchauffé par la relation humaine. Cette activité lui donnait identité, dignité. Par ailleurs, l'argent des minimas sociaux était refroidi par le caractère impersonnel des institutions redistributives.

Dans les quartiers populaires et ailleurs, ces formes d'accommodation[□] sont souvent la réalité des individus en situation de difficultés face au marché du travail officiel. De manière stratégique, sous forme de complément et de choix de vie, les individus utilisent souvent le secteur informel comme un appoint financier mais aussi pour une meilleure reconnaissance sur leurs lieux de vie. A ce moment là, le paradigme du Don/Contre don[□] est aussi à prendre en compte. Il intègre chacun de nous dans un réseau de connaissance avec un potentiel de savoir et de savoir faire qui permettent, en dehors du monétaire, de satisfaire certains besoins. On perçoit bien là le caractère pluriel de l'économie. L'économie de la réciprocité appartenant à la richesse anthropologique des peuples.

Par ailleurs, à la suite des travaux de Durkheim[□], nous pouvons mettre en avant le concept d'anomie comme fracture essentielle de la relation humaine, cette exclusion, étant selon l'auteur, un des éléments explicatifs du suicide. Le fait de ne pas exister dans le regard de l'autre me renvoie à mon inutilité à ma « non existence » dans le groupe social dans lequel je vis.

Par ailleurs, chez Bourdieu[□], le capital social appartient au concept d'habitus. Mes connaissances, mes relations sont les fondements d'une inscription dans des réseaux qui sont autant de lieux d'expression de mon identité et d'affirmation de mon existence. Cette richesse relationnelle permet à l'individu de bâtir son existence, de trouver une place dans un collectif sensé lui assurer une reconnaissance. C'est cette richesse sociale que l'on perçoit lorsque l'on voyage dans les Country du sud au contact de la population[□]. Ils n'ont pas toujours tout (surtout au niveau matériel), mais ils possèdent l'essentiel, c'est-à-dire ce bonheur d'exister ensemble.

Cette lutte des places, cette inscription dans des collectifs affiche la richesse relationnelle de chacun d'entre nous : le

bonheur passe avant tout par la reconnaissance. Loin de n'être qu'un « Homo economicus », l'être humain est, avant tout, un être social. Il a principalement besoin, comme l'affirme Albert Jacquard, « de se sentir beau dans le regard des autres ».

La mise en place de l'atelier des savoirs populaires au sein de l'Université populaire Montpellier Méditerranée (www.upmm.org)

Avant d'être considéré comme économiste Adam Smith était professeur de morale. Il écrivait, en 1759, dans *La théorie des sentiments moraux* la phrase suivante : « *Le besoin d'être regardé est même à l'origine de tous les autres besoins* ».

L'être humain est, en effet, un être social. Plus il rencontre ses semblables plus il s'approche de l'humanité (Albert Jacquard). L'expérience que nous sommes en train de mettre en place dans le quartier populaire de la Paillade au sein de l'Université Populaire de Montpellier Méditerranée (UPMM) est la démonstration que la reconnaissance peut-être le terreau du bonheur. Ce dernier a donc une dimension subjective. Il ne peut se réduire à une approche financière, il doit nécessairement intégrer cette richesse sociale, ce capital relationnel, ce souci de l'autre qui permettent de se sentir exister au sein d'un collectif. C'est certainement le plus difficile à mesurer mais, c'est aussi l'argument majeur qui doit pouvoir enclencher le processus de décroissance de l'activité pour une vie plus harmonieuse.

Ceci dit, comment avoir la certitude que l'on existe dans le regard de l'autre ? Comment valoriser les savoirs, les savoirs-être mutilés non reconnus par la pensée dominante ?

L'UPMM a tenté d'apporter des éléments de réponse. Elle est née en septembre 2006. La première année nous avons été très tournés vers des cours traditionnels, mais il m'est très vite apparu que cette formule ne permettait guère de faire émerger les savoirs populaires. Il fallait donc trouver une pratique capable de s'enrichir mutuellement des savoirs de chacun[□].

A partir de l'expérience du collectif malgré tout (<http://malgretout.collectifs.net/>) à la cité des 4 000 à La Courneuve nous avons mis en place un atelier des savoirs populaires à la Paillade

(<http://www.upmm.org/spip.php?article62>)

En partant de l'idée fondatrice que le bonheur est derrière la reconnaissance, il s'agit de faire apparaître les savoirs de chacun pour les mettre en valeur et les afficher au regard de tous. Or, dans les quartiers populaires les savoirs sont nombreux mais sont enfouis dans l'inconscient collectif et ont du mal à faire sauter les crispations imposées par les représentations. Ce sont des savoirs dominés qui acceptent cet état de fait et qui ont du mal à se faire connaître et reconnaître.

Comment lutter contre ces représentations imposées par les médias, par l'évidence de la « sagesse collective » ?

Notre réponse a été de nous lancer dans la mise en place d'un atelier où allait pouvoir émerger des savoirs être populaires. Nous avons proposé à un groupe de jeunes (entre 18 et 25 ans) des quartiers populaires de la ville de Montpellier de monter la pièce de théâtre de Rodrigo

Garcia intitulée « *Jardinage Humain* » autour du thème de la critique de la consommation. Durant les premières séances de répétition, des difficultés d'approche de la langue sont apparues. Le texte n'était pas toujours facile à aborder, le champ lexical posait problème. C'était bien la rencontre de 2 mondes. Il fallait donc que le groupe fasse des efforts importants pour s'approprier le texte et son contexte. Mais, le bonheur d'être ensemble et la force de la reconnaissance mutuelle nous ont permis de relever les premiers défis. Monter une pièce de théâtre c'était aussi se libérer des représentations sociales, être ensemble pour être vrais, être libres.

Dans cette pratique, les jeunes concernés sont enfin reconnus comme des êtres à part entière capables de façonner un écrit selon leur identité, leur vécu. Derrière tout ce travail se niche la reconnaissance de l'autre. Cet effort nous a permis de partager des moments d'une rare intensité, d'une qualité relationnelle inoubliable. Aujourd'hui, le projet est en cours. Ce travail devrait déboucher sur une pièce de théâtre interprétée par des personnes qui n'ont jamais reçu d'assentiment collectif. Ces savoirs mutilés vont trouver existence dans le regard des autres et affirmer ainsi leur différence à l'écart des représentations sociales.

L'humanité n'est-elle pas constituée de cette diversité culturelle ? Et son affirmation individuelle et collective n'est-elle pas la certitude de permettre à chacun de faire valoir ce qu'il est ? Dans cette affirmation, c'est la concrétisation que le bonheur partagé autour de la reconnaissance collective permet à chacun de se construire non pas l'un contre l'autre mais l'un avec l'autre.

Derrière cette alchimie de la diversité naît le bonheur collectif qui est une réponse concrète à la volonté de la pensée dominante de créer un Homme nouveau. Dans l'histoire, d'ailleurs, de nombreuses tentatives avortées ont cherché à fabriquer une nouvelle humanité (3^{ème} Reich, expérience stalinienne...). Mais, la particularité actuelle est que la domination symbolique (plus insidieuse que la domination physique) néolibérale qui passe par les pressions au travail, la publicité, le culte de la marchandise... façonne les comportements humains au point que la plupart de nos concitoyens n'y perçoivent pas d'issue. Ils sont ainsi, comme fascinés par les lumières de la consommation, et connaissent un véritable viol de leur imaginaire. Comment sortir de cette situation où ils perdent une part de leur humanité avec comme seule contrepartie : l'illusion de l'objet célébré par le culte de la marchandise ?

Si l'éducation populaire a encore un sens, elle ne peut faire l'impasse sur son rôle d'émancipation des populations. Elle doit prendre acte de cet état de fait et proposer de rechercher le réveil des valeurs humaines.

Cette expérience de l'UPMM s'inscrit pleinement dans cette démarche.

Conclusion

Dans son rapport « *Reconsidérer la richesse* » Patrick Viveret mettait déjà l'accent en janvier 2001 sur le rôle trompeur des indicateurs de richesse qui pouvaient positiver le négatif et négativiser le positif des activités humaines. En effet, une marée noire, des embouteillages... sont

comptabilisés comme un surplus d'activités et donc participent de la croissance économique alors que d'autres activités n'y sont pas agrégées. C'est le cas, par exemple, des activités bénévoles, des actions de Don/contre-don, de l'économie domestique et non monétaire qui sont caractéristiques de l'économie du lien dont on a parlé précédemment.

En fait, plus on s'éloigne de l'essentiel et plus on est en mesure de mesurer la production. C'est le cas de la production de biens et de services que l'on retrouve dans l'indicateur le plus connu c'est-à-dire le PIB qui mesure la somme des valeurs ajoutées produites dans un Country pendant un an.

Mais, plus on s'approche de l'essentiel, c'est-à-dire comme on l'a montré, de la reconnaissance, du lien social, de l'amitié, en un mot des valeurs humaines celles qui donnent dignité alors là, les indicateurs classiques montrent leur cécité.

Mettre l'accent sur l'essentiel et transformer les instruments de la mesure de la croissance permettraient de mettre en évidence les efforts de certains pour participer au lien social, au respect des fragiles équilibres écologiques et sociaux...

A ce moment là, si les externalités négatives de la croissance étaient comptabilisées comme il se doit, c'est à dire en négatif, alors l'impératif de décroissance s'imposerait plus facilement.

La réalité économique et sociale est observée, aujourd'hui, avec des indicateurs productivistes. Il convient de mettre l'accent sur une autre façon de percevoir ce monde pour en mesurer l'agression écologique et sociale qui lui est faite. A ce moment là, on se rendrait compte que la décroissance a réellement commencé. Il convient simplement, aujourd'hui, de transformer nos mentalités productivistes pour aborder la décroissance avec convivialité et savoir saisir simplement, dans le respect des valeurs humaines, les bonheurs multiples qui s'offrent à nous.

A Simplified Index of Sustainable Economic Welfare for France, 1980-2006

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Abstract

This paper presents the results of a Simplified Index of Sustainable Economic Welfare (SISEW) case study for France. It is shown that the results do not support the 'threshold hypothesis' put forward by Max-Neef. The paper also looks at the policy value of the index.

1. Introduction

In ecological economics, the Index of Sustainable Economic Welfare (ISEW) is often

used to empirically support the 'threshold hypothesis' put forward by Max-Neef (1995). Based on the results of a set of international ISEW case studies, it is argued that the economic system has surpassed its optimal scale in most developed countries. A decrease in per capita ISEW indicates a declining level of sustainable economic welfare. From the mid 1970s onwards, such a decrease was found in most countries for which the index was calculated.

The ISEW was developed by Daly and Cobb (1989) as an alternative measure of economic welfare that compares the benefits and the costs of economic activities. In doing so, it draws heavily on the different criticisms that the Gross Domestic Product (GDP) has attracted over the years when used as a measure of economic welfare. For instance, the ISEW includes household labor and welfare losses from inequalities in the income distribution and accounts for of the environmental costs of the economic process. For a detailed description of the ISEW methodology, Cobb and Cobb (1994) or Jackson et al. (1997) can be consulted.

The Index of Sustainable Economic Welfare is often put forward as an alternative to GDP. Recently, the index attracted a lot of interest in several European countries, either by petitions in favour of alternative measures of well-being (Belgium and the Netherlands) or by support from expert workshops (Germany). Furthermore, both José Manuel Barroso, President of the European Commission, and Stavros Dimas, Commissioner for the Environment, called for the development and further improvement of indicators that adjust, complement or replace GDP at the 'Beyond GDP' conference organised by the European Commission in November 2007.

However, the compilation of the ISEW requires a large amount of data on a wide range of topics. Gathering these data can be a very difficult task that has undoubtedly put off researchers in the past. Bleys (2007) has come up with a Simplified ISEW (SISEW), which includes in its

methodological framework only the quantitatively most important items in the original index. It is shown that reducing the number of items in such a way allows for an easier compilation of the index, while at the same time, the outcome of the exercise is almost unaffected. There are minor differences in absolute terms between per capita ISEW and SISEW, yet, as the trend over time offers the only valid ground to draw conclusions with regard to (changes in) the level of sustainable economic welfare, the message that the simplified ISEW study conveys is the same.

2. A Simplified ISEW for France, 1980-2006

Data and Methodology

Building on the methodology put forward by Bleys (2007), I have calculated the Simplified Index of Sustainable Economic Welfare for France for the period 1980-2006. The SISEW is composed of 11 items, which are given in table 1. The exact methodology used to calculate the monetary estimates for each item (including data sources) will be reviewed in this section. The results of the case study will be presented in section 2.2, while section 2.3 compares them to the results of SISEW case studies in other countries.

SISEW	=	+	Private Consumption Expenditures
		-	Welfare Losses from Income Inequalities
		+	Value of Household Labor
		+	Non-defensive Public Consumption Expenditures
		-	Costs of Commuting
		-	Costs of Air Pollution
		-	Depletion of Non-renewable Energy Resources
		-	Costs of Climate Change
		-	Costs of Ozone Layer Depletion
		+/-	Net Capital Growth
		+/-	Change in Net International Investment Position

Table 1: The 11 items in the SISEW framework (Bleys, 2007)

Private consumption expenditures are taken directly from the French national accounts, accessible at the website of the National Institute for Statistics and Economic Studies¹ (INSEE).

Welfare losses from inequalities in the income distribution are calculated using the Atkinson index, I (with $\epsilon = 0.8$). The necessary income distribution data (percentage of total income earned by each population decile) are taken from

¹ http://www.insee.fr/fr/indicateur/cnat_annu/base_2000/cnat_annu_2000.htm

the WIDER World Income Inequality Database². The actual welfare losses of income inequalities are estimated by multiplying the private consumption expenditures by a factor of $(1 - I)$.

The value of household labor is estimated by applying a shadow wage rate to time use data. Estimates of the total time spent on household labor in France for 1986 and 1999 are taken from Dumontier and Pan Ké Shon (1999), while the SMIC³ hourly wage rate is used to value these amounts of time. Linear interpolation is used to link both time use studies, while the average time spent on household labor per person is kept constant in the periods before 1986 and after 1999.

Non-defensive public expenditures are calculated as the difference between effective private consumption and private consumption expenditures. Effective private consumption is equal to the actual final consumption of households and includes goods and services acquired by transfer from government units and non-profit organizations. To calculate the effective private consumption, the value of social transfers in kind receivable is added to the private consumption expenditures. Data on effective private consumption is available from the national accounts of France.

The costs of commuting are estimated by applying a 'commuting ratio' to the total private expenditures on transportation. The latter are obtained from the national accounts at INSEE, while the former is calculated by indexing the product of the proportion of the active people that work outside their residential communities and the average distance that these people commute. The necessary data are obtained from Talbot (2001), while a commuting ratio of 0.2 is taken for 1982 based on data for Belgium (Bleys, 2006).

Time series data on the emissions of five different air pollutants (SO₂, NO_x, CO, particulate matter and non-methane volatile organic compounds) are valued at estimated fixed marginal social costs rates derived from Jackson et al (1997) in order to track the costs of air pollution. Data on emissions are obtained from UNEP's Geo Data Portal website⁴.

The 'depletion of non-renewable energy resources' item is calculated by applying a replacement cost factor to non-renewable energy consumption data. Non-renewable energy consumption includes oil, petroleum products, natural gas, coal and coal products and nuclear energy. Data is taken from UNEP's Geo Data Portal. The replacement cost factor increases over time to reflect an increase in demand for energy and the associated increasing costs, as described in Cobb and Cobb (1994).

Costs of climate change are estimated by applying a marginal social cost estimate of carbon dioxide emissions to the cumulative emissions of CO₂ since 1900. Carbon dioxide emissions data are available from the 'Climate and Atmosphere' section of the Earthtrends database at the

World Resources Institute⁵ (WRI). The marginal social cost estimate used is taken from Fankhauser (1994) and linked to the cumulative emissions from 1900 onwards in order to reflect increasing costs associated with rising CO₂ concentrations in the atmosphere.

Ozone layer depletion is accounted for by valuing cumulative consumption of ozone depleting substances (ODS) at a fixed estimated unit cost. Average per capita ODS consumption for Europe is calculated by combining data from UNEP's Geo Data portal with data from the Alternative Fluorocarbons Environmental Acceptability Study⁶ (AFEAS). These averages are then multiplied by the number of people living in France. The fixed unit cost applied to the ODS consumption is 53€/kg of CFC equivalent, the average of the estimates used in Cobb and Cobb (1994) and Jackson et al. (1997).

Net capital growth is calculated by taking five-year rolling averages of the changes in the net capital stock, adjusted for fluctuations in the number of people employed. Data on both the net capital stock and the volume of the workforce are available at the INSEE website.

Finally, the change in the net international investment position (NIIP) is taken into account, as according to Daly and Cobb (1989), sustainability requires long-term financial self-reliance. To smooth out large year-on-year variations, a five-year rolling average of the changes in NIIP is taken. Data on the NIIP are available from the International Financial Statistics (IFS) Yearbooks of the International Monetary Fund, or through their website⁷.

Results of the SISEW case study for France

The ISEW is expressed in constant 2000 prices using the GDP deflator. Figure 1 plots GDP/capita against SISEW/capita for France for the period 1980-2006 (see annex). Several conclusions can be drawn from this figure. First, both lines show a trend over time that is quite similar. In 18 of the 26 periods, both indicators move in the same direction, while only in the second half of the 1990s, the observed path of both indicators differs markedly.

Second, the SISEW case study for France does not support the 'threshold hypothesis' of Max-Neef (1995): except for a significant drop in sustainable economic welfare levels in the mid 1980s, SISEW/capita indicates improvements in economic welfare levels for France from 1988 onwards.

Finally, SISEW/capita is lower than GDP/capita throughout the entire period studied. Based on this observation, it would, however, be wrong to conclude that GDP/capita overstates the actual level of welfare. The absolute value of SISEW/capita does not contain much useful information on the level of welfare, as this value would change items are added to the methodology of the index. For instance, if the value of leisure time would be added to the index, SISEW/capita would undoubtedly surpass GDP/capita. It is the trend over time of SISEW/capita, and its comparison to the trend over time of GDP/capita, that offer the most valuable insights.

² http://www.wider.unu.edu/research/Database/en_GB/database/

³ SMIC = Salaire Minimum Interprofessionnel de Croissance, data available at INSEE (<http://www.insee.fr/fr/indicateur/smic.htm>)

⁴ <http://geodata.grid.unep.ch/>

⁵ http://earthtrends.wri.org/searchable_db/index.php?theme=3

⁶ <http://www.afeas.org/data.php>

⁷ <http://www.imfststatistics.org/imf/>

	Importance		Evolution
	Average	Change	Relative
<i>Positive Items</i>	<i>100</i>		<i>162.6</i>
Private Consumption Expenditures	56.4	-2.24	156.0
Value of Household Labor	23.8	+1.39	172.9
Non-defensive Public Expenditures	15.4	+2.1	187.2
Net Capital Growth ⁸	4.1	-	-
Change in Net International Investment Position ⁸	0.3	-	-

<i>Negative Items</i>	<i>100</i>		<i>183.3</i>
Welfare Losses from Income Inequalities	20.0	-7.21	123.6
Costs of Commuting	1.0	+0.5	308.1
Costs of Air Pollution	11.5	-18.6	37.2
Depletion of Non-renewable Energy Resources	39.4	+22.3	323.6
Costs of Climate Change	16.4	+3.4	227.0
Costs of Ozone Layer Depletion	11.6	-0.4	176.1

Table 2: Analysis of individual items within the SISEW for France

Table 2 analyses the different SISEW items individually. Items are classified in two categories: positive and negative items. The first column of the table lists the different items, the second looks at their average importances within the respective classes, the third column indicates the change in these importances in absolute terms over the period studied, while the fourth column gives the relative change in the monetary estimates of the different SISEW items.

⁸ Both the 'Net Capital Growth' item and the 'Changes in Net International Investment Position' item have recorded positive and negative entries over the period studied. As the positive entries exceeded the negative ones, they are classified in the 'positive items' category, yet it should be noted that the importances listed in column 2 understate the actual importances of both items.

Looking at the positive items, private consumption expenditures is obviously the most important one, as it accounts for more than half of the total value of all positive items. The two other major items are household labour and non-defensive public expenditures. All three items have witnessed similar changes over time. The net capital growth and changes in the net international investment position items have lower importances, yet, given the high degree of variation in their trends over time, these items have had a significant impact on the overall trend over time of SISEW/capita.

The negative items show more diverse patterns. Two items have registered significant drops in their importances: the welfare losses of income inequalities have increased at a rate that was far below that of the negative items category in general, while the costs of air pollution have fallen both in relative and in absolute terms, over the period studied. The first observation can be explained by a decrease in inequalities in the income distribution in France from 1984 onwards, while the second can be linked to a decrease in emissions of air pollutants.

The item linked to the depletion of non-renewable energy resources has increased dramatically, both in relative terms (+22.3%) as in absolute terms (+223.6%). This can be partly explained by the increase in non-renewable energy use, yet overall the escalation factor in the replacement cost has had the biggest impact. While non-renewable energy use increased by 50% between 1980 and 2006, the replacement cost estimate increased by 120%. The costs of climate change have also increased at a higher rate than that of the negative category in general, resulting in an increase of its relative importance.

The SISEW for France, Belgium and the Netherlands

The Simplified Index of Sustainable Economic Welfare has already been compiled for Belgium and the Netherlands (Bleys, 2007). This section will compare the results of both studies with the ones from the French case study presented above. Figure 2 compares the trend over time of SISEW/capita for the three countries (see annex). Two elements stand out from this figure.

First, the SISEW/capita level is highest in France, exceeding levels in Belgium and the Netherlands by over 4,000€/capita on average. The main items responsible for this difference in absolute terms are non-defensive public expenditures, depletion of non-renewable energy resources and costs of climate change. Non-defensive public expenditures were calculated for France as the difference between effective private consumption and private consumption expenditures, whereas in Belgium and the Netherlands they were based on a categorization of public expenditures. In the latter, only half of the public expenditures on health and education were included. The replacement costs involved in natural capital depletion are lower in France than in the other countries under consideration, as the per capita level non-renewable energy consumption is lowest in France. Carbon dioxide emissions per head are also lower in France, resulting in lower estimates of the costs associated with climate change. Part of this can be explained by the fact that France generates significantly more energy from nuclear power plants than the other countries (about 45% in 2005).

Next, whereas the trend over time of the per capita SISEW is fairly similar for France and the Netherlands, Belgium shows a markedly different pattern, especially in the later years of the period studied. The SISEW/capita for Belgium decreased by over 30% in the period 2000-2004. According to Bleys (2008), this decline is mainly driven by a decrease in Belgium's net international investment position, which falls

From its 2000 record high of €154,455 million to €90,475 million in 2004. A decline in net capital growth also adds to the decline of SISEW/capita in 2004.

3. Discussion

This section will analyze the value of the Index of Sustainable Economic Welfare, and by extension, that of its simplified version. The criticism that the ISEW has attracted over the years has undermined both the value of the index as well as the validity of the 'threshold hypothesis' (Neumayer, 1999 and 2000). The different critiques can be grouped into two categories: methodological issues on the one hand and practical issues on the other. Methodological issues shed doubt on the value of the entire exercise, while practical issues are concerned with specific items within the methodology of the ISEW or with data quality or availability. Many advocates of the ISEW have replied to these critiques, refuting some of the issues raised.

On the practical level, several valuation methods within the ISEW methodology have been criticized. Concerns that minor adjustments to these valuation methods would have a significant impact on the index and the conclusions drawn from the ISEW studies, were expressed by many authors. The two components that have attracted the largest amount of criticism are non-renewable resource depletion and long-term environmental damage. Another practical issue that is often put forward are the inconsistencies in the methodology of the index across the different case studies. In most countries, the original methodology was adapted in order to overcome problems with data availability or to pay attention to country-specific issues. As a result of these inconsistencies, it is very difficult - if not impossible - to make cross-country comparisons.

These practical objections to the ISEW can be overcome. It is possible to think of a consistent ISEW methodology that is widely agreed upon. This methodology would consist of a list of items to be included in the index as well as guidelines on how these items should be valued. It should be noted here that several individual efforts to improve the valuations methods of specific items have been undertaken recently. Examples include Talberth et al. (2007), Forgie (2007) and Bleys (2008). Furthermore, both the availability and the quality of data has increased significantly over the last decade.

On the methodological level, Neumayer (1999) argues that the authors of the ISEW commit the mistake of methodological inconsistency in two respects. First, the ISEW cannot at the same time function as both an indicator of current welfare and an indicator of sustainability: what affects current well-being need not affect sustainability and vice versa. Second, the index is not an indicator of strong

sustainability, but one of weak sustainability, since the ISEW framework allows for perfect substitution among different types of capital.

The methodological criticism on the ISEW is more fundamental and urges a structural rethinking of the index. When Lawn (2003) worked out the theoretical framework of the ISEW, he built on the Fisherian concept of income. This concept forces one to distinguish between the actual capital stocks and the flows of services that these capital stocks deliver. The latter are important to measure the level of welfare or income currently enjoyed by a nation's citizens, while the former indicate whether this level can be sustained in the future. The ISEW should focus on the flows of services generated within a particular year, while additional natural capital accounts are needed to keep track of changes in the ecological sustainability of the level of welfare enjoyed in a country. Other supplemental accounts could look at the sustainability of the economic process in terms of the stock human-made capital and the level of national self-reliance (financial, food production, natural resources). The ISEW goes far in being consistent with the Fisherian income and capital concept, yet a few problems remain. These need to be addressed when developing an internationally agreed upon standardized methodology of the index.

Another methodological flaw of the ISEW that is often emphasized is the high amount of subjectivity that enters its methodology. The researcher has to decide which items to incorporate into the methodology of the index and which valuation methods to employ. When the choices and assumptions made during the compilation of the index are not clearly communicated, the risk of misinterpretation of the results is high. ISEW studies should be clear and comprehensive so that this risk is minimized.

At the moment, the greatest value of the ISEW lies in its potential as a communication tool. The index is appreciated as an empirical translation of the criticism on traditional measure of economic welfare, such as the GDP. As such, it offers easy-to-understand insights that benefit the current debates on degrowth and the reorientation of the economic system. The current value of the ISEW for policy-making is rather limited. The methodological framework of the index needs revised in order for the index to gain a broader acceptability among policy-makers. Furthermore, a standardized methodology is needed to allow for international comparisons. Yet, the ISEW can be used as a guiding principle in the development of a new set of comprehensive accounts at the national level.

4. Conclusion

Reducing the number of items in the methodological framework of the ISEW by omitting the items that have a low quantitative importance compared to most others, will reduce the amount of data needed in the compilation of the index. For most countries, the trend over time of the resulting Simplified ISEW (SISEW) is nearly identical to that of the original ISEW.

In this paper, the SISEW is calculated for France for the period 1980-2006. It is found that, with the exception of a decrease in de mid 1980s, SISEW/capita rises steadily

throughout the entire period studied. These results are not in line with the findings in most other ISEW studies and do not support the threshold hypothesis put forward by Max-Neef. Compared to the results of SISEW case studies in Belgium and the Netherlands, the observed level of sustainable economic welfare is higher in France. However, making cross-country comparisons is difficult, as different data sets were used.

Although both the ISEW and its simplified version (SISEW) have numerous positive features, the lack of a consistent and internationally agreed upon methodology is a major setback. By highlighting the most important items in the ISEW framework, the SISEW gives an indication about which items require further research and debate to arrive at such a standardized methodology.

Some of the methodological criticism on the ISEW urges for a more structural rethinking of the index. Building on the current theoretical framework of the index, the ISEW should be transformed in a flow-oriented measure of current economic welfare. This would not necessarily require many adjustments to current methodology. Additional stock accounts are needed to track the sustainability of the current level of welfare. These stock accounts should include natural capital, human-made capital and information on national self-reliance.

The new set of macro-level accounts outlined above is essential if one wishes to properly monitor the links between the economy, the environment and the level of economic welfare. The development of such a set of accounts is, however, a difficult task. However, the guidelines on the System of Economic and Environmental Accounts (SEEA) worked out by the United Nations should be seen as a first step in the right direction.

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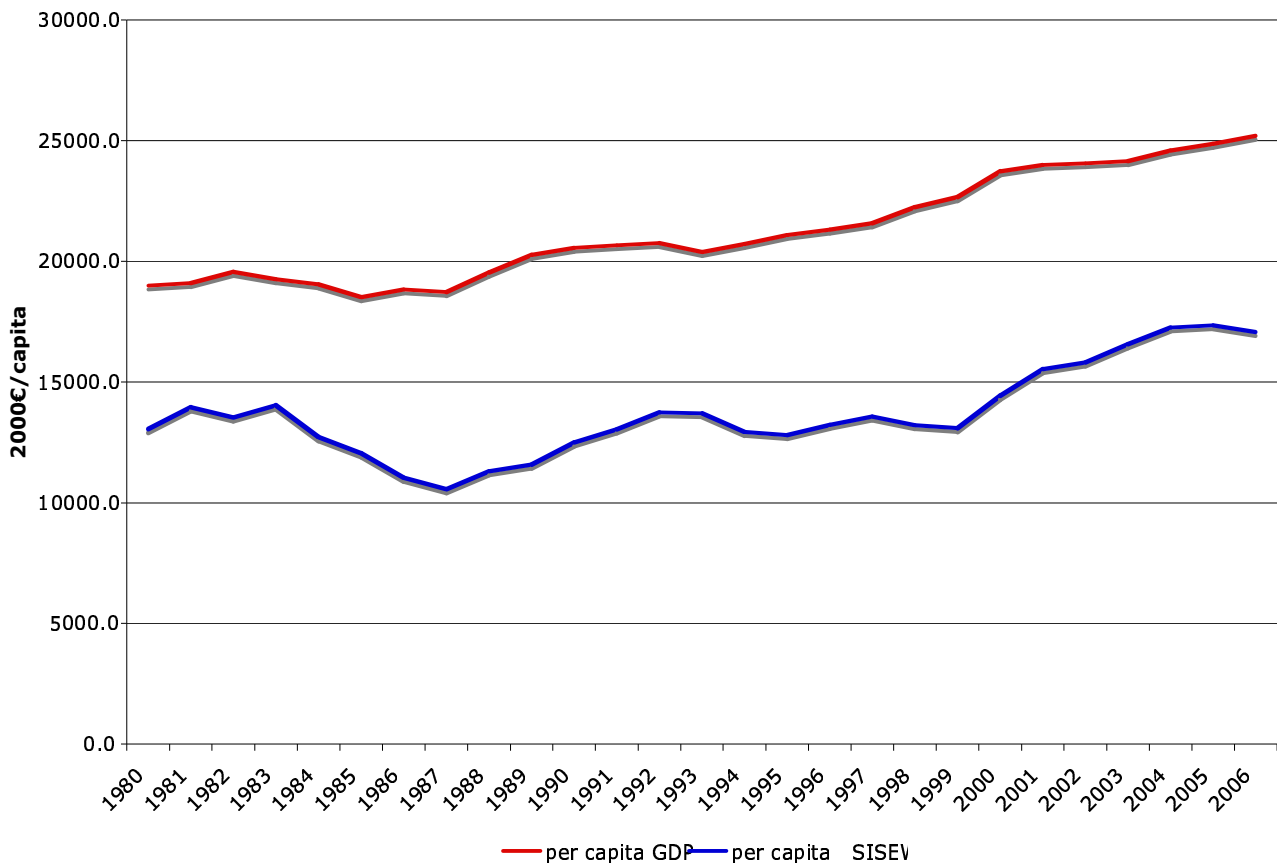


Figure 1: GDP/capita and SISEW/capita for France, 1980-2006

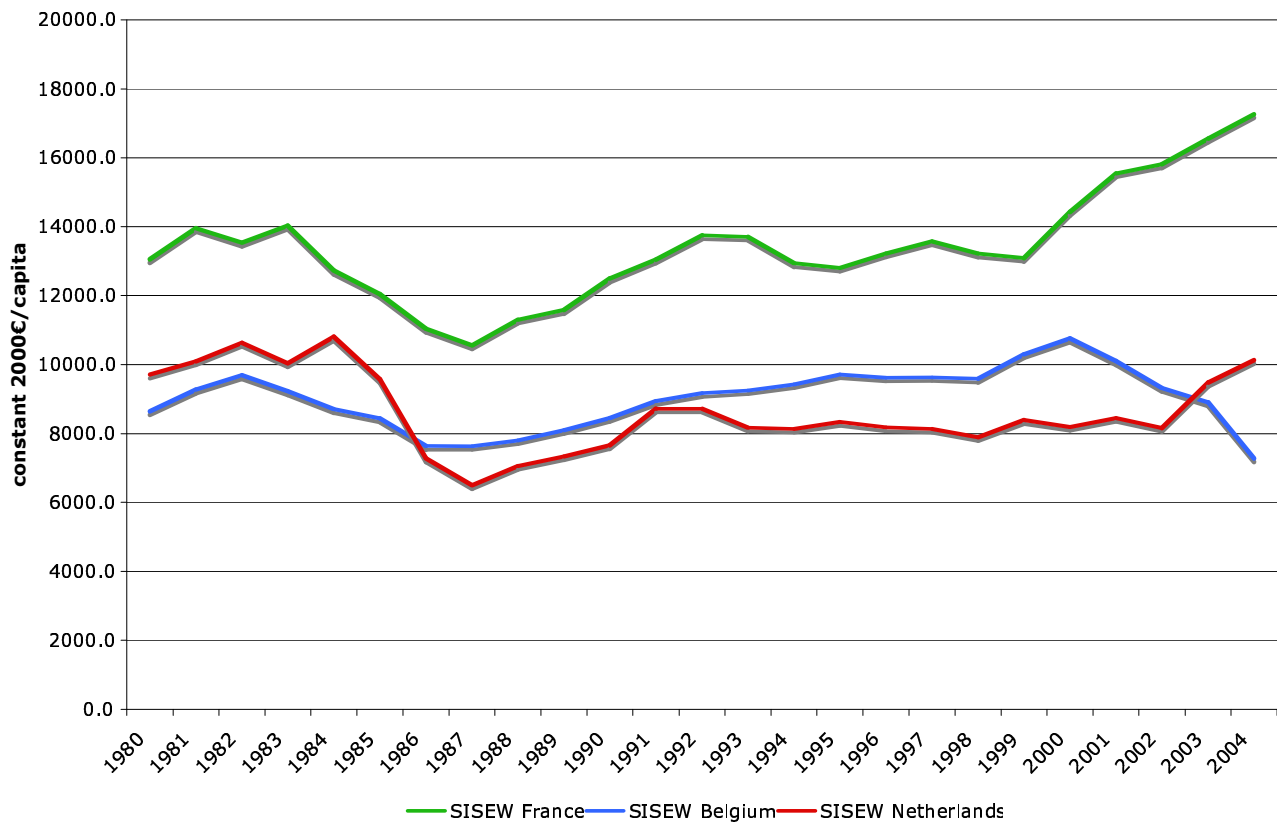


Figure 2: SISEW/capita for various countries

Growth and sustainable development

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Abstract

When analysing the relation of economic growth and sustainable development, it is necessary to distinguish three aspects:

- *The growth discourse, claiming the centrality of the growth issue for societal development;*
- *Growth politics, which follow a specific economic ideology, and*
- *The real social, environmental and economic effects of economic growth.*

Ad 1: *This discourse claims that the central factor for social, economic, political and environmental progress is economic growth – it is assumed to create wealth, and provide the necessary means for social and environmental purposes. Thus the focus of politics, it is assumed, should be on enhancing growth. The optimal growth rate is assumed to be the maximum possible rate. Unfortunately, the degrowth debate strengthens rather than weakens this discourse – it is a dance around same golden calf, in the opposite direction.*

Ad 2: *On the basis of the growth discourse, different growth policies can be derived, based on different economic and political ideologies. They can be quite different, despite joint intentions. For instance, Keynesian policies try to stimulate growth by strengthening the demand side of the economy, increasing salaries, redistribution measures and public investment. Neoclassical economics, to the contrary, demands the lowering of social and environmental standards, at best abolishing them, and leaving the regulatory function to the market. Whereas the former policy incorporates a number of (mainly social) sustainability objectives and might evolve into a sustainability-compatible direction, the latter is in all aspects socially, economically, environmentally and institutionally unsustainable. This has been demonstrated by various model simulations.*

Ad 3: *The EU council has called for "sustained and sustainable growth" – leaving the latter undefined. The "inequation of sustainability" has been developed to assess the sustainability of the growth according to selected minimum conditions.*

For sustainable development policies, however, it is necessary to get rid of the growth fetish, to define social, economic and environmental criteria for sustainable

economic development. Doing so, and deriving policies following these lines of thought (i.e. with growth explicitly no policy effect, but a more or less relevant side effect) it is possible to reduce environmental pressures in line with the IPCC demands and achieve full employment, eradicate poverty and contribute to gender equality. Economic growth is these calculations the dependent variable (rebound effects included). Modelling indicates that such policies might lead to a sharp increase in growth, plus a subsequent decline – no sustainability problem as long as the predefined criteria are met.

Key words : Sustainable development, economic growth impacts, growth policy impacts, policy preference formation, economic theory

1. Introduction

According to the full definition (usually only the first half is referred to) of the Brundtland Commission (WCED 1987)

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

It contains within it two key concepts:

- The concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given, and
- The idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and future needs."

The economic mainstream can neither accommodate the orientation towards meeting the needs of the poor nor the limits imposed by the carrying capacity of the environment (aware of the fact that carrying capacity is socially constructed):

- Only the needs expressed in the market are taken into account. As these are based on the purchasing power involved, the needs of the rich have overriding priority against those of the poor.
- As according to neoclassical economic thinking for every good (including sources and sinks) there is a fully equivalent substitute, and technology will provide them. Thus there can be no limits in functioning markets.

Unfortunately, the fate of the poor and the state of the environment clearly indicate that such expectations are illusionary and the belief the market would solve them, thus undertaking no targeted action is frivolous.

Rather obviously, an economics which makes equilibrium and efficiency its highest objectives, assuming that we are at or close to an equilibrium situation to be maintained by reducing market interferences is misleading in a situation where not stabilising the situation but enforcing massive changes for the benefit of the poor and the environment are more urgent than ever (Ackerman 2007). This is all the more urgent due to the regressive effects of climate change and biodiversity loss. As more than 20 years since the

report of the WCED have not been sufficient to realise the massive changes necessary (rather to the contrary), and as the window of opportunity for turning the tide and avoid uncontrollable effects of climate change (massive damages are already unavoidable) might soon close, it is high time for radical changes in politics and public attitudes.

However, radicalism is no end in itself. Derived from the Latin *radix*, the root, it simply means that we have to identify and address the causes of the current situation, and not only combat the symptoms. We simply cannot go on dealing with the bubbles on the surface and not asking what keeps the pot boiling.

However, what are the causes, and what the symptoms? Is growth per se bad? Or only specific kinds of growth? Or only growth exceeding certain limits? Will no growth or low growth solve the problems, or create new ones, or both? Or is not growth but capitalism the core problem? Or our excessive consumer societies?

What is the objective: reducing CO₂ emissions and our land use (ecological footprint), plus halting biodiversity loss, i.e. measures against specific pressures, or a general reduction of throughput (Daly 1991)? Would that mean a steady state economy (Daly 1973) or first of all a reduction of its biophysical size (Georgescu-Roegen 1976), by reducing material flows by a factor 4 or 10 (von Weizsäcker et al. 1997; Schmidt-Bleek 1994) or through the human appropriation of nature's surplus and substance (Haberl 2004)? Does it include preserving species diversity or only ecosystem services, efficiently provided by a limited number of specialised species?

Does technology provide a way out, or are new technologies just a drop in the bucket? Should the focus be more on social factors, such as poverty, income and wealth distribution (and the correlated consumption impacts), and the enduring gender imbalances and justice deficits? Or must we even go deeper and overcome archaic human instincts, the *ape within ourselves* (Rötger 2002)?

2. Method

This paper cannot answer all the questions mentioned above. However, it introduces a differentiation of "growth" as a research topic which is intended to bring them closer to an answer. For this behalf it is suggested to distinguish three different aspects of the growth problem:

- *Driving forces, orientations*: The growth discourse, claiming the centrality of the growth issue for societal development;
- *Pressures, mechanisms*: Growth politics, which follow a specific economic ideology, and
- *Impacts*: The real social, environmental and economic effects of economic growth.

Whereas the latter point deals with the impacts of economic growth in real time and space, the former two are governance challenges since they refer to certain elements of the institutional system causing driving forces and pressures. For policy analysis purposes, the political science definition of institutions can be applied, comprising the three levels of organisations, mechanisms and orientations

(Czada 1995). Organisations are not analysed here, as they can act into different modes and directions, depending on the orientations and mechanisms setting the compass.

From an impact analysis and policy consultation perspective the DPSIR model can be applied, illustrating the linkages between drivers, pressures, impacts (changes of state) and policy responses (Figure 1).

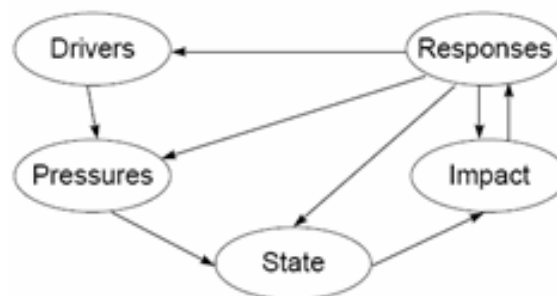


Figure 1. The DPSIR model (Smeets and Weterings, 1999)

Driving forces, orientations: the growth discourse

The public growth discourse is based upon statements from politics, the business sector and has a strong foothold in the media, all claiming the necessity of more economic growth. Its second base are the public expectations of (or at least the hope for) continuous improvements of their quality of life; this expectation provides a resonance body for the "growth is necessary" messages. They claim that the central factor for social, economic, political and environmental progress is economic growth – it is assumed to create wealth, and provide the necessary means for social and environmental improvements (thus the European Commission called growth a precondition for social cohesion and environment protection). Thus the focus of politics, it is assumed, should be on enhancing growth. The optimal growth rate is assumed to be the maximum possible rate¹.

This discourse coexists with the one on the need for urgent action to combat climate change and other environmental problems, without any cross-referencing (in the EU a formal crossing has been achieved by declaring both as mutually supportive, without any impact on the content). It is linked, however, to the social discourse on unemployment. This link has only recently become weaker as for instance in Germany people realised that the gains from growth during the economic boom benefited only the top 20% of income earners, while the rest experienced no positive aspects of growth.

Both links are real and unavoidable, however, illustrated by the following line of argumentation:

As following the precautionary principle, industrial economies should reduce the total throughput of resources (energy, material, land, i.e. the environmental space use) as the driving force behind most environmental damages, the total throughput has been chosen as the environmental

¹ Unfortunately, the degrowth debate in the German and at least partly in the English perception strengthens rather than weakens this discourse – it is perceived as a dance around some golden calf, in the opposite direction.

criterion. Simultaneously, the economy should provide enough jobs and reduce income polarisation. Thus as the initial social criterion the labour market effects have been chosen. These aspects can be formalised into criteria to assess the sustainability of the economic development, and in particular the environmental and social sustainability of the prevailing pattern of economic growth. For this behalf, we have called the size of the economy Y (its change, the growth, is then dY), and the number of employed persons L . In these terms, the labour intensity of the economy is L/Y , and the per capita productivity is Y/L . It is a simple truism that the number of jobs can only increase if the economy grows faster (or declines slower) than the production per capita – then more workers are needed to do the job. Formally speaking, this reads

$$d(Y/L) < dY \Leftrightarrow d(L) > 0 \quad (1)$$

In a similar fashion, if we call R the resource use, R/Y is the resource intensity, and Y/R the resource productivity of the economy. If the latter grows faster or declines slower than the economy Y , the total consumption of resources decreases. Formally, this condition can be written as

$$d(Y/R) > dY \Leftrightarrow d(R) < 0 \quad (2)$$

Combining inequalities (1) and (3), we get the *inequation of sustainability* (Spangenberg et al. 2002) as a minimum condition for a potentially sustainable pattern of economic growth:

Jobs, growth, and the environment are reconciled (for the time being), if the *Inequation of Sustainability* is valid: $d(Y/L) < d(Y) < d(Y/R)$ (3)

Figure 2: the Inequation of Sustainability

The figure shows that both indicators would signal improvements if resource productivity grew faster than the economy as a whole (how much faster might determine whether the development is indeed environmentally sustainable) while per capita production increased lower than the overall economic growth rate. Only in this case economic growth is associated with both, job creation and environmental relief:

$$d(R) < 0 < d(L). \quad (4)$$

This formalised way of characterising growth patterns adds qualitative aspects to the omnipresent measurement of the growth rate. This permits a new view on economic development: if the condition is fulfilled, growth may be sustainable. If it is not, the current pattern of growth is definitely unsustainable. Whether it is indeed sustainable or not will depend on the societal (i.e. for economics, externally given) problem definition: it decides whether the difference between the elements of the inequation is large enough.

The *inequation of sustainability* clearly demonstrates that social sustainability defines a necessary minimum of economic growth, while environmental sustainability defines an upper threshold. Sustainable development thus has to be based on a balanced approach between social demands and environmental limits – an approach so far hardly ever reflected in the public growth discourse. What this discourse promotes (unconditioned growth) is not sustainable and will not be sustained in the long run.

In the public discourse, growth as a specific kind of progress (since the early 1950s) suffers also from the changing attitude regarding progress: long defined as technological progress, not as social one, people have not turned anti-technology, but rather changed from a progress optimism to a progress fatalism, and expecting a diminishing quality of life as a result. Despite these more recent doubts so far sustainability as an alternative to the idea of progress seems not to command public majorities, nor capable of doing so in foreseeable time. Thus, regardless of the doubts, the discourse still sets a framework for all policy action, acting as an orientation of the society as a whole (politics, business and citizens alike) towards economic growth.

Pressures, mechanisms: Growth politics

Contrary to the current growth discourse claiming a free market model and “modernised”, i.e. reduced social security as the only way to higher growth rates (TINA: **There Is No Alternative**), throughout economic history different growth policies have been derived, based on different economic and political ideologies. For instance, Keynesian policies try to stimulate growth by strengthening the demand side of the economy, by increasing salaries, redistribution measures and public investment. Although such measures must be reframed today to reflect the realities of a common market in the EU, they are still applicable if handled with care (like all policy instruments), as model simulations show (Hans Böckler Foundation 2001). However, after the oil price crisis of the 1970s, the limited success of the Keynesian instruments in this situation and a massive conservative roll-back, neoliberal politics took over, with neoclassical economics as both an economic guideline and a means of legitimation.

Neoclassical economics, still the dish of the day and considered the only adequate world view by much of our economic, political and media elites, demands the lowering of social and environmental standards, at best abolishing them, and leaving the regulatory function to the market (in the dominant US model – in the European model reduced but still existent social transfers go together with a repressive welfare state). Whereas the post-Keynesian policy receipts incorporate a number of (mainly economic and social) sustainability objectives and might evolve into a sustainability-compatible direction, the latter is in all aspects socially, economically, environmentally and institutionally unsustainable. The discrepancies between sustainability and neoclassical growth policy can be demonstrated using the little decomposition analysis presented above. From the more formal presentation, we can immediately identify some key policy areas for sustainable development. For instance, while the growth rate $d(Y)$ is nothing politics can directly influence, resource productivity $d(Y/R)$ can be enhanced by standards, economic incentives, and relevant research with subsequent innovation. These and similar policies should be part of the suggestions for the environmental aspects of any sustainability policy.

From a social sustainability perspective, conclusions can be drawn in a similar way: as the growth rate is not available for politicians to steer, measures are needed to limit the growth of the per capita production. For deriving them, the output per capita is further disaggregated into two factors,

the labour productivity per working hour and the hours worked per employee, with h the working hours per working person.

$$Y/L = Y/h \times h/L \quad (5)$$

Due to technological and social innovations, the labour productivity per hour has been rather continuously increasing over the last two hundred years, and can be expected to continue doing so. In this case, what remains at any given growth rate Y is the option to reduce the number of working hours per capita, to increase the total number of paid jobs created from a given volume work on the national labour market. Thus reflecting on the synergies between increasing labour intensity and resource productivity, and the issue of working time regimes should be part of the social dimension in sustainability policies. Neglecting these interrelations is one of the failures of current growth policies, rendering it unsustainable in all respects (see figure 3 in annex)

In a similar fashion, factors can be identified for other key problems (Spangenberg 2007). As a minimum condition, the *inequation of sustainability* in its different formulations helps to distinguish growth patterns that are definitely not sustainable from those that might be so. The criteria to identify the really sustainable conditions would then be a result of the political process, against which the quantitative results are evaluated, for instance if the speed of the ongoing improvements towards sustainability are large enough to solve the problems identified in due time, given the politically defined preferences of the respective society. Guidance for translating preferences into quantitative policy objectives can be drawn from the results of environmental research regarding the carrying capacity of natural systems for the right hand side of the inequation (e.g. a factor 4 reduction for energy consumption, a factor 10 for material flows, see Weizsäcker et al., 1997; Schmidt-Bleek, 1992). For the left hand side input can be gained from social and political sciences and from societal debates, regarding the accepted levels of unemployment and the preferred working times in different countries.

Growth impacts

As the inequation demonstrates, the impacts of growth on employment are essentially positive. Although through reducing working hours a policy-driven decoupling is possible, growth enhances employment. However, the opposite is true for growth politics: increasing labour productivity and extending the working week per capita minimises the positive employment effects, or turns them negative.

In a similar fashion, the effects of growth and growth politics must be distinguished on the environmental side as well. For some time the still untapped potential in increasing resource productivity permits to decrease resource consumption despite economic growth (although in the long run the problem re-emerges). However, in order for the resource productivity to be sufficiently higher than the economic growth rate, market mechanisms alone will most probably not be sufficient (although they provide a permanent incentive for improvement): unlike the growing labour productivity, the increase in energy productivity has been slowing, and the trend in resource productivity is below the growth rate, i.e. clearly unsustainable.

Neoclassical growth politics tends to enhance the sustainability gap by denouncing e.g. eco-taxes or efficiency standards as market disturbances and thus not acceptable. This in effect leads to an increase of resource productivity below what would otherwise have been realised, and thus to environmental unsustainability.

The EU council has called for “sustained and sustainable growth” – an oxymoron in the long run, but a policy option requiring energetic policy interventions in the short and medium term – and this is exactly what the political level tries to avoid so far (the sustainable industrial policy communication of Verheugen and Dimas announced for Spring 2008 will most probably do little to correct this impression).

3. Results and discussion

As the results of the analysis have revealed, it is necessary to distinguish between the results of economic growth and those of economic growth politics as they can oppose impacts. From our analysis it is clear that the kind of growth policies pursued has massive influence on the growth pattern and its social and environmental impacts. This constitutes a hierarchy which makes it plausible to focus on growth politics, and neoclassical economics in general, when discussing the risks of growth and the need to change course.

Secondly, growth politics is broader in scope than growth itself and has effects in policy domains like health and safety, working time strategies or environmental standards which are not directly affected by economic growth, but relevant to sustainable development. Again it is plausible to focus efforts for change on neoclassical economics, neoliberal politics and in particular the growth fetish, and not only on growth itself and its physical and social impacts.

Thus for sustainable development policies it is necessary to get rid of the growth fetish, to define social, economic and environmental criteria for sustainable economic development and the corresponding time lines (i.e. the size of the dematerialisation coefficient δ). Doing so, and deriving policies following these lines of thought (i.e. with growth explicitly no policy objective, but a more or less relevant side effect) it is possible to reduce environmental pressures in line with the IPCC demands and achieve full employment, eradicate poverty and contribute to gender equality. Economic growth is in these calculations the dependent variable (rebound effects included). Modelling indicates that such policies might lead to a sharp increase in growth, plus a subsequent decline – no sustainability problem as long as the predefined criteria are met.

4. Conclusions

Humanity has a stark choice: either act with foresight, and thus create the conditions for a “soft landing”, or turn a blind eye on the problems and face a future of scarcity and conflict. Then humanity will find itself in trouble time and again, and the old prescriptions will worsen the problem instead of providing solutions.

However, for such a U-turn towards sustainable de-growth the interaction of the three levels of institutions provides a policy dilemma (for the more general policy dilemma resulting see Spangenberg 2002): in a democratic system, decision makers must not tell the inconvenient truth that progress and market capitalism as we knew them will lead us into a disaster if the wish to keep their backing: growth discourse and growth policy are mutually reinforcing.

So who could provide the agency needed for a change? Besides NGOs, consumer organisations religious groups and environmental activists it could be trade unions (the latter are not too motivated as both puritanical positions, growth-driven developmentalists and nature-driven environmentalists tend to neglect the social and institutional sustainability dimensions). However, even more so it should be an obligation of the scientific profession and the disciplines to follow the example of the World Meteorological Organisation to speak out and shake up the public consciousness (which was the kick-off leading to the Climate Convention, the Kyoto protocol, the founding of the IPCC and more).

It should be a part of the ethos of scientists to speak out, to be active citizens sharing their knowledge, and to involve citizens in their research wherever appropriate (the extended peer groups of post normal science, see Funtowicz, Ravetz 1993, Spangenberg 2003). Beyond some whistle blowers and concerned minorities like the Union of Concerned Scientists in the USA, the Naturwissenschaftler/innen-Initiative in Germany and the International Network of Engineers and Scientists for Global Responsibility INES, the mainstream of each discipline should take a stance for change: "whoever wants things to stay as they are does not want them to stay". The economics profession bears a special responsibility, as they can massively influence the credibility and thus the weight of actors on the one hand, and as they are so far one of the most important political sources of concepts and opinions deceiving the need for change.

Economics must change, reinvent itself in the real world, to transform itself from a part of the problem into an element of the solution. Developing degrowth economics would be a substantial part of this process.

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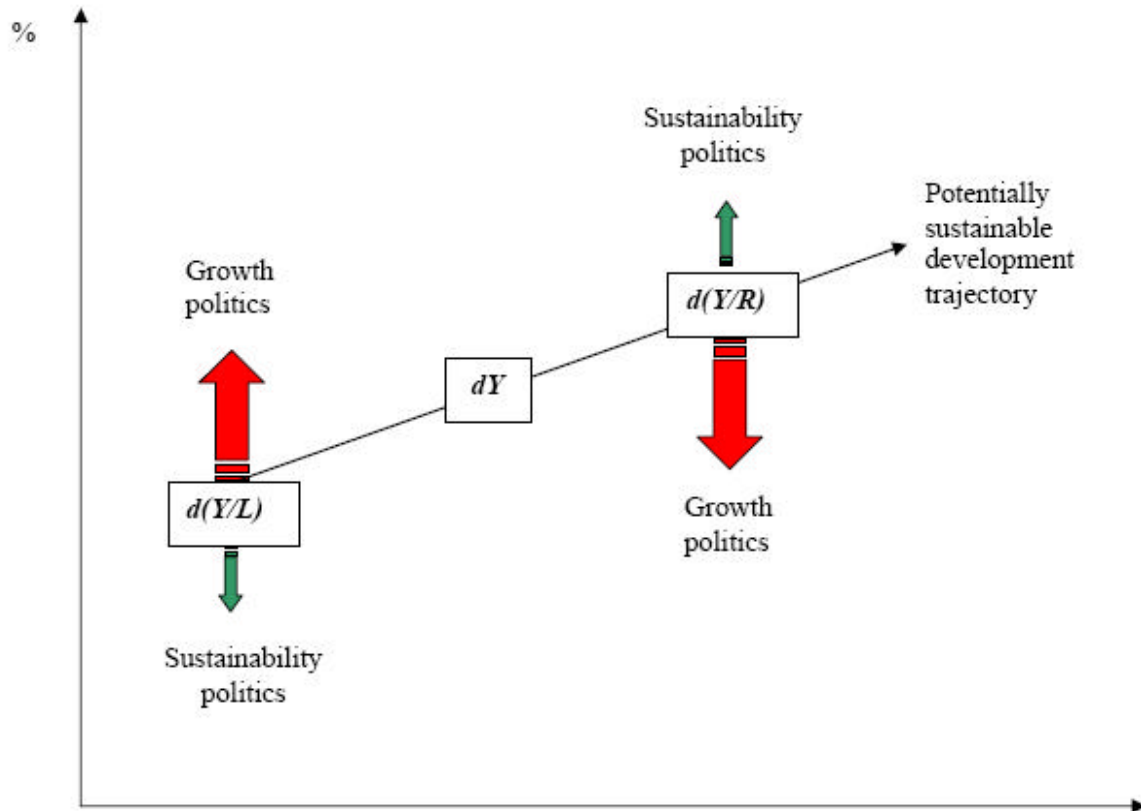
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Annex



Growth politics is structurally anti-sustainable, pushing both ends of the inequality towards the wrong direction.

Figure 3: Extended working hours increasing $d(Y/L)$ and decreasing environmental standards, plus the aversion against eco-taxes reducing incentives for resource productivity increase are structurally anti-sustainability policies

Economic De-growth vs. the Steady State Economy: complements or contradiction

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Abstract

Based on the criticisms of Nicolas Georgescu-Roegen (1976; 1977) de-growth advocates claim (e.g. Latouche 2006) that a steady state economy i.e. an economy that neither grows nor shrinks in physical terms, is impossible and undesirable, leaving economic de-growth as the only viable alternative goal to the growing economy. This article is an attempt to challenge this position and consolidate the two concepts. It is argued that many criticisms are due to a too narrow definition of, what I refer to as, the dynamic equilibrium steady state economy (DESSE). Moreover, far from contradicting themselves, economic de-growth is not an independent goal (end-point) but merely one of several paths towards a DESSE, which is a valid description of sustainability (Kerschner 2003). The two concepts, if combined could mutually benefit from the grass-root appeal seen in the de-growth movements on the one hand and the strong theoretical economic roots on which the DESSE is built on the other. Most classical economists including Adam Smith, Thomas Malthus, Karl Marx and John Stuart Mill, agreed upon the existence of a steady state and many of them regarded it as desirable. Same is true for Joseph Schumpeter and John Maynard Keynes. Herman Daly (1992) was the first author who developed a clear pre-analytical vision of a steady state and who suggested three specific policy instruments for steering toward such a state. Therein, unlike de-growth authors, he is not afraid of addressing over-population. Both, the pre-analytical vision and these instruments can equally be applied in the case of economic de-growth. Such a reduction in throughput may indeed be necessary in the over-consuming north, while some further economic growth may still be desirable in the poor south. The goal is not de-growth towards annihilation, as suggested by Nicolas Georgescu Roegen, but a balanced DESSE. Just like sustainability, so it is argued, this goal is an unattainable one - a concept described in social psychology -, but can and should be approximated.

Keywords: Steady State Economy, Economic De-Growth, Unattainable Goals

1. Introduction

Economic de-growth in its somewhat smoother sounding French version 'la décroissance', first appeared on the scientific and political arena when Jacques Grinevald (1979) translated the major works of Nicholas Georgescu-Roegen into French. There is not one unique definition of

the concept yet, but it is understood here as shrinking the human economy in physical terms. Georgescu-Roegen, the author of "The entropy law and the economic process" (1971), challenged the neoclassical economic 'growth paradigm' (unlimited economic growth is possible and desirable). He insisted that the human economy in the industrialized world was already too large and needed to shrink. This argument was partly confirmed by the Club of Rome report "The limits to growth" (Meadows, Meadows et al. 1972). Unlike Georgescu-Roegen, the authors considered the possibility of an optimal sustainable size of that economy, which they thought could *still* be attained. Herman Daly, a student of Georgescu-Roegen and strong supporter of his thermodynamic world view, also believes that there can be an optimal sustainable state of the human economy: the dynamic equilibrium steady state (DESSE)¹ (Daly 1992; 2007; 2008). Strongly influenced by the classical economist John Stuart Mill, he describes an economy that does neither grow nor shrink physically in the long run: "an economy with constant stocks of people and artefacts, maintained at some desired, sufficient levels by low rates of maintenance 'throughput', that is, by the lowest feasible flows of matter and energy from the first stage of production (depletion of low entropy materials from the environment) to the last stage of consumption (pollution of the environment with high entropy wastes and exotic materials)." Daly (1992, p. 16).

2. History of the Steady State Economy

The roots of Daly's concept of a steady state economy can be found in classical economic theory. This tradition, so he argues, was still characterised by a concern to adapt the economy to physical realities, while neoclassical economic theory wants to "(...) adapt physical reality to the dictates of the economy" (Daly 2007, p. 118). Most classical economists had their vision of a 'stationary state', which was commonly regarded as the ontological inevitable endpoint of economic growth and development caused by population growth and decreasing revenues. The term 'stationary state' was first mentioned by Adam Smith (1723-1790), in "The Wealth of Nations" (Smith 1776). Smith was convinced that economic growth was the source of all wealth and therewith laid the foundations of the neoclassical 'economic growth paradigm'. To him "...the stationary is (a) dull..." (Smith 1776, p. 99) state to be in and generally equal to poverty.

For Thomas Malthus (1766-1834) it was in fact the inability of the human society to establish a stationary state that convinced him of its eternal condemnation to 'vice and misery'. This was the inevitable outcome of his 'population principle': On the one hand humans are unable to control their exponential population growth. On the other hand food production is growing only linearly, causing humanities continuous overshooting of the carrying capacity² of its habitat. The result, according to Malthus,

¹ Initially Daly only talked about a steady state economy (SSE) (Daly 1992) adding "dynamic equilibrium" in order to emphasise that his concept was not something absolutely rigid (Daly 2008) (see also quote below). The acronym "DESSE" is introduced by the author of this paper.

² Malthus did not use the concept of 'carrying capacity', which

was 'misery' as the overshoot was to be reduced again by positive checks, which increase the death rate e.g. wars, famines and diseases and preventive checks in the form of 'vices' e.g. abortion, birth control, prostitution; (Malthus 1993 [1798]). He somewhat softened his dire conclusion in a later publication, when he acknowledged *moral restraint* as another possible preventive check.

John Stuart Mill (1806-1873), who could be considered as one of the last important thinkers³ of the classical tradition, had a highly optimistic vision of the stationary state. His writings on the subject provide the historical inspiration for Daly's 'normative' (i.e. desirable) steady state. Mill in his own words 'romantically' thought of it as a situation with "(...) a well-paid and affluent body of labourers; no enormous fortunes, except what were earned and accumulated during a single lifetime; but a much larger body of persons than at present, not only exempt from coarser toils, but with sufficient leisure, both physical and mental, from mechanical details, to cultivate freely the graces of life, and afford examples of them to the classes less favourably circumstanced for their growth." (Mill 1888, p. 454). He was convinced that humans would "(...) be content to be stationary, long before necessity compels them to it" (Mill 1965 [1948], p. 756) as he believed "(...) that it would be, on the whole, a very considerable improvement on our present condition." He was "(...) not charmed with the ideal of life held out by those who think that the normal state of human beings is that of struggling to get on; that the trampling, crushing, elbowing, and treading on each other's heels which form the existing type of social life, are the most desirable lot of human kind, or anything but the disagreeable symptoms of one of the phases of industrial progress." To him "(...) the best state for human nature is that in which, while no one is poor, no one desires to be richer, nor has any reason to fear being thrust back, be the efforts of others to push themselves forward" (Mill 1888, p 453).

The experience of the enormous technological progress during and after the industrial revolution, fuelled by coal first and petroleum later, changed the economist's vision of the stationary state fundamentally. Classical worries about the limits imposed to the expansion of the human economy by the planets carrying capacity (Malthus 1798), the finiteness of arable land (Ricardo 1817) and the exhaustibility of non-renewable resources (Jevons 1865), were brushed aside as dusty remainders of the early modern period. Economic growth now appeared unlimited and the stationary state mutated from an ontological reality to an analytical fiction (Luks 2001). Joseph Schumpeter, a teacher of Georgescu-Roegen, was a notable exception to this tendency. He dedicated a considerable amount of his work to the stationary state, which he called 'circulation' and which - so he thought - once attained, would result in the collapse of capitalism (Schumpeter 1993 [1942]). John Maynard Keynes also maintained his reservations with regards to the technophilia of his neoclassical peers and who continued to write about an ontological version of a

was developed much later, but his 'population principle' described here could be seen as the historical basis for this concept (Seidl and Trisdell 1999).

³ Henry George (1893-1897) could be regarded as the last classical economist.

steady state. He described a 'quasi stationary community' (Keynes 1936, Ch. 16), which would be characterised by a stable population, the absence of wars and several generations of full employment. The 'marginal efficiency of capital' would fall to zero, leading to a near zero interest rate and consequently the 'euthanasia of the rentier' (Keynes 1936, Ch. 24) – the inability to live of ones accumulated wealth.

3. Daly's pre-analytical vision and DESSE institutions

Based upon this rich theoretical history and on Georgescu-Roegen's (1970) flow-fund model, Daly (1992) built his normative concept of an ontological steady state, according to the definition given above. The ratios and efficiency measures given in Equation (1) constitute the core of this concept and are a result of his 'pre-analytic economic vision'. This vision in turn perceives the economy as a stock of people and artefacts, which require maintenance via throughput of a flow of physical matter and energy. Stocks provide service and as shown in ratio (2) and (3) cancel out just as they wear out in the real world. Service is the ultimate benefit of economic activity and should be maximised while throughput is the ultimate cost of this service and should be minimised. De-growth 'prophet' Serge Latouche's eloquently popularized recommendations for socio-economic transformation, wrapped up in an ever increasing number of 'R's' (Restructure, Redistribute, Reduce, Reuse and Recycle) (e.g. Latouche 2004)⁴, are all entailed in Daly's stock-service-throughput equation and can be seen as useful and stimulating key-words for putting it into practice.

$$\frac{\text{(1) service}}{\text{throughput}} \equiv \frac{\text{(2) service}}{\text{stock}} \times \frac{\text{(3) stock}}{\text{throughput}}$$

Equation 1: Service, Stock and Throughput and their interrelations (adapted from: Daly 1992, p. 36)

Just like John Stuart Mill at his time, Daly is convinced that it would be of great benefit to the human society to establish a SSE before it is inevitable. For this purpose he (1992) offers three institutions: (1) Aggregate physical depletion quotas for stabilizing the stock of physical artefacts and to keep throughput below ecological limits. (2) A distributionist institution for limiting the degree of inequality in the distribution of the constant stocks and (3) some form of population control e.g.: transferable birth licenses (Boulding 1964). Without going into the details of any of these institutions, it should be underlined that, unlike de-growth writers (e.g. Bonaiuti 2006; Grinevald 2006; Latouche 2006, etc.), Daly (e.g. 1992, 2007), is not afraid of addressing the issue of human over-population.

4. De-growth, Steady State and Population

Writing about the need for population control is still seen as a taboo and being called a neo-Malthusian is usually considered something negative. Moreover the Anti-

⁴ At the time of writing this list has apparently been amplified by three more 'R's': Re-evaluate, Re-conceptualize and Re-localize (<http://decrecimiento.blogspot.com/>).

Malthusian mainstream tends to argue that Malthus was too pessimistic with regards to technological progress and that his theories have been proven wrong by history (e.g. Economist 2008). This line of reasoning resembles that of those arguing that humanity will not “run out” of non-renewable resources, because this has never happened in the past either (e.g. Lynch 1999). Instead, it is much more likely that the effects of Malthus’ population principle have only been postponed because of the enormous energetic subsidy that the human economy obtained and continues to obtain by tapping the underground storage of solar energy of millions of Palaeolithic summers, called fossil fuels. Just one barrel of oil, for example, provides approximately the equivalent of 13.7 thousand human labour hours in terms of potential work.⁵ Once this subsidy begins to subside we might see the “Malthusian devil” unleashed again.

Hence stabilisation or de-growth of the economy inevitably requires stabilisation or de-growth of the number of humans. The planets carrying capacity of our species is defined by the maximum sustainable impact (I) of our society. Impact (I) in turn is given by the well known equation $I=PAT$: population size (P), times its affluence (or consumption) (A), times the environmental damage (T) caused (Daily and Ehrlich 1992). The reduction of (A) by sufficiency and frugality as well as that of (T) by acting more environmentally conscious and by technological progress cannot proceed indefinitely, so (I) will inevitably continue to grow if population is not stabilized or decreased.

However Boulding’s (1964) top down market-based approach mentioned above, may not be the most appropriate policy option for such a delicate issue.⁶ Instead one may find inspiration in the euro-american neo-malthusianist women’s freedom movement of 1900, as suggested by Joan Martinez-Alier (2008). It demanded “conscious procreation” to prevent low wages and pressures on natural resources, as opposition to the interests of the state, who wanted more soldiers, and the churches, whose objective was (is) to outnumber the members of other religious groups (Martinez-Alier 2008).

5. Criticisms, challenges and discussion

Georgescu-Roegen rejected the romantic visions held by Mill and Daly about a possible steady state. On several occasions he articulated his utter disregard of all writers suggesting the feasibility and desirability of an optimal state (Meadows, Meadows et al. 1972), a steady state (Daly 1992) or the ‘environmentally friendly economic growth economy’ supposedly feasible via sustainable development (WCED 1987). His so called “fourth law of

⁵ 4.94 Gigajoule Net energy (Brown 2007) of an approximate 5.93 Gigajoule are contained in one barrel of oil. This is equal to 4.94 Giga-Watts maintained during one second. The maximum sustained output of a human being doing heavy manual labour is assumed to be equal to 100 Watts, giving an approximate 13,700 hours of labour equivalent to one barrel of oil.

⁶ Boulding (1964) suggested creating a market for birth licences, where every couple would initially be issued 2.1 licences. Hence for having more than 2 children i.e. more than the simple reproduction rate one would have to find other couples, who were willing to sell all or part of their licences.

thermodynamics”, which in fact is vigorously defended by Daly, says that: “[c]omplete recycling is impossible. (...) [M]aterial objects wear out in such a way that small particles (molecules) originally belonging to these objects are gradually dissipated beyond the possibility of being reassembled” (Georgescu-Roegen 1971, p. 60). Since even in a steady state economy non-renewable materials are irretrievably dispersed, it cannot escape this “law”, leaving de-growth “towards annihilation” (Georgescu-Roegen 1976, p 23) as the only viable option.

This position is shared and propagated by most de-growth writers (e.g. Latouche 2006), although it usually goes conveniently unmentioned that the desirable end-point of Georgescu-Roegen’s de-growth economy was the disappearance of the human society. Instead the focus of the argument is placed on the fact that rich industrialised countries have evidently surpassed sustainable limits already and de-grow is therefore essential. This is however no reason for rejecting the objective of a steady state economy on a global level at some mutually agreed upon sustainable level of throughput. This objective can be achieved by de-growth in the North, while an increase in material wellbeing may still be desirable in the South, until a balance is reached (Figure 2). It goes without saying that the South would be well advised not to follow the North’s unequal and environmentally destructive model of economic growth.

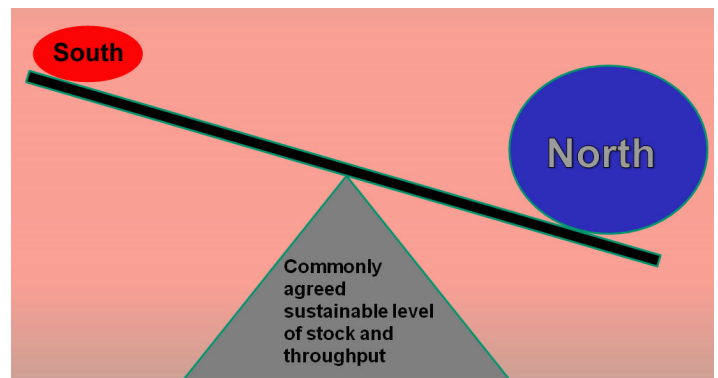


Figure 2: Balancing the world economy on some mutually agreed sustainable level of consumption by de-growing economies in the north, while allowing some more growth in the south.

Returning to Georgescu-Roegen’s 4th “law” mentioned above it should not go unmentioned here, that it is ‘only’ of practical relevance, as in theoretical terms it violates the first law of thermodynamics. According to this law matter is neither produced nor destroyed. Hence with sufficient energy it can always be re-concentrated after dissipation. Earth is not a closed system, but is subjected to a huge amount of solar energy influx, a large part of which is still unutilised. Capturing this energy could provide sufficient energy for allowing complete recycling (i.e. even 100%) according to Robert Ayres (1998). This consideration may be true in theoretical terms. However in practical terms one would have to imagine the following: with sufficient energy, all mined materials would be depleted first and then dissipated in the respective sinks of the lithosphere. This would further reduce the functionality of ecosystems and their services would have to be replaced. Then one would have to start “mining” the sinks, in order to recover (recycle) the dissipated materials. Considering the impacts

that “concentrated” mining all around the world has already, it is not difficult to imagine the practical impossibility of converting nearly all of the lithosphere into a huge mine. We have to keep in mind that the saturation of sinks for the waste products of the human economy (CO₂ in the atmosphere, nitrates in the water body, heavy metals in the soil, etc.) has become much more limiting than natural-resource scarcity.

Moreover there is another important lesson to be learnt from this thought experiment, namely that at current unsustainable lifestyles, it would be very dangerous indeed if humans found an inexhaustible and cheap source of energy, even if it were environmentally benign. Availability of energy has always been one of the most important limiting factors to the expansion of the human economy. Hence if we discovered some ‘miracle’ source of energy now, a massive explosion of the human population (P) and its consumption (A) and therefore a huge impact (I) would probably be the result. What humans are doing to the environment since they have found petroleum with its extremely high net-energy content is good evidence thereof.

Further criticism of the possibility of a steady state can be developed around the 2nd law of thermodynamics, which states that entropy increases in an isolated system. Entropy, which could roughly be defined as ‘the level of disorder’, has also been described as the “times arrow” (Eddington 1929) and only moves continuously in one direction. A standstill or steady state is therefore an entropic impossibility, at least in the long term. Two points have to be made with this respect: Firstly as already mentioned above, Earth is not an isolated system and the constant influx of energy from outside i.e. from the sun, could serve to withstand the entropic arrow until the end of the lifetime of the sun - at least theoretically. Of course the same practical limits apply here than in the case of complete recycling. However one might argue the smaller the structure i.e. the triangle in Figure 2 that has to be maintained, the easier this is, even if that structure may have to shrink over the long run. Secondly many of these criticisms can be attributed to an erroneously narrow definition of the steady state economy. Daly later emphasised that it is “... neither static nor eternal – it is a system in dynamic equilibrium within its containing, sustaining, and entropic biosphere” (Daly 2007, p. 117).

I would further add that it is important not to define the DESSE as a goal that can actually be arrived at in terms of an end-point. This is impossible in practical and entropic terms, as it was rightly argued by Georgescu-Roegen. Instead, it is an unattainable goal, which can only be approximated. Same is true for sustainability, which as I have argue elsewhere (Kerschner 2003) is equal to a DESSE. The importance of unattainable goals for humans like those used in religious contexts (salvation, enlightenment, ever lasting happiness,...), are well studied in social psychology (e.g. Wrosch 2003). They stimulate the creation of long-term visions, of the development of paths in order to approach the goal and serve as a motivation to move on in life. The dire end-point and therefore goal of economic de-growth according to Georgescu-Roegen - annihilation- is hardly an end that can fulfil this purpose. At the moment one could argue that many of us, at least in the industrialised world, are driven by unattainable goals which are formulated in an individualistic and relative sense. We

strive to be wealthier, prettier, more skilled, more admired or more powerful than everyone else. Since not everybody can be relatively better than everyone else, these are clearly unattainable goals, many of which constitute the goal or end-point of the economic growth path. The DESSE on the other hand can be an objective that is both motivating and solitary.

However, Daly (1992) himself admits that at the present state of affairs the DESSE is utopian. The same is true for Latouche (2006) and the de-growth economy. They are not ideas that people would voluntarily vote for, unless there was, what Daly (1992) calls, ‘moral growth’. However even those who might be willing to push for a radical change towards a different economy, would probably not be enthused by the imposition of Daly’s institutions, which have an air of authoritarian top-down decision making. This and the unappealing sound of ‘standstill’ might explain why the concept has not resulted in the creation of grassroot movements such as those found under the heading of ‘la décroissance’ in France, ‘la decrescita’ in Italy or ‘el decreixement’ in Catalonia. Their revolutionary spirit and provocative slogans may indeed be more suited to overthrow the economic growth dogma, than does the less tangible concept of a steady state economy. Nevertheless these movements, somewhat comparable to those gathered around the ‘factor 4’ (or ‘factor 10’) slogan, are also unlikely to be relevant on a large scale, in the absence of ‘moral growth’.

Such an advancement of the ethical properties of our society may occur in the presence of a radical external shock or crises such as that expected to be provoked by Peak Oil (the maximum level of worldwide petroleum production) or the current food and financial crises, which are of course not unrelated to the former. If unanticipated and without plans for adaptation however, the exact opposite i.e. moral de-growth and a return to authoritarian regimes could be the case (Leggett 2006; Ledera and Shapiro 2008). Even more than a well managed crisis, moral growth will require an ‘ultimate ends’ discussion. This means to redefine the true purpose of the economic process, which may be as diverse as there are cultures and religions but will be based on immaterial endeavours and the ‘joy of life’ (Georgescu Roegen in Grinevald 2006) or words such as ‘love’ and ‘compassion’, considered too esoteric even within the revolutionary spirit of the de-growth community. ‘Solidarity’ called upon by Latouche (2006), belongs to the realm of ethics and is thus only an ‘intermediate end’ that does not go far enough.

6. Conclusion

In this article it has been shown that on the one hand both concepts, ‘economic de-growth’ and Daly’s dynamic equilibrium steady state economy (DESSE) are motivated by the writings of Nicholas Georgescu-Roegen and are facing similar challenges: utopian critique, precondition of moral growth and a missing ‘ultimate means’ discussion. On the other hand they complement each other as the former offers radical grass-root appeal, while the latter practical macroeconomic solutions. Moreover the two concepts combined, would possess radical and provocative slogans to challenge the neoclassical growth paradigm, a

sound theoretical basis on the writings of the most important economists and could jointly address the population question. In fact, based on the analysis above, I argue that 'economic de-growth' is *not* an *alternative* to the DESSE but a practical mind-provoking necessity for reaching this state on a world-wide level by de-growing the rich North while allowing some more economic growth in the poor South.

Moreover, I agree with Latouche's (2004) critique of the objective of 'sustainable development' and the way it is being used to justify the maintenance of the status quo. Georgescu-Roegen (1993) had already referred to it (and also to the steady state economy, to small is beautiful, to factor 10, etc.) as mere 'snake oil'. However, I believe that 'sustainability' by itself remains a valid goal (instead of a process as some would argue) if defined as an *unattainable* goal. The DESSE in turn is a valid description of what sustainability might look like (Kerschner 2003), even if both are unattainable. Despite their elusiveness, both can (and should) be approximated. Leading towards these goals, there are a multitude of different *paths*, consisting of top-down and bottom up approaches in differing proportions for every particular geographic, social and historical context. Economic de-growth is only one of these paths, but undoubtedly a necessary one for certain regions over a certain period of time.

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GDP growth, consumption and investment composition: feasible transition paths towards energy sustainability

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Abstract

GDP growth is at the centre of economic analysis, political agenda and public debate. The correlation among GDP per capita, material welfare and well-being is increasingly held as limited. We develop a dynamic model to focus on growth feasibility in an era of increasing scarcity of fossil fuels. Our analysis suggests that the sustainability window might be very narrow. Policy should stimulate investment in alternative energy sources, target low growth rates, and discourage consumption growth; high GDP growth rates reduce the attraction basin of the long-run sustainable income.

Keywords: GDP growth, investment in alternative energy sources, consumption, backstop technology, environmental limits

1. Aim and structure of the paper

Economic growth is at the centre of economic analysis, political agenda and public debate. Positive rates of GDP-per-capita growth (that is, exponential growth) are taken as a physiological feature of contemporary economies so that any slowdown is a cause of worry and calls for action. However, particularly in the last three decades, doubts have been raised about both the feasibility and the desirability of unlimited growth.

The present paper would like to contribute to the growth debate by focusing on the relationship between energy and GDP growth. Our main aim is to address whether and to what extent growth involves the risk of running out exhaustible energy sources fuels before enough knowledge and production capacity in alternative (and cleaner) sources have been developed. We build a simple one-sector growth model in which the accumulation process of alternative energy sources capacity is explicitly considered. By envisaging alternative hypothetical scenarios, we discuss feasible paths and, therefore, highlight some pros and cons of economic growth. In particular, the paper will show the

short- and long-run outcomes of policies that involve different growth rates and dissimilar time profiles of the energy mix between exhaustible and alternative energy sources.

The paper is structured as follows. In the next section arguments in favour and against growth will be briefly recapped. In section 3 the key elements of our analysis will be outlined. Section 4 presents a one-sector dynamic model of an economy using both exhaustible and alternative energy. In section 5 possible scenarios will be analysed and discussed. In section 6 we will draw some conclusions.

2. GDP growth: pros and cons

The importance attributed to growth is grounded on several reasons.

- 1 The growth of GDP allows offsetting the decrease in the demand for labour due to the effects of technical change on productivity. Increases in productivity require constant growth in GDP to keep the same level of employment. For instance, if technical advances in productivity destroy approximately 2% of jobs each year, GDP must increase at least as much as productivity. As argued by Kennet and Heinemann (2008, 6), “this is the most important driver to promote ever further economic growth” as it appears to be difficult to gain support among the general public for the reduction of the average number of hours worked per person.²
- 2 The main Keynesian recipe for decreasing unemployment has been the increase in the equilibrium level of income. Demand for labour derives in fact from the demand for goods and services. An increase in the demand for goods and services determines a rise in employment and a consequent decrease in unemployment (if the elasticity of employment in relation to output is positive).
- 3 An increase of income per capita is regarded as a widening of the set of choices available to individuals. Therefore it is seen as an increase in individual freedom of choice.
- 4 Chief executive officers strengthen their power if they are able to increase sales and the market share of their corporation.
- 5 Firms tend to invest in technical change, which enhances competitiveness, if they forecast an increase in demand of the goods and service they supply.
- 6 Economic growth provides resources for basic research and R&D.
- 7 Increasing GDP reduces conflicts in income distribution and facilitates redistribution policies creating economic resource to improve the living standard of low-income citizens.

¹ We received many useful comments from the participants in the International Conference “Economic Degrowth for Ecological Sustainability and Social Equity” (18-19 April 2008 Paris). Shortcomings remain our own. This paper is the result of joint work. However, the authorship can be attributed as follows: sections 1, 2 and 3 have been written by Luzzati and Morroni, 4 and 5 by D’Alessandro, 6 by Luzzati.

² The reduction of the average number of hours per worker would represent a way “to convert unemployment for a few into more leisure for many” (Victor, 2008, 11). However this solution encounters some difficulties since it implies a decrease in individual wages.

- 8 GDP expansion facilitates the provision of public goods. "With growth, tax revenues increase without any alteration in tax rates being necessary", and so improved public services can be provided "without any tax rate increases" (Anderson, 2007, 4).
- 9 Growth facilitates the reimbursement of private and government debts and the payment of the interest due on it (Wall, 2008, 7).
- 10 GDP growth makes available resources to cope with the increasing burden of pension and health systems due to soaring life expectancy. Moreover, the financial weight of the health systems is increasing also by the effect of the expansion of the cost of medical cares and health insurances.

The above mentioned reasons have induced governments across the world to pursue the goal of GDP growth. However, in the last three decades, an increasing awareness of the negative consequences of an unlimited growth has arisen. Numerous authors have contended, on the one hand, the aim of a continuous growth that implies increasing economic and social costs stemming from the depletion of natural resources and from pollution, and on the other the GDP definition itself, which does not reflect the real level of welfare.³ It is not conceivable the Earth to support 6.6 billion people with the levels of consumption and depletion of natural resources that characterise developed countries.⁴ A wide range of proposals has emerged in response to the increasing need to reconcile environmental limits with social and economic goals. These proposals, focusing on the decoupling both of welfare from economic growth and of matter from economic output proposals, have been presented under the labels of de-growth, dematerialization, sustainable development, steady-state economy, eco-development, serene downscaling, qualitative development versus aggregate quantitative growth, and so on.

3. The main thread

The issue of exhaustion of fossil fuels and its impact on the economy has been thoroughly debated. The shared conclusion by mainstream economic literature is rather optimistic. Resource scarcity, signalled by increases in prices, would stimulate both technological progress and substitution of natural resources with capital. The possibility of long-run energy shortages was ruled out "by assuming away the essence of the problem" (Dasgupta and Heal 1974, 7), that is by postulating the emergence, sometime in the future, of a "backstop" technology (as named by Nordhaus, 1973) consisting in a discovery that would provide the economy a steady stream of energy resources. As a consequence, standard economic literature focused mainly on optimal depletion paths of exhaustible resources and on rents and prices.

³ A distinction must be made here between rich and poor countries. If one may argue that in rich countries a mere quantitative growth of consumption of goods is increasing costs faster than benefits, in poor countries GDP growth still increases welfare. On this see, Daly (2008, 2).

⁴ For a recent discussion on this, see Kennet and Heinemann (2008, 3) and Wall (2008, 1-2).

At the same time, searching for a backstop was acknowledged as a costly process which implies that the problem "also involves finding the correct allocation of the resources used between the production of goods and expenditure on research" (Dasgupta and Heal 1974, 5). Several papers investigated the issue of the endogenous efforts in discovering a backstop technology (e.g. Dasgupta et al., 1977, Kamien and Schwartz, 1978, Hung and Quyen, 1993). Tsur and Zemel (2003, 2005) followed a different line and assumed that investment in R&D continuously improves an existing backstop by reducing the costs of supplying the resource.

A common feature of the literature is that the services available from the backstop, once in existence, is a control variable. Some authors assume that the backstop supplies, at each time, a fixed maximum amount of services at zero costs (see, e.g., Dasgupta and Heal 1974); others impose no limits to the amount of services, which are provided, however, at very high costs.

In our model the development of a backstop is costly. As in Tsur and Zemel (2005), investments continuously affect the technology of alternative energy sources; however, we model this as a non linear process (see equation 6 and 7) that allows for technology take-off. A major departure from the literature is that, at each time t , the amount of energy which can be harnessed is determined by the past accumulation in alternative-energy-sources capacity (defined as 'AESC' from here onwards).

We model an economy that uses capital (in a broad sense to include both physical and human capital) and energy to produce a composite homogenous good. Production elements are divided in funds and flows. Capital and labour are funds because they participate in many processes being maintained in efficiency by outside processes⁵ while energy is a flow since it participates in only one production process.⁶ Hence broad capital and energy should be mainly considered as complementary⁷, involving low elasticity of substitution in the production function. As a simplification, which however does not affect our qualitative results, we assume perfect complementarity between broad capital and energy.

Apart from consumption, the produced homogenous good can be invested either in capital or in alternative energy accumulation. The reason for investing in the backstop is not a matter of economic returns rather is made for avoiding energy shortages in the future. An exponential

⁵ Georgescu-Roegen (1969 in 1976a, 83-4, 86); cf. Morroni (1999, 197-9). If durable instruments of production are treated as funds there is no need to consider these elements as joint products of the process, or to prolong the duration of the process until they are used up completely (Tani, 1988, 7).

⁶ Georgescu-Roegen gives a good example of the difference between flows and funds: with a box containing twenty pieces of candy, "we can make twenty youngsters happy now or tomorrow, or some today and others tomorrow, and so on." But with one hotel room "we cannot make one thousand roomless tourists happy *now*. We can only make one happy today, a second tomorrow, and so on, until the room collapses" (Georgescu-Roegen, 1971, 226).

⁷ On substitutability between flows and funds, see Georgescu-Roegen (1979, 98-9, 1992, 144). Cf. Stiglitz's (1997, 269-70) reply.

increase in GDP sustained by fossil fuels involves, on the one hand, more resources available for investment in the backstop, on the other, an acceleration of the depletion time of the exhaustible resources. To explore such a trade-off we developed a model (section 4) and simulated it (section 5).

Before moving on, some qualifications are needed. First, since we would like to provide a positive analysis of the sustainability implications of GDP exponential growth, we focus on feasibility rather than on the maximisation of social welfare. Second, our simulations are scenarios aimed at exploring qualitative findings, they are not predictions. Third, for reasons that will be discussed in the conclusion, we set the values of the parameters to rule out exponential growth in the long-run.

4. The Model

Broad capital and energy are the complementary inputs for the production of a composite commodity Y:

$$Y(t) = \min [AK(t), \epsilon(t)E(t)] \quad (1)$$

where K is the capital fund, E is the energy flow, $A > 0$ is a technological parameter. ϵ is the energy efficiency that increases (asymptotically to the limit Ψ) due to exogenous technical progress, that is, $0 < \epsilon(t) < \Psi \quad \forall t$, and $\Delta\epsilon(t) > 0$.

Capital accumulation is standard

$$K(t+1) = I^K(t) + (1-\delta^K) K(t), \quad (2)$$

where $I^K(t)$ is the level of investment in the capital sector, and δ^K is the depreciation of capital per unit of time.

We use the standard, although strong, assumption that the two types of energy are perfect substitutes

$$E(t) = Q(t) + H(t) \quad (3)$$

where Q and H are the services of fossil fuel extraction and alternative energy resource harness respectively.

Extraction unit costs, expressed in terms of the resource itself⁸, depend inversely on the exhaustible resource stock, X(t). Hence the dynamic of X is

$$X(t+1) = X(t) - Q(t)\{1 + \alpha[X(t) - \alpha]\}, \quad (4)$$

where α is the level of exhaustible resource at which extraction is technically impossible.

The harness of alternative energy sources depends on AESC (alternative energy sources capacity) indicated as R. For simplicity, we assume that this energy flow is a linear function of the stock R(t), that is

$$H(t) = h R(t) \quad (5)$$

R is increased through the following accumulation function:

$$R(t+1) = [I^R(t)]^\mu f(R(t)) + R(t) - \delta^R [R(t) - R(0)], \quad (6)$$

where $I^R(t)$ is the level of investment in the alternative resource sector, δ^R is the depreciation of installed capacity per unit of time, R(0) is a minimum level of AESC which represents the ability of humans to exploit alternative

energy sources (as biomasses) with no investment, $\mu \leq 1$, and

$$f(R(t)) = \beta + \theta / \{1 + e^{[\eta - \rho R(t)]}\}, \quad \text{with } \beta, \theta, \eta, \rho > 0. \quad (7)$$

This logistic function takes into account the diffusion of knowledge determined by the increase of the level of stock R. Both the parameter μ and the function $f(R(t))$ determine the marginal productivity of investment. If $\mu < 1$, the marginal productivity increases for low levels of R(t) but, after a certain capacity level, will decrease. Hence, $\mu < 1$ rules out exponential growth in the long-run.⁹

Finally, the economy allocates the produced commodity between consumption, C, and investment, both in broad capital and in alternative energy capacity,

$$Y(t) = C(t) + I^K(t) + I^R(t) \quad (8)$$

5. Results

The technical efficiency condition (see equation (1)) entails that the energy requirement is

$$E(t) = A K(t) / \epsilon(t), \quad (9)$$

that is,

$$Q(t) + H(t) = A K(t) / \epsilon(t). \quad (10)$$

As long as the exhaustible stock (X) provides enough energy supply (Q), energy is not a limiting factor; alternative energy (H) is not strictly necessary and the economy uses the above defined R(0). (Remember $H = h R$)

Hence, the production structure of this economy means that when the availability of exhaustible energy is not binding, the model is a simple AK growth model (Rebelo, 1991) with the economy growing at rate

$$g^* = [1 - c(t)] A - \delta^K, \quad (11)$$

where c is the propensity to consume and $[1 - c(t)]$ is the share of income to investment in capital when investment in AESC is zero.

Suppose that at some time τ the issue of exhaustion enters the political agenda. The economy starts investing in alternative energy sources, both in terms of research and development, and of capacity in order to avoid, if possible, energy shortages when, at time τ , exhaustible energy will be exhausted. In this model, energy shortage involves that a certain quota of capital becomes idle due to lack of energy flow (see equation 9).

We would like to focus on investment paths in R. As highlighted in section 3, accumulation in alternative energy capacity is costly in terms of either present or future consumption (via reduction of capital investment).

For the sake of simplicity, we assume that propensity to consume is constant¹⁰, $c(t) = c$, and that a share of the capital investment, $\phi(t)$, is diverted to the accumulation of AESC. Hence the allocation is

$$Y(t) = cY(t) + [1 - \phi(t)] (1 - c) Y(t) + \phi(t) (1 - c) Y(t). \quad (12)$$

⁹ We will come back later on this point.

¹⁰ Actually, propensity to consume is mildly increasing. This would make the scenarios presented in section 5 less favourable.

⁸ They are usually expressed in terms of the commodity produced by the economy (e.g., Tahvonen and Salo 2001).

Low (high) ϕ 's would entail relatively high (low) growth rate, which in turns would increase (decrease) the absolute amount of investment in R. However, high (low) growth rates would accelerate (slow down) extraction of the exhaustibles, leaving less (more) time to prepare the transition (i.e., accumulate R).

It has to be stressed that, in our model, $\phi(t)$ can be chosen only before exhaustion ($t < \tau$) since technical efficiency (equation 9) is satisfied by the exhaustibles. After $t = \tau$, $\phi(t)$ has to be set to get technical efficiency. In particular we can distinguish two cases, whether at time τ the level of AESC is or is not enough to satisfy technical efficiency. In the first case $\phi(t)$ will be set to meet technical efficiency. In the second case, energy shortage will make capital idle; the economy will then invest only in AESC ($\phi=1$) so to decumulate capital and accumulate AESC as fast as possible and make technical efficiency to be re-established as soon as possible. Our simulations, therefore, compare the paths involved by different choices constant values of ϕ for $t \in [\underline{t}, \tau]$, while after τ the investment in AESC is determined by the purpose of reaching technical efficiency.

Figure 1 and Figure 2 (see Annex) show the resulting patterns of aggregate consumption, for two economies which differ only for the initial level of capital.

As mentioned before, parameters are set to rule our exponential growth. In this case the model can exhibit two steady states, a lower one, consistent with the minimum level of alternative sources, and a higher one, whose level depends on the propensity to save and on the parameters of the accumulation of AESC (equation 6 and 7) that also determine the attraction basin of the equilibria.

For instance, let us consider the red path shown in Figure 1. In this case, given $\phi = 0.4$ and $(1-c)=0.2$, 8% of GDP is allocated to the accumulation of AESC; as a consequence the economy rate of growth is 3.6% for $t \in [\underline{t}, \tau]$. At $t=\tau$ exhaustion occurs, part of capital becomes idle, income and consumption falls dramatically. After a while, decumulation of capital and accumulation of AESC will make technical condition (9) to hold again and the economy will start recovering towards the higher steady state. Increases in ϕ , by slowing down capital accumulation, involves lower consumption and GDP growth rates (green and grey paths). The danger, however, will come from a low share of income invested in AESC, as in the red path where ϕ is 0.3. Higher income growth rate for $t < \tau$ will entail not only a deep short run crisis but also, *ceteris paribus*, a long-run collapse. Thus two interrelated policy problems are highlighted, on the one hand, the need to avoid (or to minimize) short-run crises, on the other, the risk of missing the attraction basin of the higher long-run steady state. For the economy depicted in Figure 1, both the short term energy shortage and the long term collapse will be avoided by a high share of investment in AESC which will entail low growth rates and extend the time available to build in AESC.

A third problem is, not surprisingly, the high sensitivity of the path parameters and on initial conditions. This is evident when comparing the red with the blue path in Figure 1 or the grey with the green path in Figure 2; the

latter example is particularly striking since the two paths differ only for a 0.2% of GDP invested in AESC.

Figure 2 is aimed to show the change in qualitative results depending on the initial level of capital. If the initial capital level is low, growth becomes needed to provide enough resources for the take-off in the accumulation of AESC. Differently from the case described in Figure 1, the economy of Figure 2 risks the long-run collapse not only for too low, but also for too high shares of investment in AESC (e.g. for any shares higher than 11.8%). The reason is that, for a given propensity to save, investment in AESC drains economic resources from investment in capital.

6. Concluding remarks

Fossil energy sources have been fuelling economic growth since industrial revolution. They are a very special treasure since they provide large quantities of energy at low costs and in concentrated and easy to use forms. Our analysis, which is build on the awareness that to find substitutes for fossil fuels is necessary but both difficult and costly, shows that the window of economic sustainability might be very narrow. High levels of income growth, on the one hand, make economic resources available to investment in alternative energy sources; on the other entail a too rapid exploitation of exhaustible energy. Thus, diverting investments from physical and human capital to alternative energy sources might not suffice¹¹; an effective contribution to widen the sustainability window would come from increases of the saving rates and from reduction of consumption growth.

The case of unbounded long-run growth, although deliverable by our model,¹² is not included in the scenarios discussed above. Two reasons justify such a choice. First, one of the major conclusions, i.e., the need of high saving rates, would have not been affected. Second, as highlighted in section two, unbounded growth is unlikely to be optimal due to environmental limits. These limits would not be binding, as shown by standard growth literature, if one assumed that the whole economy will eventually be able to produce a unit of income with zero matter, that is, if GDP material intensity tends to zero (see Luzzati 2003). Actually, historical empirical evidence shows strong correlations between GDP, material throughput and waste/pollution, thereby confirming the idea, emphasised by Georgescu Roegen, that production consists of extracting and processing matter which becomes very soon waste. Energy is the key factor linking resource and waste/pollution sides. It is both an essential economic input and a major source of environmental pressures since, even if 'clean'¹³, it allows matter transformation. Thus, exponential GDP growth, for being accompanied and sustained by large amounts of energy and matter put our society at the risk of "poisoning" itself. The scenarios

¹¹ Several different simulations of our model corroborate this observation.

¹² Exponential long-run growth depends on the parameters of the accumulation process of AESC.

¹³ This is not to deny that substitution of alternative for exhaustible energy would involve a relevant reduction of human impacts on the natural environment and, in turn, an improvement of human well-being.

presented in this paper implicitly take into account the environmental limits by imposing a ceiling to long-run GDP.

To briefly recap, in this paper a dynamic model has been developed in order to focus on growth feasibility in an era of increasing scarcity of fossil fuels. The analysis suggests that the sustainability window of the economy might be very narrow. A policy toward sustainability might enhance its probability of success by stimulating investment in alternative energy sources, targeting low GDP growth rates, and curbing consumption growth.

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Annex

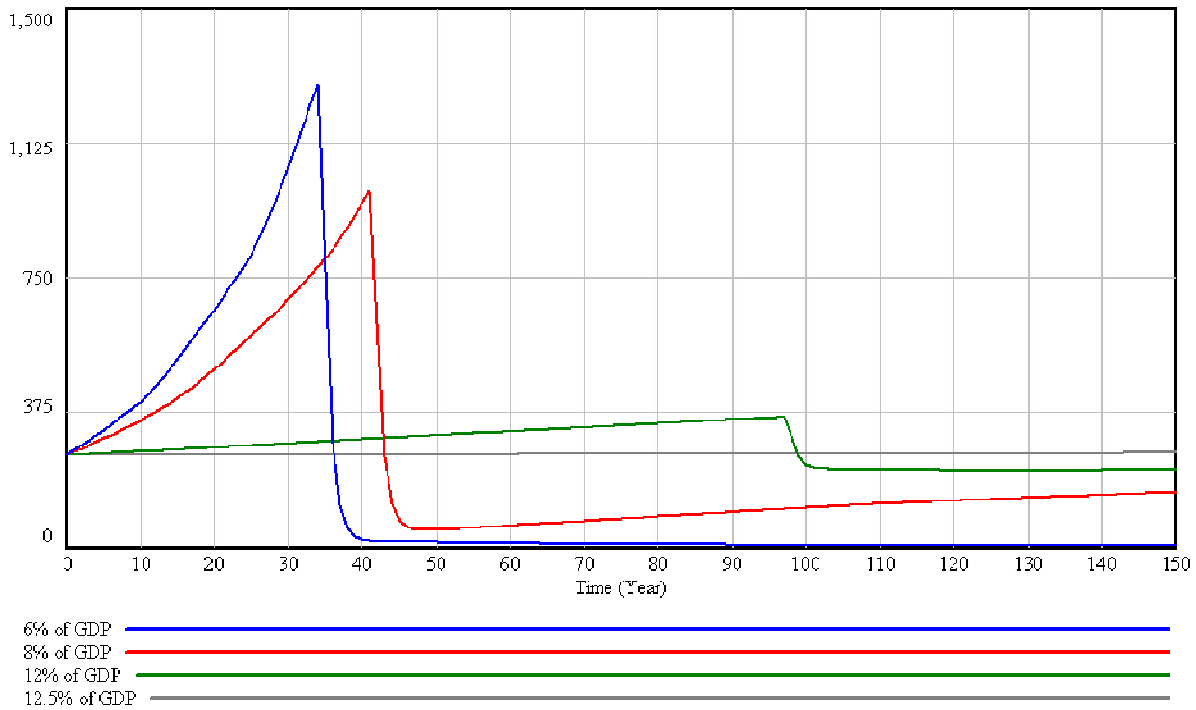


Figure 1. Consumption paths for different levels of investment in alternative energy (high initial capital level).

Initial conditions: $K(0)=400$, $X(0)=40000$, $R(0)=10$. Parameters: $c=0.8$, $A=0.8$, $\delta^K = 0.06$, $\alpha=1$, $h=0.5$, $\delta^R = 0.04$, $\mu=0.6$, $\beta=0$, $\theta=3$, $\eta=4$, $\pi=0.04$.

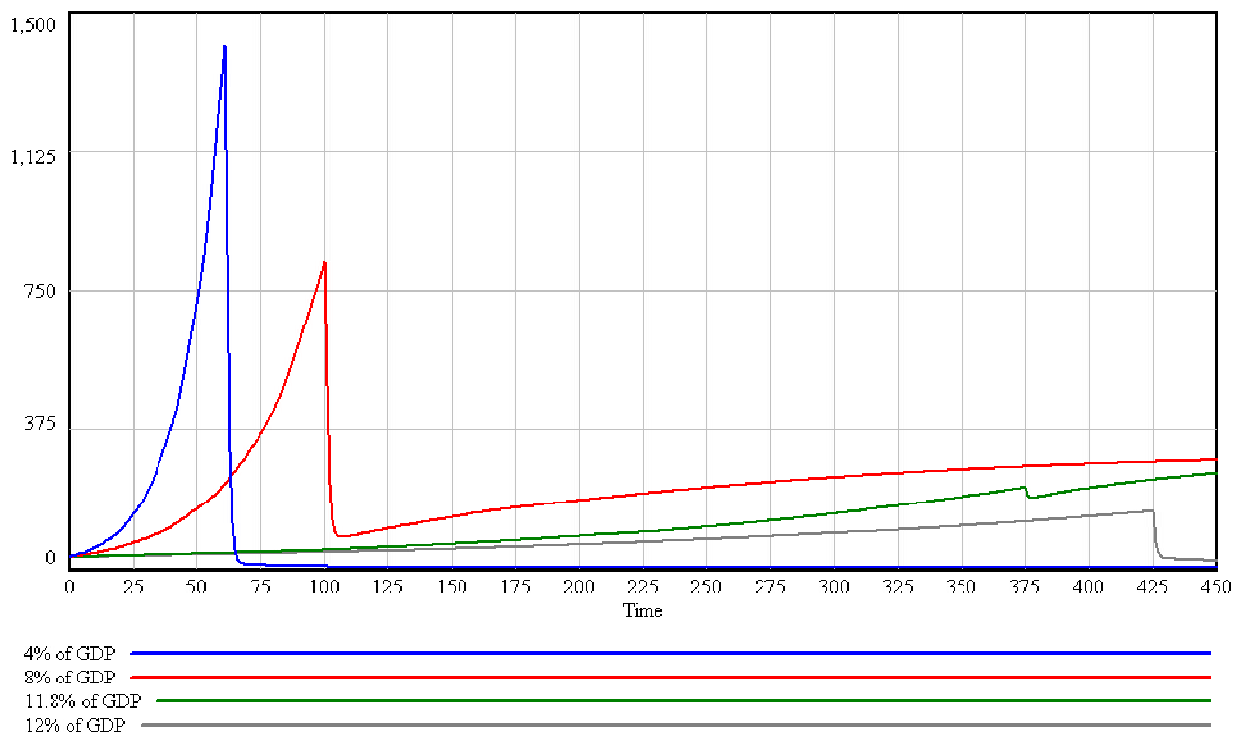


Figure 2. Consumption paths for different levels of investment in alternative energy (low initial capital).

Initial conditions: $K(0)=50$, $X(0)=40000$, $R(0)=10$. Parameters: $c=0.8$, $A=0.8$, $\delta^K = 0.06$, $\alpha=1$, $h=0.5$, $\delta^R = 0.04$, $\mu=0.6$, $\beta=0$, $\theta=3$, $\eta=4$, $\pi=0.04$.

Country carbon rationing

BLAKE Alcott

Abstract

Within I ≡ PAT the three right-side, indirect strategies to reduce impact (reductions in population, affluence and energy-intensity) are compared unfavourably with left-side strategies directly reducing production and consumption of carbon-based energy resources. The latter are effective by definition, have been implemented in wartime and must be global. In contrast the former are most likely ineffective, certainly not necessarily effective, and moreover less cost-effective than the latter: each change in a right-side quantity changes other right-side quantities, yielding $I = f(P,A,T)$ with numerous simultaneous equations. Were country carbon rations established, politics, markets and lifestyle choices would adjust population, affluence and technology to maximize welfare within the given level of resource consumption.

Epigram

Quantitative limits are set with reference to ecological and ethical criteria, and the price system is then allowed, by auction and exchange, to allocate depletion quotas and birth quotas efficiently. The throughput is controlled at its input (depletion) rather than at the pollution end because physical control is easier at the point of lower entropy. Orthodox economics suggests price controls at the output end (pollution taxes), while steady-state economics suggests quantitative controls at the input end (depletion quotas). (Herman Daly 1974, p 20)

1. Introduction

$I \equiv PAT$ yields a distinction between left-side and right-side strategies to reduce Impact to a sustainable scale. Generally, Impact is *a*) both depletion and pollution and *b*) non-aggregable, covering fuels, water, soil, space, ores, fish, biodiversity, etc. Here however Impact means carbon-based energy resource depletion. Left-side strategies include 1) reduction of resource production/consumption, 2) reduction of emissions (e.g. in the Kyoto agreement) and 3) taxes on depletion or emissions. Right-side strategies include 1) Population reduction; 2) Affluence reduction; and 3) a non-aggregable set of Technological changes favouring resource efficiency, renewable resources, consumer efficiency, and end-of-pipe techniques like carbon sequestration.

Section 1 describes direct strategies and suggests that they are simple, honest and economically efficient. Section 2 describes the indirect strategies and their interdependencies, suggesting that they are not *necessarily* effective and moreover costly to design and apply. Discussion and conclusions follow.

2. Section 1

At least four direct capping strategies can be discerned; please imagine them as global (to avoid free-riding countries) and defined on a country rather than individual basis (to accommodate changes in population size).

1. Both biomass and fossil-based energy resources are produced in the sense that they are cultivated, harvested, mined and refined. This *production* could be capped. Andrew Simms quotes Richard Douthwaite's claim that "80 percent of the fossil carbon that ends up as man-made CO₂ in the earth's atmosphere comes from only 122 producers of carbon-based fuels."¹ Amounts of exports and imports can be monitored. What is not harvested, or left in the ground, cannot be consumed.

2. *Consumption* caps have a long tradition consisting of individual or organization entitlements to buy – rations. Economic analyses of 'purchase if and only if coupon' abound.² Without production caps, however, black markets easily arise, and as with the EU certificate scheme measurement is harder than with production caps.

3. *Emissions* caps directly lower pollution, as foreseen by the UNFCCC strategy, and are translatable into units of Joules if desired, but do not explicitly address sustainability's challenge of leaving exhaustible resources in or on the earth for future people.³

4. *Taxes* theoretically also cap consumption.⁴ However, eco-tax rebound must be formally considered: 'Responding' the revenue, directly or through rebates, constitutes demand for the taxed item.⁵ Perhaps simultaneously lowering income taxes overcomes this problem. However, lowering the price of labour relative to that of energy also entails demand for the taxed carbon.⁶ Although both quotas and taxes raise carbon's price relative to all else, perhaps taxes are administratively simpler because a tax system is already in place.

Momentarily in the UK, debate is over three rival schemes: 'domestic tradable quotas, upstream auction or a carbon tax with lump sum recycling.' (Starkey & Anderson, p 34) Any of these would render superfluous the plethora of right-side measures now planned or in place. Current debate concerns not effectiveness, which is given, but economic efficiency.⁷

Left-side strategies are *necessarily* effective, and once enacted, political units and individuals would pursue their material welfare, within the substance caps, through some combination of Population, Affluence and Technology measures. The caps inherently constitute incentives to

¹ Simms 2005, p 177; also Daly 1973, pp 160-168.

² E.g. Scitovsky 1942; Reddaway 1951; Tobin 1952; Hurwicz 1973; Seyfang 1996; Eger & Weise 1998; Fawcett 2004; Starkey & Anderson 2005.

³ In today's discourse the pollution or climate problem undeservedly overshadows the depletion problem.

⁴ Weitzman 1974; Nordhaus 1992; Lee 2005, pp 3-9, 183-185, 195-204; Starkey & Anderson 2005, pp 7-9, 34-35.

⁵ Wackernagel & Rees 1997.

⁶ Costanza 1980; Kaufmann 1992; but see Røpke 1999.

⁷ Ecological or degrowth economics could arguably ignore this criterion, since such efficiency leads, *ceteris paribus*, to economic growth.

increase technological efficiency, live less luxuriously ('sufficiently') and, at least above very low income levels, perhaps have less children. Thus, many changes now investigated and advocated within *environmental* policy would take care of themselves.⁸ Global research would focus on the measurement of sustainable impact, on social marketing and on political change. National research would indicate ways to squeeze the desired amount of material welfare out of a given amount of resources. Behavioural research would shift from consumers to citizens.⁹

What rationing Joules or carbon might mean in terms of 'uses' of equipment emerges from the U.K. war experience with energy rationing:

Between 1938 and 1944 there was an enormous 95 per cent drop in the use of motor vehicles in the UK. Even in the United States fuel was strictly and successfully rationed to eliminate unnecessary travel.... Across all goods and services consumption fell 16 per cent but with much higher drops at the household level. In just six years from 1938 British homes cut their use of electrical appliances by 82 per cent. (Simms 2005, p 159)

To be sure, difficult questions remain over whether such consumption quotas should cover producers and traders in addition to individuals or households: not only do the former account for only about half of annual direct energy consumption, but omitting firms necessitates costly computations of embodied energy.¹⁰

3. Section 2

Faye Duchin writes, "Ehrlich and Holdren (1974) identified the main factors responsible for environmental degradation as population increase, affluence, and technology, providing three potentially important 'handles' for operationalizing the concept of sustainable development". (1998, p 51)

I have called each "handle" a 'strategy'.¹¹ The strong thesis here is that each right-side strategy by itself is *not effective* in reducing Impact: Each policy 'rebounds', i.e., lowering any single factor *enables* the others to rise, and given real levels of latent demand they *do* rise.¹² Thus for any right-side reduction to 'get over to' the left side, all right-side strategies must be simultaneous and coordinated. This means that coupled with difficulties of conception, measurement and enforcement, both the practicability and the *cost-effectiveness* of right-side measures is poor.

Specifically, lower population means lower impact *only if* affluence (consumption per person) and technology (factor productivity) are held constant; *only if* population and efficiency are held constant do greater sufficiency or voluntary frugality lower impact. Using resources more efficiently lowers impact *assuming* constant T and A. But

short of full consumer satiation these other quantities do *not* remain constant.¹³ Examples of interdependencies follow.

Population change

A = f(P): Concerning surface area and natural resources, lower P, *ceteris paribus*, means higher A. To the extent that world product (GWP) is like an available cake, it *enables* each person in the lower total to consume somewhat larger pieces. Of course, to the extent that the cake is a product of labour, lower population means fewer work-hours and a smaller cake (but probably not lower affluence). *Higher* population inversely means less area and natural resources per capita, yet also more producers.

T = f(P): To the extent that lower population lessens demand for natural resources it reduces the pressure to use them more efficiently. Higher population density, on the other hand, is in itself an incentive to produce more efficiently due to diminishing returns on 'land' and increasing perception of pollution. We have for instance changed from wood to coal and from wool and cotton to synthetic fibres; incentives are strong to more efficiently process lower-grade ores or for instance oil sands.¹⁴

Affluence change

P = f(A): At lower incomes, higher affluence enables survival and higher population, while at higher incomes birth rates drop – but so do death rates.¹⁵

T = f(A): If more efficient technology depends on research and investment and entails some capital junking, higher A *enables* lower T defined as efficiency. On the other hand, such research and investment as well as new, higher-quality products themselves imply higher consumption. Yet tracing the myriad of influences on technology of the knowledge that accompanies per capita wealth is a tall order.

A = f(A): The lower affluence of the voluntarily frugal initially lowers energy demand and therefore energy prices, enabling marginal consumers to increase their demand and their affluence. This *sufficiency rebound* again could also mean no net impact on Impact.¹⁶ Although the size of this global rebound is even less satisfactorily measured than the efficiency rebound, both widespread poverty and the further material aspirations of mankind suggest that all freed resources would be snapped up.¹⁷ In any case policy can ill afford to wait until methodologies and measurements have ripened, a fact which speaks for adopting the certain solutions on the left side of IPAT.

¹³ T includes recycling, renewables, and both organizational and consumer efficiency. It is also the input/output ratio, but 'output' is contradictorily definable in terms of monetary GDP, physical goods, 'goods and services', utility, material welfare and even the vague 'economic activity'. (Robinson 1956; Reijnders 1998; Polimeni et al. 2008) And what is anthropocentrically called *waste* is also output.

¹⁴ Petty 1690; Barnett & Morse, 1963; Ehrlich et al. 1970.

¹⁵ Abernethy 1994; Cohen 1995.

¹⁶ Alcott 2008.

¹⁷ With all rebounds, where lies the burden of proof?

Microeconomic and engineering methods favour assumptions of low rebound, while macroeconomic and historical ones plausibly assume rebounds of around 100%.

⁸ Fawcett 2004, pp 1077-1079.

⁹ Sagoff 1988; Röpke 1999; Sanne 2002.

¹⁰ Fawcett 2004, pp 1073, 1079; also Knoepfel & Nahrath 2005.

¹¹ See Ekins (1991). Waggoner & Ausubel (2002) offer a less parsimonious ImPACT identity whose C, C₂, T and T₂ are the T of this paper and which offer four 'sustainability levers' for actors to behave more efficiently and sufficiently.

¹² Jevons 1865; Khazzoom 1980.

Technology change

P = f(T): If agricultural efficiency (T) rises, population also rises, meaning that both affluence and impact probably stay the same. Has for instance increased yield per hectare meant that we farm the same amount of surface, or even take land out of production? No.¹⁸ This rebound effect, which renders P *endogenous* in energy-consumption models, has been neglected compared with the next example, where greater efficiency enables greater output.

A = f(T): This *efficiency* rebound has for the last 30 years received deserved attention. It is now universally recognized that lower T, whether as technological or organizational efficiency, raises income, consumption, or wealth (P x A). Even if this rebound is less than unity (meaning there is some net savings of energy inputs) the effect on impact is always diluted.¹⁹ Lower production costs, higher profits, lower prices and new uses for resources can even mean *even greater* resource consumption than before the efficiency change,²⁰ but for policy purposes it is enough to recognize that this rebound nudges 100%. At the very least, there is no way lower material input per unit of service output translates one-to-one into lower impact.²¹ It could even be true that “technology is [only] a catalyst, as it were, to induce the latent ability of a resource to emerge.” (Mayumi 1991, p 43) The period since the end of the 18th century shows moreover a strong empirical correlation between greater technological efficiency and vastly greater population and resource consumption, something that rebound theory straightforwardly predicts. Note that most efficiency increases are *not* policy-induced but rather business-as-usual cost-cutting measures designed to raise sales and/or profits. Note also that (subsidized) increases in biomass, solar, wind and wave energy supplies in no way necessarily mean less fossil fuel is consumed: Similarly to the sufficiency rebound, lower initial demand (together with relatively low price elasticity of supply) lowers prices, thus enabling other consumers to enter the market. Net consumption of the supposedly replace fossil fuels can remain near its former level.

$$I = f(P, A, T)$$

Right-side strategies could therefore be effective only in the most well-engineered, simultaneously politically acceptable combination of measures. Indeed the argument that well-meant, exogenous policy measures are easily negated by changes elsewhere in the system is widely accepted. But many argue that too much effort has gone into the design and implementation of *efficiency* measures and not enough either into population reduction or the alteration of lifestyles towards either lower affluence levels (sufficiency) or higher *consumer* efficiency. While policy interventions in this area are loosely subsumed under the concept of

¹⁸ Giampietro 1994. Efficiency is after all merely a ratio: either less input-same output or *more output*-same input.

¹⁹ Some examples of this large literature: Khazzoom 1980; Brookes 1990, 2000; Saunders 1992, 2000; Wirl 1997; Binswanger 2001; Alcott 2005; Herring 2006; Sorrell 2007; Polimeni et al. 2008.

²⁰ This is ‘backfire’, where rebound is > 100% of the theoretically realizable efficiency-enabled input savings.

²¹ ‘MIPS’ (Hinterberger et al. 1997).

‘sustainable consumption’, there is in this research field no consensus on definitions and taxonomy.²² Perhaps we could however regard a more efficient kettle as ‘technological’ efficiency, boiling only the needed amount of water as ‘consumer’ efficiency, and doing without the cuppa as ‘sufficiency’. In personal transport the analogous distinction would be between a more fuel-efficient motor, carpooling, and staying at home.

A typical classification is that of Duchin, who in addition to the population strategy sees “two main avenues for bolder scenarios: technological change and change in the lifestyles of households.” (1998, p 20; also pp 51, 60) “Lifestyle” includes the community, e.g., “a dramatic reduction of reliance on private automobiles, which could be made possible and desirable only through the increased availability of nonmotorized and public transport and mixed-use community design that satisfies requirements with far less personal displacement”. (p 71)

A similar description of this category, which is termed “conservation” as opposed to “efficiency”, includes “practically costless improvements in ‘housekeeping,’ recovery of waste heat, and electronic controls for a variety of processes” as well as “process improvements [and] cogeneration”. (Duchin & Lange 1994, pp 17, 91-96)

Yet in Duchin’s model (here chosen at random), as well as in countless others, rebound = 0. Any measure “leading to a contraction of factor inputs [is] improved energy efficiency” (1998, p 55), and one such needed technological change is “more fuel-efficient cars”. (p 20) It is attested that “more extensive recycling of materials and more fuel-efficient cars” cause the economic growth necessary for development, and “as population and affluence increased, pollution could also be expected to grow”; but it is claimed that pollution [and depletion] would grow “not nearly as steeply as if no corrective actions had been taken.” (p 19) That is, pollution would have increased even more *without* efficiency increases; the technological efficiency strategy doesn’t rebound. This neglect of feedbacks leading from efficiency to rising P x A means also that GDP and population both remain fully *exogenous*, as in scores of other models attempting to get hold of the “handles” with which to lower energy consumption.²³

Working with $I = f(P, A, T)$, we must distinguish between static description and the dynamic relationships relevant to environmental *policy*. If Duchin’s “structural economics” merely “describe[s] changes in lifestyle and technology in concrete detail” (p 51), moreover in laudably physical terms, her observations and indeed $I \equiv PAT$ hold true. Broadly, that is, it is true that the “major source of environmental degradation in an industrial society lies the ways in which materials and energy are used”. (p 2) But note that the term ‘ways’ still implies the static-*engineering* rather than the dynamic-*economic* analysis. However, she fully intends the analysis to be policy-relevant – “an explicit focus on households [should not be] absent from work about the restructuring of economies in response to

²² Jackson 2004, pp 1029-1032.

²³ Manne & Richels 1992; Schipper & Meyers 1992; Howarth 1997; Schipper & Grubb 2000.

environmental pressures”, and “importance for policy” is claimed. (pp xiii, 60, 70) But again, due to interdependencies between technological, lifestyle and population changes, this step from static to dynamic analysis, from environmental *bookkeeping* to environmental *action* or policy is not logical.

4. Discussion

Two claims about right-side strategies and combinations thereof can be ventured. First, many such policies address us as consumers and producers rather than citizens; the approach is personal rather than political.²⁴ But if the connections between behavioural change and impact are weak, Michael Jacobs is correct that “...environmentally sustainable consumption will not come about through individual choices, but through regulatory policies collectively decided and imposed through the state.... Admirable as voluntary reductions in consumption are, they are not the route to environmental improvement”. (quoted in Fawcett 2004, p 1074)

The call is for mutually agreed upon mutual coercion, for politics rather than ‘non-politics’, accepting the human attitude of ‘I will if you will.’²⁵ Of course the path to the democratic agreement to regulate leads through education, smaller-scale resource management and ethical changes.²⁶

Second, coordinating many right-side measures to eliminate rebounds is certainly very costly in terms of design and transaction costs; probably several dozen measures on the right side would have to be simultaneously enacted.²⁷ Left-side strategies thus seem far less complicated and costly. In Tina Fawcett’s words:

One of the key benefits of carbon rationing is that it provides a framework for carbon reductions. No longer might it be necessary to have separate government policies and programmes to promote everything from cycling strategies to efficient refrigerators. Under carbon rationing, the carbon ‘market’ should recognise the benefits of renewable energy, household insulation and low carbon methods of transport. (p 1077)

Instead of building codes, demand management, product labelling, work pattern change, urban design, food miles, personal ecological footprints, progressive electricity tariffs and exhortations to leave one’s wedding in a rickshaw, we would have one overall tool. The myriad of right-side changes following the use of this tool constitute what can perhaps be called carbon-tax or carbon-cap rebounds.

5. Conclusion

The right side of $I = f(P,A,T)$ offers ‘three handles’ for indirectly reducing impact. But turning any handle causes

the others to turn, in some magnitude, in the opposite direction – annihilating or even worsening the net effect on impact. At best, some fine-tuned combination of the three might succeed, but at great cost.²⁸ Leonard Brookes therefore believes that “[i]t would be more straightforward to direct that there should be reductions in ‘world economic activity’, of specific emissions, or seek worldwide agreement to placing heavy taxes on the offending fuels”. (1990, 201)

Further, “Effort directed to raising energy efficiency is likely to be counter-productive”; adjustments of efficiency are “oblique” and we would do better to unabashedly “outlaw, ration, and tax.” (Brookes 2000, pp. 363-364) The strategy, again, is to forget the producer and the consumer and focus on the citizen.

Within the transportation sector Susan Owens and Richard Cowell have similarly observed that because it is so difficult to reduce “the rate of traffic growth... a view that policy should focus on reducing pollution and congestion, rather than the volume of traffic per se, has prevailed, conveniently shifting attention towards vehicle performance, traffic management and selected improvements in the road network”. (2002, 97)

The term ‘conveniently’ raises urgent issues surrounding contraction’s or degrowth’s (un)popularity. The discourse or rhetoric surrounding right-side measures portrays them as painless. Technological and social engineering, as well as appeals to downsizing for one’s own good, purportedly amount to win-win strategies.²⁹ Directly going at impact, on the other hand, makes no bones about the fact that contraction, degrowth, and less physical throughput probably mean less material welfare – a very painful thing. For the several billion poor in the world there arises a nasty trade-off between sustainability and affluence; for the relatively rich there arises a painful challenge to humanism’s goal of material equity.³⁰

Lowering population and raising energy efficiency are good – good for affluence or personal material welfare; similarly, lowering the affluence of the rich is under certain institutional conditions good for the affluence of the poor. But these policies are not *environmental* policies. They merely help us maximize affluence within either naturally-given or socially-agreed upon environmental constraints while contributing to global equity. This is however not to deny that designing more productive efficiency and describing sufficiency’s benefits contribute to the environmental goal by making degrowth more politically palatable. At the end of the day, though, the effective and simplest impact-reducing policies lie on the left side of IPAT, whether in the form of taxes, production caps or consumption rations, all of which create the institutional scarcity with which we can more humanely approach natural scarcity.

²⁴ Duchin 1998, p 49. Waggoner & Ausubel’s (2002) ImPACT identity stands similarly in contradiction to this paper, including moreover *a priori* “acceptance” of higher world affluence and of the Environmental Kuznets Curve methodology taking ratios rather than absolute quantities as the dependent variable.

²⁵ Ophuls 1977, pp 147-156, 227-230.

²⁶ Jackson 2004, pp 1039-1045.

²⁷ Ophuls 1977, pp 119-129.

²⁸ Sachs 1988, p 34.

²⁹ Lee 2005.

³⁰ Even the environmentally and ethically sound strategy of contraction and convergence (like the UNFCCC’s ‘common but differentiated responsibility’) must leave open the carrying-capacity question of what the *ecologically* dictated level of throughput, for a given population, might mean for poverty.

But must direct policies really be so odious? Perhaps so, since they palpably lower Gross World Product. But note that with other odious things such as income taxes, we don't appeal to people to voluntarily pay them.³¹ We don't research ways to change people's attitudes towards accepting less disposable income; nor do we moralize, or legislate efficiency increases that make the taxes easier to pay – we gripe but we pay, mutually agreeing that this is the law, within which people are left free to find a way of meeting their desires and obligations. Assuming majority acceptance of sustainability and a non-growing or shrinking economy, we should accept that people are such that they will lower their throughput if (and only if) everyone else must.

Simms describes a meeting with UK government officials searching for ideas to take with them to Johannesburg in 2002. He asked “[w]hy weren't they honest with the British public and tell them what life would be like if necessary emissions cuts were made. Why not prepare public opinion now, by admitting the scale of required action, so it would be possible to sell the appropriate policies later? There was the sound of choking. Unlike the forthrightness of public communications during the war, the most the civil servants felt able to do now was ‘suggest’ that people might like to make one less car journey a month”. (p 163)

Similarly, forbidding old-fashioned light bulbs, as foreseen in impending, cutting-edge Australian and Swiss law, is no more than pussyfooting around.

Some decades ago political economists such as Kenneth Boulding, Herman Daly and William Ophuls were bravely advocating rationing, but this tradition within ecological economics, while never eschewed, has fallen into neglect. Yet rationing would not only solve the environmental impact problem, it would make the consequences of scarcity for affluence much clearer. If we first compute the global, country and individual *maxima* consistent with 1) relative climate stability, 2) some desired slowing of depletion in the interests of future affluence and 3) local impact alleviation, we can then see how much exosomatic energy each can use. Population, affluence and technological strategies will then help us to maximize material welfare within the limits, even if we consciously decide to live to some degree unsustainably.

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³¹ Compulsory military service is perhaps another example.

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De-Growth for Earth Survival

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Abstract

The starting point of The Limits to Growth published in 1972, was about the fear of scarcity of mineral resources for maintaining the industrial output. The model was in fact a serious warning to decision makers worldwide.

Global economic growth increased, according Angus Madisson, in the second half of the twentieth century by 3,9 % yearly, whereas the population only 1,8 % per year. The modern maxim sounds, 'infinite' economic growth improves the living conditions of all people and represents the best way eliminating poverty. Economy and technology could not dream of a better alliance.

Reality looks quite different. Indeed, there are limits of natural resources, more there are limits to the sinks and waste: CO2 output avoiding excessive global warming; toxic waste preserving fresh water quality; human exploitation of the biosphere resources, etc. These recognitions are known to politicians, industrialists, bankers. However, consequent decisions are still missing for tackling the planetary problems. Growth continues to be the goal along which market-economy functions.

The concept of Ecological Footprint inclusive water and carbon footprints, proves that human global activity overshoots the physical limits of the planet. Today, humankind needs 1,2 planets to fulfill its needs and wants. Consequently, sustainable development is not enough, humankind must design its sustainable retreat for its own survival. Several authors speak about the threat and collapse of our civilization.

De-growth of economic activity has to be considered as a valid solution to bend the fast overshoot tendency of the market-economy system. Emerging and developing countries, which are the majority in population and poverty, cannot be assimilated with a large scale de-growth. This situation complicates the solution of generalized application -here and nowof a de-growth strategy.

However, correctly designed technology proposed by Factor Four and Ten concepts reduce massively resource use. Clean energy generation with alternative resources do exist since several decades, their break-through is close by. The question remains if the present market economic system, driven by globalization for profit maximizing will accept de-growth implementation? Most likely not.

The search for another economic system is therefore imperative, including full respect for natural resources and environment based on a profit-distribution for stakeholders concept. The Social Business Entrepreneurs model as proposed by Muhammad Yunus, provides a way out of the

dead-end situation in which the industrial societies have evolved into.

1. The frame

The starting point of the two reports to the Club of Rome *The Limits to Growth* and *Mankind at the Turning Point*^{1,2} published in 1972 and 1974, dealt with the fear of scarcity of mineral resources for maintaining the industrial output of the booming economy of the postwar period. The results of the mathematical model, based on the method of system dynamics, were in fact a serious warning to society and its decision makers worldwide.

Global economic growth increased, according Angus Maddison³, in the second half of the twentieth century by 3,9 % yearly, whereas the world population only 1,8% per year. Since several decades the modern maxim sounds, "continuous economic growth improves the living conditions of all people and represents the best way for eliminating poverty". Market-economy and technology could not dream of a better alliance.

In the mean time some doubts arose about the limitless market-driven economy, especially due to the recognition of the phenomenon of climate change and global warming. Reviewing the evolution of the mindset about the impact of economic activities on the planetary ecosystem one can distinguish the following pattern:

- The *Limits to Growth* as announced in 1972;

The media transformed the message of the first report, describing thirteen scenarios, into a single one: the business as usual which will lead to a catastrophe.

- The *Zero Growth* option;

In the aftermath of the publication of that report, the term 'zero growth' was used in the press, mostly by skeptics about the solidity of the entire approach. Looking back it would have been a realistic possibility but was never considered as a valid option. The recognition of the climate change phenomenon was not yet as clear as it is today.

- The *Negative Growth* or *De-growth*⁴ for the 21st Century;

In fact, limitations of economic growth have not been practiced, probably even not considered, by any industrial society, by any economic, monetary or financial policy organization, nor by any national or international government.

On the contrary, unprecedented economic growth of the last two decades, the emergence of new economies (BRIC) with a yearly GDP growth of about 10% or more -meaning a doubling of their 'economic' activity every seven years- is systematically praised and regarded as the ultimate way for a generalized well being of their citizens.

¹ Meadows Donella H. et al, *The Limits to Growth.*, (First Report). Universe Books, (1972)

² Mesarovic Mihajlo and Eduard Pestel, *Mankind at the Turning Point*, (Second Rprt). Dutton/Plume (1974)

³ Maddison Angus, *The World Economy*. OECD, (2001)

⁴ Entropia, *Décroissance & technique* .Nr 3. (2007)

The limits of the ecological carrying-capacity of the planet has gained interest by business and political leaders. It became clear that the planet's natural 'digesting' capacity is unable to cope any longer with the pace human activity produced output.

Additionally a growing world population, and the perspectives of a remaining business as usual behaviour (BAU) of the market oriented economy, lead to the conclusion that the lower than a zero growth path, on a planetary scale, will be required to bend the threats humankind is facing.

Therefore, the necessity of a *de-growth economic model* has to be envisioned.

2. The footprint^{5,6} : sustainable retreat

The concept of *Ecological Footprint* inclusive *water* and *carbon* ones, indicates that human global activity trespasses the physical limits of the planet. Today, humankind needs 1, 2 planets to fulfill its needs and wants. The degree of urgency, becoming increasingly obvious, leads to a unavoidable conclusion that sustainable *development* is not enough anymore, humankind must design its *sustainable retreat*⁷ for its *own survival*. Several authors speak about the *threat of collapse of our civilization*⁸.

Correctly designed technology proposed by *Factor Four*⁹ and *Factor Ten*¹⁰ concepts reduce massively resource use. Clean energy generated with alternative resources does exist since several decades, their break-through is close by. The impact of climate change on global warming appears to take place much faster than originally assumed, e.g. in the models of the IPCC and other research institutions. In fact, the process evolves along *non-linear behaviour*¹¹ and *time patterns*, which are really alarming. Understanding of non-linearity phenomena is quite more difficult and visualize by decision makers and by the populations.

Transforming the BAU practices of economic growth in generalized *de-growth* economic pattern can be envisioned in a stepwise implementation.

From a humanistic point of view, populations living today in high poverty conditions, a *de-growth* process cannot be imposed or even presented has a necessary condition. In fact, *de-growth* pattern have to be designed in function of the impact communities/countries have on the degradation of the planet.

This means: high consumption societies (industrialized countries) have to step in *de-growth* processes immediately; emerging economies (e.g. BRIC a.o.) very soon, in a

decade or so; and, developing and least developed economies with a high degree of poverty should get time to reach acceptable level of living standards.

Remains to define the '*equilibrium status*' of the planet and its time frame. A footprint equals to one, means that the size of the economic activities are in balance with the planetary eco-system. Some scientists have expressed their concern about irreversible changes of the eco-sphere already taken place or quite near to be reached. As a result it could be more difficult than presently assumed to defining a lasting new '*equilibrium*' status.

A *time scale* on which a planetary '*equilibrium*' can be restored and maintained thereafter, has to be defined as well. The degree of urgency defines in fact the remaining time span, provided, that irreversible ecological situations do not take place during the process of '*retreat*'.

3. Modelling the future

In order to increase the understanding of the current status of the planet and its evolution in the next decades, the use of *modelling tools* for evaluating *scenarios for de-growth*, are highly recommendable. The two Club of Rome's reports have shown the usefulness of such approaches, even if appropriate policies have not been put into action and political decisions have not been taken.

As possible parameters to consider in the modelling efforts, one could think of: the frequently used GDP per capita (ppp in US\$), the Human Development Index HDI of the UNDP¹² and perhaps still others.

GDP has been criticized for a long period of time. A recent conference in the European Parliament *Beyond GDP*¹³ illustrates clearly the need for better indicator than GDP, however it was also made clear that earlier attempts have not lead to alternatives and that it would, in the best case, take some time before having another and better one.

HDI looks to be a valid option for modelling the future, although it contains GDP/ca indicator as well. In the latest UNDP report *HDR 2007*¹⁴, the difference in ranking between GDP/capita (ppp in US\$) and the HDI shows considerable discrepancies between HDI and GDP/ca. The differences occur in both directions, some countries have much better HDI ranking than GDP/ca and vice versa: e.g. Cuba shows a much better HDI ranking at the place 51 on a total of 177 countries (value=0.838) than the GDP/ca ranking at 84; whereas South Africa ranks at 121 with HDI=0.674 and a ranking of 56 for GDP/ca. Thus, the choice of the leading variable for building a model of *de-growth* scenarios is critical.

For both cases a value of the '*equilibrium*' status has to be defined expressing the target humankind should evolve to. The '*ecological footprint=1*' would be the criterium for defining the target.

Additionally, the world population is expected to increase this century from 6.5 to around 10 billion people.

⁵ Footprint Concept:
http://www.footprintnetwork.org/gfn_sub.php?content=footprint_overview

⁶ WWF, *Living Planet Report*. (2000,...,2008)

⁷ Lovelock James, *The revenge of Gaia*, Allen Lane, (2006)

⁸ Brown Lester R., *Plan B 3.0*. W.W. Norton & Co, (2008)

⁹ von Weizsäcker Ernst et al, *Factor Four*. Earthscan, (1997)

¹⁰ Factor Ten Institute, *Approaching a Sustainable Economy requires a strong Focus on Eco-Innovation*, (2006)

¹¹ Weiler Raoul, *The Kyoto Protocol and its Socio-Ethical Aspects*. In: Reading the Kyoto Protocol. Eburon, (2005)

¹² UNDP, *Human Development Report 2007*. (2007)

¹³ Beyond GDP 2007,

<http://www.eea.europa.eu/highlights/beyond-gdp>

¹⁴ UNDP, *op. cit.* (2007)

Obviously, this is not a small amount in regard with the carrying capacity of the planet inclusive the food production.

4. How to go from *limited growth* to *de-growth*?

Some examples

- For the manufacturing industries, a reduction of resource use by a factor four or even ten has been suggested in the recent past. By and large the technologies to reach these objectives do exist.

- Recycling of materials has been suggested since many years and is now practiced a respectable scales. This proposals keep their entire validity in the discussion of de-growth practices.

- Maintenance and repair friendly production schemes offer considerable reduction of resource use, they represent an serious alternative to the present throw-away habits on which the market-driven economic system is built upon.

- The transportation sector is often put into question, however the *Just in Time* philosophy (JIT) remains common practice. The announced increase of the air and maritime transport activities in the next twenty five years, are diametrically opposite to de-growth approaches.

These meritorious proposals are steps in the right direction, however their overall impact on *de-growth* could be too slow compared to the urgency for results. Their implementation remains based on changes within the business as usual practices, namely, the profitability has to be proven before adequate investments are decided.

Towards 'Zero Waste, Zero Carbon' societies

The combined objectives of *zero waste and zero carbon* for factories or companies^{15,16}, communities, regions or countries are big steps towards reducing the ecological footprint. This approach describes clear objectives for which populations can be motivated.

The Prime Minister of New Zealand *Helen Clark*¹⁷ has announced such an objective for her country. This proves not only a courageous policy but also a strong intellectual leadership. Comparable initiatives, smaller in size, have been announced by other countries, such as Ireland, Denmark¹⁸ and hopefully in the future in Flanders in Belgium.

The need for another economic system

The *de-growth* approach of economic activities is a strong option, even the sole one for avoiding catastrophic effects (e.g. sea rising), and answering dramatic urgency coming from global warming effects. The question remains if BAU

of the economic system, driven by globalization and profit maximizing, will accept the implementation of de-growth practices? Most likely not.

The search for another economic system, which includes full respect for natural resources and environment, remains therefore imperative. The *Social Business Enterprise* model as proposed by *Muhammad Yunus*¹⁹, provides probably a way out of the dead-end situation in which the industrial societies have evolved into.

5. Some conclusions

The urgency of action for coping planetary global warming, fresh water availability, etc. is continuously repeated in the media and confirmed by scientists and researchers.

De-growth of economic activity is, at planetary level, unavoidable, however its world-wide implementation appeals for a stepwise approach, taking into account the degree of development of large groups of population: the present industrialized consumer-driven societies will have to *de-grow* most and immediately; the others depending on their present status of development.

The market-driven economic system, which had led to the present system, cannot be maintained in a generalized *de-growth model*. The recent proposed *Social Enterprise Model* offers a new think path for an alternative system.

Finally, a proposal for a *research/reflection project* is formulated. The use of *modelling tools*, is proposed for evaluating and designing *de-growth and growth pattern* over longer periods of time, say the 21st century, for industrialized countries, emerging economies as well as for least developed regions with very high degrees of poverty. The objective of the exercise would be to visualize and facilitate a better understanding of the urgency which humankind is facing. The modelling tool is to be positioned as a decision help for policy makers and politicians.

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Overcoming Contradictions between Growth and Sustainability: Institutional Innovation in the BRICS

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Abstract

The recent accelerated growth rates or efforts to emulate countries that have achieved a rapid pace of economic growth are widely acclaimed as means to uplift millions from poverty. In so doing, however, this rapid economic growth is most likely to coincide with unsustainable levels of consumption, place excessive pressure on life support systems and terrestrial sinks and foreshorten options for the future. Rather than pursuing the “Environmental Kuznets Curve” (EKC) hypothesis that higher income will bring with it the means to reduce the impacts of greater consumption, ecological economists assert that buying our way out of future scarcity with fast growth is indeed contradictory with sustainability. To better understand these contradictions and explore potential institutional innovations that may enable developing nations to better confront them (in effect, “tunneling under” the EKC), this article refers to recent experience in the BRICS countries (Brazil, Russia, India, China and South Africa). Beginning with a brief comparative summary of major development and environmental indicators, pressures on resources and society in each of the BRICS are discussed, followed by identification of institutional and policy frameworks each country has evolved to confront the challenges of growth and sustainability. The article closes with general conclusions for further research and information sharing among developing nations.

Keywords: growth, sustainability, BRICS, institutions, innovation, development policy

1. Introduction

The recent accelerated growth rates or efforts to emulate countries that have achieved a rapid pace of economic growth are widely acclaimed as means to uplift millions from poverty. In so doing, however, this rapid economic growth is most likely to coincide with unsustainable levels of consumption, place excessive pressure on life support systems and terrestrial sinks and foreshorten options for the future.

Rapid economic growth is widely portrayed to offer the option to “buy our way out” of developing societies’ current unsustainable growth paths by quickly surpassing conditions that have caused unmitigated social and environmental impacts in other societies. In effect, technology transfer and avoidance of mistakes enable learning from those that have gone before. Such ideas are commonly found in the literature projecting tendencies along the “environmental Kuznets curve” (EKC) [1].

It is a fundamental tenet of ecological economics, however, that buying our way out of future scarcity with fast growth is in fact a recipe for disaster; such growth is intrinsically contradictory to sustainability.

The two policy options pursued by developing nations and by the BRICS countries specifically (Brazil, Russia, India, China and South Africa¹) with regard to the growth and sustainability may be identified as: i) permit rapid growth and ensuing scarcities to signal the correct use of remaining natural resource endowments; or ii) invest heavily in education and technological innovation to decouple development from resource depletion. In contrast, the ecological economics position is that it is necessary to adopt a third option: iii) repudiate the perspective that rapid growth rates are necessary to achieve sustainability, and strive toward a stable state while pursuing equitable access to resources. This path does not, to be sure, repudiate use of market mechanisms or investment in human capital and technical innovation, but suggests the desirability of greater caution in opting for higher growth rates due to uncertain environmental consequences.

To cast this debate in a more practical light, ecological economists representing each of the five BRICS countries discuss in this paper how each country is faring in choice of development path and environmental governance in the context of demands for rapid growth as a way out of persistent poverty or stagnation. Our focus is on institutional innovations that may offer ways to surmount the contradictions that appear to make accelerated growth and sustainability incompatible, and possibly “tunnel under the EKC” [3]. Our aim is not to compare or to emulate one or the other model, but rather to let each country’s growth path speak for itself while offering options for the rest.

Questions aired by the panel include:

- How are these nations coping with the paradox between improvement in material wellbeing and exacerbation of local and global pressures on natural resources and the environment?
- What are the distributive consequences of rapid economic growth? Are some groups profiting disproportionately at the expense of overall poverty alleviation?
- What can the BRICS countries learn from each other as they explore alternative energy and material consumption pathways?

2. Profile of the BRICS countries

Comparative overview

Based on data in Table 1, below, the BRICS countries represent over 43% of the world’s population, on 30% of its terrestrial land area, although only 13% of this land area is classified as arable. Despite their demographic importance, their economies generate only 10% of global GDP. While their per-capita incomes are only 31% of the global average, their CO₂ emissions of 2.5 t/yr per-capita, are

¹ Although most authors [2] tend to refer to “BRIC” or “BRICs” rather than BRICS, we have preferred to include South Africa in this grouping, as a significant trading partner, consumer and producer of wealth among emerging economies.

approximately two-thirds of the global mean. These societies have become more fossil fuel dependent in consequence of their assumed development paths.

The BRICS countries are governed through a wide range of political-economic systems, from democratic capitalism to market-oriented state socialism. Some of the countries are characterized as having heterogeneous cultures, housing enormous religious, ethnic and racial diversity, while others, like Brazil and China have fairly homogeneous language and culture. Many groups (especially poor rural communities) reside in areas of extreme and highly threatened biodiversity. The BRICS share common aspirations for human development and social improvement, but invest considerably varying proportions of their savings in education, health and infrastructure, and are categorized in the lower-middle range of developing countries, with a population-weighted average HDI of 0.708.

Although for many years and for various reasons closed to global markets, all are now fairly open and share in the benefits and vagaries of globalization. Although they are competitors in some markets, there is a clear tendency towards increasing trade among one another. For example, Russia is Brazil's largest beef importer; China buys substantial raw materials from Brazil, Russia and South Africa, and exports finished products back cheaply; India sells call and accounting services to other developing nations as well as exporting these to the North.

In the following sections, the growth trajectories peculiar to each of the BRICS countries are briefly described, placing emphasis on the association of these trends with social equity and environmental quality. See Annex for tables.

Brazil

Blessed with a relatively larger resource base in relation to its population of 186 million than many of the other BRICS countries, Brazil has always thought of itself as having reserves of tremendous unexploited potential that would ensure riches for future generations and permit untrammelled profligacy by current cohorts. But this vision has been tempered by decades of slow economic growth after a "miraculous" spurt in the late 1970s under military dictatorship.

Despite redemocratization, Brazil remains one of the world's most inequitable societies, whose class structure inherited from the colonial era has left 23% below the poverty line. Investment remains limited at less than 20% of GDP, most of which comes from the private sector. Although Brazil has been running a consistently positive current account surplus, most of the budget is committed to national debt service and retirement benefits in excess of contributions. Investments in education and research place greater emphasis on public higher education than on basic skills and vocational training, though this is now slowly shifting. The problem seems to be not so much the lack of resources as the inability to spend wisely.

Technical optimism persists as the primary excuse for continued devastation of remaining natural resources at the agrarian frontier: increased productivity will eventually make it unnecessary to continue expanding horizontally since there is already a vast area already cleared that is

underutilized. But by the time such productivity enhancements are introduced, much remaining biodiversity and associated ecosystem functions will have been destroyed, thus threatening potential productivity elsewhere (up to 40% of rainfall that falls in the agro-industrial heartland of the central savannas may be thanks to climatic stabilization by the Amazon forest).

Brazil's parastatal petroleum enterprise Petrobras, one of Latin America's largest corporations, has successfully opened part of its gas and oil exploration to external investment and is now a net exporter of fossil fuels. Part of Brazil's energy independence is due to its early commitment to renewable liquid fuels and hydropower generation. This gives it a conceivable edge in the search for alternative energy models. But emissions from frontier burning overwhelm its energy and transport emissions by three to one [4]. Indeed, new and worrying demands for expansion in land resource utilization in Brazil have arisen from the demand for biofuels themselves. The supply of a mandated 2% of Brazil's own petroleum demand by 2008 is expected to require about an additional million hectares in oilseeds [5]. If Brazil not only expands domestic agroenergy sources but exports ethanol and biodiesel, concerns arise regarding the land degrading potential of this alternative energy path.

Russian Federation

Like Brazil, the Russian Federation is also blessed with an immense landmass, much of which is sparsely populated. With a total area over 17 million km², Russia is the largest country in the world. Total population is about 148 million people, of which 73% reside in urban places. Population density is 9 people per sq. km. Since the Brazilian Amazon is not easily habitable, and much of Siberia is similarly inhospitable, there are some similarities in the way the two countries have occupied their respective territories. Both have only 7% of their territories in areas considered arable, though Brazil's unutilized arable potential may be considerably greater. Russia and Brazil have also both faced uneven growth rates over the past two decades. But unlike Brazil, Russia's energy profile is strongly dependent on fossil fuels, making its carbon emissions profile more similar to that of the North.

Although forests cover a similar proportion of both countries, Russia has experienced a net increase in forest cover over recent years, while Brazil faces rampant deforestation.

Starting in 1989, the gross domestic product (GDP) of the Russian Soviet Federative Socialist Republic (RSFSR), and successor Russian Federation, declined continuously until 1997. The drop in output by century-end was about 42%—a far steeper fall than was recorded during the Great Depression in the United States in the early 1930s. Paradoxically, poverty in Russia was halved from 1999 to 2003 yet adult mortality is the highest of all countries in the European Region, and has increased dramatically over the past decade [7]. At least some of this mortality is probably due to a high rate of suicide and even higher rates of alcoholism.

The major exports of Russia are its natural resources — particularly hydrocarbons. Fish production and exports are also significant. In 2005 Russia was the world's 15th

largest exporter with a little more than 2% of total merchandise trade, nearly half of which to the European Union [9], but is among the top 10 fish exporters. Russia is also the world's third largest energy consumer. In terms of CO₂ emissions intensity in relation to GDP, Russia far outstrips all other BRICS countries (see Table 1).

In summary, the changes that took place in Russia over the course of the past 15 years include first decline, and then growth in GDP, dramatically falling life expectancy, increased income differentiation, first reduced and then increased CO₂ emissions. These types of changes are related but require a multidimensional perspective for their comprehension and management.

India

On the Asian scene, India and China have reassumed their historical global dominance in generation of wealth, yet growth and prosperity have been differentiated within each country, primarily along an urban-rural divide, and along the coastal zones. At 1.05 billion, India is second only to China in population, but its per-capita GDP is only about one-third that of China (Table 1). With a considerably smaller landmass, population density is also high (475 persons/km² of arable land, and since much of the population resides in rural areas (72%), pressure on arable land is evident. Degradation of arable lands continues to constitute one of India's most serious environmental problems, while fertilizer consumption has increased by 20% in less than a decade [see Table 1].

Sectoral growth in India is concentrated in industry in services, while agriculture has stagnated. The opening of the national economy has flooded the domestic market with imports, increasing 20% over the last five years; exports are growing but at a slower pace. Investment is around 27% of GDP, although the country's latest development plan seeks to boost this rate to 35%.

India's continued dependence on coal for a high proportion of electricity generation remains a source of concern, although this share (68%) is still lower than that of China and South Africa. Investment in renewable or lower CO₂ emitting energy sources is the primary focus of India's engagement in the Clean Development Mechanism, in which several hundred projects have been approved, accounting for nearly 15% of Certified Emissions Reductions registered by the UNFCCC [10].

Due to Government's persistent efforts to preserve the natural resources, an assessment in 2001 estimated that total land area covered under different forests had been maintained at 20.6% [11]. Reserved and protected forests together account for 19% of the total land area, as a measure to maintain biological diversity.

India also seems to be on course in reducing population growth. For the first time, India has reached a stage where despite the growing base of population less people are added than the previous year, both in rural and urban areas [12].

At the same time, the population below the poverty line has been reduced. The Government of India estimates that poverty fell from 36% of the population in 1993/94 to 26% by the end of the decade [12]. The pace of decrease in

poverty has been higher after the introduction of new economic policies in the 1990s.

Since independence in 1947, life expectancy has more than doubled, reaching 67 years in 2006 and literacy has more than quadrupled and reached about 65.6% in 2006 [13]. Over these years, economic growth has gradually accelerated, with per capita income rising at 1.5% annually until 1975, at 3% until 1993, and at 8% in the last three years [14]. These growth rates were achieved as part of a national economic planning process, in which growth targets are set. Infrastructure such as power, road, water, and sewerage, irrigation and railways are bottlenecks to attaining the Government set growth target.

Due to increased energy pricing, technology change and conservation efforts, energy use per \$ GDP has declined consistently from about 36 kg oil equivalent in 1991-92 to about 32 kg oil equivalent in 2003-04 [14]

Urban systems are already under severe stress from extreme climate events due to unexpected extremes of precipitation, causing floods and ensuing environmental destruction. The traditional systems of urban drainage are unable to absorb severe downpours.

China

Similar to Brazil and Russia in the size and variability of its land area and biomes, China is an immense subcontinent of over 9.3 million km², whose population of nearly 1.3 billion is still primarily rural (62% in 2002), placing serious pressures on arable land (554 rural inhabitants/km²). Fertilizer use is substantially higher than other parts of Asia, but still on average far less than that of the other BRICS excluding South Africa. Rural-urban migration is often cited as a particularly troubling aspect of China's rapid growth trajectory: somewhere around 60 million people joined the ranks of the urban population in the 1995-2002 period. Rigorous population control has had a negligible effect on these migrations.

But probably the most troubling aspect of China's accelerated growth phenomenon is the composition of its energy production and the profile of its consumption patterns [15]. Most of the nation's electricity generation is reliant on coal-fired thermolectric facilities. Hydroelectric potential is rapidly diminishing; where additional potential has been harnessed the loss of arable land and incremental pressures on rural population are controversial (e.g., the Three Gorges dam will displace 1.9 million people from the Yangtze River banks). Although technology permitted a decline in CO₂ emissions per capita from 1995-2000, the index returned to its 1995 level by 2005. The share of coal-fired electrical generation actually grew to over 79%. And while China still has a smaller number of cars per household than east Asia overall, vehicle demand is growing rapidly, compounding per capita greenhouse emissions.

China's voracious demand for raw materials has a far larger footprint than the country itself. Recent forays into Africa and Latin America to guarantee resource flows, and joint ventures in steel and cement manufacture multiply the impacts of the phenomenon. For this reason, China has become the primary focus of global CDM and related emissions reduction investment.

Even in the country's most energy-efficient area of Shanghai, energy consumption is far higher than that in the United States or Japan, for example. Urban sprawl in major population centers has taken on crisis proportions; investment demands for those in the suburbs are sapping resources available for the urban core. In consequence, China is facing water shortages as per capita water resources of 2,200 cubic meters, are only 31 percent of the world's average. Currently, about 400 out of the 660 Chinese cities lack water and 136 have reported severe water shortages [16].

South Africa

South Africa is a middle-income, emerging economy with an abundant supply of natural resources. Tourism and the extractive resources sectors combined contribute a third of South Africa's national income [17]. Well-developed financial, legal, communications, energy, and transport sectors; a stock exchange that ranks among the 10 largest in the world; and a modern infrastructure supporting an efficient distribution of goods to major urban centers throughout the region. However, growth has not been strong enough to lower South Africa's high unemployment rate, and daunting economic problems remain from the apartheid era - especially poverty and lack of economic empowerment among the disadvantaged groups.

South Africa has been referred to as a country of two economies, or, alternatively, a double-decker economy [18]. Thus, the country is in many ways a microcosm of the global human economy today. Depending on the poverty measure used, in 2003 between 45% and 55% of all South Africans lived under the poverty line of approximately US\$2/day, and 82% of the population earned less than 67% of the average national income per capita [19].

About 70% of the poor live in rural areas and most of them depend on government remittances and grants for survival [20]. The country faces severe and pressing water scarcity: nearly all water available for human use (98.6%) is already appropriated [21]. Within this context of poverty being predominantly a rural phenomenon, access to water becomes an important livelihood concern. Only 24% of people in rural areas have access to piped water and only 15% have access to sanitation.

Common themes

The negative growth experience of Brazil and Russia suggests the need to be attentive not only to the possible effects of accelerated growth, but also to the pressures on natural resources occasioned by insufficient growth, as persistent poverty forces communities to reproduce production patterns that are unsustainable.

Furthermore, it is necessary to consider that many of the issues associated with sustainability cannot be resolved solely by national governments acting alone. Multilateral cooperation is essential. However, such cooperation should not imply that states be obliged to adopt institutional and regulatory models prevalent in advanced economies. Models cannot be simply transplanted without regard to local specificities. Key concepts for successful sustainable development policies are those of ownership (appropriation and protagonism in policy choice) and empowerment (the

"agent" as central to the development process, as Sen [22] emphasizes).

The wealthier nations' contribution to this process should focus on technical and financial assistance, above all to facilitate environmental technology transfer to emerging nations. However, transfer alone is insufficient: "Georgescu-Roegen was unequivocal in asserting that residents of 'developed' nations must accept a lower standard of living if 'underdeveloped' countries are ever to escape poverty" [23].

Finally, growth in income alone is not a sufficient condition to promote sustainable development. Although increased income certainly augments economic opportunities for all, despite distributive imbalances. Martinez-Alier emphasizes that we must focus on the composition and qualitative aspects of the cake and not only on its size [24].

There is also an underlying need to de-link growth from resource depletion by focusing on unnecessary conversion of natural capital and the need for ecosystem restoration [25]. The longer term land requirements associated with increased demand for biofuels, and their potential impacts on settlement expansion at the Amazon frontier is an important example of the paradox between substitution of nonrenewable fuels and the land hungry character of biomass alternatives.

3. Institutional innovation by the BRICS

A number of questions emerge from criticism of the EKC hypothesis, regarding the potential for institutional innovation toward sustainability. The idea that exacerbation in material and energy demand may be avoided by borrowing from experience in the North is attractive, but those adaptations came in response to cultural change as well as shifts in relative factor prices. Innovations may very well be pushed along by increasing petroleum prices, but a thoroughgoing change will require that the comfort and status associated with personal vehicle autonomy be downplayed by society.

The BRICS have in some cases been proving ground for bold experiments in alternative development styles and governance approaches. The following sections describe some of these experiments, concluding with observations on their generalization and uptake by other nations.

Integrated development policies

Rather than segregating environmental concerns into specialized ministries whose role is primarily to license and monitor enterprises whose actions may harm the human or physical environment, some BRICS nations have begun to search for ways to better integrate these concerns into line agency responsibilities or overall development planning. At the same time, dialogue processes that engage economic actors and civil society representatives in debate and conflict resolution over regional development alternatives have been institutionalized as standard practice rather than an exception. China, India, Brazil and South Africa offer particular examples in this realm.

“New Development Strategy” in China

Institutional capacity building has led to recent changes in environmental governance structures in China, under this rubric. The new strategy has been promoted by the central government in a top-down approach, calling for a whole scale, coordinated sustainable development and humanity-centered approach. A circular-economy based industrialization process is also called for. The new strategy emphasizes innovation in approaches and modes of development, quality of growth, coordination of all sectors, and sustainability.

Narrowing the gap between rural and urban areas is another priority on the agenda of many local governments in 2006. Energy efficiency has begun to concern local governments in their new blueprints. In southwest China's Sichuan Province, the government's 2006 program calls for reducing the energy consumption per unit GDP by 4 percent.

China aims to reduce water usage by 69 billion cubic meters by 2010, according to the country's water conservation plan for the 2006-2010 period. According to the plan, mapped out by the National Development and Reform Commission, and the Ministries of Water Resources and Construction, China hopes to cut water consumption per unit GDP by 20 percent compared with 2005. The plan said that China would try to improve efficiency of water conservation by popularizing the use of water-saving facilities and technologies in agriculture, industry and everyday life. Instead of exploring water resources, China has begun to switch its focus to conservation, protection and proper distribution of water to ease water shortages and a possible water crisis amid its soaring economic growth. In Beijing, a water conservation campaign has helped the city save 100 million cubic meters of water per year, enough for 10,000 three-member families for four years, but well below the amount required for long-term sustainability [26].

Better natural resources governance in India

Better environment, recycling and waste management are now actively becoming issues at the planning stage. Government has engaged itself in the task of managing environmental issues by focusing on the development of important administrative tools and techniques, impact assessment, research and collection and dissemination of environmental information. Although it is perceived that economic progress along with adoption of social and environmental goals can lead to sustainable societies, it is equally clear that a mere increase in government expenditure will not be sufficient. Civil society and local communities will have to play a larger role. Massive capacity building not only at primary education level but spread of Information, Communication and Technology (ICT) empowers poor to take control of their livelihoods and markets for their products.

Mainstreaming environmental policy in Brazil

Cross-cutting policy making approaches undertaken through “transversal” planning engage the full spectrum of responsible sectors in building a response to regional development and environmental problems. Transversal approaches involve societal control and stakeholder participation as key to yielding sustainable solutions.

The planning processes adopted to reach transversal solutions involve firstly a broad-brush diagnosis of the problem at hand, from a multi-sectoral perspective. Agency constituents and stakeholder representatives form working groups to inform an officially designated interagency working group to identify possible responses and budgetary requirements. An immediate action plan is set in motion, and then closely monitored as it unfolds, leading to regular evaluation and adjustments as initial assumptions are tested in practice.

The most important aspects of this approach for policy effectiveness include: i) high-level government commitment; ii) flexibility to reallocate existing resources where necessary to meet incremental demands; and iii) capacity to quickly leverage partnerships to stimulate the flow of private sector and international resources, as well as technical support.

To date, transversal approaches have been adopted most notably in the structuring of integrated regional sustainable development plans for paving a road through a pristine corridor in the central Amazon region, for multistate river basin planning along the San Francisco River in the semi-arid Northeast, and in an interministerial plan to combat the continuing high rates of deforestation in the Brazilian Amazon. At an international level, the process has also been applied to biodiversity protection in the context of river basin management in the Amazon basin.

Accelerated and Shared Growth Initiative in South Africa

In its overarching goal to reduce poverty, South Africa has adopted a quest for accelerated economic growth. A specific national level growth initiative, called the Accelerated and Shared Growth Initiative of South Africa (ASGISA), aims to halve poverty by 2014, to attain and maintain an economic growth rate of 6%, to launch various major infrastructure projects (also motivated by the upcoming 2010 Soccer World Cup event), and to mainstream broad-based black economic empowerment (the official policy of government to involve more black people in the formal economy) [27].

Contradictory to stated government policies and objectives, however, over half of ASGISA's 11 provincial turnkey projects are extremely resource intensive. These projects include large-scale plantation forestry using exotic species, water intensive mining projects (especially platinum), a biofuel (biodiesel and bio-ethanol) project, and commercial irrigation farming and livestock schemes. These agricultural, livestock, and mining projects are all water and energy intensive, and require large areas of land, all of which compromise biodiversity and environmental conservation. They also have a limited poverty alleviation impact since they are all focussed on existing establishments with little access to new greenfields companies. A sustainable and workable solution has to be sought, through broader discussion of these projects among South African society.

Public-private partnerships

In recent years, specific user taxes, earmarked funds, retained earnings; tolls and private sector participation have played an important role in infrastructure development in

India as well as other BRICS nations. Increasingly public-private partnerships (PPP) are developing in infrastructure, which was earlier limited primarily to the public sector. While PPP initiatives are multiplying among the BRICS, environmental and social safeguards are often not clearly established in the conditions for private sector involvement in such undertakings. This represents a challenge for which institutional oversight is clearly needed, while offering flexibility to avoid repelling investors.

In India's case, while stepping up public investment in infrastructure, the Government is actively engaged in setting an appropriate policy framework, which gives private sector adequate confidence and incentives to invest on a massive scale, but simultaneously keeps adequate checks and balances through transparency, competition and regulation.

In the 1990s Brazil engaged in a number of privatizations, notably of most state-owned public banks, major mining industries, energy and telecommunications services, although the pace of privatization slowed nearly to a standstill under the Lula administration. The order of the day is also now public-private partnership, but here as well the rules need to be clearly set out. The lack of explicit norms on the participation and guarantees of government toward such investments have led to continuing uncertainties and delay in implementation.

Despite a call for small-scale biofuel technologies so that small farmers can benefit, much fear exists that new demands for liquid fuels will reinforce the highly concentrated agribusiness model that has been followed in the 30 years in which Brazil has been engaged in fuel ethanol production. An innovative measure to counter this tendency is the adoption by government of a "social fuel label" provided to companies that refine biofuels from feedstocks purchased from small farmers under contract. Those who agree to do so receive tax breaks and credit subsidies.

Contrary to common knowledge, privatization is also well underway in many facets of China's economy. The growth of rural industry in China since 1978 was explosive, grounded in a system of Township-Village Enterprises (TVEs). By means of a combination of privatization, liberalization and fiscal decentralization, rural industrialization took off. Much of the groundwork for this explosive rural industrialization was laid during the Maoist era, but it has indeed blossomed since China embraced the market economy [28]. The privatization process begun in the mid-1990s was deep and fundamental. More than 50% of local government-owned firms have transferred their shares to the private sector, partially or completely [29].

Tools for sustainability assessment

Multicriteria sustainability assessment for Russia

Russia's fifty-year experiment with central planning was vanquished by its entry into global financial markets, leaving a far more chaotic and vulnerable system in its place. Yet some efforts are being made to resuscitate national capacity to plan for the future, with a more explicit incorporation of environmental quality and human well-being. The current economic revival offers new

opportunities and presents new challenges for Russia's sustainable development.

Application of the UN Sustainable Development framework of indicators and sustainability assessment to Russia has begun, using multi-criteria evaluation methods [30]. The potential of several MCE methods for the sustainability analysis was evaluated. Incommensurability [31] and strong sustainability determined the choice of methods for the multi-criteria dynamic assessment of sustainability at the macro level. Incomparability of values – environmental, economic, and social goods cannot be substituted for each other in the condition of relative scarcity – suggest the need to analyze the trajectory of development from a multidimensional and dynamic perspective to be able to understand the system and processes involved.

The analysis shows that the choice of policy priorities explicitly affects the assessment results and determines the changes that are desired by the society. More emphasis should be drawn to the elicitation of social preferences and democratic articulation of different interests within a society.

China: New Indices for Measurement of Sustainable Development

As part of its "New Development Strategy" (see 3.1.1, above), a significant change in institutions for environmental governance is underway in China. It is hoped through this process that GDP will be gradually excluded as a primary indicator of development by government. Natural resource and environmental costs will be taken into account in the green GDP system and in the performance assessment of governmental officials. This will shed light on government decision on the process of how decisions are made and who participates in these decisions. However, this change is still in the process and local environmental governance and institutional innovation is still very weak.

In the meantime, some development indices familiar to the general public are fading out from the local governments' development schemes. The industry added value, tertiary industry added value, retail sales volume, fixed assets investment, export trade volume, the value of used foreign investment, and the average life expectancy are all removed from the development program of Shanghai municipal government [26].

India and the Millennium Development Goals

The Millennium Development Goals (MDG) will contribute to streamlining and strengthening monitoring and enhancing accountability for sectoral agencies and ministries in relation to specific targets and indicators. Local government needs to proactively ensure the both women and men are fairly represented in the development and implementation of the MDG-linked local development strategy. If gender equality considerations are successfully incorporated into efforts to achieve the Goals, the MDG process will help serve to mainstream gender in a broader range of national programmes and policies than may previously have been possible.

Institutional innovations to restore natural capital

Although Brazil has by far the world's worst record on containing deforestation, it is refreshing to note the turnaround toward forest restoration underway in other BRICS countries. Whether forced to do so due to overwhelming indications that upland watersheds had lost their ability to regulate stormwater, or in response to growth in demand for wood, afforestation or reforestation is now fairly common. Successful tree planting may not however restore environmental services.

In South Africa, an extended public works program currently underway to restore critical natural capital is the "Working for Water" program. Unemployed people are provided with training and the opportunity to remove invasive alien vegetation. The concept has been expanded upon into areas such as the active restoration of indigenous vegetation areas and wetlands, although as yet it is on a very small scale. Such restoration activities provide direct employment and education opportunities and it leaves a lasting legacy.

In Gawula, for example, a remote rural and impoverished village in South Africa the only affordable form of energy is that of fuelwood. The unsustainable harvest of fuelwood has led to widespread and serious environmental degradation to the point that the increasing lack of the resource has increased the community's vulnerability to adverse climatic conditions and a reduced ability to prepare food. This has given rise to an ecological restoration programme, called ARISE [32]. Restoration has increased the stock of natural capital and it provides much needed employment opportunities (approximately 250 direct jobs in total) in an area where the unemployment figure is as high as 90%.

In India, common property wastelands that were previously subject to unsustainable harvest have been gradually allowed to regenerate through natural succession, where management responsibility and the goods and services that flow from forests has been vested in local communities. Such approaches toward collaborative public-community wasteland regeneration and management have now become widespread [33].

Although considerable efforts are underway to restore degraded forests, burgeoning populations continue to place pressure on these resources for agricultural expansion, fuel and timber. International cooperation has been modest, complicated by concern for sovereignty. The Kyoto Protocol holds out the prospect that forest restoration in lands already deforested or never forested may be compensated by carbon markets, but as yet is silent on how to protect standing forests from destruction. Brazil, whose deforestation and burning contributes 75% of the greenhouse gases it emits, has now proposed that its good faith efforts to reduce deforestation in standing forests such as the Amazon be rewarded by voluntary contributions [34].

4. Conclusions

Innovation and governance offer avenues for emerging nations to face the challenges of sustainability within the context of rapid economic change, but do not counter the

underlying paradox that makes growth fundamentally unsustainable. Political will to face the difficult choices associated with resource conserving restraint is seldom available, except perhaps in the face of major natural disaster or looming man-induced catastrophe. Even when environmental problems assume a global dimension, however, innovative attempts are often stymied by hidden agendas that impede progress to reach common goals.

The experience of the BRICS countries suggests that imaginative solutions may be promoted as a means to avoid "overshoot" in resource consumption. For this to occur, opportunities for South-South interchange are needed to find pathways to "tunnel under" the EKC. This will require, in turn, the help of propitious international terms of trade and institutional arrangements, costless and smooth technology transfers and above all, societies willing to forego current consumption for future social benefit and environmental quality.

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Annex

Table 1. Comparative analysis of growth and consumption patterns in the BRICS

Indicator	Unit	Brazil	Russia	India	China	South Africa	BRICS	World	BRICS/World
Population	billion	0.184	0.144	1.08	1.296	0.046	2.75	6.365	43%
GDP	\$ billion	944	763	796	2,680	256	5,439	41,290	13%
GDP growth rate (a)	2006 est. %	2,8	6,6	8,5	10,5	4,5	8,0	4,0	201%
GDP/capita	2006 est. \$	5,021	5,373	737	2,068	5,565	1,976	6,329	31%
Human Development Index (2004) (a)	Index	0.792	0.797	0.611	0.768	0.653	0.708	--	
Land area	1000 sq. km.	8,459	16,381	2,973	9,327	1,214	38,354	129,663	30%
Rural population share (b)	%	16%	27%	72%	60%	43%	60%	51%	117%
Arable land (c)	% of total land area	7.0	7.3	54.4	15.4	12.1	13.0	n.a.	
Rural population density	Rural pop/ha arable land	52	32	475	554	134	201	492	41%
Fertilizer consumption	100 g/ha of arable land	1302	2777	1008	119	654	1172	136	862%
GDP/unit of energy	2000 PPP \$/kg oil eqv.	6.9	1.9	5.3	4.5	3.9	4.5	4.7	96%
Energy use / capita (a)	kg petroleum equivalent	1,065	4,424	520	1,094	2,587	1,066	1,734	61%
Electricity consumption / capita (a)	kWh / yr	1,883	5,480	435	1,379	4,504	1,309	2,456	53%
Electricity generated by coal	%	2%	19%	68%	79%	93%	52%	40%	131%
CO ₂ emissions / GDP	kg / 2000 PPP \$ of GDP	0.2	1.4	0.5	0.6	0.8	0.7	0.5	140%
CO ₂ emissions / capita (a)	tons	1.8	9.8	1.2	2.7	7.6	2.5	3.9	64%
Gross savings	% of Gross National Income	24%	32%	23%	42%	15%	27%	21%	131%

Sources: [6]; [7] (HDI); [8]. Notes: BRICS average weighted by: (a) population; (b) GDP; (c) land area. The rest are simple averages of country indices.

Is the economy (de)materializing? A comparison of Germany, China and Spain

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Abstract

The question whether the economy is dematerializing or not, is relevant to the environment versus economy debate in several respects. This paper discusses the drivers and inhibitors of dematerialization. The Domestic Material Consumptions (DMC) and the Physical Trade Balances (PTB) are presented for three major economies – Germany, China and Spain. This allows the authors to illustrate three scenarios of economic development over a decade. Results emphasize that a clear distinction needs to be made between absolute and relative dematerialization. As the world economy grows, there is no absolute dematerialization. This leads towards a discussion of the material intensity of the satisfactors of human needs, and finally to a discussion on the perspectives of “sustainable degrowth”.

Keywords

Dematerialization, Environmental impacts, Industrial ecology, Ecological economics, Human needs, Sustainable degrowth

1. Introduction

The evolution of economies towards less intense material and energy use is often referred to as dematerialization. Dematerialization can be defined as the reduction in the amount of materials needed for the economic process, or a reduction in the quantity of material used per unit of economic output, also called “intensity of material use” (Cleveland and Ruth 1998). It is relevant to the economy versus environment debate for essentially two reasons. First, it is believed that the economic process of ever doing more with less is inherent to the information society where knowledge increasingly substitutes for energy and materials in the economy. Second, to reduce the magnitude of the flow of materials, or throughput, in the economy would presumably lighten the load on the environment. In other words, the weight of throughput becomes a quantitative measure of economic performance in the same way as gross domestic product (GDP). Questions arise of whether a “lighter” economy (e.g. substituting nuclear energy for fossil fuels) will be less or more damaging to the environment. We leave this aside for the moment, and share the belief that increasing the use of materials is in principle a good indicator of increased environmental load.

The dematerialization debate has been mainly onset by *Limits to Growth* (Meadows and Club of Rome. Project on the Predicament of Mankind. 1972) and concerns about the

exhaustion of both material and energy supply as well as the assimilative capacity of the environment. These concerns also supported the emerging research field of Ecological Economics, which studies the metabolism of the economy (Georgescu-Roegen 1971, 1976; Ayres and Kneese 1969; Daly 1991; Martínez-Alier and Schlüpmann 1987; Boulding 1966). This paper intends to provide an overview of what is understood by dematerialization and starts with an overview of economic and physical indicators followed by an explanation of how dematerialization may or may not take place. To illustrate their points, the authors present new empirical evidence and some important distinctions are made. The paper concludes by suggesting some policies.

2. Physical measures of the economic process

Economic growth as measured conventionally with GDP at constant prices is problematic in several ways. GDP has long been criticized for excluding non monetary transactions such as unpaid domestic work¹ and negative externalities. Rising income per capita is considered by mainstream economics as an adequate indicator to assess *standard of living*, often associated with *quality of life* and ultimately confused with *societal happiness*. However, the costs of wars, toxic farming, climate change, oil spills, depression or cancer while profitable for the few and added to GDP, should really be subtracted to reflect societal progress. Hedonist psychology (Kahneman et al. 1999) shows that the correlation between GDP and happiness in the western world no longer holds and that societal happiness has been declining for the past thirty years (Veenhoven 2004) very much in parallel to the *Index of Sustainable Economic Welfare* (Daly et al. 1989) or the *Genuine Progress Indicator* (Redefining Progress 1995). On top of the distribution conflicts that are hidden by an indicator as biased as GDP, how can economic growth be sustained on limited stocks of natural resources and sinks? In a system such as the Earth, the economy cannot expand indefinitely. Viewing the economy as an embedded subsystem of the environment, the response from Ecological Economics has been to promote physical indicators to account for the limits of the biosphere.

The following two hypotheses thus need to be confronted: the first claims – as some proponents of Industrial Ecology do – that economic growth can be delinked in relative or even absolute terms from energy and material consumption and presumably go on forever; the second one considers economic growth and growth of energy and material consumption as being two sides of the same coin.

Several indicators have been developed to evaluate the biophysical requirements of the economic process. Among these, material and energy flow accounts (MEFAs) present advantages to assess (de)materialization (Bartelmus 2002). Specifically MEFAs reflect relatively well long-term structural changes, substitution of energy and materials as well as externalization, moving production overseas for example (European communities 2002).

¹ Originally, the economy (*oikonomia*) has no chrematistic intention *per se* and simply refers to the “management of the house”.

3. Dematerialization: an Industrial Ecology's dream

Industrial Ecology takes dematerialization as the cure to minimize resource extraction, while maximizing reuse and recycling. The prospect is to *close the material cycle* (Ayres and Ayres 2002) although authors in the field know only too well that at present waste from the human economy (carbon dioxide and other greenhouse gases, or heavy metals) is not being recycled to the extent required. Human ingenuity, technology and knowledge are often praised as the main dematerialization drivers. These factors will now be discussed.

Dematerialization as outlined above has been primarily achieved through innovation promoting resource efficiency (technology effect), enhanced by the shift towards an information society and the structural change of economies towards growing service sectors (structural effect). According to Ayres and Ayres (1998), sustaining the present growth can be achieved by dematerializing the economic process itself without sacrificing prosperity. A new service-oriented economy in which goods are not accumulated but converted into services must be established, they contend. Arguably, such high-tech service-economy allows for economic growth without exhausting the Earth's resources or its waste assimilative capacity.

Increasing functionality and technological efficiency, as well as promoting "immaterial" information and knowledge exchange are also praised by industrial ecologists. Greater fuel efficiency within the automobile, aviation and maritime industry is a direct consequence of light weighting. Plastic materials and composites have given a chance to many industries to progressively reduce their weight. However, as mentioned above miniaturization often involves a sizable ecological rucksack; in other words, the life cycle analysis of a product reveals large inputs of primary materials essentially invisible in the output.

The faith in human ingenuity and knowledge relies on the following premises. First, reserves of natural resources are functions of technology; meaning that the more advanced the technology, the more reserves become known and recoverable. Second, technology allows us to develop substitutes for resources that may become scarce. Third, substitutions between inputs of labor, capital, renewable and non renewable resources are always possible. This is the core of the debate of "factor 4: doing twice more with twice less stuff" (Weizsaecker et al. 1997). Similarly, "factor 10" as suggested by researchers at the Wuppertal Institute (Factor Ten Club 1994, 1997; Schmidt-Bleek 1992), preaches the even higher reduction in the material and energy intensity per unit of economic output as a reasonable if daunting goal. As argued by Rees (1996), 'reasonable' because a reduction in throughput of this magnitude seems necessary; 'daunting' because a reduction of this magnitude through material efficiency alone seems impossible, considering current trends.

5. Drivers and inhibitors of dematerialization

Technological innovations, telecommunications, substitution of plastics for wood, and the increasing

strength to density ratio of many materials seems to drive the popular idea that society's fate is less and less dependent on physical resources. But not all technological innovations support dematerialization (Herman et al. 1990). Energy efficiency (which benefits are largely cancelled out by increases in consumption), biotechnologies and nanotechnologies seem indeed false promises in dematerializing the economy. The inhibitors of dematerialization are numerous. Increasing product complexity and miniaturization makes recycling almost impossible. The properties of new materials often involve a larger ecological rucksack, or the quantity of material and energy consumed and discarded in the manufacturing process (Ayres and van den Bergh 2005).

Therefore, changes in the production or consumption phases of the economic process may cancel each other out when it comes to overall material throughput. It is no different with energy, which efficient use is yet another argument in (de)materialization. Efficiency can be defined as the ratio of actual work performed to maximum work. Increasing efficiency enables decreasing production costs, the very principle of ever doing more with less. Nevertheless efficiency does not imply reductions in total material and energy input, quite to the contrary (Bunker 1996). Efficient use of one input for example may come at the expense of another such as energy efficient dwellings which often require extra insulation material. Furthermore, as will be discussed below, the Jevons effect or "rebound effect" often cancels some of the initial benefits to the environment.

4. Results: empirical evidence from Germany and China

Measures of (de)materialization are essentially the weight of material requirements and the energy necessary in the production process. In order to quantify the physical impact of an economy's services on the environment and probe whether or not dematerialization in the absolute or relative sense is a bona fide tendency, several indicators have been established.

Different methodologies have been applied but common ground has emerged in the calculation of total changes in Domestic Material Consumption (DMC), which is defined as the sum of domestic extractions and imports minus exports. For instance, Ayres and van den Bergh (2005) showed that total and per capita material and energy consumption have been rising steadily over the past century in the United States. As compared with GDP figures, there is a trend towards relative dematerialization, meaning that the growth rate in energy and material consumption is positive but smaller than that of GDP (Ayres and van den Bergh 2005; Cleveland and Ruth 1998). The European Union at 15 showed the same behavior of relative dematerialization. From 1980 to 2000, the EU's economy grew at 56 percent (in constant 1995 dollars) while DMC rose 2.7 percent on average over the whole period (European communities 2002). In other words, both economies are physically expanding.

The case of Spain for instance is different though. Cañellas et al. (2004) showed that Spain's DMC increased by 78.5 percent from 1980 to 2000, while GDP grew by 74 percent over the same period and in constant prices. Thus, the

Spanish economy is materializing faster than it is growing in monetary terms; in this case there is absolute materialization.

New empirical evidence from China and Germany is presented below. Clearly, both economies have very different structures; in 2002 China's population was more than 15 times larger than Germany's. As expected, the Chinese economy is also one order of magnitude larger in physical terms. This latter result is very different from the picture given by monetary values such as GDP.

Data from MOSUS², Comext³ – EUROSTAT's external trade database – as well as customs statistics from the National Bureau of Statistics of China⁴ were used to compare two of the world's largest economies over the period from 1994 to 2002 (details in appendix). The computation of material input data was carried out according to the nomenclature and categorisation of the Statistical Office of the EU (Eurostat 2001) and covers the following aggregated material groups: fossil fuels (coal, oil, gas, peat), metal ores, industrial and construction minerals as well as biomass (agriculture, forestry and fishery). Conversion factors were applied in cases where primary data was given in other units (e.g. cubic meters, heads, etc.). Figure 4 and Figure 5 show the results for China and Germany respectively.

Physical Trade Balance (PTB) is a useful indicator as the ecological rucksack of imported goods and services are not accounted for by DMC. PTB is a measure of the extent to which environmental loads are displaced abroad and is obtained by subtracting domestic extraction to DMC. Hence, a positive PTB shows to some degree the appropriation of foreign resources, whether energy, materials or sinks for wastes. Figure 6 and Figure 7 show the results for China and Germany, respectively⁵.

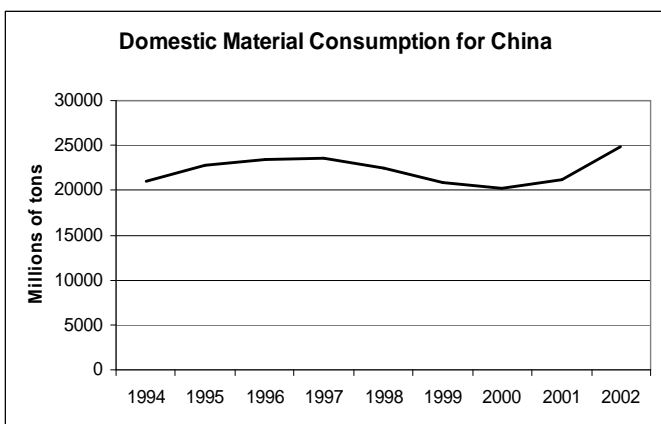


Figure 4: Domestic Material Consumption for China (Source: own elaboration)

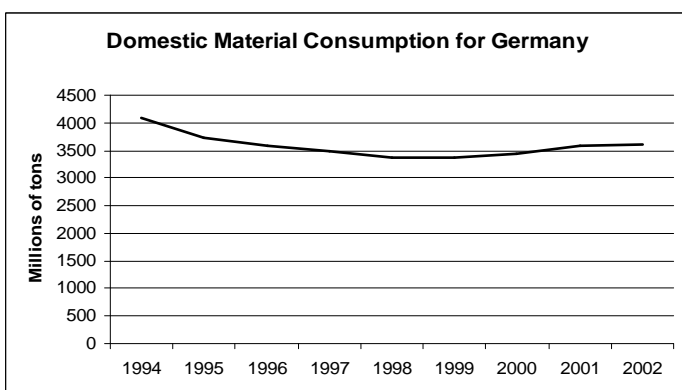


Figure 5: Domestic Material Consumption for Germany (Source: own elaboration)

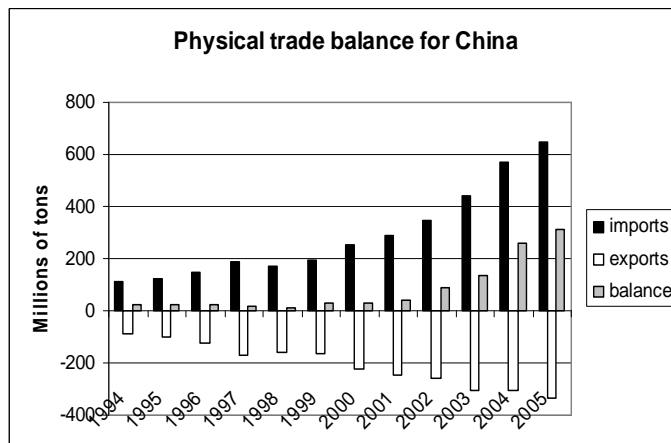


Figure 6: Physical trade balance for China (Source: own elaboration)

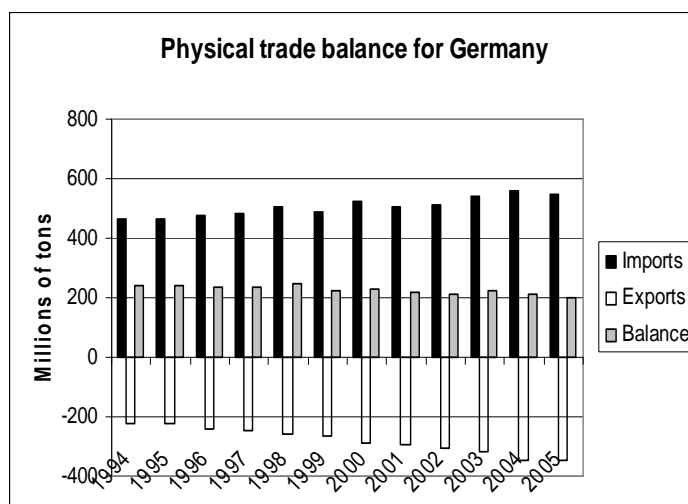


Figure 7: Physical trade balance for Germany (Source: own elaboration)

Both countries import more than they export, in terms of weight. While the PTBs are on the same scale for both countries there is a clear difference in trends. China is rapidly materializing from abroad, whereas in Germany the balance remains roughly constant or slowly decreases. The results given in Figures 1 to 4 are discussed in the following section.

6. Absolute vs. relative dematerialization

Dematerialization should thus be differentiated in basically two ways. De Bruyn and Opschoor (1997) distinguish

² Refer to <http://www.mosus.net>

³ Refer to <http://fd.comext.eurostat.cec.eu.int/xtweb/>

⁴ Refer to <http://www.stats.gov.cn/english/>

⁵ Note that in Figures 3 and 4 results are given from 1994 to 2005 as more recent data was found for external trade than for domestic extraction.

between “strong” and “weak” dematerialization, where the former refers to dematerialization in the absolute sense, meaning a total reduction in the material requirements of the economic process. In its “weak” sense, growth in material requirements is relatively slower than growth in the economy (Carpintero 2002); in other words, relative dematerialization refers to a declining intensity of use, while total material use still increases. Table 1 (in annex) summarizes the growth rates for domestic material consumption (DMC), gross domestic product (GDP) and physical trade balance (PTB) for China and Germany from 1994 to 2002 and Spain from 1980 to 2000.

Therefore, China exhibits so-called “weak” or “relative dematerialization”, while Germany actually dematerializes its economy in absolute terms, experiencing “strong dematerialization” which cannot be totally attributed to a substitution of imports for domestic production since the PTB does not increase with time. On one hand, with the reunification of Germany, fossil fuels extraction, mostly brown coal of very low quality, was rapidly cut by half in the early 1990s before reaching another plateau. Imports of coal on the other hand, close to tripled over the 1995 to 2006 period. Gas imports more than doubled over the same period. Coal is also the primary fuel for Chinese industrialization which provides the rest of the world with cheap goods. The impact per unit of mass on the climate is however much worse than that of oil and gas. Germany also decarbonized its economy with nuclear energy which accounts for approximately 30 percent of the energy production mix and probably more with energy imports. German exports of cars also tripled from 1995 to 2006. Thus, several reasons explain the dematerialization of Germany, but not one of them could be replicated elsewhere in the short or even long term.

The dematerialization model is therefore nuanced and the hypothesis that growth in material consumption and economic growth are tightly linked cannot be rejected. In fact, in many countries the largest share of materials by weight entering the economic process is that arising from the construction industry (although in poor countries biomass might have a larger share). As such, trends in urban development in the form of urban sprawl, covering larger areas but housing fewer people while requiring bigger infrastructure, increases the consumption of building materials per capita (Wernick et al. 1996). From this perspective of suburban culture, wealth is a definite materializer.

Moreover a reduction in material quantity does not necessarily mean less damaging production processes or less hazardous waste generation. Toxicity concerns undermine many new technologies precisely taken as dematerializers such as computers, which require unhealthy doses of hazardous chemicals and heavy metals. Weight is one among the many attributes of materials and one unit of gravel is certainly less damaging than a tiny fraction of that unit in radioactive material. Indeed, reducing the description of the economy to a single one dimensional *numeraire* does not satisfactorily indicate environmental consequences. Therefore a broader palette of measures of environmental, social and economic performance should be considered (Wernick et al. 1996) in a macroeconomic multi-criteria assessment.

Furthermore, ecological economists like Daly (1999) argue that technology and resource substitution (through ingenuity) cannot continuously outrun depletion and pollution and that the basic relation of man-made and natural capital is one of complementarity, not substitutability. Tools of transformation, i.e. the efficient causes of production, are complementary to material causes and therefore cannot substitute for them. According to Daly (1999), there is a maximum scale of the economic subsystem, a point beyond which further physical growth, while possible, costs more than it is worth. This allows a clear distinction between economic and uneconomic growth. Once economic growth increases ecological costs faster than production benefits, it becomes a true uneconomic growth, impoverishing rather than enriching, and its measure, GDP, indeed becomes ‘a gilded index of far-reaching ruin’⁶.

The “gospel of efficiency”, as Hays (1959) called it, has been debunked or at least severely questioned because improved unit efficiency does not necessarily lead to lower consumption levels. Jevons (1906), in his book *The Coal Question*, observed back in 1865, that the higher efficiency of steam engines did paradoxically lead to a greater use of coal by making it cheaper relative to output⁷. As mentioned above, increased attention is being paid to the implications of “Jevons’s paradox” onto the material sector⁸. Do we automatically use more material as production processes become more efficient, i.e. less material is used per unit of output? In other words, increasing *eco-efficiency* can lead to decreasing *eco-effectiveness* (Figge and Hahn 2004). As Saunders (1992) notes, energy efficiency gains might well increase aggregate energy consumption by making energy cheaper and by stimulating economic growth, which further “pulls up” energy use, in a form of “rebound effects” (Jaccard 1991). Similarly, technology-induced money savings by individuals are usually redirected to alternative forms of consumption, canceling some or all of the initial benefits to the environment (Hannon 1975).

7. Discussion: basic needs and material wants

We suggest here that the “materialization” pathology of our western society partly arises from the confusion between material wants and immaterial needs. This misunderstanding is strongly anchored within the underlying paradigm stating that human needs can be satisfied by economic growth, which will automatically enhance quality of life. Hence, in the final part of this paper, the ideology lying behind economic and material growth is more closely examined, emphasizing the difference between material wants and immaterial needs.

Max-Neef (1991) built up a set of human needs with intercultural validity. He postulates that basic needs are shared by everyone and are finite and few. According to his model, it is not the accumulation of materials and the consumption of energy that provide satisfaction, but the degree to which

⁶ Quoted from John Ruskin, *Unto this Last*, 1862, cited in (Daly 1999).

⁷ See (Martínez-Alier and Schlüppmann 1987) p. 160

⁸ Refer to (Darwin 1992) for an illustration of this effect in the timber industry.

basic needs (food and housing but also knowledge and affection) are met. This is where the essential distinction between *need* and *satisfactor* must be made. One key characteristic is the election of *satisfactors* (with their associated socio-environmental costs) to meet previously defined needs. Under Max-Neef's conception, *needs* should not be confused with *wants*, infinite, insatiable and shaped by culture, advertising and personality.

As suggested by Baudrillard (1970), what we buy and consume are not merely objects but rather culture embedded signs constituting a social language with the surrounding community. Veblen's "Theory of the Leisure Class" (1899) and his concept of *conspicuous consumption* had much earlier given a social explanation of why things are bought. It is this cultural and symbolic character of artifacts that led Gorz (1978) to distinguish between *misery* and *poverty*; where the first one is defined by the (objective) lack of a subsistence *satisfactor*, whereas the second one refers to the (subjective) gap between one's present situation and the culturally defined state of "well-being" at a given point in time. According to Illich (1973), the level of consumption exactly indicates one's ranking in the modern social hierarchy and Hirsch's "positional goods" (1976) explore this point by distinguishing between *absolute* and *relative* deprivation in the societal context.

From a biological point of view there is, indeed, some kind of lexicographic order since the minimum amount of endosomatic energy required to keep a human body alive cannot be substituted by other goods. Notwithstanding, besides necessary endosomatic energy consumption of around 2000 kilocalories per day, average exosomatic use exceeds in rich countries 100 000 or 200 000 kilocalories per person per day and does not satisfy basic needs as such, but rather socially constructed needs, which would better be called *wants*. So, in our society, one may wonder if there is a tendency to increasingly use highly intensive energy and materials *satisfactors* in order to satisfy needs, which exhibit predominantly non-material characteristics (Jackson and Marks 1999; Martínez-Alier 2002). As Catton (1986) observed, the biosphere accommodates not just more people, but effectively 'larger' people. This realization led Georgescu-Roegen (1979) to develop a theory supporting a degrowing economy or *décroissance*, oriented towards the satisfaction of needs, not profits or wants. Such an *oikonomic* system necessarily requires less energy and materials to be sustained, while prosperity does not need to be sacrificed (Odum and Odum 2001).

8. Conclusion: towards sustainable degrowth

In sum, the absolute dematerialization of the economy is largely a red herring, maintained by technological optimism and other beliefs that find little empirical evidence. While some national economies have been able to generate relatively more revenues than they have consumed materials, the aggregate amount of materials continues to grow worldwide (Behrens et al. 2007) although as, we have shown, there is an interesting trend to the contrary in certain economies like Germany. The main explanation is the displacement of material load to foreign countries through trade, especially the substitution of imported coal and gas for domestic brown coal. Revenues gained in the service

sector, less materially intensive than heavy industry, are usually spent in energy and material intensive consumption such as bigger cars, larger houses and extensive traveling.

This paper emphasizes that a clear distinction must be made between absolute and relative dematerialization, where relative dematerialization only refers to a decrease in the intensity of use, implying that the ratio between material throughput and GDP decreases over time. However, improvements in the ratios of materials to GDP (or energy to GDP) are really not relevant since nature sets absolute and not relative limits to resource consumption. Oil reserves for instance are finite in absolute terms, so is the assimilative capacity of the oceans for carbon dioxide.

Considering that developing countries such as China, India, and Indonesia will further expand their use of materials and energy, a new economic model based on socially sustainable "degrowth" of materials and energy use becomes mandatory in the rich countries. New *satisfactors* of needs must be necessarily less material and energy intensive. At least in the wealthiest countries, which are responsible for a disproportionate share of global resource extraction and associated environmental damage including climate change, radical changes in consumption patterns will be required to sustain the human enterprise globally in the longer run. In order to generate "environmental space" for the South, the North must embark on a socially sustainable degrowth path. So, we move from Sustainable Development (the false illusion of an economic growth which is ecologically sustainable) towards Sustainable Degrowth (in the rich countries), Meanwhile, social measures (basic and maximum income for all) would be introduced to compensate for increased unemployment in the economy, or increased burden of unpaid debts as economic growth stops, and declines. Such socially sustainable economic degrowth remains, however, a political taboo.

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Annex

Table 1: Changes in DMC, GDP and PTB for China and Germany from 1994 to 2002

	DMC (%)	GDP (% in constant 1995 prices)	PTB (% from 1994 to 2005)	
China	17.6	70.2	1175	Relative dematerialization
Germany	-11.8	12.1	-17.3	Absolute dematerialization
Spain (1980-2000)	78.5	74	110	Materialization

Table 2: Extraction, imports, exports, material consumption and trade balance figures for China in tons (elaborated from data available on the Eurostat, Mosus and National bureau of Statistics of China websites)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
DE	21070960737	22821254257	23414912771	23616079885	22524678168	20867031877	20177207967	21188659785	24727648461			
Imports	114048697	125552726	144290142	188411563	172127356	196557461	253054447	289998051	349685092	443677003	567712818	645295958
Exports	-89709328	102581438	122238605	171262859	161391084	166526228	223180563	249116408	260730005	308095646	308558174	334994146
DMC	21095300106	22844225545	23436964308	23633228589	22535414440	20897063110	20207081851	21229541428	24816603548			
PTB	24339369	22971288	22051537	17148704	10736272	30031233	29873884	40881643	88955087	135581357	259154644	310301812

Table 3: Extraction, imports, exports, material consumption and trade balance figures for Germany in tons (elaborated from data available on the Eurostat, Mosus and National bureau of Statistics of China websites)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
PTB	240000000	238896109	236733823	233103648	244810904	223512559	231751006	214955295	209129830	223325583	210908777	198474498
DMC	4097715863	3739323680	3580101232	3481827729	3374517291	3360065373	3435322386	3578950325	3616086813			
Exports	-	-	-	-	-	-	-	-	-	-	-	-
Imports	463000000	463590909	474990819	482415275	504722007	488954049	520987309	506632837	512836850	541783287	560397411	548287174
DE	3857715863	3500427571	3343367409	3248724081	3129706387	3136552814	3203571380	3363995030	3406956983			

Data quality:

Inevitably the quality of the data must be discussed here. For in such material and energy flow analysis, data quality depends on precision and accuracy which can be further divided into the absence of representative data or simply the absence of data. In the case of Germany, data seems to be relatively consistent coming mostly from Eurostat, nevertheless with a given degree of uncertainty. For China the domestic extraction figures must be consistent with that of Germany as they were taken from the same MOSUS project. Import and export data is provided by China Customs and available from the National Bureau of Statistics, both in monetary and physical terms. Reasonable conversion factors were used whenever data is given in units of production rather than weight. While the categorization of these flows has been adapted to UN statistical standards, not all the categorized products are recorded. Also, statistical territory for domestic extraction includes Taiwan, while imports and exports cover continental China alone, which the authors assumed a relatively marginal difference, given respective land masses or terms of trade.

Contribution from italian civil society

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The declination and the application of the principles of de-growth in the current political agenda find an obstacle in the relationships with classic politics.

Why hasn't politics acknowledged it yet?

The Greens and the European Left, like the other alignments, both at European level and at national level, ignore the important elaboration of intellectuals and movements on the topics of the de-growth. Also in Italy the political parties don't take these topics in earnest.

For a correct analysis of the obstacles we find in our way we must analyse the crisis, obvious to everyone, of the representative democracy.

The classic image of politics is a pyramid in which the apex is the place where the decisions are taken and where the politicians seat. They speak with the intellectuals and the representatives of the social categories that have to speak and convince the base of the pyramid, that is to say the mass. This image is obviously and deeply out of date.

The classic political forces lack an alternative and complete view. Movements and demands of the civil society unfortunately are more and more distant from the classic political forces. The analysis of the real context and the proposals of the de-growth remain a minority thought, not spread in a circular way to the different social classes. Even the trade unions continue to speak about growth of global economy in the future. We must report a delay in the relations with the classic social bodies. A historical and cultural delay is caused also by the fear of spreading a message that could be translated in a lowering of the purchasing power, in the increase of unemployment and so on.

In Latin America trade unions and classic political forces, have been swept away by new kinds of organization of the civil society that help us to speak about the idea of de-growth. And this is the result of a spontaneous process. Important examples are the indigenous organizations like the Aymara of Bolivia, new kinds of social movements like the Argentines piqueteros. New trade unions, movements, committees born in the entire continent. These movements and committees are our important allies. The committees of Esquel against the mines in Argentine don't want this type of development and growth. What do all these movements have in common?

Defence of common goods, respect of the sovereignty of the local communities and the failure of the representative democracy.

These topics have rebuilt a new imaginary.

Our association, after analysing the global economic crisis caused by the current phase of neo-liberalism, now has to

face and live the conflicts where the crisis of the same idea of representation is more and more evident.

It is a failed idea because in the current economic, financial and institutional architecture politicians don't have real impact and power.

These new kinds of organizations and self-governments come into being also because the classic politics has left its main aim: dialectic and conflicts.

This is why people organized by themselves.

If we observe the European contest we have to say that in Italy we are living an anomaly. In our territory new movements are born in and from the conflicts.

Like in Latin America, in our country we have a lot of movements that have chosen not to delegate any more.

Some examples are the communities of Val di Susa. They oppose to the construction of Corridor 5 for the high speed transport. The movements for the right of house are also experiencing recovery and re-use of metropolitan spaces taking them off the abandonment and the real estate speculation. The committees for the protection of the territories. Local committees against the privatisation of water. Committees against the incinerators, against the pollution from electrosmog and many others. These movements recreate an idea of a common feeling.

The committees of Vicenza speak about the militarization of the territory, the increase of military expenses and the USA bases on other territories.

A lot of committees all over Italy fight against privatisation of basic public services like water.

The conflict in Naples about the waste is a clear example of the collapse of a model of growth and consumerism.

In all these new conflicts the Italian left has enormous responsibilities.

What can an association like A Sud do? A Sud can create weldings, linkings between different committees, fields of the civil society, universities and some local administrations.

We must leave the ivory towers and go to speak with people in conflict, in need, stand by them to organize that process.

This will oblige politicians to leave their palaces.

This is the only way to force them to realize what is happening on earth.

In the European Parliament there are 6000 lobbyists of the great corporations and the multinational trusts. We must recreate a condition of balance.

To conclude, three suggestions:

- we hope that the ISEE opens a dialogue with the European political forces, as it is necessary.
- A useful instrument, that we could carry out, is a map of the ecological debt the north contracted with the south. It can be an instrument useful both for the organizations of the north and the ones of the south.
- At the local level we must experience new possible kind of participatory and directed democracy.

An Environmental Kuznets Curve Analysis of Italy: A scale approach for sustainable de-growth.

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Abstract

The Sustainable Development (or eco-efficiency) paradigm and the Bioeconomics (or ecological economics) paradigm are two of the most important approaches that try to integrate the social, economical and environmental dimensions. In this paper, the Sustainable Development and the Bioeconomics paradigms have been investigated with regard to the Italian economy. The purpose is to highlight the effects of economic growth on the ecosystem in order to promote a different way to sustainability based on sustainable de-growth.

We investigated the Italian case study in order to emphasize that a productive dematerialization doesn't mean a lifestyle dematerialization and that a local de-pollution does not necessarily mean a sustainability improvement. In particular, the international trade, the pattern of consumptions and some environmental variables have been analysed to highlight that local sustainability improvement may be accompanied by global un-sustainability displacement. In this context, the Material Flow Accounting is suggested to be an useful approach in order to support a sustainable de-growth. It defines the economic system as an analogous to a living system that produces waste and needs a continuous throughput of material and energy from natural system. Based on the thermodynamic foundations of the economy and comparing the metabolisms of different society, Material Flow Accounting can be an effective methodology to promote an equitable and sustainable management of natural resources.

To reach a sustainable de-growth is a scale issue. This paper suggests to reduce the scale of consumption and production. Considering the pattern of consumptions as the main cause of un-sustainability, a quantitative reduction of our consumptions should be promoted to achieve a physical de-growth. At the same time, a new economic system, based on local systems of production, should be established to reduce international trade pollution and avoid environmental load displacement. Italy, historically and culturally composed of more than 8.000 local municipalities, may be a suitable country starting to support this process.

Keywords: Sustainable Development, Bioeconomics, Sustainable De-growth, Environmental Kuznets curve, Material Flows Accounting.

1. Introduction

Since the end of World War II, an increasing attention has been devoted to environmental problems and today sustainability has become a fundamental issue in the world political agenda. The worldwide deterioration of environmental quality urges to set out an integrated framework to consider the complex relationship between environment, economy and society. The Sustainable Development (or eco-efficiency) paradigm and the Bioeconomics (or ecological economics) paradigm are two of the most important approaches that try to integrate social, economical and environmental dimensions.

The Sustainable Development concept has been introduced by the World Commission in 1987. It states that “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987: 43). Adopting an anthropocentric approach it focused on socio-political issues and represents an attempt to link environmental conservation with economic development. It acknowledges that economy depends on environmental functions, which provides materials, energies and sinks for waste. However, it considers economic growth as the best way to resolve environmental problems and distributional conflicts. “The concept of sustainable development does imply limits, not absolute limits but limitations imposed by the present state of technology and social organisation on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organisation can be both managed and improved to make way of a new era of economic growth” (WCED, 1987: 8). Responsibility, efficiency gains and economic growth allow resolving any social and ecological problems, without drastic changes in behaviour and priorities.

According to Sustainable Development paradigm, globalisation and free trade policies are compatible with sustainable patterns of development (Bommer and Schulze, 1999) and eco-efficiency can be reached through economy growth and market liberalization. The sustainable management of natural resources, tanks to “ecological modernization”, “de-materialization” and “environmental Kuznets curve”, will reduce the biophysical constraints of economic growth (Martinez-Alier, 2002) and the “trickle down effect” will reduce poverty and inequality (Beckerman, 1992). Economic growth is seen as the best cure for the environmental consequences of itself and, in the longer run, the surest way to improve the environment is to increase the Gross Domestic Product (Beckerman, 1992).

Today many criticisms exist to the Sustainable Development approach. The growing disparities between rich and poor countries and the impossibility to increase efficiency and reduce consumption, according to Jevons paradox (Greening et al., 2000), are some of the most important scepticisms. Moreover, ecological distribution conflicts are growing with the increasing demand for energy and materials, and with the geographical

displacement of environmental impacts (Martinez-Alier, 2002).

The Bioeconomics paradigm, enforcing limits to infinite growth, gives birth to a radical criticism of neoclassical theory and lead to an evolutionistic idea of Sustainable Development (Daly, 1997a; Daly 1997b; Solow; 1997; Stiglitz, 1997). This approach, leading to emphasise biophysical variables as indicators of sustainability, considers the material and energetic requirement of economy as a measurement of the size of economic system in relation to the environmental one (Daly, 1991; Daly 1995; Hinterberger et al., 1997).

The thermodynamic analysis of economy, elaborated by Georgescu-Roegen (1971), was the crib of Bioeconomics approach, even if Frederick Soddy, prize Nobel of chemistry, was the first, in 1920s, to highlight some thermodynamic foundations of economics (Daly, 1996). Based on the mass balance principle and thermodynamic laws, the Bioeconomics paradigm is centred around the notion of entropy and offers an unifying conceptual framework to integrate a description of the human economy and its biophysical surrounding (Martinez-Alier, 2004). Using an expression from Shumpeter, its pre-analytic vision regards economy as an open system inside the framework of a closed and finite system: the environment (Daly, 1977). This theoretical framework is strictly related to the concept of Social Metabolism which is a notion that links up natural sciences, social sciences, and also human history (Martinez-Alier, 2004). Extending the biological concept of metabolism to human system, it defines the economic system as an analogous to a living system that produces waste and needs a continuous throughput of material and energy from natural system.

Considering the economy as a subsystem of the environmental system, limited and thermodynamically closed, Bioeconomy arrived to propose specific alternatives to infinite growth. These alternatives are mainly based on the stationary state (already proposed in the "Limits to Growth" by Meadows et al. (1972), or in "Stationary State Economy" by Herman Daly (1991) or on "de-growth" idea (Bonaiuti, 2004; Latouche, 2004).

In this paper, the Sustainable Development and the Bioeconomics paradigms have been investigated with regard to the Italian case study. The purpose is to highlight the effects of economic growth on the ecosystem in order to promote a different way to sustainability based on sustainable de-growth.

The paper is organized as follows. Section 2 briefly introduces the theoretical basis of Sustainable Development and Bioeconomics paradigms: on one hand the de-materialization and the de-pollution ideas, on the other hand the Social Metabolism approach and the Material Flow Accounting. In section 3, the de-materialization and the de-pollution hypotheses are tested in order to explore the possibility of a sustainable growth for Italian economic system. To do so, we take into consideration the Environmental Kuznets Curve model and we analyse the relationship between material input, emissions and income. The section 4 shows the results obtained from the methodologies presented in the third section. In section 5, a biophysical perspective is adopted. The Material Flows

Accounting data are considered in order to show that economic growth generates an increasing movement of materials and a global un-sustainability displacement. In section 6 we suggest to adopt the Bioeconomics paradigm to promote a biophysical de-growth and we introduce the idea of a scale approach to reach a sustainable de-growth. Based on this idea, different practical applications are presented with regard to the Italian case. In section 7 we conclude.

2. Theoretical bases of Sustainable Development and Bioeconomics paradigms

The Sustainable Development paradigm, still focused on neoclassical theory of economy, considers that economic growth will "de-link" itself from its environmental base.

There are two theories supporting this idea: one is "De-materialisation Theory" and the other one is "Environmental Kuznets Curve hypothesis".

De-materialization Theory, introduced by Malembaum in 1978, affirms that the environmental impact of the economic process depends on the material throughput of the economy and at the same time the throughput per unit of production may decrease over time. Innovation, investment and technical progress will reduce biophysical constraints of economic growth, achieving a long-run sustainability. The reduction of material intensity is also associated with "de-industrialisation": a switch away from resource-intensive industry towards knowledge intensity services (Glyn, 1995).

The Environmental Kuznets Curve (EKC) hypothesis postulates an inverted-U-shaped relationship between different pollutants and per capita income. It derives its name from the study of Simon Kuznets (Nobel for economy, 1971) who postulated a similar relationship between income inequality and economic development. From the 1990s onwards, the Kuznets Curve has been applied to environmental problems (Grossman and Krueger, 1992; Grossman and Krueger, 1994; Shafik and Bandyopadhyay, 1992; Panayotou, 1993; Banco Mundial, 1992) and used for sustainable development policies. According to this theory, economic growth is good for the environment because it seems existing an empirical relation between per capita income and some measures of environmental quality (Arrow et al., 1995; Suri and Chapman 1998; Ekins, 2000). In other words, environmental pressure increases faster than income at early stages of development and slows down relative to GDP growth at higher income levels. The income elasticity of environmental quality demand (Gitli and Hernández, 2002), the "composition effect" (Bell, 1973; Rothman 1998) and the "technological effect" (Komer et al., 1997) are the three main factors responsible of this path.

Considering the economy as a subsystem of the environmental system, the Bioeconomics paradigm proposes specific alternatives to infinite economic growth and give birth to a radical criticism about neoclassical theory (Daly, 1997a, 1997b; Solow; 1997; Stiglitz, 1997, Georgescu-Roegen 1971, 1977). The theoretical basis of the Bioeconomics idea are strictly related to the concept of

Social Metabolism and to the idea of Material Flow Accounting.

The Social Metabolism theory, extending the biological concept of metabolism to societies, considers the economic systems as subsystems of larger physical system, that transform raw materials and energy in goods and services, producing emissions and wastes. This way to consider the interrelations between societies and environment has been also used in the past by Marx and it has recently obtained a growing importance thanks to the studies of Ecological Economics and Industrial Ecology (Fischer-Kowalski, 1998). These studies investigate the whole of the materials and energy flows going through a society system (industrial societies but also non industrial modes of subsistence) and allow distinguishing between culture and societies on the bases of the Principle of Mass Conservation. Since this idea highlights the impossibility of an infinite economic growth in a finite system (Georgescu-Roegen, 1971), some authors argue that a prerequisite for sustainability is the reduction in the scale of social metabolism (Hinterberger et al., 1997).

According to this idea, during the recent years, a growing attention has been devoted to the physical exchanges between economy and environment, both for the increasing demand of energy and natural resources, and both for its socio-ecological consequences (De Bruyn and Opschoor, 1997). The social metabolism has become an important issue, used to investigate the socio-ecological conflicts, the ecologically unequal trade, and the (un-)sustainability degree of societies. Statistics has been published by governments (Weisz et al., 2002) and several indicators have been proposed. Material Flow Accounting (MFA) is probably the most used approach and it is also adopted by the European Commission (EUROSTAT, 2001).

Material Flow Accounting is a set of methods that consider the social-economic system in a physical dimension through a continuous exchange of energy and matter with their natural environments (Eurostat, 2001). MFA considers the economy embedded on environment and analyses the material interaction between environment, national economy and rest of the world. Environment provides low entropy flows of energy and material. They are used by national economy to produce goods and services, consumed internally or exported to the rest of the world. After a production or consumption process, emissions and wastes come back to the environment. Based upon the idea of balancing, which originates from the law of conservation of mass (the sum of material/energetic inputs into a system = the sum of outputs + changes in stock), it provides an overview, in tonnes, of annual material inputs and outputs of an economy. The Materials Flow Analysis was first developed by Ayres and Kneese (1968) to relate efficiency and consumption. It was an attempt to re-conceptualise economy into a thermodynamic framework taking into account the law of conservation of mass. Since the early 1990s the Material Flow Accounting has been then introduced into many official statistics and numerous material flow accounts for national economies in various geographical regions have been compiled (Weisz et al., 2006). Today MFA is an official statistic of European Union and is internationally considered an important operational tool for sustainability analysis.

3. Analysis of the Environmental Kuznets Curve hypothesis

In order to test the de-materialization and the de-pollution hypothesis, supported by the Sustainable Development paradigm, an EKC has been performed for the Italian economic system. In this paper we applied the statistical model usually employed in the EKC empirical literature (Dinda, 2004):

$$y_{it} = \beta_0 + \beta_1 x_{it} + \beta_2 x_{it}^2 + \beta_3 x_{it}^3 + \varepsilon_{it} \quad [1]$$

where y is environmental indicators, x is the per capita GDP, ε is the error term and $\beta_1, \beta_2, \beta_3$ are parameters to be estimated for the country i at year t .

This model permits to test several forms of relationships between environment (y) and income (x). In this paper, we tested the EKC hypothesis in the inverted-U (quadratic: $\beta_1 > 0, \beta_2 < 0, \beta_3 = 0$) and the N (cubic polynomial: $\beta_1 > 0, \beta_2 < 0, \beta_3 > 0$) shaped curves.

No relationship: $\beta_1 = \beta_2 = \beta_3$;

A monotonic increasing (linear relationship): $\beta_1 > 0$ and $\beta_2 = \beta_3 = 0$;

A monotonic decreasing: $\beta_1 < 0$ and $\beta_2 = \beta_3 = 0$;

An inverted U-shape curve (i.e. EKC): $\beta_1 > 0, \beta_2 < 0, \beta_3 = 0$;

A U-shaped curve: $\beta_1 < 0, \beta_2 > 0, \beta_3 = 0$;

A cubic polynomial or N-shaped curve: $\beta_1 > 0, \beta_2 < 0, \beta_3 > 0$;

Opposite to the N-shaped curve: $\beta_1 < 0, \beta_2 > 0, \beta_3 < 0$.

Considering the EKC theory, an inverted-U shape is the expected relationship between income and environmental quality. The N shaped EKC (Pezzey, 1989; Opschoor, 1990) makes the negative relationship in the middle part of the curve a transitory phenomenon, because the inverted-U shape is followed by a phase where environmental degradation increases (Huttler et al., 1998). This positive relationship has been explained by decreasing returns, changes in consumption patterns or changes in environmental policy. It is a situation that usually refers to very high income countries (Opschoor, 1990).

In this paper, with the purpose to test de-pollution hypothesis, emissions data has been used to model an EKC. Nitrogen emissions (NO_x), Sulphur emissions (SO_x) and Carbon Dioxide (CO_2) emissions are the indicators used in this paper. They are some of the most important pollutants emitted in the production and in the consumption activities. Sulphur and Nitrogen emissions are local pollutants that contribute to local air pollution and smog, acid rain, dry deposition and global climate change (Stern, 2004). On the contrary the Carbon Dioxide is one of the most important pollutants on global scale. It contributes to global warming with potentially irreversible negative impacts on economy, society and environment (IPCC, 2001). Emissions data has been provided by NAMEA (National Accounting Matrix including Environmental Accounting) and refers to the period from 1990 to 2001.

On the other hand, to test the de-materialization hypothesis, we performed a "material EKC" using Material Flow Accounting data. They have been provided by the ISTAT

(Italian National Institute of Statistics) and refer to the period from 1980 to 2001.

In order to analyse the biophysical dimension of Italian economic system, we considered two of the most important MFA indicators: the Total Material Requirement (TMR) and the Total Material Consumption (TMC). The first is an input indicator, which takes into account all primary material required by a national economy in order to perform its production. The second considers all primary materials which are associated to the (intermediate and final) consumption of a national economy (Eurostat, 2001). The TMR includes the direct input of materials (DMI) for use into the economy (it is the domestic used extractions plus imports), the indirect material flows associated to imports (material input flows associated to imports but not physically imported) and the unused domestic extraction (materials moved by economic activities but not used for production or consumption activities). In particular, the indirect material flows are equals to TMR minus exports and associated indirect flows of exports (material input flows associated to exports but not physically exported). Quantifying the physical dimension of economy, they provide important information about de-materialization, eco-efficiency and sustainability.

4. Results of the Environmental Kuznets Curve analysis

The results of our analysis, performed with the statistical model [1], are reported in Table 1. The high R-squared values for the second and third order polynomial functions suggest that the model have reasonably good explanation power.

The quadratic correlations show that per capita GDP has a positive and significant impact on local air emissions. The SO_x and the NO_x emissions declined from 1990 to 2001 (Fig. 1). However, for the NO_x emissions, the cubic income terms, when entered into the regression, is found to be positive and significant. It means that this emissions level might eventually start to creep up again. The EKC is respected and the de-pollution hypothesis for the Italian economic development is confirmed, with regard to SO_x and NO_x emissions.

On the contrary, CO₂ emissions and material data don't respect the EKC hypothesis. As reported in figure 2 and 3, carbon dioxide emissions and TMR performs a U-curve and an inverted N-shaped relationship. The Total Material Consumption shows a monotonic increasing and a N-shaped relationship. From a material point of view and for long terms pollutants, the de-materialization and the de-pollution hypotheses don't seem to be respected.

Tab. 1: Quadratic and cubic correlations

	Quadratic correlation	Cubic correlation
SO _x	$y = -4E-07x^2 - 0,0017x + 0,0325$ R ² = 0,9952	$y = -5E-06x^3 + 0,0001x^2 - 0,0022x + 0,0332$ R ² = 0,9961
NO _x	$y = -8E-05x^2 - 0,0001x + 0,0353$ R ² = 0,9785	$y = 1E-05x^3 - 0,0003x^2 + 0,0013x + 0,0335$ R ² = 0,9888

CO ₂	$y = 0,0086x^2 - 0,0369x + 7,6753$ R ² = 0,8478	$y = -0,0021x^3 + 0,0493x^2 - 0,2572x + 7,9602$ R ² = 0,896
TMC	$y = 2E-08x^2 + 0,0001x + 18,343$ R ² = 0,6913	$y = 2E-11x^3 - 1E-06x^2 + 0,0189x - 91,544$ R ² = 0,6952
TMR	$Y = 9,30E-08x^2 - 1,35E-03x + 2,86E+01$ R ² = 0,923	$y = -1E-11x^3 + 8E-07x^2 - 0,0139x + 101,81$ R ² = 0,9232

Considering de-pollution hypothesis, Italian economic development has reduced the SO_x and NO_x emissions from 1990 to 2001 (Fig.1). According to US and Norway studies, technological changes can account for the major decline of sulphur and nitrogen emissions (de Bruyn, 1997). Nevertheless, in agreement with different studies, the EKC is generally confirmed only for pollutants involving local short term cost (for example SO_x, NO_x, etc.), but not for accumulated stocks of waste or for pollutants involving long-term and more dispersed costs (such as CO₂), which are often increasing functions of income (Arrow et al., 1995; Cole et al., 1997). Our work confirms this. In Italy, the CO₂ emissions have been largely increased during the period considered (Fig.2). EKC can't be generalized for all types of pollutants. Economic growth doesn't necessarily generate de-pollution and sustainability improvement.

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On the other hand, economic growth has not even led to a real de-materialisation of Italian economy. Italian economic development has generated more material requirement and consumption from 1980 to 2001. It proves that the Italian resources use is non-stop increasing. The de-materialisation hypothesis is rejected.

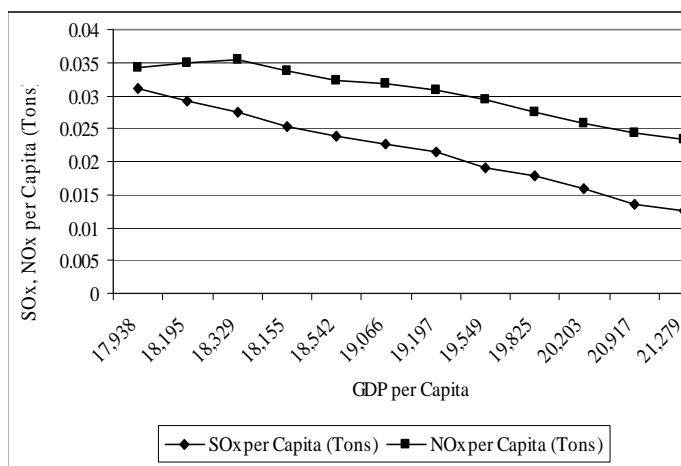


Fig. 1: Local air emissions (NAMEA data)

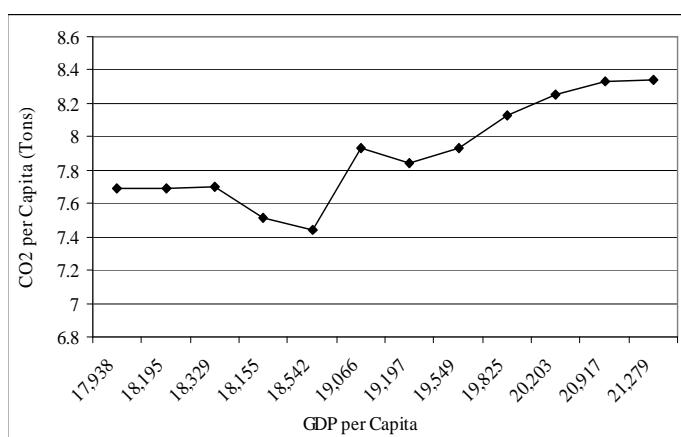


Fig.2: CO₂ emissions (NAMEA data)

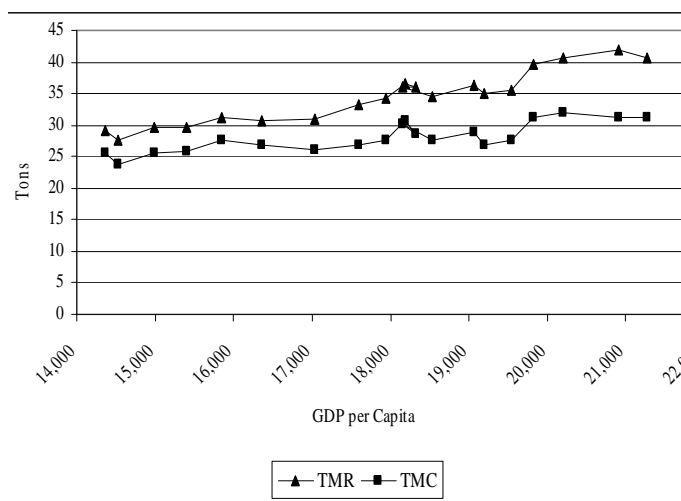


Fig.3: TMR and TMC (MFA data)

5. Material Flow Analysis of Italian economic system

Adopting a Bioeconomics perspective, we performed a Material Flow Analysis in order to evaluate the real movement of material through the Italian economic system. Table 2 reports the Material Flows Accounting data of Italy, provided by the ISTAT, from 1980 to 2001.

During this period, the Total Material Requirement and Total Material Consumption have been augmented in absolute terms (respectively +33,6% and +15%). The Italian economic growth has generated an increasing exploitation of natural systems. Moreover, the increasing inputs are mainly sustained by imports. They augmented of the 43,5% in direct terms but especially the indirect flows associated to imports increased of the 84%. Indirect flows are important variables to consider in order to estimate the socio-ecological impacts of material requirement. They provide information about total movement of material generated at global level that may cause habitat destruction and soil erosion. Indirect flows highlight that each product, besides its actual weight, carries a so-called “ecological rucksack”¹ of all the material flows that were activated along its life cycle² (Adriaanse et al., 1997).

Table 2: MFA indicators for Italy (Tons) (Istat)

	1980	2001	Δ	Δ%
Used domestic extraction	754.783.954	747.810.442	- 6.973.512	- 0,92%
Unused domestic extraction	124.301.961	86.445.648	- 37.856.313	- 30,5%
Imports	229.959.493	330.035.125	+ 100.075.632	+ 43,5%
Indirect imports	628.246.908	1.156.049.017	+ 527.802.109	+ 84%
Total Material Requirement	1.737.292.316	2.320.340.232	+ 583.047.916	+ 33,6%
Export	57.945.200	123.117.502	+ 65.172.302	+ 112%
Indirect flows export	137.044.321	420.917.109	283.872.788	+ 207%
Total Material Consumption	1.542.302.795	1.776.305.621	234.002.826	+ 15%

As reported in fig. 4, the composition of Italian imports has changed during the last years and it has caused an increasing movement of materials: the indirect flows of materials, moved in a foreign country to generate 1 ton of Italian imports, have been increased from 2,73 tons in 1980 to 3,5 tons in 2001. Moreover the percentage of indirect flows associated to import is larger than the percentage of indirect flows associated to domestic extractions. In the first case a mean of 3 tons of unused materials are generated for 1 ton of used material. In the second case only a mean of 0,14 tons of unused flows are generated for 1 ton of used material flows. These data suggest that there is a significant displacing effect of the Italian system, especially considering that the indirect flows associated to national extraction have been reduced (-30,5%) and the protection of national territory has been tripled during the same time. The

¹The term ‘ecological rucksack’ has been used to mean the life-cycle-wide material requirements associated with the production of a product.

² Several indicators and methodologies have been proposed in order to account for ecological rucksacks, either by applying approaches based on life-cycle analysis or by applying input-output analysis based on monetary or physical I-O tables (Giljum and Eisenmenger, 2004).

Italian system is clearly reducing the national movement of material, displacing in the other countries its un-sustainable pattern of material consumption. According to Pearce and Warford (1993): "It is perfectly possible for a single nation to secure sustainable development—in the sense of not depleting its own stock of capital assets—at the cost of procuring un-sustainable development in another country". Italy is going this way.

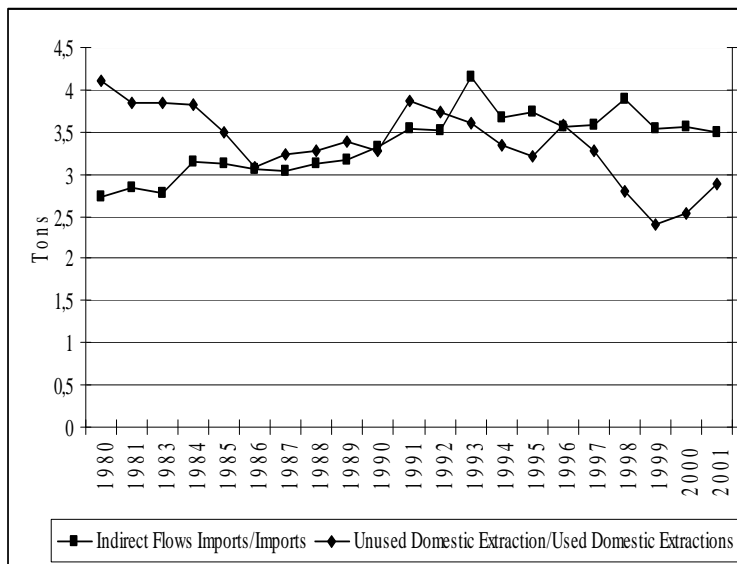


Figure 4: Indirect flows of Import/Imports and Unused Domestic Extraction/Domestic Extractions (MFA data)

Concerning the EKC theory, a large number of studies, evaluate sustainability taking into account only the environmental performance of domestic production and neglecting the international trade issue. But in a globalised world the throughputs of economic systems are strictly linked to material imports and exports. This is particularly true for the Italian economy that increased a lot the imports and the indirect imports from 1980. In other words, the results of our work suggest that the Sustainable Development allows to achieve an apparent sustainability based only on technological progress efficiency and environmental load displacement. According to Ekins (1997) "If the shift in production patterns has not been accompanied by a shift in consumption patterns, two conclusions follow: 1) environmental effects due to the composition effect are being displaced from one country to another, rather than reduced, and 2) this means of reducing environmental impacts will not be available to the latest-developing countries, because there will be no countries coming up behind them to which environmentally-intensive activities can be located". In the long time this model of development makes evident its un-sustainability. For these reasons, the EKC hypothesis can't be extended to global level to promote economic growth as an environmental friendly process.

On the other hand, the Material Flow Accounting seems to be an useful approach to evaluate the real material exploitation of an economic system and to aim at a sustainable use of resources. Based on the thermodynamic foundations of the economy and comparing the metabolisms of different society, the MFA can be an effective methodology to promote an equitable and sustainable management of natural resources. Moreover, as

trade is a spatial component of the environmental consequences of local consumption patterns, an inter-country or inter-regional perspective should be considered, and environmental impacts should be explained as a consequence of the biophysical metabolism of societies.

6. A scale approach for Sustainable De-growth

The Sustainable Development idea, mainly based on economic growth, has failed to reach its sustainability goals. A new approach to sustainability have to be considered. In this paper, we suggest to adopt the Bioeconomics paradigm in order to promote a Sustainable De-growth approach. Based on thermodynamic laws and mass balance principle, Bioeconomy acknowledges that, in a finite ecosystem, an infinite economic growth is impossible and it enforces ecological constraint to societies. According to Bioeconomics paradigm, we think that economy can no longer ignore the biophysical constraint. Social and political science has to take into account that immutable laws of nature exist and a de-growth process from our patterns of resources use is necessary to aim at sustainability. Moreover, we consider that sustainability is not an issue of maximisation but an issue of scale. Social-economic systems should have an optimal scale relative to the total ecosystem. For this reason, we propose a scale approach for Sustainable De-growth. We believe that the de-growth process should be aimed to reduce the scale of both consumption and production. In terms of consumption, the de-growth process has to decrease the "quantitative scale" of exploitation of natural resources (material and energy), while, in terms of production, it has to reduce the "spatial scale" of productive systems. To achieve both these objectives, it's strictly necessary to give birth to new social-economic systems mainly based on local production that can generate, as first positive result, the reduction of international trade pollution and environmental load displacements.

Based on this approach, many practical applications are starting to spread in Italy. For example Coldiretti, an Italian farmer association, is promoting, around all the country, local markets with products that come only from local farms. At present there are 80 local markets but a specific study make provision for establishing 400 local markets involving 8000 farms. Another Coldiretti's initiative has started to promote "0 km products", that is to say agricultural products that cover very few kilometres. As effect many bars and restaurants are proposing "0 km menù" (menu only with products of local farms). On the other hand, many citizens have started to create self-organised groups of people, well-known as "Gruppi di Acquisto Solidale" (GAS), that practice fair purchase addressing to local farms and cooperatives with social and environmental aims. Many GAS are then involved in different networks ("Reti di Economia Solidale") that group together single person, groups, farms, cooperatives and associations that promote and practice a different economic approach.

All these practical application and initiative are based on the idea of "short chain" for the production-consumption processes. This approach may i) improve product's quality, ii) reduce costs, iii) decrease CO₂ emissions, iv) supports

local economy and v) promote solidarity at the same time. Italy, with more than 8000 municipalities, may be a suitable country to start this sustainable de-growth process based on scale reduction.

7. Conclusions

This paper shows that Italian economic growth increases the carbon dioxide emissions, the material inputs into the economy and generate an increasing displacement of socio-environmental un-sustainability. According to the main developed and developing countries, economic growth doesn't generate a sustainable development. On the contrary, eco-efficiency has been converted in increasing demand. Technological progresses and environmental investments can reduce ecological impacts only if associated with changing lifestyle oriented to reduce consumptions. A sustainable production able to respect the environmental carrying capacity should be associated to a sustainable consumption able to respect the finite limits of the biosphere. In order to improve sustainability, economic growth can not be maximised. On the contrary a change and reduction in our pattern of productions and consumptions is really needed. A Bioeconomics perspective has to be adopted in order to consider the economy as a subsystem of the environmental system, limited and thermodynamically closed, where infinite growth is physically impossible. At present, a sustainable de-growth process from our patterns of resources use is strictly necessary to aim at sustainability. We believe that sustainable de-growth is mainly an issue of scale. Our efforts should be addressed to reduce the scale of the production-consumption process. A cultural change that was active at individual and social level is needed. At individual level, we have urgently to change our lifestyle. At social level, a change of economic productive system is strictly necessary.

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The Basic Income, a factor of degrowth

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Abstract

For the majority of its promoters, citizenship income (unconditional income, subsistence income, universal allowance or guaranteed income) is an essential measure to confront the current evolutions of capitalism. The persistence of mass unemployment, ever present vulnerability and the explosion of poor workers, invites the assertion of a right to income before even the right to work.

However, the disconnect between work and income is seen as evil by a number of researchers who see in citizenship income an incentive to idleness, an encouragement of laziness. Those who despise citizenship income point a finger at the risk of a drop in economic activity that the payment of an income, without condition or compensation, makes society run.

Within a framework of degrowth, this major obstacle becomes a godsend of course, and one can legitimately wonder whether citizenship income is not the political tool, the concrete economic measurement which objectors to the growth need. In fact, disincentive to work created by citizenship income is obvious. Even doubly so. Initially, why work if sufficient income is already paid to me without conditions or counterpart? why work if work does not pay any more? Indeed, financing of income disconnected from work presumes an increase in fiscal pressures on other incomes. The remunerative character of work is thus doubly attained.

Obviously, the more citizenship income is raised, the more the disinclination to work is marked. Following this reasoning, it would be enough to pay a higher income to each citizen to generate, almost mechanically, a fall of activity synonymous with degrowth. The question of course is more complex, the necessary "sustainable" characteristic of degrowth imposing some reservations. Indeed, to be sustainable, degrowth must support voluntary simplicity and not shortages and rationing. It is thus the drop in consumption which must lead to a fall in production, and not the reverse. The uncontrolled fall of production which allows the projection of a higher citizenship income would thus put us face to face with an unsustainable degrowth as part of a true economic and social crisis.

However, if the amount of citizenship income is more reasonable, a completely different outcome is possible. The morbid over consumption which dominates our society is partly the "duty to purchase" born of "work value". Today, the determination of income precedes the assessment of the financial needs of each individual. In effect, work time being imposed by the social constraints on work, it's hard to adapt their incomes and standard of living to their needs. Unconditional income, defined as an adequate income,

allows us to call into question this logic, thanks in particular to the inversion of forces between employer and employee. If an adequate minimum income is paid to all, each becomes free again to define his or her working time according to their needs and the level of consumption which they wish to reach. Society would then take up again the "traditional" logic described by Max Weber, and would direct itself towards voluntary simplicity against the capitalist logic of accumulation.

1. Introduction

In the mind of most of those who promoted this concept, the basic income (BI), is an indispensable tool to meet the current changes of capitalism. Persisting mass unemployment, increasing precarity, the emergence of poor workers urge citizens to claim for the right to an income prior to the right to work. However, dissociating an income from work is not considered favourably by some researchers who see the basic income as an incentive to idleness. The opponents of the BI highlight the dangers for society of granting an unconditional income, which will lead to decreasing economic activity. It is very likely that introducing "a reasonable BI" would actually entail generalizing optional work, part time work or temporary work and proportionally increasing the amount of time devoted to leisure and extra work activities. For the BI is no incentive to work for two reasons:

1. Granting every one a BI eliminates the need to work. Why should people keep on working if they can make a living by doing nothing?
2. To be funded the BI necessarily implies raising taxes on other incomes thus diminishing the profit generated by work. Therefore why should people keep on working if what is gained from work is not profitable enough?

There are, however, means to curb a potential economic decrease and its impact on society.

1. First, once citizens are freed from the need to work, they might volunteer to do socially useful tasks
2. Secondly, increasing wages in sectors that are short of labour would probably be a financial boost to work
3. Decreasing economic activity due to dissociating income from work would immediately mean a proportional decrease in this income. This decrease would result in re-boosting the financial incentive to work according to a pendulum effect.
4. The main means regulating the likely decrease in economic activity lies in the amount chosen for the BI.

In other words, the higher the amount, the greater the decrease in activity may be. Choosing a balanced BI guaranteeing the financial incentive to work would then considerably reduce a possible activity decrease.

2. Degrowth because of the BI

But after all, would a decrease in economic activity be necessarily harmful? On account of our compulsive over-consumption, a decrease in production and consumption would particularly be welcome! It would first be welcome from an ecological point of view, considering the negative impact of our frantic consumption and production on the environment. Then, it would also be welcome from a social point of view, as this frenzy turns us into sick and senseless devotees of work, consumption and growth. Thus, the supposed impact of the BI on production would prove a very good thing. Should a BI lead to a decrease in activity, so much the better! And since deterring people from working is tightly linked to the amount of the BI, unconditionally granting each citizen a very high BI would almost automatically entail economic degrowth.

Should everyone be granted more to achieve faster degrowth? Undoubtedly, the issue is a more complex one: how can one make the difference between degrowth and a slump? What kind of degrowth are we talking about? Degrowth must lead to a criticism of growth devotees rather than a decrease in consumption and production. It must question growth seen as an economic and political necessity and as a social aim. But basically that's where the problem lies. The type of degrowth we sense today is not a critical questioning of society. It is only the random and unwelcome consequence of a wealth distribution policy. We can't accept it. Sustainable is certainly the only adjective that should be used to describe degrowth. Indeed, degrowth should necessarily be economically, socially and politically sustainable.

Sustainable, then voluntary. Since it implies questioning our material welfare - for most of us anyway- economic growth to be sustainable must be readily accepted by society. It can only be the result of a democratic choice or at least the result of individuals massively choosing "the voluntary simplicity" advocated by "degrowth objectors". In fact, the degrowth generated by a high BI, foreshadowing an activity decrease, does not meet any of these requirements. Indeed, if a citizen with a generous guaranteed minimum income given by his employer would certainly be happy to leave his job while keeping his standard of living, thanks to let's say a BI of 1000 euros, it does not mean that they would be ready to accept a decrease in their material welfare. On the whole, the decrease in activity would only come from individuals unwilling to modify in any way their consumption habits but nevertheless wishing to work less.

However, individuals deciding to quit their job would directly impact production, their consuming habits and ultimately their welfare. Can a decrease in production similar to a general strike be figured out? Would it mean that society would be unable to fulfil its own needs? What's the use, then, of keeping one's standard of living if goods and services are no longer provided? "Working less to consume as much or even more", the stance is, of course, bound to fail and as a result any form of degrowth would be disastrous. In other words, if production degrowth is undoubtedly to be wished for, an economic crisis is not... That's why sustainable production degrowth can only derive from a decrease in consumption. Let's make this clear, it is because people will consume less that production

will decrease and not the opposite. Otherwise "voluntary simplicity" inevitably gives way to shortage and rationing.

3. Degrowth thanks to the BI

Then, there is no possible degrowth without a criticism of growth and consumption. Is this radical criticism rooted in the BI? Can it make a decrease in economic activity possible and above all sustainable? At first sight, the link between the two is not obvious. There's apparently no reason why redistributing purchasing power thanks to a minimum wage should lead to questioning the place of growth and consumption in our society. As it is more equitable, redistributing purchasing power may at best change the nature of consumed goods. It would allow a wider access to goods and services usually meant for wealthy households and thus reduce the consumption of luxury goods because of the levelling effect of the BI. To put it in a nutshell, more cars and fewer yachts but nothing that favours a decrease in consumption.

So it seems at first glance. Indeed, the link between the BI and a questioning of growth is much tighter than it seems. A guaranteed minimum wage is certainly a means to fight poverty and cope with the unemployment and precarity that hit or may hit each and every one of us. But it is also a means to get rid of "work as a value". Because it questions this absurd value and the place of work in our society and enhances free time and other extra work activities, the BI debunks the ruling norm of a full time job. Yet, the norm is part and parcel of our greedy consuming habits. On the contrary, these habits are totally fuelled by this norm. The prevailing place of work generates "a purchasing duty". Logically, every one should work just the right amount of time - no more, no less- to meet their needs while making the best of their free time. According to this, a balance must be found between work as a source of income, the goods and services it provides and the free time we must devote to them. A personal balance must be found according to one's financial needs, the living standard and the way of life that are wanted. Unfortunately, today, it is difficult to find the right balance between work, consumption and free time. As a result, you can neither choose your working hours nor decide freely on your consumption level.

It would be an illusion to believe that this level of consumption can totally meet every one's expectations. Actually, it is very unlikely that every one can exactly get the level of consumption that fits their requirements. It is all the more unlikely considering the different factors that influence people's standard of living and how little influence they have on these factors (work hours, hourly wages, social contributions, taxes). As the existence of poor workers shows, our present standard of living does not really reflect our financial expectations. Truly, a great number of workers who are imposed part time jobs and therefore get low wages wish to earn more. Lots of workers earning the minimum wage would certainly agree to that... Their present condition and low standard of living do not therefore reflect their real financial expectations. Conversely, we can rightfully suppose that the full time job norm imposed, namely, by "work as a value" compels a large part of the working population to work more than they wish. They are, thus, urged to live above their needs....

Therefore, while poor workers and those on a minimum wage have a lower standard of living than their financial expectations, other wage earners have to face the opposite: they have a higher standard of living than what they would find reasonable as they can't choose freely their working time.

So, here comes the “purchasing duty”! For what else can be done except use and abuse this high consumption level? Finally, people have to make a huge sacrifice of their free time on account of the social pressure of “work as a value” and they indulge in inevitable over-consumption. If, as we have just said, some people live above their needs because of the “purchasing need” imposed by “work as a value” and the resulting need for over consumption, implementing a BI seems to be an opportunity to break with the consumption – growth – work spiral. As the hub of a society in which people could choose their working time, the BI calls upon citizens to define their needs prior to their working time and their standard of living. It then leads to more equally adjusting consumption to needs. So, while the “labour revolution”, which gave birth to the concept of “work as a value” in the 19th century, has anchored the domineering logic of maximum - profit capitalism, implementing a BI could well restore “the traditional” logic described by Max Weber. Why should you work more if you already earn enough? Why should you work more to consume even more?

It would then give rise to an economical society in which time will be spared for other things. By deflating the useless and greedy bubble generated by the imperative of growth, “work as a value” and the consumer society, the BI allows true degrowth. Sustainable degrowth which would not stem from a vain attempt to keep up our standard of living but would stem from voluntarily decreasing our material welfare for greater social welfare.

4. Degrowth with the BI

Slump or degrowth? The BI, as we can see, can lead to both. It depends on the amount of this income. If it is too high, we are very likely to experience a slump favouring a decrease in production, which rather than be an incentive to a decrease in consumption will impose it. Conversely, if this amount is lower, it allows a decrease in activity provided we first agree in return to a decrease in our standard of living (economically speaking). Better, it makes this decrease in activity possible, desirable, and above all sustainable.

For if the BI is actually a factor of degrowth, let's insist on the fact that it can support this decrease in economic activity and ensure its sustainability. Implementing a BI seems to be one of the prior requirements to the degrowth we want. Since it is meant to guarantee each citizen a minimum standard of living through a fairer distribution of riches, the BI actually is a guarantee that degrowth is a social leveller. Beyond that, it is also a guarantee that a decrease in economic activity - however desirable it may be – will not increase the growing poverty of the lower classes. Isn't it therefore the social and economic tool and the actual policy that degrowth objectors need?

Career guidance and de-growth

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Abstract

Career guidance lies at the heart of the problematic of the employment-training relationship, for both young and old. The French guidance system works poorly and according to assumptions that make us question the de-growth option. The two fundamental assumptions are that the choice of a specialism (in training or employment) must be made depending on the subject's aspirations, with regard, if possible, to the needs of the job market; and that the choice of occupation is (more or less) independent of the territory on which the job will be carried out, to some extent a landless specialism, chosen in the light of the subject's interests.

We propose changing the reference point, from guidance by occupation, to guidance by territory, as this answers one of the main malfunctions of the current system that ends up excluding a substantial number of young people.

Our societies are to a large extent steered invisibly by mimicry. But if we all had the same occupation, what would become of our country? The principle of a limitation on the specialisation of countries and territories is to maintain or develop the diversity of the skills and occupations on each territory.

The oppositions between equal opportunities and the upgrading of manual occupations, between general training open to all and professional training by way of demotion, between equality and equity, cannot be resolved by a discussion on occupations and procedures.

We need to shift focus, and move from a discussion on occupations to a discussion on territories. Too often the desire to live together is overshadowed in career guidance, to the detriment of a reasoning that would result in everyone having a professional goal. And if one rehabilitates this desire associated with the territory and the human community, occupations will moreover maintain their diversity. Territory is also the place where status and the individual can be disconnected, where people could avoid being stigmatised because of their job.

In a schematic way, one can represent the choices of occupation or territory in four types: the anemone, the hermit crab, the nomad and the floater.

This proposal has consequences on the actions of training-integration called project preparation where it might be necessary to review the content, and given the career profile, even the training of the guidance or integration counsellors. Often psychologists, they have to take into account the historic, economic and social dimensions as well as the environment of the persons they are guiding in their search.

1. Introduction

Long-lasting exclusion of 10% of the population in developed countries is concomitant with the periodic and repetitive difficulties in recruitment. This apparent paradox can be explained by three deregulations. The choice of a relocated, simple way of life, will reduce these deregulations and in so doing will reduce exclusion, against which 30 years of "employment policies" were unable to achieve anything notable.

The malfunctions of the job market

For one century and a half, periods of recruitment difficulties have followed one another in Europe and especially in France. Since the 1980s, there has been juxtaposition with huge, ongoing unemployment. The causes are multiple: training, means of recruitment, working conditions, exclusion of seniors. More fundamentally, there is a gap between the different dimensions of the economy and the social aspects:

- between rate of production of the capital and availability of the work force in time,
- between places of accumulation of the capital and places of availability of the work forces,
- between the skills and abilities of the available work force (rhythm, relationships, technologies), while it relentlessly produces spheres of exclusion (system of integration, socially handicapped people, etc.).

The current malfunctions of career guidance

Guidance towards training and occupations is caught in a contradiction between a psychological option (the project of the individual, an injunction that is often paradoxical), and an economist-utilitarian option (guiding unemployed people towards the jobs available). This contradiction is not surpassable in the current system, except by force. Training programmes that open up industrial employment do not have enough candidates.

Career guidance lies at the heart of the problematic of the employment-training relationship, for both young and old. The situation is not unknown, let us summarise it in broad outline. Trained people do not correspond, are not adequately suited with the "needs" of the job, the most obvious sign being that we were seeing both an unemployment of exclusion and that employers actually have difficulties in recruiting¹ for a certain number of occupations². Inadequacies concern specialisms (specialism lacking being mainly those of industry) as much as the level of training (shortage of industrial workers, graduates D level in biology, literature or psychology have difficulty in finding a job). Surveys show that more than half of French people do not work in the specialism corresponding to their initial training, which may indicate either a major malfunction, or remarkable mobility, depending.

This being said, if the guidance system functions badly, it functions according to presuppositions that it makes us

¹ Arnaud du Crest, *Les Difficultés de recrutement en période de chômage* (The difficulties of recruitment in periods of unemployment), Ed. L'Harmattan, Paris, 2001

² Unédic, survey on the needs of labour, <http://info.assedic.fr/unistatis/>

question the option of de-growth. The two fundamental presuppositions are that the choice of a specialism (in training or employment):

- must be made depending on the aspirations of the subject, with regard, if possible, to the needs of the job market. This choice is assumed to be neutral in relation to the type of society. All jobs are of equal merit – in theory at least. In fact, the perception of the status of jobs introduces a considerable expedient in favour of the higher positions and white-collar workers,

- is independent of the territory on which the activity is carried out, to some extent a landless specialism, chosen in the light of the subject's "centres of interest". Of course, proximity, either in training or employment, may influence the choice, but this is proximity, not the territory as such.

Introducing moral or political elements in the guidance process (by what right could one prohibit training associated with the use of non-renewable resources, such as petroleum chemicals, or aeronautical research?) is out of the question. This influence on the processes can be had by a policy of managing the supply of training, suppressing or reducing the corresponding training, and through the job market, if the number of corresponding jobs diminishes, two major modalities, but outside the process of guidance as we know it.

Guidance is nourished by the subject's imagination and desires; you have to dream about your career. It is therefore possible to enhance the value of jobs corresponding to political options, such as research into renewable energies, organic farming, crops for industrial use, etc. but this will be marginal to the process.

We propose changing the reference point, abandoning guidance by occupation, in order to choose guidance by territory, as this answers one of the main malfunctions of the current system that ends up excluding a substantial number of young people.

De-growth, putting matters back into phase

Putting matters back into synch is to give preference to proximity, including proximity of the capital and work, by considering territory not just as a space to collect savings but a territory of regulation, to the relationship between producer and consumer that will act on the cycles, to the adaptation of the organisation of the work according to the available skills and abilities (works of Bertrand Schwartz).

De-growth, a process towards a simpler life, will change the nature and localisation of the activities of production and service, and hence occupations. It will be even more possible that the steps for choosing occupations and training will be modified as well. The dream must take on a different form. We need to move from career guidance steered by occupation to a life guidance steered by the territory.

The system of information and guidance in France

For young people, the main network is national education system with the Centres for Information and Guidance, where psychological advisers work (the equivalent for private Catholic schools are the family information services). Two other networks coexist, the Local Missions and PAIO, under the authority of the Ministry for

Employment (and the local government) for young people who are unemployed, as well as the Youth Information Points under the authority of the Ministry for Youth and Sports, which is more focussed on information than guidance, but which publishes, for example, the job sheets of the CIDJ (youth information centre).

For adults, the system is developed for unemployed people with the ANPE (national employment association) and the Services for Professional Guidance of the AFPA (association for the professional training of adults), much less for salaried employees (the FONGECIF – management funds for individual training leave) and the OPACIF – approved joint institutions for the management of individual training leave – act on behalf of those requesting training leave, skills recognition or accreditation).

2. Maintaining the diversity of occupations

The principle of a limitation to the specialisms of countries and territories maintains at a constant level or develops the diversity of skills and occupations on each territory. Our societies are to a large extent steered invisibly by mimicry (Girard). Acting like students who *succeed* (i.e. adopting the dominant criteria of success, in maths or literature), acting like the teacher (who has sat his baccalauréat, then got a degree ...).

But if we all had the same occupation, what would become of our country? No more bricklayers, bakers, blacksmiths, chefs³ ...

For the logic of individual projects (equal opportunities, psychological trends), the desire of each person is a *good thing*, and it is *right* that everyone achieves his or her project. If each one can achieve his or her project we would reach the maximum well-being as the sum of everyone's projects but perhaps the minimum response to social needs (!) if we are in the mimicry project. The individual's choice is apparently maximal, and in reality limited by external constraints.

For the logic of social needs (equal opportunities, psychological trends), if we know the needs of the economy and training is imposed according to career prospects, everyone would have a job (but this is utopian or totalitarian). The well being obtained at the level of society would compensate social inequalities that are induced (or rather reproduced). Individual choice here is apparently minimal, and in reality close to the equality of possibles.

In this logic of utility, only a clumsy compromise would be possible between the logic of project and the logic of need, leaving both students and employers unsatisfied. Most theories are applied in measuring the equality of wealth (measurable) more than that of the process⁴, i.e. favouring justice (sharing) rather than wealth (moral

³ Arnaud du Crest, *Des métiers qui disparaissent* (Disappearing occupations), Carif Oref, Nantes, October 2006

⁴ The process is illustrated by Maslow's pyramid: satisfaction of emotional or intellectual needs can only come if basic material needs are met. Likewise, individual choice can only be made in the context of the satisfaction of collective needs, thus economic and social.

notion that cannot be measured).

In Sen’s theory of capabilities, the possibility to choose, the extent and the diversity of the choice have a value, independent of the value of the choice made. This runs contrary to the standard theory of the consumer for which well-being is measured as the value of the item (or the option) chosen, independently of the process. This is also what J.B. de Foucault writes when he states that the growth of choice is preferable to the choice of growth (in the GNP).

In order to protect themselves from the uncertainty of their children’s future, parents push their children into going “as far as possible” in their studies, even if it means easing off a bit if they become stuck. This is the theory of the stepladder, supported by a part of the professionals in education, training and guidance, for whom equality is a supreme value, and who prefer to push towards dreamed equality rather than to focus on a world of real inequality, who prefer an egalitarian paradise (inaccessible in this world) to the inegalitarian purgatory on this earth⁵.

We therefore need to propose a process of guidance that opens up choice and creates conditions of equity, if not equality, better than we do today.

3. From the professional project to the life project

The opposition between equal opportunities and the upgrading of manual occupations, between general training open to all and professional training by way of demotion, between equality and equity, cannot be resolved by a discussion on occupations and procedures.

We need to shift focus, and move from a discussion on occupations to a discussion on territories. What do we want most? To become a doctor or an astronaut, or to live in a known, secure milieu, to have a high salary or enriching relationships? The two are not incompatible, of course, and each person will respond differently to these questions. The best off will choose without difficulty their professional project, but this same choice risks locking in others. Too often the desire to live together is overshadowed in career guidance, to the detriment of a reasoning that would result in everyone having a professional goal. And if one rehabilitates this desire associated with the territory and the human community, occupations will moreover maintain their diversity.

People on the way to professional integration have to make a choice: occupation and territory. The priority choice is forced both on those with the most qualifications, who will find a job corresponding to their training in cities but less so at the seaside, in the mountains or in their region of origin, and on those with few qualifications, whose occupation is perhaps not in demand locally. This is the case of the specialist in oceanography from Tours, the doctor in astronomy who sets up in Nantes, as well as the cabinet-maker who has to take a job as a factory labourer.

We often need to prioritise one of the two. The choice of occupation involves geographic mobility, with the advantages (open-mindedness, character-building travel for

young people) and the disadvantages⁶ (cutting oneself off from one’s roots, environment and networks). Choosing by territory also has its advantages and disadvantages, as in the example of the children born on the Isle of Yeu who set off on their studies on the continent and who, returning with a degree in their pocket, take the jobs available (sales, gardening) since what counts is living there. It is professional mobility which often does not require any prior training, other than at the workstation.

What is true for a limited territory, a rural location, is also true on a country-wide level with the growing levels of training and the appeal of other countries for young graduates, like the United States, Canada, northern European countries who come and recruit in Europe (but also in Asia, India, etc.). It is the choice of career (research in the USA), direct income (the City of London), or living among one’s own. The search for justice is also the fight against the brain drain between countries.

4. Hermit crab or floater?

In a more schematic way, one can represent the choices of occupation or territory in the following way:

		Occupation	
		Important	Not important
Territory	Priority	I stay put <i>anemone</i>	Territory > occupation: <i>hermit crab</i>
	Not significant	Occupation > territory: <i>nomad</i>	Without any project or attachment: <i>floater</i>

Floaterers are the case of individuals in great difficulty, without any professional project: there might have been one once but it was broken, or there never was one, and without any attachment, no more friends or relations, unemployment has often destroyed all these links. These floaterers go along with opportunities as they come up, without wanting to, and accordingly without any possibility of convincing any employer. Sometimes they move home, thinking that they will find work elsewhere, find themselves, but they find nothing. Time must be taken, a long time, to find a new attachment, a wish, a group to belong to. Which will be, initially, a social fabric, a local one. Re-invested territory can be an aid to a renaissance.

Nomads on the other hand are ready to take on any professional opportunity, here, in another region or abroad. Like a modern mercenary, who will leave alone or with the family, but the entourage knows that the profession comes first, and draws from this either material benefits or the pleasure of discovery... sometimes it is at the initial contract, like a soldier who periodically changes garrison,

⁵ This comparison is by Stéphane Rozès.

⁶ Adults having changed primary school at least twice have twice the risk of having reading or writing difficulties than average. INSEE, IVQ survey 2004-2005. These changes can be due to either geographic movements or a family break-up.

or senior civil servants who can only change their function by moving. Their territory is the world.

Hermit crabs illustrate our thesis on poorly qualified individuals, seeking integration. They can change shell, here the profession, the professional milieu, to remain in the same environment, a hermit crab never goes very far, and forever in search of a shelter, they take on any available shell going. That's what allows them to live!

Finally, anemones pose a problem, they want everything, to have their cake and eat it. It is a key benefit if they have rare skills that can be enhanced on site, and an anemone in its milieu, at high tide, is superb with its blue-tinted filaments. It is a handicap if the occupation does not correspond to jobs or the potential for job creation, it closes up at low tide, and if the sea level were to begin to fall it would die through lack of water. And we see some withering away in this manner, stuck to their rock, insensitive to the lack of opportunities - it's always someone else's fault.

It will be easier in this case to get them to change their (professional) body than territory. There is an inherent fragility, which can only be accentuated if we cut them from their roots, from their milieu.

4. Live free!

Territory is also the place where status and the individual can be disconnected, where people could avoid being stigmatised because of their job. We find (Iribarne) that the stronger the formal equality between people (the classic model being Jean-Jacques Rousseau's citizen, all citizens are equal and in a direct relationship with the State, without any intermediary bodies⁷), the more the profession classifies the person. This is the case in France (when you meet someone for the first time, the question "what do you do?" comes up very quickly), while in Anglo-Saxon countries the social class or the territory is first, i.e. the non-professional belonging - social, territorial - is the matrix and gives a structure to relationships. We meet among ourselves (among workers, nobles etc., or among women or men, or in the pub with all classes mixed from a territorial point of view), and do so whatever the job, professional success, which counts for little in the end (except, of course, from a financial or lifestyle point of view).

Territorial identity can be vital, as shown by the policy of elimination of the American Indians by the conquering Europeans. The myth of geographic mobility has led us to deny this reality, to suspect it of being attached to the past, when territory today is again becoming a key factor of our identity with the development of globalisation. Who wrote: "Men weaken and finally die - a whole people can thus be extinguished - if they are cut off from this source that is the land"? Fredrick W. Turner⁸, who goes on: "it seemed to the white men [Americans] that they had already had too much [of nature] and that one of the achievements in which the American experience took the most glory was in fact the

domestication of nature, the transformation of a wild and violent nature into a garden." The enhanced value of geographic mobility came to us from the Americans, from this radically wrong idea that territory is only a neutral space, without life, without roots.

We do not want all the same to promote the withdrawal from territories: let us not confuse opening of the territory and mobility of the population. If one tiny part of a territory is mobile, goes abroad and brings back new ideas, if the territory welcomes the foreigner, it will be opened, without necessarily having all its population move around, move home, or without imposing the idea that all could be forced to move.

Territorial skills

This reflection sends us back to the notion of territorial competence that can be defined by five dimensions⁹. It is an *accumulation* (a history, a sedimentation). It is, consequently, heritage that is as important to value as our historic monuments. It is a place to create social links, of *living together*. It is a place of entrepreneurial dynamics, of *business creation*. It is finally a space of *transmission* of occupations, business activities, and skills.

Skills to be passed on

We learn knowledge, a skill is passed on. It cannot always be passed on by word, or in writing, but the action, the practice (whether it be manual or intellectual) is fundamental. And the demographic wrench to come (the future fall in the active population) will demonstrate our insufficiencies in terms of transmission. Skilled individuals are leaving in large numbers, (highly) trained people are committed, but in the absence of any capitalisation through the transfer of skills, a part of them risk disappearing. Can the territory be with, alongside, but as such, a facilitator of this transmission?

The historic dimension of the territory can be a factor of identity and integration, as shown by the action of integration carried out in Alençon¹⁰: "For a long time, lace has no longer been the economic engine of the Orne. It is however with the support of this tradition that the urban community of Alençon has set up three professional training and integration workshops for some fifty young trainees without qualifications and in great social difficulty. Needle-point lace, famous since 1665, has served as a motif in the realisation of... six roundabouts in the framework of the European programme for Community initiatives (Equal), which combined two important points: social integration and heritage conservation. The experience has lasted three years, from 2002 to 2005, and is today a role model in terms of integration policy".

5. What identity for the personal project?

We have seen the limits of professional identity. Social, cultural and family identity, has acted as a basis for reproduction in society for centuries, it is conservative by nature, and thus competes with the upholding of previous

⁷ Jacques Julliard, *C'est la faute à Rousseau* (It's Rousseau's fault), cf. also the Chapelier law

⁸ *Mémoires de Geronimo* (Geronimo: His Own Story) Introduction, La Découverte, Paris, 1994

⁹ Yvon Minvielle, Carif Oref Conference, Nantes, 17 October 2003.

¹⁰ Le Monde 26.09.06

inequalities. Independently of any moral or political considerations, it is a guarantee of stability, but also of stagnation in today's society.

There remains territorial identity, combined with the two other dimensions that cannot be denied; it is a question of a balancing act; territorial identity, "where I come from", can be something other than old-fashioned or cultural. It is a place of freedom in the sense that I am not a prisoner, as a person, of my professional success or my social origin. It is a place of possible freedom that allows you to meet, the living together of different categories, - as long as this territory is not a ghetto¹¹ and is not in escheat¹². It is a place, as we have said, of transmission, of creation.

This proposal has consequences on the actions of training-integration called project preparation where it might be necessary to review the content, and given the career profile, even the training of the guidance or integration counsellors. They are often psychologists, and they must take into account the historic, economic and social dimensions as well as the environment of the persons they are guiding in their search. Which poses difficult questions on the way to recruit psychological counsellors in Education – in accordance with the regulations they have a degree in psychology, perhaps more easily approachable for the other types of counsellors. This also poses the question of the place of history in territorial diagnostics, often focussed on the future - the projections, but forgetful of the past, of our origins, and therefore of the collaboration of other partners in territorial diagnostics, often only economic, from the opening of local job forums to local historians. Local history clubs can be vectors of development and guidance if the educational community and guidance counsellors are open enough (no doubt), and have the knowledge (which is acquired, historic interpretations cannot be made-up), to speak with them. Integration is a part of the local development.

¹¹ Eric Maurin, *Le ghetto français* (The French Ghetto), Editions Seuil. Collection: La république des idées, 2004

¹² *L'évolution inégale des territoires* (The unequal evolution of territories), INSEE/Carif-Oref Pays de la Loire, Nantes, 2006

A human rights based political economy for a de-growth based equitable development

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Abstract

Within a scenario of de-growth many may conclude that development in general, and equitable development in particular, may become outdated concepts and aspirations. In their minds this would immediately put the de-growth philosophy amidst the reactionary ideas and would favour world wide resistance to de-growth. The purpose of this paper is to explore institutional principles and tools that allow the conciliation between de-growth and equitable development, namely within economic thought. In this respect we will present human-rights based political economy as an institutional tool of this sort. We will show how a human-rights based political economy can at the same time respect ecological sustainability and social equity. The main reason for that consists in the fact that within a human-rights based political economy, welfare is not the result of economic growth, as within traditional political economy, but of justice. The main objectives of development will be attained, therefore, not through growth but through redistribution of resources.

In this paper more specific issues will be discussed by examining the human right to work. The main aspect which will be stressed is that within a human-rights frame full employment becomes disconnected from both growth and labour market deregulation. It will be shown that traditional policies not only do not solve unemployment but are also not environmentally and socially sustainable. The only policy that is not contradictory with either human rights and de-growth is work sharing by decreasing the length of the work day. When properly enforced this policy has, indeed, historically shown to be the only one that has created jobs qualifying to right-to-work specifications.

Keywords: Human Rights, Right to Work, Employment, Unemployment, Redistribution, Economic De-growth.

1. Introduction

In the call for papers for this conference on de-growth its organisers declared taking for granted that the level of physical consumption in the North is unsustainable. For that reason they propose to explore scenarios of collective reduction and redistribution of financial capacity to gain and to use natural resources, within the boundaries of democracy, respect for human rights, ecological soundness and fairness. This statement means that they are aware of the risk of environmental sustainability being achieved on the back of the weakest layers of society.

Indeed, within a scenario of de-growth many may conclude that development in general, and equitable development in particular, may become outdated concepts and aspirations. This would immediately put the de-growth philosophy amidst the reactionary ideas and would favour world wide resistance to de-growth. The purpose of this paper is to explore institutional principles and tools that allow the conciliation between de-growth and equitable development in what concerns the employment issue. In this respect we will present a human-rights based political economy as an institutional tool of this sort. In other words we will discuss the ways in which a human-rights based political economy can at the same time respect ecological sustainability and social equity. The key issue in this respect concerns the fact that within a human-rights based political economy, welfare is not the result of economic growth, as it ensues from some traditional political economy, but of justice. The main objectives of development will be attained, therefore, not through economic growth but through a fair redistribution of resources.

Regarding the issue of job creation within a society where full employment has been impossible to achieve for over thirty years now it would seem that de-growth can only accentuate this tendency. This inevitability is acceptable only if one sticks to the mainstream economics frame, though. In providing work to everybody fit and willing, certainly the most emblematic of all economic, social and cultural rights, the conflict between mainstream economics and human rights languages reaches its paroxysm, indeed. Not only mainstream economics does not seem too worried about creating jobs for all, as according to its logic one should try to use the resources involved in production as parsimoniously as one can, but also not all jobs qualify to right-to-work specifications; in other words some jobs do not confer that dignity to people's lives which is demanded by human rights proclamations.

2. A human-rights based political economy

According to the United Nations, a human-rights based approach to development is a conceptual framework for the process of human development that is normatively based on international human rights standards and operationally directed to promoting and protecting human rights. In its essence, a rights-based approach integrates the norms, standards and principles of the international human rights system into the plans, policies and processes of development. Regarding the employment issue the main

standard of international human rights concerned is the right to work.

The Right to Work

Although there are several references to the right to work since the French Revolution (see Harvey, 2002; Tanghe, 1989), as the US employment act of 1946, for example, which established full employment has being a right guaranteed to the American people and mandated the federal government to do everything in its authority to achieve it, it was not until 1948, in the surge of the discussion about universal human rights by the recently created United Nations Organization (UN), that the right to work got explicit general recognition as a human right. In article 23 of the Universal Declaration of Human Rights (UDHR) it is proclaimed that:

1. Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment.

(...)

3. Everyone who works has the right to just and favourable remuneration ensuring himself and his family an existence worthy of human dignity, and supplemented if necessary by other means of social protection.

This proclamation clearly states not only that people have the right to a job but also to a decent job, and therefore that ensuring the right to work and favouring any kind of job are not synonymous. Furthermore, people have the right to protection against unemployment, which should be understood as a set of mechanisms protecting an individual from becoming unemployed and not only from the consequences of being unemployed. In other words, not only should he have the right to a monetary compensation for being out of a job, for example, but also that he is entitled to some kind of job security.

As seen in the first chapter, and despite the legal weight that it has assumed over the years, the Universal Declaration on Human Rights did not impose binding obligations on the governments of the signatory states. In order to allow individual countries to assume such obligations concerning the right to work, international community designed the International Covenant on Economic, Social and Cultural Rights (ICESCR), which came into force in 1976, ten years after having been approved by the General Assembly of the United Nations.

Concerning the right to work, the ICESCR proclaims the following:

Article 6

1. The States Parties to the present Covenant recognize the right to work, which includes the right of everyone to the opportunity to gain his living by work which he freely chooses or accepts, and will take appropriate steps to safeguard this right.

2. The steps to be taken by a State Party to the present Covenant to achieve the full realization of this right shall include technical and vocational guidance and training programmes, policies and techniques to achieve steady economic, social and cultural development and full and productive employment under conditions safeguarding fundamental political and economic freedoms to the individual.

Article 7

The State Parties to the present Covenant recognize the right to everyone to the enjoyment of just and favourable conditions of work which ensure, in particular:

(a) Remuneration which provides all workers, as a minimum, with:

(...)

(ii) A decent living for themselves and their families in accordance with the provisions of the present Covenant.

There are two main dimensions to the right to work in both the UDHR and the ICESCR. The first one is quantitative and sustains that the right to work means the existence of sufficient jobs for everyone, not only the right to compete on terms of equality for scarce employment opportunities (Harvey, 2005, p. 9; Canotilho, 1984, p. 35). It is not incidentally that The United Nations Charter, drafted in 1945, proclaims in article 55 that the United Nations shall promote 'Higher standards of living, full employment and conditions of economic and social progress and development'. The second dimension of the right to work is qualitative and regards those criteria that determine whether a particular job qualifies as decent work. These criteria sum up what could also be called the rights of an individual at work, and concern wages, working hours, working conditions, the right to join and form unions to protect one's interests, and so on. Different policies are usually demanded to secure each of these dimensions, and although trade-offs between them could be expected, ensuring the right to work should not tolerate them. That is why some public action aiming to just create jobs may not qualify as right-to-work securing policy if, for instance, it despises the rights at work.

3. Growth, redistribution and employment

In traditional economic theory, economic growth is supposed to expand the demand for work, however not only are there serious doubts about the sustainability of growth in the long run (see for example Daly, 1997; Goodland,

1997), but also the ability of this same growth to increase the amount of work to be done, in other words to create new jobs, has not been unequivocally demonstrated. The fact that in France, between 1970 and 1992, there was a 70% increase in total output and only 6% in employment (European Commission, 1994, p. 149) is a good example of the inexistence of a tight relationship between growth and jobs. This absence of relation is not so obvious in the United States for example, but it is undeniable that, since the 1970s, unemployment has been climbing side by side with economic growth in major industrialised countries. Now, if economic growth is not the panacea for solving unemployment, what reasons are there for the unemployed to fear de-growth?

The main reason for fearing de-growth is the expected preservation of the status quo. Indeed, if the current distribution of resources, including jobs, was to be preserved, the weak layers of society would have much to fear of de-growth. But, continuous growth being unsustainable, the key issue is no longer so much de-growth as redistribution. In what regards employment, distribution policies should concern first of all work-sharing, which means reshaping the work load. Under the designation of reshaping the work load two substantially different sets of measures are usually taken into consideration.

The first one concerns reducing labour supply, in other words the permanent or temporary early retirement of workers from the labour market, and the second refers to work sharing, or better said, to work-time redistribution. None of these policies intend to create more jobs in the sense that they would increase the total amount of work demanded by the economy. They operate the other way around. Reducing the labour supply is one very obvious way of filling the job gap even if it does not mean more jobs available but just fewer people willing to work. Indeed, it is quite simple to understand that if labour supply is reduced, all things remaining equal, unemployment will decrease. Sharing the work time, in turn, is supposed to create more jobs because the already demanded amount of work would end up being shared by more people, that is to say by more jobs.

At first view distributing subsidies to convince people to withdraw from the job market either temporarily or definitively does not seem to undermine the right to work ideal, and, furthermore, appears to have many positive aspects. It allows people to concentrate on activities they would not otherwise have been able to engage in and to which they attach great value, such as bringing up children or taking care of the elderly, for example. One should be cautious of eventual perverse effects that may surge, though. Early retirement incentives may put excessive pressure on eligible workers that nevertheless prefer to stay in the labour market, and contributes to the development of an age stigma. Temporary retirement with the intention of favouring families that have young children, for example, can also be transformed in an instrument of gender discrimination, as it may especially push women out of the labour market.

Redistributing work time by reducing work hours could, then, seem the only instrument available to reduce the job gap. French economist Marcel Maréchal states that, since the end of the nineteenth century, job creation in France has

been, precisely, the outcome of working time reduction, not of economic growth. Here, between 1949 and 1991, the truly active population rose by 16.5%, from 19.074 million to 22.204 million people (Maréchal, 1999, p. 203). However, according to Marcel Maréchal, these 3.16 million jobs were mainly created thanks to the reduction in the average annual working time per worker, which in the same period decreased from 1952 to 1537 hours, confirming, as a matter of fact, an historical trend, as in 1837 the average annual work time summed up to 3041 hours (Maréchal, 1999, pp. 203-205).

The concept of job sharing needs to be specified in order to avoid some objections due to misunderstandings, though. Job sharing considered above as an instrument of securing the right to work should not, by any means, concern a mechanism within which employed workers come to share their meagre wage with the unemployed through the implementation of involuntary part-time jobs, which constitutes a softer version of technical unemployment, frequently used by several firms in order to reduce the global wage burden. In this view, work redistribution has to be understood in terms of a broader redistribution of wealth, and this should concern the whole of society. The former way of understanding work sharing means that the redistribution of wealth would be done amongst wages only. Work sharing experiences that have been implemented within this philosophy resulted mainly in lower wages and job precariousness (Collin, 1997, pp. 96-98), not qualifying, though, as right to work securing policies even if the job gap has apparently been reduced.

Work sharing that meets the demands for right to work securing policies imply a reduction of working hours without a reduction in wages, which means that income redistribution is not done within wages only but within global income, including income from capital, therefore. In doing so, work sharing meets its major obstacle, which is the capital-versus-labour conflict concerning the distribution of income, or in other words the conflict between wages and rents. It doesn't seem probable, then, that this distribution of income will be accepted without significant transformations in the political and economic systems.

As a matter of fact, mainstream economics' obsession with economic growth as the one solution for human welfare is not just a matter of faith. It comes from the very foundation of this school of thought. It is one of its most important constitutive parts. In 1751, going on equality, David Hume in his *Enquiry Concerning the Principles of Morals* stated that:

It must also be confessed, that, wherever we depart from this equality, we rob the poor of more satisfaction than we add to the rich, and that the slight gratification of a frivolous vanity, in one individual, frequently costs more than bread to many families, and even provinces (...) Render possessions ever so equal, men's different degrees of art, care, and industry will immediately break that equality. Or if you check these virtues, you reduce society to the most extreme indigence; and instead of preventing want and beggary in a few,

render it unavoidable to the whole community (Hume, 1751).

It was in order to solve this dilemma, in other words to reach a more harmonious society without having to cope with the alleged drawbacks of extensive wealth redistribution, that Adam Smith, ultimately, wrote his *Wealth of Nations*. In it, economic growth was clearly put forward as the only effective instrument to alleviate poverty free of the risk of social clash. In David Ricardo's model also only perpetual growth, that is to say steady growing factor productivity, could stop both capital holders and workers from seeing their share of the national income inevitably decrease when compared to that of land owners, and, therefore, avoid social conflict and hopeless deprivation. In conclusion economic growth, in other words expansion of global wealth, has been for a long time the miraculous instrument put forward by mainstream economics in order to simultaneously pacify the lower classes and avoid an extensive redistribution of the wealth historically accumulated by the upper classes.

Classical economists were genuinely concerned with the well being of the lower classes, the weak link of society, though; but they were not too keen on changing the rules of society in order to reach that goal. Despite the fact that universal human rights share with mainstream economics both its liberal genealogy and its concern for the weakest links of society, ensuring the right to work, supposes, on the contrary, substantive societal change. Indeed, as we have seen above, guaranteeing the right to work demands global wealth redistribution consubstantiated in extensively sharing the work load, which not only deeply questions the dominant economic paradigm, but also claims for a new and global social contract.

We have taken for granted until now that mainstream economics' solution for employment is based on economic growth, but that is obviously not entirely true. As a matter of fact, the majority of mainstream employment policies do not demand economic growth. These policies are usually centred on obtaining the greatest flexibility possible of the price of labour. Within this frame, trade unions, generous unemployment benefits, work contracts, and many other institutional arrangements, are considered obstacles to flexibility and, thus, to employment. Does that mean that these policies can constitute an alternative to economic growth in search for equitable development? In the following lines we will show that these policies are intrinsically opposed to the right to work.

First of all, promoting the right to work is not a synonym of fighting against the unemployment rate. Many countries have substantially reduced their unemployment rate with mainstream policies but very often they have done so by violating some of the qualitative aspects of the right to work. Indeed, the reduction of the working classes' standard of living, the dissolution of job security schemes, the erosion of unemployment benefits, the fostering of involuntary part-time jobs, the promotion of trade union irrelevancy, that characterise mainstream employment creation schemes, must not constitute the core of policies intended to promote human rights in general and the right to work in particular. Secondly, promoting the right to work

is not about work as much as it is about people. By taking humans as a resource like any other, economics, as seen above, inevitably tends to look for saving work. Now, in rights language, individuals are not mere resources holding productive specifications, but citizens holding rights. Therefore, policies that take people as disposable assets and sometimes plain liabilities, once again, must not be considered instruments for effectively promoting human rights.

Thus, there seems to be a contradiction between the purposes of purveying everyone with work and of effectively managing the human resource. While trying to demonstrate the importance of culture in economic performance, a recent study perfectly illustrated this confusion. This study compared the behaviours of two farming communities in Illinois, USA. The allegedly poorer economic performing farmers, descending from German Catholic immigrants, seldom sold their land and used labour intensive technologies in order to employ all members of the family. On the other hand, the better performing Protestant farmers, native from other states of the union, sold their land more often and used less labour intensive technologies (Guizo et al., 2006, p. 25). While trying to show that culture matters in economic performance, what these researchers ended up doing was plainly asserting that, for mainstream economics, purveying jobs to the community is not that valuable a goal as far as economic performance goes.

3. Conclusion

It seems quite natural that an economy that does not aim at full employment can only but expect to reach it through arts of magic, in other words by some sort of supernatural trickling down effect which takes full employment as the by-product of the attainment of superiorly ranked goals, such as perfect markets. But magic is no longer what it used to be, and therefore, it seems also quite clear that in fighting unemployment, mainstream economics happens to be not only shooting in the wrong direction but also causing excessive collateral damage. Indeed, we have seen that under the cover of employment policies, i.e. wannabe right-to-work policies, one can frequently end up facing as many attempts on this same right to work. Misstatements are countless as we have seen above.

Some last remarks should be added to these misstatements. The state is traditionally supposed to hold exclusive responsibility for implementing economic-rights promoting policies. In the wake of the progressive irrelevancy of the state in economic affairs, the main consequence of this equivoque is the progressive irrelevancy of economic rights, and thus of the right to work. In these conditions, if one shouldn't have many expectations about the state's ability to secure the right to work, one should expect even less the right to work to be secured through decentralized decisions by the market only. Economic rights, unlike rights of freedom, require centralized intervention which, in today's global world, demands global responsibility. In other words, right-to-work enforcement policies should be designed neither against nor for the market, but with the market and for the people.

The last remark concerns the fact that economics does not seem to be at the service of people anymore, but, on the contrary, people seem to be at the service of particular economic interests. By insisting on labour market deregulation policies that have impoverished many workers throughout the world, like constricting unemployment benefits, despite its efficacy not having been empirically demonstrated (see Altman, 2004), policy makers do not seem to aim at creating employment but just plainly at obtaining labour market deregulation. Thus, instead of just an instrument in procuring economic efficiency, labour market deregulation has been upgraded to a goal of economic and social policy.

In conclusion, the question one should ask about human rights and the economy in a sustainable society is not so much if human rights, like the right to work, are good or bad for the economy, but what are the necessary arrangements the economy should make as a consequence of choosing to pursue the goals of human rights and sustainability. Evidently, promoting human rights has a cost, but isn't that a constant of every choice? Therefore, if it's impossible to respect the human right to work in a given set of economic rules, one should not forcibly give up on human rights, but rather enrich this system and change its rules. It is by doing so that, instead of submitting the people to its specific purposes, economics will fulfil its real duty which is to pursue people's proclaimed goals.

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The Precautionary Principle as a Framework for Sustainable Design: Attempts to Counter the Rebound Effects of Production and Consumption

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Abstract

Consumption has long been neglected in environmental discourse. In fact, ecological deterioration was not attributed to consumption, but rather to population growth, especially in developing countries. Yet, according to assessments made using ecological footprint, if the entire world population were to achieve the consumption levels of the average North American citizen, we would need several planets of Earth to sustain them. So, over-consumption and not only over-population have become a major concern. The barriers that inhibit humans from shifting to more sustainable lifestyles present the need for a greater intervention than simply informing them of their destructive habits. Design can play a major role in this transition, since the action of planning with the intent of improving an existing situation, according to Simon (1996) is the definition of design. Therefore, design can contribute towards sustainability through the consideration of various criteria that are no longer limited to the scope of material, form and process, but include the considerations of political, environmental, economical, cultural and educational issues as well.

What new strategies will be adopted for sustainable design? How could a participatory approach contribute to de-growth and improve social equity and ecological integrity? Evidence suggests that environmental gains from technical improvements in product efficiency have historically been outweighed by an overall increase in consumption – rebound effects. So a sustainable future can be founded on both an approach of efficiency and sufficiency. Efficiency largely depends on technical innovations; get the same goods and services out of less. Sufficiency relies on individual behavioral changes as well as on social innovation; improved well being out of fewer goods and services. An approach to design that entails the logic of sufficiency, elicits the values of precaution in the solutions proposed. These methods for transforming unsustainable modes of living towards sustainable modes will not be coercive, but cooperative. They will help stakeholders assume their responsibilities.

This presentation suggests that sustainable design within a perspective of precaution can complement dominant

preventive methods of decision making used for eco-design. It will seek to demonstrate how a precautionary approach can be used with the logic of sufficiency to complement the traditional preventive approaches (based on the logic of efficiency) for establishing/assessing sustainable solutions. As a consequence of a decision taken within a preventive approach, a transfer of new problems may result, perhaps to other levels of society or the environment. Precaution will allow designers to develop new areas of insight and influence for addressing this.

Keywords: sustainable design, precaution, prevention, foresight, prudence, evaluation framework

1. Introduction

There is growing evidence that an economy based on the growth of current consumption levels cannot be maintained while seeking sustainable development. For example, ecological footprints¹ of countries like the U.K. or the U.S. differ significantly to that of developing countries (Durning, 1992, from Schaefer & Crane, 2005). If the entire world population were to achieve the consumption levels of the average European citizen², three planets of Earth would be necessary to sustain them; five for a North American citizen. This is extremely critical if world populations follow the high fertility pattern proposed by the United Nation's report on World Population in 2300 (UN, 2004, from Schaefer & Crane, 2005).

Yet, advocates of the ideology of progress³ maintain that techno-science can solve all problems, and "growth for growth's sake", in particular continual economic growth, is based on three main arguments: the substitutability of capital, immateriality and eco-efficiency (Latouche, 2006). The substitutability of capital abides by the hypothesis that

¹ The term was jointly coined by Canadian ecologist and professor at the University of British Columbia, William Rees and Mathis Wackernagel who is currently the Executive Director of Global Footprint Network (Wackernagel & Rees, 1996). It is used around the globe as an indicator for evaluating environmental sustainability and is a way of determining relative consumption for the purpose of sensitizing people about their resource use.

² An average person worldwide is 2.28 hectares; the average U.S. American needing 9.7 hectares; the average UK citizen 5.35 hectares, and the average person in Mozambique 0.47 hectare (World Wildlife Fund for Nature 2002, from Schaefer & Crane, 2005).

³ According to De Noblet De Noblet, J., 2002. Extension du domaine de la forme. In Colloque de Cerisy, Prospective d'un siècle à l'autre (III), Les nouvelles raisons du savoir: vers une prospective de la connaissance, T. Gaudin and A. Hatchuel (eds), éditions de l'aube., the ideology of progress is based on six principles: (1) technological innovation produces an improvement of the artefact affected by the change; (2) technological advancements directly contribute to the improvement of our material, social, and cultural environment, and our spiritual life, and accelerates the development of civilization; (3) the progress of technology, and through its consequences, of civilization, can be measured in terms of power, energy, and speed; (4) social control from technology is total; (5) technology had rendered us masters and owners of nature; and (6) technology and civilization have achieved their most elaborate form in the occidental industrialized countries (p.160).

the increase of knowledge and skills can compensate for the depletion of natural resources and thereby enable the continuation of production capacity and the appreciation for the well-being of individuals (Latouche, 2006). Yet, substitutability is not without limits, because stocks cannot be replaced if the flow of raw materials were interrupted or worst, stopped. So this argument shows that sustainable development cannot be achieved through such a strategy.

The argument of immateriality places a strong emphasis on services and intangibles. However, this does not replace the old economy, but in fact completes it, "*In the last 20 years, the economy grew 17% in Europe and 20% in the United States*" (liberal translation, Latouche, 2006, p.47). For example, a computer consumes 1.8 tons of materials, including 240 kg. of fossil energy. In addition, the digitalization of society was supposed to eliminate the need for paper. Yet, there has been a constant increase in paper consumption during this time, a paradox in the digital society. Therefore, even with a strategy of immateriality, in the end, overall consumption of energy has increased (Latouche, 2006).

According to Latouche (2006), the only serious initiative of sustainable development is eco-efficiency, as it seeks to reduce both, environmental impacts and the rate of degradation of natural resources in order to achieve a level that is compatible with the carrying capacity of the planet. Yet, according to Madlener and Alcott (2006), energy efficiency may be an appropriate strategy for increasing economic growth and wealth, however, it is not clear how useful it is with regards to environmental improvements. In fact eco-efficiency may lead to an ever increasing resource use rather than less because of the ever-increasing potential for rebound effects based on the resulting cost savings that are eventually transferred to the consumer. In the end, a strategy of eco-efficiency may impede long term economic growth because resource shortage will pervade technical change (Madlener & Alcott, 2006). In fact, this is what Stern (2007) attests to in his report called "*The Stern Review Report*".

The matter regarding rebound effects is a widely held concern. Sorrell (2007) in the report called "*The Rebound Effect: An assessment of the evidence for economy-wide energy savings from improved energy efficiency*", a report commissioned by the UK Energy Research Centre, also states this concern. The focus of this report is: "What is the evidence that improvements in energy efficiency will lead to economy-wide reductions in energy consumption?". This seems to be an inescapable area of concern; if a more global and long-term perspective for evaluating sustainability is sought, then these concerns cannot be ignored. A hypothesis that can therefore be proposed is that there is a relation between rising consumption and rising efficiency of resources. This phenomena is very difficult to define or evaluate, yet, methods for assessing this become fundamental for an overall positive gain towards sustainable development, and in particular, in seeking to operationalize sustainable design.

For example, saving 30 to 40% of inputs is possible by increasing efficiency and reducing waste, but the rebound effects eat away at much of the environmental gains sought. By 2012, the amount of greenhouse gases per GDP dollar will be reduced by 18%. But by then, the GDP will increase

by 35 to 40 %, therein obliterating any hoped for sustainable gains (Latouche, 2006). Therefore, efficient technologies encourage increased consumption (Hertwich, 2005; Princen, 2005; Korten, 2006; Latouche, 2006). These strategies have sought sustainable gains, yet have resulted in the opposite effect. This is because they adopted preventive strategies which are limited when used on their own. A change in the way solutions are sought has become an imperative.

As previously mentioned, these arguments, on the most part, rest on the ideology of 19th century progress (De Noblet, 2002). However, a blind faith in techno-science and in the future to solve current problems is contrary to the precautionary principle and common sense (Harremoës et al., 2001; Cavanagh et al., 2002; Latouche, 2006; Whiteside, 2006). This is why this paper presents the precautionary principle as a viable principle for addressing such concerns. More importantly, the proposed approach to support decision making in a context of sustainability can complement existing approaches to decision making that are based on eco-efficiency. And finally, the precautionary principle can contribute to a change in direction of the current state of affairs and not in the slowing down of the rate of degradation. Therefore it can play a role in changing the rapport that humans currently have with their world.

2. Why is Design Necessary for Sustainability?

Design is part of an industrial system and is one of the main sources of nourishment for the economy (Orr, 2002). However, the proper functioning of this economy is completely dependant on the natural systems; these natural systems allow all life on earth to continue (Sachs, 1997; McDonough & Braungart, 1998; Hawken et al., 2000; White et al., 2005). So, it becomes important to understand how design methods can be made sustainable. Historically, design has contributed to this type of continual economic growth by continually introducing innovative products to the market, and therefore playing a major role towards this infinite economic growth. Since design has been used to spur infinite growth and consequently, has contributed to the environmental and social crisis, then why is design being considered as a vehicle for sustainable development? There seems to be a paradox. However, the action of planning with the intent of improving an existing situation, according to Herbert A. Simon (1996)⁴ is the definition of design. He defines design as: "*Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artifacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state. Design, so construed, is the core of all professional training: it is the principal mark that distinguishes the professions from the sciences. Schools of engineering, as well as schools of architecture, business, education, law, and medicine, are all centrally*

⁴ There are various other definitions of design, for example Victor Papanek (1985) wrote: "All men are designers. All that we do, almost all the time, is design, for design is basic to all human activity. The planning and patterning of any act toward a desired foreseeable end constitutes a design process." (p. 3).

concerned with the process of design" (p.111).

So given that design seeks to improve existing situations to preferred ones, then it can be used to develop unsustainable communities into sustainable communities. Therefore, design can contribute significantly towards the progress of sustainability through the consideration of various criteria; where the criteria is no longer limited to the scope of material, form and process, but includes a diversity of considerations that may include political, environmental, economical, cultural and educational issues (Madge, 1997).

Levy⁵ refers to the ways in which humans are constantly modifying their relationship to their world through the process of design. In effect designers⁶ are initiators of change in and of society (De Coninck, 2005). Therefore, the notion of social change is a fundamental and inherent characteristic of design in this context. But how can design contribute to social change by introducing sustainable solutions without removing the freedoms of the community? In fact, the implication of the community is an integral part of sustainable design since solutions that address new modes of life will not be adopted unless the society has accepted them as beneficial for their communities.

In fact, according to the collaborating work done by both the United Nations Environmental Program (UNEP) and the Wuppertal Institute (2007), the brochure entitled "*Creating Solutions for Sustainable Consumption and Production*" states that,

"The ways in which products and services are delivered to our doors have become increasingly complex and global. Actions taken by designers, producers and consumers are all interlinked and can affect each other, and the global environment, in far-reaching ways. For instance, decisions taken by a producer regarding the design of a product may have repercussions for the consumer in terms of the negative environmental effects that result from the use of the product. In the same way, decisions taken by consumers located on one side of the world might influence producers and communities on the other side. The challenge is to manage these interdependencies in a way that advances human development without causing harm to the environment."(p.2)

So as the global conditions continue to deteriorate on many levels, the need for immediate change has become crucial. This implies that there is an imperative to move sustainable development beyond its theorization and into a mode of operationalization. This refers to the fact that the production, consumption, as well as the conceptualization of products and services must change to modes that are really sustainable, more integrated, and therefore become essential components for this operationalization to occur.

⁵ The definition of design according to Levy (from De Coninck, 2005, pp.68-69, liberal translation), "*Design is the manipulation (by humans) of all things; that is all phenomena (living or non-living), of all objects, all mechanisms, all systems, and all procedures. The finality of this manipulation of things is the creation of new concepts and experiences such that its totality will change the world in a recursive way.*"

⁶ In this context, designers refer to engineers, architects, industrial designers, and to some extent decision makers and stakeholders.

3. An Evolution of Design Strategies for Dealing with Global Crisis

As a result of the global crisis, design approaches have had to evolve to deal with the emerging problems and with this change, corporate responsibilities and activities have shifted in parallel (Janin, 2000). The increased significance of design in achieving environmental, economic, and social policy goals at a regional, national, and international level is a reflection of the growing concerns that have come to be accepted as fundamental for design (Fletcher & Goggin, 2001).

There have been three main strategies for design in dealing with the crisis, namely *green*, *eco*, and *sustainable*, according to Madge (1997). The main goal of *green design* is to reduce pollution by reducing the amount of waste generated; therefore end-of-pipe and zero-waste are the main strategies in this approach (Madge, 1997). *Eco-design* is a multi-criteria and hierarchical approach, used to support the decision making process because it considers not only the traditional elements of design (form, material, process, function), but also includes environmental dimensions (Janin, 2000). Life Cycle Analysis (LCA) tools emerged as a framework for eco-design practice. These are preventive tools as they are based on the assessment of predictable risks throughout the life cycle of the product or service, and therefore facilitate decision making by seeking to minimize the negative impacts. It continues to be used today because of its pertinence for the assessment of environmental impacts based on observable consequences of product and service systems.

Sustainable design is the activity of designing products or services whereby they are environmentally benign, socially equitable and economically viable (Vigneron et al., 2003; White et al., 2005). The main concern of sustainable design is the satisfaction of the fundamental needs of everyone (present and future) and understanding the limitations and impacts imposed on the environment and society by technology, production and consumption. It requires a global and systemic vision because it seeks to establish new relationships with the environment and others, for the short, medium, long and very long-term. The consideration of human consumption patterns is an example of issues addressed within a sustainable design context (Marchand et al., 2005).

With this new approach, designers are now placed in a position of developing new lifestyles rather than only creating products that seek to 'commodify' human needs. In a society where the designer's role shifts from a shaper of commodities, to a shaper of lifestyles, it is clear that the user's role will shift as well. In this type of society, the users will have more control of their daily experiences based on their level of engagement to their environment. The relationships between the users and their products will, as a consequence, evolve. Designers will need to adopt solutions that consider the common-good, as well as solutions that can satisfy the most needs by consuming the least resources. This is not a trivial task, and in fact will require that the designer understands the various concerns within a community.

The notion of social change is a fundamental and inherent

characteristic of design in this perspective, as it can be used as a vehicle for changes on various levels, not only on the product or service level. But how can design contribute to social change by introducing sustainable solutions without removing the freedoms of the community? In fact, the implication of the community is an integral part of sustainable design since solutions that address new modes of life will not be adopted unless the society has accepted them as beneficial for their communities.

4. The Challenges faced by Sustainable Design

Questioning current thinking with respect to design, production and consumption practice are a way of seeking solutions at the source; where fundamental changes in human behavior have to occur, if lasting effects to the environmental crisis are to happen (Madge, 1997). A global perspective must consider the common-good and an improved quality of life for all. So beyond an efficient mode of provisioning, questions of how much is enough or more importantly what is enough, must be considered. Enough can refer to a sufficient mode of provisioning for a sustainable, desirable future for all humanity, present and future. Sufficiency implies that the 'enough' limitation reflects both social values and ecological constraint (Princen, 2005). Sufficiency relies more on individual behavioral changes as well as on social innovation (Reisch & Scherhorn, 1999; Roome & Anastasiou, 2002; Princen, 2005).

Therefore questions of self-management emerge on an individual and collectively on society (Jackson, 2005). The relationship that humans have with their world is challenged, and new modes of consumption emerge (Princen, 2005; Latouche, 2006). So methods to elicit values that may help define or assess sustainable solutions, emerge. Such values can facilitate the evaluation of social impacts or benefits of consumption and production as well as the elaboration of more sustainable solutions through a global and long-term perspective (Cucuzzella, 2007). It is important to emphasize that the social values elicited must address the concerns of both inter and intra generations, since they are all affected in the current global crisis. This implies that the benefits on a planetary scale will be at the forefront, ahead of the interests of the enterprises (Mongeau, 2007).

A more global approach is required if real sustainable gains are sought, and where rebound effects and perverse effects can be considered in a more integrated manner. The precautionary principle, a principle defined in the Rio Declaration on Environment and Development, can be used as a basis for assessment and helping to define an anticipatory course of action. This is a very common-sense approach, yet remains very controversial (Cavanagh et al., 2002). Precaution can deal with situations that present potentially harmful global (both on a temporal and spatial scale) consequences, where the uncertainties are great; issues that cannot be dealt with using preventive (predictable) approaches, such as LCA tools (Cucuzzella, 2007).

5. Defining the Precautionary Principle

The definition of the precautionary principle⁷ in a general context can be defined as a principle that tries to guide decision making in the absence of certitude and in the presence of potential risks, and therefore allows the establishment of a responsible, anticipative action (Harremoës et al., 2001; Kriebel et al., 2001; Kourilsky, 2002; Tickner & Raffensperger, 2002; Godard, 2005). Uncertainty is a prime motivating factor in the origin and application of the precautionary principle.

In an attempt to operationalize a precautionary approach, a clearer understanding of precaution and how it relates to prevention is essential. In fact, the idea of precaution is based on an attitude of prudence (Ewald, 1996). According to Ewald (1996), prudence refers to how humans deal with situations when they are faced with uncertainty. This author claims that historically there have been three concepts based in uncertainty: *foresight*⁸, *prevention*, and *precaution*. Kourilsky and Viney (2000) also group prevention and precaution within a category of prudence. Their definition of prudence is farther from that of Aristotle (Aristotle, 2002), and closer to the definition by Weber (1959), which is based on an ethic of contemporary responsibility (Lavelle, 2006). An attitude of precaution in fact, introduces a shift from the paradigm of predictability (for prevention) towards the paradigm of complexity (for precaution), both within a systemic approach.

So, it is important to point out that uncertainty is not equal to risk, just as precaution is not equal to prevention. Uncertainty (potential risk) is associated with precaution, whereas (known) risk is associated with prevention. Precaution and prevention may seem similar since both define actions that ultimately seek to reduce harm in situations of perceived danger. Therefore, both can be considered as frameworks for decision making where risks are immanent; whether they may be potential or known. The main difference between prevention and precaution is that prevention uses predictable means of addressing risks, such as statistical methods. The precautionary principle requires defining an action when knowledge of the outcome is lacking or divergent. In addition, the potential of catastrophic danger is high. Therefore, the risks within a preventive approach are known, with expected probabilities of occurrence. Whereas the dangers associated within a precautionary approach are *risks of risks*; second order risks, and are therefore not predictable (Ewald et al., 2001; Harremoës et al., 2001; Kourilsky, 2002; Tickner et al.,

⁷ This is defined as "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.", principle 15, from the Rio Declaration on Environment and Development (UNCED, 1992). This declaration recognized the precautionary and polluter-pays principles as guiding principles.

⁸ Ewald (1996) uses the French word 'prévoyance' in describing one of the three prudent attitudes related to uncertainty. We have used the word foresight as the translation for the word 'prévoyance', which in this context, is defined as 'providence by virtue of planning prudently for the future' (Fellbaum, 1998). The word 'prévoyance' is sometimes translated to 'responsibility'.

2003; Raffensperger, 2004; Dorman, 2005; Godard, 2005; Whiteside, 2006). The precautionary principle has largely been ignored in decision support tools as it is not evident how it can be operationalized; it is based on fundamental uncertainties and therefore inherently rests on an ethical framework (Jonas, 1985; Whiteside, 2006).

6. A New Sustainable Innovation Framework based on Prudence

The approach to decision making within a preventive requires tools that can assure the predictability of risks associated with products and services using a strategy of efficiency. The decision approach for precaution addresses the uncertainty prevalent in many design situations and therefore requires appropriate tools for adopting a strategy of sufficiency to accomplish the goal of regeneration. As foresight is a framework that is based in responsibility (Ewald, 1996), it requires tools available to make decisions so that the products and services are as effective as possible. The strategies and values specified in *Figure 8* can be manifested through the use of the tools available within each of the decision frameworks. However, tools for every framework are not yet available.

As the *prevention framework* is an established framework for supporting decision making, many tools are already available. For example, the tools available for *eco-efficiency* are Life Cycle Assessment, Risk Assessment, Substance Flow Analysis, and Environmental Impact Assessment, among others. The tools available for *socio-efficiency* are the various approaches based on Social Life Cycle Analysis. And the tools available for *economic efficiency* are the available approaches based on Life Cycle Costing. This framework considers short and medium term solutions. This is because the available tools cannot support decisions based on a long-term perspective; the uncertainties are far too great to justify since very long-term predictions with such tools are not reliable.

In the case of the *precaution framework*, the three pillars would most likely be dealt with in an integrated manner. Possible approaches to decision making can be participatory design, new forms of governance, democratic decision making processes, etc., all of which have not yet been developed for the context of sustainable design. This framework considers long-term and very long-term scenarios, and therefore the decisions are anticipatory, yet justified within this framework.

In the case of the *foresight framework*, the decision is individually constructed based on a deep sense of responsibility. This implies that the decision will be based on a fundamental desire to respect the limits of environment and the well-being of society. This represents individual responsibility (Ewald, 1996) and is based on a traditional sense of responsibility. According to Thiers (from Ewald et al., 2001, p.274), "*one person cannot transfer the burdens of what happens to him*". This principle allows citizens to understand the relationship between responsibility, freedom and social organization. In fact, the term foresight which is a translation from the French word "*prévoyance*" is sometimes translated to responsibility (Werner, 2005; Petrini, 2007). This is why effectiveness is the main strategy for this framework. In this framework, the

individual is seeking to be as effective as possible with respect to the environment and the society in which they belong. Existing deterministic decision tools may be used to help the individual make choices, but the strength of this framework is that it is a more holistic approach to decision making in terms of ensuring that the environment and society have been considered.

So, foresight is based on individual responsibility. Prevention is based on expert knowledge which is fundamental to understand the associated risks of decisions taken. And, precaution is based on a collective decision process that results when the uncertainty based on a preventive approach is too great and too potentially damaging to ignore. Therefore the three frameworks comprise a system of frameworks that offer a promising approach for decision making for sustainable design.

The strategy for the foresight framework is effectiveness, which entails a fundamental consideration of nature's cycles into design, and therefore the goal of *stewardship* is sought. Stewardship refers to the notion that humans are responsible for their world. In this framework, the goal is to not have to abide by norms and regulations, but by a deep-rooted sense of responsibility to society and the environment. In this framework, more specific goals such as waste equals food (McDonough & Braungart, 2001; Van Der Ryn & Cowan, 2007) and the avoidance of irreversible damages are sought.

The *preventive framework* is based on the idea that risks exist and must be addressed in the decision process. The goal of *conservation* (Van Der Ryn & Cowan, 2007) is sought through the strategy of efficiency. What is important to note is that non-linearity cannot be considered in this framework, as it is based on a doctrine of predictability. Non-linearity rests on the phenomena that beyond a certain threshold of damage, the predictability of consequences is no longer possible. This becomes a serious limitation when using this framework on its own, and is the reason why it is essential to complement this with an approach that is not dependant on quantification of data and predictability.

The precautionary framework seriously considers the uncertainty within situations and is therefore necessary when a preventive approach fails to convincingly and responsibly support decision making. This occurs when the level of uncertainty and potential of harm is too high. A precautionary framework will seek to avoid situations of irreversible damages. In addition the idea of substitution of resources because of their diminishing availability is not acceptable. In this framework, the non-linearity of situations is carefully deliberated. In essence it is concerned with avoiding potentially catastrophic situations. The goal of regeneration (Van Der Ryn & Cowan, 2007), and not conservation, rests on this framework since this is a long-term (and not a medium-term) perspective. *Figure 8* (see annex) presents this new framework specifying the goals and strategies of prevention, precaution and foresight. This new framework is based on the theories of various authors (Orr, 1992; Ewald, 1996; Lascoumes, 1996; Kriebel et al., 2001; Dyllick & Hockerts, 2002; McDonough & Braungart, 2002; Raffensperger, 2004; Tickner & Geiser, 2004; Young & Tilley, 2006; Van Der Ryn & Cowan, 2007).

It is important to understand that sustainable design will

require methods of decision making that are very different than those within an eco-design approach; an approach that is predominantly focused on the production of the product (Cucuzzella, 2007), where consumption is dealt with as a direct consequence of the production and not an issue on its own. And in addition, Roome and Anastasiou (2002) claim that an approach of sufficiency for product/service/social innovation shifts the focus from production to production and consumption. In this approach then, the scope or solution space becomes more encompassing and integrative, enabling a higher success for a sustainable solution. These authors claim that: “*Sufficiency strategies correspond to a circular or loop economy [which the reader might view as similar to managing the level of a lake]. They focus producers on the sale of performance and optimization of extended producer responsibilities. Emphasis on performance and the sale of utilization value creates demand for competence in managing the value of the assets retained in material products. It shifts focus from production to production and consumption*” (Roome & Anastasiou, 2002, p.39).

This is where sufficiency then becomes pertinent for the conception and production of a product or service. This approach is far beyond an approach that focuses on the optimization of products and services for longer life. It will require social innovation as well as technological innovation. In essence, this new approach seeks to define ways in which the scope of the decision-making process can be redesigned. Roome and Anastasiou (2002) claim that the redesign⁹ of production systems, distribution systems, consumption systems require new platforms for participation by actors so that social as well as technical innovation can occur. In fact the idea of precaution to envision innovative sustainable living systems is an important consideration for these authors. They claim that a form of governance is necessary to better deliberate the alternatives in cases where uncertainties are prevalent. In addition: “*Strategies for sufficiency require scenarios and foresight methodologies. These multi-disciplinary procedures examine alternative futures, and use back-casting techniques to identify stepping stones and pathways to desired futures*” (Roome & Anastasiou, 2002, p.44).

So, sustainable design represents a very challenging approach, both in theory and practice, especially as it calls for technical innovation as well as social innovation. The soundness of solutions and the acceptability of solutions both must be considered in an integrative way (Cucuzzella, 2007). The justification and legitimization of solutions cannot be based solely on technical and/or scientific expertise because all solutions are based on world views and therefore values (De Coninck, 2005). This is why sustainable design requires not only a preventive approach to decision making when considering the impacts of products and services, but a precautionary approach as well. A precautionary approach will encourage an integrated reflection of long and very long-term issues, including a rediscovery of new possibilities and new modes of living

⁹ The notion of redesign is one of three sustainable product design strategies: redesign, rediscovering and reorganizing Fletcher, K., Drewberry, E. and Goggin, P. (eds), 2001. Sustainable Consumption by Design, Pergamon: Elsevier Science, Oxford (UK)..

(Cucuzzella & De Coninck, 2006); a framework for not only product and service (technical) innovation, but also for social innovation. So a framework of precaution can allow a re-consideration of current unsustainable modes of living, and is therefore promising in a context of de-growth.

7. Conclusion

A framework where the visions and views of the community become integrated within the final solution will not only raise the level of responsibility among participants, but also help renew their belief in governing (democratic) systems, where the goal is to improve the quality of life by challenging the ways in which humans live, how life is organized, and seeking alternative sustainable solutions at this level. And in this consideration, ensure that irreversible harmful effects are circumvented and that the substitutability of natural resources does not occur as a result of the use of the product or service. So a precautionary framework seems a potential approach for an operationalization of sustainable design in a context of de-growth. It can provide new elements for the justification and the legitimization in the choice of criteria when conceptualizing new products and services. And so, would not only consider the eco-efficiency of a product or service, but would question the pertinence of its existence, its social acceptability, its ethic, its equitable capacity, and its longevity, as a point of departure.

Several elements are necessary for such a process to be successful: (1) the awareness and willingness from the community that a current unacceptable situation must be addressed; (2) some system of governance is in place so that such deliberation can occur; (3) methods within such a system that can help elicit the values of all the representative stakeholders; and (4) methods of arriving at a consensus. In this perspective, a precautionary approach to sustainable design can provide a new innovation framework. This may help move beyond the idea of product and service optimization, and instead toward a mode of design that challenges the status quo, and therefore discovering new possibilities and evaluating how these can contribute to a better quality of life of individuals and state of the world.

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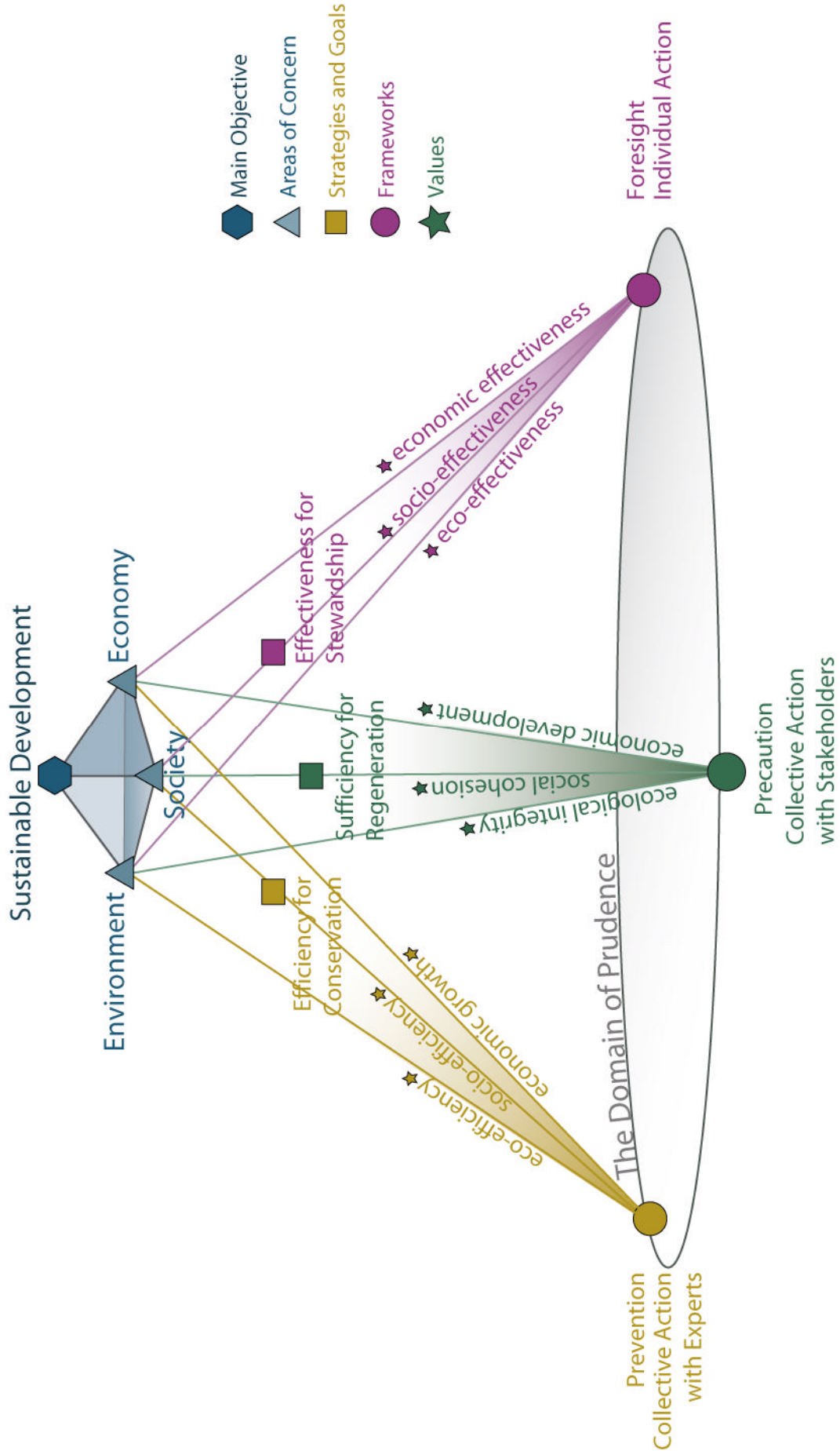


Figure 8 : Specific values and goals within a prudent framework for sustainable development, (source: Cucuzzella, 2008, p.39).

Technology and the Growth Problematique

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Abstract

Technology is a major facilitator of efficiency and potential material degrowth. For example, with the help of information technologies, real products and services could be replaced by virtual ones. The virtual economy could be primarily a service economy which makes it possible to increase efficiency and have both material degrowth and growing GDP. This assumption has been widespread and it had also impact on political and economic strategies like the Lisbon Strategy (European Council 2000 and 2005).

But why did we not achieve significant material degrowth in spite of the wide application of the new technologies? The increase in efficiency results also in lower prices for products and these lower prices stimulate consumption and increase overall resource use (rebound effects). Such effects are not new: The industrial society replaced the agricultural society mainly with respect to the workforce. In the year 1900 there were only 38% of the workforce active in agriculture in Germany compared to 62% in 1800. On the material level, the industrial society did however add to the agricultural society. Via a positive feedback even more agricultural products could be produced by the industrial society than by the agricultural one. In 1840 Justus von Liebig had published his findings about the application of chemistry in agriculture which resulted in the broad use of fertiliser and the cereals production in Germany increased significantly. If we don't manage to decrease rebound effects originating from a similar feedback which occurs during the transition of the industrial society to the information society, our "civilization" will collapse.

The information society might continue to be a driver of the industrial production and might produce more "conventional" industrial goods than the industrial society did. Which are the ways out of the problem? In principle we would know several options like ecologically oriented consumer behaviour or environmental regulations like taxation. They are however not sufficiently realized. Ecologically oriented thinking is restricted to a share of the population, and even among that group, the phenomena of "eco-schizophrenia" is widespread. There is a drastic contrast between verbally promoted attitudes and real behaviour. On the other hand, ambitious regulatory concepts could not be introduced due to the fear of politicians to lose elections. There might be a "democratic brake" and there is evidence that it actually exists. Solving the problems which arise because technology does not automatically reduce overall material consumption under present conditions due to rebound effects, would only be possible by a well-designed parallel approach, which addressed behavioural change and regulatory approaches at the same time.

1. Good Intentions - Counterproductive Effects

Technology is a major facilitator of efficiency and potential material degrowth. For example, with the help of information technologies, real products and services could be replaced by virtual ones. The virtual economy could be primarily a service economy which makes it possible to increase efficiency and have both material degrowth and growing GDP.

But why did we not achieve significant degrowth of material consumption in spite of the wide application of the new technologies? The increase in efficiency results in lower prices for products. The lower prices stimulate consumption and can increase overall resource use. Because of such rebound effects it is possible that increased efficiency does not result in a decrease but in an increase of resource consumption. Such effects are not new, they can occur related to any technology.

There are also special feedback effects which might prevent the information society from being dematerialized. These effects have already played a role in earlier transitions of human civilization.

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2. Have the Political Strategies Been Adequate ?

The Lisbon Strategy [1] was agreed upon by the Lisbon European Council in March 2000 and was designed as a new political strategy for the European Union "in order to strengthen employment, economic reform and social cohesion as part of a knowledge-based economy". The Council stated that a "radical transformation of the European economy"

was required as a consequence of globalisation and the challenges of a new knowledge-driven economy. The Council analysed the strengths and weaknesses of the European Union. Among the strengths there were low inflation and interest rates, remarkably reduced public sector deficits and a healthy balance of payments as well as a generally well-educated workforce and social protection systems. The weaknesses were seen in the area of employment (15 million Europeans were out of work at that time) and in an underdeveloped services sector, particularly in the area of telecommunications and the Internet.

The strategic goal for the European Union according to the 2000 Lisbon Strategy can be characterised by the most frequently cited phrase from the document. The Union wanted *“to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion”*. Aspects of the strategy were an information society for all, establishing a European area of research and innovation and creating a friendly environment for starting up and developing innovative businesses, esp. SMEs.

Two items in the key phrase are remarkable: The first one is the focus on highest competitiveness. The 2000 Lisbon Strategy did not only argue that Europe should be competitive, but it claimed that Europe should be the most competitive economy in the world which means that other economies have to remain less competitive. The 2000 Lisbon Strategy was not an agenda for a global partnership, but for European leadership. The second item is the use of the term *“sustainable economic growth”*. It meant just permanent and high economic growth.

Environmental problems did not play a special role in the Lisbon Strategy. The document stated simply that achieving the goal required an overall strategy aimed at:

- preparing the transition to a knowledge-based economy and society by better policies for the information society and R&D, as well as by stepping up the process of structural reform for competitiveness and innovation and by completing the internal market;
- modernising the European social model, investing in people and combating social exclusion;
- sustaining the healthy economic outlook and favourable growth prospects by applying an appropriate macro-economic policy mix.

It was not discussed that physical base of the economy, a healthy environment and intact natural systems were under threats and measures for environmental sustainability were not an essential part of the document. The focus was just on growth itself (3% were indicated as a realistic prospect). An explanation may be derived from the Council's understanding of the corresponding relationships:

“The shift to a digital, knowledge-based economy, prompted by new goods and services, will be a powerful engine for growth, competitiveness and jobs. In addition, it will be capable of improving citizens' quality of life and the environment.”

The knowledge-based economy was not only regarded as the tool that provided economic growth, it was also supposed to lead to a better environment. Thus the Lisbon Strategy was a document based on techno-optimism. The new information technologies were supposed to solve our environmental problems. But what would happen if the technologies didn't have the positive effects as assumed, or if their positive effects were accompanied by negative ones?

3. "Virtual" Growth Has Impact on the Real World

It became soon obvious that the European Union did not reach the competitiveness it aimed at and in the area of sustainable development, negative trends continued. One reason for the failure to reach sustainable development was the missing consideration of the environment in the Lisbon Strategy and its technology-based optimism. A better quality of life and a better environment should have been the consequences of the application of the new information technologies.

It is interesting to have a look at some documents which had been prepared before the Lisbon Strategy was decided upon, because they reveal the spirit and way of thinking that time. In 1998 there was a status report *“Towards a Sustainable Information Society”* [2], in which there was a very positive prognosis:

“No other technology than IST offers such a high potential of “Dematerialisation”, that is, the same value added with much less resource input and environmental burdens,. . . ”

“It is clear that with the Information Society, new opportunities are emerging which will help to achieve both global environmental sustainability and continued economic growth; to achieve social goals of employment growth and local community development within a free market framework; and to enable greater access to work, services and mobility without congestion. This new opportunity for a triple winwin development is in stark contrast to the current debate on sustainability, notably in Rio and Kyoto, where the goals of sustainability are seen to be in conflict with economic growth, employment and industrial interests.”

There was generally assumed that the service economy, could decouple economic growth from resource consumption. Virtual meetings should replace physical conferences. These assumptions seemed to be supported by research which showed that people in many industrial countries tended towards postmaterialistic attitudes and values.

Of course there is no doubt that information technology enables dematerialisation to a degree as no other technology did before. But this does not necessarily mean that overall resource consumption is reduced [3].

Some areas, in which the increasing resource use is directly visible are:

- Energy consumption: A contemporary PC with a monitor has an energy consumption during use which is comparable to the metabolic turnover of a human being;
- Paper consumption: The *“paperless office”* uses still a lot of paper and restrictions to printing in the offices or at home are not due to cost of paper but result from high cost of toner and ink cartridges;
- There is a *“mountain”* of electronic waste that grows year by year and contains still quite a variety of hazardous chemicals.

There are several areas [4], where a reduction of resource consumption did not yet occur: travel did not decrease. People are today as mobile as they have never been before, and there seems to be a close relationship between

communication and travel behaviour. There was already in the pre-Internet age a correlation between the number of messages sent by people, beginning with letters and later including phone calls, and the number of kilometres travelled. The increase of the two entities was in parallel. Did people in the past forecast that because of telephone calls, which bridge distances easily, they would travel less, and that television would replace holiday trips because they could see foreign countries comfortably from their home? E-mail and video conferences, was the argumentation since the late 90s, would result in a replacement of motorways for cars by information highways. But we use the new technologies to increase our communication activity, while at the same time travel statistics show that traffic continues to grow.

It is not an accident that the release of the Lisbon Strategy in March 2000 coincided with the peak of the IT hype at the stock exchanges. On March 10th, 2000, the NEMAX All Share peaked at 8546 points and then began to follow the trend shown by the NASDAQ which lost 2/3 of value between March 2000 and April 2001. The Lisbon strategy was clearly a child of the euphoric mood related to information technology which dominated discussions at the turn of the century. And even though the material effects of the immaterial service economy became soon visible, it took five years until the Lisbon Strategy was revised in 2005.

4. Conclusions

Which are the ways out of the growth problem? The "technology does the job" option has been very seducing. It did not work, as the example of information technology showed. In principle we would know several factors which could help to realize the dematerialisation potential of technologies like ecologically oriented consumer behaviour or environmental regulations like taxation. They are however not sufficiently applied. Ecologically oriented thinking is restricted to a share of the population, and even among that group, "eco-schizophrenia" is widespread. There is a drastic contrast between verbally promoted attitudes and real behaviour. On the other hand, ambitious regulatory concepts could not be introduced due to the fear of politicians to lose elections. There might be a "democratic brake" and there is evidence that it actually exists. Solving the problems which arise because technology does not automatically reduce overall material consumption under present conditions due to rebound effects, would only be possible by a well-designed parallel approach, which addressed behavioural change and regulatory approaches at the same time.

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Globalization, localization and the cost of complexity - a network approach

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Abstract

The process of globalization not only corresponds to a growth in terms of economic scale but is also associated with a profound change in the structural properties of the socio-economic networks towards more connectivity, more interactions, faster changes and greater uncertainties, in sum: more complexity. We apply network metrics to international trade data and show a clear trend towards a rise of complexity in the patterns of global economic exchanges. We suggest that some costs may be associated with this structural evolution such as (i) a suboptimal global efficiency of the economy and diminishing returns on investments (ii) limited accountability and predictability, favouring short-term decisions and (iii) increased risks of large-scale instabilities. We suggest that a sustainable alternative to these rising structural costs may lie in promoting local initiatives, as already demonstrated through numerous successful grassroots initiatives.

1. Introduction

Globalization embodies the ongoing process of growth of international trade and investment, wherein a growing number of countries are linked by increasingly intense exchanges in an open world trading system. Although this process is by no means recent, improvements in telecommunications and transportation and the spread of policies facilitating the exchange of goods, ideas and people across borders appear to bring the world closer. This tends to make physical location less of a factor in determining interaction between nations, firms and individuals. Proponents of globalization claim that the economy benefits from the efficiency gains that flow from superior resource-allocation decisions in more open markets (Bhagwati and Srinivasan, 1999). But numerous others voice their concerns at a system of exchanges that leads to uniformization and rising inequalities (Wilterdink, 2000). Although globalization implies that firms and individuals are inter-related in a multilevel network, its analysis is often limited to a mono-dimensional measure based essentially on the notion of scale. However, global growth has deepest implications on the structural characteristics of the socio-economic network. The evolution of these internal properties can be further explored through a quantitative analysis of the interconnections between parts of the system, and in particular its associated complexity.

This paper is organized as follows: In section 2 we suggest to consider the economic network as a Complex Adaptive System. Section 3 quantitatively defines the notion of

network complexity through several metrics. These measures are applied in section 4 to international bilateral trade data, and show the evolution of the complexity of the economic network at the global scale in the second part of the 20th century. We discuss in section 5 how the observed this large-scale evolution is related to a complexification of the supply networks. In section 6 we show how complexity leads to several unaccounted economic costs and ultimately augments the risk of global catastrophic failures. We then propose in section 7 that a sustainable alternative to the rising costs of complexity can be found in the establishment of local socio-economic systems, which do not exclude distant interactions but favor small scale, manageable relationships. We provide real-world examples for the local production and distribution of food in section 8.

2. The economy as a Complex Adaptive System

The economy is composed of a variety of agents (from individuals and corporations to national economies) embedded in the natural environment and connected through a number of social and economic interactions. Such a system can be modeled as a graph where the nodes represent the agents and the edges their inter-relationships. This network description is standard practice in social sciences (Scott, 2000; Freeman, 2004; Newman, Watts and Strogatz, 2002) and is becoming more frequent for the representation of economic systems (Potts, 2000; Foster, 2005). Network analysis comes with a powerful tool kit of quantitative measures that allow a thorough analysis of their inner structure: rather than focusing on a single agent of the economy, a network approach enables to obtain a description of the statistical properties of the inter-connections between agents. Networks can be described through a number of parameters characteristic of their topology, such as the *degree* (number of links per node) and their distribution, the distance between nodes (defined as the number of edges of a shortest path between them), the diameter, etc. (for a recent review, see Costa et al., 2008).

More elaborate descriptions of real-world connected systems may involve the description of the dynamical properties of their associated network, in particular how the agents and their relations evolve (e.g. how nodes and links are created and destroyed, or how nodes respond to a set of input signals) and how information, goods or services transit from agent to agent through non-linear, time-dependent connection patterns. This has led to the notion of Complex Adaptive Systems (CAS, Holland, 1995; Levin, 1998), characterized by their adaptation to change (e.g. locally, at the agent level) and their self-organization (at the network level), and the emergence of - often unpredictable - global behaviors from local interactions. The economy can be described as a CAS where agents (individuals, firms, etc.) related through trade relationships adapt their behavior at each moment as a function of changing environments (Matutinovic, 2005; Foster, 2005).

3. Definition of complexity

Another benefit of representing the socio-economic system as a graph is that we are able to draw in the literature from the existing associated measures of complexity. Complexity

is an elusive concept and can lead to an array of definitions, depending on the chosen perspective: simplest measures are traditionally related to the cardinality of the network's subcomponents and relate for example to the number of nodes, the number of links, the connectivity. Other measures explore in more details the inner structure of the graph. These can be based on an estimate of the associated algorithmic complexity (Li and Vitanyi, 1991), on the number of subgraphs (Grone and Merris, 1988), on the graph information content (Standish, 2008), or on the node-node link correlation matrix (e.g. the offdiagonal complexity, Claussen, 2008). A useful comparative discussion on various graph complexity metrics can be found in Kim and Wilhelm (2008). Graph complexity measures have been exploited in various fields, from the characterization of algorithms and software processes (Lew et al., 1988), to organization theory (Fioretti and Visser, 2004) and business methods (Johansson, 2002).

We limit our discussion here to simpler measures of graph complexity that are indicative of an increase in the number of possible interactions between the agents of the economy. We stay in this sense close to Joseph Tainter's intuitive vision: "*Complexity is generally understood to refer to such things as the size of a society, the number and distinctiveness of its parts, the variety of specialized social roles that it incorporates, the number of distinct social personalities present, and the variety of mechanisms for organizing these into a coherent, functioning whole. Augmenting any of these dimensions increases the complexity of a society*". (Tainter, 2006).

Having modeled the economy as an undirected unweighted network constituted of n nodes and l links, we will consider here the following parameters as indicative of an increased complexity. The scale of the graph, as described by the number of nodes n . The level of interactions between the nodes, measured by the average degree $\langle k \rangle = l/n$. The link density D (the relative number of edges) defined as $D = (l - n - 1) / (n(n - 1) / 2 - n + 1)$. We also estimate the complexity of the network as the number of its different subgraphs. This measure can be roughly approximated by the number of spanning trees N_{ST} contained in the graph (Kim and Wilhelm, 2008). Thanks to Kirchhoff's theorem we have $N_{ST} = \det(L_{reduced})$, where $L_{reduced}$ is the Laplacian (i.e. the degree matrix - adjacency matrix) of the one-edge-deleted graph. The normalized subgraph complexity is given by: $C_{I,NST} = (N_{ST} - 1) / (n^{1.68} - 10)$ (Kim and Wilhelm, 2008).

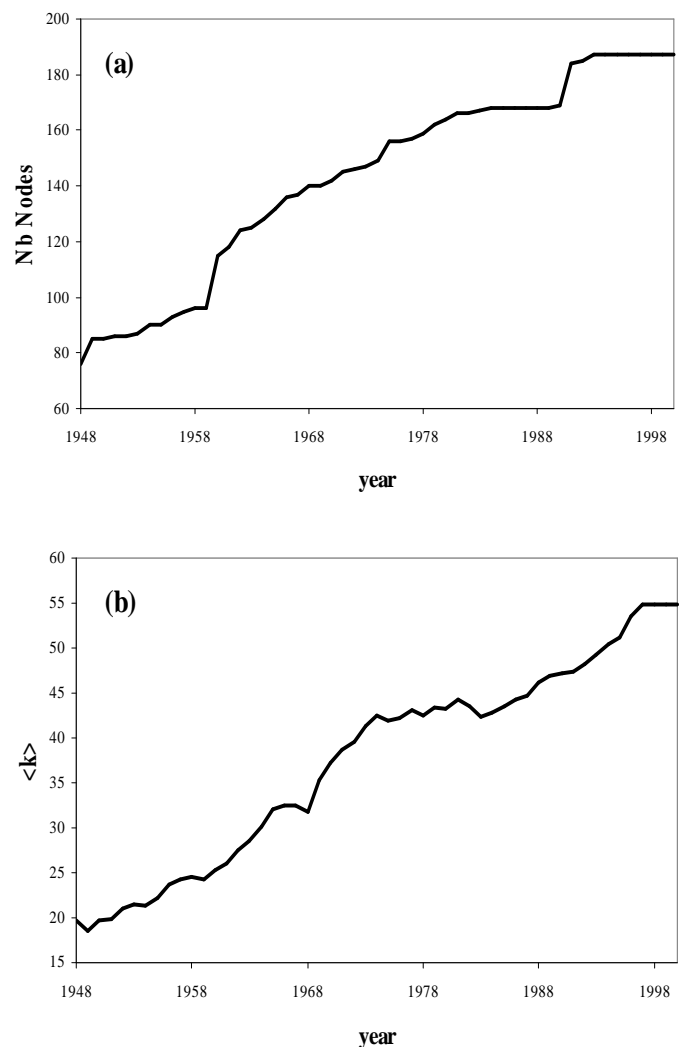
Note that we only use here complexity in close relation to size and connectivity of socio-economic networks. The term complexity is taken in its common meaning and characterizes a system composed of many parts in intricate relationships. We do not attempt at a precise definition of network complexity but rather focus on the consequences of an increase in the number of possible inter-relationships between the agents of the system.

4. Network analysis of international trade data

The process of globalization can be represented by the intensity and variety of international trade relations among nations. Using data compiling the international bilateral trade relationships between countries over 53 years published in Gleditsch (2002), Bhattacharya et al. (2008)

have derived for each year the corresponding trade network, each node representing a country, and the links expressing the import and export between countries. We have re-calculated some of these results in the context of our present study, with a focus on the measures related to the notion of complexity as defined above. These results show a systematic increase of the scale, the average degree and, to a lesser extent of the connectivity (Fig. 1a-c). The evolution of the network complexity measured as $C_{I,NST}$ (Fig. 1d) also grows monotonically from 1948 to 2000.

The trends shown in Figure 1 show unambiguously that the number of countries, the number and variety of interconnections has significantly increased during the second half of the 20th century. This tendency towards more interconnections - a trend that matches the standard definition of complexification and that is measured here through the properties of networks - is corroborated by the recent analysis of the evolution of international trade network in East Asia and Latin America (Kali and Reyes, 2006; Reyes et al., 2007).



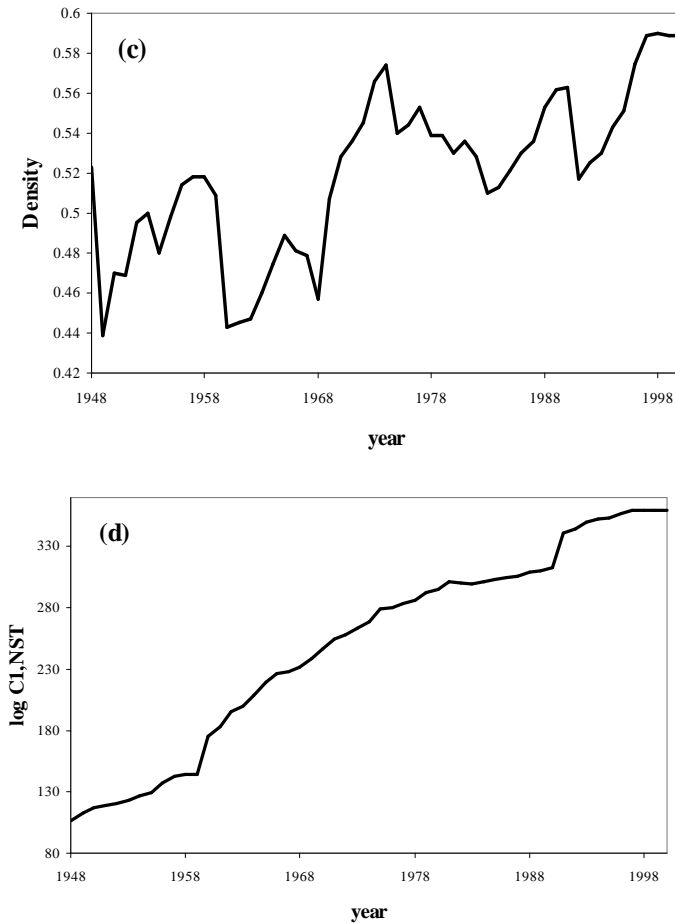


Figure 1: The evolution of the measures of graph complexity of the international trade network. The number of countries involved in the global trade network has increased from 76 in 1948 to 187 in 2000 (Fig. 1a); in the same period the average degree steadily grew from 19.7 in 1948 to 54.8 in 2000 (Fig 1b). The evolution of the link density is shown in figure 1c. The complexity measured as the normalized number of subgraphs $C_{I,NST}$ is shown in figure 1d.

5. Globalization and the complexification of the economy

The above analyses of the global trade in terms of network tend to point toward a steady increase of the variety of possible trade patterns, indicative of more complex systems of dependencies between countries. This global tendency is also reflected at lower levels of the economy. Indeed, if globalization entails an increase of the scale of the economy, it is also associated with the access to new markets, meaning that more products and services are exchanged, and as distance becomes less of a factor in determining interaction between agents of the economy, more connections are established between parts of the system. This may appear – at the user level – as a simplifying mechanism (as direct connections are created easier exchanges are made possible) but this is without accounting with the structural growth of the complexity of the economic network. Tucket et al. (2003) note that, as the scale of the economy grows, the number of possible trade options increase, leading to more complex decision-making processes and thereby imposing higher demands on

organizations to operate (Williams, Maulla and Ellis, 2002). Furthermore, in a Complex Adaptive System perspective, signals (information, events, resources, etc.) transmitted nonlinearly through a larger network, lead to unpredictable large-scale consequences. Examples in the financial sphere abound (Kaminsky and Reinhart, 2000). The effects of these distant interconnections can be quite subtle and hard to link together, as in the case of 1998 earthquake in Taipei that disrupted the world’s supply of computer chips and shut down the production lines of several PC manufacturers in the US (Tucket et al., 2003), or in the case of the 1997 East Asian financial crisis that affected the irrigation of farmland in the Rio Grande Basin through the presence of Intel’s water intensive manufacturing plants near Albuquerque (Tainter, 2006). These secondary unforeseen consequences are another indication of the strongly interconnected nature of today’s world economy.

Globalization not only increases the number of possibilities for the agents, but also sets up greater interdependencies at various scales of the economic network. A particularly relevant example in this respect is provided by the structure of modern international supply chains involving many foreign partners: events in the various countries participating in the chain can now directly influence the organization’s functioning. This has been emphasized by a recent trend to outsource activities that were previously conducted within the organization (Peck et al., 2003). As a matter of fact, as Kumar and Stecke (2008) remark: “*Outsourcing, globalization, and decentralization are interlinked supply chain practices. By outsourcing, organizations motivate decentralization, while globalization provides options for the outsourced operation to be sourced globally. Outsourcing increases the number of external disruption points for a supply chain. For example, overseas shipments may pass through as many as 11 middle-men (Monahan et al., 2003), which greatly increases the risk of disruption. Outsourcing makes it harder for a company to foresee a brewing glitch in the supply chain (Murphy, 1999)*”. Such a multi-level chain of consequences is characteristic of a strongly connected complex network and is getting more and more out of hand as the complexity of the interdependence patterns in the system grows.

This complexity is further augmented as today’s large scale product structures are composed of a huge number of parts and subassemblies and therefore directly involve complex processes within the manufacturing. The planning, coordination of this web of suppliers, assemblers and distributors requires a huge effort (Guercini and Runfola, 2004) in particular in the case of Just In Time (JIT) supply chains (Martha and Subbakrishna, 2002). For example, electronic products such as computers use thousands of components. These components may come from hundreds of suppliers, from all over the world. A small disturbance in any one of these suppliers may significantly delay or even prevent the final product from reaching customers. This unpredictability is inherent to the nature of complex nonlinear systems and is strongly dependent on the topology of the economic network; a more complex set of inter-relations leading to a more unpredictable system. Examples of such systematic increase in complexity can be found at many different levels of the economic scale and in many different fields, from modern health care systems

(Plsek and Greenalgh, 2008) to business environments (Rycroft, 2007) and R&D Networks (Roediger-Schluga and Barber, 2006). But few may be as emblematic and far reaching as the production and distribution of food: In trying to make sense of the food we eat, each of us face the complexity of global agri-food systems that link together diverse people, places and processes through product flows and multiple intermediaries. This theme will be further developed below.

6. The costs of complexity

Increasing the connectivity of the network structure may not be systematically counter-productive. As a matter of fact, at low connectivity levels, increasing the average degree of the nodes (i.e., the number of connections per node) may lead to positive returns: the addition of new links in the socio-economic network provides shortcuts between previously unrelated nodes and offers new chances for direct interactions. However this connectivity gain eventually comes at a price: As the number of links per node grows, it becomes indeed more difficult (i.e. computationally costly) to navigate the maze of connections. The benefit (a shorter average path between nodes) becoming dominated by the the difficulty of exploring a growing number of links to find a path between two given nodes. In this sense, the cost of complexity grows faster than its associated benefits. On a study of over 130 biotech firms, Rycroft (2007) revealed that an increased level of partnerships (e.g. higher connectivity) was not linearly related to an increase in efficiency (measured as product development time): At low levels of connectivity new products were introduced faster, but as the level of networking increased, the temporal benefits tend to decline. At high levels of connectivity the cost of an additional cooperation outweighs the benefits and the product development time is actually increased. Similar conclusions are obtained in the field of supply networks (Choi et al., 2001). In the field of evolutionary biology, Kauffman (1993) modeled the evolution of organisms as adaptive walks on fitness landscapes (similar to hill climbing optimization, higher positions being the most favorable), where the topography of the landscape is determined by the interdependence between the organism genes. Kauffman revealed a non-monotonic relationship between the degree of interdependence and the height of the peak found during the search process, with a maximum at intermediate connectivities. The same model was used to conceptualize the innovation process as a search over a technology landscape and indicated that high degrees of interdependence (or in network language, high level of connections) lead to a sub-optimal outcome (Fleming and Sorenson, 2001; Rivkin, 2001). Tainter (1988) proposed that in any system of problem-solving, the initial returns on investment are high (simple and inexpensive solutions are chosen first), but as the highest return solutions are exhausted only more costly approaches remain. The marginal return is therefore expected to be maximum at intermediate levels of complexity.

An additional cost of increasing network connectivity - and an intrinsic hurdle of complex socio-economic systems - lies in the practical impossibility, as complexity grows, to safely evaluate the consequences of one's actions. To better

understand this point in a CAS perspective, let us suppose that the systems evolves in a discrete time and that at each time step, information is processed by individual agents and exchanged through the network of connections. As time passes, the domain of influence of an initial (localized) perturbation (e.g. a change of the state of a node or the decision to pass some information to certain neighbors) spreads through the network and reaches a growing number of nodes. After N time steps the size of the domain of influence can be expressed as the number of possible interactions pathways (subgraphs) between the subset of nodes distant by at most N edges from the source node. How fast the domain of influence grows depends on the structural properties of the network, and in particular of its degree distribution. Let us further assume that each agent has a limited capacity C to follow the diffusion of the information on the network (C can be, for example, the maximum number of subgraphs than can be recorded at any time). Qualitatively, for a small number of agents NA_1 and average degree k_1 , the number of subgraphs grows moderately at each time step and it is possible to record the various alternative interaction routes on a relatively long time span $T_R(NA_1, k_1)$. However, as the number of nodes NA_2 and degree k_2 increases, the number of affected nodes and the number of possible interactions pathways between them grows accordingly, and the maximum capacity C is reached in a smaller number of steps. The corresponding $T_R(NA_2, k_2)$ will therefore be shorter than $T_R(NA_1, k_1)$ and so will be the time span on which it will be possible to foresee the probable consequences of a change in the system (Fig. 2). The evolution of the structural properties of the interaction network towards more connectivity and more nodes therefore forces short-term views for finite capacity actors of the economy. A possible consequence will be to trade longer evaluation of future impact (or past actions) in a low complexity system, with short-term evaluation in a large scale, highly connected economy. A shift towards short-term decision-making process that has a dramatic impact on environmental systems, which timescales are usually orders of magnitude longer. The practical impossibility to track the consequences of one's actions in a complex system is even worsened as the system is constantly changing, unbeknownst to the agents. The system responds indeed to (i) endogenous changes due to the effects of past decisions (Beck 1994; Faucheux and Froger, 1995) and (ii) the introduction of new options pathways.

As medium to long-term states of the system become lost in the mist of combinatorial uncertainties, positive short-term decisions may not reflect their subsequent evolution and can eventually prove counter-productive. This is exemplified in the so-called *Rebound Effect* (Polimeni and Polimeni, 2006; Sorrell and Dimitropoulos, 2008) which can be attributed to a lack of forecasting capacity in a complex system. The occurrence of such paradoxical situations will undoubtedly become more frequent as the complexity of the system grows.

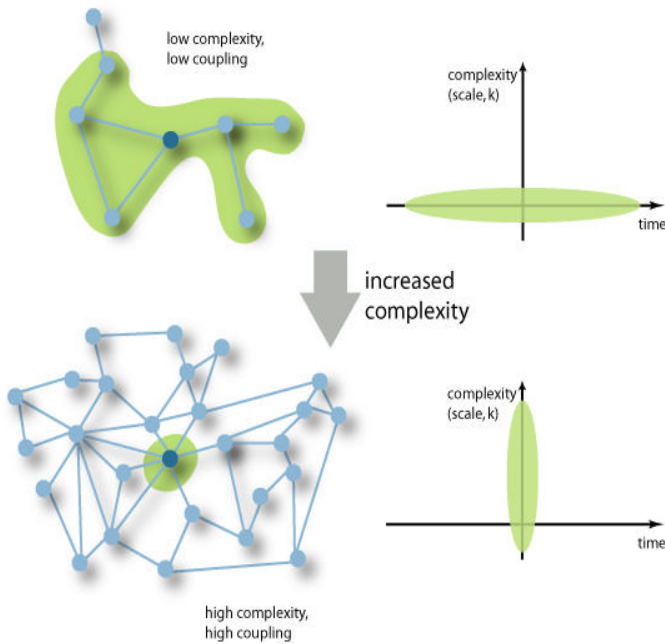


Figure 2: An illustration of the impact of network complexity on the forecasting interval. At low complexity, low coupling network, it is possible to follow the propagation of a perturbation on a significant portion of the network (or equivalently, for a long timespan, as illustrated on the right-hand graph). As scale, connectivity (k) and coupling increases, it becomes more and more difficult to follow the perturbation, or equivalently it is only possible to forecast the evolution of the system on a short timescale.

The above analysis relates to following the probable future consequences of a change, but it also stands with respect to back tracking the present situation to its root causes. In complex networks there are so many possible pathways that causal relations are not immediately apparent, and the (past) time span within which one can relate cause and effects is reduced. In this sense, the accountability of each agent decreases as the system's complexity grows. To come back to the previous example of supply chains, it becomes increasingly difficult to attribute the responsibility of a faulty outcome to a particular intermediary as the complexity of the supply network grows (Choi et al., 2001).

We cannot meaningfully define policies or stir strategies before the causal chain of relationships has been clearly identified. In a complex network of interactions this causality link is blurred within the combinatorial explosion of possible dependency paths. Much effort is required to explore and weigh these options in order to identify and address the probable cause. This often corresponds to a situation where the problem under scrutiny has reached a catastrophic stage before it is widely recognized (e.g. the destruction of the ozone layer by CFCs, or the current situation with climate change). To quote Voss and Kemp (2005): “*In highly developed societies, most problems are the unintended result of past choices*”.

As complexity of the economic network increases, it becomes as difficult to estimate the medium to long-term effects of our current decisions as to measure the impact of our past actions. We are left confined in an ever smaller temporal domain within which the causal chain of events can be followed and responsible decision taken.

In a largely connected, large scale system, not only do unintended outcomes become more frequent, but their consequences become more volatile and risk affecting a larger number of agents. In other words, large-scale catastrophic events become more probable. Results from theoretical ecology, help justify this statement. According to the May-Wigner stability theorem (May, 1973), increasing the complexity of a random network inevitably leads to its destabilization. Although this approach, based on the study of the local asymptotic stability of simple random Lotka-Volterra networks (i.e. limited to small perturbations from an assumed equilibrium), had raised some critics¹, it has been recently shown to remain quantitatively valid for more realistic network topologies (Sinha, 2004), where no initial equilibrium is assumed (Chen and Cohen, 2001; Sinha and Sinha, 2004). The evolution of the network's *long-term global stability* has also be shown to follow May-Wigner's criterion (Sinha, 2004). This indicates that the complexity-stability relationship holds in a large variety of situations and that, as the connectivity of the socio-economic system increases, the chance that small perturbations disrupt the entire system becomes highly probable (Perrow, 1984; Sovacool, 2008; Fisk and Kerhervé, 2006).

7. Managing complexity ?

We have advanced above that the observed increase in scale and connectivity of the common economic networks induces greater uncertainties and risks of large-scale instabilities. The question then arises of how to manage complexity and its consequences. Two sets of strategies can be considered: adaptation and mitigation. Adaptation deals in this context with our capacity to cope with the consequences of a growth of complexity (i.e. to (at least) maintain a certain level of efficiency as the size and connectivity of the economic network increases). The results in Rivkin (2000) seem to indicate that it may not be possible to keep controlling the system globally as complexity grows: above a certain level of connectivity, the problem of optimizing the system (e.g. finding the best strategy amongst all possible routes) becomes NP-complete (computationally too costly to be manageable). Moreover our standard problem-solving methodologies at the core of the adaptation strategy are actually sources of complexity and, as stated earlier, due to increased difficulty to forecast the probable medium-term consequences, may actually be the cause of future problems. Furthermore, by letting complexity grow, one faces the risks of lowering the system's resilience in the sense of increased catastrophic failures and global spillover effects beyond our control. In this view, adaptation to the consequences of a rise in complexity (such as greater volatility, greater uncertainties, larger maintenance costs) without internalizing the notion of complexity might prove counter-productive. Mitigation on the other hand, tends to address the problem at its roots,

¹ (i) a local asymptotic analysis is indeed only valid for small neighborhoods around the equilibrium, (ii) it depends on the choice of interaction coefficients which vary considerably in real networks, and (iii) it excludes complex dynamical behaviors such as periodic and chaotic solutions, which may be consistent with community persistence.

by tackling the causes before they develop and not by limiting the response to the symptoms. In the context of this study, this means reducing the level of complexity of the system. A possibility to limit the complexity and the large scale dependence induced by the global economy – with the drawbacks we have underlined above – is to reduce the *size* of the network of inter-relations between agents of the economy. This can be achieved by a localization of the economy. Reducing the distance between producer and consumer (thereby keeping the supply-chain at a manageable scale) allows indeed to keep a better understanding of the consequences of one's actions, both socially and on the surrounding environment to which the individual is attached. Some initiatives are already going in this direction.

8. Local alternatives to complexity

Localization

Localization of the production-consumption patterns is a concept nowadays often present in the popular media. In a way, the notion of *local* has become “beautiful,” as was *small* in the 1970s and 1980s (Schumacher, 1973), *organic* in the 1990s or -at least in the US- *wilderness* early in the last century (Dupuis and Goodmann, 2005). But beyond the gimmick and the fashion, local economies do offer examples of sustainable alternatives to global networks, dependent on ever more complex economic systems. These solutions emphasize, as much as possible, local production for local consumption and strike a healthier balance between trade, local production and local ownership using local labor and materials within ecologically stable democratic models (Mander, 2007). Localization is often seen as a process, which shifts emphasis from the politics of space to a politics of the place in place (Sachs, 1992)

Such initiatives are numerous, from people working on reforming, inventing, developing new food systems¹, alternative businesses², independent local monetary and banking systems³, to independent small scale media⁴, local adapted technology and farming⁵, personal attempts at a simpler life⁶, or the development of community initiatives as a response to Peak Oil and Climate Change⁷. Some of these initiatives are embedded in political, social movements such as the De-growth Movement (in France and Italy), the Relocalization Network (in the US) or the Transition Network (in the UK).

¹ Community Supported Agriculture, Box Scheme, Community Garden, Farmer's market, Urban Gardening, School Gardens, Seeds Saving, Seeds Banks.

² Business Alliances for Local Living Economies (BALLE), Community Cooperative, Buy Local Campaigns.

³ Local Currency, Local Exchange Trading Systems (LETS), Credit Union, Community bank

⁴ Local TV, newspaper and radio.

⁵ Natural Building, Appropriate technology, Alternative medicine, Permaculture.

⁶ Downshifter, Ecovillage, the Voluntary Simplicity, Back to the Land movement, Cultural Creatives.

⁷ Transition Town, Post Carbon Cities, Community Powerdown, Oil Depletion Protocol.

These alternatives are the answers to different individuals' or communities' concerns regarding various issues such as Peak-Oil, Climate Change, Food Insecurity, etc. Nevertheless they directly or indirectly participate in reducing the size of the network of inter-relation between agents of the economy. They act therefore as a practical means to decreasing the complexity of the economic network.

The example of local food systems

Lacy heralds that numerous scholars and practitioners are currently trying to redress the imbalances in the global food system through the development of locally based alternatives. (cited in Born and Purcell, 2006). One of these alternatives is the *Community Supported Agriculture* (CSA, or AMAP in France, Teikei in Japan), which refers to a particular relationship between farmers and consumers where the consumer pays a share of the farm's expenses in return for a share of the harvest. It enables small-scale commercial farmers to have a successful, small-scale closed market. By providing a guaranteed market through prepaid annual sales, consumers essentially help finance farming operations, limiting the number of connections to the complex global market. Typically, CSA farms are small, independent, labor-intensive, family farms. In France, the first CSA started in 2001 and in 2007 the total number of CSA was close to 1000 (Olivades, 2008). In North America 1200 CSA have sprung up since 1985 (Robyn Van En Center). Concerning farmers' markets, they have increased in the USA from 1755 in 1994 to 4385 in 2006 (USDA). The UK went from having no farmers' market at all in the mid-1990s, to having more than 270 at the end of the decade (Norberg-Hodge et al., 2002).

Douthwaite (1996) identifies three reasons why such initiatives are spreading rapidly. The first one is that only within local, diverse, small-scale food production can one be reasonably sure about the safety and the content of what one eats (Henrickson and Heffernan, 2002). Friedmann, a keen observer of the globalization of food, underlines this point: “*only food economies that are bounded, that is, regional, can be regulated because they bypass the corporate principles of distance and durability*” (cited in Dupuis and Goodman, 2005). Local food supply chains are indeed low complexity networks (small scale, low global connectivity). In the case of CSA and farmers' markets, the consumer is in direct, face to face, contact with the producer. Furthermore Hartwick argues that a local food system entails “*a greater realization of connections between consumers, places, and networks*”⁸ [which] allows an ethical politics of consumption” (cited in Dupuis and Goodman, 2005). Indeed, Bill Mc Kibben noted, for example, that shoppers have “*ten times as many conversations at farmers markets as they do at supermarkets*” (McKibben, 2007). A small scale, low complexity network discourages carelessness or deceit, the producer and the consumer being offered a market concentrated within a limited region, within a restrained population. The accountability of a faulty outcome to a

⁸ It is to be noted that here Hartwick refers to living web of interdependencies, and not a network composed of highly connected global economic agents spread all over the world.

particular supplier or consumer in a simplified food supply chain becomes an easier task.

The second reason is that large scale food production for a global market, leaves communities dependent on a socio-economic system related to many parameters beyond any local control (such as food stock market, direct/indirect subsidies, global competition, currency speculation). For example as the Andersonville Chamber of Commerce showed every \$100 spent with a local firm leaves \$68 in the Chicago economy; \$100 spent at a chain store leaves \$43 in Chicago (Civic Economics, 2004). The money invested locally⁹ stays within the local area and does not fuel an unstable global network. A small scale, relatively low connected economic network reduces the probability of unexpected outcomes. Consequences of local actions are more likely to remain local and will not tend to spread unpredictably over long distances and risk affecting a large number of agents.

The third reason is for the people to look for a more sustainable system. People involved in a local food system are aware of the unsustainability of intensive farming. The more localized a food system, the less the need for global transportation and communication networks, for long supply-chain, for complex technologies, producers and consumers being closer to each other (Norberg-Hodge, 2002). It allows also a diversification of the production adequate with the respect of biodiversity. In a simplified, local, socio-economic system, it becomes easier to estimate the impacts of past actions, and it remains possible to foresee their outcome. As Tainter (2006) notices: "*Being unaware of larger forces that affect them, local societies lose control of their destinies. As local autonomy disappears, dependency and environmental deterioration follow*". Scaling down economies and decreasing the complexity of socio-economic networks has also the multiple benefits of bringing control, understanding and foreseeability over the use of natural resources. Local economies give the opportunity to see the effects of everyone's actions, a situation practically impossible in modern complex societies.

9. Conclusion

As discussed above, a network analysis of international trade data shows unambiguously a trend towards more complex sets of relations in the global economic network. Some of the costs that may result from an increase in both the degree of connection and the scale of the economy include: (i) a suboptimal global efficiency of the system and diminishing returns on investments, (ii) limited accountability and predictability, favoring short-term decisions and (iii) increased risks of large-scale instabilities. These costs are directly related to the structural properties of the network, and cascade down from the global scale (country to country exchanges) to smaller entities (firms, individuals). We suggest that a sustainable alternative to these rising structural costs may lie in promoting local initiatives, as already demonstrated through numerous grassroots initiatives.

⁹ Local currencies and LETS are good examples of monetary systems keeping money in a community.

Although by no means fully integrated in the socio-economic debate, the theory of complexity can be an effective tool to all social and political organizations working towards sustainability. Bringing this tool to the public sphere, will undoubtedly help policy makers and citizens alike internalize the costs associated with a global economy largely out of our control, and hopefully choose a more local, manageable and responsible path.

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Lose less instead of win more: The failure of decoupling and perspectives of a redirected competition in a de-growth economy

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Abstract

Using the European Union as an example and based on five different scenarios, this paper aims to provide a comprehensive explanation for the future failure of decoupling of economic growth from resource use and environmental degradation and to show perspectives on the new direction of competition towards de-growth or a steady state economy. It is concluded that, on the one hand, in some ways, the current EU situation is already quite close to an economic system without growth. However, this does not mean that this system is globally viewed as already sustainable. On the other hand, future public financial intervention will help to ensure that the newly redirected competition will not further harm the poorest, but will instead provide them with, in addition to more equity, as a fixed minimum only, a chance to develop, even in a de-growth economy.

1. Introduction

The decoupling of economic growth from resource use and environmental degradation has become a critical issue and challenging task worldwide. During the last decade, major international institutions also started to seriously deal with the question of decoupling's implementation (e.g., FAO, 2000; OECD, 2002; World Bank, 2003). Decoupling is said to occur when the growth rate of an environmental pressure is less than that of its economic driving force (e.g., GDP) over a given period. A distinction is made between absolute and relative decoupling (OECD, 2002). Absolute decoupling is said to take place when the relevant environmental variable is stable or decreasing while the economic variable is increasing. Relative decoupling is said to occur when both the environmental variable and the economic variable are increasing, but the latter at a higher growth rate (OECD, 2002). The European Union (EU) made, in its 6th Environmental Action Programme (EAP), the decoupling of economic growth from resource use and environmental degradation one of the main objectives in relation to Sustainable Development (EU 2002:1; EU Council Environment, 2002:11). This decoupling aim has also been expressed several times in connection with the Lisbon Agenda, mainly in relation to economic growth and

competition (Giljum et al. 2005). This gives rise to several questions including whether or not decoupling is an appropriate approach to address the long-term aim of Sustainable Development and what are perspectives of competition if durable growth in a world with limited resources and sinks is not possible? These two questions are mainly addressed in the following with a focus on the EU's decoupling aim. The analysis starts with a literature review on the history and content of the EU's decoupling aim. The analysis of the different decoupling scenarios is based on principles of Ecological Economics, whereas the Rebound Effect and the laws of thermodynamics are particularly taken into consideration. Therefore, 'growth', as used in this paper, refers, if not otherwise stated 'to an increase in the physical scale of the matter/energy throughput that sustains the economic activities of production and consumption of commodities' and, therefore a steady state economy, 'is not to be thought of as "zero growth in GDP" (see Daly, 1996:31f). The analysis of perspectives of competition decoupled from growth is mainly based on political developments.

2. Decoupling of growth and environmental degradation

Overview of EU's decoupling aim

The European Union's decoupling aim is closely connected to one of the principal objectives of the EU, namely, the promotion of 'sustainable growth respecting the environment'. This objective was introduced into the EC Treaty prominently on 7 February 1992 by the Maastricht amendments to the Treaty. It was further emphasized by the European Council and representatives of the Governments of the Member States when introducing a Community programme of policy and action in relation to the environment and Sustainable Development, namely, the 5th EAP 'Towards Sustainability' (EU, 1993). Although afterwards the decoupling aim was only mentioned twice in the proposal for the 6th EAP (European Commission, 2001a:219 and 224), it became a general aim in the final version in point (8) of the preamble and in Article 2 (1), alongside the main principles of the EU's environmental policy. It was also emphasized several times throughout the rest of the document, e.g., in Article 2 (2), Article 5 (2) iii) b) and Article 8 (1) (EU, 2002). This occurred at the same time as the almost parallel development of the EU Sustainable Development Strategy (SDS), in which the decoupling aim was also mentioned several times (European Commission, 2001b). However, after a review of SDS in 2005 and its revision in 2006, a progress report on the SDS found only relative decoupling of material use from economic growth with regard to resource productivity (European Commission, 2007a:14).

Five decoupling scenarios

In general, decoupling can be considered as achieving a durable parallel non-linearity between two or more factors.

In this paper, only non-linearities are taken into consideration, which show at least a smaller increase in resource use and environmental degradation than an increase in economic growth. Therefore, the phrase 'decoupling of economic growth from resource use and environmental degradation' can be understood in relation to

Sustainable Development in five different scenarios (Table 1).

	Decoupling scenarios				
	A	B	C	D	E
Economic growth	Increase	Increase	Increase	Equilibrium	Decrease
Resource use/environmental degradation	Smaller increase	Equilibrium	Decrease	Decrease	Larger decrease

Table 1: Scenarios for decoupling of economic growth from resource use and environmental degradation

Within Table 1, decrease or increase is understood in terms of an absolute percentage. This concerns economic growth as well as resource use (renewable or non-renewable) and environmental degradation (e.g. in used space, emissions, biodiversity loss). These scenarios can also be applied to public or private entities to distinguish between decoupling strategies. Without doubt, the European Union does not value all of these five scenarios in the same way and does not include them all in its current environmental policy. However, this does not exclude possible future political changes between scenarios and their weightings. Hence, the relationship of all five decoupling scenarios to Sustainable Development should be further investigated.

In this paper, several scenarios are investigated together: scenarios A to C, because they have in common the assumption of economic growth, and scenarios D and E, because they share an absence of economic growth. Opinions on the relationship between economic growth and Sustainable Development are widespread. While some have tried to develop criteria for ‘sustainable growth’ (Spangenberg et al., 2002), others advocate that, in general, Sustainable Development and growth are contradictory (Daly, 1996) and propose to abandon the competitive and Sustainable Development model to pursue competitive growth and sustainable resource use as separate policy objectives (Jones, 1999). There are also diverging views within the European Commission on the aim of ‘sustainable growth respecting the environment’, as quoted by Scott (1998:128).

Scenarios A to C

It is unclear whether or not the EU is advocating for a ‘decoupling aim’ leading to scenario A. On the one hand (in relation to resource use), the EU promotes quite intensive high eco-efficiency as a main goal (EU Council Environment, 2002:10). As pointed out by Dyllick and Hockerts (2002), such an eco-efficiency approach only leads to relative improvement because it overlooks several aspects laid down by strong sustainability, such as non-substitutability, irreversibility and non-linearity of capital depletion. This means an increase in the absolute percentage of used resources in the long run. However, on the other hand (in relation to environmental degradation), the EU admits that the existing demand for resources exceeds the carrying capacity of the environment in several

cases and proclaims, for example, the objective of halting biodiversity loss by 2010 (EU, 2002:2 and 8). Scenario A is incompatible with the EU’s objective of halting biodiversity loss, as scenario A involves an increase (although small) in resource use/environmental degradation and, therefore, also biodiversity loss. Also, the limits for smaller increasing resource use are – especially in relation to non-renewable resources – unclear within the 6th EAP, in which the overall aim is stated to be to ensure that the consumption of renewable and non-renewable resources does not exceed the carrying capacity of the environment (EU, 2002:3). The extent of the consumption of those two resource types proposed by Daly (1996) should at least have been included. In summary, the ‘decoupling-aim’ of the EU seems to be incompatible with scenario A.

In relation to scenario B, the 6th EAP does not provide any explanation as to how long economic growth can continue without claiming more resources or requiring permission for a higher level of environmental degradation. Eco-efficiency has its limits and, technically, only a recycling rate of less than a hundred percent can be achieved due to the second thermodynamic law on entropy (see e.g., Faber et al., 1996). In addition, often the rebound effect eats up any efficiency gains (Binswanger, 2001).

Scenario C faces similar problems to scenario B, just much more exaggerated. The ‘decoupling aim’ laid down in the 6th EAP to promote Sustainable Development is also too complex and too incoherent to fit clearly into one of Dobson’s conceptions of environmental sustainability (Dobson, 1996), a widely used and well researched framework for a typology of Sustainable Development.

Scenarios D to E

Scenarios D and E are possible results of the ‘decoupling aim’ that are not intended by the EU. The state of equilibrium in growth within scenario D is closely related to the ‘steady state economics’ proposed by Daly (1977). For decoupling, as defined in this paper, a decrease in resource use and environmental degradation is required (a simple equilibrium in these factors would be insufficient). Scenario E would probably be well appreciated by deep ecologists with their demand for substantive change to the economic system (Naess, 1995). However, it is not clear how to verify their assumed requirement of a smaller human population.

Scenario D shows an economic scenario without further decrease or increase in environmental degradation, similar to that indicated by the ‘steady state economy’ of Daly (1996), or, more practically, like the Index for Sustainable Economic Welfare (ISEW) of Austria and the Netherlands (Max-Neff, 1995 quoting Obermayer et al., 1994; Stockhammer et al., 1997 and Rosenberg and Oegema, 1995). In comparison, scenario E indicates a durable decrease in economic growth, similar to the decrease in the ISEW of the United Kingdom (Max-Neff, 1995 quoting Jackson and Marks, 1994). However, the ISEW is a monetary indicator strongly comparable to GDP and, therefore, indicating only weak commensurability (Martinez-Allier et al., 2001:40 and 46).

Whether these two scenarios (like the others) are sustainable or not depends on the unanswered question, if the limits of environmental degradation (especially

concerning climate change) have already been exceeded by too much and irretrievable.

Four perspectives of competition in a degrowth economy

Based on the aforementioned scenarios, it is quite clear that durable economic growth is not compatible with conforming to environmental limits. However, these limits reflect the maximum carrying capacity of the environmental system, in which the social system as well as the economic system are both embedded, such as described by the concept of 3-D Sustainability (Mauerhofer, 2008). Hence, the vision of durable economic growth does not seem to have much hope of surviving in the future, while competition between different economic stakeholders will always continue. Thus, in the future, a sort of 'decoupling between economic growth and competition' will take place, leading to the disappearance of economic growth and a 're-directed competition', with a stronger focus on 'lose less than win more'. Both, economic growth and competition are widely seen as broadly interconnected and influencing each other. In comparison to the current system, a future economy without economic growth is usually expected to be different in terms of competition (see in general Beckermann, 1999). Neither within scenario E, nor within scenario F, is competition theoretically necessary because public authorities or altruistic behaviour could also deal with the social distribution and economic allocation of limited non-renewable resources and the search for their renewable substitutes. Of these solutions, the first (distribution by public authorities) is reminiscent of the (no longer existing) strategies of Eastern European socialist countries, and the second (reliant on altruistic behaviour) is not really realistic. However, for non-renewable resources, of which exploitation and consumption would seriously harm the environment, such a denunciation of use would be desirable from an ecological point of view. The founder of the idea of a 'steady state economy' (SSE) makes it clear that such a state includes competition when he states that: 'In SSE the aggregate throughput is constant, though its allocation among competing uses is free to vary in response to the market' (Daly, 1996:31). It seems quite clear that this statement not only anticipates different uses by different users, but also one and the same manner of use by different competitors. Furthermore, it is also valid in situations in which the aggregate throughput isn't constant, but decreasing. The question now arises, what does lack of growth mean for continued competition in such economic systems. Four perspectives will be discussed in the following.

Direct competition will become more fierce

This first perspective is in relation to competition for non-renewables already extracted. Firstly, non-renewable resources available the first time for throughput will become more and more rare. Hence, competition will increase for those 'last pieces of desire'. Secondly, competition will increase for non-renewables that have already passed the throughput and are now available, even though as waste and in a much higher state of entropy, such as used cans made from metal. Such 'matter' (not only energy) is also included in the second thermodynamic law referring to entropy (see e.g., Faber et al., 1996). Of course, much non-renewable matter cannot be recycled after having

been consumed, like petrol or coal. However, non-renewables within this recycling process will be the reason for new competition and new jobs. 'Waste diggers', companies specialising in searching for, analysing and 'exploiting' non-renewables at landfill sites, will compete for the most 'suitable' areas and materials. Thirdly, the main aim of competitive behaviour will be to lose as little as possible or even to maintain already gained resources.

Indirect competition will increase

In this paper, the term 'indirect competition' includes, for example, research for substitutes for non-renewables. Additional efforts will be made by competing companies to continue to produce their current products. If unable to continue to produce current products due to lack of resources, competing companies will search for new products.

Regulatory public intervention will increase

At this point, a distinction must be made between two regulatory measures: those aimed at the distributional aspects of competition and those aimed at the environmental aspects of competition. These regulatory measures, which exist in almost all economies, will still have their place in an economy without economic growth. Because it is not socially desirable, for example, that the whole constant or decreasing throughput would be (theoretically) achieved by only one company, even though this company might have succeeded within the environmental regulatory measures in displacing its competition. Also, the environmental regulatory measures will (further) increase in comparison to distributional regulatory measures and will affect both 'direct' and 'indirect competition'. For example, additional environmental taxes, especially on the consumption of limited non-renewable resources, will affect competition (for an overview of already existing environmental taxes in Europe see EEA, 2000 and EEA, 2006). In particular, the share of pollution and resource taxes, which is shown in EEA (2002) to be currently disproportional low, will increase in the future. Within a steady state economy, Hauser (1992) advocates for the need for a new constitutional framework, probably also leading to increased regulatory public intervention.

Financial public intervention will increase

Financial intervention, in this sense, is applied through public authorities by way of non-binding instruments, as opposed to taxes, which are compulsory. One example is the tax deductibility of interest returns and dividend yields from certain 'green projects' in the Netherlands between 1995 and 1999 (Scholtens, 2001). Furthermore, public sponsored research into substitutes for non-renewables and technical improvement will also increase. Additionally, a new type of public financial intervention to secure the livelihood of the unemployed shows up in the public discussions of wealthy countries with more economic competition (European Commission, 2007a; Howard, 2007; Matsaganis and Flevotomou, 2007). In the future, this will help to ensure that the new redirected and even fiercer competition will not further harm the poorest, but will, as a fixed minimum only, provide them with more equity and a chance to develop, even in a de-growth economy.

3. Discussion and conclusions

The current EU situation seems to be already quite close to an economic system without growth, but only with regard to its low GDP growth rates in comparison to other world regions (for data see e.g. Eurostat, 2002:160, 197 and IMF, 2007: 31). However, concerning the throughput of energy and resources, the EU is still viewed globally as unsustainable given, for example, its high ecological footprint (WWF and Global Footprint Network, 2007). It appears that the EU has introduced the decoupling of economic growth from resource use and environmental degradation too soon as a main objective of its environmental policy. Therefore, ill-considered, the EU fails to sufficiently show how this relationship, under the assumption of durable increasing economic growth, can ensure Sustainable Development in the long run. The chosen approach for assessing decoupling is also limited, especially in relation to combining resource use and environmental degradation, which does not allow for the allocation of different attributes (smaller increase, equilibrium, etc.). By changing this, the three scenarios A to C could be further investigated. In summary, the pattern for competition within an economy without growth seems to be quite similar to the current system, although the intensity of competition is likely to increase. The same can be assumed about the regularity and extent of public regulation and public financial intervention.

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De-growth as unlocking socio-technical systems : an application to mass motorization

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Abstract

Orthodox economics sees economic activities as a market which can be made more sustainable by improving its self-regulating capacity. To date this static approach has not been able to limit the growing demand for goods and services and its increasing environmental impact. Starting from using institutional and evolutionary theories of change, a de-growth policy could be based on three fundamental considerations. First, current economic activities are not sustainable because they are locked in obsolete socio-technical systems. Second, to unlock existing economic systems and to establish totally new ones there must be structural changes in institutions, technologies, organisations and values in order. Third, the transition process to new economic systems should be dynamically managed.

We give an example of the use of such an approach in the transition from the socio-technical system of mass motorisation to the new urban mobility system.

Keywords: De-growth; Institutional economics; Evolutionary economics

1. A de-growth approach to environmental policy

Environmental policies (EP) are increasingly influenced by economics.

Today EP are particularly influenced by orthodox economics, and they use policies that perceive the market as a mechanism which maximizes economic and social benefits. Public intervention is seen as a residual option, to be used to correct market failures by stimulating and simulating competition (Stigler, 1971). Market tools such as taxes, tradeable permits, insurance obligations are widely used by orthodox EPs to reduce environmental externalities (Pearce and Turner, 1989). The use of cost-benefit analysis as the standard evaluation tool also shares the orthodox bias in favour of the market: “shadow” prices are usually based on stated or revealed preferences for converting environmental damage into monetary values (Boardman et al., 2001).

So far such policies have had little impact and this means that a deeply critical analysis is possible. One can start with a critique of the way the concept of externality is misused. The environmental damage caused by economic activities is not the result of involuntary and independent individual actions, as would be the case if a rigorous definition of externality were used, but rather the result of often intentional choices made by the subjects (and more often by coalition of subjects), in full awareness of the impact that their actions will have on other subjects. From a heterodox

point of view, environmental damage is not external to the market, but an “internal” result of developments in transport in the past. Using market tools to internalize externalities (following Coase’s or Pigou’s approach) is at best an ex-post correction, and useless for selecting and promoting potentially most sustainable future developments (Vatn and Bromley 1997).

“Socio-technical system” is an alternative – and more useful – concept.

Socio-technical systems are the result of the historical process of the simultaneous evolution of structural factors such as institutions, technologies, organisations and values (Weber and Hemmelskamp, 2005). These structural factors are endogenous variables of the transition process of change from one system to another, but they act as lock-in factors once a system has been established. Thus economic activities are unsustainable not because of environmental externalities, but because they are locked in obsolete transport systems.

Starting from classical critiques of orthodox environmental economics (Kapp, 1950; Georgescu-Roegen, 1971), and from more recent theoretical works on institutions (Olstrom, 1990; Vatn, 2005), preferences (Frey, 1992; Bowles, 1998) and innovations (Kemp, 1997; Sartorius and Zundel, 2005), one may imagine a de-growth approach to EP aimed at unlocking existing unsustainable socio-technical systems and at making the transition to more sustainable ones viable.

The potential efficacy of a de-growth approach to EP may be increased by three elements. First, the action is multidimensional – EP should intervene in all the aspects of the process of structural change in economic activities, not only in the technology/organisation used, but also in institutional and cultural areas (Kemp and Rotmans, 2005). Second evaluation tools which are solely based on economic values (such as cost-benefit analysis) must be replaced by multidimensional instruments (such as multicriteria). These should be used in procedures which explicitly take public opinion into consideration when making the final decision (Munda, 2004; Stagl, 2006). Third, a de-growth approach to EP is designed to decrease the demand for goods and services, not through economic incentives, but through information and public awareness campaigns that try to draw attention to, and condemn, behaviour that causes environmental damages.

2. Mass motorization as a socio-technical system

“Mass motorisation” based on private cars is one of the two basic socio-technical systems of current transport activities (the other being “transport globalisation”, based on sea transport of goods and air transport of passengers).

The non-sustainability of mass motorisation is increasingly evident (ECMT, 2007; EEA, 2007 and 2008). It not only wastes energy and consumes collective and individual economic resources but also degrades urban areas and makes it more difficult for citizens to use public spaces for social purposes. This is especially true for weaker members of the community such as children and elderly people (Zuckermann, 1992).

The dominance of mass motorization was not the spontaneous result of market choices, but due to the complex dynamic evolution of three linked structural factors: institutions, technologies/organisations, and values.

Three structural factors have all contributed to mass motorisation. First there are the linked interests of the car manufacturers, the petrol companies and the road construction companies. Then there is the abandonment of possible technological and organisational alternatives, such as the dismantling of tram lines and the precocious abandonment of the development of electric vehicles (Hoogma et al., 2002). Finally there is the affirmation of values based on individualism and consumerism.

All these structural factors are locking current transport in the environmentally obsolete systems of mass motorization. Being aware of this multidimensional lock-in and identifying the measures needed to unlock it are the two principal conditions necessary for establishing an effective de-growth policy.

3. A de-growth policy to unlock mass motorization

With reference to the stage of development of the alternative system to mass motorisation, it is clear that a technological option is in conflict with an organisational one. There are a series of technological innovations: spread of the use of bio-fuels, more efficient traditional engines, increasing use of hybrid vehicles (while awaiting future developments in fuel cells). There is also the possibility of creating a new urban mobility system, based on mass public transport, flexible transport (car sharing, on-demand buses, pooled taxis, etc.), non-motorised transport (on foot or by bicycle), and transport demand management (TDM).

Technological changes in the existing system of mass motorisation is less advantageous in terms of sustainability because: 1) it assumes that the increase in the number of cars in the future will be less than the improvements in the efficiency of the vehicles – so far it has not been; 2) it implicitly abandons the idea of intervening in the non-strictly environmental aspects of sustainability (congestion, consumption and degradation of urban space, etc.). The second offers the possibility of creating an alternative to the car.

Thus for STPs the choice is clear: support the transition towards the new urban mobility system. Operating on both fronts would only result in an inefficient dispersion of effort and waste of public resources, and cannot be justified even on the grounds of maintaining a variety of “niches” open until one is shown to be superior to the others. In this case all the options are already well-matured.

In order to manage the technological and organisational transition, a de-growth policy must exploit the potential of all the elements which make up the new urban mobility system: 1) by reducing the demand for transport, and in particular the use of private cars (increased use of online work and services; urban development for dense agglomerates); 2) by enlarging the urban areas reserved for non-motorised transport; 3) by increasing the quantity and quality of public transport; 4) by encouraging the investment of private capital (e.g. involving venture capital in the development of flexible services).

The economic interests linked to the private car and the option of making it more environmentally friendly are still strong and influential. This is particularly true in countries with national car industries. Thus, to combat these, one of the key elements of a de-growth policy is the development of a close long-term relationship with interests linked to the system of new urban mobility. These are environmental and commuter associations, cyclists, pedestrians, producers of the means of transport, infrastructure and technology for mass transport, managers of flexible transport services, construction companies which specialise in planning and building pedestrian zones, etc.

A de-growth approach to unlock mass motorization systems must bear in mind a strong “enemy”: car advertising. EC norms have obliged the car companies to include information on the environmental and safety characteristics of their cars in their advertising. Some countries ban advertising which includes the top speed of the car, if this is greater than the maximum speed limit. However these measures are not enough if the aim is to move away from the system of mass motorisation. It is time to consider some kind of strict regulation of, or ban on, car advertising. This has already happened for other goods which have a negative collective impact, such as alcohol, cigarettes, etc.. Once the effect of car advertising has been reduced or eliminated, the campaign to increase awareness would be more efficient.

4. Conclusions

Environmental policies guided by orthodox economics see economic activities principally as a market, to be oriented towards sustainability by supply and demand incentives and, more generally, by favouring the spread of spontaneous or stimulated competitive mechanisms. So far, this approach has not been able of dealing with the unsustainable impact of the growing demand for goods and services.

A de-growth approach, based on institutional and evolutionary theories, is necessary in order: 1) to identify the structural elements of the existing economic systems; 2) to evaluate the level of maturity of the potential alternatives; 3) to manage the structural dimensions of two dynamic processes: the unlocking of present systems and the transition to new and more sustainable ones.

An application of such an approach to the transport sector helped to identify mass motorisation based on individually owned cars as a socio-technical transport system and its unsustainable growth as a case of environmental lock-in.

Starting from these considerations, the design of a de-growth policy has been simulated to unlock mass motorization and to promote the already mature new urban mobility system (i.e.: mass public transport + flexible services + non-motorised transport + transport demand management + etc.).

Technological innovations are not at the heart of the simulation. On the contrary, other three elements are needed to make a de-growth policy effective: 1) organizational innovations aimed at reducing transport demand; 2) participated evaluation and decision procedure aimed at balancing interests linked to mass motorization; 3)

information tools (sensitisation campaigns, regulation of advertising, etc.) aimed at the diffusion of ecologically compatible values, preferences and behaviour.

Monetary incentives – such as green taxes and tolls – are not effective because they are implicitly based on the existing transport systems; they can be used too, but only if they are integrated in a heterodox approach intentionally aimed at the transition to new transport systems.

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Towards a « degrowth society » - the labor question in problematics of transition

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1. The paradox of the « growth objector »

« S'il est lui quand il joue, comment cessera-t-il d'être lui ? S'il veut cesser d'être lui, comment saisira-t-il le point juste auquel il faut qu'il se place et s'arrête ? » Diderot, *Le Paradoxe sur le comédien* (1773).

The « growth objector » who investigates the work problem in the prospect of a « sustainable degrowth » policy is forced to surmount a paradox comparable to the one with which is confronted the ethnographer : how to speak about the Other one, about a radically different Other one, by using concepts inevitably foreign to those of the studied culture ? Even if the ethnographer leaves his ethnocentrist prejudices, the glance he gives to this last one is necessarily « ethnocentred ». However, his cultural anchoring is a part of a game of « mirrors »¹ with which the discovery of the Other one may provoke in him the questioning about the foundations of his own society². We have the example of these rigorous works, made chronometers in hand, in order to estimate the time spent producing material means of existence : what meaning can take similar measures in societies which ignore the notion of work, the arithmetical calculation and the mechanical measure of time³ ? And what image do they send back to us, in our own way of resolving the so-called economic question ?

Logically, a society which would have put away among the old-fashioned things and other aberrations of history, the cult of growth, of productivism and consumerism, should have dismissed at the same time notions or categories such as economy, work, wage-earning, capital, profit, development, even State, representative government... Based on an imagination different from modernity's, it would make invalid the « great Stories » with which the hope rocked Westerner's generations for two centuries of thermo-industrial civilization : man's rational domination on nature,

¹ In *From Mandeville to Marx. The Genesis and Triumph of Economic Ideology*, Louis Dumont suggests returning the Indian mirror on ourselves (*Homo Aequalis. Genèse et épanouissement de l'idéologie économique*, Paris, Gallimard, 1977).

² Cf. Tzvetan Todorov, *La Conquête de l'Amérique. La question de l'autre* (Paris, Seuil, 1982).

³ Cf. the Jacques Lizot's study on Yanomami, « Population, resources and war to Yanomami », *Libre*, n° 2, 1977.

disappearance of death in its three forms (violent, miserable, natural), material abundance, end of the obligation to work... Naturally we would not know how to forecast the components of a society that stays an ideal project. And if it is not recommended « to formulate recipes for the pots of the future » (Marx), on the other hand, it seems justifiable to wonder about the « material » conditions of its possible achievement. A similar investigation presupposes the closing of any semantic ambiguity, notably about the work concept.

2. The question of « socially necessary work »

« L'imposture du travail nécessaire est la plus lente et, partant, la plus consolante et la plus cruelle manière d'en finir avec la vie. » Raoul Vaneigem (1990).

Work as « total social phenomenon »

Has the work to be considered as an « anthropological category » or as a « historical category »⁴ ? In the first case, it sends back to the process of practical appropriation of nature by which men produce their material means of existence. For Greek philosophers (Plato, Aristotle), this « self-conscious vital activity » belongs to the sphere of necessity and, as such, dispossesses men of their freedom : the free man is the one who does not work ! This ideological vision continued through centuries until it was admitted as an evidence by those who regard the work as a historical category, more exactly a capitalist category. Those ones denounce the alienation and the exploitation of salaried workers, but uphold that the emancipation of these last ones requires specific material conditions – under the circumstances, the full development of the productive powers. It is one of the elements that constitute the myth of « a liberatory technology » (Murray Bookchin) from which some contemporary theorists of « social criticism » have difficulty to give up⁵.

Over against this almost aristocratic conception of work, we can set the point of view of the « workers » - at least, before the promoters of mechanization disqualified their productive activity by expropriating their knowledge and know-how. As George Sand noted it⁶, those could have not only the taste of the well made work, but also of « the effort » without feeling dispossessed of themselves ; they did not dedicate

⁴ Problem set by Marx in *Introduction à la critique de l'économie politique* (1857), and, in a recurring way, by Jean-Marie Harribey : cf. « Désaliéner le travail pour économiser les ressources » in *Entropia*, n° 2, springtime 2007, or « Que faire ? Croître ou décroître ? », *Contretemps*, n° 21, February 2008. In the same review, see also Daniel Bensaïd, « Politiques de Castoriadis (Castoriadis corrige Marx ?) ». And read the various articles published in *Entropia*, n° 2 (op. cit.), dealing with the subject : « degrowth and work ».

⁵ The position of Marx is not devoid of ambiguity : in the conclusion of *The Capital* (Volume III), following the example of the Greek philosophers, he argues in realms of necessity and freedom ; but, in *La critique du programme de Gotha*, he declares that the work will be « the first need of the life » in a communist society. As regards the contemporary « social criticism », cf. notably *Manifeste contre le travail* of the Krisis Group (Editions Léo Scheer, 2002).

⁶ George Sand, *Histoire de ma vie* [1854-1856], Part IV, chapter IX.

themselves to « the ideal of slackness » that the mechanical progress encourages today⁷.

Work in industrial society, as in any other society, must be treated as a total social fact: ecological, economic, social, political, ideological, cultural, but also technical and thermodynamic⁸. Because, beyond the assuaging speeches which maintain the myth of « work value », there is a whole logic that the psychoanalyst Erich Fromm qualified, rightly, as « necrophilic »⁹: indeed, for reasons that some attribute to its « internal contradictions », but also more fundamentally in consideration to the modern imagination, the industrial capitalism persists in substituting dead work for alive work, machines for workers, « necrotechnologies » for bio-ecological cycles ...

About work in a « degrowth society »¹⁰

We shall apt to admit that a « degrowth society » would be a society which would excite, not the simple existence, but life¹¹. It should invert consequently the dynamics that characterizes the capitalist movement, i.e. substituting alive work for dead work, men for machines, and recomposing technics (Ivan Illich, André Gorz) doubtless for objective reasons resulting from the non-durability of thermo-industrial civilization (Alain Gras), but also and especially for subjective reasons: it is necessary to finish with the false opposition sphere of necessity / sphere of freedom, to restore the quality of work, and to rehabilitate the alive work as the expression of man's creative genius. In such a society, the advent of freedom reign would not have to be subordinated to the realization of specific material conditions; in other words, freedom and fulfilment of productive tasks must not be considered as antinomic. Freedom and equality are not for all that natural rights, but much rather, as in the Greek democracy, political institutions¹².

Some of growth objectors (Latouche, Cheynet, Ariès) wonder if a « degrowth society » would imply or not a significant reduction of socially necessary working time¹³. Before considering this question, it is advisable to set the problem of its relevance. The one who would raise this question having respect to the objective of full employment would remain prisoner of the « *sphère autoréférentielle de représentations* »¹⁴ that draws the modern and industrial

⁷ Expression of George Orwell, *The Road to Wigan Pear* [1937].

⁸ On this last aspect, cf. François Vatin, *Le Travail. Economie et physique, 1780-1830* (Paris, PUF, 1993), and more recently, Alain Gras, *Le Choix du feu. Aux origines de la crise climatique* (Paris, Fayard, 2007).

⁹ In *Anatomy of human destructiveness* [1973].

¹⁰ It is not superfluous to specify that a « degrowth society » would not state its name as such. It would be the same error than describing under the sign of lack of the so-called primitive societies (society without State, without surplus, without class, without writing, without economy, etc.). See Pierre Clastres, *La société contre l'Etat* (Paris, Editions de Minuit, 1974).

¹¹ Cf. Seneca, *The Brevity of Life*.

¹² Cf. specially Hannah Arendt, *On Revolution* [1963].

¹³ Cf. among others, Serge Latouche, *Le Pari de la décroissance* (Paris, Fayard, 2006) and *Entropia*, op. cit.

¹⁴ Serge Latouche writes about the economy: « It is thought as autonomous because it bases upon a self-referring sphere of representations, most of which linked to the West. Need (nature), scarcity (avarice of the nature), work (transformation of nature in

vision of « economy », and, beyond, of the terms in which the social question is set today: it is to hope that the problem of full employment will be as improper in a « degrowth society » as in a primitive community. The question of the « socially necessary working time » is justified as far as it concerns the material conditions which make possible or impossible the advent and the reproduction of a « degrowth society ».

If we refer to the current situation, the achievement of this kind of society makes play processes which effects on socially necessary working time are opposed: so, the disappearance of many branches of industrial activity and managing tasks then unnecessary, would decrease it, while the development of new products and the « relocation of some activities » would increase it. But it is doubtless that, all other things being equal, the renunciation of the thermo-industrial model would, in a very sensitive way, contribute to increase the socially necessary working time. The calculations of Fernand Braudel, Louis Puiseux, David Landes and, in a more general way, the eco-energy analysis establish what the common sense lets guess: that, without the « *machines à feu* », industrial revolution would have been impossible¹⁵. As a consequence, with a relative abandonment of « mechanical slaves », the deindustrialization would mean the replacement of energy contained in fossil fuels by metabolic energy, and ipso facto, the increase of alive work.

However, there is a factor rarely taken into account that could reduce the impact of a strong increase of alive work resulting from the decline of work productivity: the mode of distribution of the socially necessary working time in the population defined as active according to the terminology of industrial world. This world gave to the division of social labour new and also extreme forms. If the « degrowth society » has to promote new forms of common life, we may expect that it puts an end to the division between intellectual workers and laborers¹⁶. Summary calculations were made by socialists of the XIXth century and by partisans of the « distributive economy » in the first half of the XXth century: if the productive tasks were distributed in an equalitarian way on all the potential active population, the daily working time per person would reach a level which hunter-gatherers would not consider excessive¹⁷. But it would suppose a radical change at the same moment in the social structuralization and in the mentalities, which nothing today allows to expect.

3. The sempiternal question of « transition »

« Ithaque, c'est le chemin vers Ithaque ». Constantin Cavafy

order to satisfy natural needs), production, income, consumption are the key concepts which draw a perfectly saturated set of meanings, in *La Planète des naufragés. Essai sur l'après-développement* (Paris, La Découverte, 1991).

¹⁵ Louis Puiseux, *La Babel nucléaire* (Paris, Galilée, 1977), David S. Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present* [1969], Alain Gras, *Le choix du feu*, op. cit.

¹⁶ On this question, see George Orwell (op. cit.) and particularly Jan Waclav Makhájski (1866-1926): *Le socialisme des intellectuels*, translation and presentation by Alexandre Skirda (Editions de Paris, Paris, 2001).

¹⁷ Cf. in the last chapter of *Technics and civilization* [1934], the section where Lewis Mumford talks about « basic communism ».

What social strength would may today promote successfully a « sustainable degrowth »? In a different context, the question repeats the problem for a long time discussed by the Marxists in the years 1960-1970 : that of the transition from capitalism to what was named in this time socialism or even communism – terms indicating projects that the XXth century history would have irreparably compromised, according to the opinion today collectively admitted. But if the formulation changed, the question brings to light relatively comparable cleavages. There are those who, as Raoul Vaneigem, believe that, by a sort of providential fate, the capitalism will evolve of itself, via the development of a green capitalism or an eco-business, towards a kind of society where the economy will not be any more the « finished form of man's denial » (Marx), where it will not mean any more the sacking of nature¹⁸. Others (as Hardt and Negri) base the same hope on the development of an immaterial capitalism¹⁹. Some sceptics (Anselm Jappe) foresee a fatal crisis which would precede the wreck of industrial society in a new sort of inhumanity²⁰. Finally, the most consequent ones believe in a political scenario in which the transition to « degrowth society » would be made gradually, without radical break with the capitalist logic. Those are doubtless the most realist, but we can rightfully suspect them of underestimating the resistance of « consumers » (i.e. their degree of integration in the realm of commodity), and that of manufacturers and financiers, to the implementing of a similar project.

Hypothetical conditions of a « negative expanded reproduction »²¹

If we take a « Marxian » model as theoretical reference, promoting a policy of durable diminution in a capitalist frame, as some growth objectors invite us, implies [besides radical qualitative alterations – in as well means of production as consumption goods – in order to change the mode of appropriation of nature] the respect for two types of conditions : some with the capitalist logic, the others able to provoke, on long time, an important reduction of the general level of activity.

For the main part, the first ones amount to the necessity of guaranteeing a rate of profit, and thus also a rate of surplus value, positive. The question is to know if the respect for this condition does not pull inevitably a capital accumulation ; or, expressed otherwise, if it can be connected, as it would be necessary, with a process of « negative expanded reproduction », or of « desaccumulation ». The history of industrial capitalism was punctuated with moments marked by massive destructions of capital, but, since Marx and Schumpeter established it, we know that these critical phases are indispensable to the regeneration of capital. In this case, the matter is to make this movement continue.

In main lines, the second conditions sum up as follows :

¹⁸ Vaneigem, *Pour l'abolition de la société marchande pour une société vivante* (Paris, Payot & Rivages, 2004).

¹⁹ Hardt & Negri, *Empire* (Paris, Exils Editeur, 2000).

²⁰ Anselm Jappe, *L'avant-garde inacceptable* (Paris, Léo Scheer, 2004).

²¹ Concept used by Nicolas Boukharine to qualify the process of reproduction in case of war. In *Economique de la période de transition* [1919-1920] (Paris, Etudes et documentation internationales, 1976).

- On one hand, the value of production must decrease both in the section producing means of production (section I) and in the section producing consumption goods (section II) ;
- On the other hand, the organic composition of capital has to be on the decline, which also means the decline of the capital-intensive coefficient because it is necessary to decrease the consumption of nonrenewable energy resources and to substitute progressively alive work for dead work.

By adopting the usual formulation²², these various conditions to be respected in both sections can be expressed in the following way :

- $PI / (C + V) > 0$ and thus inevitably $PI / V > 0$, what means the preservation of the capitalist relations of production (and exploitation) ;
- $d(C/V) / dt < 0$ and $di_k / dt < 0$, which implies that the productivity of work decreases ;
- $dC / dt < 0$ and $dV / dt > 0$;
- and, by putting $M1 = C1 + V1 + P1$ and $M2 = C2 + V2 + P2$ [values of the production respectively in the section I and in the section II], $dM1 / dt$ and $dM2 / dt < 0$.

It is possible to complicate the model by imagining the existence of an economy in parallel which would ensure the promotion in both sections, of production and consumption authentically sustainable on an ecological plan, in order to precipitate into the decline its thermo-industrial equivalent. However, that we made turn either of these models, we would obtain the same result : never the capitalism subdued under the sole market indicators, as its devotees say, cannot, of itself, generate a durable dynamics of desaccumulation. Only a voluntarist policy may push it to that. But it would suppose that the State (and, at the world level, supranational institutions ?) not only promulgates appropriate measures, but also undertakes the « part maudite » (Georges Bataille) of capitalism, i.e. answers the « need of disproportionate loss » which would require a degrowth policy : it would have not only to neutralize the « rebound effect » but also to sterilize more than all the surplus. However we see badly how a similar policy, already conceivable with difficulty in the actual condition of the world, could obtain the approval of the largest number : in a capitalist context, it would stumble inevitably over an essentially social problem of double bind : the salaried workers would be more requested to produce without benefiting as compensation an « increase » of their standard of living. Then, we must fear that the exit of this situation passes by the institution of a particularly authoritarian political system.

The inescapable political question

As Tomas Maldonado wrote in 1972 : « Today, the social scandal peaks in the natural scandal » ; but he added immediately : « the question on the social scandal has to

²² i.e. designating by M : the value of production ; C : the value of constant capital ; V : the value of variable capital ; PI : the surplus value ; PI / V : the rate of surplus value ; $PI / (C+V)$: the rate of profit ; C / V : the organic composition of capital ; i_k : the capital-intensive coefficient.

precede the question on the natural scandal »²³. To forget it would be exposing oneself to the extreme solution that Hans Jonas suggested in sweetened terms: solve the socio-ecological tensions by establishing a « friendly tyranny » - the « almost secret government of an elite » clear-sighted enough « to assume alone, ethically and intellectually, the responsibility for the future » by using « the white lie » if « truth is difficult to bear »²⁴.

As long as the project of a « degrowth society » will be presented as an imperative necessity dictated only by imperious ecological constraints, its achievement will appear only as the exclusive matter of specialists, technocrats, economists, and other experts: in brief, it would complete the process of individuals' dispossession of their political sovereignty, of their « lived world » (Habermas), and it would pull therefore the establishment of a more or less « friendly » « ecofascism ». Does alienation of freedom represent the price that humanity has to pay to acquire the assurance not to ruin the living conditions of future generations? What would be the existence of individuals deprived of « the possibility of bringing to a successful conclusion their self-fulfilment »²⁵? So that the « degrowth society » can correspond to what Castoriadis understood by autonomous society, it would have to be desired for itself, in other words, alike autonomous individuals would wish to appropriate it, to make of it their collective project, the common instrument of their own emancipation.

²³ Maldonado, *Environnement et idéologie* (Paris, 10/18, 1972).

²⁴ Hans Jonas, *Le principe responsabilité. Une éthique pour la civilisation technologique* (Paris, Cerf, 1991).

²⁵ T. Kaczynski, *Industrial Society and Its Future* [1995].

Why are we growth – addicted ? The hard way towards degrowth in the involutory western development path

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Abstract

The reduction of the energy-matter flow which feeds the economic process (throughput), and voluntary simplicity are two pillars of degrowth. Constitutive elements of a reorientation of economic activities according to ecological and sociocultural criteria, these measures are characteristic of an ecological and social rationale, according to which the sustainable insertion of human activity in the natural environment passes through subordination of economic activities to the demands of renewal of natural and sociocultural spheres. While necessary, these measures however contradict capitalist economic rationality, anchored in the institution of property, which subjects natural and sociocultural dimensions to growth in property value engaged (in monetary form) in economic activities, forcing the economic system to grow and innovate in a race with socially exclusive and ecologically destructive profitability.

To pass from the particular economic rationality of the economy of property to one of eco-social rationality requires a radical inversion in the hierarchy of social decisions. But such an inversion can only run into systemic blocking from the economy of property, and in particular from the interest groups that it supports and which depend on its expansion. Still more basic, an evolutionary analysis of the dynamics specific to the economy of property shows that such an inversion of hierarchy cannot take place spontaneously.

Indeed, left to itself, the economy of property is enclosed in a development itinerary increasingly more dependent on its internal references, selecting among social innovations those leading to an increase in the value of property engaged in the economic system, to the detriment of any alternative option. To avoid such involuntary development leading to the elimination of the economic system and the destruction of its eco-social context, the role of property in the orientation of economic development must necessarily be the subject of social revaluation and collective control. The creation of institutional innovations aimed at subordinating the potential of the economy of property to an eco-social rationale, seems necessary, ensuring the renewal of the natural and sociocultural spheres. At stake is the redefinition, collectively and substantially, of quality standards of living and to make such criteria the standards of the economic system. Failing this, and as long as economic evolution reinforces its dependence on the institution of property, any social, institutional,

organizational or technological innovation will see itself directed to the increase in value of the engaged property, as the phenomenon of the rebound effect testifies.

1. Introduction

Every scientist interested in the degrowth debate has noticed the strong inertia to which any attempt to orientate the world development path towards ecological sustainability and social equity has been confronted. While the Meadows Report insisted on *The Limits to Growth* as soon as 1972, Nicholas Georgescu-Roegen presented his bioeconomic program the very same year. 36 years have passed, but the economic system is far from having decoupled itself from its material throughput, even progressively. Quite the contrary, it has become more than ever dependant upon the exploitation of natural and human resources, reinforcing both ecological degradation and social inequities in so far as the viability on human species in the Biosphere is under peril.

Why is it so? When most social and ecological indicators indicate that our growth-based development path has led our societies close to a general collapse, why do our self-proclaimed developed societies prove unable to getting rid of that “growthmania” (Daly 1974) and initiating the necessary reorientation? While answers lie in the causal role of ideology, economic theory or vested interests’ strategies, we want here to investigate the economic rationale that induces and forces the economic system to persistently realise a process of economic growth. Such an analysis will help identifying the institutional and technological obstacles that prevent the socioeconomic system for entering into the physical degrowth process.

2. Property as the constitutive institution of capitalist economies

In order to understand the peculiar manner in which the capitalist mode of development orientates the evolution of the socioeconomic system, a close examination of the institution of property is required. Such an examination has recently been done by two German economists, Gunnar Heinsohn and Otto Steiger (Heinsohn and Steiger 1996, 2006; Steiger 2006), and was further elaborated by Steppacher (Steppacher 1999, 2003, 2006, 2007) and van Griethuysen (Steppacher and Griethuysen 2002; Griethuysen 2003, 2004, 2006a), who integrated property economics’ findings into the analytical framework of critical institutional and ecological economics. We summarise their argument here and elaborate on some of their findings, adopting an evolutionary perspective much in vein with the precursory analysis of capital developed by Thorstein Veblen in the early 20th century (Veblen 1904, 1908a, 1908b).

Property economics identifies two different potentials in the institution of property: (1) The first potential, which has been called the *possession aspect of property* by Steppacher (2007), refers to different levels of use rights, such as access, withdrawal, management, exclusion and transfer, provided by property rights to their holder (Schlager and Ostrom 1992, Le Roy *et al.* 1996); (2) The second potential, the *property aspect of property* (Steppacher 2007), refers to

the possibility of engaging the security associated with the legal property title in a *capitalisation process*¹, the most elementary one being the *credit relation*.

Following Heinsohn and Steiger (1996), Steppacher (1999, 2006) points out four essential phenomena that emerge from the credit relation: (1) creation of *money* as a transferable anonymous property title²; (2) *interest* as compensation for the creditor's property engagement; (3) *indebtedness* as a counterpart of money disposal for investment and (4) creation of a monetary valuation *standard*, defined by the creditor, and diffused by financed activities throughout the economic system. As the recourse to credit becomes economic common practice, such phenomena spread in the economic system as economic agents actualise property specific potentials.

3. The potentials and constraints of the credit relation

Through the credit relation, an economic agent can expand his economic activities (growth) or invest in new activities (development). This possibility is made feasible by pledging the property's immaterial yield (actualisation of the property aspect of property) and affects neither the physical features of resources nor their material yield (actualisation of the possession aspect of property)³. Thus not only can both potentials of property be simultaneously engaged, but the earning-capacity of engaging property in a capitalisation process comes in addition to the income-stream that can be earned from the concrete, material exploitation of the property. Such a dual actualisation allows for the *cumulative enrichment of proprietors* since a higher material yield usually implies a higher earning-capacity through capitalisation which can itself be invested in increasing material productivity, and so on⁴.

The possibility of engaging simultaneously both potentials of property, together with the possibility of cumulative enrichment of proprietors make explicit two characteristics of property-based economies: (1) Economic growth through expansion and development through innovation are phenomena that are spontaneously impelled in a property economy: once emitted, monetary capital can be invested by the debtor in productive capital formation, new market activities or be used to finance any other type of

innovations. Conversely, this explains why economic growth and development are so difficult to achieve in economic systems with no formalised property system, as pointed out by Hernando de Soto (Soto 2000). It further makes explicit the particular power and competitive advantage property regimes present over possession regimes; (2) A general socio-cultural trend towards the increasing reinforcement of proprietors' social status, and more fundamentally, towards the cumulative reinforcement of the institutional status of property as the cornerstone institution of capitalist economies, as a consequence of proprietors' strategies.

For, as pointed out by Steppacher (2007:335), capitalisation not only allows for growth: *it imposes it*. This results from the contractual obligations the debtor has to fulfil once he has engaged his property as collateral in a credit contract: *refund the loan and pay the interest in due time*. Altogether these obligations impose the following requirements for the debtor⁵:

- (1) *solvency*, which requires the valuation in monetary terms of economic activities according to the standard defined by the creditor⁶;
- (2) *profitability* of productive activities, which results in the routinisation of the cost-benefit analysis;
- (3) *time pressure* for income realisation, which permanently pressures the economic system to accelerate both production and consumption.

The role of such requirements in the orientation of the capitalist economy cannot be overemphasised. Any debtor who fails to meet those constraints will be eliminated from the property-based economy (through the seizure of its property). This also means that any economic behaviour motivated by alternative criteria will be discouraged, even eliminated by the capitalist requirements. The degrowth movement is directly affected by the peculiar nature of property's selection criteria.

4. The capitalist economic rationality and the subordination of eco-social considerations

By deciding which activities to finance, the creditor gives the primary impulse towards the capitalisation process and the expansion of the capitalist economic system. Therefore, economic rationality in a property-based economy is defined from the point of view of the property of the creditor⁷. This general orientation towards the monetary value of property, which imposes the solvency of economic agents, the monetisation of economic activities and the profitability of economic activities, constitutes the *specific rationality of a capitalist, property-based economy*.

¹ "capitalization is an appraisal of a pecuniary "income-stream" in terms of the vendible objects to the ownership of which the income is assume to inure. To what object the capitalized value of the "income-stream" shall be imputed is a question of what object of ownership secures to the owner an effectual claim on this "income-stream." (Veblen 1908b:122)

² The merit of Heinsohn and Steiger theory was to identify in the immaterial yield of property titles, which they called the *property premium*, the origin of *money creation*. For to be exchanged, quantified and somewhat materialised, the value of property's immaterial security needs to be expressed through an *ad hoc* medium.

³ "During the period of the loan, lender and borrower continue the physical use of the possessory side of their burdened assets." (Steiger 2006:187). This was already noticed by Veblen (1904:163ff).

⁴ "any increase of the aggregate money values (...) will afford a basis for an extension of loans (...). The extension of loans on collateral (...) has therefore in the nature of things a cumulative character" (Veblen 1904: 105-106).

⁵ For details, see Steppacher (1999, 2003, 2007), Steppacher & Griethuysen (2002) and Griethuysen (2004, 2006a).

⁶ The fact that the monetary standard is defined by the creditor is especially important in the case of international credits since the debtor must reimburse the amount borrowed in foreign currency, which can only be obtained on international markets.

⁷ "All economic decisions and evaluations are hierarchically differentiated, integrated, balanced and centred according to the impact they are likely to have with regard to the security, quantity, quality and value of property". (Steppacher 2007:336)

In order to meet the specific requirements associated with capitalisation, business entrepreneurs develop three main types of economic strategies: commercial strategies, institutional strategies, and profit driven innovations. *Commercial strategies* result of the profitability requirement which constantly pressures the entrepreneur to reduce the monetary costs he is accountable for and to increase the revenues he is entitled to get. This results in various commercial strategies among which we may cite labour-saving technical progress, lay-offs, substitution in favour of cheapest natural resources, delocalisation, marketing, advertising and publicity.

If economic agents must constantly improve their cost-benefit ratio, it must be reminded that “*institutional arrangements define who must bear which costs, and who may reap which benefits*” (Bromley 1989:57). This also means that “*the structure of institutions provides the theoretical (as well as the legal and political) rationale for the disregard of certain costs that attend particular economic activities*” (Bromley 1989:57). Therefore, it is most rationale for any business agent acting in a property-based economy not only to favour institutional arrangements that secure and increase the monetary value of the property, but also to pursue *institutional strategies* aiming at the privatisation of monetary benefits and the socialisation of the costs, even when this ends up with the transfer of negative impacts of economic activities to third parties (Kapp 1950).

In a property-based economy, every *economic innovation is profit-driven*. This not only refers to conventional economic innovations⁸, but includes all kind of institutional strategies that aim to favourably affect the monetary results of economic agents. In such interpretation of innovations, profit relates not only to the short term positive difference between monetary benefits and costs (a basic survival requirement in the property economy), but to a value of capital which includes both actual and future return⁹, evaluated according to the capitalisation of both tangible and intangible assets¹⁰.

⁸ In 1934, Joseph Schumpeter (1934:66) distinguished the following economic innovations: “(1) *The introduction of a new good (...)* (2) *The introduction of a new method of production (...)* (3) *The opening of a new market (...)* (4) *The conquest of a new source of supply (...)* (5) *The carrying out of the new organization of any industry ...*” All such innovations introduce novelty in the economic process through the actualisation of new economic potentials.

⁹ “*The value of any given block of capital (...)* turns on its *earning-capacity (...)* not of its *prime cost or of its mechanical efficiency. (...)* But the *earning-capacity which in this way affords ground for the valuation of marketable capital (or for the market capitalization of the securities bought and sold)* is not its *past or actual earning-capacity, but its presumptive future earning-capacity.*” (Veblen 1904:152-153)

¹⁰ Intangible resources, such as customary business relations, reputation for upright dealing, franchises and privileges, trademarks, brands, patent rights, copyrights, exclusive use of special processes guarded by law or by secrecy, exclusive control of particular sources of materials, all immaterial assets that Veblen (1904:139) associates with the notion of *good-will*, have now turned out to be “*the nucleus of capitalization in modern corporation finance.*” Veblen (1904:117)

All innovations being orientated towards profit, it is worth noting that the so-called *rebound effect*, which characterises a situation where a technical improvement in the production of a good (such as an increase in the matter-energy efficiency per unit of output) is more than compensated by an increase in the number of units produced and sold, is no paradox whatsoever but the very expected outcome of a profit driven investment.

In this capitalist rationale, considerations of an ecological and social nature are relegated to the background. Not that they are in themselves incompatible with a property regime’s rationale, but they can only be considered by economic agents insofar as they are compatible with the property specific requirements. Restraining competitors by institutionalising ecological and/or social regulations, establishing voluntary labels to increase sales’ income, establishing new property titles granting exclusivity over “free” resources (as illustrated in the climate change international regime by the creation of a carbon market resting on exclusive emission quotas) are among others situations where eco-social considerations comply with the property’s specific requirements. However, from an eco-social point of view, those so-called « *win-win solutions* » are most often problematic, not least because they usually result in further economic growth and increased entropic degradation.

5. Materialise growth, eco-social repercussions and the need for social hierarchy inversion

The economic pressures imposed by the self-expansion of property-based economy through capitalisation are exponential monetary growth, time pressure, monetary cost efficiency and favourable institutional conditions (Steppacher 2007). In the past, property-based economies have responded to such imperatives through territorial expansion (at the expense of local populations who were most often *dispossessed* of their lands and resources), property concentration and over-exploitation of renewable resources¹¹. With the advent of the *thermo-industrial revolution*¹² and the invention of technologies allowing the exploitation of fossil energy, technological innovation became the main method for materialising economic growth. Based on mineral resources¹³, industrial

¹¹ Theses different methods have often gone together, as in the case of the Roman Empire and pre-industrial colonial Europe (Field 1989).

¹² The concept of thermo-industrial revolution was proposed in the 1970s by a philosopher of science, Jacques Grinevald (Grinevald 1976). The qualifier “thermo” emphasizes that it is the transformation of heat into movement that is the basis of industrial machines, the engines. It also emphasizes that the recourse to fossil energy stocks marks the beginning of a human disturbance of the atmosphere’s thermal equilibrium (Grinevald 1990).

¹³ Contrary to biotic resources, whose growth potential is naturally limited, mineral resources are capable of inducing a process of exponential growth: the stocked energy-matter can be used to develop machines and motors that allow an even quicker exploitation of the stocks (Georgescu-Roegen 1965). The process is therefore circular and cumulative. However, because of their finite nature, mineral resources (and fossil fuels in particular) will allow the fuelling of exponential economic growth only for a historically limited time and with grave environmental

innovations have been developed to meet the capitalist goals of producing more, faster and newer. In return, industrial development has imposed new constraints on economic activities, such as mechanisation, standardisation and planning, reinforcing economic and political power concentration. Such an industrialising path has reinforced the *dependency of economic system on mineral resources*, increasing the scarcity of these resources together with their strategic character.

The physical growth process on which the property expansion ultimately rests on affects the natural environment in many and interrelated ways: overexploitation of local biotic resources leading to a global biodiversity crisis, expansive depletion of mineral resources, lowering of ecosystems' resilience and disruption of the global ecosystem, the Biosphere. Altogether, such human-induced phenomena affect natural process up to the point that both the Biosphere and humanity enter in a new geological age, called the *Antropocene* by eminent scientists (Crutzen & Stoermer 2000), where the evolution of the Earth System is for the very first time dominantly shaped by the activities of one singular species, man.

Resting on the exclusive privileges of the proprietors and the exclusion of non-proprietors, the expansion of the property-based economy goes along with an ever widening of social inequities, with the reinforcement of a ever less numerous elite together with a growing population of excluded people. In the absence of significant redistributive policies (which most elite's members are opposed to) such socio-cultural evolution spontaneously locks itself into a recurrent social crisis. Moreover, the widening of social inequities reinforces environmental disruption, as both extreme poverty and extreme richness are important factors of ecological degradation -the latter being far most problematic than the former (Griethuysen 2006b).

In order to avoid such an eco-social collapse, a radical reorientation of social decision criteria should be implemented. Conceptually, such a reorientation would imply the shift from the property-based hierarchy where social and ecological considerations are subordinated to the capitalist economic rationality towards an eco-social rationale, where economic and interests activities are subordinated to social and ecological imperatives. A radical *inversion* in the hierarchy of decision making is thus needed. But what could be the changes of success of such a transition phase when property criteria play an ever more dominant role in the cultural evolution? Besides the systematic opposition coming from the interests-groups that take advantages in the capitalist expansion and to the huge technical difficulties to concretely shift from an industrialised, mineral-based development path to a sustainable one, we want to point out here that the very peculiar nature of the Western development path *acts in itself* as a systemic obstacle to such a reorientation.

6. The self-expansion of the property economy

Because of the control it gives on both the material and financial flows, and the cumulative enrichment and consequences (Steppacher & Griethuysen 2008).

increasing power such control provides, the institution of property, its institutional status and the conditions of its expansion are at the centre of proprietors' preoccupations. Consequently, they will constantly favour and seek for means to securing and expanding the property regime. In order to get access to and engross the most profitable technologies with the best pecuniary conditions, capital owners will promote a competitive credit market in which business entrepreneurs have to compete with one another to access external capital.

For the entrepreneur acting in the competitive business context, having recourse to external capital through the engagement of property as collateral¹⁴ turns out to be a decisive advantage. "*But under the regime of competitive business whatever is generally advantageous becomes a necessity for all competitors. Those who take advantage of the opportunities afforded by credit are in a position to undersell any others who are similarly placed in all but this respect.*" (Veblen 1904:96).

After earlier entrepreneurs benefited from initial advantages provided by collateral-based external capital, other economic agents had no choice but to have recourse to credit in order to avoid economic elimination. The recourse to credit, which first appeared as a competitive advantage, soon became a condition to economic survival in a competitive business environment¹⁵. Several lessons can be drawn.

First, in a property economy, recourse to external capital is not a matter of choice, but obligation: (...) *under modern conditions business cannot profitably be done by any one of the competitors without the customary resort to credit.*" (Veblen 1904:97). Economic agents do not take recourse to credit only because they want to get richer, but because they have to: not having recourse to external capital means economic elimination.

Second, while the rationale of credit requires *absolute profitability*, competitiveness imposes *relative profitability*: only the concerns with the highest profitability will get access to the finite stock of capital. As credit practices and capitalisation spread into the economic system, not only insolvent agents and unprofitable economic activities, but also absolute profitable economic activities that prove unable to generate a competitive monetary return get eliminated.

Third, creditors are the major beneficiaries of the expansion of property. The reason for this is twofold: (1) as noticed by Veblen (1904:97), under the competitive employment of credit, "*the aggregate earnings of an enterprise resting on a given initial capital will be but slightly larger than it might have been if such a general recourse to credit to swell the volume of business did not prevail*"; (2) creditors,

¹⁴ "*The money value of the collateral is (...) the capitalized value of the property, computed on the basis of its presumptive earning-capacity.*" (Veblen 1904:105)

¹⁵ *Speaking broadly, recourse to credit becomes the general practice, the regular course of competitive business management, and competition goes on on the basis of such a use of credit as an auxiliary to the capital at hand. So that the competitive earning capacity of business enterprises comes currently to rest on the basis, not of the initial capital alone, but of capital plus such borrowed funds as this capital will support*" (Veblen 1904:96-97)

who do not support the risk associated with the realisation of productive activities (which are borne by the debtor), are frequently in the position of buying insolvent agents' property after their nominal value has dropped below their real one. This leads to property and wealth concentration, one of the most characteristic traits of the property-based economies (Duchrow & Hinkelammert 2004).

The fourth lesson is that entrepreneurs acting in the competitive business context of a property economy face a *double bind* situation: or they join the capitalistic race towards profit which subordinates eco-social considerations to economic exploitation, with the permanent risk of being excluded whenever insolvent or insufficiently profitable, or they do not join it and let other agents appropriate every available resource and exploit them for their own, exclusive interests. Only two options are available for choice, and while each excludes the other, both are problematic, collectively or individually¹⁶.

By entering the competitive race to future profit (which they are forced to do in order to avoid economic elimination) economic agents condemn themselves to adopt the peculiar economic rationality of capitalism, where ecological and social considerations are subordinated to the quest of increasing property value. In doing so, they join and reinforce a very problematic development path, for it results in the general diffusion of property selection criteria (exponential monetary growth, monetary cost efficiency and time pressure) together with the expansion of the property economy, the widening of social inequities and ecological degradation.

7. Global capital and the pecuniary magnate

The loan credit is the primary form of capitalisation. And its causal analysis allows for an adequate description for the early stages of capitalism only. Considering the generalisation of loan credit as a special case of the general diffusion of any competitive advantage in a competitive context, Veblen presents in his *Theory of Business Enterprise* (Veblen 1904) a deep analysis of the subsequent stages of capitalism, where property and capital merge in different economic organisation such as joint stock companies and corporations, which start with a fully organized capital and debt, the owner of the concern being also its creditors (Veblen 1904:119).

In a subsequent work, Veblen depicts the emergence of a new capitalistic organisation out of the cumulative process of property concentration, and refers to it as the *pecuniary magnate* (Veblen 1908b)¹⁷. Contrary to the conventional

“capitalistic employer” (Veblen 1908b) who looks for the most profitable investments the industrial system may offer the pecuniary magnate's core business consists of buying and selling of capital goods. As ways of expanding capital, pecuniary magnate systematises the capitalisation of already existing tangible and intangible assets through merging, acquisition, reorganisation and coalitions of corporations.

At the abstract, purely monetary level where pecuniary magnates are competing, the volume of credit is the decisive point (Veblen 1904): property with the highest value is the most powerful in attracting external capital, others run the risk of elimination through acquisition. And since the institutional framework establishes what merging, acquisitions and coalitions are possible, pecuniary magnates invest all their power and influence in shaping institutional conditions that favour their strategies.

At this later stage of capitalism, the pecuniary magnate influences the orientation of the economic system as a whole¹⁸. The abstract reasoning of the proprietor¹⁹ is systematised in and by the global capital market, increasing the path dependence of the property-based development. Ever more social situations are analysed according to the capitalist perspective and rationality, with options being evaluated on regard to their impact on property. Moreover, with the globalisation of capital market, the double bind has shifted to the global level: pecuniary magnates have no choice but to increase property by capitalisation, market organisation and corporate coalitions. Property global expansion not only diffuses, but imposes its specific rationale to every context that present opportunities to economic value, and no single actor can either reverse or even slow down the process. The involutory path, which both reinforces property internal selection criteria and discriminates alternatives, is self-reinforcing.

In such a cumulative path dependence, the capitalist mode of development get locked into its own internal functioning and incapable of adapting to external evolution²⁰: Unable to perceive the ecological or social repercussions of capitalist

holdings of the smaller capitalist-employer...” (Veblen 1908b:135-6)

¹⁸ “*In the measure, therefore, in which this relatively new-found serviceability of extraordinary large wealth is effective for its peculiar business function, the old-fashioned capitalist-employer loses his discretionary initiative and becomes a mediator, an instrumentality of extraction and transmission, a collector and conveyer of revenue from the community at large to the pecuniary magnate, who, in the ideal case, should leave him only such an allowance out of the gross earnings collected and transmitted as will induce him to continue in business.*” (Veblen 1908b:133-4)

¹⁹ In order to express such an earning capacity and to make alternative options comparable, the heterogeneous complexity that characterise the complex relations linking economic resources to their eco-social context have to be homogenised in monetary terms, money being the property value's expression.

²⁰ “*under the régime of capital, the community is unable to turn its knowledge of ways and means to account for a livelihood except at such seasons and in so far as the course of prices affords a differential advantage to the owners of the material equipment. The question of advantageous –which commonly means rising-prices for the owners (managers) of the capital goods is made to decide the question of livelihood for the rest of the community.*” (Veblen 1908b:108)

¹⁶ According to Steppacher (2007), the double bind was firstly pointed out by Garrett Hardin (Hardin 1968). Hardin, who confused common regime with free-access, rightly identified the limits of competition, when referred to as the guiding principle of socio-cultural evolution.

¹⁷ “*The basis of this business enterprise on the higher plane is capital-at-large, as distinguished from capital invested in a given line of industrial enterprise, and it becomes effective when wealth has accumulated in holdings sufficiently large to give the holder (or combination of holders, the “system”) a controlling weight in any group or ramification of business interest into which he may throw his weight. (...) The larger the holdings of the magnate, the more effectual and expeditious will be his work of absorbing the*

expansion unless it affects property rights, the property economic rationale proves unable to conceive any institutional response that goes beyond the property-based rationality, as the international regime on climate change has proven.

Incapable of apprehending external phenomena, locked in its internal rationale, the contemporaneous property economy has gone as blind as neglecting even the sound principle of banking²¹, as the subprime crisis has recently illustrated. Competing with one another in a race for higher monetary return, “higher plane capitalists” have granted loans to economic agents without any security to engage as collateral²², and without making adequate reserves. Observing such an unwise capitalisation practice, one might understand Veblen’s statement that the “*cumulative extension of credit through the enhancement of prices goes on, if otherwise undisturbed, so long as non adverse price phenomenon obtrudes itself with sufficient force to convict this cumulative enhancement of capitalized values of imbecility.*” (Veblen 1904:106)

8. Conclusion

The institutionalisation of property title as *de jure* claims on economic resources makes the economic system enter into a specific economic rationale, where property specific security can be actualised in relations that are inexperienced in non-property, possession based societies. Emerging from the self-organised actualisation of property’s specific potential (property premium’s contractual engagement), credit relations create and diffuse the monetary dimension as the one to which every property and economic activities must be assessed. Expanding the earning-capacity of assets, credit relations induce a process of circular and cumulative enrichment of proprietors, both creditors and solvent debtors, resulting in the self-expansion of property-based economy. Credit expansion requires the reinforcement of a property regime which aims at securing and increasing the value of existing property. In such a process, any resource or instrument that presents a potential economic value is rapidly integrated into the dynamics of exclusive appropriation and control. This includes natural and human resources, technology and know-how, as well as other intangible elements of political and economical power.

In this circular and cumulative process of property expansion, no internal criterion acts as limiting factor. On the contrary, as the actualisation of property specific potential requires a capitalisation process, the functioning of a property-based economy seems condemned to expand and to capture into its rationale of exclusivity, accumulation and exploitation, any valuable resource that might ease this expansion. Any limit can thus come from nowhere but outside the realm of the property-based economy. It must emanate from the institutional conditions that define the legal frontiers of economic system. However, as proprietors gets cumulatively richer (the self-enrichment of proprietors

being a spontaneous consequence of property expansion) and non-proprietors get locked into ever increasing pauperisation by being excluded of richness’ creation (when not dispossessed from their own goods through enclosure and other appropriation processes), the institutional framework gets ever more influenced by proprietors and inclined to favour their vested interests.

As the property economy expand through capitalisation, the specific selection criteria of property (solvability, profitability and time pressure) spread in society, reinforcing the role of property as a central institution in the organisation of society. Such institutional path dependence has been reinforced and further accelerated by the industrial mode of development, which provided unprecedented responses to property’s peculiar pressures, along with industrial society’s fundamental dependence on mineral resources. In such a process, every option that shows incompatibility with the property requirements is discriminated, every proposition for alternative development path is eluded. Aiming at the reduction of the *economic throughput* and promoting responsible consumption and voluntary simplicity as demand-side alternatives to consumerism, the degrowth movement is unsurprisingly confronted to a systematic and systemic discrimination. Finally, understanding the institutional and technological locked-in situation in which the western, both capitalist and industrial path of economic development has led our societies seems to us to be a prerequisite for any socioeconomic reorientation towards a world sustainable development path.

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²¹ i.e., issuing money “...not only against interest but also against good securities and with sufficient capital of the issuing bank.” (Steiger 2006:188)

²² These economic agents have been called by specialists the “*ninja*” for *no income, no job or asset*.

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Degrowth vs. sustainable development: how to open the space of ontological negotiation?¹

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Abstract

On the basis of a comparison between the discourses on 'sustainable development' and those on 'degrowth', the paper shows how degrowth reveals the limits of sustainable development understood as a space of negotiation. By contrast to sustainable development, degrowth exhibits the specific ontology of sustainable development, and goes against the pretension of sustainable development to be a universal solution to our contemporary and global problems. Still, in the majority of texts, the ontology promoted by degrowth remains implicit. The second part of the paper is then devoted to the elucidation of this ontology in order to begin to enter into the ontological negotiation. Through the clarification of the needed ontology, a secondary aim of the paper is to make some elements of the debate around "décroissance" in French texts available for the English-speaking public.

1. Introduction

'Sustainable development' and 'degrowth' are not well-defined terms, for different reasons. The term 'sustainable development' has been coined at the highest international level to open a space of negotiation and to convene a series of actors — corporations, NGOs, scientists, trade-unions, governments, etc. — in order to launch discussions over the question of the relationships between development and environment. Sustainable development is not a project of society, nor a concept. It belongs to the category of terms that are clear at the abstract level (e.g. peace, justice, equity), these ends upon which everybody agrees, but which are difficult to be implemented. The plasticity of the term 'sustainable development' is precisely the key of its success: each actor can take it and give it the coloration and interpretation s/he wants. This key opens a space of negotiation.

The term 'degrowth' is, on the other hand, overall polemical and has been coined to prompt debates about the same question (environment and development) though radicalised: the current development, based on ever-lasting growth, is incompatible with the limited carrying capacity of the Earth (www.decroissance.org, Latouche 2006, Flipo 2007). Degrowth takes as motto the quotation attributed to

Boulding: "Anyone who believes exponential growth can go on forever in a finite world is either a madman or an economist." Degrowth takes thus sides *against* all-pervading discourses asserting the need of an economic growth. From this perspective, "sustainable development is a semantic weapon in order to evacuate the dirty word 'ecology'" (Kempf 2007, p.33)

As a method to analyse this contrast, I will take a constructivist point of view about sustainable development and degrowth. Taken here as actants of discourses, *sustainable development* and *degrowth* (in italics) are analysed as substantives, as nouns that play certain roles in texts and narratives. *Sustainable development* and *degrowth* have both performative effects: the former opens a space of negotiation, the latter challenges the way this space is functioning. We will see that these actants are entrenched in different ontologies and yield to different effects. The use of current discourses allows making a distinction between the original texts (e.g. Brundtland Report) and how actants are creating real effects.

The constitution of an ontology proceeds through inclusions and exclusions. An ontology is made of beings and relations, or alternatively of entities and forces. Forces explain the manner entities are linked and how space is striated. Descola (2006) explains that ontology is a system of "distribution of property" to this or that existing objects, plants, animals, people. Each ontology is a distribution of natures and cultures. Beings or entities happen as actors in discourses or on public scenes. Actors can be individuals or groups, human or non-human. So, problems are for not acknowledged nor hierarchised in the same way in *sustainable development* and *degrowth*. Both are mobilising ethical and ecological arguments, in different ways. They oppose on the kind of grip to get on the natural world and on its management. The universality of development, knowledge and actors that should be mobilised, the question of well-being, the place of the economics and its institutionalisation, notably the power delegated to the market, are some of the many points of disagreement between both discourses.

The question I would like to raise in contrasting *sustainable development* with *degrowth* concerns the limits of the classic negotiation and how *degrowth* could or not make the negotiation becoming *ontological*, namely to help thinking of a negotiation that would also concern the negotiators' being. The first hypothesis is that ontology is correlative of politics: the hierarchisation of beings and their attributes is a way to decide on the mode of government. The second hypothesis is that negotiation is desirable if one acknowledges that there is no *a priori* good manner to select beings that are important for a given problem (Stengers 1996-97, Latour 2004). In other words, hierarchisation of beings has to be negotiated.

The ontology of *sustainable development* has been developed, elaborated and temporally crystallised. What does *sustainable development* call forth and represent as entities? How are forces distributed, brought together, translated in the spaces of negotiation? What is the current ontology of *sustainable development*?

2. Creating spaces of negotiation

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Sustainable development is first and foremost a key to open a space of negotiation. This concept was coined to convene a series of actors - business, NGOs, scientists, unions, governments, etc.. - around the same table to begin a discussion on topics urgent and global. At first view, nobody can contest the Brundtland definition: "sustainable development is a development which meets the needs of the present without compromising the ability of future generations to meet their own needs". *Sustainable development* was conceived in the spheres of international dialogue to meet the challenges of long-term, continued problems related to the degradation of the environment and ecosystems. The emergence of *sustainable development* is also concomitant with the convergence of a global movement of NGOs. It is the introduction of this new type of actor in the process of international negotiations that gives its novelty to the *sustainable development*. *Sustainable development* has helped push the institutionalization of a series of civil society organizations, within various organs of dialogue and negotiation, and at different levels - international, national, regional and local. It is therefore not surprising to see the difficulty in defining sustainable development, meet so many different versions of sustainable development, and in particular depending on the type of actor. The plasticity of the term allows everyone to add it colours and to come quietly to the negotiating table.

Besides the IPCC, National Councils for SD, local Agenda 21, a good example of a constituted space of negotiation is a 'river contract'. The different points of view are not simply juxtaposed but have to be articulated so that everyone transforms one's perception of the river and of its users, and eventually the river itself. To accompany the development of the spaces of negotiation, the 'stakeholder theory' has been developed and applied.

In the relatively brief history of *sustainable development* as an institutional concept, the spaces of negotiation have already evolved considerably. The enthusiasm of participants at the Earth Summit in Rio in 1992 is palpable in the document at issue, Action 21. But very quickly *sustainable development* has been reduced to "three pillars" (economic, environmental, social) and businesses have been more effective in the appropriation of the term, as seen in Johannesburg in 2002. The space of global negotiations has clearly closed - just consider the Kyoto Protocol, but other issues such as changing consumption patterns demonstrate it too - while local negotiations have increased and ad hoc alliances are born, especially between enterprises and NGOs.

The representation in the form of a triangle (with the economic at the top) was introduced by the World Bank, and particularly entered the business world (Hodge, 1997). The three pillars are far from being on an equal footing. The representation of the economy is clear, unambiguous and powerful, the environment is diverse, and the social is disparate. The current balance of power is clearly in favour of economic pillar, if only by the uniqueness of its representation. It seems obvious that the economic pillar is represented by companies and their federations. As representations of the environment are multiple (Bachus et al., 2002), its representatives are sometimes contested: there is a deep misunderstanding (perhaps sometimes voluntary) on what is meant by environment. The social pillar is

supposed to be represented by trade unions and development NGOs, but the social is everywhere and its representation challenged. Hence, the adequacy of the representatives to the representations occurs only for the economy. And that is why companies like well the definition in terms of three pillars. Therefore, if *sustainable development* is to find the right balance between the three pillars, it is done in a well-circumscribed framework.

3. The ontology of sustainable development

The reduction to three pillars simplifies the space of negotiation and probably allows more easily to reach compromises. But at what price? *Degrowth* arrives in this context where positions seem frozen by the seizure of power of corporations. It shows what are the assumptions underlying today's compromise *sustainable development*, and how this has been recuperated in the space of negotiation.

Sustainable development is basically a question of speed: destruction and creation rates. Climate has always changed, but it is now changing too fast. Species have always appeared and disappeared, but the rate of destruction is much higher than the rate of creation, leading to the 6th global extinction in the history of life. Poverty and wealth have always existed, but inequalities are growing rapidly. There are today a lot of production but also destruction. Production, however, is fairly uniform, and some destructions are irreparable. There are many destruction for a few real creation: the history of mankind turns dreadful, or at least the current development does not seem able to solve the different crises. A current option taken by *sustainable development* is 'transition management': with more collective reflexivity, the transition towards a sustainable society could be fostered (Kemp & Marten 2007).

Degrowth underlines the emergency of the situation, the imminence of a global, environmental and societal, catastrophe. For *degrowth*, the catastrophe is not desirable, but should be thought as a real possibility. Like Dupuy (2002) says: "we do not believe in what we know". We know we are heading for disaster, but we do not believe it since we do almost nothing to avoid it. The only way to avoid the catastrophe is to embody it in our ontology, as paradoxical it may sound. This 'heuristics of fear' can however work only by convincing people, and a radical transformation of people's consciousness will take time as well. *Degrowth* seems also lacking time. *Degrowth* eliminates the question of transitions. 'Transition' probably refers to a reformist point of view. *Degrowth* would rather use 'mutation'. Mutation denotes more a radical change, a change of ontology, even. There is a proximity between catastrophism and *degrowth*. The question of the becoming ontology, called by the mutation, is however not asked deeply enough.

A strong contrast between *degrowth* and *sustainable development* is the acknowledgment of different crises. Environmental and social crises are certainly admitted by the two. But *degrowth* deals with crises not tackled by *sustainable development*: the loss of cultural diversity, the crisis of political representation, the crisis of meaning

broadly speaking. This places *degrowth* in a minority situation.

The majoritarian aspect of *sustainable development* gives its plausibility to some scenarios, or at least its 'believable' characteristics. On the other hand, *degrowth* looks for opening the possibilities and the virtualities of the current situation. Then it criticizes economic growth, development, commodification. *Sustainable development* is seen as an alibi for governments and companies to carry on their plundering of natural resources in the name of this new rationality that would be innocuous for the planet. The term 'development' itself is subject to discussions: for *degrowth*, development is not a universal process, and should not be imposed on third world countries. 'Development' belongs to a language coined in order to increase the Western hegemony on other populations. Each ethnic group should appropriate again one's identity. This leads to a vision of autonomous micro-societies connected together (Latouche 2006).

Somehow, in criticizing the dominating market (and growth), *degrowth* deepens the distinction between weak sustainability and strong sustainability (Williams & Millington 2004, Harribey 2007). Today, most often, weak sustainability wins while sometimes negotiation takes a 'natural capital' away from the influence of the market. The ontology of *sustainable development* is indeed based on entities and capitals, and on a 'resourcist' vision of nature (it is just required that the sum of capitals must increase). The very fact of speaking in terms of 'capitals' implies the idea of stocks and their convertibility. Growth is simply the indefinite extension of fluxes between capitals (based on the hypothesis that space and resources are illimitable). According to this point of view, material fluxes can be replaced by dematerialised capitals (a.o. services). The quantification of capitals is reflected into the universality of the development: this general ontology is actualised locally through spaces of negotiation, where swaps occur between financial capital, salaries and externalities. (For a detailed analysis of the ontology of sustainable development, see Zaccà 2002).

The relationship between ontology and epistemology helps explain the link between 'rational individual' and 'technological progress'. Each ontology indeed refers to a technology, i.e. a set of knowledge and know-how. The link between ontology and knowledge is epistemological: how some knowledge is formed in a given situation (because knowledge is always situated). The knowledge mobilised by *sustainable development* relies upon technology: rational individuals are attributed the power to choose the most efficient technology to achieve their ends. After many others, *degrowth* asks the question of technology: should we multiply our interventions in the ecosystems in order to manage them more carefully? Negotiation of *sustainable development* leads to more management of the environment; humans are becoming more and more 'nature managers', with expected benefits and unpredictable problems. *Degrowth* is also a refusal of this growth of management. *Degrowth* is however not clear about what to do with existing technologies.

The ontology is manifested notably through favoured policy instruments. The purpose of a policy instrument is to make beings acting. The actors of change in *sustainable*

development are the corporations and the consumers, namely individuals already constituted. A motto of *sustainable development* is "changing behaviours", that reflects the ontology of sustainable governance. Soft law and informational means are recommended to the detriment of stronger actions (rules, taxes). The actors of change for *degrowth* are not very clear yet. It seems that *degrowth* is still based upon modern ontology (i.e. individual responsibility). The motto of *degrowth* might be 'transforming modes of living', but there is currently no political or collective force able to support this at a large scale.

Ontology proceeds from inclusion and exclusion. In the prevalent *sustainable development* ontology, cultural diversity, nature and future generations are excluded. The diversity of cultures steps aside at the international level, where solution is selling technology. *Degrowth* emphasises the role of cultures, their diversities, as point of departure of regimes of individuation. By contrast, technology is presented as a solution that could be implemented in different contexts, notwithstanding the social circumstances of reception. In the space of negotiation, only 'environment' is used, not 'nature', namely these beings living well independently from humans. *Sustainable development* definition is based on the idea of 'future generations', but nobody can claim to be his right spokesperson.

Cultures, natures, future generations: these exist more on the mode of relation than on the mode of entities. A culture belongs to a group of people. A nature is not a set of living beings, but a togetherness of relationships, as an ecosystem. Future generations exist only insofar as we are able to transmit them something. It is striking to notice that in the modern ontology, nature and culture are separated while they are not admitted in the space of negotiation (Latour 2004). It should be exactly the reverse: natures and cultures are not separable and have to enter in the negotiation.

4. Ontological negotiation

The contrast between *sustainable development* and *degrowth* shows the limits of the classic negotiation. The question is to see how *degrowth* could or not make the negotiation becoming *ontological*, namely to help thinking of a negotiation that would also concern the negotiators' being. Negotiating being. In the *sustainable development* framework, negotiation aims mainly at strengthening or weakening some actors: negotiation concerns only the balance of power, not the power themselves. *Degrowth* asks: "what is a good power?"

Classical negotiation focuses on codes: terms are negotiated and succeed in a contract. Eventually, negotiators share common codes, even if they have different ontologies. For instance, a federation of companies or a trade union have not the same ontology, but they can agree in exchanging quantified advantages. The question asked by *degrowth* is about the way ontologies are constituted. In which sense could *degrowth* transform the space of negotiation? A classical negotiation does not touch the negotiators' beings. In such a negotiation, one must not ask to an interlocutor: "what is your culture? How do you consume?", since today, our culture is mainly reduced to the 'society of

consumption'. Ontological negotiation should be conceived as negotiation through which one is negotiating oneself together with the other negotiators. Even a 'revolution' is a way of negotiating: negotiating with the way the space of negotiation is constructed, negotiating our lifestyles, ... *Degrowth* calls for negotiating the frame in which the negotiation happens: political constraints, budget, time, etc. This is not possible as long as *sustainable development* negotiations are framed by the three institutionalised pillars.

Degrowth is a way to debate over ends, to get away from economism. As long as economics is dominating, means will reign over ends. An ontological negotiation would discuss until the means are absorbed by the ends. Then we might be able to begin negotiating with beings that are often presented as transcendent and fragile: ecosystems, human cultures, future generations. But somehow, *degrowth* wants to be able to distinguish anew nature and culture. There is an idea of purity of culture and purity of nature by *degrowth*. *Degrowth* thinks often that mankind and nature should find again a harmonious relationship. "Revive with this frame of prearistotelian mind is without doubt the condition of our survival." I suggest, on the contrary, that ontological negotiation includes discussion on the subject, or rather on mixes that blur the distinction between objects and subjects. It is the only way to understand what "nature" and "cultures" are today (Latour 1993).

In the debate around *sustainable development* and *degrowth*, there is a lot of 'religious' invectives. *Degrowth* criticises the 'market economy' as a new God. Some denounces *sustainable development* as a "new religion" (Brunel 2008). On the other hand, voices are raising against the 'spiritualism' of *degrowth* (Di Méo 2006). (We have seen the problem of the call to nature, to cultures and to future generations.) These 'transcendences' are however not established in the same way. Growth is institutionalised in the framework of *sustainable development*, like a kind of self-prophetic pantheism: all is becoming market. On the other hand, *degrowth* is a way to debate over ends, to get away from economism. As long as economics is dominating, means will reign over ends. An ontological negotiation would discuss until the means are absorbed by the ends, until the distinction between short and long terms is not relevant anymore. Or, rather, until a new meaning to this distinction is given. Then we might be able to begin negotiating with beings as ecosystems, human cultures, future generations. The problem is that *degrowth* often presents these beings as transcendent and fragile. For *degrowth*, nature and cultures seem to be transcendent. They are fragile and need to be protected. That explains some prophetic stances. But that underestimate the process of history and of politics. And that shows the need to make more explicit the required ontology.

We have up to now gathered several clues and elements of the *degrowth* ontology. This ontology is open to every being which takes part to the considered problem. Beings arise as relations, and not as already constituted entities. Virtual beings are accepted as interlocutors. In the classical space of negotiation everything is actual (representatives and their mandates). The negotiation is about relations and tries to tie them in other ways. In the ontological negotiation beings are perceived as nexus of relations; it is then possible to untie and tie in another way beings

themselves. Natures and cultures are intertwined, each time differently. Beings are surrounded by a halo of virtualities, i.e. shaped through the potency of relationships they could make. In this perspective, rituals are practices that associate a gesture to a representation.

This kind of ontology allows experimentation and accounts for bodies and practices. Mutations and bifurcations are possible and thinkable. Negotiating technology is possible and sensible. Use-value is considered for itself and for its incorporation into practices, and cannot be equalised to exchange-value. This approach has a history in which one finds philosophers as Spinoza, Nietzsche, Bergson, Whitehead, Simondon, Deleuze (Debaise 2004).

In order to illustrate this '*degrowth* ontology', I will consider the proposition of Guattari (2000): an ontology is the superposition of three ecologies, i.e. related ecologies of environmental, mental and social worlds. An ontological negotiation should concern simultaneously individual, social and environmental levels. The issue of culture and of imaginative faculty (*imaginaire*), fostered by *degrowth*, is then replayed through the relationships of the three ecologies. Guattari thinks that the three ecologies should be changed in the same time: if an ecology is left unchanged, it will react and impede the mutation to occur.

In *sustainable development*, the individual level is defined by the market. *Degrowth* proposes in its charter at this level a programme of voluntary simplicity: "degrowth does not suggest to live less, but better with less goods and more links". In opposition to the ontology of having, *degrowth* promotes an ontology of being — understood as a nexus of relations. *Degrowth* proposes a form of ancestral wisdom: happiness actualises "through the satisfaction of a carefully limited number of needs". To slow down allows transforming one's imagination and feelings, a kind of 'inner revolution'. It questions our lifestyles: comfort or well-being? desire or need? It is very difficult to address these questions today for even if the negotiation is individual, it has to be supported by the others, their practices and the infrastructures. On concrete individual actions, *sustainable development* and *degrowth* can meet, the difference being that *degrowth* does not pretend it is enough.

At the societal level, the question is the type of desired democracy and the organisation of public debates. Participation is called forth, but in every sphere, including the production. Self-management and direct democracy are the political consequences of the *degrowth* ontology.

Environmental negotiation is the most difficult, because the issue is relatively new and cannot rely upon past experiences. Limits do not determine straightforward the possible environment for mankind. Too often *degrowth* thinks in local terms: environment and culture have to be respected. Local limits are clear and should not be touched, for *degrowth*. Global limits are however much less obvious. For *degrowth*, there are clear limits: they are geological. But resources (renewable and non-renewable) depend on technology. So the question of limits is taken back to the negotiation of technology. We will have to negotiate limits. For instance, the global increase of temperature is currently negotiated between mitigation and adaptation. For the biodiversity issue: how many species could disappear

without threatening mankind? What is the place to hold for other species: conservation parks should be open or closed to humans? We are losing our freedom of action: how could we negotiate in other ways with the planet?

5. Conclusion: a new cosmology?

Is it possible to negotiate with whom wants to destroy the object of negotiation? That's the way *sustainable development* thinks of *degrowth*. In the *sustainable development* space, relations to objects and between beings are negotiated. *Degrowth* challenges this for it wants to negotiate also beings, and call for other representatives in the negotiation. *Degrowth* blames *sustainable development* for wishing to change things so nothing changes. It is nevertheless possible that the space of negotiation will be reopened, as some interest for long-term visions is growing and common targets are discussed. The question is again one of speed: will it be fast enough? Ontological negotiation allows that the theme of negotiation evolves through the negotiation, and it will be interesting to observe how the debate between efficiency and sufficiency will evolve around the question of energy.

How is the issue of rhythms inscribed in an ontology? Ontologies are more or less fluid, with different degrees of constituted beings and supple relationships. And as long as it is based on past models, *degrowth* will not lead to a radical and ontological transformation. Our historical being — history of mankind as well as history of life — is at the moment harboured in technology: we can admire these narratives and also say that history as it is going very badly respects the past and hopes of mankind and life. To take up the global challenge, I suggest to think up to the end the process of negotiation until the constitution of the space of negotiation is completely transformed. But to move our ontology, we will have probably to recompose our cosmology.

For Descola, a cosmology is the product of our ontology, of the distribution of beings' properties. The inclusion of virtual beings, and the way to represent them is decisive. Contrary to the current implementation of *sustainable development*, *degrowth* tries to include in its ontology the diversity of cultures. This diversity was valorised in the Brundtland report through the "protection of traditional rights" (chapter 4). But has disappeared from the space of negotiation. The inclusion of new beings should not be limited however to culture: ecosystems and future generations are for instance welcome. Yet, we do not know how to bring us to the cosmopolitics where all beings (human and non-human) have their place, but a negotiated place. The 'we' is itself difficult, is part of the problem.

Every human is concerned by politics, but not only humans are affected. All beings on Earth are more or less affected by humans, and should be present when we ask: "what should we do?" As this question refers to specific situations, always singular, we are not negotiating with all beings, but have to carefully select beings. This had could been sustainable development.

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Less is more: The influence of aspirations and priming on well-being

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Abstract

If resource consumption is to be reduced through economic "de-growth", individuals in industrialized countries may have to accept a reduction in their consumption levels. In democratic societies, implementing this process requires the consent of a majority of the population. However, as long as people have high reference levels of consumption, lower consumption will induce feelings of loss, and hence evoke resistance. This paper summarizes recent experimental evidence on some of the factors that determine the utility costs involved in decreasing consumption. The results suggest that the acceptance of economic de-growth would be facilitated if people's material aspirations were moderated, and the extent to which material possessions are emphasized in our daily environment was reduced.

Keywords: aspirations, expectations, well-being, reference states, priming, experiments

1. Introduction

After many years of growth in material living standards, people in western industrialized countries have become used to aspiring for ever higher levels of consumption. Neither policy makers nor industry so far had reasons to counter this development, since people's working hard and consuming much is often perceived as being the basis of our economic and social system.

Recent reports on the state of the ecosystem have cast doubt on the future feasibility of constant growth in material output. The long-term living standard that the resources on our planet can sustain for all its inhabitants may well be far below the current standard in the western world, even if new technologies further increase the efficiency of resource use. This implies a need to reduce this standard if sustainability and peace are to be achieved in the long-run.

The present paper discusses two aspects of the question how this reduction can be made less painful, and hence easier to accept, for people who are affected by it. First, it presents a lab experiment which analyzes the impact of high material aspirations on expected well-being. Second, it considers evidence from a classroom experiment on the influence of a focus on material achievements in people's daily environments. Experiments seem particularly suited to analyze these basic characteristics of people's preferences, since they provide a controlled environment where the effects of the variables of interest can be isolated from external influences.

The first experiment shows that aspirations continue to influence people's reference states even after their expectations have changed. This implies that initially

aiming for high levels of consumption leads to losses in well-being when aspirations are not fulfilled. These losses occur, first, when people have to lower their expectations regarding their consumption, and, second, when they actually receive the lower outcomes.

The second experiment provides evidence for the influence of priming on people's reference states. It shows that if people are exposed to statements that emphasize the importance of material achievements, their reference states regarding material outcomes increase. This implies that a given level of wealth or consumption will lead to lower well-being than when people are not exposed to such statements.

Although the results are clearly preliminary in that they are based on one-time experiments, they indicate a need to reconsider a basic consensus in many western democracies, namely the focus on consumption. As long as this focus persists and is present in many spheres of our daily lives, policies aiming at reducing our level of consumption in order to achieve sustainability will lead to strong feelings of loss and find little support.

2. The influence of aspirations

Throughout our lives we form aspirations regarding future outcomes. These aspirations are not always based on detailed information, but may derive from what we consider desirable or appropriate. For example, we may have a perception of our future wealth and consumption level. But we do not possess reliable information on the market conditions prevailing in the future, i.e., on the consumption level we are really going to achieve.

When we obtain better information or market conditions change, our aspirations may prove incorrect. We may learn that we will earn less than we thought, or that we will achieve a lower consumption level than we hoped for. How hard it is for us to accept these changes depends on how fast we adapt to new expectations. If we adapt relatively quickly, our initial aspirations do not significantly influence the well-being we derive from our outcomes: We do not mind earning and consuming less than we aspired for initially. If, however, we do not adapt quickly to new expectations, our well-being is affected. Then we keep on comparing our small flat to the villa we dreamed of: not meeting initial aspirations leaves us disappointed. In this case, forming high aspirations induces losses in well-being if expectations have to be reduced later on.

Matthey and Dwenger (2007) develop a theoretical model, where they analyze the effects of aspirations on utility¹. There they distinguish between aspirations and expectations in the following way. Aspirations are based on vague information and are potentially biased by factors like social comparison (see Stutzer, 2004), self-image (see Nauta et al., 1998; Bandura et al., 2001, Pinquart et al., 2004), wishful thinking (see Bryce and Olney, 1991) etc. Expectations, in contrast, are formed when detailed information becomes available. They are unbiased in the sense that they correctly reflect the available information. Utility in the model is defined according to prospect theory (Kahneman and Tversky, 1979), i.e., preferences are referencedependent. This means that outcomes are not only

evaluated in absolute terms, but experienced as gains and losses relative to a reference state. Whether aspirations influence well-being then depends on whether they influence reference states, and continue to do so once realistic expectations are formed.

The model shows that the net effect of aspirations on utility depends on one crucial factor: the adaptation of reference states to new expectations. If reference states adapt quickly, no costs of high aspirations must be expected. If they do not adapt quickly, negative effects on utility are possible.

Next, the authors conduct a lab experiment that tests this adaptation. Through analyzing observed behavior they can infer whether people adapt quickly to changes in expectations. The design of the experiment can be summarized as follows. Before the experiment begins, the authors assess the participants' aspirations regarding their payoffs from the experiment. Then they inform the participants about a lottery they are going to take part in. Some subjects participate in a lottery with high payoffs (10 and 12 Euro), some in a lottery with low payoffs (1 and 3 Euro). Once participants have received this information, they complete a different task, which takes about 10 minutes and allows them to get used to expecting their respective lottery. Then this lottery is played out, with half of the subjects winning in their lottery (3 and 12 Euro), and half of the subjects losing (1 and 10 Euro). The authors then analyze whether the participants' feelings of loss and gain, that is, their reference-states, depend only on their expectations, or whether they are still influenced by their initial aspirations.

The results show that people's initial aspirations have a persistent influence on their reference states, even if they have time to adapt to new expectations. This implies that the potential losses induced by high aspirations are not trivial. The higher people use the term utility and take it as a proxy for well-being. Although this is a simplification, it is used here to comply with the notation in the model form aspirations regarding their future consumption, the more they suffer from a reduction in expected outcomes, and the more they will resist such a reduction. Hence, in order to facilitate the acceptance of a policy of de-growth, people's aspirations regarding wealth and consumption levels would have to be moderated.

Another result is interesting here. In an earlier experiment, Matthey (2008a) finds that not only the utility from realized outcomes is reference-dependent, but also the utility from expectations (anticipatory utility, see Caplin and Leahy, 2001). This means that when people's reference states are influenced by high aspirations, losses can occur twice. First, when people have to reduce their high initial aspirations to lower expectations they experience a loss in anticipatory utility. The joy of looking forward to high outcomes has to be reduced to looking forward to lower outcomes, which leads to disappointment. Second, when people receive their outcomes, but reference states have not yet adjusted to the lower expectation, this is again experienced as a loss. In order to avoid these losses, people will try to avoid a decrease in their (expected) consumption, and resist policies aiming in this direction.

3. The influence of priming

Matthey (2008b) conducts a simple experiment to test the influence of priming on people's reference states. Priming is a method that is frequently used in psychology, and is meant to activate certain concepts in the subjects' minds without drawing their attention to this activation (see, e.g., Vohs et al, 2006). Participants in this experiment had to form 20 meaningful phrases from a group of five words per phrase. Ten of these phrases were neutral and the same across groups. The other ten referred to either material achievements (e.g., "Smart investors become rich."), social contents (e.g., "Children help their parents.") or neutral contents. This task took about 5 minutes. It was intended to activate social vs. material concepts in the subjects' minds. Then participants were given some amount of money and had to decide how much of it to invest in a lottery. In this lottery they would either triple or lose the invested amount with equal probability. The risk attitude that the participants expressed through their investment decision was used to assess differences in their reference states regarding monetary outcomes. The results show a significant difference between the "material" and the "social" group, with the material group showing lower risk aversion.

Prospect theory finds that people are risk loving in the domain of losses, but risk averse in the domain of gains (Kahneman and Tversky, 1979). Applying this finding to the experimental results implies that activating the material rather than the social concept led to significantly higher reference states. Hence, even such a brief priming exercise in a classroom environment is sufficient to significantly influence people's reference states, and hence their preferences. This gives an indication on how strongly people's reference states may depend on the "priming" they are exposed to in their every day life. The stronger the focus and emphasis on consumption and material achievements, the higher reference states must be expected in this dimension. Accordingly, the higher a loss in well-being will people experience when their consumption levels decrease, and the stronger they will resist policies with this aim.

4. Conclusion

The experiments described in this paper show that the effect of a decrease in consumption on well-being does not only depend on the absolute size of this decrease. It also depends on the individual's aspirations, and on how strongly the environment "primes" the individual towards focusing on material achievements. If de-growth is to be brought about through a democratic process, these effects must be taken into account.

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Psychological barriers to de-growth: values mediate the relationship between well-being and income

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Abstract

Sustainability and the limits of the planet – terms that many people see as remote from their everyday lives and that some refuse to accept at all. Moreover, the underlying message that we all need to consume less stands in direct opposition to a dominant myth in Western society, namely that more consumption is the route to greater happiness.

In fact, a good deal of recent research has shown that subjective well-being is relatively insensitive to changes in income and consumption, yet much more sensitive to various social and personal factors (even when wealth is controlled for). Moreover, a consistent finding is that holding a broadly materialistic outlook depresses happiness and leads to higher levels of dissatisfaction and anxiety. In other words, individuals who consume more are not necessarily happier and focusing on consumption at the expense of other things may in fact be constraining their well-being.

The argument that consumption growth can be detrimental to well-being in some key respects provides a new and powerful motivation for changing to a de-growth model. However, despite empirical evidence to the contrary, the fact remains that many people perceive that a de-growth economy would be bad for their well-being. In this paper we will consider the mechanisms through which psychological well-being is achieved and maintained. In doing so, we will also explore some of the most significant psychological “barriers” to the personal and social changes that would accompany de-growth. These include a variety of cognitive biases (e.g. loss aversion, endowment effects) and problems of affective forecasting, the role played by social norms and values in construing self identity, and the difficulties posed by mass action problems.

The enticing vision of low-consumption, high well-being lifestyles can be realised only to the extent that these psychological barriers can be overcome. We will therefore argue that whilst legislation, coercion or need (e.g. poverty) may help to instigate behaviour change, the well-being benefits of such changes will depend on the individual being able to internalise the motivation such that they value their new lifestyle for its own sake. In other words, we must persuade people that de-growth is both necessary and – crucially – in their own best interests.

1. Introduction

“There is no crime greater than having too many desires; There is no disaster greater than not being content;” Lau Tzu, *Tao Te Ching* 46

Throughout history, across widely different cultures, people have recognised the dangers of an excessive focus on wealth and material possessions. Viewed in this wider historical context, our current Western fixation with the pursuit of individual gain as *the* route to happiness appears anomalous. And yet, we live in an age in which the pursuit of individual wealth and national growth have risen beyond mere social acceptability to become virtually synonymous with “aspiration”, “development” and even, in some quarters, touted as a moral good in themselves (for a stout defence of economic growth and its attendant personal aspirations in moral terms, see Friedman, 2005).

It has become unfashionable to promote restraint and contentment as virtues. However, the wisdom of centuries stacks-up well against the findings of modern experimental psychology. In recent decades, great strides have been made in uncovering the factors that give rise to individual happiness. The results are strikingly consistent, if unsurprising. In most reasonably developed countries, material circumstances such as wealth and possessions play only a small role in determining levels of happiness – some psychologists estimate that they explain only around ten per cent of variation in happiness at the aggregate level (Lyubomirsky, Sheldon & Schkade, 2005). Much more significant are factors relating to individual differences in outlook and to the kinds of activities that people engage in: socialising, participating in cultural life, having meaningful and challenging work and so on.

These findings are extremely significant for the burgeoning de-growth movement. The need for a de-growth economy has usually been framed in terms of environmental sustainability and the limits of the planet – terms that many people see as remote from their everyday lives and that some refuse to accept at all. Moreover, the underlying message that we all need to consume less stands in direct opposition to a dominant belief in Western society, namely that more consumption is the route to greater happiness. Consuming less is seen to be a sacrifice. Given that, under virtually any plausible de-growth scenario, real incomes for many in the rich West are likely to remain static or even decline, and with them levels of personal consumption, persuading people that de-growth is somehow in their own best interests seems likely to be difficult. Quite apart from the economic and political challenges, this represents a very significant *psychological* barrier to instigating a de-growth policy.

2. Income and life satisfaction

In this context, understanding the functional relationship between income and subjective well-being is of particular interest. Over the last 40 years, some economists have begun to explore this issue by using self-reported measures of happiness and satisfaction to represent utility within econometric models, rather than simply regarding income as a direct proxy for it. If people are really experiencing increased utility as they become wealthier, the argument runs, we would expect to find them reporting greater satisfaction with their lives as a consequence. A considerable amount of research using large, cross-sectional data sets has settled broadly on the conclusion that aggregate life satisfaction and income are monotonically

but non-linearly related. Past a certain level of income, marginal increases in life satisfaction decrease rapidly as income rises (for a recent review of this research, see Clark, Frijters and Shields, 2008).

The term “double dividend” has often been used to encompass the general argument that there may be benefits to individual well-being from living lower-consumption lifestyles (Jackson, 2005).¹ For proponents of de-growth, the non-linear relationship between life satisfaction implies an enticing double dividend; perhaps the process of de-growth could be accompanied by a net gain – or, at the very least, no net loss – in experienced well-being at the aggregate level. After all, if having more money has an increasingly negligible impact on happiness once an acceptable level of income has been reached, then it seems possible that those whose income exceeds this level could, *ceteris paribus*, be more or less as happy with lower incomes. It has sometimes been argued further that the process of *striving* for more money can lead to factors such as increased stress, “time poverty” and strain on personal relationships, which are for many people actively detrimental to well-being. Perhaps, then, some people could be *even happier* with less if their decrease in income were accompanied by changes to other aspects of their lifestyles.

This argument seems to offer a way of overcoming the psychological barrier to de-growth discussed above; namely, the overriding belief that consumption is the route to happiness and the concomitant fear that reducing consumption would inevitably impact negatively on quality of life. Were it to be accepted by the general public, it could dramatically change consumption patterns.

3. The role of values

But does the argument hold? Do these results *really* imply that de-growth would feel less painful than people intuitively assume? Research on the relationship between experienced well-being and income is extensive (for a comprehensive recent overview, see Eid & Larsen, 2008). For the purpose of understanding the psychological impact of income on well-being, however, we will concentrate on just one aspect, namely the relation between income, well-being and the broader value orientations that people hold.

An extensive body of research work in psychology has argued that values and aspirations play a key role determining how people evaluate their material circumstances (see, e.g. Ryan & Deci, 2000). Specifically, Kasser and Ryan (1993, 1996, 2001) have drawn a distinction between goals and aspirations that are intrinsic and extrinsic. Intrinsic goals are those that are inherently rewarding and do not depend on external validation. Extrinsic goals, by contrast, are typically pursued as a means to some external reward, for instance financial success, image or popularity/status. Empirical analyses of goal structures across 15 nations (Grouzet, Kasser, Ahuvia, Fernández, Kim, Lau, Ryan, Saunders, Schmuck & Sheldon, 2005) has given rise to a so-called circumplex

model of motivations (see figure 1). This model shows that intrinsic and extrinsic goals are in opposition to one another, such that an individual who is more intrinsically focussed will be, by necessity, *less* extrinsically focused and vice versa.

The extent to which intrinsic or extrinsic values dominate for an individual has been found to be a significant predictor of well-being. Across a range of indicators including self-esteem, depressive symptoms, drug and alcohol abuse, self-actualisation and self-reported life satisfaction, individuals who are more extrinsically motivated show lower well-being relative to those who are more intrinsically motivated (Kasser & Ryan, 1993, 1996, 2001; Sheldon & Kasser, 1995; Sheldon, Ryan, Deci & Kasser, 2004). This central finding, which we shall refer to as the “values dividend”, has been corroborated both by those working in other laboratories (e.g. Carver & Baird, 1998) and other paradigms (e.g. Sagiv & Schwartz, 2000).

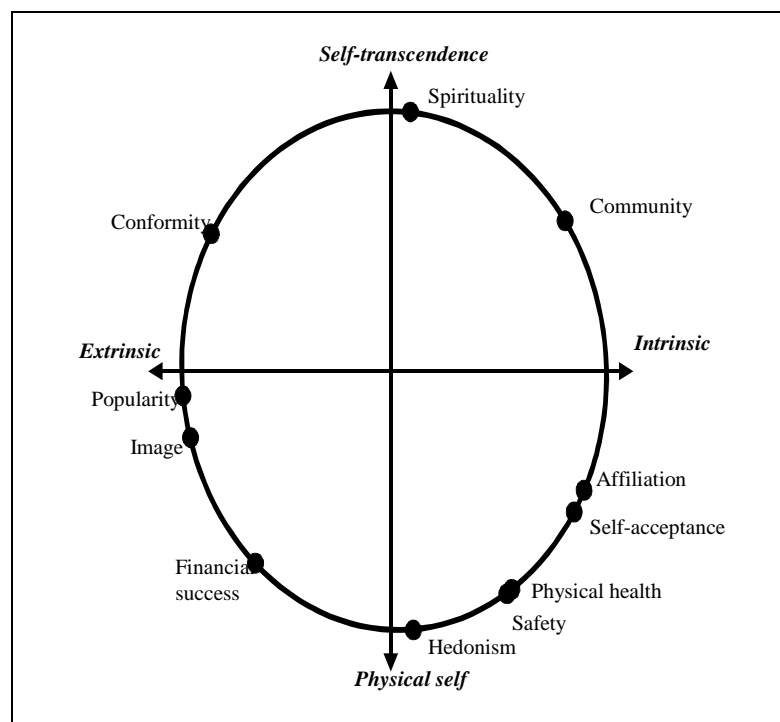


Figure 1: Circumplex model (Grouzet *et al.*, 2005) – Reproduced with permission from Tim Kasser

4. Do values and income interact?

In itself, the suggestion that individuals who hold more intrinsic value orientations are likely to have higher well-being overall is interesting, but says little about how a change in income under a de-growth scenario might impact on people’s lives. However, there are reasons to hypothesise an interaction between the values people hold and their material circumstances.

Kahneman, Krueger, Schkade, Schwarz and Stone (2006) suggest that when people consider how satisfied with they are with their lives overall, they tend to think about “conventional status-bearing achievements” – their income, their home, whether or not they have a good job and so on. They note that these kinds of factors are significant because, in Western society, they function as a means of

¹ Although it was coined in relation to the more specific claim that a “double dividend” of welfare and environmental benefits could (in theory) be gained from increased use of environmental taxation.

signalling relative social position. To the extent that individuals have more income they are likely to have more of these “status-bearing” goods and achievements; hence, even when absolute consumption needs have been comfortably met there remains a moderately positive relationship between income and life satisfaction attributable to the beneficial impact of relative status.

Clearly, however, some people – those with relatively extrinsic value orientations – simply *care more* about status than others. It is already known (as discussed above) that people whose value orientation is relatively intrinsic are more satisfied at a lower level of income than those whose value orientation is relatively extrinsic, *ceteris paribus*, since extrinsic goals are inherently less satisfying of basic psychological needs (Kasser & Ryan, 2001). However, if the relative balance of intrinsic and extrinsic values shapes the extent to which status effects influence a person’s well-being, we would expect to find that the aggregate functional form of the relationship between life satisfaction and income should be mediated (in part) by values. In other words, we would hypothesise the existence of a significant interaction effect between values and income, such that income plays a more important role in determining subjective well-being for those with a more extrinsic value orientation, whereas values play a more important role in determining subjective well-being for those at lower incomes. However, consistent with previous research, we would not expect the values dividend to disappear entirely, even at higher income levels.

The aim of the present study was to test these hypotheses with a large representative sample. Further, we sought to quantify the life satisfaction changes one might expect as a result of widespread value changes, and compare them in scale with life satisfaction changes resulting from changes in income.

5. Methods

Data source

Data were drawn from the third wave of the European Social Survey (ESS), a biennial household survey of social attitudes across Europe with a statistically representative sample of N = 1-2000 in each country surveyed.² This provides data at the individual level on all three of the variables of interest in this study – subjective well-being (operationalised as life satisfaction), income and values orientation, across the 16 European states from which the ESS had complete data.³ To enhance the power of our statistical analyses, we pooled data across Europe.

Operationalisation of variables

The ESS does not explicitly operationalise the intrinsic-extrinsic discussed above. Instead, it uses a 21-item Portrait Values Questionnaire based on Schwartz’s theory of 10 human values (Schwartz, Melech, Lehmann, Burgess, Harris & Owens, 2001). Sagiv and Schwartz (2000) suggest that intrinsic goals correspond to Schwartz’s values of self-

direction, benevolence and universalism; whilst extrinsic goals correspond to Schwartz’s value of power. Communication with Kasser (personal communication, 2008) suggested that Schwartz’s achievement value may also be considered to map onto extrinsic goals. Lastly, we also treated Schwartz’s value of conformity as an extrinsic goal, given that conformity is also a construct in Kasser & Ryan’s model and that it falls on the extrinsic side of the circumplex model.

Figure 2 shows how we have translated Schwartz’s model of values onto Kasser & Ryan’s intrinsic-extrinsic dimension.

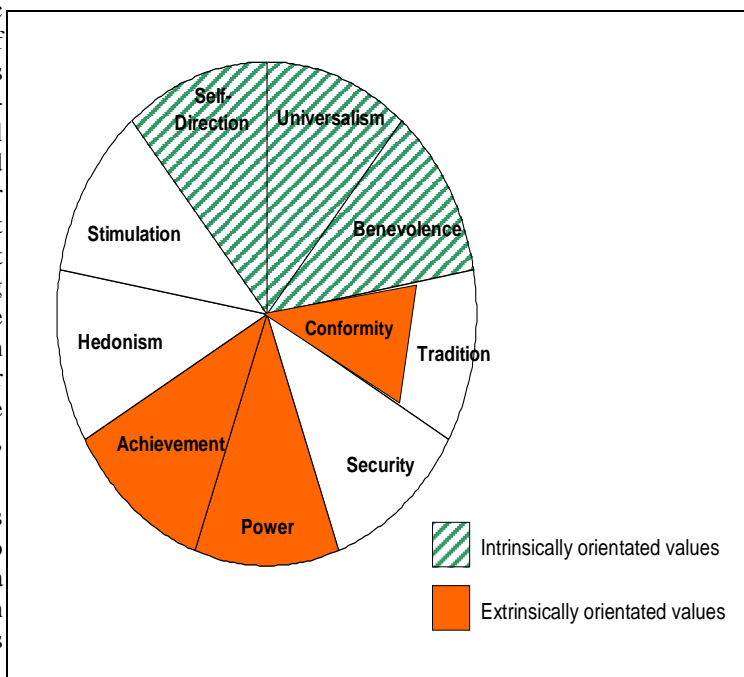


Figure 2: Schwartz model of values, with values used to operationalise intrinsic and extrinsic motivations highlighted (adapted from the ESS Edunet website: <http://essedunet.nsd.uib.no/cms/topics/1/1/2.html>)

The table below illustrates the operationalisation of extrinsic and intrinsic values. In both cases the overall score for the orientation was taken to be the unweighted average of the scores for each relevant Schwartz value, which in turn was taken to be the unweighted average of the scores for the questions purporting to tap that value.

Recognising the conflicting nature of values, as outlined in the circumplex model, we created a single intrinsic-extrinsic dimension by subtracting the mean for one orientation from the other. The more positive the final score, the more intrinsically orientated is an individual, and vice-versa.

Subjective well-being was operationalised as the answer to a single life satisfaction question, on a scale from 0-10:

“All things considered, how satisfied are you with your life as a whole nowadays? Please answer using this card, where 0 means extremely dissatisfied and 10 means extremely satisfied.”

² www.europeansocialsurvey.org

³ The 16 countries are: Belgium, Bulgaria, Cyprus, Denmark, Finland, France, Germany, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

Schwartz Value	Question	Schwartz value	Question
Self-Direction	Important to think new ideas and being creative	Power	Important to be rich, have money and expensive things
	Important to make own decisions and be free		Important to get respect from others
Universalism	Important that people are treated equally and have equal opportunities	Achievement	Important to show abilities and be admired
	Important to understand different people		Important to be successful and that people recognise achievements
	Important to care for nature and environment	Conformity	Important to behave properly
Benevolence	Important to be loyal to friends and devote to people close		Important to do what is told and follow rules
	Important to help people and care for others well-being		

Income was assessed in the survey with a question allowing respondents to be put into one of twelve bands according to net household income (i.e. after tax).⁴ The household income for a given respondent was estimated to be the half-way point in the range covered by the income band within which they fell, defined in Euros. This figure was then converted into a purchasing power income based on the purchasing power parity (PPP) conversion factors for the respondent's country of residence.⁵

Analysis

Our main analysis (Method 1) was a two-stage OLS regression model, performed in SPSS v14.0, with life satisfaction as the dependent variable and income, extrinsic/intrinsic value orientation and an interaction term as independent variables.⁶ Given evidence that the relationship between income and life satisfaction within developed countries is typically logarithmic (e.g. Layard, Mayraz & Nickell, in press), income was entered as a natural logarithm term.⁷ Value orientation was entered as

⁴ Precise wording: "Using this card, if you add up the income from all sources, which letter describes your household's total net income? If you don't know the exact figure, please give an estimate. Use the part of the card that you know best: weekly, monthly or annual income."

⁵ Downloaded, on 09/05/08, from the World Bank's World Development Indicator website (<http://publications.worldbank.org/subscriptions/WDI>)

⁶ Appropriate weightings, as provided in the European Social Survey dataset were used throughout.

⁷ We did explore entering a linear term in addition to a logarithmic term for income. This did prove to be significant, but as a negative term. In other words, the function predicted that, at very high levels of income, life satisfaction would actually start to

decline with income. calculated above (positive values indicating a more intrinsic orientation). The interaction term was a simple multiplication of the value orientation score and the logarithmic income function.

In the first stage of the regression analysis, we entered income and value orientation as predictive terms. In the second stage we used a stepwise methodology to test whether the interaction term would enter the equation, with a threshold of $p < 0.05$.

Using the beta values from this regression methodology to produce estimated life satisfaction scores, it is possible to predict the effect that changes in values would have across Europe overall, for different countries, and at different levels of income. Looking at it another way, one can predict how changes in income might affect people with different value orientations. One can also estimate the changes in values that, assuming a static model, would produce the same changes in life satisfaction as a given change in income. For example, what change in values would compensate for a 20% decrease in income?

In parallel with the regressions incorporating interaction terms, we also developed another approach for assessing the mediating effect of value orientation on the income-life satisfaction relationship (Method 2). Rather than creating a single regression model for all respondents, we divided them into three roughly equally-sized groups according to their scores on the intrinsic-extrinsic dimension: relatively intrinsic, relatively extrinsic, and medium.⁸ We performed separate regressions for both the relatively intrinsic and relatively extrinsic groups and used the estimated functions to plot best-fit lines, allowing a visual assessment of how the relationship between life satisfaction and income differed. This also allowed us to check whether the difference in life satisfaction between relatively intrinsically and extrinsically motivated individuals exists across the income spectrum, as would be expected by Kasser & Ryan (2001).

6. Results

Method 1

After entering income, the natural logarithm of income and the intrinsic-extrinsic dimension, both interaction terms still entered the regression with significant beta coefficients, as shown in the table below:

	Unstandardised B	Standardised Beta	t-value	p
ln (income)	0.765	0.289	28.6	<0.001
value orientation	0.850	0.333	4.4	<0.001

decline with income.

⁸ This was achieved using SPSS's visual bander function. We specified cutpoints so as to divide the respondents into 33% groups according to value orientation. Of course, given that many individuals would have the same scores on value orientations, including at the cutpoints themselves, this prevents the groups from being exactly equal in size.

value	x			
ln(income)	-0.074	-0.293	-3.8	<0.001

All three terms proved to be highly significant, including the interaction term. The negative sign indicates that, for more intrinsically motivated individuals, increasing income has a milder impact on life satisfaction as predicted. In other words, values are important in determining life satisfaction, but the magnitude of the value dividend diminishes as income increases.

It should not be forgotten that there are many other factors that determine life satisfaction, and that this model does not have exceptional predictive power ($R^2 = 0.07$). However, the inclusion of the interaction term significantly improves the model (F of change = 14.4, $p < 0.001$).

Method 2

Dividing respondents into relatively extrinsically and relatively intrinsically motivated groups, allows us to visualise the interaction better and provides the further degree of freedom required to explore what happens to the value dividend across the income spectrum. As shown in Figure 3 the gap in life satisfaction between the more intrinsic group and the more extrinsic group is widest at low

motivated individuals are still marginally happier than those more extrinsically motivated. It would be hard to argue that this is because they have been unable to meet their extrinsic goals.⁹ As shown in Figure 4, across the income range taken in the survey there is no point at which the value-dividend disappears altogether (at about €150,000 per year PPP it drops to below 0.1 on the life satisfaction scale).

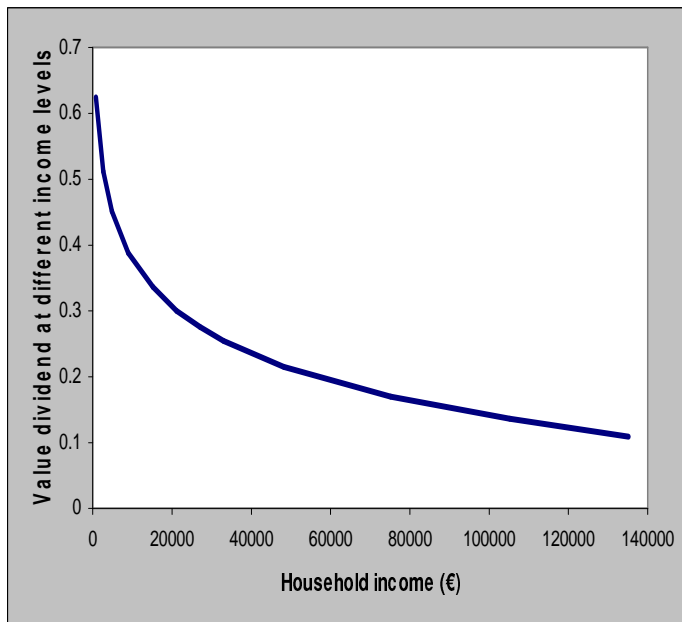


Figure 4: Estimated value dividend across income.

It should be acknowledged that these effects are not huge at any income level. Nevertheless, given the difficulty in predicting life satisfaction with *any* independent variable, they are noteworthy.

Estimated effects at country level

The regression in Method 1 allowed us to project what might happen to a given individual’s well-being should their value orientation shift by a fixed amount. Using the regression function, we calculated projected life satisfaction scores for each respondent should value orientation shift towards the intrinsic by 2 standard deviations. We then explored what this shift would do for the distribution of life satisfaction within each country – specifically the percentage of individuals with a life satisfaction of 5 or lower. Figure 5 shows the results of this analysis.

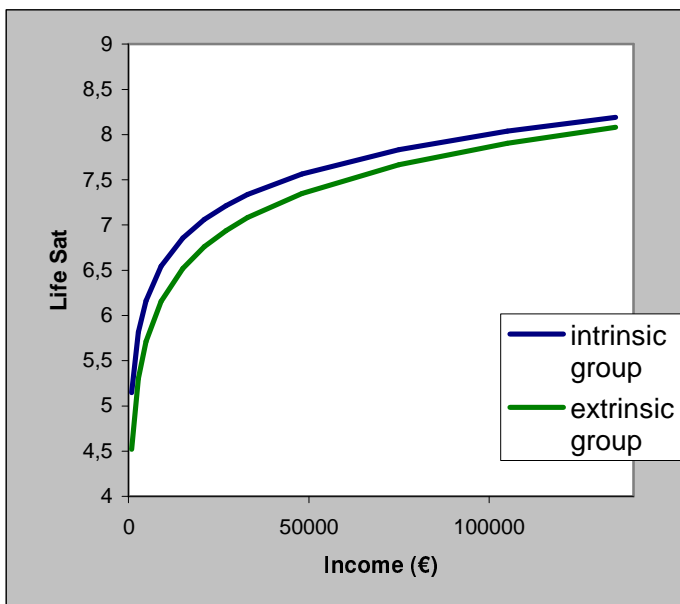


Figure 3: Separate income – life satisfaction functions for relatively intrinsically motivated and relatively extrinsically motivated groups. incomes (0.51 at a household income of €2700 per year PPP), but reduces with higher incomes (0.22 at a household income of €48,000 per year PPP). The distinction between the two groups is supported by the lower R value for the predictive regression for the intrinsic group compared to the extrinsic group (R^2 of 0.046 vs. 0.079), indicating that income is simply a poorer predictor of life satisfaction for that group.

Importantly, the two curves do not meet within the income range studied, supporting the claim that intrinsic values remain inherently more positive for subjective well-being than extrinsic across the income spectrum. It seems that, even at incomes of over €100,000 per year, intrinsically

⁹ It may well be that whilst they may have met some extrinsic goals, this is never sufficient. Anecdotal evidence suggests that extremely wealthy individuals seem to constantly set their targets higher as they attain greater wealth (Kasser, 2003).

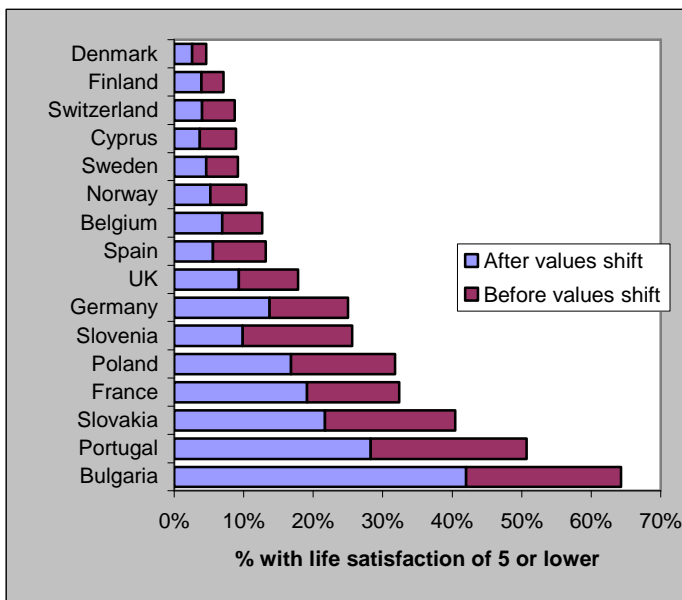


Figure 5: Projected reduction in proportions of population with low life satisfaction following a 2 standard deviation shift towards intrinsic values.

Unsurprisingly, in absolute terms, this chart predicts larger dividends of a values shift in countries where mean PPP income is lower. However in terms of the proportion of individuals moved beyond life satisfaction levels of 5 or lower, the benefits are quite widely spread. Interestingly, this quite substantial shift at the lower end of the life satisfaction distribution is roughly equivalent to that which would be predicted by a universal increase of annual household income of €5000 PPP.

Estimated effect across Europe

At the mean PPP annual household income for the countries in the ESS dataset (around €27,000), a 1 standard deviation change towards intrinsic values corresponds with the increase in life satisfaction seen with a 12.5% increase in income (to approximately €30,500). Looking the other way, with de-growth in mind, a 20% drop in income (from €27,000 to €22,000) would theoretically be compensated for by a shift towards intrinsic values of 1.6 standard deviations.

6. Discussion and conclusions

This study represents the first attempt to replicate the well-evidenced relationship between values and life satisfaction using representative national samples. More importantly, it demonstrates that the interaction between relatively intrinsic/extrinsic value orientations and income is significant for subjective well-being, such that income plays a more important role for individuals with more extrinsic value orientations. This supports the finding in Rojas (2007) that the regression equation relating income to life satisfaction has more predictive power for people classified as having outer-facing ‘philosophies’ of happiness, than those having inner-facing philosophies. However, it does not deny that values play a role in determining well-being across the income spectrum.

The regression models we have developed allow one to quantify the impact values have on life satisfaction. It must be acknowledged that the impact is typically marginal; however, it is statistically significant and not small compared to that of income. For example, a shift in values of 1 standard deviation, at mean income, equates to a change in income of 12.5%. Similarly, a highly extrinsically orientated individual (2 standard deviations more extrinsic than the mean) would require a net household income of over €28,000 per year to achieve an acceptable level of life satisfaction of 7.0. On the other hand, a highly intrinsically orientated individual (2 standard deviations more *intrinsic* than the mean) would achieve this level of life satisfaction at €16,000 per year. Lastly, such an extrinsically motivated individual, suffering a substantial income drop (from €75,000 to €21,000 per year) would suffer a life satisfaction drop of 1.04, whereas an intrinsically motivated individual suffering the same income drop would only suffer a life satisfaction drop of 0.70.

It is important to recognise that the projections we have performed here are based on a single cross-section rather than on longitudinal panel data. As result, our model should be regarded as static rather than dynamic, in the sense that it can not take account of the effects of *transition* from one level of income or values to another. Nor does it attempt to model the causal interactions between values and income. Nonetheless, these findings imply that decreases in real income likely to be associated with de-growth could in principle be compensated for by changes in values, so long as any negative transition effects are not permanent and that it proves possible in practice for intrinsic values to increase even as real incomes decline.

From the perspective of overcoming the psychological barrier to de-growth represented by fears of loss to well-being from decreasing income, these findings suggest that consideration of values may be an important component. Despite the static nature of the model, we feel confident in arguing that instigating a widespread shift in value orientations would at least prove helpful in increasing the acceptability of the de-growth argument and, indeed, in weakening the perceived link between income and life satisfaction that is prevalent in Western society. Precisely how such a shift in values might be facilitated is another matter. Research by Matthey & Dwenger (2008) and Vohs, Mead and Goode (2006) suggests that individuals’ motivations and level of aspirations of can be altered in the short-term by simple priming. However, transferring this effect from the laboratory to real life is another matter. We call on researchers interested in de-growth to commit to a greater understanding of the sociological and psychological processes involved in transforming values.

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The anthropological stakes of degrowth

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Abstract

The thesis we are proposing is that the political project of degrowth in its current formulations (namely that by Serge Latouche) is not sustainable on the anthropological level: it is expected to bring about a social change, leaving the basic anthropological structure, belonging to the developmental modernity, untouched. We are going to try and unveil the numerous gaps in degrowth by comparing it with the theory of « dépense » by Georges Batailles and his « general economy ». The solidarity of the project of degrowth with the founding imaginary structures of the present time that he means to question is clear, starting with the central argument used against the growth society: the spectre of catastrophe. This critical process shows the primacy of the safeguard principle of « life for life » that is both specular to the principle of « growth for growth », and also is the foundation of the « neutralist » policy of the utilitarian tradition. Generally speaking, degrowth, in its contempt for catastrophe, aims at the preservation of an immanent-to-itself existence, that no longer recognises the need for waste, for reversion. The « disaffection in contemporary civilisation » is not determined by the threat of a natural catastrophe, but paradoxically by the absence of a collective and participatory implementation of the catastrophe, rejected by the imagination of modernity, along which degrowth is perfectly aligned.

The anthropological inconsistencies of the project show up in particular in the political construction of the « society of degrowth »: here it is expected to preserve the autonomous constitution of the modern subject, by imposing both a pre-established political-territorial architecture and overwhelming values. All this is incompatible with any democratic autonomy. The perspective of degrowth requires, instead, a radical coming to terms with the issue of resacralisation and reversion which it currently avoids.

1. Introduction

In the debate on degrowth there is a clear lack of thought about the anthropological framework of the project. This stems from an assumption often believed to be implicit: that one can gear towards degrowth, leaving untouched the imaginary statutes of a “good” modernity (indeed – it is asserted – degrowth becomes feasible exactly thanks to these imaginary statutes). Instead, we believe that any “degrowth policy” whatsoever is bound to fail if it is not supported by a consistent “anthropology of degrowth”.

But the question is not well formulated, since even if the objectives of degrowth were likely to be achieved, preserving the imagination of our modern tradition, we

would still obtain an uninhabitable world pervaded with the same anxiety that exists in the societies of growth.

Then, thinking over the anthropological framework is not only useful simply to make degrowth feasible, but also to thoroughly reassert the objectives and redefine both the reasons why we criticize the society of growth, and the nature and purposes of the alternative proposed. In short, with this paper we intend to:

- Show that the project of degrowth currently rests on the same anthropological infrastructure of the “growth” regime (and that this circumstance makes it unsustainable in the long run);
- Give some suggestions for reconstructing an anthropological sense of the project of degrowth.

In our argumentative process we will make special reference to the declination of the theory of degrowth supplied by Serge Latouche (2007). Not simply because of the authority of the writer, but especially because Latouche’s theory – in evoking the idea of a “society of degrowth” (as opposed to the mere “economy of degrowth”) – is that which, more than any other, has clearly made room for subtle thinking on the anthropological substratum of the project. Despite the fact that, exactly by reason of the opening, Latouche has been accused by the most demanding modernist theorists (Cheynet 2006) of winking treacherously at archaic and old-fashioned social repertoires, we will highlight, instead how his anthropological reference picture does not draw away at all from the foundation imagination of the present time (the same as the one of the society of growth) and that this very circumstance determines the unsustainability of an alternative project. In this sense, if our criticism applies to Latouche, it will apply more so to those, among the supporters of degrowth, who completely exclude the anthropological dimension from their own theoretical horizon, thus postulating an adherence by default to the imaginary bases of the present.

2. The anthropological homogeneity between the growth society and the degrowth society

In order to find out the anthropological content of the alternative of degrowth, we must clearly devote ourselves to the “propositional” side of the project, that which outlines the features of the society yet to come. In particular, the so-called agenda of the “eight Rs”: *re-evaluate, re-conceptualize, re-structure, re-distribute, re-locate, reduce, re-use, recycle*. If we took this path, demonstrating our thesis would be far too simple. The type of man able to sustain similar guiding principles is undoubtedly the same at the foundation of the society of development and growth: none but the “modern man”.

It would be easy, for instance, to demonstrate that the objective of “stationariness” (expressed by the mottos: “reduce”, “re-use”, “recycle”), aimed at ensuring the reproducibility of renewable resources and the reduction to a minimum of the exploitation of non-renewable resources, is pursued through a process of self-containment (not via acts of squandering compensation, as the wisdom of pre-modern societies would have it, inappropriately recalled). We mean to say that we are claiming a device of unlimited

valorisation, with the purpose of forever perpetuating the utilitarian statute of goods and certainly not of suspending it.

It would be easy to demonstrate that the orientation to the “reduction” (of “useless and harmful” productions) is not a downward blow against the devil of productivism but the Trojan horse of integral rationalisation, which tends to eliminate even the remaining anti-utilitarian outposts of the present time (such as “perfumes” or “advertising”). At the foundation of these instances there is an anthropological constitution imbued deeply with the unilinear utilitarian logic of temperance, of self-control, of the rationality of exchanges, despite all unjustifiable prefiguration of inebriating states of joy.

It would be easy to show that the catalogue of values of the degrowth society (altruism, cooperation, play, sociality, localism, beauty, etc.), spelt out under “re-evaluate”, is superimposable, incredibly enough, almost entirely on another well-known catalogue of values - the one compiled by David Riesman (1950) in the work *The lonely crowd*, which describes the reference value horizon of man produced by the society of consumption. That is to say that the imaginary bases of the man of degrowth are the same as those of the consumerist ideal-type.

It would be easy, finally, not to recognise in the slogan “re-localise” a return *saint-simonism* in which citizenship is given to the only dimension of the “real production”, so that each community takes on the whole burden of its own livelihood, by self-producing all kinds of necessary goods (Latouche 2007, 33). An autarchy achieved even at the level of the municipality, which, as all economies of this kind, would end up by asking its own members (beyond any initial good wish) a work-centred overcommitment without any respite and/or a desperate status of deprivation. Autonomy, self-sufficiency, “relying exclusively on one’s own strength”, control over all segments of social and economic life are typical modern aspirations. They represent the will to root the “Robinson Crusoe” model in any place, a model that is actually reported in the sociology of literature as the foundation account of modernity.

This construction not only leaves modern imagination untouched, but it is also pervaded by a deep internal contradiction that makes it impossible to implement. This is clarified especially when examining what Latouche defines as “local political utopia”. Around the democratic anthropology taken as the basis of the project, there is an embroidery of straitjackets as necessary as unbearable for that anthropology. Once the devil of autonomy is awakened, it is truly deceptive to think that you can confine it within some special, value-related or even “thematic” constraints. We cannot understand how these constraints can be made to stand without heavily violating the same democratic principle.

Just to clarify, why should the single territorial units be within the dimension suggested by Latouche (thirty-thousand inhabitants)? Who has the power to sanction any possible excess?

Why should a free citizen, even one living in a democratic arena, choose to stay put within his own original community, rather than undertaking, as it is easily

predictable, the path of mobility, of discovery of other places and other people?

The “re-location” espoused by Latouche seems to be dangerously similar to the historical process of affirmation of the “western city”, as analysed by Max Weber (1999, pp. 351-376). The foundation moment of the city matches with an act of breaking away from the centres of imperial power. The city communities endow themselves with independent institutions and, at the same time, start to work for economic self-sufficiency, producing by themselves all the necessary goods that meet the needs of the community (a necessary undertaking, since the interruption of the flow of resources redistributed by bureaucracy at the central level must be made up for). At the same time, an offensive is launched against any encroaching feudal and corporative influence: the immanence of the territorial community against the transcendence of the Empire!

What can we infer? That the institutional ingredients at the basis of degrowth are the same that have historically given birth to western modernization: growth, development, omni-marketization - in short, to the world against which we intend to fight. We are thus facing the old game that proposes the “good” modernity of the origins as a therapy for the present “bad” modernity, which really exists. What makes us think that the same institutional and imaginary structure can produce a different outcome?

We expect that a determined political-territorial architecture (the localist one) necessarily engenders and reproduces a specific political agenda (that which is enclosed in the formula of “ecologic democracy”)... We deceive ourselves that once a community has been made democratic and independent, it will spontaneously attain the “good” values of sobriety, measure, the “small-is-beautiful” principle, etc.

It is a genuine “ontology of spontaneity”, that reappears in many passages of the theory of degrowth¹. As in the myth of the *bon sauvage* by Rousseau, we persuade ourselves that in “letting the men be”, in a regime of perfect immanence, they will always pursue the good and the right. Therefore, every inferior trend could be attributed exclusively to the influence of loutish “powers” to annihilate.

There are not many traces of the reliability of this ontology. On the other hand, the “truly existing localism” has so far produced quite a few night patrols against immigrants and prostitutes, as well as several fires in the gipsy camps, with the aim of ensuring hygiene in our pretty communities. If the project is about radical democracy, we cannot then complain, in the long run, about the loss of a “common vision”, of irrationality of exchanges, of the phenomena of anomy, etc. The institutional-imaginary picture supplied by democratic anthropology prevails over any value-related constraint and produces the triggering of a dynamics of alienation that does not constitute a “betrayal of the origins”, but rather their perfect fulfilment. In particular, if the project is about radical democracy, degrowth (or a-growth, whatever we want to call it), cannot be a foundation, for the same reason as the degrowth advocates

¹ Speaking about school education, Latouche declares for instance: “we should not enter the brain of our children, but we must give them confidence so as they can themselves find their own way...” (2007, p. 105).

do not believe that “growth” should be a foundation. Both “proposals” are bound to merge in the melting pot of the thousand options that cross the democratic regime. Growth and degrowth, in this sense, rest in the same paradigm of the autonomous subject: their validity is a function of the historical contingencies and neither of them can aspire to the throne of constitutional dogma.

3. What man for which type of degrowth?

The criticism of the eight “Rs” programme, however, risks confining all the discourse within one superficial area. Venturing into the construction of a political proposal is a generous attempt (which is to be credited to Latouche anyway), but it is nevertheless daring, hence by its own nature exposed to easy reprimands.

We believe, instead, that the issue of degrowth bears with it some basic problems relating to its critical position, which keenly anticipate the propositional front (and which are at the origin of the many leaks of the proposition as mentioned above). It is the sense itself of “degrowth” that has to be more deeply examined and reasserted. Once again, we have to ask ourselves: “What is the use of degrowth?” Or rather: “Why do we object to growth?”

According to Latouche, the regime of “growth for growth” has to be condemned, first of all because it is a threat to life itself. Disputing it helps preserve the possibility of the survival of the planet and its people, since a regime of unlimited growth is incompatible with the quantity of non-renewable resources available, and with the speed of regeneration of the biosphere for renewable resources. Hence:

“... a radical change is an absolute need ... in order to prevent a brutal and tragic catastrophe” (Latouche, 2007, p. 10).

The defence of “life for life”, regardless of and before any question on the sense of life, is launched here as a value in itself, an undisputable moral imperative, that does not need any justification whatsoever. The impending catastrophe does not allow us to indulge in similar questions... But there is a much deeper reason explaining this omission: the subordination of degrowth to the main article of faith of the modern-western imaginary colonialism (disguised, as usual, as a universal dogma, extra-historical and extra-geographic). That is to say: the sacredness of life in itself. This imperative translates the “neutralitarian” root of utilitarian political philosophy²: democracy and freedom demand an a-teleological Politician who would never interfere with the construction of the sense of associated life, since this is but the spontaneous result of the interaction among individuals, who alone are given the sovereignty in formulating and fulfilling their own existential project. In such conditions, politics cannot but have a function of mere guarantee for preservation (“life for

life”) or, even better, for cultivation (“growth for growth”) of the “organic” life of citizens, combined with the administrative regulation of their circulation. We need to limit ourselves to making life grow, so that the living being can be free to do whatever he wishes with it. Originally, therefore, growth is nothing but the translation of the modern principle of neutrality: it is “rightly” indifferent to whatever aim, except for that of increasing the material possibilities of each one to choose and achieve one’s aims. In this sense, the principle of “growth for growth” is equivalent to the principle of “life for life”. They are mutually pleonastic. The former can be said to be nothing but a euphoric declination of the latter. For decades we have bet that the best way to defend and sustain life was to head for growth. Today, someone is warning us that this strategy is insufficient when not harmful: therefore, it would be better to head for degrowth. The strategy changes but the goal is the same: life beyond any “sense” whatsoever. The neutralitarian regime that we pretend to fight (by candidly denouncing the lack of purposes in growth) is fully reconfirmed. Degrowth does not produce any epistemological difference compared with the utilitarian fundamentals of the growth society.

These considerations are confirmed by the approach of the second axis of criticism against the growth society: the one devoted to its “social” unsustainability. The rise of the GDP, Latouche warns us, produces unhappiness and weakens relations. The well-having causes a reduction of well-being. It is interesting not to cast doubt on the truth of the assumption but on its paradoxical feature. That is, the fact that it leaves the model of western life basically immune, referring however to a concept of life based on the unlimited, infinitely positive quest for “being better and better”. Modernity has never encouraged having more for having more, but having more for being better. It seems, therefore, entirely superfluous to state:

“It is a question of... striving for a better quality of life and not for an unlimited growth of the GDP” (Latouche, 2007, p.62).

“... we have to make the ‘well-having’ measured by economic indicators decrease in order to better the ‘well-being’ really experienced” (Ivi, p. 98).

The criticism by Latouche fits within a more general instance typical of the “reflexive modernity” (Beck *et al.*, 1994). That instance which saves modernity in itself, denouncing some drifts that make contemporary society different from its original project. The ultimate goal still remains the quest for immanent well-being: the fact that it can be obtained by increasing the resources produced, decreasing them or, even, stopping to deal with them, is a detail that certainly does not challenge the model of society. The wishing scheme, of heading for the highest satisfaction possible - briefly, the anthropological and imaginary structure of modernity, remains completely untouched.

Under these conditions, the strategy of degrowth works only as an artificial breathing device in order to keep a now-exhausted model of society alive.

It is, therefore, urgent to radically rethink the sense of degrowth and, in this vein, it seems to us essential to refer back to the lesson of a great classical author, Georges Bataille (1967, 1976a, 1976b), whose proto-arguments

² As we know, Bentham argued that the political institution was supposed to deal with the happiness of the great majority, but without ever getting into the concept of happiness chosen by each one. For some people happiness is making money, for others it might be writing poetry... We often forget this pivotal idea of utilitarianism, blindly reducing the doctrine to a monomaniac inclination to the useful intended in a merely economic sense.

against the growth society remain, in our opinion, unsurpassed³. His “general economy” warns us that only a very small amount of the available and circulating energy can be used for the growth of the living system. Inversely, we can state that it is that same capacity for growth of the system to be limited, along with the possibility of a “useful” use of energy. The problem is still the same: the excess energy. That is, what to do with it once the capacity for absorption of the system has run out. The reaching of the limit is a crunch time, because it closes the phase in which the living being can be concentrated on a “necessary” activity, by doing away with the thought and the thematization of the sense of one’s own working. Until the growth process runs out, the living being will behave like a robot: in a sense, he is on this side of the human, without any qualified goal. But once the threshold of satisfaction has been reached, he has to tackle the nihil, the vacuum. The lack of spontaneous “natural” indications on how to use energy, to what purpose to devote it, raises the problem of a system with a vast range. The utilitarian logic, when it gets reflexive, becomes unliveable, because it reveals the inhumane and subservient substance. The existence of unused, suspended and circulating energy, represents the threat of non-sense that looms near the living being. This is what makes the “waste” necessary. The exceeding energy is to be cleared, cancelled, for it is in itself an element of anxiety. The operation can take many shapes. The pure and simple waste, which once occurring gives us back the condition of de-thinking that stems from being involved in a growth activity. The sacrificial act: in which a living being or a property is destroyed and at the same time made sacred. Destroyed as a “useful thing”, that is, taken away from its servile function and therefore summarised at the sacred level. Through this ritual of *dépense*, human societies make sense, emancipating themselves from the utilitarian motive, in itself inadequate to keep them together. The utilitarian does not require common intents: the unique features can remain symbolically separate, since they circulate under the emergency register of the search for survival. After trespassing on it, we need to find a reflected and shared sense of community again, which can be obtained by destroying the utilitarian statute of bodies and things. That is how *dépense* takes on a strategic position. We can say that the ultimate purpose of the living being is destruction. The aim of being is not *existence* but *dépense*.

Catastrophe, if we dare speak in this key, is not at all a problem, but a natural destination. The problem is how to make sense of this destruction, how to make it again a moment in time when a community is sacralized and acquires meaning. We should not, hence, fear catastrophe, but rather its de-qualification, its offering itself as a mere “natural” calamity, not worked out by man.

Growth is not condemned for threatening life, but because it is not adequate for catalysing the excess energy. If Latouche, though contesting the regime of “growth for growth”, still indulges in the positive and unilinear track of the quest for well-being, Bataille points to the need for reversion that is, the cancellation of any perspective of

³ It is clear that what we are proposing is not a philology of the theory of *dépense* and of the ‘accursed share’, but a completely personal interpretation, certainly not bound to be subscribed to the numerous specialists of Bataille’s thought in their own right.

unlimited promotion, quantitative and/or qualitative of the living being in itself. The logic of “life for life”, in neglecting this need, is exposed to an even more ruinous fate than that of “growth for growth”. Energy, in fact, remains suspended and circulating with its own load of non-sense to threaten the social existence (long before the physical one). The challenge, therefore, is in requalifying the paths of waste, and not preserving a too-preserved and immobile existence, as it looms on the horizon of the “degrowth society”.

Latouche, paraphrasing Arendt, has often argued that “there is nothing worse than a growth society without any growth”. Well, paraphrasing her further, we argue that “there is nothing worse than a society of sense without any sense”.

The society of degrowth is certainly a society of sense, for it is based on the anthropology of the disclosure of an immanent, autonomous, conscious subject, intent on his/her well-being. This posture, free from any transcendent guidance, exposes the individual to a continuous search for sense. In a society of growth, the exposure to sense is structurally delayed due to the reabsorption of the subject in the undertaking of growth. A further tool is that of the practices of *dépense* which in our societies are mainly exhibited in the narrowness of private rooms. These elusive strategies are undoubtedly unsatisfactory, but prove to be functional anyway for turning our attention away from the vacuum produced by the anthropology of disclosure. Latouche continues to bet on the same anthropological pattern, transferring it, however, to a framework of stagnation of the production commitment and of the wishing duress. A frustrating solution. In the society of degrowth we find ourselves naked in the face of the chasm of non-sense.

This is implicitly acknowledged by Latouche, when he states that: “Without a re-enchantment of life, degrowth itself would be bound to fail” (Latouche, 2006, p. 154).

Evoking the need for “re-enchantment”, however, does not lead to an adequate thematization. It only shows an opportunity through which Latouche reaffirms his own belief that life is sufficient in itself, that one can simply be in “life for life”. The re-enchantment comes to being, then, a mere contemplation of the thing in itself, with a beauty that gives itself spontaneously and which alone (or maybe with the help of a skilful creative expert) fills the vacuum.

The truth is that enchantment is incompatible with the autonomous-democratic character of the society of degrowth. The truth is that Latouche fights for an ever less enchanted, more aware, responsible, wise subject.

4. Conclusion

We need, instead, to take enchantment seriously. As an immobilization, liberation from thought (de-thinking). It is the only way out for the man who, once he has taken the path of disclosure, finally finds himself facing the non-sense, incapable therefore of using his own energy of living being. Growth is not enough any longer to free us from thought: we need to acknowledge it and adopt new strategies. Thus the alternative of degrowth is necessary, but in its current form it would be a worst-of-all remedy, since resuming the anthropology of disclosure would

produce nothing but the exposure of man to the absolute immanence of life. That is, to its non-sense. It would leave the energy of the living being suspended and without any prospect for use (either useful or un-useful).

An alternative to degrowth should instead challenge re-enchantment. To this aim, the concept of degrowth has to be radically dis-economized. We need to reinterpret the undertaking of degrowth, first of all, as an overturning of the process of unlimited promotion and valorization of the living being: the opposite of the increase of awareness proposed by Latouche. This requires that *dépense* is brought back to a collective level, by delving into the question of power: that is, the construction of a transcendent entity, operator of the waste. A construction which, far from threatening democracy, would contribute to revitalizing it, entrusting it with the invention and fulfilment of political objectives that would closely involve the members of a community.

It is not a radical or esoteric alternative. It is but a return to classic authors. For instance, to that “charismatic power” which according to Weber (1922) has the quality of breaking the logic of the selfish and utilitarian interest, to which the anthropology of the disclosing immanence necessarily leads. It has the quality of creating a community and tracing a destiny, freeing the individuals from the grip of a vacuum. It is a return to Durkheim in *The elementary forms of religious life*, who stresses the need to control the “vertigo of sense”. That is to say, the locking in the safe of the sacred a number of fundamental precepts for social cohesion, thus removing them from the annihilating screening of conscience, of omnivorous reason, of ruling protagonism.

We need a power to which to entrust the periodical requisition of the social product (generally speaking, from material to symbolic production) and its shared destruction, collectively operated: so as to take it away from the utilitarian logic and, in this way, sacralizing it. That means, therefore, requalifying and resocializing *dépense*, in the framework of a new “consumerist communism”, which on the one hand ensures individual existence by protecting the individuals by the market and the rigour of self-production, and on the other clears the excess energy, preventing the vacuum of sense from spreading.

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The finality of degrowth and its relation with justice

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Abstract

How are we – from a moral and political point of view – to reorient human activities towards a degrowth of global material and energy flows and a more equitable wealth distribution? In other words, given the urgency and the seriousness of the ecological crisis, what are the conditions of a total ecological effort that would lead to an economical rebound effect?

We will start with a brief outline of some of the systemic and psychological principles which conflict with such an ambitious economic degrowth programme: the inherent amorality of the economic system and its internal logic, whose focus is narrowed to economic growth only and whose means are a continuous increase of social inequality levels and the overexploitation of non renewable resources.

An economical degrowth strategy aiming at avoiding a rebound effect necessarily appeals to a renewal of some of our moral values, including voluntary sobriety and a redefinition of individual freedom so that collective utility dominates on private interest. Can sobriety be linked to the ancient notion of moral debt? Is the recognition of moral debt towards society, or nature, an indispensable part of a degrowth strategy? Are sobriety and moral debt compatible with modernity?

This will lead us to question the ability of governments and institutions to deploy a total ecological effort (and to try to provide a definition of the latter). Participative democracy or governance models, which were initially developed to facilitate processes of negotiation in controversial situations, could seem to be particularly well adapted to degrowth issues. However, the relative success of participative experiences has shown the limits of such models. We will explore some of the ways such procedures could be improved, and will in particular try to answer the following question : to which extent could the moral notion of a debt of humanity towards nature be part of the commonly shared collective values that would sustain a so-called “culture of the whole”?

Keywords

Degrowth, teleology, self-interest, equality, justice, religious sentiment

1. Introduction

The imperative of “Economic De-Growth” calls for a reconsideration of economy’s finality – in philosophical terms: it’s ultimate finality. We must therefore question its teleology, the famous *télos* from the ancient Greece.

To which extent do the finalities of a late enchanted world appeal to actual citizens and to which extent is it possible to refer to them in order to embrace the real signification of degrowth? Should degrowth be based on the perspective of transcendence? Or shall we envisage degrowth in the perspective of equality between human beings in order to contribute to the progress of distributive justice in an immanent way? Which one of these purposes is the ultimate finality of degrowth?

In this article, we first assert that the ancient *télos* and the precept of Christian charity were fought against by the promoters of market economy since the 17th century in order to give way to the moral doctrine of self-interest. Then we refer to the distinction Rawls makes between teleological ethics and those centered on the question of justice. We analyse the limits of his definition of the concept of teleology. Two degrowth compatible ideal types of finality and moral values are then compared. The first kind is justice, a perspective that is immanent in society. Could justice be the ultimate finality of degrowth? Is it a sufficient finality in the context of a voluntary and collective degrowth economy? The second ideal type is a transcendence-based finality, expressed through a religious sentiment. Advantages and disadvantages of these two kinds of finality are discussed, as well as our doubts about the ability of justice to be the ultimate finality.

To conclude, we underline that the problematic of finality is of utmost importance to the comprehension of degrowth and we comment on some of the obstacles to this question.

2. The moral doctrine of interest: a contraction of the field of morality

The emergence of the notion of self-interest in the XVIIth century is the first step of the process that has finally led to the design of our current economic system. We have gradually shifted from a civilization based on secular rules such as reciprocity, noble generosity or Christian charity, to a socioeconomic system ruled by market logic. This logic sometimes has consequences far from what morality or even reason approve: Mandeville's fable “demonstrates to us that all human vices, in particular vanity, the whim of fashion and envy, facilitate trade, industry and invention. One has to be crazy, the moral of the fable says, to want to combine righteousness and wealth. Private vices are thus indeed the condition of a prosperous society” (Laval, 2006, p. 111). “Money supplants other values to become their unique measurement” (Gorz, 1988, p. 83). Consumption and the market comply with the moral doctrine of interest which supposes a continuous and indefinite growth of economy and material flows, the effects of which are immoral.

Two and a half centuries ago, Montesquieu was praising commerce as “a cure for the most destructive prejudices”, in particular war (Montesquieu, 1878, book 20, chapter 1). He was also at the same time witnessing some of the early

noxious effects of a shift towards an individualistic society: “Peace is the natural effect of trade. Two nations who traffic with each other become reciprocally dependent; for if one has an interest in buying, the other has an interest in selling; and thus their union is founded on their mutual necessities. But if the spirit of commerce unites nations, it does not in the same manner unite individuals” (Montesquieu, 1878, book 20, chapter 2).

Indeed, he develops, “The spirit of trade produces in the mind of a man a certain sense of exact justice” (idem) forbidding him to give way to robbery, but also to those moral virtues that are opposite to the rules of private interest, e.g. hospitality.

Commerce definitely uses one of the most commonly-shared human moral defects, egoism (or “self-love”), as its driving force. By embodying an objective convergence of people’s individual interests, trade mechanisms thus transform what could be thought as an economically counterproductive human feature into a means for wealth creation. Adam Smith, one of the fathers of the concept of economic liberalism, understood it well: “It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages” (Smith, 1991, Book I, Chapter 2).

The actual market economy is then the result of the prominence of the concern for self-interest – later reinforced by the notion of individual freedom – over collective interests, which has gradually lead humanity from a civilization (in fact a bunch of civilizations) guided by religious or other metaphysical rules to a global society obeying almost only to the doctrine of utilitarianism: “The creed which accepts as the foundation of morals, Utility, or the Greatest Happiness Principle, holds that actions are right in proportion as they tend to promote happiness, wrong as they tend to produce the reverse of happiness” (Mill, 1863, Chapter 2). In that paradigm, the moral worth of an action depends only on its capacity to maximize one’s pleasure or to minimize his pain, the sum of the optimizations of individual well-beings being supposed to maximize overall utility. The question of morality being thus solved, all what is needed to ensure the best possible satisfaction of human needs is to let the market do its job as freely as possible.

However, an intense capitalistic regime devoid of strong moral rules – that’s to say the particular type of socio-economic system that has become the actual norm – is deemed to generate some social and environmental collateral damages. Although certainly a most efficient economic system in a time of industry-based human development, it is now the source of issues reaching beyond a contraction of the field of morality or even, as we noted earlier, of reason.

3. Degrowth and the curbing of the rebound effect

The rebound effect is in fact one of the mechanisms of economic growth: productivity gains in the field of ecological efficiency lead to economic savings that can be

used to consume more. . According to Hertwich: “It is also possible that the alternative expenditure has a negative emissions intensity if it is used for reducing emissions, for example, for insulating a home” (Hertwich, 2005, p. 93). This author is aware that further researches are necessitated outside the “established notion of rebound effect”. And it is true that the consumption choices are crucial and that the right choice will depend on the morality of the economic agent. Thus, our question is: what kind of morality or religious sentiment could lead one that has insulated his house to reinvest the forthcoming benefit in another ecologically friendly good or service, hopefully containing more human labor than energy? The eventual benefit of this new investment being reinvested in another ecological mode of consumption, this kind of behavior could theoretically be envisaged as a way to avoid the rebound effect. Insofar as the quest for ecological perfection is subdued to the law of diminishing returns, it represents an exhausting process that could – it is an audacious hypothesis – curb the rebound effect in a way similar to a kind of agonistic gift. It is rather theoretical indeed, we do not ignore that companies implementing ecological efficiency strategies are mainly trying to make money.

Another way to investigate the curbing of the rebound effect is purely social. It implies that the richest give up the urge to earn more and accept to distribute the surplus of their wealth to the poorest. Donors and beneficiaries quite evidently have to accept birth control measures, and to limit their level of consumption of goods and services.

What can be said about the ultimate finality of degrowth, what kind of regime of ends does it belong to? This question is not that important as long as degrowth is considered a private concern. But curbing the rebound effect implies that society has to be moralized in a voluntary way, a political agenda that could certainly encroach on a specific power of the sphere of private life. A discussion on the ultimate finality of degrowth seems then to be necessary.

4. Teleological approach of justice

According to John Rawls – whose doctrine called justice as fairness is opposed to utilitarianism – any ethical doctrine is determined by the articulation of two main concepts: the good and the right. Depending on their articulation, the doctrine can be teleological or not, that is to say based on the deliberate formulation of a finality. This question is of interest because voluntary simplicity and virtues in general could emphasize the superiority of the good over the right in an ethical doctrine.

According to Rawls’ analysis of different kind of ethical doctrines, “it is essential to keep in mind that in a teleological theory the good is defined independently from the right” (Rawls, 1978, p. 25). This separation between the good and the right provides clarity to teleological theories. For instance, Aristotle defines the good “as the realization of human excellence in the various forms of culture” (Rawls, 1978, p. 25). Courage, generosity, magnificence, magnanimity, are some of the moral values which, according to Aristotle, make a man complete. At least two of them have a common point with the paradigm of the Gift defined by Marcel Mauss.

Generosity is the capacity to give to others people so as to oblige them. Aristotle defines it as follows: “The use of wealth seems to consist in spending and giving (...). The generous person will give for the sake of what is noble and in the correct way – to the right people, in the right amounts, at the right time” (Aristotle, 2006, IV, 1120a).

Magnificence is the way to get artists, architects and craft workers to create and to built something beautiful for the whole community. “Magnificence is found among the sorts of expenditure we call honourable, such as those connected with the gods – votive – offerings, temples, and sacrifices – and similarly those concerning religion as a whole” (Aristotle, 2006, IV, 1122b). Magnificence can also be expressed through objects of public-spirited ambition, like feasts for the city. Thomas Aquinas' work shows us that Magnificence can also be immaterial. His writings can be conceived as magnificent indeed, his work being a Gift: “Yet if anything regarding himself admits of greatness, the magnificent man accomplishes it magnificently: for instance, things that are done once, such as a wedding, or the like; or things that are of a lasting nature; thus it belongs to a magnificent man to provide himself with a suitable dwelling, as stated in Ethic” (Thomas Aquinas, 1999, Q134 a1 s1).

According to Aristotle, virtues alone should not be considered as the ultimate finality. The contemplation of cosmos is what achieves the vocations of man. All these activities participate fully to the good. Then, justice and the fair repartition of goods are deemed to allow the access to the good. According to Rawls, Aristotle's view tends to be “teleological and to hold that institutions are just to the extent that they effectively promote this good” (Rawls, 1993, p. 248). Aristotle's doctrine is a kind of perfectionism like magnificence or wisdom. The Aristotelian way of specifying the Gift is clearly dependent upon the existence of a religious sentiment which is partially collective – it is an object of shared pride – and has value by itself. It propels man in the vertical dimension and is clearly transcendent. It is teleological in the best sense of the word because it informs the search for answers to the questions on finality starting by “why...?”.

But conflicts between rival conceptions of the good, and subsequently finality, lead to political problems. Hence our question: shall the forthcoming ethical doctrine of degrowth become teleological? Before answering, we would like to specify some theoretical points, notably on Rawls' criticism of utilitarianism.

According to Rawls, even utilitarianism is a teleological doctrine. The maximization of pleasure is deemed to be the good considered as the finality of justice. Justice being dedicated to the maximization of pleasure, Rawls deduces that utilitarianism is a teleological ethics. We agree on this point, but we must note that the utilitarian definition of pleasure is not consistent when considered at the scale of society because the process consisting in extrapolating the pleasure of the entire society from the summation of the pleasure of each individual is not properly founded (Caillé, 1986). On the strict ethical level, there is a lack of substance in utilitarianism that makes it a teleological ethics only in a formal sense. But the utilitarian ethics is first and foremost the ethics of a system – the economic system – whose functioning focuses on its own growth, to the

detriment of the Biosphere and future generations. (Birnbacher did try to think an utilitarianism taking into account the pleasure of future generations (Birnbacher, 1994), but, in our opinion, its intellectual enterprise failed.

5. Is Rawls' theory of justice as fairness teleological ?

Rawls demonstrates that his theory of justice – justice as fairness – is not teleological *in the classical sense*. When the right share of goods is the greater good, the right is no longer secondary nor dependent upon the good.

In justice as fairness, “social unity and the allegiance of citizens to their common institutions are not founded on their all affirming the same conception of the good, but on their publicly accepting a political conception of justice to regulate the basic structure of society. The concept of justice is independent from and prior to the concept of goodness in the sense that its principals limit the conceptions of the good which are permissible” (Rawls, 1985, p. 249).

“If the distribution of goods is also counted as a good, perhaps a higher order one, and the theory directs us to produce the most good (including the good among others), we no longer have a teleological view in the classical sense ” (Rawls, 1978, p. 25). From an ethical point of view, Rawls' approach can be described as deontological and procedural, since it gives importance to the deliberations and discussions dealing with the definition of a fair society. The first principle of his theory of justice emphasizes the importance of basic liberties in a way that is clearly opposed to utilitarianism.

Rawls' views on the non teleological aspects of his theory therefore fails to show that there is no implicit good in his theory, and that it does not hold the first place. Human rights and values that are widely accepted at our time have really great influence on our conception of what is good. When Rawls is broaching the question of the responsibility toward future generations, it is quite clear that fairness among generations has to be understood in a context of economic growth only (Rawls, 1985). The environmental crisis does not exist in Rawls' ethical doctrine and there is no allusion to the responsibility of the present generation regarding this real issue. Rawls never admitted that his theory determines implicit ends the content of which clearly reflects values that were widely shared when he elaborated his theory. He actually never had to give any explanations on this subject, since he was theorizing the procedural and deontological aspects of a political trend that has been well implanted since then (it is notably called social-democracy in Europe). Because of this, we do not consider that Rawls theory is teleological in the full sense of the word. The explicit finality of his ethics is actually justice.

For us Moderns, justice is well fitted to normative theoretical work, whereas any work related to other values necessarily has to take into account the question of the respect of justice in order for its content to be normative. Justice is therefore the ultimate natural finality for the degrowth researchers.

6. The finality of degrowth

We have seen that curbing the rebound effect necessitate a strong moral resolution. We have designed the two following ideal types that we compare to each other using our approach of finality.

- 1) If justice is the ultimate finality of degrowth, the behaviour of consumers and population in general is an important feature to take into account in order to reach its purpose. To this extent, we define personal simplicity as a virtue adjacent to justice, a way of life that leads to a diminution of material flows (intergenerational justice) and a better share of wealth (intragenerational justice). Personal simplicity, as we define it here, is the good that comes second to justice. It is dependent on justice because it is thought through within its perspective (fairness explicitly requires degrowth). Justice can then be considered as the finality of degrowth prior to the question of personal simplicity, which is held as a means. Personal simplicity can also be enriched by an individual religious sentiment supposed to link soul with eternity. However that may be, justice is clearly the ultimate finality at the scale of society.
- 2) If we refer to ancient ethics, the object of the religious sentiment comes first. The condition for his existence is the world be the seat of a mystery that can be questioned with questions starting by “why...?”. This has consequences since it is better to come to terms with the hidden order of the world; dread is not the only motivation to comply, but the blossoming of man’s humanity too. The notion of harmony would give an idea of the good. The religious sentiment is somehow the cultural answer to this mystery rooted in eternity. In this context, justice can be considered as part of the answer and, referring to Rawls’ words, justice is the means of the good. It is not the ultimate finality of society. This pre-eminence of the good belongs to the tradition of perfectionism instituted by Aristotle’s ethics and others. However, we should notice that any kind of religion is able to sustain simplicity in a way that is compatible with degrowth.

The above ideal types are indeed deeply paradoxical. The first one has been shaped in such a way that justice becomes the finality of a political regime that considers it as the only link among human beings. Justice is thus the main cement of individualist society. Insofar as the individual religious sentiment is put forward by some authors as an essential characteristic of personal simplicity, the risk is that this requirement may seem political. This would indeed lead to a paradoxical situation where the individual religious sentiment – understood as an area devoid of any collective content – would somehow become a mere tool benefiting the economic degrowth programme.

The second ideal type of finality implies a common agreement on the presence of mystery on earth and that the question “why?” is rooted in eternity. The religious and its object – transcendence, the mystery of our origin, the invisible, Nature, the ancestors, God – is a matter for a questioning, the core of which is independent from moral or political considerations. Exploring this thesis, Leszek

Kolakowski explains that “religious values” are prior to politics, since it is impossible for man to institute himself as a meaning-free creator. “To believe that I am the almighty creator of every possible meaning is to believe that I have no reason to create anything” (Kolakowski, 2003, p. 60). The religious sentiment tries to express the soul of the world, it is related to meanings that are above justice. It implies the explicit definition of a good prior to a justice. But its generalisation to the whole society is hardly compatible with a pluralist society. In this perspective, the right is on the way to being sacrificed by the good.

How are we to reconcile the good with the right without sacrificing one to the other? Rawls sacrificed the good on the right and equality. His ethical doctrine was implicitly founded on economic growth and the related conception of the good. In other terms, if equality and justice are the finality of collective life, does it limit the public debate on real issues to the expression of objects that are totally immanent? After all, future generations do not exist yet. How are we to curb the rebound effect in this condition?

7. Comment

Self-interest can hardly be considered as the ultimate finality of degrowth, unless to conceive – paradoxically – that the citizens will agree to give up their living standards for the sake of a sophisticated calculation on their self-interest. Hence the pleasure cannot be considered as the finality of degrowth, except for a few unrealistic people belonging to a distinguished elite.

Aspiration for more justice and its realisation among humanity could possibly incarnate the essential motivation for an economic degrowth. Historically, it seems that ethics focussing first on justice have flourished since technological progress and economic growth have emancipated humanity. This raises questions about our perception of the condition of humanity. Does the implicit belief in the omnipotence of humanity allow us to consider justice as the ultimate finality of life in society? If so, knowing that degrowth manifests suspicion towards rapid technological progress – created by human genius – is it not ironical to consider equality as the ultimate finality of degrowth? In other terms, is not setting the ultimate finality of society in equality, like Rawls did, sentencing ourselves to rely implicitly on technological progress (and economic growth) in order to reinforce justice?

On the other hand, if we admit that the good is prior to justice, difficulties are also considerable although different in nature. The good is there predetermined – at least partially – by the religious, save it is purely formal like it is in utilitarianism. In this framework, degrowth can not impose itself at the scale of societies without the acknowledgment that it incarnates a good prior to justice, this being explained by the fact that it has to go together with a transcendence. Magnificence supposes clearly the anteriority of the religious and it is clearly a manifestation of the paradigm of the Gift. Aristotle does not imagine that the virtue of magnificence can operate without any transcendence. But the religious does not solve anything by itself and it could not be envisaged as a solution. We cannot decree the religious. Moreover, religions – considered as the expression of the religious – constitutes a problem since

the diversity of their traditions leads to conflicts, hence the risk to refer to it. Some religions would most probably consider degrowth suspiciously, even asking their believers to oppose it. Yet, however the religious could not constitute a solution itself, we can emit the hypothesis that it may be a necessary condition to a degrowth policy, although not a sufficient one.

In conclusion, we think that treating the subject of degrowth cannot elude a reflection on its ultimate finality and the ensuing values. The foreseeable ways presented in this article certainly do correspond to one of the main intellectual scissions of modernity, one of those that appears to be irreconcilable, hence its attractiveness.

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Environmental Politics and Actual Degrowth. The issue of a sustainable financing of care activities, public goods and commons.

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Abstract

This paper considers some of the many problems involved in the financing of a sustainable economy of care activities and services, for person and commons, briefly: Sustainable Care Economy (SCE). In the notion of SCE we should include not only the well known Commons and Public Goods, such as our cultural and natural heritage, but also all the activities aimed at taking care of nature and persons, such as organic agriculture and shiatsu (shiatsu is a type of Japanese massage that heals certain bodily and existential pain; by preventing illness it can curb the high cost of traditional medicine and thus become meaningful for a degrowth approach).

Namely, the SCE should include all activities that cannot achieve their goals according to the principles of a dissipative growth economy, based on intensification of time and linked to the inflationary devaluation of money, because they take place slowly and gently (as plants grow, as shiatsu heals).

The paper has three main sections. The first concerns the new failure of markets and the state to manage care activities and commons. In section two, I briefly consider some issues associated with financing a SCE by green tax and by giving an alternative economic value to care activities. In section three, I will move on to the matter of financing a SCE by means of a time-based local currency. I consider some of the many advantages of natural time-based value, after introductory comments on the problems linked to a sustainable implementation of the main alternative currency models: demurrage, energy and time based currencies.

Keywords: financing public goods, care activities, green tax, local currencies.

1. Introduction.

The environmental politics and the degrowth movements can improve their collaboration if they tackle the question of the *actual degrowth* of advanced capitalist societies: i.e. deterioration of the daily life conditions, devaluation of economic values and degradation of social, cultural and institutional fabric. Attention should not be restricted to the “external” limits that economic growth encounters in natural physical dimensions. “Internal” limits must also be considered, namely the inner contradictions shown by growth economies and their financial ramifications.

This means to focus on the increasing difficulties that market and state are facing in their effort to impose the principles of productive growth and intensification of time: on public goods and services activities, on personal and environmental care and relationship, which demand more stationary and shared economic condition, to avoid degradation of natural and cultural resources, overcharge of cost and inflation, increasing of inequality and new forms of *servitude* (Gorz, 1988).

Environmental politics can better take care of earth if they can foster social equity and balanced taxation on commons and economic production of wealth. The policy of degrowth can become an attractive and enduring political project if it is aimed at reconstituting the main economic dimension and instruments. New monetary forms and new systems of financing the public goods and care activities must be experienced by local, political, communities, according to the principle of a sustainable and sharable degrowth: based on responsibility, participation, cooperative solidarity and “re-localization” (Latouche 2007), out of cash flows and beyond the failure of capitalistic markets and nation states.

2. The new failures of Market and State.

Here I only focus on some new failures of the market and state or recent public policies, those arising from the attempt to commercialize public services and commons, according to the principles of the dissipative growth economy.

I am not concerned with generic market relations but with capitalist market systems, as they are constituted nowadays, shaped by the economic institution of continuous monetary growth: i.e. rents, interest paid on debt and the many types of profit. When applied to most care activities and commons, rents, money interest and profits increase costs, increasing the inflationary devaluation of monetary wealth, and eventually reducing the quality of goods, scarce natural resources and human relations.

Most care activities cannot be mechanized and they cannot offer continuous and systematic growth in productivity (Laville, 1994), as most scarce natural resources cannot be re-produced in a growing way. Capitalist monetisation of care activities and commons lead to a prevailing unsustainable increase in prices, money stocks and supply, which grow more and faster than current increases in production of goods and services (Ruzzene 2005).

In developed countries, declining production of traditional goods is related to the massive growth of financial speculative motives and shares. Financial speculation is directed at any scarce resources, land, buildings and commons, and market relations and attribution of value does not allow scarce resources to be saved, but aggravates inequality of access to them (Bardhan et al., 1998). It increases many types of exploitation, of labour, cultural heritage and natural resources, for the simple reason that the traditional goal of increasing productivity cannot be achieved by mechanization and standardisation of individual care activities, or by growing reproducibility of commons.

With regard to new failures of the State and the Public Economy it should suffice to focus on a couple of issues. The high debt of the Public Economy also fuels financial power and speculative activities into a steady, dissipative and wasting type of growth. Because of low competitiveness and the lack of individual and community involvement in all the areas of the public services, reinforcement of their hierarchical, centralized, “economic” management does not imply a reduction in wastefulness but increase corruption and collusion among politicians and economic interests. Moreover, because the public sector pays large amounts of interest for money obtained from financial funds, it is forced to progressively cut public services (Fitoussi, 2000).

The productivity of care activities and services cannot be increased continuously or systematically through management. If debt is to be kept within certain limits despite the increasing amount of compound interest paid on debt, this leads to a reduction in the volume of services rendered. Finally, the growth of the monetary, financial, global economy means *actual degrowth* of finance for the public economy through issue of public debt titles (Ruzzene 2007).

Just a few more words on new forms of inflationary devaluation of money (Boyer and Mistral, 1985). We really do not pay much attention to it anymore, but it is still important for at least four reasons:

- inflationary devaluation of money is much higher than the levels recorded by official statistics;
- inflationary devaluation of money completely uproots national economies from their territorial environment (and resources) because it makes production of social wealth vulnerable to daily global fluctuations in exchange rates, i.e. to speculative attacks against any form of stable store of value;
- together with the system of variable interest rates and currency exchange rates, inflation is now the main consequence and one of the main instruments for governing the dissipative growth economy, a weapon held over the heads of local and general populations;
- inflationary devaluation of money makes everyone (individuals, public institutions, trade unions and so on) agents of speculative financial growth of the monetary economy, all attempting to maintain monetary wealth deposited in superannuation and pension funds.

I do not think more considerations are necessary about the new failures of the capitalist market and the state. It seems clear that we first have to find new ways of financing public services and the SCE, more economically balanced and compatible with the social and natural environments.

3. The Issue of sustainable financing of a Care Economy by green tax.

The choice of the most appropriate sources for financing a SCE depend on the principles on which the SCE is based. Like any ecological approach, the SCE needs to find a balance and environmental sustainability and extend them to the social sphere. It should favour solidarity, cooperation, participation, equality and responsibility

(Bonaiuti 2004). Only a sufficient level of *responsible, sustainable autonomy* can favour the development of solidarity, cooperation and long-term economic stability and equilibrium. A sufficient level of *responsible, sustainable autonomy* should be felt not only in individuals’ capacity for judgement and choice but also in the economic self-sufficiency of social systems.

The existence of sufficient levels of self-sufficiency of a SCE is necessary because dependence on wealth produced by the growth economy means depending on the underlying exploitation and environmental devastation, and thus sustaining them. This is one reason for shifting from income tax to green tax, but there are many others. Green tax can reduce pollution and the consumption of natural resources to some extent (Barg 1995). It can reduce tax evasion and the uncertainty caused by fluctuations of monetary wealth in the liberalised global economy. Finally green taxes certainly change the relationship between the community and the taxpayer.

Under a green tax system, taxpayers depend on the community for the concession of something that is not theirs (like income), but that belongs to the community (such as commons). This could be an important change, but the financing of a SCE by green tax is much more difficult. Just two examples:

- pollution has to be reduced to a minimum in the long term, possibly to zero; this means that finance for the SCE from green taxes must also tend to zero, and is therefore not sustainable in the long term;
- tax on the use of natural resources, such as land, may be less problematic (Hartzok 1999), but since local government tends to exceed in the concession of the private use of commons (such as permits for new buildings) in order to finance itself, this does not sufficiently promote care of the environment in the long term.

To tackle these problems new access to the scarcer resources, such as building land, should be rendered uneconomical by much higher taxes for building. The main sources of finance should depend mainly on taxes on sustainable and reproducible uses of natural resources. Environmental taxes should also be reduced to a minimum because they too depend on capitalist production of wealth, lead to increasing costs of living (Parry and Oates 2000) and remain linked to the inflationary devaluation of money.

The main means of obtaining sufficient levels of self-sufficiency in a SCE therefore seems to be attribution of alternative economic value to care activities. This may be pursued by paying persons employed in care-giving and making users pay for services and benefits derived from care, while also setting up alternative economic means for activating exchange of care services (Warmoth, 2003).

Attributing economic value to care services may offer many advantages. It can develop much needed activities useful for environmental conservation, for which money is currently not available, and it can also make the social and individual costs and benefits derived from care more transparent. Balanced development of environmental and personal care services do not generally have high environmental costs, but cost mainly in terms of available

time. Indeed, care activities do not consume natural resources but tend to conserve and regenerate them.

The development of care activities should also curb dissipation and growth because the labour resources used in SCE cannot then be used in other sectors of production. Hence the attribution of economic value to care activities should not only reduce GDP (Daly, 1996) but take a positive value, developing a SCE and diminishing the dissipative growth economy.

The project of attributing economic value to care activities does, however, present many problems, especially economic and ethical ones (Ribault, 2007), that cannot be considered in detail here. The most difficult problems are nevertheless economic.

The first order of problems is well known. For a large proportion of environmental care services, individuals cannot be asked to pay because access to certain environmental goods (commons) is free, even if much labour must be invested to conserve them. Moreover, there are often no economic resources to start socially useful care services for which exchanges would be possible, because all the main resources are absorbed in the production and consumption of commercial goods that create profits (Galbraith 1958). A third order of problems regards the fact that goods and services embodying the principles of care are often not competitive with goods and services supplied according to the logic of economic growth (as occurs for organic farming compared to intensive and extensive agriculture).

For the first order of problems, public intervention is needed through taxation and contributions that should be obtained principally with the sustainable green taxes. This could also help finance sectors of the care economy at particular disadvantage with respect to capitalist economic sectors (such as organic farming). However, this type of solution raises further problems.

It may seem unsustainable from the point of view of social consensus to shift financial resources from one economic sector to another. It should be recalled that the financing of care activities by taxation inevitably maintains close links with the dynamics of inflationary devaluation of money typical of the dissipative growth economy. Finally, subordination to inflationary dynamics considerably limits autonomy of decision of a community and its capacity to plan alternative paths and economic constraints.

For all these reasons, it seems advisable to rely on another new form of finance for care activities, persons and commons: interest and inflation-free local alternative currencies, that do not promote socially detrimental competitiveness (Lietaer and Warmoth, 1999).

4. The issue of alternative currencies for financing a sustainable Care Economy

The question of Alternative Currencies (AC) arose more than 150 years ago, fostered by anarchist and socialist utopians, such as P.J. Proudhon and F. Lassalle, who proposed linking money or *credit coupons* with hours of work. In the first decades of 20th century the question was revived by Silvio Gesell and F. Soddy, who conceived two

different, and divergent, types of money: the *demurrage* and *energy-based* currency models, aimed at solving problems associated with capitalist economic crises. Then, for about 50 years, the question lapsed as State intervention in the economy increased, welfare schemes developed and consumer goods abounded. It re-emerged in the 1980s, mainly in the Americas, as an answer to new generalized economic and environmental crises. There are now hundreds of examples of AC in developed countries. They have different aims, that can be condensed as follows (Kennedy, 1995):

- to create interest- and inflation-free money;
- to centre production and consumption in the local economy;
- to provide more new quality job possibilities for people;
- to stimulate cooperative relationships among individuals, toward better care of the environments and commons.

These goals could be shared by a SCE, but it is not easy to create an appropriate alternative monetary and pricing system to support full environmental sustainability in the natural and social dimensions. Many difficulties are involved in building, socially rooting and spreading AC. They depend on cultural, technical, legal, economic and political factors (Lietaer 2001). Let us focus here only on the main problems associated with the design and implementation of the principal AC models, those currently considered useful for financing sustainable care of public goods and commons: *demurrage*, *energy* and *time-based* currencies.

The demurrage system, well described by Silvio Gesell in *Die Natürliche Wirtschaftsordnung durch Freiland und Freigeld* (Gesell 1916), involves planned depreciation of AC to avoid hoarding of money and to promote circulation. Since money with demurrage does not have its own intrinsic value, it must be linked to official money, that of the dissipative growth economy. This causes many problems, first of all legal problems (the creation of a second, parallel money system is prohibited by law in most countries); moreover, it links the local currency to the inflationary devaluation of official, national currencies. Inflationary and dissipative effects are not avoided, but seem to be increased by demurrage. If nothing else, it increases the stress of alternative currency holders, who have to vigilantly avoid the effects of planned depreciation by spending, as noted by Fredrick Soddy in *The Role of Money* (Soddy, 1934).

As a solution to the virtual growth of debt-money issued by banks, and according to a supposed loss of weight of the labour force in developed societies, Soddy proposed a new currency and social wealth system based on energy. In line with Marx, Soddy wrongly supposed that machines would soon do all work, exploiting many kinds of natural energy. He considered that energy accountability would link the measurement of social wealth to something steady and more balanced, but energy is not really steady at all (and adopting a stable unit of measure does not ensure any balancing of an economic system). The role of energy and its economic value or influence in the long term varies in relation to technological advances. It is not easy to develop

steady energy accountability for economic value (Martinez-Alier et al., 1998) and, more important, energy-based economic value is not sufficiently sustainable from a social point of view.

In a SCE, we not only need a stable basis of economic value that can limit exploitation of resources, but also adequate constitution of social wealth to develop solidarity and cooperation. *Energy-based* accountability would be good for green tax accounting and for abatement of pollution. It is less appropriate for a SCE based mainly on human activities (and on commons, the value of which is more qualitative than quantitative or energy-based). Nowadays labour time is the most important economic factor in advanced societies and service economies (Atkinson 2005), and it would also be the most important factor in a SCE.

This suggests that an appropriate model of alternative currency would be time-based. A particularly interesting example is the Japanese Fureai Kippu, a Health Care currency system that promotes exchange of hours of care offered by relatives of elderly persons who live far from each other (Lietaer and Warmoth, 1999). Shortly, it is a type of Time Bank system that records care services and enables persons to obtain care credits that they can spend at any time or pass on to others.

There are many other time currencies or Time Banks, but their main limit is usually that they have only been applied in small social groups, almost privately. The recording of time credits usually only concerns work pertaining to a single kind of activity (or to bartered work). Time Banks are very marginal with respect to the mainstream economy, and to become emancipated and stronger, they probably need to be taken up by large political communities, i.e. by local or preferably regional government.

The larger and more cooperative an exchange system of care services and goods is, the better a time-based currency can work and develop. Time-based currencies are substantially the opposite of demurrage currencies, which require only a small user-ship. Time-based money can and ought to become part of a large project aimed at activating and sustaining all care activities, for all members of the community who are orientated towards better and meaningful care of their life environment and of their natural and human resources (such as public services, health care and teaching, but also sustainable agriculture, alternative medicine and small-scale hospitality for sustainable tourism, like farm stay, and so on).

Local care activities have real potential for development in the near future; they already account for more than 30% of Gross National Product, soon exceed 50% (Gadrey, 1992). To realise this we only have to look at the amount of income tax that goes to pay for care activities and services; then add all the private care activities and services unable to function under the principles of mass production and the growth economy.

Finally, it is important to note that the growth of a SCE sector, based on time-credits, has its own limits - like any natural growth process, it can continue only as long as there are hours of labour available for care activities in a community. This also implies that any growth of a SCE (and of time-based money) cannot lead to inflation of

money, but necessarily places limits on the wasting dissipative economy and possibly also on use of its currency. Most resources employed by the care economy (mainly hours of labour) are limited. Thus, if someone's hours of labour (and time-based money) are used in a SCE, they cannot be used by the wasting economy.

Reliance on time-based money (or quasi-money) offers many advantages for financing a SCE (Lietaer and Warmoth, 1999). Some examples are:

1) Money or quasi-money based on available hours of labour provides a steady and equal foundation for social wealth (linking it to the real reproducible resources of a community).

2) A stable value base can relieve us of the need for currency convertibility and of the many problems involved in the convertibility system, such as inflationary effects and legal problems associated with complementary currencies.

3) Natural time-based value is not proper money but quasi-money; it is more properly a credit instrument or title (that communities provide, free of interest and costs, to members who render hours of their labour to the community or to single members of the community for individual care services).

4) Time-based money may be the best type of "credit money" because the credit titles can be personalized (issued and recorded as a nominative title). This can be done without losing any function of traditional money, such as the medium of exchange function. Anyone is absolutely free to pass it on to another member or to buy other labour services or goods.

5) As credit titles concern hours of care activities aimed not at producing or increasing monetary wealth, but at taking care of commons, health, natural and cultural resources, normal taxation can be abolished or substantially modified (as is customary with non-profit activities).

6) A major advantage is that time-based credit money can develop egalitarian, cooperative and supportive attitudes among members of a community. It can help to demonstrate that in an advanced society an hour of time has more or less the same cost for any human and its economic value may change only in relation to the fatigue, nuisance or gratification associated with the work (in the Fureai Kippu system, hours dedicated to bodily care have twice the value of hours spent shopping for the elderly, for example).

7) The principle of time-credits can also develop solidarity and cooperation between different, even distant, local and regional communities, according to their different needs and situations. The exchange of time credits could be a universal and steady value and would not create inequality with exchange rates and trade deficits.

5. Conclusion.

Further explanations and demonstrations of the above statements will be the subject of a future paper. To conclude, a major limit of SCE and of quasi-money based on hours of care is that they do not lead to increased consumption of goods or more free time. They would

probably reduce the quantity of goods produced and modify the existential value of time: they could engender conviviality and alternative (emancipated) economic attitudes. The economics of care activities could become the art of taking care of the household, or rather our common house, as in ancient Greece, going beyond chrematistic, or artifice to make new money an instrument of the social domain.

This would only be a benefit, not a cost, if people can orientate themselves towards the cultivation and enjoyment of human relations, the natural and social environments, and the many beauties of our cultural resources. This would of course involve many changes in our cultural, political and economic institutions, first of all true democratization of all spheres of our societies and communities, as this *International Degrowth conference* has pointed out so well.

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On the way towards a degrowth society: a review of transformation scenarios and desirable visions of the future

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Abstract

A society involuntarily confronted with de-growth (because it has reached the limits of economic growth, probably due to the consequences of Peak Oil and/or climate change) will mainly regard this phenomenon as a severe crisis. Rising unemployment, rising poverty levels, diminishing supplies of basic goods – especially for the poorer parts of society – and rising social tensions may be some of the symptoms.

Thus, the question arises if and how a smoother transition towards a degrowth society might be shaped and managed. This transition should have the following features:

- *it should be compatible with a reduction of resource throughput to stay within ecological limits*
- *it should allow that the shrinking economic wealth is distributed more equally (in such a way that grinding poverty is avoided)*
- *it should mitigate the worst symptoms of crisis (as mentioned above)*
- *it should connect the necessary reduction of resource use with positive images and values.*

In this article we undertake a systematic review of approaches, policies, strategies and future visions that are relevant with respect to the transformation of society into one that takes reaching ecological goals seriously.

The here discussed approaches cover a broad bandwidth: Starting from more conventional approaches of reforming the market economy (like Ecological Tax Reform), moving to more ambitious reforms (like quota systems in the form of TEQs, i.e. Tradable Energy Quotas and similar ones), moving further to approaches including profound transformations which involve deeper structural changes in society.

The approaches covered will be assessed with respect to several criteria: Are they compatible with a de-growth strategy at all? Do they fulfill the necessary features of a transition strategy (as mentioned above)? What is the role of markets, the state and other stakeholders? Are there nuclei of the vision already in place or happening? Were could a “degrowth movement” find relevant models to refer to? Is the approach or vision more oriented towards a desirable final state or more towards the necessary transition?

After assessing the approaches according to the framework shortly outlined above, final remarks, conclusions and recommendations will be presented.

Keywords: degrowth, transition strategies, societal change, future visions, peak oil, resilience

1. Introduction

What happens to societies confronted with economic degrowth (i.e. with shrinking economic activity as being measured by gross domestic product)?

We may infer our predictions from past examples of societies involuntarily confronted with degrowth, like Eastern Europe and Russia in the 1990-ies, Argentina around 2000, Cuba and North Korea after 1990. These experiences show that rising poverty levels, rising unemployment, diminishing supplies of basic goods – especially for the poorer parts of society – and rising social tensions leading in the worst case to a civil war may be some of the symptoms of a degrowth phase.

The symptoms of crisis caused by the shrinking of the formal monetary economy are to some extent levelled off by growing importance of the “informal economy” and of subsistence structures. As well, the potential for implementing social experiments, e.g. broad introduction of new local currencies, like the “Credito” in Argentina, grows (though this particular experiment failed). Different societies also show a different potential of coping with the unwelcome effects of degrowth in a more human or a more inhuman way: take Cuba on the one side as a more positive example (despite several problems) and North Korea on the other side as a clearly negative example.

It is likely that the diminishing supplies of fossil energy resources (having become popular under the notion of “Peak Oil”) turn out to be a historical turning point: Economic degrowth may spill over from the peripheries of the global economy and become a mainstream phenomenon.

On the other hand, degrowth may not only be regarded as a cause of crisis, but as desirable. This idea emerges with the ecological movement (e.g. the early Green parties in Europe were rather critical towards economic growth) and has gained momentum in recent years in the “decroissance”-movement, mainly in France.

Mainstream policy-makers still cling strongly to economic growth. Degrowth (either voluntary or involuntary) is still a taboo.

2. About transition strategies

Requirements of transition strategies

If we accept the premise that economic degrowth will be a common phenomenon in the not too distant future and that degrowth is also desirable (mainly due to ecological reasons) the question arises – in the light of experiences with negative consequences of degrowth in the past – if and how a smoother transition towards a degrowth society could be shaped and managed.

This transition should have the following features:

- It should allow to be kept within ecological limits by reduction of resource throughput and emissions (e.g. drastic reductions of greenhouse gas emissions).
- It should allow that the shrinking economic wealth is distributed more equally, in such a way that grinding poverty is avoided. Leaving the distribution of goods merely to markets in a period when the economy shrinks, incomes fall and prices of basic goods rise, means that more and more people have growing difficulties to obtain a sufficient supply of basic necessities (take the recent food price crisis as an example).
- It should mitigate the worst symptoms of crisis (as mentioned above) that may arise due to economic degrowth. A by and large peaceful transition by mitigating social tensions may be regarded as an especially desirable goal.
- It should connect the necessary reduction of resource use with positive images and values. Raising the population's acceptance for strategies and measures that are regarded as unconventional and/or inconvenient (and initially unpopular) is crucial for any transition strategy.

Criteria to assess transition strategies and visionary models of society

Transition strategies and visionary models of society can be assessed with respect to several criteria:

- Are they compatible with a degrowth strategy at all?
- Do they fulfill the necessary features of a transition strategy (as mentioned above)?
- What is the role of markets, the state and other stakeholders?
- Are there nuclei of the vision already in place or happening?
- Where could a "degrowth movement" find relevant models to refer to?
- Is the approach or vision more oriented towards a desirable final state or more towards the necessary transition?

In the following we will discuss and classify several approaches, taking into account the criteria above.

3. How to degrow – a discussion of approaches, strategies and future visions

In the nineteen-eighties and -nineties, issues of social movements diffused in official politics under the headline of sustainability. However, during this decade ecological and social problems were intensified by the neoliberal turn towards privatization and globalization. Partly as a result of internal developments after the collapse of the traditional Left, partly in the frame of the resistance to globalization many new approaches and future visions were developed within progressive movements. The main questions tackled

were: how can ecological and social problems be solved, what is a good life, how can it be reached?

Degrowth challenges us in many respects without any historical precedence. Nevertheless it will be necessary to draw on existing theories and ideas in the first step and to use wisely the intellectual wealth social movements have created over many decades in order to react effectively.

Table 1 thus gives an overview of existing approaches to social change that might be useful to manage degrowth. They are either implemented (e.g. emission trading), currently developed (e.g. solidarity economy) or widely discussed (e.g. basic income). Each approach is described by a set of criteria. Approaches and criteria were clustered by use of multivariate statistic (see appendix). Approaches that favor some sort of socialisation of the means of production and partly promote degrowth are separated from those that favor market mechanisms and promote growth of the monetary economy.

See table 1 in Annex.

Figure 1 visualizes how different approaches relate to each other in terms of similarity. The same data set as in table 1 was used. Approaches were grouped according to table 1 (see table 3). Mainstream approaches favoring market mechanisms are rather homogeneous, whereas approaches favoring social control of production show considerable variation. The main difference in this group concerns the question (1) whether or not the state should take a leading role in social change and (2) if basic capitalist social forms such as wage labour or money are being questioned or not.

Figure 2 roughly indicates discursive weights of the approaches analyzed by counting entries of catchwords characteristic for each approach in the World Wide Web. Global Keynesianism, Free Money (Local Currencies) and New Work outweigh all other approaches. Solidarity Economy and Emission Trading are also widely discussed.

See figure 1 and 2 in Annex

Hence the big picture consists of three kinds of discourses: (1) reforming the market economy, (2) redefining socialism, and (3) rebuilding society from the bottom up. Approaches representing each of these will be discussed in the following.

Reforming the market economy

The basic premise of market-based reform proposals is that it is possible to reach ecological (and social) goals by integrating certain regulatory frameworks into the existing market economy. The most prominent reform proposals in this respect are the Ecological Tax Reform and Emissions (resp. Certificate) Trading. Whereas the first tries to influence directly the *pricing* of goods and services by making undesirable, ecologically harmful items more expensive and desirable ones less expensive, the latter tries to regulate the *amount* of certain items, mostly emissions, in particular greenhouse gas emissions. In the case of emission trading a cap is set and normally reduced from period to period, emission entitlements (certificates) are allocated by various methods and trading of emission entitlements is allowed. Depending on the scarcity of entitlements the price of entitlements varies influencing indirectly the prices of desirable and undesirable goods.

In principle, certificate trading schemes are more suitable to guarantee attaining certain goals (like emission limits), because they directly regulate the amount of a certain item. The effects of an ecological tax reform are less clear because the reactions of consumers on rising prices can only be estimated roughly in advance. But currently existing certificate trading schemes, like the EU Emissions Trading Scheme, are criticised for several reasons, as e.g. outlined in FEASTA (2006).

Both, Ecological Tax Reforms and Certificate Trading Schemes, are already implemented to a certain extent but were not able yet to reverse the trends of growing resource throughput and emissions.

Several more ambitious proposals have therefore been made, claiming to be more effective regarding ecological and social goals, like "Tradable Energy Quotas" (Fleming 2007) or "Cap and Share" (FEASTA 2008). Common features of these proposals are that every adult citizen (nationally or globally) would receive the same amount of carbon emission entitlements and all carbon emissions from fossil fuels (either nationally or globally) would be covered.

All market-based reform proposals aim at *material degrowth* in the sense of reducing resource use and/or emissions, although they are not necessarily successful. But how do they position themselves regarding *economic growth* and *degrowth*?

Three positions can be identified in this respect:

1) the "*win-win-principle*": it is possible to significantly reduce material throughput and/or emissions while the (monetary) economy keeps on growing.

The win-win-principle is based on the assumptions that

- a) steadily on-going improvements in resource efficiency are possible and these efficiency improvements grow faster than the economy and/or
- b) the transition towards renewable energy allows a constant and even growing amount of energy services (and thus economic value).

One may be sceptical about the validity of these assumptions, speaking with the prominent ecological economist Herman Daly (Daly, 2007):

„Some (Amory Lovins) think GNP can grow tenfold or more with a constant throughput - that is, a tenfold increase in resource efficiency. I tend to doubt it.“

2) the question is more or less ignored.

3) the possibility of a shrinking economy is recognized but either seen as rather non-dramatic or manageable.

Representing the third position is David Fleming, inventor and promotor of "Tradable Energy Quotas" (TEQs): "No problem: the main reason why we need economic growth is to maintain full employment [...]. If the climate action maintained near-full employment - and it would certainly be a job-provider - the critical task of sustaining a stable economy would be achieved" (Fleming 2007, p. 37).

FEASTA (2008, p. 26) argues that economic growth would take a different form. "Energy-intensive activities will decline, labour-intensive ones will expand. The overall effect on total world income is impossible to calculate but

incomes in the energy-intensive parts of the world can be expected to decline in relative terms." But this effect would be, as FEASTA points out, an effect of any method of limiting fossil fuel use.

Eco-Socialism sensu Sarkar – a redefinition of socialism

Following an analysis that stresses the limitations of technological potentials, the basic premise of Eco-Socialism in the sense of Saral Sarkar is that the necessary reductions of resource throughput and emissions go hand in hand with a shrinking economy. Within capitalism the reduction of the size of the economy (= degrowth) would lead to chaos and cause a severe economic downturn: "A shrinking capitalist economy would mean a catastrophe for the whole society, a never-ending great depression. [...]. Therefore, the state must take up the task of organizing the retreat. It must be a planned retreat, otherwise there will be terrible chaos and calamity" (Sarkar/Kern, 2008, p. 27f.).

Furthermore, the necessary reduction of individual consumption will be more acceptable within a more „equal“ society with little differences in income.

Basic principles of Eco-Socialism (according to Sarkar) are:

- (1) organizing the transition period (as a planned contraction) by the state
- (2) economic planning
- (3) socialisation of big capital (owned by the state or socially controlled institutions); small enterprises may be run by individuals, families or cooperatives.
- (4) participation of the people through decentralized, small economic and political regions (after the transition phase)
- (5) use of appropriate technology: labour-intensive, resource-saving technologies are preferred

Eco-Socialism would be compatible with a degrowth society as this issue is one of the main reasons for transition. During the transition phase first the state and then different institutions on a local, regional or even worldwide level will play a considerable role. Herein lies one possible source of contradiction: although strong participation of citizens is intended, (local or national) authorities should be rather powerful at the same time.

Building a new society from the „bottom up“ – beyond market reforms and state interventions

A third group of transition approaches is characterized by a critical consideration of both the market and the state. Economic growth is seen as an unavoidable dynamic of capitalist markets. The state also promotes economic growth being interested in increasing tax revenues and a stable political order.

Following this argument, market and state are rather part of the problem than of the solution. Money is seen as the basic communication medium of capitalist economies and is heavily criticized suggesting that it makes an escape from the growth addiction impossible.

Accordingly, the necessary change would originate from initiatives that create social relationships and relations of production beyond the market, controlled by direct communication and directly oriented towards the satisfaction of needs. The subsidiary organization of

production and decision making is favored, along with a great deal of local autonomy. Two well elaborated visions that belong to this approach are „Subcoma“ (P.M., 2000) and „The Simpler Way“ (Trainer, 2007).

“Subcoma”

A society beyond market and state would have to be gradually created. In “Subcoma”, the growth of an alternative society starts on the one hand with local initiatives and projects that enrich already existing neighborhoods with collective elements, such as the joint use of tools, common kitchens, or networks of social self-help.

On the other hand, it starts with the creation of an increasing number of experimental communities, where new ways of living could be tested and illustrated by example. The public authorities should not organize these joint activities, but foster their development facilitated by an appropriate legal framework. This could include the creation of funds that strengthen experimental communities or the allocation of vacant buildings.

These initiatives, projects and experimental communities would successively link themselves to each other, in order to build nested organizational levels. With expanding collaboration an increasing number of tasks and products could be manufactured and organized outside the monetized economy. Since this domain would be directly controlled by the people instead of indirect, disembedded monetary relations, no constraint to increase output would exist.

At the final stage of this transition process, six types of social organisations on different scales would organise and satisfy all human needs according to the principle of subsidiary production. On the most basic organizational level, the „Life Maintenance Organisation (LMO)“ would comprise about 500 persons, being able to produce about 60% of all goods and services demanded by autonomous self-organization. Several of these LMOs would constitute a communal area (CA), encompassing about 15.000 persons. On this scale, according to P.M., about 80% of self-sufficiency would be possible, as well as a grass-root democratic planning. Further organizational levels, each constituted by an association of several of the lower level organizations, would be the agro-urban region (150.000 to 12 million people), the autonomous territory (10 to 20 million people), the subcontinental network (0,5 to 1 billion people) and the planetary organisation (all human beings).

“The Simpler Way”

Trainer’s ideas are similar to those of P.M. in many ways. The basic economic unit according to Trainer would be the suburb or town and most of the things that are needed would be produced by this local economy. Only such production that is impossible on this level of organization would be organized in concentric circles around this basic unit.

Similar to P.M., the transition could start with working groups that develop neighborhoods („Community Development Collectives“). Their task would be to mobilize unused potentials that enable the community to satisfy parts of their needs autonomously, for example by community gardens and collaborative workshops. Also,

voluntary activities could be organized locally and help to maintain infrastructures.

In the beginning of the transition process, part of the production would be still monetarized. However, all production takes place under close participatory social control or in cooperatives instead of privately owned companies. Contrary to socialist conceptions, the state would not function as a centralized planning organization, but instead would be substituted by a cascade of nested economies that are directly controlled in their local environment.

4. Degrowth in practice

Apart from the mainstream reform proposals the approaches discussed in the previous chapter were mainly visionary. Consequently the question arises which concrete models and examples actually exist a degrowth movement could refer to. In the following we shortly present two examples for bottom-up initiatives (transition initiatives, urban gardens) and outline the case of a country confronted with economic degrowth (Argentina).

Transition initiatives

Transition initiatives (like transition towns / cities / villages / islands) have committed themselves to proactively face the twin challenges of diminishing oil and gas supplies and climate change in a participative manner involving the local community.

For example the two-fold mission of the transition town Totnes is:

1. To explore and then follow pathways of practical actions that will reduce our carbon emissions and dependence on fossil fuels.
2. To build the town’s resilience, that is, its ability to withstand shocks from the outside, through being more self-reliant in areas such as food, energy, health care, jobs and economics (<http://totnes.transitionnetwork.org>).

Transition initiatives have in common that they

- are very process-oriented (sharing practical tools for communication etc.)
- try to create and promote positive visions for a low-energy, more localised future
- stress permaculture design principles
- try to involve the whole community.

They form a fast growing network, mainly situated in the UK, but also in Ireland, Australia, New Zealand and the USA.

One core activity of a transition initiative is the creation of an “Energy Descent Action Plan” (EDAP). An EDAP consists of a collective vision concerning how the region in question could and should look like in 2020 or 2030 (taking into account especially the diminishing availability of oil and gas) contrasted by a description of the status quo. Creating the vision is followed by an elaboration of pathways which show how to get from here to there (Hopkins, 2005).

Richard Heinberg proposes to complement Energy Descent Action Plans with “Community Resilience Plans” that have a more explicit focus on disaster management. In a recent publication Heinberg (2008) outlines 10 steps of how to develop such plans. David Fleming criticises that transition initiatives at present are far away from fulfilling their ambitious goals although he appreciates the pioneering work done there. He argues that the transition needs to be backed by setting up a Tradable Energy Quotas (TEQs) scheme (Fleming, 2008).

Urban gardens in Detroit

Urban gardening has become a widespread practice worldwide in order to transform urban environments, restore food sovereignty and enhance quality of life. Often cited are the urban gardens in Cuba, which enabled the population to overcome the severe shortenings of food and oil imports after the collapse of the Soviet Union.

Less known is the example of the urban gardening movement in Detroit, USA (Boggs, 2006, Howell, 2006, Exner and Vellay, 2006). The Detroit region was once famous for its car industry. Due to outsourcing, rationalization and deindustrialization, the car industry was affected by a severe crisis in the eighties. Unemployment rose, while social programs were reduced.

In this situation, social movements in Detroit developed a common vision of urban agriculture. The main idea was to rebuild socially as well as economically those parts of the city that were abandoned. Urban gardening became community gardening in a double sense: to produce healthy food cooperatively reorganizes social relationships that are damaged by capitalism.

The urban agriculture movement in Detroit emphasizes self-reliance, cooperation, unconditional support for the poor and networking from the academic to the social activist and cultural scene. Poetry workshops stimulate creativity and develop local discourse. Mural painting revitalizes public space and social relationships. These are essential for further progress towards cooperative production networks.

„Crisis management“ in Argentina

In December 2001 Argentina – once a country with a standard of living comparable to Europe – experienced a nearly complete collapse of the capitalist economy. Already before the collapse out of 37 million people 14 million were poor, 5 million of them absolutely. More than a third of the workforce was unemployed. On the 19th December 2001, massive protests of the unemployed and the middle-class led to the resignation of the government. In the following weeks, a nationwide exchange network, the Red Global de Trueques, was established starting from small circles that had been grown steadily since the end of the nineties. On several occasions, workers took over capitalist enterprises left by the owners. In many parts of the cities peoples assemblies (asambleas) emerged. The whole social movement was propelled forward by the piqueteros, organizations of the unemployed, that gathered strength in the course of the economic crisis (Brand, 2003, Habermann, 2004, Boris and Tittor, 2006).

Results of these movements are ambiguous. On the one hand, social movements were not successful in organizing

life-supporting services such as food production and health care on the scale necessary. The huge exchange networks borne out of emergency were not able to provide enough food for the impoverished masses. In 2002 the Red Global de Trueques broke down to a great extent. Similarly, social movements did not succeed in formulating an alternative to traditional politics that rely on economic growth. Seen from this perspective, the social movements after 2001 were strong but ephemeral.

As for 2008, the economic situation has improved and most of the movements were absorbed by capitalist everyday life. The economic collapse triggered self-organization processes that were unexpected. These both helped to survive and opened space for positive visions and collective debates. However, social change was limited because movements failed to build economic structures and social networks that were self-reliant.

5. Concluding theses, proposals and open questions

Due to the consequences of peaking fossil fuel supplies and climate change, “the economy” as we know it will come to an end anyway. A smooth transition towards a degrowth society might be possible. However, the involuntary confrontation with degrowth is more likely. Since a smooth transition is unlikely, especially on a global scale, it is important to start now to strengthen resilience of communities and societies, at least at the local level (see ch. 4.1).

Thus we propose for action first of all to think about what is NOT to be done anymore. This means in particular cancelling decisions that do not fit in a future of post-peak oil and climate change. The construction of fossil fuel dependent infrastructure like roads, suburban development etc. must be stopped immediately. As quick as possible, preparation for the energy descent should be started, for instance in the form of “Energy Descent Action Plans” and “Community Resilience Plans” (ch. 4.1). This must be accompanied by creating space and allocating resources for social experiments from the „bottom up“. Resources freed by cancelling decisions on infrastructure development must be invested into transition management.

Open questions remain, since the course of events is not predetermined but will be the result of social actions taken. Globalised market relations are likely to shrink dramatically. However, the question what will or should remain of the capitalist market economy cannot be answered in advance. Especially the task to re-organize production and distribution on a local level can only be solved by promoting social innovations on a broad-scale.

Localized markets might probably be under some sort of social control. But social movements and struggles will finally decide to what extent local markets will remain and if they will also be capitalist markets, i.e. including wage labour. How inter-regional production networks and material as well as energy flows will be organized remains unclear.

The approaches reviewed in this paper indicate directions social movements should explore, but outcomes of struggles and results of social learning cannot be anticipated.

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Tables

see annex

Annex

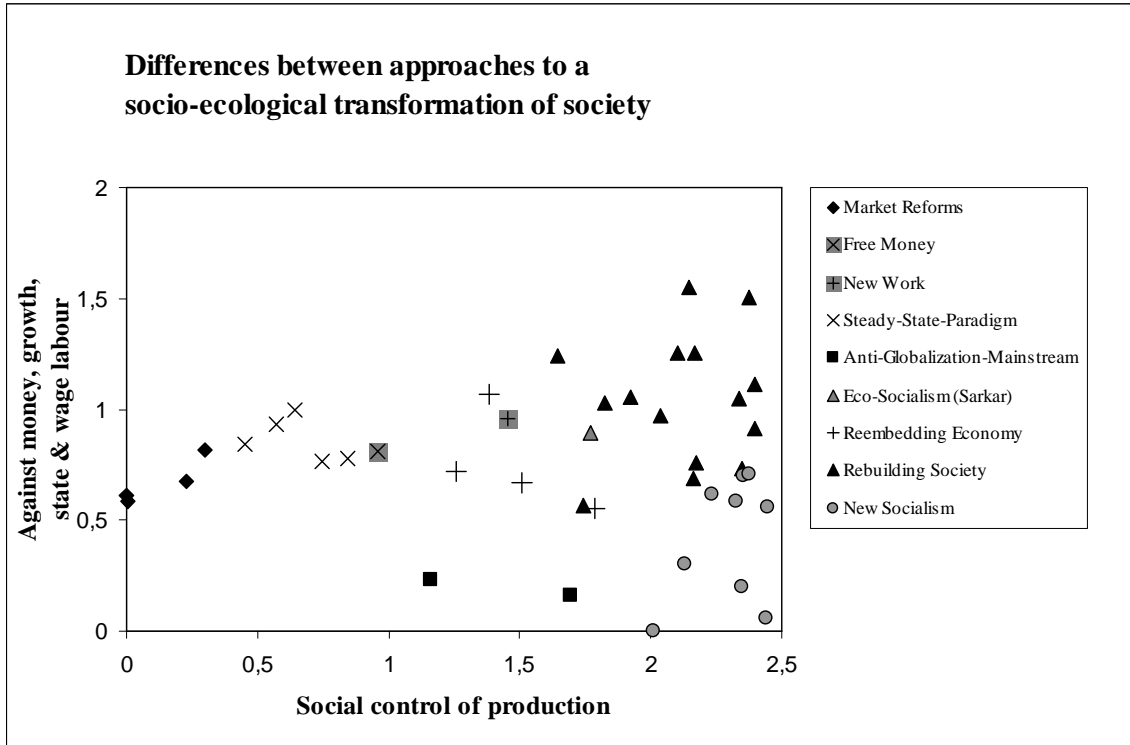


Figure 1: displays the result of a detrended correspondance analysis performed by the program CANOCO (Ter Braak and Šmilauer 1998). Default settings were used. The closer two data points are, the higher is the similarity of the corresponding approaches. The first two axis of variance are interpreted as a gradient of social control of production and the degree of rejection of capitalist social forms, i.e. of money, state, wage labour respectively. Cluster of approaches correspond to the TWINSPAN-result (table 1). See table 3 for details.

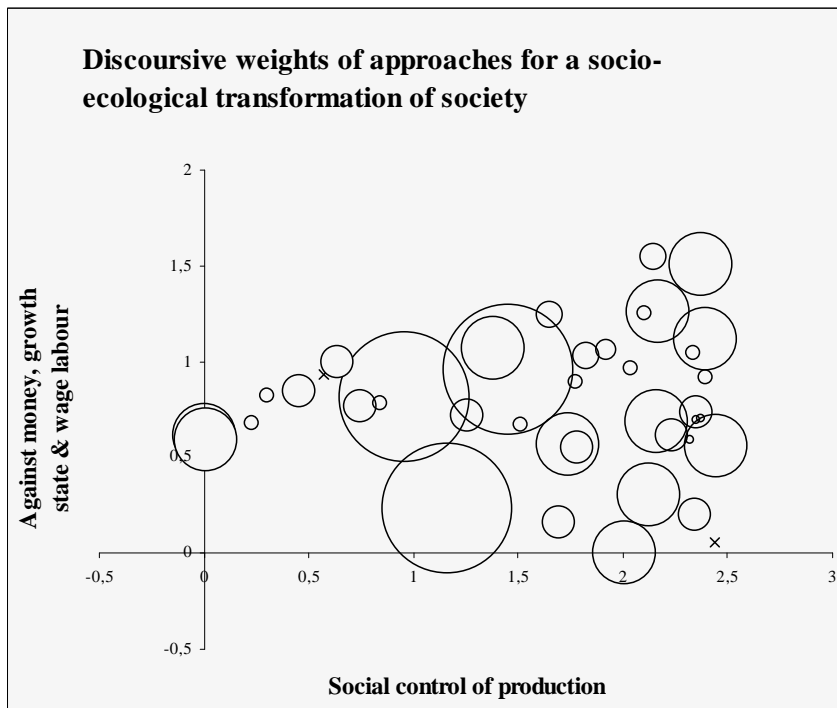


Figure 2: Data for the estimation of discursive weight are given in table 3. Circle radius corresponds to the number of entries of catchwords indicating a given approach in the WWW. $x < 100$ entries, circle radius 4 = 100-1.000 entries, 8 = 1.000-10.000 entries, 16 = 10.000-100.000 entries, 32 = 100.000-1.000.000 entries, 64 = > 1.000.000 entries.

Approach	Author, Sources	References for table 1
1 Socialism	Christian Zeller	Zeller (2004)
2 New Socialism	Paul Cockshot	Cockshot (2007)
3 Radical Reformism	Joachim Hirsch, Linksnetz a.o.	Hirsch (2005), www.links-netz.de
4 Post-Capitalism	Immanuel Wallerstein	Wallerstein (2002, 2004)
5 Operatism	Karl-Heinz Roth	Roth (2005)
6 User-Oriented Supply-Economy	Alfred Fresin	Fresin (2005)
7 Free Doing	John Holloway	Holloway (2002)
8 Practical Socialism	Hans-Jürgen-Krahl-Institute	Hans-Jürgen-Krahl-Institut (ed., 2008)
9 Integrated Society	Kai Ehlers	Ehlers (2006)
10 Libertarian Municipalism	Chaia Heller, Murray Bookchin	Heller (2007)
11 Free Cooperation	Christoph Spehr	Spehr (2007)
12 Caring Labour	Nancy Folbre	Folbre (2007)
13 Peer Economy	Christian Siefkes	Siefkes (2007)
14 Gift Economy	Genevieve Vaughan	Vaughan (2002)
15 Revolutionary Economy	Willem Hoogendijk	Hoogendijk (1991)
16 Subcoma	P.M.	P.M. (2000, 2007)
17 Subsistence Economy	The "Bielefelderinnen"	Mies (2001), Werlhof et al. (2003)
18 Anti-Economy	Group "Krisis"	Kurz (1992), Trenkle (1996)
19 Global Villages	Franz Nahrada	www.oekonux.de/texte/globldorf.html
20 The simpler way	Ted Trainer	http://ssis.arts.unsw.edu.au/tsw/
21 Dual Economy	André Gorz	Gorz (2000)
22 Solidarity Economy	various	e. g. Altvater & Sekler (ed., 2006)
23 Local Exchange Trading Systems	various	e.g. www.tauschkreise.at , www.lets-linkup.com
24 Participatory Economics	Michael Albert	Albert (2007)
25 Reembedded Economy	Elmar Altvater	Altvater & Mahnkopf (1999), Altvater (2005)
26 Localism	Rob Hopkins, Colin Hines a.o.	Hopkins (2006), www.opentheory.org/attac-awwo/text.phtml
27 De-Globalization	Eckhard Stratmann-Mertens	Stratmann-Mertens (2004)
28 Revolutionary Reforms	Mohssen Massarrat	Massarrat (2006)
29 Eco-Socialism	Saral Sarkar	Sarkar Sarkar (2001)
30 Global Keynesianism	Attac	www.attac.at
31 Market Socialism	Hans-Georg Conert	Conert (2002)
32 Cap and Share	Richard Douthwaite	www.capandshare.org
33 Oil Depletion Protocol	Richard Heinberg	Heinberg (2006)
34 Personal Carbon Trading	David Fleming	www.teqs.net
35 Sun-Economy	Hans-Peter Aubauer	http://homepage.univie.ac.at/hans.peter.aubauer
36 Steady-State-Economy	Herman Daly	Daly (1999)
37 Emissions Trading	EU-Policy	
38 Ecological Tax Reform	Policy in many EU-countries	
39 Eco-Capitalism	Paul Hawken, Amory & Hunter Lovins	Hawken et al. (2000)
40 Ecological Market Economy	Ökosoziales Forum	www.oesfo.at
41 Free Money	various	www.inwo.de
42 New Work	Frithjof Bergmann	www.dorfwiki.org/wiki.cgi?NeueArbeit/public/NeueArbeitTexte

Table 2: List of references for the approaches shown in table 1

Group of approaches in figure 1	Approaches	Catchwords searched by Google	WWW-entries
Market Reforms	Emissions Trading	"Emission trading"	577 000
	Ecological Tax Reform	Ecological Tax Refor	154 000
	Eco-Capitalism	Eco-Capitalism	6 630
	Ecological Market Economy	"Ökosoziale Marktwirtschaft"	9 040
Free Money	Free Money	Local currency	3 240 000
New Work	New Work	New Work Bergman	3 100 000
Steady-State-Paradigm	Cap and Share	"Cap and Share"	9 700
	Oil Depletion Protocol	"Oil depletion protocol"	44 200
	Personal Carbon Trading	"Personal carbon trading"	35 800
	Sun-Economy	Sonnenökonomie Aubauer	7
	Steady-State-Economy	"Steady-State-Economy"	45 300
Anti-Globalization-Mainstream	Global Keynesianism	Attac	4 150 000
	Market Socialism	"Market socialism"	91 200
Eco-Socialism (Sarkar)	Eco-Socialism	Eco-socialism Sarkar	1 520
Reembedding Economy	Reembedded Economy	Elmar Altvater	41 300
	Localism	Relocalisation	190 000
	De-Globalization	De-Globalization	25 800
	Revolutionary Reforms	Mohssen Massarrat"	9 430
Rebuilding Society	Subcoma	Subcoma	4 080
	Subsistence Economy	Ecofeminism	158 000
	Anti-Economy	Robert Kurz Krisis	468 000
	Global Villages	Global Villages Nahrada	3 100
	Solidarity Economy	"Economia Solidaria"	650 000
	Local Exchange Trading Systems	"Local Exchange Trading Systems"	12 100
	Participatory Economics	Parecon	174 000
	Dual Economy	Dual economy Gorz	15 100
	Revolutionary Economy	Willem Hoogendijk Economic Revolution	409
	The simpler way	The simpler way Ted Trainer	95 200
	Caring Labour	"Care economy"	85 000
	Peer Economy	Peer Economy Siefkes	3 730
	Gift Economy	"Gift Economy"	124 000
	Libertarian Municipalism	"Libertarian Municipalism"	6 120
	Free Cooperation	Freie Kooperation Spehr	5 270
New Socialism	Radical Reformism	"Radikaler Reformismus"	517
	Post-Capitalism	"Immanuel Wallerstein"	412 000
	User-Oriented Supply-Economy	Versorgungswirtschaft Fresin	186
	Operaism	Empire Hardt Negri	39 700
	Free Doing	John Holloway Marxism	279 000
	Practical Socialism	Praktischer Sozialismus Krahl-Institut	67
	Integrated Society	Integrierte Gesellschaft Ehlers	14 600
	New Socialism	New Socialism Cockshot	96
Socialism	Trotskyism	271 000	

Table 3: Discursive weights for different approaches for socio-ecological change of the society used in figure 2

Catchwords best matching the approach were searched by Google and those with highest numbers of entries were selected for each approach. Quotation marks indicate that the exact phrase was searched. The first column gives the clustering of approaches used in figure 2. The clusters were calculated by TWINSpan (see table 1) except Free Money and New Work, that are separated, and the TWINSpan-subgroups of Rebuilding Society and New Socialism, that are not differentiated in figure 2.

Searching for a Shared Imaginary - A Systemic Approach to Degrowth and Politics

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Abstract

The post-modern condition is characterized by the end of the metanarratives (grand narratives, Lyotard), by the emergence of a liquid social organization (Bauman) and fragmented, fluid imaginary.

Since social systems, unlike physical and biological ones, are characterized by the capability to negotiate meanings (D. Lane), they react according to what may be defined shared imaginary. The absence, or the extreme fragmentation, of such shared representations of the world, makes any attempt to institute "alternative" social organizations ineffectual.

Following a functional division (economic, ecological, social and cultural) the paper attempts to identify a few "fundamental" processes, in which growth is the common denominator, and which explain the reasons for the multidimensional crisis we are facing.

The analysis starts from the growth process which characterized industrial capitalism first and financial capitalism later, pointing out its self-pursuing character and the main consequences for the ecological equilibrium. The effects of growth on inequality (S. Latouche), on the progressive dissolution of social relationships (K. Polanyi) and on the liquidity of collective imaginary (Castoriadis) are examined, with a view to offering a systemic interpretation of these processes.

What emerges from this analysis are three fundamental dimensions through which an interpretation of contemporary history is possible. Starting from these dimensions a framework of a political programme toward a degrowth society may be delineated. Examples are provided of policies capable of triggering self-reinforcing relationships among degrowth, sustainability and autonomy.

1. Introduction

A new spectre is haunting Europe, the spectre of degrowth. Faced with a widespread ecological, social and political crisis, with injustice, with a loss of meaning, insecurity and finally the possibility of the collapse of the very economic system itself, not only political movements but also growing sectors of the public are wondering what new plan might be conceived for society.

It is a very difficult/delicate/subtle question. Serge Latouche himself, when requested to take up a standpoint, frequently made it immediately clear that degrowth is above all a slogan, and that there are no "ready-made political solutions". Indeed, overcoming today's model and

changing to a true, just, calm, sustainable and autonomous society of degrowth raises such vast, complex problems that one must be wary of anyone who proposes simplistic solutions. On the other hand, the crisis is so pressing that it is not possible to be deaf to these questions, nor can the time for defining a plan of action be any longer deferred. Moreover, there has been considerable progress in theoretical considerations in recent years and it cannot now be claimed that degrowth merely represents a criticism of neo-laissez-faire economy: some proposals for political action can accompany the *pars destruens* (Latouche, 2007).

It is obvious that, of the hundreds of discrete voices characterising post-modernity, "degrowth" means a shared, meaningful horizon, a systemic vision of the whole, which gathers and links within itself some of the examples of progress advanced in recent years by political movements. It is this task of weaving, of proposing a shared import, that must be carried forward forcefully and without delay. Opinion that the system is facing a grave crisis has now become very common. However, the perception of the urgency of this crisis, and to an even greater degree the strategies by means of which it may be tackled, differ vastly, even among those of the Left. The possibility of embracing the various dimensions of the crisis within one single viewpoint, and above all the possibility of seeing behind the extraordinary changeability of its manifestations, the operating of a systemic dynamics that is undoubtedly complex, but which can be deciphered and imputed to the working of a few basic processes, represents the true "challenge" of that horizon of thought which we call degrowth, and, hence, of its chance of becoming a generally shared political project.

2. The turbo-engine invented in modern times: capitalist accumulation, growth and degrowth

The fundamental trait of any capitalist economy is the fact that part of the profit made by enterprises is reinvested, thus contributing to an increase in capital, which then, by means of technological innovation, becomes the basis for creating more profit. This process explains the uncontrollable economic growth that has characterised these types of economy since the Industrial Revolution; it is a process, however, that was unknown to all the earlier forms of economic and social organisation. Although the process is more complex than we can describe here, it can hardly be denied that the nature of capitalism is self-expanding.

Yet, while innumerable words have been spent on celebrating the self-regulating character of markets, very little is said that underlines the self-expanding nature of the process of accumulation. It had already reached its full maturity at the beginning of the twentieth century, when the American economy assumed the form of "monopolistic capitalism", well described by Baran and Sweezy (1968). The process of the accumulation of capital, being a self-increasing process, has the ability to lead the system towards the *concentration* of enterprises into a few large bodies. It has today reached its purest form in the processes of financial concentration, wherein the concentration of property and control typically corresponds to productive decentralisation, by means of multinational enterprise.

Classic economists, Marx in particular, already understood quite well that this circular, recursive process was the fundamental trait of the capitalist economic system. A systemic approach, however, enables us, as we shall see, to reinterpret these processes in a new, less ideological, decidedly more profound way. However well a systemic analysis may point out a multiplicity of self-developing spirals of this type, the process of the growth and accumulation of capital assumes, in my view, a central role in the dynamics of the world system for two reasons: first, for its undeniable force and pervasiveness and, secondly, as we shall see, because the other significant, self-destructive processes – from the spiral of the ecological crisis to that of poverty/exclusion – are a consequence of the former. We shall restrict ourselves here to pointing out some of these basic processes.

3. The spiral of the ecological crisis

What, to be very succinct, is the reason for the crisis between the self-increasing nature of the capitalist system and the biosphere? As is known, in standard economic conceptions (including the Marxist one) growth is in any case generally assumed to be positive. This is perhaps why neoclassical economists have never considered that it should be subjected to any restrictions: in their view, *more* always means *better*. Without going into the anthropological limitations to this concept, although they are undoubtedly considerable (Mauss, 1965, Polanyi, 1974, Caillé, 1991), it is clear that it was created in an historical phase of the capitalist process when the stocks of the biosphere were so readily available that the services they offered (resources, absorption of waste, etc.) seemed virtually inexhaustible. Moreover, there was also a concept of science founded on the separation among different types of knowledge; thus economics was considered to be an isolated system. However, it is not so: from the fundamental bioeconomic studies of Georgescu-Roegen (2003) we have learnt how the economic process is rooted in the biophysical system that maintains it and it is, thus, subject to the limitations of a biological and thermodynamic nature. The consequence can be summed up in the following conclusion: the basic objective of economic process, unrestricted growth of production and income, contradicts the fundamental laws of thermodynamics. It must, therefore, be rejected, or somehow radically reconsidered.

Another important conclusion can be drawn from the above: as biologists are well aware, the type of trend that characterises self-increasing processes in a limited environment is that described by the logistic curve, with its characteristic bell-shape: first there is a rapid growth and then, when the peak is reached, a falling trend.

The best-known, but by no means the only, work that uses a systemic approach, thereby revealing trends of this type, is the classic study by the MIT, *Limits to growth*. (Meadows D. e D. Randes J., 2006). What we should like to underline here is not so much a forecast of the dates of the peaks of the different variables but rather the type of trend we may expect for the basic variables in the system (population, life expectancy, industrial production, etc.). Unless some “Promethean” technology is found, the system will present

the classic bell-shaped trend: first rising, then falling. We may add that the temporal scale of the peak of the main variables, according to researchers at the MIT, while we are aware that there can be no certainties about this, lies somewhere between ten and twenty years, which is to say very soon, if one considers the “inertia” (or more correctly feedback delays) that characterises anthropo-economic systems.

A fully systemic approach cannot, however, be restricted to considering merely variables of an economic and ecological nature, as is the case of the MIT study: it will also have to introduce considerations of a social and symbolic type. The present state of research permits us to state that a fully systemic approach foresees at least four dimensions: economic, ecological, social and cultural.

4. The three axes of degrowth policies

Once this unavoidable premiss has been made, what may the fundamental characteristics of a degrowth policy be?

I suggest the following general criterion: *any policy that compensates, by means of suitable negative links of feedback, for the current self-increasing processes, without compromising the system's capacity for generating well-being, makes a move in the right direction*. By following this briefly outlined analytical approach, it is possible to determine three basic axes for the evaluation of a degrowth policy: socio-economic, ecological, and cultural/symbolic. Any political programme to be hoped for must therefore move:

- From unsustainability to sustainability
- From inequality (competitiveness) to fairness (cooperation/reciprocity)
- From dependency to autonomy

Although this representation is highly abstract, it does point out some aspects that are fundamental for us. First: however the dimension of equality, that is to say together with Bobbio (1994) that signified by a traditional Left-Right political polarity, may still be a contemporary question; indeed, it cannot be ignored if one wishes to define the area in which history is to be interpreted. Yet it is no longer adequate: at least one other dimension must be added to it: that of sustainability/unsustainability, which, in its turn, is inextricably linked to the dimension of growth/degrowth.

However, if we wish to understand fully the struggles and revendications of the political groups which, at least from the origins of the Socialist movement, up to today's environmentalist or feminist groups, and the various examples of all those who in various corners of the world are fighting for the defence and shared management of resources and common goods, then we must add to the first two at least a third dimension, which we define, along with Castoriadis, autonomy. Briefly, by autonomy we mean “the project of a society in which all citizens have an equal, effective chance to participate in the society's legislation, government, jurisdiction and, finally, institution” (Castoriadis, 2005).

If we imagine a matrix formed by these three axes (assuming, for simplicity's sake, that the second dimension, that of ecology, can be included in the first), the first obvious conclusion is that western societies all fall in the top right-hand corner of the matrix. The scheme thus offers us an initial, simple criterion of evaluation: any policy capable of re-equilibrating the position of a society by moving it "towards the bottom left-hand corner" of the matrix is moving in the direction we hope for.

The second aspect: just as it is not difficult to demonstrate, for western countries, the existence of a vicious circle among growth, competitiveness and dependency, so is it important to note the existence of a virtuous circle among degrowth, sustainability and autonomy. Let us try to understand this important process better. First of all, a degrowth society, a society, that is, that has reduced the weight and scale of its own megastructures, would favour the attainment of an effective ecological sustainability. The closure of bioeconomic circles is only possible on a regional or local level, where information is available and where better control concerning the sustainability of productive processes is possible. It is true that smaller does not necessarily mean more efficient from an ecological point of view, but small to medium-sized productive structures are the only ones that permit a certain shared control of technology and are thus the only ones that in actual fact are capable of making choices in favour of a true ecological sustainability.

To the same degree, degrowth is a condition for social equality. As has been shown (S. Latouche, 2003; G. Rist, 1998) inequality and exclusion are, above all, the offspring of growth. In the end, only an economy that has reduced the scale of its apparatuses can give rise to an autonomous society (Castoriadis, 1998, 2005). In other words, only technology that has renounced its own giant dimensions, its desire for power, can be managed in a shared fashion, on a local level, collectively, thus giving birth to an autonomous, convivial society. On the other hand, only a society that has been able to transform its own imaginary, encouraging autonomy, will be capable of generating individuals and institutions that may accompany the transformation of economic structures, in other words achieve degrowth. In this virtuous circle it is obvious that there is little point in asking whether the imaginary or the socio-economic structures should be changed first, since the one goes hand in hand with, and supports, the transformation of the others, and vice versa.

What types of processes may favour this re-equilibration? And what concrete proposals can we put forward?

If the analysis we have given is correct, if, that is to say, the capitalist system is characterised principally as a self-increasing system, and if it is responsible for social inequalities and the devastation of the biosphere, imagining a degrowth policy means above all individuating some feedback processes capable of allowing the system first of all to avoid its collapse and, afterwards, starting a process of socio-economic and cultural transformation on the road towards sustainability, justice and autonomy.

One might also ask, polemically, the opposite question: If the capitalist system is, as we have maintained, a self-increasing system, how is it possible that it has not yet

given rise to its own self-destruction? It is undoubtedly true that there are many symptoms of a crisis and that every growth process requires an uncertain period of time before it destroys the system's capacity to reply (resilience). However, there is no doubt that if, even after over two centuries, the capitalist system has not yet collapsed, although this has been predicted several times, it is due to the simultaneous operation of determinant processes of a self-correcting nature.

I shall start by illustrating a few classic cases in the twentieth-century economic-political tradition, but which have not yet been interpreted in a systemic key. Probably the most significant case is that pertaining to the traditional welfare policies of Keynesian origin. Seen from a systemic point of view, traditional policies of redistribution, which use, for example, the well-known institutions of progressive taxation, represent a typical example of negative feedback. Keynesian policies, taken as a whole, probably represented the most significant compensatory process that the twentieth century was able to offer to the lack of social equilibrium caused by capitalist accumulation. In the same way, we can interpret the trade-unions' struggles and pressures to sustain salaries and working conditions. It is following the very periods of crisis, such as after the Great Depression, that the system brought about the most significant processes of a compensatory nature, giving rise to the social state and to the various forms of safeguarding labour.

Yet it must be clearly said that Keynesian policies, while contributing to the salvation of the economic system from the crises of the twentieth century, will not be able to provide a suitable answer to the crises in the twenty-first century for the simple reason that Keynesian policies, acting as a multiplier of consumption and hence of growth, cannot but aggravate the current ecological crisis. Of course, standard economists, both of neoclassical and of Keynesian extract, will object that thanks to technological progress it will be possible to increase aggregate production while reducing the impact on ecosystems (ecoefficiency). This is, however, as I have shown elsewhere (2005), a course that camouflages some systemic traps: in reality, technological progress actually accompanies an increase in the total consumption of matter/energy and in the impact on the biosphere; this is clearly shown by the data at our disposal (*rebound effect*).

If one wishes to find a solution to the present ecological crisis, and imagine a new type of sustainable, serene society, possibly capable of affording subjects a high level of autonomy and self-determination, one cannot exclude a decisive inversion in today's dynamic trend towards a global economic system, that is to say it cannot progress but by degrowth policies.

Systems challenges: profit, growth, and speed: results from the SYSCONS study

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Abstract

Sustainability cannot be reasonably aimed at through the traditional sector specific, incremental, and linear policy instruments and tools, and it cannot be effectively managed as an “anomaly” emerging inside powerful trends pointing into the opposite direction from sustainability. While the capitalist market economy, the prevailing human cultural construct and its development path resulted in much wished social benefits, it has also got burdened by a series of unintended consequences, including the regeneration of social injustice and unfair distribution of wealth, the depletion of certain natural resources, and the quick transformation of environmental conditions rendering planetary eco-services potential, supporting human cultures, questionable in the long run. Through the SYSCONS¹, the broad interdisciplinary literature related to production and consumption has been studied, and international expert communications conducted on the dynamic system challenges; assessing human needs and the often seemingly antagonistic conflicts among the many actors of the production and consumption whole-system. This whole-system got visualised, to identify causal loops and archetypes for the system’s behaviour. As a result, perhaps not surprisingly for the sustainability research community, the concepts of growth, speed, and profit emerged as massive obstacles to sustainability. The solutions, along Meadows’ work on system leverages, point to the inevitability of very high-level interventions, not currently being in the repertoire of relevant institutions. The authors’ aim is to provide a starting point for open and frank discussion on the reasons behind typical environmental and social policy making that traditionally focus on solving problem derivatives instead of looking at the large systemic processes needed to grasp the complex challenges of today and tomorrow within democratic contexts.

Keywords: sustainability, consumption and production, complex systems, resilience, system behavioural archetypes, system leverages, growth engine, de-growth

¹ SYSCONS stands for *System dynamics to diagnose and devise sustainable consumption and production patterns*; a study conducted for the Swedish EPA, in the framework of the FLIPP Research Programme.

1. Introduction

Taking a systemic perspective on sustainability requires a deeper understanding of the nature of the production and consumption complex, the socio-cultural and political-economic systems and their driving evolutionary psychological and sociological processes, and the overall ecologic framework in which humans, their culture(s), and all their activities exist.

Policy-makers face the problematic that sustainability cannot be reasonably aimed at through the traditional sector specific, incremental, and linear policy instruments and tools. Moreover, it cannot be effectively managed as an “anomaly” inside powerful trends pointing into the opposite direction from sustainability. The capitalist market economy, the prevailing human cultural construct in the past two centuries, has resulted in the evolutionary conditions of competition, selection, mutation, and the survival of successful replicators of genes and memes in a complex, adaptive, multilayered system (Bodo and Nemeskeri, 2008). This human development path resulted in much wished social benefits of welfare, comfort, security, and even self-fulfilment, and to some extent, happiness of people. On the other hand, this process has got burdened by a series of risk involving side-effects, including the (re)generation of social injustice and unfair distribution of resources, as raised by e.g. Rawls (1971), Chomsky (1999), de Soto (2003), Bowles and Sethi (2006), Baykan (2007) and Fotopoulos (2008), the depletion of certain natural resources (Birol, 2008), and the quick transformation of environmental: physical (e.g. climatic conditions, land availability), chemical (e.g. toxicity in various media including the food chain, and degradation of nutritional value in soils), and biological (e.g. loss of biodiversity, strategic health concerns) conditions rendering planetary life, or at least human culture support potential, questionable on the long run (Worldwatch Institute, 2004; Millennium Ecosystem Assessment, 2005; Meadows et al., 2005).

Scientific evidence has been mounting (e.g. Nelson and Winter, 1974; Costanza, 1995; Ayres, 2001; Bringezu, 2006) that inducing economic growth based on energy and material intensive solutions drives human development beyond environmental, economic, and social sustainability. The challenge of addressing sustainable consumption and production (SCP) is far more complex and requires more comprehensive socio-cultural changes than hitherto developed approaches.

To conceptualise and analyse this multilayered system of socio-cultural and political-economic mechanisms, this paper offers a system thinking approach that may assist more advanced adaptive policy development towards sustainability.

2. Behavioural archetypes of the production and consumption system

Through the SYSCONS study, Nemeskeri et al. (2007) have assessed the broad interdisciplinary literature with relevance to production and consumption, and conducted international expert communications on the revealed dynamic system challenges. They have looked at human needs in their plasticity, and the often seemingly

antagonistic conflicts among the many actors of the whole-system. Then the production and consumption system got visualised (see appendix), to identify causal loops and archetypes for the system's behaviour, along Braun's (2002) discussion on archetypes. This framework provides a glimpse into the extraordinary complexity that the concept of SCP encompasses, and also implies that the conceptualisation and meaning of SCP, sustainable development, and sustainability can vary and evolve over time. The generic system archetypes identified in this causality model could then be used as diagnostic tool to provide insight into the underlying structures in this system, from which behaviours over time and discrete events emerge. The main archetypes prevalent to this system are as follows:

Limits to Growth: The message here is that there is no such thing as limitless, unrestricted positive reinforcing system behaviour; that there are always limits that eventually make themselves visible. In our field of enquiry, the use and depletion of environmental resources is limited by the renewal rate of natural systems. We know the driver(s) of the growth engine that are behind the logic and rationale for induced economic growth (see figure in appendix). We also have some understanding of the doubling times of these processes. The problem is that there is a discrepancy between the doubling time of the growth loop and the changes required to avoid running into the limits.

Economic growth and market processes are far more rapid than the natural and human processes for adaptation to changes. The market outcompetes all co-evolving systems, including technology innovation and policy development, argue Nemeskeri et al. (2007). The whole-system is out of control; or rather the control is being distributed throughout the system. The continuous growth of the economy leads to the overuse of environmental resources, which, at a point, inevitably become external limiting conditions for the system. The pressure of this limiting effect can be somewhat attenuated by increased resources efficiency and certain resource shifting, but it cannot be escaped. For the sake of avoiding running into these limits and their ensuing risks on human cultural progress, the engine driving towards the limits must be better managed, reinvented or removed. Effective ways of balancing growth and strategies to tackle the known and suspected limits have to be developed and implemented; and quickly enough, before the whole-system runs into serious trouble, straining all its co-evolving subsystems and their actors.

Shifting the Burden: The essence of this archetype is that „once the symptomatic solution (which by contrast requires less understanding, is easier to formulate, relatively less expense - in the short run - and produces instant gratification) has had its effect, there is little perceived need to pay any more attention to the fundamental, underlying systemic problem” (Braun, 2002). This archetype can be found in several places of the causal loop diagram of the production and consumption system. For instance, the market prefers to (over)use natural capitals, which is reflected in environmental and social externalities, such as the relatively low pricing of natural resources and ecosystem services, and of health and well-being. This leads to the decrease of total production costs in the short run. On the other hand, the side effects of environmental depletion exert more substantial impacts in the long run.

Similarly, increasing level of material consumption can achieve short-term satisfaction; however, ignoring non-material needs and their satisfiers can result in long-term psychosocial problems. As people require more money for the consumption of material need satisfiers, they have to allocate more-and-more time for work instead of leisure. While the price of work is reflected in salaries, the worth of leisure and rest are less precisely valued on the market. Although bringing the perceived benefits of increased income and associated goods in the short run, this process leads to a stressful lifestyle with long-term physical and mental health challenges. The main lesson from this archetype is that fundamental solutions often require more time to have recognisable results, and the quicker symptomatic solutions often fail in the long run. High-leverage, more potent actions usually require more measuring and understanding of long-term impacts, and determination and commitment on high political level to reach more profound solutions.

Eroding Goals: In this archetype the dynamic tension between symptoms and fundamental problems continues through examining the dynamic behaviours in the present – in the light of forecasts have been made in the past. The field of policy development and assessment may pop into the researchers' mind immediately. Major political and economic goals set by and for society, including the correct application and redistribution of tax revenues get altered by counter-interests of lobby, corruption, and illegal production activities, for instance. This can result in the erosion of environmental and social policy goals. To avoid drifting original goals, one has to consider anchoring their more specific targets to substantial external domains, like species resilience, justice and fairness, ecological integrity, or to such solid grounds as the sufficient percentage in pollution reduction - calculated through safety margins of precaution; and establish a clear transition plan from current reality to the goal, including a realistic time frame for achieving it. The recognition of alternative goals that conflict with the democratically chosen socio-cultural or political-economic goal is vital, as conflicting interests and agents can have substantial influence on the complex processes designed to reach the goal. Monitoring the firmness and integrity of the goal is also important, to see whether the goal itself has been changed, became less ambitious over time. These lessons are particularly relevant to environmental policy making. For example, environmental tax regimes are often designed through tedious consultations with powerful stakeholders, and in this course the potency of the new instrument often becomes significantly reduced, its potential to internalise the targeted externalities get much lowered, thus becoming an ineffective tool at its introduction already.

Escalation: „A commonly held belief of competition is mounting an appropriate response to the actions of competitors to sustain own competitive advantage, to maintain momentum toward gaining competitive advantage, or because that is what managers are supposed to do“ (Braun, 2002). In neoclassical economic theory, the consumption and production system is a system approaching equilibrium through the intricate interplays of rational market actors - in healthy (and fair) competition. In reality the production system actors seem running their own accelerating growth course, trying to justify it through

artificially induced marketing-advertisement-media saturation of the time-space continuum consumers - all of us - wonder inside. As market and technology influence the evolution of perceived human needs, they further increase consumption, justifying the accelerating growth of production, thus the system continuously escalates, leading to ever more production, marketing and sales, reinvestment into production, and also overconsumption. While there can be certain limiting factors to these co-powering loops, such as the lack of locally available quality labour force, suitable technologies, or raw materials, these can be overcome by the flexible, globalising economic system. Thus the most important limit remains the renewal rate of the natural environment, as argued at the Limits to Growth archetype. However, the perception of threat related to this limit is often distorted by the delays built-in the complex processes of the vast natural system. To break the escalation archetype, one should identify broader goals for a system, which meets the goals of conflicting subsystems and their actors. For this, Nemeskeri et al. (2007) have elaborated on a longer list of individual and institutional actors of the production and consumption system; studied their motives, benefits and disadvantages to the system, and their emerging conflicts with the system and with the other actors (for more on actor conflicts see Nemeskeri and Mont, 2008). The researcher has to find the reasons behind behaviours and actions to grasp what might be done to correct the escalation processes. Naturally, there are multiple rationals used by the different actors, trying to avoid various threats, like losing profit versus losing jobs, health, and future. The interest of the profit-seeker actor is to keep the system - running based-on growth and (out)competition - in a continuous disequilibrium via product innovation and marketing. One potential point of intervention to avoid the trap of escalation in this system could be the creation of innovative collaboration networks.

Success to the Successful: This is the common practice of rewarding good performance with more resources in the expectation that performance will continue to improve, while leaving the other persons, organisations, populations, or nations behind; creating a system in which they can never catch up with the forerunners. At the state level, expenses are often channelled to investments in infrastructure instead of investing in social services, since their immediate and tangible results have greater communication value. Producers also prefer investing in production infrastructure instead of investing in human, social, or environmental capitals, as the first usually brings higher and better controllable returns on investment. Businesses performing short-term profitable activities can outcompete companies whose profit levels may only get high in the long run. This process causes path dependency on market and technology evolution. In dealing with this archetype, evaluating alternative development paths could become an important measure. The current political-economic system is planned, run, and judged according to values developed in earlier times without understanding the challenges of today; and it favours established practices, processes, and power structures over potential alternatives. A probable way out from this archetype is to identify goals and objectives that refocus the definition of success to a broader system. It is important to investigate the historical origins of success, and the reasons for favouring one solution over another. As the initial conditions and the

beneficiaries of current system rules rarely favour alternative options, the success criteria and evaluation methods are designed to suit the status quo. To break out from this system archetype, there must be space for social, economic, and political experiments and innovation around the globe, instead of globalising, strengthening, and (re)enforcing a single approach.

Tragedy of the Commons: This archetype describes a well-known phenomenon, when individuals overuse resources that are undivided and can be accessed freely or at a very low price. Production activities using the "free" services of natural capital are examples of this. It seems worth for each economic entity to carry out its production activity; however, the total impact of the market system on natural resources destroys the potential for certain alternative market activities. For instance, it is hard to attract tourism in heavily polluted regions, grow food crops in depleted and arid land, or develop safe new settlements on low laying coastal plains in light of likely raising sea levels. But perhaps the most obvious example of running into the Tragedy of the Commons is overfishing, where the specific market segment has been destroying itself with alarming speed. While the more recently recognised decreasing climate stabilisation service of nature threatens entire societies and their economies with mass-scale collapse, limiting many future potential human activities. To make system actors recognising the cumulative effects of using the common resource, it is important to urgently establish methods that quantify the life-cycle impacts of individual actors more precisely. When using commons, ways to replace, renew, or substitute the resource should be studied, before it becomes depleted. There must be a whole-system level control of the commons in order to manage their correct, fair, and strategic usage for entire society. Policy developers need to see which incentives are reinforcing the process of individual or corporate exploitation of the commons over respecting macro-economic needs and social will. The timeframe is crucial when addressing the depletion of common resources. When the benefits seem immediate and the accumulating negative effects seem uncertain, it is more likely that the respective common resource gets overused and potentially depleted. Therefore long-term effects should be felt immediate and uncertainties approached with precaution, to urge system actors searching for alternative solutions. Limiting access to common resources is, of course, a major point of intervention that requires a shared vision to respect others, and allocate resources based-on the needs of the whole-system.

Fixes that Fail: This archetype displays a steadily worsening scenario, where the fix applied to them further exaggerates the initial problem symptoms. A well-known example of this is the *rebound effect*. Although humankind advances technologically, the potential benefit of *decoupling*, creating less pollution by per unit production and use is dissolved by the increase in consumption and use of that product or service. The long-term reduced prices arising from improved production methods, or from an illusion of environment friendliness achieved by operating on better efficiency, drive consumers to increased levels of ownership and habitual applications. This indicates that technological improvements can bring only short-term benefits in reducing the harms of resources exploitation.

This archetype explains that environmental innovation alone is not able to break the growth loop, and suggests that a fundamental cause of the problem exists underneath the symptoms that can be seen on the surface. This problematic is, perhaps, better understood nowadays in the field of medicine, and need to be applied also in the complex systems of sustainability. When a problem requires a quick fix, it is important to plan a parallel solution dealing with the fundamental underlying matter(s), as well. Quick fixes often create additional side effects, which could be mapped for each intervention, in order to prepare for or avoid them. This archetype suggests learning from past and current interventions, in order to compare the intended with the actual results. Whether fixes and fundamental causes have been linked at all should also be identified.

3. Profit, growth, speed

Thinking through these identified system behaviours and ensuing challenges, deep inside the production and consumption system, the constructs and logic of profit generation through rough competition in growth and speed of growth emerge inevitably as massive obstacles to sustainability.

Revisiting the growth engine in the figure, *profit making* can be recognised as the basic *selection pressure* among economic actors, since financial capital is necessary for the reinvestment in any economic production activity, and profit is the source of surplus financial capital. When an activity fails to create profit, it loses the invested financial capital and will hardly attract more of it to that activity. For the individual investors profit is the major motive for investment; for the investor community profit, as return on investment, is a sign of attractive investment opportunity. Consequently, profitability results in the multiplication of the activity that has created it, as long as this profit generation potential remains attractive enough in comparison with alternative profit making options on the market. This multiplication is the result of either the reinvestment in the same organisation or the imitation of that business activity by other investors and companies, a trivial since Smith (1776) laid out the basics of the free market concept.

When several economic actors experience growth, growth alone will not be sufficient for *competitive advantage* and success. In (stock) market competition the key factor is not the absolute value of financial capital, but the dynamic surplus of financial capital, to be redistributed, becomes the key indicator of market power. Therefore, a second order competition emerges: not just for growth, but for *faster growth* than those of the competitors. The more rapidly a stock-market company can generate the higher return on investment, the more it attracts investors' attention. How much, how quickly, and with what risks, are the main questions of the financial actors.

In most advanced industries like household electronics, information and communication technologies, the *network effect* is increasingly important: the more people use a certain technology, the more attractive it becomes. A similar process is experienced with brands that have an important social signifier role - think of prestigious cars and

designer clothes! This implies the *law of increasing returns* (Kelly, 1994) instead of the law of diminishing returns, as described in conventional economic theory (e.g. Samuelson and Nordhaus, 1998). The network effect requires that the technology achieves a critical mass when the need for technology starts sky-rocketing; i.e. when two people have a mobile phone it is not very attractive, but when everybody has one except you, it becomes a must. This requires that the initial conditions are favourable for the spread of the technology. Thus the speed of initial growth determines what technology, what economic activity will be successful in the long run. This process results in the spread of initially successful technologies even if their competitive alternatives offers could be technologically superior. Examples include VHS vs. Betamax, the QWERTY keyboards or some of the most diffused computer operating systems, where the slower market offers became more-or-less extinct. Major consequences of competing in terms of increasing speed is *technological path dependence* and *technology monopoly*, which are sources of high profit generation potential. This process can be described with the Success to the Successful archetype. Another major consequence of speed requirement is desperate continuous product modification, in better cases: innovation. A successful technology will be quickly adapted by other producers whose process improvements, increased efficiency, well planned outsourcing and thus increased competition will soon diminish the high profit levels of the original technology developer. In order to remain successful, companies need to keep creating new products and services, and developing new technologies to achieve temporary monopolies and thus the desired profit margins. So the speed of innovation is increasing, along with the marketing-media-advertising push.

The consequences of this race are far-reaching, affecting technology diffusion, market dynamics, regulatory approaches, culture, and the human psyche. On human capital, they include increasing overwork, stress, and stress related illnesses that nowadays are characteristics to unskilled labour, management, and investors alike. Natural resources are also exploited with increasing speed; and even the spread of illegal and semi-legal economic activities became so fast, they are hardly controllable. While market actors innovate continually in terms of technology, organisation, production, marketing and sales procedures, regulation is still based-on the institutions and processes created decades if not hundreds of years ago. Thus any reforms are painfully slow and inefficient to lead through. Regulation fails to meet the speed of market and technology evolution, found Nemeskeri et al. (2007).

4. Leverages

The substantial and fast enough solutions towards sustainability, along with Meadows' (1997) work on system leverages, point to the inevitability of very high level interventions, rarely being in the repertoire of governing institutions.

At the bottom of the list of a dozen leverages stand *parameters and numbers*, the currently mainstream, slowly evolving applications of taxes and other economic instruments, setting standards, allocating budgets (for welfare and warfare), hiring and firing people, voting for

and against governments and electing new politicians. All the prevalent evidence and hard data based policy and decision-making approaches in our socio-cultural and political-economic systems get tuned „according to the same old information and goals and rules“ – says Meadows (1997). So what substantial changes, improvement in behaviour patterns can be expected that could be suited in the same old systems, as their operational framework conditions are keenly protected? It should be realised that the higher, the more powerful a leverage is, the more fiercely the old system’s beneficiaries fight it back, suggest Meadows (1997) and Nemeskeri and Mont (2008).

Slowing down current socio-economic processes comes at medium strength leverages. Slowing economic growth being a greater leverage than trying to speed up the rate of adjustments by technological development and internalisation of market externalities, according to Forrester’s (1973) World Model used at MIT.

The advanced and democratic *management of information* flows, in our case the correct and sufficient information acquisition and provision on what, how (best), and why to do in the markets – for and by all actors, comes up as an even stronger leverage. Can science, education, governance, and economic actors feel relieved in this matter?

Then we get into the most powerful leverages, starting with the *system rules* that define the scope, boundaries and degree of freedom inside the system. While the laws of the natural world, of physics and biology can be considered absolute, human-made laws, incentives, and informal social agreements are progressively less powerful. Meadows (1997) warns: „If you want to understand the deepest malfunctions of systems, pay attention to the rules, and to who has power over them!“ Thinking of the world trade system and its institutions and rules, designed and run by the corporate world for its own benefit, makes many thinkers wonder about the global economic driving forces, indeed.

The fourth most potent leverage is the *power to create new system structures and behaviours*, such as evolution, technical innovation, and social revolution – all being emergent self-organizations in complex systems. Similarly important is the preservation of diversity in species, in knowledge, and in human cultures – all being great storages of information accumulated over long times. Insisting on a single global culture much limits the resilience of the population, taking out systematically a lot of potential for experimentation and innovation necessary for long-term adaptation capability to the ever-changing environmental conditions, argue Bodo and Nemeskeri (2008).

The third most powerful leverage is the articulation, repetition, and standing up for the clearly established and stated *system goals*. This may be to gain control of a centralised and planned authority, as can be seen in political and corporate empires, or to bring about a new Renaissance in global thinking, open-mindedness, and ensuing management approaches and networking. The basic matter is to influence all other leverages down the list, so they get twisted to conform to the GOAL. The goal of unstoppable profit generation, for its own sake, or for a minority of system agents, while exploiting natural and human resources, and risking coevolving systems’ resilience,

seems to be a somewhat different selection mechanism and direction for evolution from what most known species go through; except those parasitic organisms and malignant cell formations that kill their hosts and are thus destined for an inevitable fate.

The second highest leverage is what sustainability scientists and other „enlightened“ thinkers refer to as *paradigm shift*, the great advance in the mindset of society, in peoples’ deepest beliefs about the world’s working order, about what is reality, meaning, and purpose. According to Meadows (1997), while it may be relatively easy to change one’s own worldview in light of new information or the recognition of different logics, it seems extremely hard to change the mindset and values of entire societies. Hence, the revolutionary thinkers and change agents have always run the risk of getting burned. Sometimes literally so. However, social and cultural paradigms did get changed throughout history, and we have good reason to expect that they will continue to change as human species and cultures progress, evolve. Kuhn (1962) explains that in the case of shifting scientific paradigms progressive thinkers kept pointing to the anomalies and failures of the existing paradigm, and spoke up loudly expressing the more robust logic of the new one. They convinced people of high visibility and power; wasted no time trying to convince helpless reactionaries, but worked with change agents and the open-minded segment of society. So for us the question may be: how to work around the today so powerful economic and political actors, profiteers and other system beneficiaries, seemingly controlling every valves and rivets, every themes and memes of the complex production and consumption system? Before getting discouraged, one could just think about the unexpected speed and course of the so painstakingly planned and massively controlled totalitarian Communist system’s collapse across Central and East Europe, Central Asia and the Caucasus! Many hoped, a few believed, but none really expected it so. Systems change, so their agents need to adapt – or else. As Nemeskeri and Mont (2008) point out, one needs to be naïve believing that the system conditions and rules seemingly so powerful and set into stone today will never change.

At last, the highest leverage, according to Meadows (1997), based on thousands of years of wisdom quite easily grasped when studying history and culture, is the capability of *transcending paradigms*, understanding that there is no one and only paradigm that should be ruling on the planet. There are alternative truths and logics, and there is a significant degree of uncertainty in understanding highly complex systems. In certain situations, we just better let things profoundly go, trying to accommodate to the circumstances, accept not knowing, so we may get “enlightened”. “It is this space of mastery over paradigms that people throw off addictions, live in constant joy, bring down empires, found religions, get locked up or disappeared or shot, and have impacts that last for millennia” concludes Meadows (1997).

5. Discussion

While understanding that this information might be interpreted in various ways, including being provocative or, perhaps, considered impractical by some to current policy

development and enforcement, our aim is to enhance frank discussions on the approaches to environmental and social policies typically handling system fragments independently, instead of looking at the larger picture, its players, their interrelationships and conflicts, required for managing the complex challenges of today and tomorrow within democratic contexts.

It is important to recognise that during the majority of human history people have lead a very different lifestyle from today's. The cultural system has been simpler, slower, and thus more stable - but still prone to sudden changes, unexpected events, and occasionally to collapse, see e.g. Diamond (2004) and Homer-Dixon (2007) -, therefore the knowledge gained through several generations and kept in memory or in written records remained useful and satisfactory for longer periods. There was limited information reaching and motivating people, besides the information that had direct relevance to their everyday life, to coping with fundamental environmental and social challenges, such as temperature and precipitation, flood and draught, hunger and thirst, finding attractive and suitable mate, protection from hostile competitors and from accidents, safely raising children, joyfully playing with family and friends, and the like. In fact, small enclaves of native, tribal communities still live this lifestyle today in remote forested and mountainous regions of the world, in distant smaller islands, and in the high North.

Even a century ago, people around the world had no cars, had hardly bathrooms in their homes, and cities had far less sophisticated infrastructure. People had no access to quality healthcare by current means, and seemed sufficiently educated for lifetime work after grade 6-12. Remarkably, the level of satisfaction with that life, the recorded level of happiness of people almost a century ago, compared to such assessments made today, has not changed. Regardless of the enormous improvements of material wealth and affluence in the past century, and especially since the welfare states have been established after the Second World War, people have not become happier, indicates research (Myers, 2001; Easterbrook, 2003; Layard, 2005). Even more surprisingly, material wealth might not even count as a factor for being satisfied with life, suggest Easterlin (1974) and Radcliff (2001).

Then why most people want so desperately to be affluent; seeking economic gains, profit, comparative advantages through fierce competition, in a highly stressful lifestyle? The perception of human needs and their satisfiers are tricky matters, found Nemeskeri et al. (2007). It is context dependent, and it can be much influenced. This is well known by all those making their living just by doing that. When enormous amount of information reaches people suggesting that life is worthless without the technological miracles and regularly redesigned everyday items, who would be able to resist, withdraw, and risk becoming a loser?

No doubt, imagining slowing down is difficult. It is one thing to live in the "happy ignorance" of the "innocent savages", and another to give up existing and exciting attributes of our colourful lifestyle and culture. Nevertheless, when facing highly risky situation(s), people might just opt for that. Deconstruction is not unknown in history, and it might even provide an aesthetic experience

as sought in experimental modern and post-modern architecture, and ethical revelation as seen in the Reformation of the Church or in Buddhist economics. Having less, but in higher quality, having different things that have nothing to do with material intensities, relying on renewable resources, and turning toward the options for social progress that are known to provide life satisfaction and happiness, such as enriched relationships, love, family, friendship – without a note on outcompeting others, cheating the system to get unfair comparative advantages and advances, performing aggressive and violent acts, all so familiar to the rough rules of biology, and all so well known throughout the past millennia of cultural revelations. Our only hope, according to evolutionary biologist, Dawkins (2001), is our large enough brain and its yet undiscovered potentials. So we better start to use it intelligently!

In the short run, and realistically, Vogel (2004) has suggested realising what really makes people feel good. Many of these things come easy and can be accommodated by the current economic system. In fact, the potential is well-known: instead of focusing on material and energy intensive need satisfaction options, such as driving cars on long distances, shopping till dropping, overworking ourselves to get more money to spend on things we do not really need, Vogel promotes quick and easy direct options for enjoyment and health, such as Nordic walking, massage, yoga, and shiatsu, for instance. There are many simple activities that require nothing much but people's own body, and perhaps another person's professional or kind service or care, and soothing, clean environmental conditions, including meditation, seeking inner depths, learning, or just reading books, or observing the wonders of life and the Universe. How do these activities compare to much more expensive and resource intensive solutions for the well-deserved leisure of the working class? According to Vogel (2004), people can quickly develop a different lifestyle, and having got the motivational start, like temporary free passes to health and sport facilities, and participation in promotional and dissemination events, they report increased quality of life.

There are many more examples and options for dematerialisation and de-growth, including the initiatives of simplicity in lifestyles, living in eco-communities, walking and cycling instead of driving, eating slow organic food, and developing a culture more based on spiritual values than on material ones.

Society, including economy and market, cannot continue developing in the same way as in the past centuries, since the conditions, in which they operate, have changed. The current environmental situation demonstrates that society has been slow in realising the scale of the ongoing environmental changes, and is rather narrow-minded in its mainstream options for exploring ways to address these changes. Stemming from this is the failure to see the current state-of-affairs in economic, environmental and social terms as a deep-rooted system failure. This in turn leads to difficulties with appreciating the extent, to which fundamental changes in thinking, institutions, and actions are required to embark upon a more sustainable trajectory. Contributing to this problem is also the absence of a long-term vision of a sustainable society that could provide

guidance for short-term hands-on problem-solving activities.

The current global environmental and social crises are born out of the failure of both conventional state-directed development and neo-liberal market-oriented monetarism to meet vital needs of growing populations, said progressive, real-life economists, Ekins and Max-Neef (1992), holding two convictions:

“First, that economics in its mainstream neoclassical form is failing to provide an intellectually coherent explanation of economic reality, especially with regard to such issues as the nature of markets, environmental degradation, persistent poverty and household production, and is therefore responsible for much flawed policy advice; and second, that the many constructive, potentially complementary, alternative proposals on these and other issues, some originating in the economics discipline, others from outside it, are too often left standing in isolation from each other, so that the larger framework within which they could be accommodated, and which could help win them acceptance, is left unarticulated”.

Ekins and Max-Neef (1992) have then defined the larger framework that could be built from (a) insights from institutional-, evolutionary-, and socio-economics; (b) ecological economics and the concern with sustainability; (c) an emphasis on development, including economic development (that is not equal to economic growth!), as a creative and participatory process, and (d) a perception of the economy that recognises the productive role of households and the voluntary sector, as well as of business and government.

The prevalence of efficiency, including eco-efficiency approaches in public and private sector policies, having received so much attention in the past decade from all actors of the production and consumption system, in addressing environmental and economic challenges, might be seen as a problem in its own right, since “fundamentally nothing changes: democratic consumer capitalism assimilates ecological necessities as technical constraints, and adapts the conditions of exploitation to them”, argues Gorz (1987). Moreover, singling out efficiency as the optimisation criterion; efficiency that is the cornerstone of economics, including environmental economics, and a major goal of management and policy-making, creates its own problematique. Being efficient, argue Walker and Salt (2006), leads to the elimination of redundancies and less efficient alternatives in various complex system processes, keeping only a few options of the many possibilities; those that seem directly beneficial on the short time horizons of political (4 years) and major investment (about two decades) cycles. This kind of efficiency then leads to massive losses in the resilience of markets and technologies, economies and societies. Any drive for an efficient optimal state will make the whole-system more vulnerable to shocks and disturbances. This risk has already manifested itself in the fragile and occasionally hectic interplays of the light-speed interconnected and almost completely globalised financial system (Homer-Dixon, 2007).

Despite the growing awareness about the environmental problems and unprecedented prominence of climate change as an issue in international politics, the main premises of

consumer capitalism – infinite economic growth, wealth accumulation, speed and profit maximisation, consumer spending, and international competition - remain unchanged and largely unquestioned, recognises Blühdorn (2007). The environmental and social dimensions of sustainability are subordinated to economic growth, competitiveness and globalisation, which then redirect traditions, families, businesses, work and leisure into unsustainable patterns and levels. Even players, who recognise the necessity of addressing the fundamental principles of the market economy, resort to rhetorical reforms and societal deceptions by calling for producing and consuming “differently”, and not, God forbid, “less”. Raising the issues of over-consumption and unsustainable consumption levels is seen as political suicide. Until this situation remains, it is a major challenge to address the root cause of problems that lead towards unsustainable consumption and production patterns and levels, say Nemeskeri et al. (2007).

Systems thinking provides a general approach for understanding the complexity of the issue at stake, for identifying the leverage points for changing the system and for providing insights into possible actions. While the method we have used is unable to predict the future evolution of human and ecological systems, it is nevertheless useful for indicating problematic tendencies in the current framework: economic growth, increasing speed, and globalising materialistic values climaxing in profiteering – ignoring present and future societies’ potential to benefit. The research demonstrated that fundamental changes can only be made by changing the ruling paradigms of society: obsession with infinite economic growth that is awkwardly equalled to wellbeing, and globalisation, speed of life and profit maximisation equalled with wealth accumulation. Nemeskeri et al. (2007) suggested that slower living and higher quality of life - not defined in terms of ownership of material and energy intensive products and offers, but rather in terms of personal and spiritual growth and progress, health and long term survival – are likely to address some of the identified critical drawbacks of the current whole-system.

6. Conclusion

The thesis of economic growth bringing sustainable welfare to global society has been refuted from various viewpoints. Induced global economic growth has been proven to have started pressing its systems limits, at least to its access to certain precious resources and to nature’s potential of effectively sinking man-made harmful substances. The increasing system pressure on economic actors of generating evermore profit results in the trap of accelerating growth, without providing the sustainable and global social benefits economists promise (Homer-Dixon, 2007). The attempts to change, or at least to slow down these processes - so some more time could be gained for preparation to adapt to the changing framework conditions - have seemed to be futile, the studied trends indicate. On the other hand, the knowledge on cultural-evolution (Boyd and Richerson, 1985; Tooby and Cosmides, 1989a and 1989b; Dawkins, 2001; Hammerstein, 2003) and on the options for increasing our species’ resilience (Boyd and Richerson, 1995; Walker et al., 2002; Walker and Salt, 2006; Abel et

al., 2006; Cooper et al., 2007; Janssen, 2007) has been accumulating.

Based on these information, we suggest that responsible and capable decision-makers in governments and international organisations around the planet rethink (1) the potential for substituting the current driving logic of the market system: profit generation, and (2) instead of globalising a single cultural system: laissez fair Capitalism (or, in fact, any other human construct), start nurturing a ray of alternatives (just like multiculturalism is promoted in some developed nations). Humankind's future depends on its adaptation capability to the continuously changing environmental conditions; its social, cultural progress may rely on experiments that haven't yet unfolded in history. Every attempt to create a single World Order, a totalitarian rule for all, regardless of its philosophical proposition, limits the creative forces of evolution.

Not thousands of volumes of laws and regulations, but a few simple rules that most people can easily understand; less courts and jails but more schools and healthcare facilities; not miniscule aids to the exploited and unfortunate but education, respect, fairness and justice are needed if policy- and decision-makers, at all levels, get ready to take sustainability seriously. Focusing on these steps should not pose such an overwhelming difficulty as some pragmatists may suggest. It requires clear goal setting, advanced communications, leadership and management, sustained commitment, and hard but rewarding work. As Plowman et al. (2007) recommend to leaders and managers: think of what Jesus, (or Mohammed or Buddha, etc.) would do or say in the decision-making situations, especially when conflicting interests are involved. Most of us would know the right answers. This does not require of being religious, or even transcending over the analytical scientific paradigm where Capra (1997), Meadows (1997), and an increasing number of others were daring and able to (re)search.

In light of the realities of climate change, loss of biodiversity, destructive land use, inequalities, epidemics, political tensions and other known alarming consequences of the present system's processes, many growth oriented societies might opt for substantial alternative development paradigms. De-growth, shoving off less necessary system components, such as relying on the products and services related to mining, and burning fossils, and wasting precious metal resources, to industrial-scale fishery and forestry management, and food and drink processing seems to be a logical and socially attractive option, for the sustainability scientist and system resilience thinker, to start with; along with the partial deconstruction of overbuilt environmental systems, such as excessive transport and poorly planned and designed urban systems. Naturally, the political-economic framework conditions need to be suitably adjusted on the global scale to allow for, to enhance this challenging journey, so the market-based culture will not be motivated, and capable of, outcompeting, buying-out, exploiting, and discarding its creative, innovative, but perhaps less rapidly reacting, perhaps less economically efficient, and differently aimed humane potentials and choices seeking harmony with nature's majestic processes.

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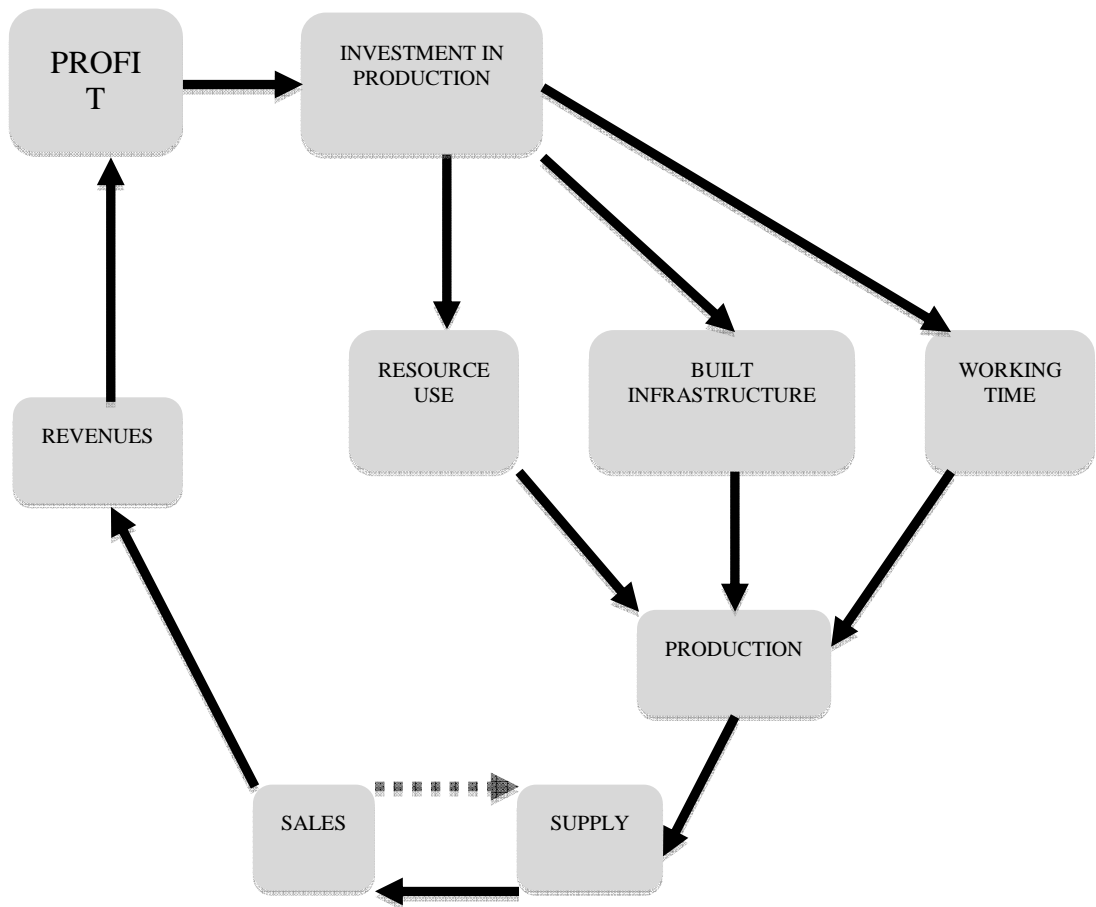
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Appendix

Figure - A simplified view of the reinforcing growth engine (adapted from Nemeskeri et al, 2007)



The De-Growth Economy and Lifestyles

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Abstract

The transition to a de-growth economy cannot be effected in gradual incremental change and will be experienced by most people as a lifestyle transition from one life style "package" to another. Most of the time people manage their lives in largely stable routines in which they more or less hold in balance an age related job with a pattern of skills and abilities, a level of income (and debt), habitat and domestic arrangements including their diet, a state of health and disability, a network of emotional and instrumental relationships. All of these reflect and give rise to a corresponding mind-set of assumptions, aspirations, expectations and social and community values. Inside this interrelated complex structure there is an inertial weight which bestows on certain behaviours addictive features. For example the network of relationships and geographical habitat make it difficult to break consumption patterns that are shared by peers without risking damaged relationships - e.g. meal routines and rituals with close relations provide security in a changing world or again a routine weekend leisure journey may provide the binding features to a close relationship.

A transition to a de-growth economy caused by oil and gas peaks, responses to climate change and the credit crisis will create radical disjunctures and a break up of these routines for millions of people in a way that will be frightening and disorientating for many. There is a danger that groups will channel their anger at scapegoats - perhaps led by demagogic thugs with simple explanations for the crisis that blame vulnerable people and foreigners. Millions of single unsupported people will find it difficult to cope. Practical movements like that of the UK Transition Towns are needed to provide people with new models for their lifestyles in order to avoid a community health crisis. The Transition Towns are beginning to provide a social network in which people support each other to develop new skills to conserve resources and supplement their means of living close to their habitats. They help collectively develop alternative energy and resource-light lifestyle packages and community focused value systems. A movement like this will be needed to provide people with an alternative basis for self respect and dignity as more and more recognise the futility and destructiveness of living according to the values and goals of the debt burdened consumer society.

"The great advantage of being in a rut is that when one is in a rut, one knows exactly where one is" Arnold Bennett - British novelist and playwright 1867-1931

1. Routines

It is sometimes by re-examining the most mundane and obvious, that which we take for granted, that we learn the most.

Most of the time most people live in routines which are the constants, the stability in their lives. It is very difficult not to - no individual and no society could function if all its members were constantly on the move, constantly changing jobs, constantly changing instrumental and work relationships. Although nomadic lifestyles and a range of agriculture and pastoral skills can make for great variety even they must happen in known locations. They must involve arrangements between people in conformity to routines imposed by the seasons and nature - the need to sow and to harvest at the same times of the year. Matching temporal rhythms are also necessary if people are to sustain relationships - to be in a relationship people must not only spend time together they must to a degree synchronise their emotional states and practical inclinations. Thus it is that to find their identity people must hold in balance a habitat with all its domestic arrangements and chores of eating, sleeping, toilet and hygiene with their work and income and their network of instrumental and emotional relationships. These are constituted as interrelated patterns - as a generalisation we cannot have a large habitat without a large income. The number and quality of our relationships will depend upon the size of our habitats. Our income will depend partly on our work and skills. Our work, skills and incomes will determine our relationships. These in turn will affect our state of health, our morale and aspirations. How these arrangements are managed together depends on our age, gender, state of health and disability. They also embedded in spatial, economic and cultural arrangements which will affect what kind of neighbourhood or settlement we live in, how it organises the supply of essential means of life, how far we must travel to work.

2. Lifestyles considered as "packages" and lifestyle transitions

Because the different elements in our lives have to be managed as a package - as interrelated elements which must be consistent with each other - the routines and the ordinary features of our lives can be thought of as having an inertial character. To be sure, even a routinised lifestyle will have some variety and novelty in each day, up to a point - however, beyond that point, adjusting one aspect of our lives to a greater extent will mean that we must adjust other elements in our lifestyle package. In turn this will likely bring with it a degree of uncertainty and unpredictability. To take an example - if we decide to move where we live then we will be faced with different financial circumstances and that will have a knock on effect on work, relationships and so on.

As is obvious periods of comprehensive lifestyle change are of different types. There are some changes which are inevitable age specific processes - the obvious cases being late adolescence and early adulthood when most people start living independently, move from education to a job (if they are lucky) with an independent income and set up their own adult sexual relationships. As they are doing this all at

once it is a difficult and challenging time - but it is happening with all the others of their age group. At the other end of life there are the challenges associated with retirement. In between there are also typical lifestyle transitions triggered when children leave home, parents die, people evaluate their lives so far and perhaps have a mid life crisis, deciding if they really want to live as they have been doing for the rest of their lives. As should be clear there are situations where a life style shift is happening to all one's peers - for example when a firm goes bust and there is mass redundancy which affects an entire community and there is the rather different situation in which only one person, or a family, decides to launch out in a change of direction. There are situations too which are willed, which are entered into deliberately and those which are entered into because people are forced to change - as in the redundancy situation.

3. The risks of launching into the unknown

Now it is clear that all these situations share in common that they involve largely launching out into the unknown. As such all these situations involve risks. As the English author Arnold Bennett expressed it: "Any change, even a change for the better, is always accompanied by drawbacks and discomforts." Arnold Bennett

At its worst a change in life launched into with insufficient skills, resources and friends can go badly wrong. Indeed there are arguments that mental breakdowns sometimes have this character. The stresses, tedium and limitations of an existing lifestyle may become too much and a person decides to launch into new territory - risks leaving a job without a new one, risks changing where they are, leaving a relationship and giving up a secure habitat in the process. To others this seems like a crazy choice as they do not have the resources and skills and support to make the move - and indeed they fall in the process. Their emotional turmoil therefore becomes greater. This is described by the psychiatrist Anthony Storr in psychological terms

"Suppose that I become dissatisfied with my habitual self, or feel that there are areas of experience or self understanding which I cannot reach. One way of exploring these is to remove myself from present surroundings and see what emerges. This is not without its dangers. Any form of new organisation or integration within the mind has to be preceded by some degree of disorganisation. No one can tell, until he has experienced it, whether or not this necessary disruption of former pattern will be succeeded by something better". (Anthony Storr, "Solitude", HarperCollins 1994 page 35)

This is a very good description of how madness might arise in a lifestyle transition that goes wrong. Sometimes the new surroundings and new setting are not better and the people in the old relationships resist or counsel against the change. Sometimes the change, which has financial implications, is badly managed. Sometimes the new surroundings requires skills and an orientation that we do not have. In those circumstances the psychological stresses that have impelled our movement become even worse in our new surroundings. To those who observe the process it appears that we have gone mad, that we have chucked ourselves recklessly into a new lifestyle for which we are not suited and not equipped.

4. Degrowth as a political-cultural movement for lifestyle transitions

In so far as the idea of "de-growth" becomes a cultural movement that inspires people to change their lifestyles it is enormously helpful that there are other people who are treading the same path and helping each other along the way. This gives some sense of what to do and what to expect. In this sense de-growth as a movement, with complementary and similar movements like permaculture, can be a powerful support for change. The risks are that much less when one is not on one's own in the change process. It is perhaps for this reason that movements that form around causes can be so intoxicating. Although one knows that change will be challenging and discomforting the fact that other people are making these changes in the services of a cause is actually making it easier.

"A cause may be inconvenient, but it's magnificent. It's like champagne or high heels, and one must be prepared to suffer for it." Arnold Bennett

Without such causes the danger of being stuck in a rut is that one does not explore sides of oneself and that by staying in situations of safety one limits what one can become.

"The real tragedy is the tragedy of the man who never in his life braces himself for his one supreme effort, who never stretches to his full capacity, never stands up to his full stature" Arnold Bennett

It is in this way that one can understand the attraction and the possibility that people would decide to adjust their lives and be prepared to sacrifice their income and purchasing power to be able to do so. The attraction of de-growth is clearly that by having less income and purchasing power to acquire consumer goods one will be able to get certain experiences and satisfactions in life that money cannot buy directly. Perhaps it is more time to spend with one's children as they are growing up. Perhaps it is to learn a new trade that is regarded as more interesting, more challenging and more socially responsible. Perhaps it is to engage with social and community responsibilities. At such times the absence of work and contractual obligations may free people up to be more creative and use their time better. The purchase of freedom by less money is often a very good bargain.

5. Downshifting and upshifting

The number of people who have made this choice over recent years, for a preferred lifestyle at a lower income, is not inconsiderable in rich industrial countries. The term "downshifting" has been used to describe what is happening. In his book, 'Growth Fetish', Clive Hamilton, reports a number of studies on the extent of downshifting. For example 19% of the US adult population declared that over the previous five years they had voluntarily decided to make a change to their lives that resulted in making less money. This fifth excluded those taking a scheduled retirement. A similar survey in Australia found that 23% of 30-60 year olds had downshifted, citing as their reasons a desire for more balance and control in their lives, more time with their families and more personal fulfilment. ("Growth Fetish", Pluto Press, 2004, page 206)

For all of those people who have chosen to make a lifestyle change of this type there will be others who want to make this kind of change but who, whether because of a lack of support, knowledge or resources may lack the will to take the plunge. Perhaps, with more support, they can be persuaded to do so. However there are also people who will have only recently entered into lifestyle choices which are fundamentally antithetical to a de-growth agenda - perhaps they will just be starting or consolidating a lifestyle which is fundamentally growth focused and within the mainstream values of the current economic system. After all there are powerful forces encouraging them to do so. Perhaps they will be too tightly bound into the messages and values of the growth system, its routines and its obligations, particularly debt and a consumption lifestyle to even consider or be aware of a degrowth approach to life. At the moment it has to be said that this group probably constitutes the majority of the population and this group are only amenable to change messages at those points where they are going through fundamental changes - like moving job or house, or having a child, which compel a re-evaluation of self and behaviour.

6. Growth and mainstream institutions

This group are bound into a relationship with the mainstream institutions of our society who can only run smoothly if the future is predictable and mostly organised in bureaucratic routines. Growth gives the arrangements and routines of an increasingly complex society leeway for adjustment and for coping with stresses and change. Access to additional resources is typically seen as the way to solve problems and these resources are seen as arising out of extra income, extra production or through borrowing. In the last case extra resources to solve problems are generated by shifting payment into the future and paying an interest payment to buy the right to do this. However any macro growth of output and real income is ultimately only possible through an increase in physical energy available to the economy multiplied by the efficiency with which the energy can be applied to the production process. Once the amount of energy available is no longer rising the scope for real output growth dries up. At that point solutions for problems cannot be found in extra resource availability but must be found in greater ingenuity for improvised solutions working with the same or less. This means more psychic work and stress levels may rise.

7. Downshifters as a pioneering minority

This majority are however currently stressed and challenged by the difficulties of the economy. So far this paper has described the situations of people who have **decided** to change their lives in a degrowth direction. These people may be acting, whether they are aware of it or not, as the leaders and pioneers of new life styles. They create the community gardens, the social enterprises, the community exchange systems, the cultural arrangements which provides seeds for a new de-growth economic order. Hopefully those who have voluntarily changed their lives will have created the lifeboat institutions and arrangements which can support millions who are compelled to change when the existing economic system can no longer continue.

8. Degrowth as an involuntary process

As is obvious some life transitions are not voluntarily entered into. Sometimes abrupt lifestyle shifts take place across society that most people do not want. In the early stages of wars and economic catastrophes people may watch with interest the novelty of things going seriously awry. They may even, perversely, celebrate in the hope that change will make a normally humdrum existence more exciting and dramatic. However grim experience may take away the excitement, replacing it with unwanted and unpleasant experiences that had not been expected. Fundamental change may confront a lot of people with painful and frightening challenges.

This possibility cannot be avoided. Most people are likely to be forced into degrowth lifestyle changes that they have not wanted. They may enter the process enormously stressed, very angry, frightened and unhappy. This would be very dangerous - historical experience suggests that millions of people can be mobilised by channelling their emotions of frustration and fear against scapegoat minorities and foreign enemies. We are already seeing how shortages of oil and gas are being conceptualised by governing elites and the media as "energy security" issues in which nations are pitted against each other. Military intervention to secure oil and/or gas fields and pipeline routes has inflamed and polarised cultural and religious divisions. Such conflicts are in the short term interests of armaments manufacturers, aerospace, military logistics, security companies and the builders of gaols. Opportunities for profit in these circumstances will increasingly arise out of what Naomi Klein has termed 'disaster capitalism' or 'shock capitalism'. The degrowth movement will have its work cut out to develop a positive alternative to this frightening scenario of increasing conflict and destruction.

9. Reaching the limits to growth

Degrowth as an involuntary process which people are flung into looks increasingly likely as the outcome of both the credit crunch and the oil and gas supply crisis. The degrowth agenda derives from the sustainability agenda. 'Sustainability' has been a word in circulation for over a decade and the people who use the word have mostly lost sense of its original meaning. To be sustainable means to be able to continue. If something is unsustainable then it cannot continue and comes to an end. If there are limits to growth then, at some point, growth will no longer happen.

The climate crisis occurs with a time lag which has lulled political and economic elites into a false sense of security. However, the increasing costs of recovering depleting fossil fuels compared to the global demand for those fuels is taking place in real time. The credit crisis, which is as an over extension of the globalised banking system, is also taking place in real time. Together with imbalances arising out of the uneven development of the global economy these processes look set to throw millions of people into a period of economic chaos. Taken together they will compel lifestyle changes which provide the possibility and necessity to change to a de-growth economy and society.

There is thus no doubt that degrowth will happen - but not mainly as the result of a political and cultural degrowth movement but, rather, because of the consequences of

passing the peak of global oil production, then global gas production, and because of the overextended position of the global financial system which cannot any longer be propped up.

The financial system has 'dis-credited' itself in both senses of the world - though a radical loss of reputation and as a loss of its ability to lend into an economy where debt had reached its mathematical limits of financial sustainability. In the financial newspapers we read over and again the idea that the banks do not trust each other. This is ironic because the original meaning of the word "credit" is trust and belief. Without trust and belief the financial system cannot continue to expand and it will not continue to expand - it will collapse.

This does not mean that the promotion of degrowth economics and politics has been a waste of time. To prevent the coming collapse turning into a catastrophe we need the prior development of a movement which can show how a degrowth economy and society might be managed. Without this ability to show how things might be organised differently we will be tipped into a catastrophe of wars and conflicts. We need arrangements to manage life within the capacity constraints of the global ecological system in ways that are felt as equitable and fair. Otherwise the eco-system will be destroyed and society will tear apart.

Common resources which we share must be managed in the interests of everyone in contemporary society as well as in the interests of future generations. For example, in rationing and reducing greenhouse gas emissions, the scarcity rent for permits for using the earth's atmosphere should go to citizens directly - not to the state and certainly not to the big companies. The atmosphere is a commons and should be managed as such - that means propertising it but not privatising it. A Global Atmosphere Trust should be under a legal obligation, enforceable by the courts, to manage the atmosphere in the interests of everyone equally. The monetary system can also be regarded as a common arrangement that should be managed in the interests of all. Currency trusts with duties, enforceable by the courts, need to be set up to manage the money system in the interests of everyone in a currency zone equally. Instead of debt money, repayable with interest, created and owned by private banking corporations, with an inherent growth dynamic, we need a non debt money supply made available for and through the people, including at a local level.

These are the kinds of overarching framework institutions that we need in an ecological society. They will complement the local projects and arrangements to meet basic needs that people will be forced to make to try to stabilise lives which are in turmoil. That means creating initiatives like local community gardens and food arrangements; make do and mend initiatives for clothes; mutual aid and simple support for building and rebuilding structures to make them energy efficient; arrangements to help people share resources, tools and skills for energy light lifestyles. We need to create local renewable energy systems where we can. We will need cultural and artistic programmes for people to find new reasons for living and simpler pleasures.

10. Transition Initiatives and the Degrowth Process

In the UK the Transition Initiatives movement is beginning very much to occupy the space for this movement. The prospect of energy famine requires the organisation of a response and Transition Initiatives are a way of preparing at a community level. There are now many Transition Initiatives springing up around the country - initially in small towns like Totnes, Stroud, Lewes, Falmouth, Penwith but increasingly also in cities like Bristol, inner city areas like Brixton and in Nottingham.

The thinking behind Transition Initiatives (formerly Transition Towns) is simply that settlements using much less energy and resources than we presently consume could, if properly planned for and designed, be more resilient, more abundant and more pleasurable than at present. Transition

Initiatives develop Energy Descent Action Plans as a tool for designing a positive timetabled way down from the oil peak AND as a response to climate change.

The basic formula for the development of Transition Initiatives is a number of steps

1. Awareness Raising about peak oil and gas as well as climate change and its implications.
2. Lay the Foundations of groups and networks to respond to the crisis.
3. The Official "Unleashing" - telling the public with much publicity that you are there and what it is all about.
4. Forming Groups - for example around food and peak oil, transport, health and social welfare and the support of vulnerable people etc etc
5. Use Open Space - this is a way of organising meetings where the agenda is not pre-fixed but is created by and from the people who have come to the meeting.
6. Develop Visible Practical Manifestations of the Project - for example in Totnes they have started to plant nut trees as a way of re-developing local food sources. This should not be a talking shop!
7. Facilitate The Great Reskilling helping people with the skills they will need in the very different economy that will develop on energy descent - e.g. skills to grow, cook and prepare food, repairing bicycles etc.
8. Build a Bridge to Local Government - obviously we want support if we can get it and need a harmonious working relationship. At some point we will need policy support - the sooner the better.
9. Honour the Elders - elder people will still have skills developed in a less energy intensive era. (They will also be vulnerable in energy descent)
10. Let it Go Where It Wants to Go and Reflections...not pre-planning or trying to fix or steer such a big process too much.....

To conclude with another quote from Arnold Bennett: "Pessimism, when you get used to it, is just as agreeable as optimism."

L'Asem, un outil pour aujourd'hui ?

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Abstract

Depuis quelques années, à la faveur de la progression des idées écologiques et de décroissance, nous assistons en France à un mouvement, encore modeste numériquement, d'établissement de collectifs de vie alternatifs. Il est à espérer que ce mouvement s'accroisse, car il constitue une des principales pistes à explorer dans l'idée de la mise en place d'expériences concrètes de décroissance.

Si l'on se réfère aux réflexions de François Partant, ces expériences, actuellement marginales, sont appelées à prendre de l'ampleur, notamment sur le plan économique. Cette évolution constitue un enjeu important jusqu'à peu fortement négligé. Aujourd'hui encore, seule une minorité comprend l'urgence de créer un fonctionnement alternatif à l'économie dominante, notamment par le biais d'échanges privilégiés entre structures indépendantes dans le but, à terme, de créer un "tissu économique" de plus en plus autonome.

Dans l'hypothèse d'une telle dynamique, François Partant estimait indispensable la mise en place d'une structure technique qu'il appelait "Centrale économique" et qui était destinée à être le lieu privilégié du fonctionnement de la démocratie économique des collectifs alternatifs. Cette centrale devait permettre aux unités indépendantes d'être autonomes vis à vis du marché et du capitalisme.

Dans le contexte actuel, est-il opportun de réfléchir aux conditions et aux possibilités de mise en place d'une telle structure ?

Pour l'instant, aucune contrainte majeure de court terme n'oblige les populations à se détourner massivement du système dominant pour fonder des lieux autonomes. Celles et ceux qui le font, semblent, pour l'essentiel, guidés par leur conscience des enjeux et de ce qu'ils ne veulent pas vivre.

Mais l'hégémonie des structures dynamiques et de régulation du marché ne facilite pas le parti pris de l'autonomie et de l'indépendance. Au contraire, ces initiatives paraissent utopiques. Les contraintes pratiques et juridiques s'accumulent : moyens d'échange, accès au foncier, structures juridiques inadaptées...

Sur tous ces aspects, la "Centrale économique" devrait permettre, avec des moyens non capitalistes (financement populaire, dons privés...), d'aider les alternatifs à avancer en marge et à l'encontre de l'économie dominante.

1. La Centrale économique (ou Asem) selon François Partant

Un bref historique

L'idée d'une Centrale économique est apparue tôt dans l'œuvre publiée de François Partant. Ses publications théoriques s'échelonnent entre 1976 et 1987. Dès la publication de *La guérilla économique*¹, en 1976, la description d'une Centrale figure de façon détaillée. Les tentatives de mise en pratique sont plus anciennes : « *J'ai évoqué pour la première fois cet organe de la démocratie économique dans La guérilla économique, en racontant comment son projet de création avait été enterré au Congo en 1972, puis à Madagascar dans les années qui suivirent le renversement du président Tsiranana [1972 à 1974]. A vrai dire, il l'avait déjà été en 1969 au Sud-Yémen, où je m'étais rendu sur la foi d'informations qui se sont révélées fausses (...).* »² Quoique l'auteur parle « d'enterrement », la Centrale a bien été expérimentée, brièvement et dans un contexte d'entreprise, à Madagascar en 1972. Un des intérêts de cette expérience est qu'elle a eu lieu dans le tiers monde, en reprenant un mode de fonctionnement vernaculaire : le « fokonolona »³

Après 1975, Partant s'est essentiellement consacré à des travaux théoriques et a notamment retravaillé son idée de Centrale. Ne croyant plus à la possibilité d'intervenir au niveau de l'Etat et de l'entreprise, il fait évoluer son idée pour la proposer au mouvement alternatif. C'est chose faite en 1982, dans son livre « de référence » : *La fin du développement*⁴. L'auteur consacre à la Centrale l'essentiel du chapitre 9⁵. Enfin, un dernier état de la réflexion de Partant se trouve dans *La ligne d'horizon*, rédigé à partir de 1985 et paru en 1988. Il s'agit d'un ouvrage posthume, mis en forme à partir d'un manuscrit inachevé. Les références à la Centrale figurent au début et au milieu du chapitre 6⁶, brièvement au chapitre 8⁷, et surtout dans l'annexe 1 qui lui est entièrement consacrée⁸. Nous constatons que la Centrale se nomme à présent ASEM (pour Association pour une alternative socio-économique mondiale) et que son fonctionnement est précisément détaillé dans l'annexe 1.

C'est dans ces deux derniers ouvrages que nous emprunterons prioritairement nos éléments de réflexion.

L'Asem, « organe de la démocratie économique »

Le rôle de l'Asem

« L'objet de l'ASEM est de réunir toutes les personnes qui souhaitent fonder ensemble une société au sein de laquelle

¹ François Partant, *La guérilla économique*, Paris, Seuil, 1976.

² François Partant, *La ligne d'horizon*, Paris, La découverte, 1988, réédition 2007, page 152. Toutes les références à cet ouvrage se feront sur cette réédition.

³ *La guérilla économique*, op. cit., page 154.

⁴ François Partant, *La fin du développement*, Paris, La découverte, 1988, réédition Babel 1997. Toutes les références à cet ouvrage se feront sur cette réédition.

⁵ op. cit., page 199.

⁶ *La ligne d'horizon*, op. cit., pages 151-152, puis pages 157-158.

⁷ op. cit., page 203.

⁸ op. cit., page 211.

sont exclus les rapports de domination et les relations de pouvoir. Il est de promouvoir des activités productives pour donner aux sociétaires des moyens d'existence, en évitant que n'apparaissent entre eux des contradictions d'intérêts. Il est aussi d'instaurer de nouveaux rapports sociaux et de nouveaux rapports économiques dans le cadre de l'association, qui conserve la propriété légale des moyens de production. A cette fin, l'ASEM effectue des études de faisabilité, acquiert des moyens de production et consent des prêts aux sociétaires pour faciliter leurs investissements productifs »⁹

La raison d'être politique

La raison est de permettre l'autonomie économique : « L'autonomie économique est l'objectif immédiat que [les alternatifs] devraient s'assigner. Elle implique la rupture des échanges, tels qu'ils se pratiquent aujourd'hui, au sein de chaque pays et à l'échelle mondiale. Mais l'objectif à plus long terme n'est pas et ne peut pas être de rompre les relations qui se sont nouées entre les peuples, ni de stopper des échanges qui permettent de mettre en commun certaines ressources trop inégalement réparties. Il est de transformer des liens d'interdépendance conflictuelle en lien de solidarité effective.

L'autonomie économique n'est donc pas une fin en soit. Elle est le seul moyen, la seule opportunité qui soit offerte par le système lui-même, du fait des conséquences sociales de son évolution (de la marginalisation d'une partie de la société), de reconstruire progressivement le monde comme il faudrait qu'il le soit pour devenir, peut-être, un peu plus juste, un peu moins déchiré par des contradictions d'intérêt : de bas en haut. »¹⁰.

Il s'agit donc de permettre l'apparition d'une société autonome **économiquement** par rapport au système. Partant écrivait en 1982 à propos de l'exemple des alternatifs allemands : « [les alternatifs] se marginalisent sans former une société marginale, parce qu'ils peuvent, à la lisière du système productif qu'ils refusent, vivre très largement de l'enrichissement collectif qu'il assure. Dès lors, leur autonomie individuelle est à la merci de l'évolution techno-économique. Pour la préserver, il devront, tôt ou tard, la concevoir et l'organiser dans le cadre d'une société économiquement autonome. »¹¹. En 2008, il est possible d'écrire exactement la même chose sur les alternatifs contemporains : ils mettent en place des expériences politiquement intéressantes, produisent des biens choisis et écologiques... qu'ils écoulent sur le marché. Leur réflexion (et a fortiori leur pratique) sur l'alternative ne va pas jusqu'à l'économie. Aujourd'hui, dans le contexte des idées de décroissance, la réflexion est peut-être en train d'évoluer. Mais la difficile question de la mise en pratique reste entièrement posée. Partant de ce constat, il est logique de réfléchir à un outil « technique » qui permettrait d'aider à cette mise en pratique.

2. Pourquoi une Asem ?

Envisager une Asem ?

La construction d'une Asem ou d'une « centrale » telle que l'envisagea François Partant doit être placée dans une perspective à préciser. L'idée vient, chez cet auteur, quand il se rend compte que même avec les meilleurs conseils « techniques » et « politiques », il n'y a aucune chance que l'Etat agisse pour le bien du peuple qu'il prétend représenter ; il n'y a aucune chance que les objectifs de l'Etat-nation prenne pour objet la vie ¹² des gens vivant sur son territoire... Pouvoir décider pour soi-même, décider de ses activités de vie et d'accord avec l'environnement, du sens de la vie. Les nations salariales n'ont fait, au bout d'un moment, que développer la figure du producteur-consommateur... C'est la mégamachine et le léviathan !

La deuxième idée-force qu'il met en avant, est que cette société a montré sa capacité à « foncer dans le mur » en intégrant ou en récupérant toute forme de contestation ou de volonté de transformation¹³. La transformation, c'est son domaine ! « *La révolutionnarisation* » disait Marx. Cette société capitaliste, productiviste, de développement... ne peut être dépassée, la « dialectique » comme mouvement historique a échoué ! Cette société n'est ni réformable ni transformable (pour aller vers une société meilleure) de l'intérieur, que ce soit en prenant le pouvoir légalement ou par la force.

Que ce soit ses tentatives d'expérience de la « centrale » ou ses analyses de notre société et du monde contemporain, tout le pousse à envisager une « force porteuse » de transformation. Ce seront les exclus qui pourront (ou devront) jouer ce rôle.

L'alternative, c'est pas malin... (chanson¹⁴)

Cette véritable transformation sociale, économique et psychologique doit considérer une société qui permette aux exclus, volontaires ou involontaires d'exister, de vivre par leurs propres moyens. Peut-être François Partant reconnaissait-il l'énoncé de Cornélius Castoriadis qui pourrait être résumé ainsi : « Posant comme exigence de l'autonomie de "*se donner soi-même ses lois, sachant qu'on le fait*", il s'agit ensuite de trouver un sujet pour devenir cette société autonome consciente d'elle-même et de ses limites. »

En tout cas, l'idée de la « centrale » et de l'Asem reste d'abord une idée de lutte pratique et non d'élaboration d'un système théorique même parfaitement cohérent et rationnel. C'est-à-dire que ce qui est envisagé, c'est de commencer dès à présent la construction d'une alternative. Une « vraie » alternative qui ne découle automatiquement de rien du tout ! Et dont le devenir ne dépend pas d'une théorie préétablie, mais de l'action de ces gens qui sont en rupture avec le système.

¹² Il faut entendre ce mot ici non pas comme la « simple existence », mais comme la possibilité de décider de ses orientations, de ses activités... sans être rivé à des dépenses monétaires.

¹³ L'histoire des formes et des modes de contestation l'argumente à l'envi !

¹⁴ Chanson de François Béranger, sur son album éponyme, qui date de 1975 (déjà !).

⁹ *op. cit.*, page 211-212.

¹⁰ La fin du développement, *op. cit.*, page 223.

¹¹ *op. cit.*, page 210.

Y a-t-il des gens susceptibles de porter le projet de la « vraie » alternative ?

François Partant cherche dans la réalité immédiate ce qui peut faire que des personnes ou des groupes se situent dans cette perspective. Il y a ceux qui s'excluent et qui se disent alternatifs. Avec eux, il cherche un débat qui permette de se situer. Alors qu'avec ceux qui sont exclus il faut, sans doute, trouver d'autres ressorts que le débat sur les alternatives, la démocratie, l'autogestion. Il va définir le contexte d'utilisation de son outil en fonction de comment ces groupes peuvent imaginer leur nouveau système de besoins et quelles pourront être leurs perspectives « révolutionnaires ». Bien sûr, il y a des principes à établir, des perspectives à se donner, des erreurs historiques à ne pas refaire... Tout cela n'est pas évident !

Mais Partant affirme que dans les premières mesures concrètes à prendre pour la revitalisation d'une région déshéritée, par exemple, il y a la séparation ou la déconnexion d'avec le marché, le système des prix, ... Bref, il faut supprimer les éléments de dépendance qui empêchent de décider par soi-même.

Cette perspective entraîne également l'idée de la fin des prélèvements y compris pour la sécurité sociale pour retrouver des niveaux de décision quant aux services publics nécessaires. Moins de travail pour chacun, plus de chômeurs... Puis, le choix des activités, une autre idée de la rentabilité.

L'Asem, un instrument de l'alternative...

François Partant affirme que l'alternative n'a de chance de durer et d'amplifier que si elle forme une société alternative ! Les gens doivent sortir de leur autonomie individuelle ou de groupe pour concevoir un collectif humain. Pour cela il pensait à une coordination de d'unité de vie de base. Ce qui peut être perçu comme la coordination des expériences, pour commencer.

Pour « caler » son instrument, François Partant recommande de lutter d'abord contre la division entre décideurs et exécutants, étant sous-entendu pour lui que les exclus ne reproduiront pas la division du travail liée aux grandes usines...

3. Description d'une Asem

L'idée est de regrouper, au sein d'une structure technique, des gens exerçant des activités complémentaires dans la même région pour leur effectuer des échanges prioritairement entre eux, aux conditions qu'ils décident eux-mêmes. Dans un deuxième temps, il sera possible de choisir une partie de ce qui est produit, et d'aider à l'installation de nouvelles structures.

Une structure d'échanges prioritaires...

L'idée fondamentale d'une Asem est de s'associer pour échanger prioritairement, afin de se rendre le plus indépendant possible du « marché » et de l'économie dominante. Il est donc nécessaire de se regrouper entre divers groupes de vie (collectifs, familles...) vivant dans la même région, et capables de proposer des productions relativement complémentaires afin de pouvoir effectuer des échanges.

...avec un rôle technique

Une Asem est destinée à permettre des échanges économiques indépendants de la situation du « marché ». Son rôle est donc éminemment pratique. Elle est destinée, le cas échéant, à pouvoir effectuer des études techniques.

L'essentiel du rôle dit « technique » est porté par les sociétaires eux-mêmes. Il s'agit notamment :

- de choisir, au consensus, ce qui peut être échangé au sein de l'Asem ;
- de choisir le mode d'échange le mieux adapté ;
- de décider et de se répartir ce qu'il « vaut mieux » produire, en fonction des besoins et des conditions locales ;
- d'accepter de nouveaux sociétaires ;
- d'aider à de nouvelles installations.

Tous ces choix devront se faire sans perdre de vue l'objectif d'une meilleure autonomie économique.

Afin d'aider à certaines de ces décisions, il est envisageable de faire appel à des techniciens (par exemple économistes ou agronomes) qui pourront effectuer des études sur des questions précises.

Choix de la production

Actuellement, il est hors de propos que les producteurs choisissent ce qu'ils produisent. Pour prendre un exemple dans l'agriculture, on voit une année du maïs à longueur de champs, et l'année suivante du colza, sans que l'agriculteur ait son mot à dire.

L'objectif d'une meilleure autonomie économique nécessite de réfléchir à ce que l'on veut produire. Que ce soit pour les « biens d'équipement » ou la nourriture, faire des choix sur la production à réaliser est le moyen de « reconquérir le domaine vernaculaire », pour reprendre l'expression d'Ingmar Granstedt. Cet auteur a d'ailleurs, depuis longtemps, mené une réflexion sur la question dont on pourra utilement s'inspirer¹⁵. Effectuer un minimum de « planification », au sens où François Partant utilisait le terme, est une condition indispensable au retour à l'autonomie économique, même partielle.

Avec un peu d'expérience, il sera relativement facile et très utile aux participants d'une Asem de faire des choix de production, et de se les répartir de gré à gré, partant du constat de ce qu'il a fallu se procurer sur le « marché » jusqu'à présent. Cette possibilité représente une avancée potentielle non négligeable vers une meilleure autonomie économique du groupe dans son ensemble.

Aides à l'installation

L'Asem pourrait mettre à la disposition du porteur d'un projet les moyens et outils de production (par exemple du terrain agricole ou des machines). Mais l'Asem doit en conserver la propriété, afin de garantir la pérennité de ses activités. Par contre, l'accès à ces outils doit être garanti aux personnes qui exercent l'activité tant qu'ils continuent de l'exercer. Cette garantie doit être effective, donc « statutaire », au besoin elle pourrait faire l'objet d'un

¹⁵ Ingmar Granstedt, *Du chômage à l'économie conviviale, réédition A plus d'un titre éditions, 2007 (le texte date de 1982).*

contrat. Cette question de la propriété, qui recoupe celle de l'accès au foncier, est très importante et se pose actuellement à de nombreux collectifs. L'Asem pourrait constituer l'une des réponses possible, en permettant de conserver une propriété collective.

4. Quelques éléments de fonctionnement

La démocratie directe et l'implication des sociétaires

Une Asem ne peut fonctionner que si elle reflète les besoins et les choix de l'ensemble des sociétaires.

Partant était conscient de risque de dérive et de prise de pouvoir dans une Asem. Il a insisté à plusieurs reprises sur le côté indispensable du fonctionnement démocratique : Dès 1976, dans *La guérilla économique*, il écrit : « La centrale ne serait alors que l'organe qui impulse les entreprises économiques du pays, mais qui reçoit en retour les projets et les directives de ces dernières. Elle ne serait donc pas un pouvoir hiérarchique, mais un centre des décisions collectif, un organe de coordination technique, contrôlant enfin l'exécution des décisions prises en commun »¹⁶. On lit dans *La fin du développement*, en 1982 : « Les statuts de la centrale (...) doivent strictement refléter la démocratie économique qu'elle a à mettre "techniquement" en forme »¹⁷. Enfin, dans *La ligne d'horizon*, Partant écrit : « Dès lors que l'ASEM se propose de réaliser la démocratie directe dans le domaine économique, tous les producteurs sociétaires [ont] un même pouvoir de décision en ce domaine (...) »¹⁸.

Le financement des opérations

Le financement ne peut faire appel qu'à des sources privées (souscription, mécénat...) ou internes à l'Asem (aide à l'installation). C'est la seule façon de maîtriser le fonctionnement de la structure. Le recours à des fonds publics est à proscrire. Dans un premier temps, le recours à des financements importants ne semble pas indispensable. La question se posera avec plus d'acuité quand il s'agira d'acquérir des terres ou des biens.

Les statuts

Les statuts doivent refléter le fonctionnement de la structure, tout particulièrement la démocratie directe. Ils doivent également garantir la pérennité des activités. Notamment, en cas de dissolution de l'Asem, ses avoirs doivent être reversés à une structure ayant un objectif similaire.

Comment échanger ?

Une des questions « techniques » à laquelle devront répondre les sociétaires de l'Asem est celle du ou des modes d'échange. En principe, il est possible de procéder à des échanges de différentes façons :

– par troc pur et simple. Il s'agit d'un échange d'une certaine quantité de marchandise contre une certaine quantité d'un autre bien (ou service). L'accord sur l'équivalence se fait de façon ponctuel pour l'échange considéré.

– Par « vente » payée en monnaie « officielle », c'est-à-dire en Euro. Cette façon de faire peut s'envisager dans des cas ponctuels. Si elle est systématique au sein de l'Asem, risque de poser rapidement problème, puisqu'elle renvoie directement à l'économie dominante dont il s'agit de s'affranchir.

– Par utilisation d'une « unité d'échange », c'est-à-dire une « monnaie interne », comptabilisée dans l'association, et qui donne un « pouvoir d'achat » à l'intérieur de l'Asem. Cette unité d'échange a été utilisée notamment dans les Sels (Systèmes d'échange local), ce qui a permis de prouver son efficacité, ou du moins son efficience¹⁹. Ce mode d'échange est susceptible de diverses variantes (échanges basés sur une équivalence de temps, monnaie « fondante », etc.)

Il semble difficile d'indiquer a priori « le » bon mode d'échange, car le choix qui sera à faire dépendra assez étroitement des conditions concrètes de mise en place de l'Asem. Il faut toutefois être conscient de l'importance de cette question qui ne doit pas être traitée à la légère.

5. Un exemple en forme de fiction

Imaginons un collectif de vie dans une région rurale semi montagnaise. Par exemple, et arbitrairement, en Ardèche. Ce collectif est composé d'une dizaine de personnes (enfants compris). Il vit actuellement en partie d'activités d'horticultures, donc les produits, parfois après transformation (conserves, etc.), sont vendus sur les marchés. Il exploite également des « ressources locales gratuites » (typiquement la châtaigne, dans le cas de l'Ardèche), qui sont récoltées en saison puis transformées (confiture, purée, etc.) et vendues également sur les marchés. Ces productions font aussi l'objet d'une auto consommation.

Une importante source de rentrée financière du groupe reste toutefois les allocations Rmi et chômage de certains membres du groupe, ainsi que ponctuellement les salaires d'emplois à l'extérieur.

L'ensemble de ces rentrées financières sert à acheter tout ce qui n'est pas autoproduit, c'est-à-dire beaucoup de chose : une partie de la nourriture, les vêtements, tous les objets de consommation courante (du savon au tabac), etc.

Imaginons à présent que ce collectif décide de constituer une Asem avec des groupes qui lui sont proches. Il devront dans un premier temps évaluer les échanges qui sont possibles entre eux. Les châtaignes devraient être rapidement éliminées, puisque facilement accessibles.

Pour les autres productions agricoles, certaines ne sont possibles qu'à certaines altitudes, ce qui devraient permettre une première complémentarité et de premiers échanges. S'il se trouve dans le groupe un artisan producteur de chaussures, ou un fabricant de savon artisanal, d'autres échanges pourront se faire. Dans le cas du savon, il sera intéressant de rechercher un producteur d'huile. En poursuivant cette logique, il sera possible de se poser la question de la

¹⁶ La guérilla économique, *op. cit.*, page 157.

¹⁷ La fin du développement, *op. cit.*, page 224.

¹⁸ La ligne d'horizon, *op. cit.*, page 215.

¹⁹ Sur le fonctionnement des Sels, on se référera utilement à un livre écrit par des économistes « de terrains » : Une économie sans argent. Les systèmes d'échange local, par Denis Bayon, Jérôme Blanc, Isabelle Guérin, Gilles Malandrin et David Valat, sous la direction de Jean-Michel Servet, Seuil, 1999.

production à l'intérieur du groupe pour toute une série de choses.

6. Un mot de conclusion

Toute notre réflexion n'offre d'intérêt que si elle permet de passer à terme à la pratique. Après tout, l'idée n'est pas neuve, puisque Partant l'a lancé dans ses livres depuis années 1970. Peut-être que l'époque que nous vivons, avec ses dysfonctionnements économiques de plus en plus manifestes, appelle la réalisation de ce type d'expériences, qui pourraient être une aide tant à la vie des gens qu'à la (re)construction d'un futur.

Let's liberate our economies! From offer back to demand

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Our economies are no longer growing. They are ruining their very bases. So calming down and shrinking our economies will lead us away from the abyss and towards *real* growth.

We must put an end to the *absurd* system of continuous and maximum production and obligatory ditto consumption, to be based on consumers' 'confidence' (which means: spend and waste!).

This system is money driven, so we must get rid of money as our master and turn it into our servant. (By the way, most money is credit- or fiat-money, money created by banks as loans.)

We need to shift from a supply-side (push, waste) economy to one geared to demand (and kept within ecological bounds) is entirely feasible if we **free business from its current compulsion to growth**. From an airplane-economy that has to fly on in order not to crash, to a helicopter-economy that can go forth or backwards, or mark time.

Most demand will fluctuate or have to be restrained. So there should be scope for production to fluctuate without widespread company closure. That scope can be created by *liberating* business and thus production and trade (not to be confused with more free enterprise!) in two essential respects, by:

- **making flexible the remuneration of invested capital and**
- **making flexible the workforce, by diversifying the sources of income of most workers** (so that most people will have more than one job).

As effective ecotaxing still has a long way to go, regionalisation of our economies can already be kick-started by public authorities enabling all those who are jobless or otherwise marginalised to **create a sustainable, calmer, more cooperative 'home-economy'**, to be built beneath the official WTO economy of scale, with its Big Industry, High Finance and too-Free Trade, and birthplace of devastation and many more unemployed yet to come (outsourcing, Asian competition, etc.). In each region locally produced goods and services should be favoured.

The main activity of the domestic sector: organic farming and horticulture. New economic activities will be geared mainly to import substitution. Unemployment will be a thing of the past, under the motto 'Everyone should work', but in a climate of greater solidarity and equality. (NB. Caring and being educated or trained also count as work!). **To take from the Earth and society, one must give something back in return.** (The new work ethic!) Work should be shared among us all. For healthy old folk and those with a light handicap, too, there will be plenty of

suitable work in a less hectic society. *Warm work* in stead of *cold labour* (Robert Kurz). A definite liberation of the employee too..

Some form of protectionism will be necessary, **in response to today's massively protected supranational flows of capital**, and will in fact prove rather healthy, ecologically as well as socially. It will be a liberation from external capital coming and going as it pleases, holding our governments & municipalities permanent hostage. Economic regionalisation means a partial delinking from the global 'casino'. **Money from master to servant.**

Regionalisation will narrow the gap between metropolis and periphery, between richer and poorer regions. Reviving the local economy while keeping money more in the region will stem the demise of services in small towns and villages: schools, library, medical care, public transport, shops, discos...

A big shrinking in the North will give room for poor countries to have some growth. If a Northern (i.e. over-industrialised) country or region would start the intelligent U-turn proposed here, it may well be a valuable indirect signal to such countries as China, India and Brasil which have recently embarked on the Northern catastrophic high-way of productivism and are not charmed by our paternalistic warnings.

A little less *liberté* and a little more *égalité* will be all to the good of *fraternité*. Our home-economies will be a lot more fun, they will be greener and cleaner, more social and tastier as well !

The new major economic activity worldwide: regreening our planet. All revenues from oil, coal and gas (old photosynthesis) should be used for generating new photosynthesis.

In 1939, Britain had to change overnight into a wartime economy. If we are to effectively tackle the problems that face us today – with our production overkill and frantic consumerism, have we not declared war on ourselves? – we need to make the same kind of sudden U-turn.

Our change will be a **liberation movement**. A move towards a life-saving economic paradigm-shift. **The economy brought back into the hands of the people.** Regenerating enthusiasm, energy and a perspective in our lives.

It is now or never. We have to act fast.

Supplementary explanation:

"The difficulty lies not in the new ideas, but in escaping from the old ones which ramify into every corner of our minds." (John M. Keynes)

I suppose one thing just leads to another. You are concerned about the environment. So you start reading up on the subject – Commoner, Ehrlich and others. You delve a little deeper and learn about *entropy*: in today's growth economy, the Achilles' heel of every environmental policy or technological fix, however well-intended.

Then, by way of Herman Daly's *For the Common Good*, you stumble on Georgescu-Roegen, one of the first

economists to incorporate the second law of thermodynamics into his thought. Half a century earlier that same law had led the chemist Frederick Soddy to criticise mainstream economics, proposing among other things a drastic reduction in the amount of money banks are allowed to create.

Entropy: it would take a whole new wave of environmental education for people to get their minds around the concept. It would mean a decisive deepening of environmental awareness (a feeling of 'deep ecology', but without becoming too New Age) and would prepare them for what the UN 'Brundtland' report has to say: "*The time has come to break out of past patterns. Attempts to maintain social and ecological stability through old approaches to development and environmental protection will increase instability. Security must be sought through change.*" Let's be honest. Despite serious attempts to protect the environment, at no time since the alarm was first sounded by Rachel Carson (USA, 1962), *Blueprint for Survival* (UK, 1971), the Club of Rome (1972) and Aktie Strohalm (here in Holland, from 1970 onwards) has there been any such change. Quite the contrary: in the rich countries we inhabit so comfortably, producerism and consumerism have simply spiralled, ever faster. And so I began to wonder: **Why all this unceasing production, geared, moreover, to maximum output?**

- Because of our unceasing consumption at ever higher levels – just didn't seem a satisfactory answer. There's just too much pressure to consume, too much enforced consumption, and too much ongoing structural damage that constantly needs repairing and compensating. (We now have entire sectors of the economy thriving on damage, injury, disease...)
- Nor could I see it being motivated by employment concerns. If that were so, workers would not be sacked on the scale they are, or manufacturing facilities transferred abroad wholesale.

(In my case I identified the modern money & credit system as being one of the key driving forces behind all this (as set out in my book *The Economic Revolution*, 1991, reprint 1993). But you don't need to follow me on this one. You can leave that to other – dissident – economists!)

To my mind there is one common-sense question that remains to be answered: why this unceasing production at maximum levels, even of products we don't consume all the time? Fine for things like bread, milk, electricity, newspapers, education and health care, but surely not for chairs, hi-fi systems and other such products? This is obviously rooted in the ever more rigid division of labour we see in today's world, which is stifling entrepreneur and employee alike, hounded as they already are by the mad-hatter tempo of today's growth economy.

This by way of introduction.

Now down to business.

What I think is crucial for sustainable development (s.d., which in the affluent nations should in my view be the *development of sustainability*, for otherwise we shall just continue to grow in the wrong direction; we have already

seen politicians trying to translate s.d. into 'sustainable growth') is that we *move from a supply-side to a demand-side economy*, with that demand kept firmly within environmental constraints. (1) (As the Dutch economist Opschoor once remarked: "We need to get the economy back into the environmental stable." Here in the Netherlands we are fortunate enough to have several other economists who are willing to discuss economic *shrinkage* (the curse of every economy compelled to growth): Heertje, Hueting, Pen and our 'economist of sufficiency', Goudzwaard.) *Before any of this can get off the ground, though, companies must first be freed of the compulsion to grow, i.e. the constant pressure to produce continuously while maximising their output* – which is what they are forced to do under the over-heated (and money-driven) competition of today's economy, in which each and every business must constantly grow if they are to avoid bankruptcy.

To achieve the envisaged goal requires two things, I would say:

- on the one hand, *making the servicing of capital more flexible* (payments on investments and loans) (2),
- on the other, *making the sources of worker income more diverse* (i.e. the income of the majority of people). (3)

As far as I can see, payments on investments (or if there is no outside capital involved, efforts to maintain the entrepreneur's own capital) and the pressure to retain staff (or, in the case of a one-person business, maintain her or his income) are the two jaws of the vice in which entrepreneurs and businesses are trapped.

My point of departure here is the observation that the current system of production developed in the so-called advanced nations is destroying the very foundations on which it rests. It seems to me that besides being just plain suicidal, that system is patently *absurd*, and what I therefore advocate is a *liberation* of production, i.e. of business – not to be confused with yet more *free enterprise*. And an end to the destructive, idiotic rat-race, I might add.

(Dynamics are fine, but you can have too much of a good thing. Calming the economy would mean: greater scope for true service, quality, two-way packaging and other forms of environmental prudence, greater scope for enjoyable work, skilled craftsmanship, apprenticeship training and so on. Greater resilience too, when faced with fluctuation and setbacks.)

What we need is a new context for business to operate in.

Notes, and initial steps - some already in practice - towards such change

A share in profits one year may turn into losses the next. And when times get rough, businesses will try to arrange deferment of payment or softer lending terms, lower interest rates and so on. All too frequently, though, funds are withheld, shares are sold, loans dry up, and the axe falls. Sometimes deservedly, often needlessly. And usually with

substantial loss of capital goods. If the company had been given more time, demand would probably have picked up again. Referring to UK plastics producers ICI, vacuum cleaner manufacturer Dyson is quoted as saying: "This is a cyclic industry. There are busy years and quieter years. In one of the latter ICI shut down all its plastics facilities. Rationalising it was called. Now we must import our plastics. But the guy who did that 'rationalising' got a medal." (Dutch newspaper NRC-Handelsblad, 13-6-'98). And so there are those who recommend more solid legal bonding between commercial enterprises and those providing venture capital, in the form of a foundation, for example (H. Chr. Binswanger, 1994).

NB: If, in the demand-side economy of the future, the machinery of production does sometimes slow down or stop altogether once in a while, it will still be regarded as a loss – in traditional economic terms, that is. However, from the perspective of the environment (the very *foundation* of every economy) a calming of production isn't such a bad thing at all. It will mean longer lifetimes for plant and equipment, too. This is a question of optimum versus maximum. And how we calculate. Intensive ecotaxing (meaning among others far less transport) and the stopping of further social desintegration (which is now marginalising ever more people) will lead to a wholesome *regionalising* of the economy. (4)

One example of how the sources of worker income can be diversified - the other jaw of the vice - are the labour pools currently operated in some ports and regions (in Rotterdam and the Dutch region of Twente, for example). But that is just the beginning, because the pooled workers are still doing roughly the same kind of work each day. In my proposal we would need to diversify the *kind* of work, too. For example, assembling TVs as one's main occupation, but also (during a temporary slump in demand for TVs) helping out on the land, at a market gardening centre, on a building site, or in education, transport or health care, doing sports with marginalised adolescents, etc. Most people's abilities extend well beyond their current paid job – as is readily apparent from all the things they do in their spare time. Today's thriving employment agencies (popular with employers as well as with many employees, the latter because of the varied work on offer) are another step in the right direction. (Yes, a step, even though it is a trend the trade unions are at present understandably unhappy about.)

The notion of a basic income for all comes into the picture here – backed up, as I have always stressed, by a duty for *everyone* (yes, everyone) to engage in productive work, as well as help out with basic social services. After all, it's only fair that what you take from the Earth and society should be refunded in one way or another.

Unemployment? Let's make it a thing of the past!

Beyond these first signs of change ("The new society is born within the old!") throughout the 'developed' world we see people striving to cut back their consumption, slow down their rhythm of life, opt for more caring work and live less materialistically.

Oh yes, there was also my trip to Crete, where I found a café-restaurant that proved to be a post office and a grocer's as well. So nice to still find the intelligence so endemic to less-developed regions. As it is to find people

who have mastered a variety of jobs and skills, just like our agrarian ancestors.

Then there is the issue of how, in a demand-side economy, the market is to be rid of poor entrepreneurs and ditto products, something that is organised pretty efficiently at present. In the calmer marketplace of a demand-side economy I reckon this will happen much the same way. After all, in that kind of economy there will still be some competition.

What I would like to see is a demand-side economy so embedded in the community that competition will be more 'live-and-let-live' (more good-neighbourly) and less a case of the biggest or richest fish consuming the rest. In any given economic sector there will still be different-sized businesses, but freed of the compulsion to grow these will be far more stable, far more 'steady-state', simply serving their particular segment of the market. In terms of service, quality or innovation, though, there will always be scope to gain an edge on competitors.

My slogan: "We can still turn the Earth into a magnificent planet!"

(1) Supply-side and demand-side economy: or alternatively, following Aristotle, economies of acquisition and of subsistence.

(2) In his contribution to *Geld und Wachstum* (Weitbrecht, 1994) Binswanger supports this idea of a *Flexibilisierung der Geldschulden* (p.119). His *Geld und Natur* (Weitbrecht, 1991) is concerned with the money system and with compulsion to growth. See also: *The Economist*, vol. 143, no. 2 (May 1995), p. 275 *et seq.* At the time I sent copies of the chapter in question (*Die Dynamik der Geldwirtschaft – Zur Frage eines Wachstumszwangs*) to some thirty well-known Dutch economists. A mercantilist droplet in the neoclassical ocean?

(3) As already proposed in *The Economic Revolution*, p. 91 *et seq.*

(ISBN 90-6224-997-3) See also my article: *Let's make a living, not money.*

(4) See for instance my article *Let's regionalise the economy and cure ourselves of a host of ills.* More theoretical against too much free trade: chapter 11 of Herman Daly's *For the Common Good*, second edition 1994: Free Trade versus Community. See also the Afterword about Money, Debt and Wealth. Other useful pioneer reading, and more practical: *Future Wealth*, by James Robertson, and Richard Douthwaite's *Short Circuit.*

NB. For equity's sake, ecotaxing should be accompanied by distribution systems. Otherwise the rich can go on polluting.

Translation from Dutch: Nigel Harle

Articles en français:

De la libération économique. Quelques banalités économiques de base.

Inclus en partie dans : *Objectif: décroissance*. (Parangon, 2003)

Les mésaventures d'un objecteur de croissance, dans *Entropia No 2*.

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Sufficient, Closed-loop Agricultural Production in a Degrowth Economy

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Abstract

This paper assumes that a hypothetical nation has chosen to abandon the traditional economic growth model in favor of degrowth with the goal of sustainable well-being for the nation's population. This country's practical options for agricultural technology surrounding a rapid transition away from the further extraction of finite, subsurface, fossil and mineral resources are considered. Various growing media, work inputs and crop choices are reviewed, solely on the basis of net yields and sustainability of production. Briefly, quantities of biomass are related to an adequate standard of living, and basic material needs of a population. Per capita consumption is related to population density, assuming an optimistic and constant agricultural yield.

Key words: degrowth, agriculture, sufficiency, biomass extraction

1. Introduction

Economic degrowth refers to a voluntary reduction of economic production. Despite widespread political acceptance that increasing economic production inherently improves society, in developed countries, it impairs progress towards sustainability and equity. This paper considers a scenario of economic degrowth where a government abandons the extraction of finite, subsurface, fossil and mineral resources, and relies on agricultural production to provide an adequate standard of living. Agricultural technologies are reviewed for their net yield, and related to goods and services and population density.

Three major arguments against growth of economic production in developed countries (Victor and Rosenbluth 2007) include "(1) global economic growth is not an option because of environmental and resource constraints, so developed countries should leave room for those that benefit the most from growth, (2) beyond a point that has been passed in developed countries, growth does not bring happiness, and (3) in developed countries growth is neither a necessary nor a sufficient condition for achieving such objectives as full employment, elimination of poverty and environmental protection."

Fabrice Flipo summarizes the possible routes for supporters to arrive at degrowth, loosely rephrased here. (1) The cultural argument of (Latouche 2007), (2) A global equity and democracy argument of (Daly 1977), and the avoidance of conflicts over resources (Nikiforuk 2001; Martinez-Alier 2002; Chomsky 2003; Padel and Das 2006), (3) An

ecological argument stemming from the valuation and respect for the living (4) A spiritual argument that growth does not bring happiness (Matthey and Dwenger 2008; Thompson and Abdallah 2008) and over-consumption leads to physical and mental diseases and community disintegration among the rich (Lasn 2000), (5) Economic argument that even cost-benefit analysis indicates growth is not desirable (Islam, Munasinghe et al. 2003) and long term economic stability may be realized by reducing size and complexity, thus increasing redundancy, resilience, traceability and forecasting (Louchet and Deltorn). Economists argue that employment and welfare levels will increase, through intentional degrowth, compared to forced growth (Hueting 1974; Victor and Rosenbluth 2007), (6) the most common and popular is the resource argument. Steady state economics were promoted by (Mill 1848) and (Daly 1977) and degrowth by (Hueting 1974) and (Georgescu-Roegen 1971) who also explained the economic significance of the entropy law. The entropy law states that in a closed system, useful energy always declines. New technologies generally fuel the rebound effect so more people can consume faster. Recent analysis indicates that the global economy is not dematerializing (Moreau and von Medeazza 2008) and levels of material throughput are therefore still growing.

In a contained system, communities of species without limits grow until they have caused too much damage to the systems that support them and then experience widespread conflict and death. Our understanding of this phenomenon, along with our political and technical abilities leaves the future wide open to the possibility of society and commerce maturing from growth to find sustainability.

Various works have attempted to define sustainable levels of consumption, for example, (Tinbergen and Hueting 1991; Wackernagel, Onisto et al. 1999). Here we build on such work by assuming no new extraction of non-renewable resources, limiting all new production of materials and energy to that of sunlight, the biosphere, the atmosphere and the hydrosphere. The yield of closed loop agriculture will be compared to population density and per capita consumption.

Non-renewable material resources are defined here as materials that, on the scale of hundreds of years, are finite on earth. The majority of such resources as petroleum, metals and minerals are mined from subsurface geological deposits. We define renewable resources as those that are replenished by biological and hydrological cycles and processes, within hundreds of years.

2. Methods: National Sustainability Scenario

Abandoning the extraction of all forms of non-renewable resources would, by definition, indicate a level of consumption that might be sustainable. Although few real governments have prioritized reducing non-renewable resource extraction (Monbiot 2006), our hypothetical government (HG) has adopted a new value system in which material throughput will be minimized.

Instead of the traditional economic sustainability of which seeks to maximize the flow of consumption while maintaining the stock of assets that yield these beneficial

outputs, the HG's goal is to minimize the flow of consumption, while maximizing human well being.

In our degrowth scenario, the HG has created policies that resemble Daly's institution for distribution (Daly 1977) including maximum and minimum material wealth entitlement for each person. Here, we will focus on such a HG's options for agricultural technologies that may replace extracted, non-renewable resources.

3. Results

Technology Options

The technological approach taken here is not to replace the infrastructure with another high-tech infrastructure, nor is it to return to a pre-industrial society. The approach is to use what we have already extracted and built to provide an adequate standard of living without extracting more non-renewable resources, augmented by an increased use of some existing technologies and decreased use of others. In keeping with the overall reduction of material throughput, a major focus will be production of goods that provide service over space and time.

Here we focus on agriculture as a means of producing materials and energy that may sustain an adequate standard of life. Among the competing methods to replace extractive industry, agricultural biomass has several advantages. It is low tech, and requires only water, sunlight, nutrients. High-tech solar, hydrogen, geothermal, and wind relies heavily on various material and energy inputs for manufacture, and generally provides energy, but not materials, food or shelter.

The scope of this analysis is limited to the sustainability and yield of agricultural production methods, without inputs from non-renewable, or extracted materials.

Land Use Economics, Net Primary Production, indicators and other concepts

Although the productive capacity of land was once the major factor in economic well-being, industrialization and the use of mineral resources, and agro-chemicals has appeared to free the economy from reliance on the productivity of fertile land (Hubaceka 2006). The factors considered in economic productivity shifted from land, labour and capital to only labour and capital, and neo-classical economic theory allowed for the substitution and even disregard for the value of natural resources (Hubaceka 2006).

Criticism of the neoclassical system has been backed up by a number of whole-system approaches aimed to capture the dependency of economic and social systems on the natural world, such as throughput, entropic flow, economy-ecology input-output models, human appropriation of net primary production, environmental space, and ecological footprint (Hubaceka 2006).

The rate of production of plant tissue from carbon dioxide is called Net Primary Production (NPP). Ecological, agricultural, and atmospheric researchers have developed standards to measure this mass and energy flux, usually in terms of dry weight, ash-free dry weight, or mass of carbon (Fahey and Knapp 2007). New methods for measuring

NPP in soil (Jenkinson, Harkness et al. 1992) as well as our increasing understanding of microbial communities (Xu 2006) suggest that NPP measurements will continue to improve. Uncertainty in estimates and sampling procedures are far from standardized across biomes, and uncertainty for terrestrial vegetation is particularly prevalent in the root zone (Fahey and Knapp 2007). In 1967, the IBP Handbook on Measurement of Forest NPP suggested a wide adoption of general principles to make measurements comparable, and today NPP data has led to global socioeconomic biomass flows (Krausmann, Erb et al. In Press) and global ecosystem modeling (Olson, Johnson et al. 2001).

Various frameworks and indicators of (un)sustainable development have been put forward in recent years. One of the more widely used is the Ecological Footprint (EF), developed by Wackernagel and Rees. The framework is based on the assumption that one's ecological impact corresponds to the amount of nature one occupies through the use of nature's products and services (Wackernagel, Onisto et al. 1999). Consumption and pollution are converted into the amount of biologically productive land area that can provide these services.

Notable criticism has been made of EF's neglect to account for intensity of land use or multifunctional land use (van den Bergh and Verbruggen 1999). Van den Bergh has also criticized the direct conversion of fossil carbon emissions into forest land, because it ignores supply side of fossil energy use, over-emphasizes land allocation to energy and ignores other options for CO₂ mitigation. Perhaps if the biomass accumulated on the sequestration land were used as fuel, supply would be considered and land allocation might be more accurate.

Financial valuation of services from biosphere has been estimated globally for 17 ecosystem services from 16 biomes (Costanza, d'Arge et al. 1997) but includes cropland only for direct services such as food production. Recent progress within a similar framework has led to the aggregate indicator Ecosystem Services Product, which has been added to GDP to form SEP (subtotal ecological-economic product). Ecosystem Services Product has been estimated globally, in terms of US\$ per hectare and correlated with satellite imagery as an indicator of economic activity (Sutton and Costanza 2002), revealing a new perspective on global wealth distribution.

There are significant ecosystem services associated with natural and semi-natural land, apart from the production of materials destined for human consumption, such as regulation functions, habitat functions, carrier functions, and information functions (Groot 2006). The benefits of conserving complex natural systems often outweigh the short term advantages of harvesting natural capital but the limited scope of market economics advances habitat destruction for unsustainable monoculture (Costanza, d'Arge et al. 1997; Groot 2006; Vogtmann 2007). Here we assign no intrinsic value assigned to these functions. Agricultural techniques that may be integrated with natural ecosystems, such as high biodiversity and multifunctional cropland are considered only for their sustainability and yield.

Substitution of various forms of capital is a general shortcoming of aggregate indicators like GDP, Genuine

Progress Indicator, Net Primary Product Use and Ecological Footprint (Victor 1994; van den Bergh and Verbruggen 1999; Victor and Rosenbluth 2007), however the very reason these indicators are useful is because they allow conversions of capital. Here we explore current agricultural yields and the technology that converts agro-inputs into NPP and eventually into products and services.

Definition of Sustainable Agriculture

Developments in modern agriculture have led to heavy on reliance chemical inputs, and to degradation of wildlife habitat, soil, environmental and human health, which are arguably unsustainable (Rigby, Woodhouse et al. 2001).

Various definitions of sustainable agriculture have been reviewed and contrasted to organic agriculture (Rigby, Woodhouse et al. 2001) and found to share common principles. A report by the International Federation of Organic Agriculture Movements defines organic agriculture as having key elements of ecology, care, fairness and health (Ageson and Horwat 2005), and many definitions stretch beyond farming without chemical fertilizer, into social and economic sustainability (Vogtmann 2007).

To qualify as sustainable agriculture, we consider the simple environmental criterion: that production may be maintained without non-renewable inputs or cumulative degradation of physical and biological resources.

Production Technology

Only crops (NPP) will be considered – rearing of livestock will be considered a “use” of crops. All forms of crop agriculture must choose (1) a growing medium and containment, (2) work inputs for cultivation and harvest, and (3) a choice of which crops to grow. These three categories are assumed to include most inputs to agriculture. Location and climate can be other major choices; however, here we consider them to vary, as they are often beyond the control of the farmer or government. Net yields are compared at the end of this section.

The aspects of methods discussed here are human-centric and utilitarian, but over the long term. The main considerations are (a) crop yield and (b) long term maintainability of agricultural methods. We recognize that other factors have values, such as regulatory functions and aesthetic values, however these are not considered here. Recent work evaluating public demands on multifunctional agriculture and ecosystem services includes that of (Groot 2006; Parra-Lopez, Groot et al. In Press). Some evidence shows that sustainable, high yield methods often involve maximizing other factors (Vogtmann 2007).

(1) Containment and Growing Medium

A major division exists between intensive and extensive crop production. Traditionally, intensive production refers to major inputs of capital, materials and labour, whereas extensive refers to low input methods, such as production of grass for grazing of livestock over large areas. In a very low input scenario, extensive agriculture may resemble hunter-gatherer type harvesting, in which case cumulative degradation of productivity may be caused by non-native species, over-harvesting or climate change (MEA 2005). This method is not considered to be unsustainable, but the stability of “natural” systems must be monitored for

cumulative degradation, over the long term. Extensive agriculture tends to be lower yield, although average NPP of aggregated biomes range from grassland at 5 to tropical forest at over 20 tonnes dry matter per hectare (Olson, Johnson et al. 2001).

Intensive agriculture often involves containment systems such as scarification of the topography, fences, pots or glasshouses. Various small horticultural projects are springing up around the world in the urban areas and other traditionally non-agricultural areas. Havana, Cuba is a leader in urban agriculture and has managed to produce over 50% of its vegetables within the city limits (Sinclair and Thompson 2001). A number of needs may be satisfied with urban agriculture, particularly installations on or beside existing buildings, including heat regulation, storm-water regulation, air quality regulation, and non-economic services (Carter and Keeler 2008).

A comparison of yields between large and small scale containment systems is presented in tables one and two. Small scale yield data is from a popular book by (Jeavons 2006) on how to grow more vegetables in home gardens and the large scale yield data is from the online FAOSTAT database for national agricultural yields.

Glasshouses and heating systems can lengthen the growing season and provide increases in production in cooler climates, and although historically required major heating inputs, the Netherlands government has recently claimed that by 2020 greenhouses may become a net source of energy throughout the year (Timmermans 2008). The materials and fuel required to increase the area of greenhouses will include the production of translucent glass or plastic and other energy and materials. Glass may be recycled at around 7 GJ/tonne (Krivtsov, Wager et al. 2004) at 2.5mm thick, this requires around 400GJ/ha, or plastic at 437 GJ/ha which dwarfs most annual inputs to agriculture, other than the manufacture of machinery, estimated at 87 MJ/kg (Cormack and Metcalfe 2000).

Soil has been found to contain over 8 million different species and a total of several billion organisms per gram (Roesch, Fulthorpe et al. 2007). Soil or substrate macroorganisms and microorganisms can benefit or harm plant growth, and may be employed or destroyed, depending on the farming techniques.

Since the beginning of agriculture, plowing has provided short term increases in yield but caused soil degradation and erosion that has played a major factor in the longevity of past civilizations (Diamond 2006; Lal, Reicosky et al. 2007; Montgomery 2007). No-till agriculture has emerged as a competitive alternative, and high soil quality depends on high organic matter content, so future trends must shift towards constant additions of organic matter and less tillage through other methods of weed control and bed preparation to avoid another dust bowl, especially in soil-stressed regions in Africa and Asia (Lal, Reicosky et al. 2007; Montgomery 2007).

Soil with high biodiversity and organic matter requires less water, nutrients, and pest control and is less prone to erosion than low biodiversity soil with low organic matter content (Martin, Gershuny et al. 1992). Permaculture and organic farming encourage organisms to exist in soil, and may use waste organic mater as a source of nutrients. A

recent review has been published on technologies for soil and water conservation worldwide (WOCAT 2007) which has highlights such techniques.

Soil organisms may produce weeds, insects, and pests that can destroy crops, and organic fertilizer is often more difficult to apply to a field than are synthetic fertilizers. In addition to non-renewable minerals and fossil sources, biogas and biofuels are also able to produce some synthetic fertilizers. The current global consumption of 150 million tonnes of chemical and mineral derived nutrients require about 2% of the worlds energy (IFA 2002), which is equivalent to 210 million tones of oil, or around 5 times the world's 2005 ethanol and biodiesel production combined (Martinot 2006). A low energy source of nutrients is deceased plants and animals, sewage, manure, or any other organic matter. (Williams, Audsley et al. 2006) reveal that the increased inputs into field work in organic systems can exceed the savings of fossil inputs in synthetic fertilizer. The overloading of nutrients, particularly N is considered to be one of the most serious threats to ecosystems worldwide (MEA 2005), recycling of waste nutrients is an attractive long term option.

Water is crucial for all life, and agriculture currently accounts for over 70% of human water use (Owens 2001). In order to reduce the amount of water used in agriculture, crops must be chosen carefully, irrigation must be delivered efficiently, and water retention in soil can be improved, primarily through increasing organic matter content. It has been argued that increasing the plant cover in a catchment basin reduces the amount of water available to humans, however root systems actually increase soil absorption, store water and allow groundwater to infiltrate and enter into streams as the base flow. Without plant cover, infiltration is poor, and water runs off in the form of flash floods which cause soil erosion (ISRIC 2008). World Soil Information is currently promoting "Green Water Credits", a program where water users downstream pay upstream farmers to maintain vegetation on their land in order to ensure a continuous flow of clean ground water and base flow in rivers for the downstream farmers.

(2) Work inputs for cultivation (machines, labor, pest control)

Current interest in climate change has stimulated a wealth of research into the significant energy inputs and emissions from agricultural techniques (Little 2007). Major energy inputs including seeds, fertilizers, pesticides and pest control, machinery, dryers, collection, transport and distribution to the UK have been contrasted between organic and conventional (Cormack and Metcalfe 2000), as shown in Figure 2 (Annex).

Other sources provide energy input figures for conventional vegetable, grain and tuber crops in the same range – bread wheat at 2.5 GJ/ t, oilseed rape at 5.4 GJ/t, potatoes at 1.4 GJ/t and tomatoes, including heat and lighting outside of the growing season at 130 GJ/t (Williams, Audsley et al. 2006). Depending on yield, figures average at approximately 6 GJ/hectare (Cormack and Metcalfe 2000).

Perhaps synthetic fertilizers and pesticides could be sustainably produced with biomass rather than fossil fuels? In addition to their detrimental impact on overall farm

sustainability (Rigby, Woodhouse et al. 2001), pesticides require significant energy inputs. Energy value of pesticides have been estimated (Stephens 1991) in Table 5.

For synthetic fertilizers, different forms of nitrogen ranges from 55 MJ/kg N (ammonia) to 70 MJ/kg N (urea) but average figures are 60 MJ/kg N, 8.5 MJ/kg P₂O₅ and 5 MJ/kg K₂O. In addition there is between 20 and 160 MJ/kg energy inputs associated with formulation and packaging as miscible oil, wet-able powder or granules/dust and between 36.3 MJ/ha and 119.8 MJ/ha to apply chemicals with a pull-type sprayer (Stephens 1991).

Pesticide application can range from 125g to 20kg per hectare, and in a recent study definite maxima for application were determined, as higher levels inhibit useful microbial activity and decrease yield (Glover-Amengor and Tetteh 2008). The levels of nitrogen and other nutrients applied seldom exceed 300 kg/hectare (Singh 1999), but the production of required chemicals can account for thousands of MJ per tonne of produce (Cormack and Metcalfe 2000). A presentation of the yields associated biofuels needed to produce these quantities of energy are provided in Table 6 and indicates energy required for chemical inputs can decrease the net yield by 10%.

Biological pest control is a preferable to poisoning pests. It is based on introducing a natural predator of the pest to the agricultural system and has gained much respect and momentum recently. It requires no additional energy inputs, however remains severely underdeveloped due to uncertainty related to complexity of natural systems and economic return, and currently accounts for 1% of the global pest control market (Cullen, Warner et al. 2008).

A conservationist organic farm that avoids chemical inputs has produced a detailed report on its energy usage (Bentley-Fox 2004), and highlights plowing as weed control, combine use for harvest, and drying as by far the most significant energy costs.

A recent project on energy use in organic farming systems "did not identify any significant opportunities for replacement of energy inputs by labour", in the case of weed control because the work is time sensitive and generally because there is a shortage of suitable and willing labour for this type of work in many places (Cormack and Metcalfe 2000). The supply of willing labour has seldom been a function of solely job description; rather it is a function of compensation. Labouring on farms can be a healthy and enjoyable task, compared to many jobs, as demonstrated by voluntary participation in the international Willing Workers On Organic Farms (WWOOF) program, and the lack of voluntary miners, truckers, meat cutters or office workers. If a small part of a human diet of 2000 kilocalories or 10.5 MJ per day in food energy were released perhaps just one or two days per week, it could do wonders for obesity and poor mental and physical health in much of the developed world (Lasn 2000). There is a strong argument for using the energy value of the food crops instead of growing separate energy crops.

In a publication compiling articles on labour in sustainable agriculture is a review of studies focused on labour in sustainable agriculture (Comte 1994), as well as an analysis of the trade off between mechanized work and high inputs of chemicals with manual labour.

(3) *Choice of crops*

Ecologists have long declared that biodiversity is essential for healthy ecosystems and recent work shows health is enhanced by a wealth of parasites (Hudson, Dobson et al. 2006), so our assumption is that mimicking of natural ecosystems with a diversity of organisms will provide a more sustainable form of agriculture.

Proponents of forest farming argue that even if one crop fails, another will succeed, and that high diversity systems are much more productive than monoculture. High biodiversity organic cropping may also allow for conservation and sustainable use of biodiversity (Vogtmann 2007). Techniques basing agriculture on resilient natural systems and working with natural biology, not against it, have been synthesized into the field of permaculture (permanent agriculture), in which high biodiversity crops are integrated with both urban and rural land.

However advantages of multi-species agriculture versus monoculture are still debated. Number of species versus productivity has been studied by (Haberl, Plutzer et al. 2005) and (Haberl, Schulz et al. 2004), without increased biodiversity showing a definite advantage yield of a particular crop. However, others have found that yields of foods, biofuels and ecosystem services are higher and more reliable and efficient with a greater number of plant species (Tilman, Reich et al. 2006). Inter-cropping can also have other benefits, such as salinity tolerance (Reddy, Sanjana Reddy et al. 2003).

Crop residues and weeds may be harvested and used as animal feed, fuel or fiber, and certainly, more total biomass is produced in a multi-species system than in a monoculture for example, where every organism is eradicated except one species of grain.

Globally, the amount of carbon in biomass that is appropriated but not used (6.6 Pg/yr) is equivalent to half of the CO₂ emissions from fossil fuels world wide. Some of this biomass may improve soil quality and perform other functions, however it is split among unused losses from cropland and forest, human induced fires, and underground NPP (Krausmann, Erb et al. In Press).

Conversion of biomass into goods and services

As alluded to earlier, our hypothetical government (HG) seeks to minimize resource flow. Thus, instead of a consumer society they will have a conserver society, within which, the only new materials required are to replace items that are no longer re-useable. This follows from the assumption that in a developed country, the material products currently in use could provide an adequate standard of life to the whole population. Most items, such as tractors or clothes have a limited lifetime and will require new materials for maintenance and eventually manufacture of a replacement item. As such, ongoing maintenance and repairs to lengthen the lifetime of a product will likely reduce the overall material throughput. In addition to the maintenance and replacement of items, an adequate standard of living requires some continuously flowing materials – namely food and energy. While food shortages have gained prominence in the western media in 2008, it is likely that levels of biomass extraction will

continue to increase for fiber and energy consumption in the near future (Krausmann, Erb et al. In Press).

Maintenance and replacement of items

Fabrics and clothing are essential to an adequate standard of life. The ecological footprint and life cycle assessment of textiles have been investigated by (Herva, Franco et al. In Press) and (Huijbregts, Hellweg et al. 2008) and a Swiss government study (Hans-Jörg Althaus 2007).

Recent reviews indicate feasibility of recovery of metals from waste (Cui and Zhang In Press), and recycling of glass (Krivtsov, Wager et al. 2004), in contrast, while some types of plastic, such as Polyethylene terephthalate (PET) are easily recyclable, many others are near impossible to recycle into new materials with current technologies, and are exclusively recycled into fuels (Garforth, Ali et al. 2004).

Construction, heating and maintenance of buildings has been analyzed for environmental impacts including material and energy consumption, and reviewed for a sustainable threshold (Zimmermann, Althaus et al. 2005). Reducing use of extracted materials in favor of wood, cob, biomass based plastics, natural fiber insulation, green roofs or living walls was not prioritized directly by Zimmermann et al. however such techniques may be competitive to recycling metals, petroleum and concrete.

Computers and communication systems rely almost entirely on extracted materials such as metals, plastics and fossil fuels. As previously mentioned, only their maintenance and replacement are needed, if we assume the current levels of goods are adequate, the only inputs are direct electrical power, maintenance and recycling of parts, reviewed by (Streicher-Porte, Widmer et al. 2005).

Transportation is currently essential for delivering goods and services, to many parts of the world, however motorized personal travel is not considered necessary. The distribution of food is considered in the current net yields from agriculture.

Higher desires, self actualization, and other material objects may be fulfilled by proximity of nature, although it has been shown that desires for material riches are hard to shake (Matthey and Dwenger 2008).

Continuously Flowing Materials

Energy for food distribution and transport has been estimated by (Cormack and Metcalfe 2000), and presented earlier in this paper, but does not include cooking, which ideally would be combined with heating of a home. The amount of food needed per person is estimated at around 2000 kilocalories per day (FAO and WHO 2002).

The largest part of the Ecological Footprint (Eaton, Hammond et al. 2007), and the biggest threat of reducing resource extraction is associated with the use of fossil fuels. Petroleum has revolutionized every aspect of human development, by providing millions of years of photosynthesis to be burned in decades. The overwhelming requirement for most material goods (previous section) is energy for their manufacture, maintenance and function.

Biomass flow data given as kilogram (kg) dry matter can easily be converted into both carbon or gross calorific

values by applying specific conversion factors, such as those used by (Krausmann, Erb et al. In Press):

1 kg dry matter biomass = 0.5 kg carbon = 18.3 MJ
gross calorific value (upper heating value)

Methods of combustion may include prior drying of biomass, pulverization, gasification, and many others that will approach the upper heating value. Notable energy crops that may replace conventional diesel, natural gas and gasoline include oils from algae, biogas from waste, ethanol from cellulose, respectively. Wood chips, crop residue and other forms of dry biomass are substitutable for coal in large, stationary heating units.

Assuming all of the weeds, crop residue, wood scraps, manure and other excess NPP were used as fuel in an extremely efficient system, the NPP of natural ecosystems (ranging from grassland at 5 to tropical forest at over 20 tonnes dry matter per hectare (Olson, Johnson et al. 2001)) indicates the potential of 90 to 360 GJ /ha /year in total theoretical energy from NPP. Biomass currently accounts for 9 to 13% of global energy (Krausmann, Erb et al. In Press), whereas fossil fuels and uranium account for around 85% globally.

Consumption Levels

“The average rates at which people consume resources like oil and metals, and produce wastes like plastic and greenhouse gas are around 32 times higher in North America, Western Europe, Japan and Australia than they are in the developing world” (Diamond 2008).

A global inventory of current levels of extraction and throughput of extracted natural resources and domestic material consumption per person is presented by (Schandl and Eisenmenger 2006). Four major categories of domestic resource extraction: fossil fuels, construction materials, ores and industrial materials and biomass are presented by geographic region in Figure 3 (see Annex).

Average fossil fuel extraction, per capita per year is 0.1 tonnes for least developed countries, around 1 tonne for developing countries and 3 to 6 (to 15) tonnes for industrialized countries (Schandl and Eisenmenger 2006). The world average is 1.6 tonnes/ capita per year. Shell Oil estimates that the current energy consumption levels per capita per year are 350 GJ in the US, 150 GJ in the EU, and 50 GJ in China (Fries 2008).

Detailed accounts of human appropriation of biomass, globally, have been produced by (Haberl, Erb et al. 2007) and (Krausmann, Erb et al. In Press), and give an idea of our current consumption levels, per capita (figure 4, see Annex).

Basic needs

A widely accepted framework for describing human needs and desires was presented by (Maslow 1943) and describes physiological needs and safety needs as the most basic needs of humans, followed by the less basic needs of love, self-esteem and self-actualization. Maslow notes that all of these needs may be met to different degrees, and that when one becomes even partially satisfied, another emerges.

For the purposes of this paper, it is assumed that love and self esteem do not require additional material flows, but

that self-actualization and further intellectual desires do. Therefore we consider the importance of having an excess of material flow that may, for example, support the state, the arts, and the broadcasting of information.

UN Human Rights Charter #25 is “Right to an adequate standard of living,” however this has not been defined by the UN or elsewhere. In most countries, poverty is determined by an income threshold. Absolute poverty measures have been considered by (Chen 2007), but only in terms of financial prosperity. People who enjoy an adequate standard of life but do not rely on markets are therefore ignored. Cost of living indexes and purchasing power parity cannot provide a direct conversion of financial prosperity into material needs of humans, largely because the needs of humans are subject to psychological conditioning.

Although a set of basic physiological needs may be definable, for the purposes of the HG and in any given culture, an adequate standard of life and the poverty level will be determined by social and cultural norms (Matthey and Dwenger 2008). In a developed country, this level of material consumption will be closely linked to the current levels of consumption.

Suggested thresholds for physiological needs include:

- Water: 20L per day for solely personal use (Engineers Without Borders)
- Food: 2000 kilocalories per day or 3.2 GJ /year (FAO and WHO 2002), equivalent to 0.16 tonnes dry matter
- Energy: 24 kWh per day or 31 GJ/year, including shelter, maintenance and industrial processes to produce goods and services (Zimmermann, Althaus et al. 2005), equivalent to 1.6 tonnes dry matter

Various groups of people, such as Quakers, Hutterites, Monks, and environmentalists, have voluntarily limited their pursuit of various desires, including material consumption. However, a reduction in material throughput imposed on a population is a very different phenomenon. Who has the authority to decide what one’s needs are? (Cohen 2008) argues that governments are well equipped with mechanisms to ration a population, such as during World War Two. This was publicly acceptable because rationing was only expected to last for a certain period of time and (Cohen 2008) further suggests that open-ended rationing will be more difficult to implement, in terms of public acceptance.

4. Discussion: Population Density versus Consumption Levels

Consider the scenario where all materials consumed by a population must be produced on their land. Assuming a constant agricultural yield, consumption per capita and population density are related in Figure 5. The relationship assumed is that agricultural yield is equal (tonnes per hectare) to human consumption per area (tonnes per hectare). From this it follows that if x = population density (capita per hectare) and y = consumption per capita (tonnes per capita),

$$xy = k, \text{ where } k = \text{agricultural yield.}$$

The area below the line represents consumption levels of a given population density, that may be sustainable with no inputs from outside land. Regardless of yield, a line of this shape will represent the relationship between biomass consumption and population density (Figure 5, annex).

This curve represents a very optimistic assumed maximum constant yield of 10 tonnes dry matter/ hectare/ year, equivalent to average temperate ecosystem Net Primary Production (Olson 2001). In 2006, average US corn production was 3 tonnes of dry matter per hectare, average root and tuber yield in the Netherlands was 12 tonnes dry matter per hectare (FAOSTAT website).

Population densities considered for human dwellings range from rural (3 cap/ha) to suburban (10 cap/ha) and urban (35 cap/ha). Several bench marks indicate real cities, such as Greater Bangkok at 36 capita per hectare, which is different from central Bangkok, which provides a home to several hundreds of people per hectare.

6. Conclusion

Society is facing various cultural and resource problems that could be solved by decreasing economic production. Physiological human needs may be met, while abandoning metal and fossil resource extraction, by encouraging high levels of local net primary production through improved economic value systems and agricultural land use. In a closed-loop scenario, organic, high biodiversity cropping with extensive plant cover, no till, labour intensive farming will produce the highest yield and level of sustainability over the long term. Decreasing levels of population density and per capita consumption will improve the probability of future resource self sufficiency for humans within the biosphere.

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ANNEX

Figure 2. Energy input by category on a unit output basis (MJ/t yield)

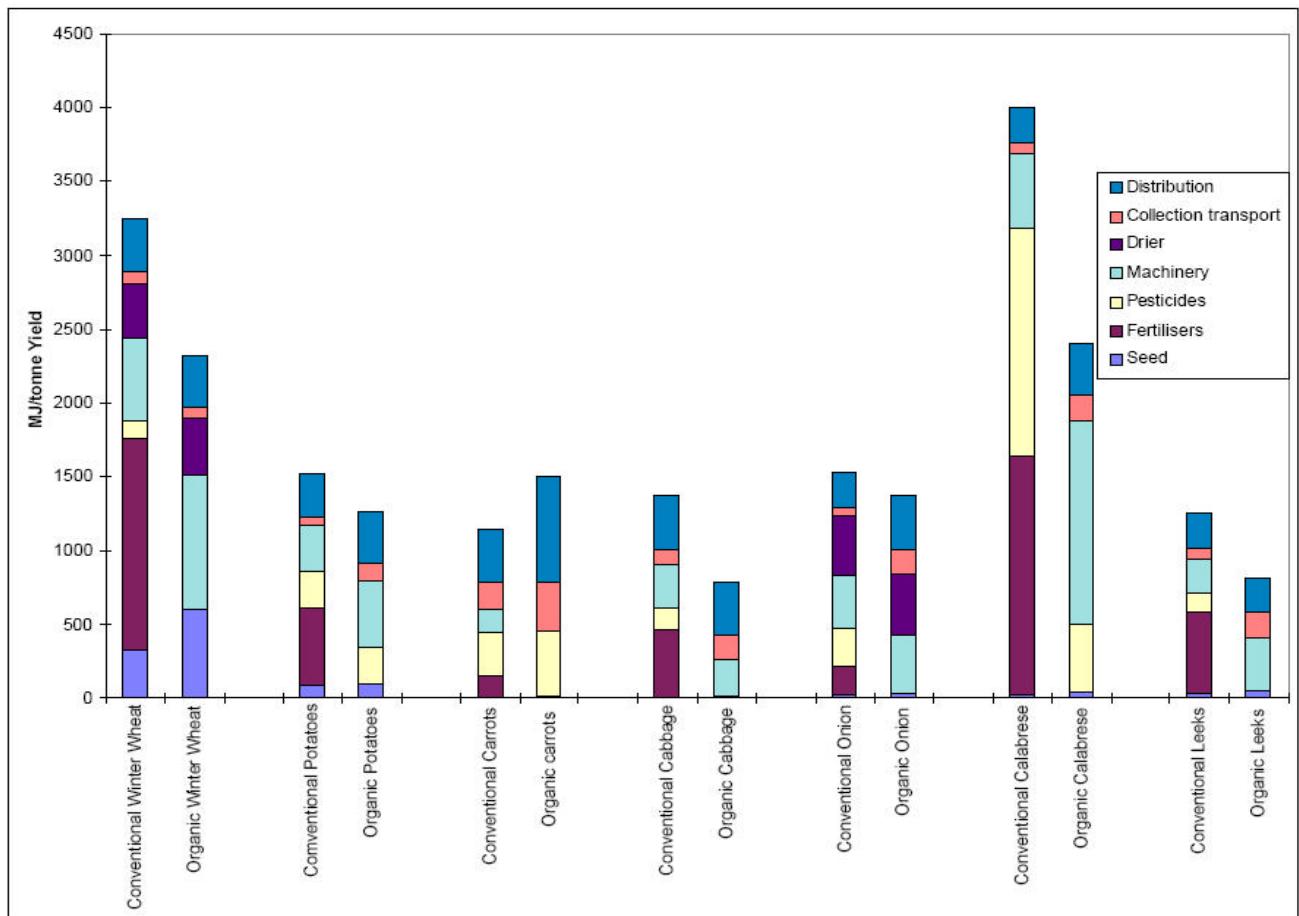


Figure 3, Domestic Resource Extraction

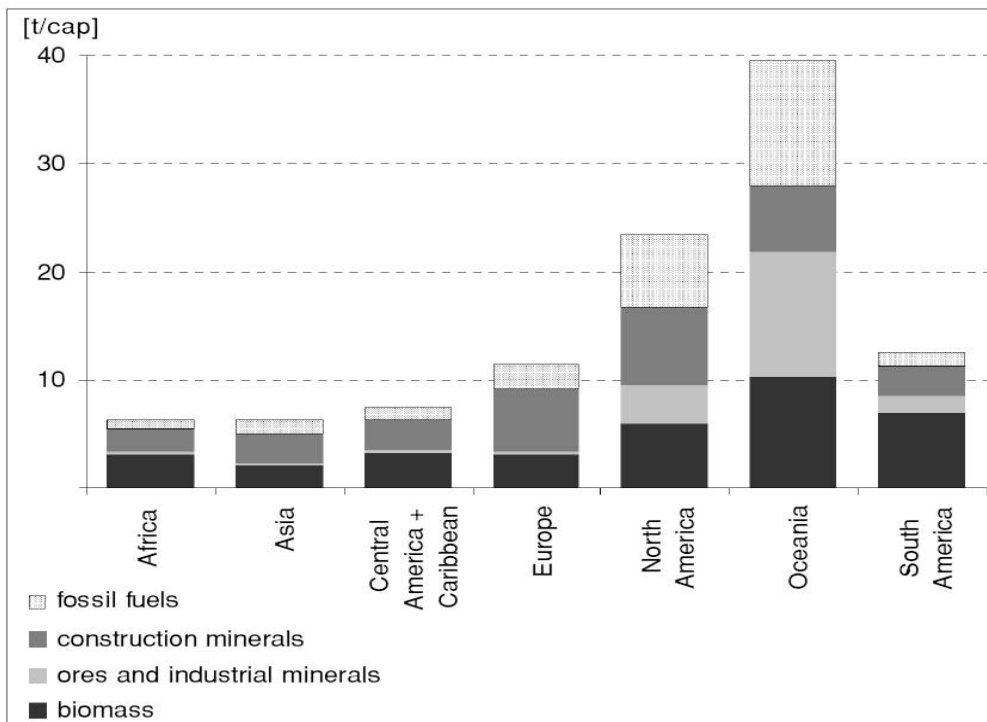


Figure 4, shows a global inventory of biomass flows indicates use of biomass, by region for the year 2000 (Krausmann, Erb et al. In Press).

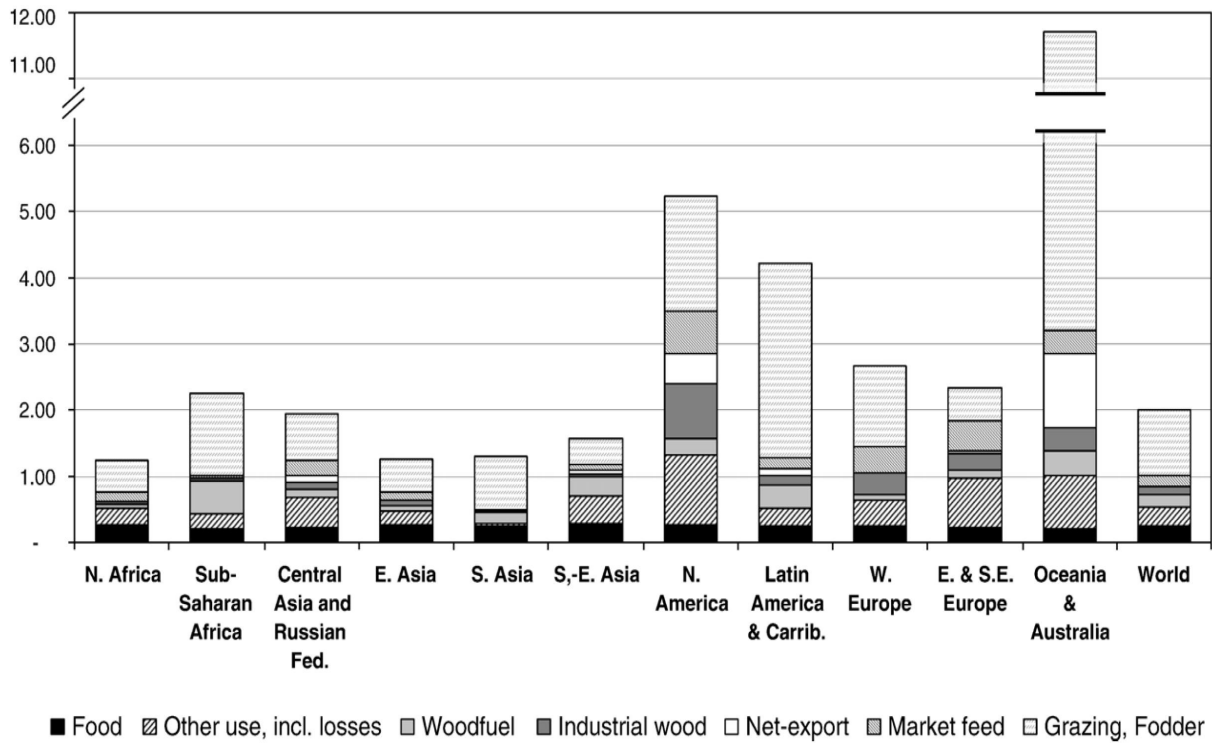
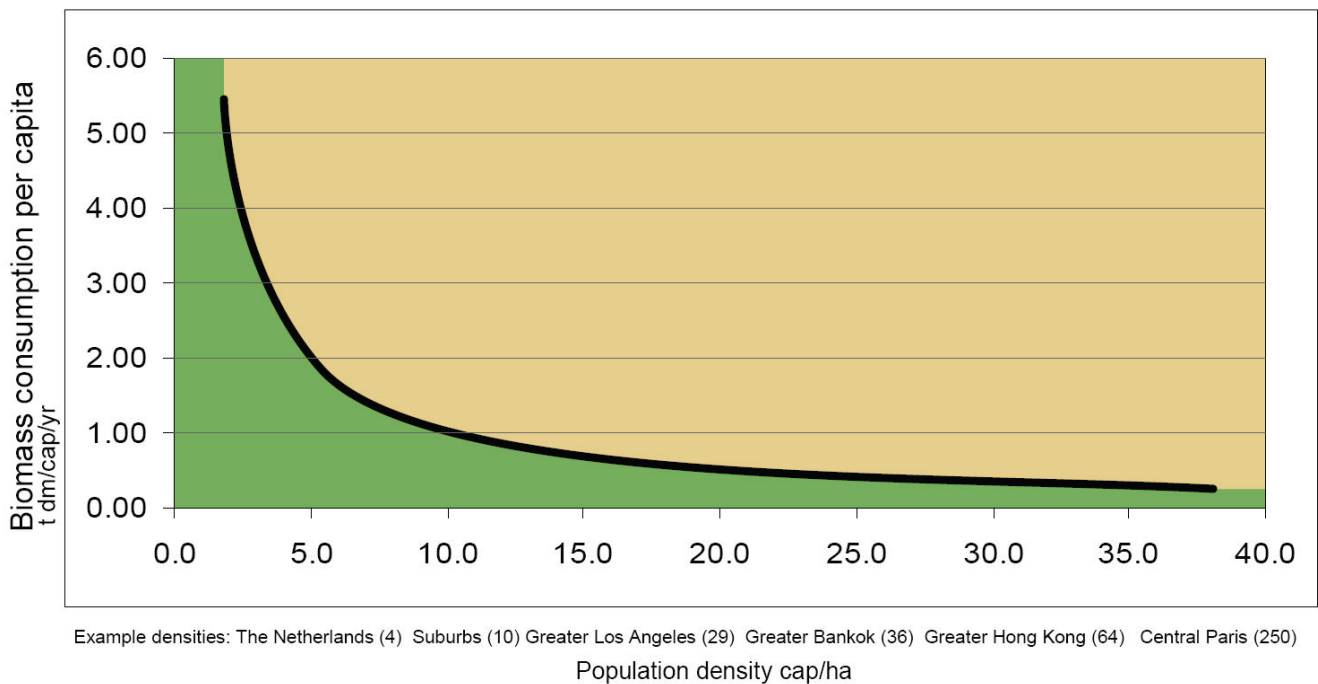


Figure 5, biomass use versus population density in a closed loop scenario



Tables of Yields

This section is meant to give a quantitative orientation to yields of biomass per hectare. Between 15 and 95% of the mass of crops is water, and this often distorts quantities of yields, however agricultural data (FAOSTAT 2008) is generally recorded as a wet weight, rather than a dry weight.

Table 1 Shows small scale garden yields in kg/ha (Jeavons 2006)

	Beginner Gardener	Expert Gardener
Artichokes - Jerusalem	5051	21212
Beans	1515	5455
Broccoli	1313	2677
Carrots	5051	54545
Corn - Sweet	859	3434
Cucumbers	7980	29343
Onions	5051	27273
Peas	1162	5354
Peppers	1818	9949
Potatoes - Sweet	4141	24848
Salad	6768	27273
Squash - Green	8081	24141
Tomatoes	5051	21111

Table 2 shows the wet yields used in the Ecological Footprint calculations (Wackernagel, Onisto et al. 1999).

	Wet Yield kg/ ha
Meat from pasture	74
Other meat	457
Milk	502
Cheese	50
Butter	50
Marine fish	29
Cereals	2744
Animal feed	2744
Veg and fruit	18 000
Roots and tubers	12 607
Pulses	852
Coffee and tea	566
Cocoa	454
Sugar	4893
Oil seed	1856

Table 3 shows yields of various agricultural goods in kilograms of wet biomass per hectare (FAOSTAT 2008).

	Canada	China	Egypt	Greece	Kenya	S.Africa	Thailand	UK	USA
Almonds, with shell		2333		2674					3047
Apples	19508	13714	21154	18713	10256	31007		25858	29798
Bananas		25234	41905	22084	15236	49366	13232		22846
Barley	2976	3988	1815	2500	6343	2629	2167	5947	3283
Carrots and turnips	41385	18022	27273	29014	11120	28236		66237	39690
Cashew nuts, with shell		417			5248		989		
Cauliflowers and broccoli	15487	21077	24074	18170	35600	13501	6910	11727	18573
Coconuts		10662			4289		7050		
Coffee, green		1500			284		681		1174
Cotton lint		1243	1007	1092	133	677	373		805
Eggplants (aubergines)		17502	23256	21370			5667		35012
Grapefruit (inc. pomelos)		8860	16316	23153	8140	38838	1848		24837
Grapes	7967	13193	21667	10960		13755	16071	1386	19042
Lentils	1249	2206	1750	1200	1520				1427
Lettuce and chicory	18391	22095	23333	19266	9685	15030	14500	23874	35482
Maize	8480	5365	7887	9000	1720	3412	4116		9360
Oats	2517	5202		2000	1179	1740		6017	2133
Onions (inc. shallots), green		28611		12268				10193	
Rice, paddy		6265	10598	9118	3602	2279	2906		7694

Sesame seed		1039	1194	620	370		627		
Sorghum		4130	5705	1414	801	2584	1897		3529
Soybeans	2882	1703	2944	2000	827	1762	1561		3025
Spinach	5890	16577	19480	11522	10791				18658
Sugar beet	58060	66726	48781	40000				54580	53091
Tomatoes	78685	23158	38974	48052	20625	68227	17190	418632	66176

Table 4 shows the net primary production and human appropriated net primary production averages for various regions, in kilograms of dry matter per hectare (Haberl, Erb et al. 2007).

	potential	actual	human	remaining	HANPP,%
Cropping	12220	7940	5920	2020	83.5
Grazing	9720	8660	820	7840	19.4
Forestry	14400	14400	960	13460	6.6
Infrastructure	11720	4420	1260	3160	73
Wilderness	4580	4580	0	4580	0
Global	10040	9080	1260	7820	22.1

Table 5 shows the energy value of pesticides (Stephens 1991)

Pesticide	Average MJ/kg
Insecticides	185
Fungicides	97
Herbicides	255

Table 6 shows the required energy for various agricultural inputs, per tonne of yield, based on the figure from (Cormack and Metcalfe 2000). The column headed 'kg dry matter' indicates the amount of dry biomass that contains the energy required for each input. Assuming no other sources of energy, these values may be directly subtracted from the agricultural yield to find the 'net yield'. For each one wet tonne harvested, an assumed 1900 MJ of energy is used, or 104kg dry matter or, roughly, 300kg of wet matter – one third of the harvest must be used as energy inputs. The energy consumed in the production of plastic for a greenhouse will take years to produce on the land the greenhouse occupies.

	MJ/ wet tonne	kg dry matter
Transport and Distribution	400	22
Drier	400	22
Machinery	500	27
Pesticides	300	16
Fertilizer	300	16
Human labor	0	0
Total	1900	104
	GJ/ha	kg dry matter
Greenhouse plastic	437	23880

Implications of this table are further discussed in section headed: Work inputs for cultivation.

Table 7 provides further insight into the energy value and water content of various agricultural products. These default values are were used by (Krausmann, Erb et al. In Press).

	MJ/kg dry matter		Fraction water
Cereals	18.3	Mixed Grain	14%
Nuts	25.0	Cereals nes	14%
Oil bearing crops	25.0	Potatoes	78%
Vegetables	18.5	Brazil Nuts	5%
Spices	19.0	Kapok Fruit	50%
Grass harvest	17.5	Cabbages	92%
Wood and wood products	19.5	Artichokes	85%
Live animals	22.0	Bananas	75%
Meat	22.0	Plantains	66%
Fats and Oils	40.0	Seed Cotton	10%
Hides and Leather, Wool, Silk etc	19.0	Linseed	10%

La décroissance soutenable face à la question du « comment ? » - Une remise en perspective par les processus de transition et leurs conditions de réalisation

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Résumé

Dans ses grandes lignes, la thématique de la « décroissance soutenable » a jusqu'à présent surtout consisté à présenter et justifier un nouvel horizon commun permettant aux populations de la planète de sortir de situations actuelles pesant sur la soutenabilité écologiques et les vies humaines. Mais, pour passer d'un état à un autre, aux caractéristiques différentes, il faut une transition. Pour que le projet soit crédible, il devrait donc aussi passer par une étape de réflexion sur la transition qui permettrait d'avancer vers une « décroissance soutenable », et notamment sur la forme de cette transition et ses modalités. De ce point de vue, alors qu'il s'agit de sortir de trajectoires jugées dommageables, les propositions sur la « décroissance » souffrent de n'être pas véritablement articulées à une théorie du changement. Celle-ci apparaît pourtant essentielle pour pouvoir penser les conditions sous lesquelles ce genre de vaste projet peut s'appliquer. En guise de base de départ, cette contribution suggère trois axes de réflexion qui s'avèrent déterminants parce qu'ils correspondent aussi à des champs de confrontation face au monde actuel, à savoir : le rapport aux valeurs dominantes, qui joue fortement sur les conditions de diffusion et d'acceptation des idées ; les possibilités de généralisation des pratiques et de capitalisation des expériences ; et les possibilités de renversement des contraintes structurelles grâce à la coordination et à la mise en réseau des initiatives existantes.

1. Introduction

Les réflexions sont nombreuses pour souligner que les logiques de développement actuelles ne sont pas « soutenables ». Logiquement, les préoccupations et insatisfactions soulevées aboutissent souvent à la recherche d'une alternative. De ce point de vue, l'idée de « décroissance » suscite un intérêt montant, même si elle reste dans des sphères plutôt périphériques par rapport à d'autres discussions, notamment celles développées à partir de la notion de « développement durable ». Les propositions disponibles donnent à voir un nouvel horizon, bien que la vision présentée apparaisse généralement plutôt vague.

Cette conception apparaît en effet plus facile à définir par ce qu'elle ne veut pas que par ce qu'elle veut. Dans son noyau, elle met en avant la nécessité de sortir de l'obsession de la croissance économique, transformée en objectif

ultime, presque autoréférentiel, au détriment d'autres considérations, notamment écologiques et sociales. Elle place les schémas d'accumulation permanente et infinie face aux limites de la planète, avec l'idée d'inciter à rechercher un modèle d'organisation sociale qui permettrait d'assurer, de manière équilibrable et démocratique, la subsistance et les activités des populations sans dégrader le substrat naturel. Un tel projet devrait alors passer par une « diminution régulière de la consommation matérielle et énergétique, dans les pays et pour les populations qui consomment plus que leur empreinte écologique admissible »¹. Autour de ce noyau, les visions proposées restent en fait diverses, plus ou moins formalisées selon leurs porteurs (mouvements associatifs, personnalités académiques...) et des clarifications sont donc encore à attendre.

Toutefois, au-delà des difficultés de définition, les propositions sur la « décroissance » semblent avoir d'autant plus de mal à s'installer dans les débats que les voies pour y arriver se révèlent encore plus floues. D'où le problème (et même presque l'impensé) que souhaite examiner cette contribution. Pour passer d'un état à un autre, aux caractéristiques différentes, il faut une transition. Pour peu que le point d'arrivée puisse être défini plus clairement, quelle transition faudrait-il pour une « décroissance soutenable » ? La question est d'autant plus importante que les obstacles sur ce chemin sont nombreux. Et d'autant plus nombreux qu'il s'agirait d'un changement profond, de large échelle et destiné à durer dans le temps.

La transition à envisager dans cette perspective renvoie ainsi à un processus englobant, censé intervenir dans tout un système de façon à le faire évoluer jusque dans ses fondements. Il s'agirait donc touchant notablement à la fois les rationalités, les pratiques, les institutions, les bases culturelles. Autrement dit, si l'objectif visé est celui d'une décroissance soutenable, cette transition s'apparente à la recherche de voies d'extraction (« *extrication paths* »), pour reprendre (en la détournant quelque peu) une expression utilisée dans l'étude des « transitions démocratiques » afin de désigner les voies de sortie des régimes autoritaires.

Au-delà de l'analogie, cette idée d'extraction est intéressante dans le sens où l'objectif de décroissance présuppose en effet qu'il faut sortir de trajectoires jugées dommageables. Adopter ce type de perspective incite ainsi à déplacer l'analyse vers l'identification des cheminements possibles et, en prolongement, à resituer ces derniers par rapport aux choix collectifs à effectuer et au poids plus ou moins persistant des structures antérieures. Cette extraction sous-entend le passage par une période de réorganisation, qui elle-même peut demander de prévoir différentes étapes, différentes séquences. Ce qu'il faut alors explorer, c'est l'installation d'un processus de transformation, dans lequel il s'agit de réaliser consciemment, pour le long terme, une adaptation quasi générale parvenant à combiner des ajustements multiples et entremêlés dans une pluralité de dimensions (économique, technologique, culturelle, institutionnelle). Or, de ce point de vue, les propositions sur

¹ Nicolas Ridoux, *La Décroissance pour tous*, Lyon, Parangon, 2006, p. 91.

la décroissance n'apparaissent pas véritablement articulées à une théorie du changement.

Une perspective transformatrice aussi imposante suppose effectivement une intentionnalité collective quant à la direction envisagée, mais pose aussi comme enjeu de trouver les manières d'organiser ou de « gérer » une telle transition. De fait, un projet, *a fortiori* pour une aussi vaste ambition, peut difficilement se réaliser si ne sont pas pensées les conditions sous lesquelles il peut s'appliquer. Il amène à soulever des problèmes interdépendants et, quel que soit le point d'entrée, conduit à passer par une cascade de sujets qui ne peuvent guère être traités sans vue d'ensemble. Ce qui veut dire aussi trouver une pluralité de leviers dont les actions soient cohérentes entre elles. Autant sur le plan analytique que pragmatique, il devient alors préférable d'avoir une appréhension systémique de la situation et de son évolution possible. Mais cela ramène par la même occasion à la question de la complexité (du fait d'une multitude de variables potentiellement hétérogènes à prendre en compte) et à la possibilité de la prendre en charge dans une logique de changement.

Au-delà de la question du « que faire ? », cette contribution vise surtout celle du « comment faire ? ». Les difficultés évoquées auparavant incitent en effet à prendre plus au sérieux la dimension transitionnelle et à réfléchir davantage sur l'adaptation de l'idée de transition. Il s'agira notamment d'en examiner les fondements et les implications, s'agissant notamment de la conception de la transition comme processus à gérer, de la capacité à corriger des trajectoires jugées problématiques, et des conditions de l'action collective par rapport à un projet visant la totalité sociale.

Ainsi reconsidérée, la perspective de la « décroissance soutenable » devrait au bout compte amener à réfléchir :

- aux conditions de diffusion et d'acceptation des idées (comme celles de sobriété dans la consommation, de critique des satisfactions matérialistes, de révision de la manière de penser le travail...);
- aux possibilités de généralisation des pratiques et de capitalisation des expériences (comme celles visant à réviser le rapport aux marchandises, les modes d'usage des produits, ou utilisant des formes innovantes d'économie solidaire comme les « ressourceries »...);
- au travail de coordination à engager entre les initiatives existantes (comme celles cherchant à restaurer des circuits courts, à créer des coopératives d'achat, à rapprocher consommateurs et producteurs...).

Ce sont ces trois axes que cette contribution propose d'explorer plus profondément. En effet, ces trois axes peuvent être d'autant moins négligés qu'ils correspondent à trois champs de confrontation.

2. L'enjeu de la confrontation avec les valeurs et intérêts dominants

Le premier axe signalé est une manière de remettre le projet de « décroissance soutenable » face à la nécessité de tenir compte des schémas normatifs et des intérêts installés. Comment faire évoluer les intérêts dominants, notamment les intérêts économiques ? Est-il suffisant de s'attaquer à la publicité, comme essayent de le faire les Casseurs de pub ?

S'il faut sensibiliser les populations, conférences et marches pour la décroissance peuvent-elles suffire ? Bref, comment promouvoir et diffuser des idées dans un contexte qui est peu favorable à leur réception ?

La question des valeurs et des matrices culturelles est plus ou moins explicitement posée dans les réflexions promouvant la « décroissance ». Elles contiennent en effet un appel à une transformation des visions du monde, à un réagencement des valeurs. Face au modèle occidental de développement et à ses effets, Serge Latouche veut par exemple « décoloniser l'imaginaire »². Dans ce type de perspective, la réorientation vers un projet de « décroissance » repose sur une prise de conscience à large échelle, mais va aussi au-delà en supposant une réorganisation des préférences individuelles et collectives. Manque cependant l'explicitation des processus transitionnels qui doivent permettre ce double déplacement. Effectivement, les difficultés surviennent dès qu'il s'agit de sortir des propositions superficielles et générales, autrement dit d'aborder plus précisément les dynamiques qui participent à l'évolution des aspirations, valeurs, croyances et idées dominantes. Si un accord peut se faire sur ce qui peut être mis derrière le terme de valeurs, il faut ensuite arriver à discerner comment elles prennent forme, comment elles s'articulent, comment elles se maintiennent ou s'adaptent, par quels agencements, combinaisons, recombinaisons elles peuvent se transformer³. Or, il suffit de faire une incursion rapide dans le champ des sciences sociales pour constater qu'il y a encore de lourds débats théoriques sur les moteurs du changement dans les systèmes de valeurs. Les propositions marquantes de Ronald Inglehart sur la montée de valeurs post-matérialistes ont été fortement discutées et continuent à nourrir les investigations sociologiques. Pour lui, c'est par rapport à ce vaste phénomène qu'il faut resituer le développement des mouvements écologistes et des débats autour des enjeux environnementaux⁴. Mais, outre les interrogations sur les fondements de cette tendance post-matérialiste, un fort scepticisme subsiste sur les effets généraux à en attendre, notamment pour la résolution des problèmes écologiques.

Si le type de système socio-économique qui reste légitimé est considéré comme néfaste, comment alors intervenir dans les processus sociaux qui participent à sa légitimation ? La tâche est difficile car ce n'est pas seulement sur une série d'éléments qu'il faut agir, mais sur des éléments qui font système. La sphère institutionnelle et *a fortiori* le monde des affaires continuent à baigner dans un climat idéologique où la croissance reste un objectif central. Dans un tel climat, l'idée de canaliser la consommation ne peut aboutir qu'à la prédominance de situations de dissonance cognitive, mettant en porte-à-faux l'argument d'une nécessaire responsabilité individuelle et collective.

² Cf. Serge Latouche, *Décoloniser l'imaginaire. La Pensée créative contre l'économie de l'absurde*, Lyon, Parangon, 2003.

³ Cf. Shalom H. Schwartz, « Les valeurs de base de la personne : théorie, mesures et applications », *Revue française de sociologie*, vol. 47, 2006/4, pp. 929-968.

⁴ Voir par exemple Ronald Inglehart, « Public Support for Environmental Protection: Objective Problems and Subjective Values in 43 Societies », *PS: Political Science & Politics*, vol. 28, n° 1, March 1995, pp. 57-72.

La mise en discussion du modèle économique dominant dans les sociétés industrialisées fait revenir à la question de l'influence du système publicitaire et à la manipulation des désirs par les différentes formes de marketing⁵. Robert J. Brulle et Lindsay E. Young ont pu vérifier empiriquement l'influence de la publicité sur les niveaux de consommation personnelle aux Etats-Unis⁶. Les groupes et mouvements qui ont essayé de contrer ces processus d'influence ont pu mesurer la difficulté de la tâche. Les actions de résistance face à la pression publicitaire, portées par des groupes comme Adbusters ou en France les Casseurs de pub, peinent encore à trouver les relais qui leur permettraient de jouer les grains de sable dans la vaste machinerie qui vient désormais ordonner les univers culturels. La tâche est d'autant plus difficile que les résistances à la consommation peuvent être récupérées et ouvrir la voie à de nouveaux segments de marché⁷.

L'autre point de friction classique concerne les besoins⁸. Dans les schémas d'appréhension les plus répandus (*a fortiori* lorsque s'y mêlent des intérêts économiques), l'idée d'exercer une contrainte sur ces besoins est le plus souvent envisagée avec une forte réticence. Même des justifications fortement motivées, comme celles mettant en avant l'avenir de la planète, se voient opposer des échappatoires (le « besoin » de mobilité étant par exemple censé pouvoir être satisfait par des véhicules moins polluants). Ces besoins sont bien entendu traversés par toute une série d'influences culturelles, sociales, et économiques. Jean Baudrillard avait utilement suggéré de considérer « le système des besoins et de la consommation comme système de forces productives »⁹. S'il s'agit de faire évoluer le modèle économique dominant, la question est alors aussi de savoir si une réflexivité individuelle et collective sur les besoins peut se développer. L'enjeu est là de faire en sorte que les consommateurs aient conscience non seulement des modèles de consommation auxquels ils participent, mais aussi des risques d'enfermement dans certains de ces modèles, potentiellement problématiques parce que non soutenables. Le problème est que ces situations d'enfermement sont souvent subies sans que les consommateurs aient beaucoup de moyens pour réagir ou pour trouver les choix qui leur paraîtraient plus adéquats.

⁵ Cf. Kalman Appelbaum, *The Marketing Era. From Professional Practice to Global Provisioning*. London, Routledge, 2004.

⁶ Robert J. Brulle, Lindsay E. Young, « Advertising, Individual Consumption Levels, and the Natural Environment, 1900–2000 », *Sociological Inquiry*, vol. 77, n° 4, November 2007, pp. 522-542.

⁷ Sur ces points, voir par exemple Joseph D. Rumbold, « Consumer resistance in a world of advertising clutter: The case of Adbusters », *Psychology and Marketing*, vol. 19, n° 2, February 2002.

⁸ Avec, là aussi, des débats théoriques qui sont loin d'être taris. Pour une mise en perspective, voir par exemple Tim Jackson, Wander Jager, and Sigrid Stagl, « Beyond Insatiability — Needs Theory and Sustainable Consumption », in Lucia A. Reisch and Inge Røpke (eds.), *The Ecological Economics of Consumption*, Cheltenham, Edward Elgar Publishing, 2004.

⁹ Cf. « La genèse idéologique des besoins », in *Pour une économie politique du signe*, Paris, Gallimard / tel, réédition 1993, notamment pp. 83-94.

Ce qui rend alors difficile la maîtrise des conséquences des décisions d'achat¹⁰.

Valeurs, besoins, désirs, intérêts, c'est en tout cas tout cela qu'il faut parvenir à démêler avant de prétendre engager une transition vers un autre modèle d'organisation socio-économique. Sur ce plan, les réflexions sur la décroissance avancent, mais sans avoir de véritable théorisation sur le rapport que peuvent entretenir ces facteurs et variables avec le changement collectif souhaité.

3. Les possibilités de pénétration des pratiques

Vouloir amener la collectivité vers un modèle socio-économique plus soutenable amène une autre question importante : celle de la confrontation avec les pratiques (modes de consommation, modes de déplacement...), dont les ancrages sont aussi révélateurs de multiples dépendances subies par les populations. Dans quel répertoire de propositions puiser pour engager l'adaptation des pratiques ? Faut-il favoriser les pratiques communautaires, par exemple pour la production énergétique, l'habitat ou le transport ? Faut-il développer une culture du « Do it yourself », restaurer des marchés pour des produits de seconde main ?

Avec la montée des préoccupations environnementales, chacun est censé faire plus attention que par le passé à ses pratiques. L'objectif de décroissance va plus loin. C'est en effet la diminution des consommations matérielles qui est préconisée, avec comme contrepartie souhaitée la possibilité d'élargir et d'enrichir les liens sociaux, mais aussi d'investir davantage de temps dans la vie collective et la participation politique.

De fait, tant que la consommation globale continue à augmenter, la tentative de passage à des formes de consommation moins dommageables pour l'environnement est une orientation dont les effets peuvent s'avérer limités et insuffisants. Le sociologue américain Andrew Szasz a aussi signalé une autre tendance potentiellement problématique. Devant les craintes de présence de produits toxiques dans leur environnement immédiat, beaucoup d'américains ont eu tendance, en guise de solution, à privilégier ces dernières décennies les achats censés les préserver de ces menaces : eau en bouteille, filtres pour l'eau du robinet, produits d'hygiène personnelle, etc. C'est ce qu'Andrew Szasz a appelé la « quarantaine inversée » : plutôt que de pousser à des formes de régulation gouvernementale, une partie croissante de la population s'est repliée de manière plutôt fataliste et individualiste sur une offre commerciale les rassurant face à leurs soupçons¹¹. Bien entendu, ce sont de nouveaux marchés qui ont ainsi été ouverts, mais les effets sont aussi politiques, dans la mesure où, comme le montre Andrew Szasz, les consommateurs achètent ces produits en pensant acquérir une forme de protection face aux risques environnementaux, mais se sentent par la même occasion moins incités à chercher à les résoudre, notamment par

¹⁰ Cf. Christer Sanne, « Willing consumers—Or locked in? Policies for a sustainable consumption », *Ecological Economics*, 42 (1–2), 2002.

¹¹ Cf. Andrew Szasz, *Shopping Our Way to Safety. How We Changed from Protecting the Environment to Protecting Ourselves*, Minneapolis, University of Minnesota Press, 2007.

l'action collective et politique.

Les mobilisations politiques axées sur le mode de vie (*lifestyle politics* ou *life politics*) risquent également d'être insuffisantes. Le mouvement de « simplicité volontaire » a ainsi suscité des appréciations ambivalentes¹². Dans ce genre de démarches, les efforts pour réduire les consommations matérielles se font plutôt sur une base individuelle. Leur portée, comme le signale Michael Maniates, devient toute relative lorsque ces efforts sont comparés à la puissante combinaison de forces culturelles et économiques qui poussent plutôt dans le sens de l'accroissement de la consommation. Ce qui veut dire que, pour avoir un effet large, ces efforts doivent d'une manière ou d'une autre rentrer dans une appréhension collective propre à nourrir une mobilisation elle-même collective¹³.

Avoir une perspective suffisamment large sur les pratiques signifie donc qu'il est nécessaire de prendre en compte des contextes qui sont à la fois sociaux, culturels, institutionnels, et qui peuvent déterminer et contraindre les choix individuels et collectifs. Pour prendre l'exemple de l'urbanisme, il est difficile de faire autrement que de tenir compte du tissu existant et des contraintes infrastructurelles qui en résultent. Il faut donc à la fois gérer le déjà-là et éviter les décisions risquant de créer de nouveaux problèmes. Dans le domaine des biens de consommation courante, faire évoluer les habitudes suppose aussi de pouvoir sortir des situations de dépendance par rapport à certains circuits de distribution, notamment ceux devenus dominants des supermarchés et hypermarchés. Vues sous cet angle, les évolutions ne dépendent pas seulement de comportements individuels, mais peut-être davantage des systèmes et infrastructures d'approvisionnement¹⁴. Le marché de l'occasion par exemple peut être autre chose qu'un circuit périphérique réservé aux consommateurs « nécessaires » et y recourir peut aussi devenir un choix¹⁵.

L'enjeu est aussi informationnel, puisqu'il s'agit idéalement de pouvoir évaluer les effets de l'ensemble des pratiques. La question des informations dont peuvent disposer les populations pour ce faire devient donc majeure. Ce qui suppose de s'intéresser à la nature de ces informations, à la manière dont elles peuvent être produites et utilisées, à la circulation dont elles peuvent bénéficier. En matière de production énergétique par exemple, l'acceptation et la diffusion de technologies innovantes à l'échelle domestique

suppose effectivement une implication individuelle ou familiale et les possibilités d'appréciation des choix à faire et de leurs conséquences sont donc importantes¹⁶.

Bref, prétendre faire évoluer les pratiques suppose là aussi de retrouver les déterminants de ces pratiques, de les disséquer pour pouvoir les réinscrire dans une appréhension plus ou moins théorisée du changement à engager. Difficile d'envisager un autre modèle d'organisation socio-économique sans également passer par cette étape pour démêler les facteurs entretenant les logiques de consommation, de production et d'accumulation¹⁷.

4. Renverser les contraintes structurelles : de l'utilité des démarches de coordination et de la mise en réseaux d'expériences

L'ambition du projet de « décroissance soutenable » le place enfin plus fondamentalement au niveau des structures, dans leurs dimensions à la fois institutionnelles, économiques, technologiques... La difficulté est de dégager des capacités pour mettre en synergie des actions intervenant sur des plans ou dans des registres différents. Comment créer structurellement les conditions d'une participation collective ? Les dynamiques de réseaux, et plus particulièrement de mise en réseau d'expérimentations diverses (comme les systèmes d'échanges locaux [SEL], les Associations pour le maintien d'une agriculture paysanne [AMAP]...), paraissent offrir une piste et leur développement conjoint mérite donc d'être regardé plus attentivement.

Un changement à un niveau systémique, comme celui promu sous le label de la « décroissance soutenable », ne peut effectivement se faire sans une forme de coordination entre un large ensemble d'acteurs et une mise en commun, voire une synergie, de ressources et de compétences. De ce point de vue, un gros écueil à franchir est celui de la fragmentation des démarches tentant d'offrir des voies alternatives. C'est ce qu'avait bien senti le réseau européen pour l'après-développement (READ) : « Le danger de la plupart des initiatives alternatives est, en effet, de se cantonner dans le *créneau* qu'elles ont trouvé au départ au lieu de travailler à la construction et au renforcement d'un ensemble plus vaste »¹⁸.

S'il s'agit de rechercher des effets structurels, il peut donc être utile de s'intéresser aux démarches de constitution ou d'activation de réseaux¹⁹. La forme réseau peut en effet permettre de rassembler des acteurs hétérogènes dans un

¹² Pour une présentation de ce mouvement, voir par exemple Michael Maniates, « Résister à la consommation en optant pour la simplicité volontaire », *La Revue Durable*, n° 13, novembre-décembre 2004 - janvier 2005.

¹³ Cf. Michael Maniates, « In Search of Consumptive Resistance: The Voluntary Simplicity Movement », in *Confronting Consumption*, Edited by Thomas Princen, Michael Maniates and Ken Conca, Cambridge, The MIT Press, 2002, pp. 199-235.

¹⁴ Voir Dale Southerton, Heather Chappells, Bas Van Vliet (Eds), *Sustainable Consumption. The Implications of Changing Infrastructures of Provision*, Edward Elgar Publishing, 2005, notamment Dale Southerton, Alan Warde and Martin Hand, « 3. The Limited Autonomy of the Consumer: Implications for Sustainable Consumption ».

¹⁵ Cf. Colin Williams, Christopher Paddock, « The meanings of informal and second-hand retail channels: some evidence from Leicester », *The International Review of Retail, Distribution and Consumer Research*, vol. 13, n° 3, July 2003, pp. 317-336.

¹⁶ S'agissant des technologies de « micro-génération », voir par exemple Raphael Sauter and Jim Watson, « Strategies for the deployment of micro-generation: Implications for social acceptance », *Energy Policy*, vol. 35, n° 5, May 2007, pp. 2770-2779.

¹⁷ Sachant que le sujet ouvrira forcément des discussions sur les variables à privilégier. Pour un effort de repérage de ces variables, voir par exemple Inge Røpke, « The dynamics of willingness to consume », *Ecological Economics*, vol. 28, n° 3, 1999.

¹⁸ « Manifeste du réseau européen pour l'après-développement (READ) », *Revue du MAUSS*, n° 20, 2002/2.

¹⁹ Un premier effort de théorisation sur l'utilité politique de la notion de réseau a été tenté dans : Yannick Rumpala, « La connaissance et la praxis des réseaux comme projet politique », *Raison publique*, n° 7, octobre 2007.

même agencement pour poursuivre collectivement un but commun, en agissant de manière coordonnée grâce à des relations d'échange et de coopération. L'échelle générale du changement envisagé supposerait d'aller au-delà d'une série d'agencements épars et de chercher davantage des voies pouvant faciliter des phénomènes de coalescence. Autrement dit, cela revient à faire l'hypothèse que le développement de la longueur, de la convergence, de l'interconnexion de ces réseaux peut aboutir à un résultat global porteur d'effets profonds.

La construction de réseaux alternatifs (circuits courts, collectifs d'échange et d'entraide...) apparaît ainsi comme une base qui demande à être développée. L'accumulation des soutiens aux expériences engagées peut avoir un effet d'entraînement. Les différentes formes de résistance à la pression publicitaire et marchande ont par exemple pu donner de plus en plus à des actions hétérogènes des allures de véritable mouvement²⁰. Dans une logique de réseau, la recherche de soutiens pour les expériences existantes est par conséquent un effort minimal à faire avant d'escompter des effets d'agrégation.

Si l'ambition est celle d'un réajustement systémique et profond, prendre appui sur les réseaux disponibles, en susciter de nouveaux, les faire converger, peut somme toute offrir un effet cumulatif aidant à agir sur les structures. La créativité existe et se manifeste par un foisonnement d'initiatives qui cherchent souvent à gagner en visibilité. Au croisement du social et de l'économique, les systèmes d'échanges locaux (SEL) expérimentent des modes d'organisation éloignés des bases marchandes et monétaires. Dans ces expériences, l'échange de produits, de services, mais aussi de savoirs et de savoir-faire, est conçu comme pouvant reposer davantage sur des relations de solidarité, de réciprocité et de communauté grâce à d'autres unités de compte que l'argent²¹. Dans un registre davantage orienté vers les aspects écologiques, les « écovillages » essaient de développer et d'agréger localement des pratiques permettant de repenser les modes de vie dans leur rapport au collectif mais aussi à l'environnement. Mais la logique de ces initiatives, plutôt locales, peut-elle être reproduite sur des échelles plus larges ? C'est au moins ce que semblent penser les membres et promoteurs du Global Ecovillage Network (GEN) qui a été mis en place pour soutenir ce genre de démarches.

Dans une perspective systémique, l'enjeu est aussi de trouver le lien entre des initiatives et des démarches qui peuvent paraître à première vue éloignées. Prenons le cas par exemple de la conservation d'une agriculture de proximité, à laquelle les AMAP peuvent contribuer. Elle devient une question importante si elle est reconnectée avec celle de la restauration ou de l'encouragement de circuits de distribution courts. Renforcer et rapprocher des initiatives innovantes ou dissidentes par rapport à l'ordre dominant,

les insérer dans un projet commun de changement structurel, peut leur donner un sens renouvelé, plus robuste, en les situant dans une dynamique de transition plus large.

Ces initiatives, souvent présentées aussi comme des modalités d'investissement démocratique et de renforcement du lien politique, ont encore largement un caractère expérimental. Il est pour cela plus juste de parler d'espaces d'expérience²² à propos des dispositifs qui sont ébauchés. Dans leur globalité, les efforts déployés peuvent être vus comme une étape d'apprentissage dans un processus de transition plus large et, en tout cas, encore à construire. Pour ceux qui chercheront à les généraliser, la difficulté va être là de passer de cet état fragmentaire à des démarches plus systématiques. Et va donc se poser aussi la question des possibilités d'articuler ces espaces entre eux, de les faire se rejoindre, notamment s'il s'agit de les inscrire dans un projet d'ensemble comme celui d'une « décroissance soutenable ». La difficulté peut être d'autant plus grande que les initiatives peuvent être d'ampleurs différentes, par la taille des publics concernés selon le niveau où elles prétendent opérer. Face à la somme des problèmes à affronter, on peut envisager que ces espaces d'expérience deviennent productifs collectivement (autrement dit dans leur ensemble) si peut s'effectuer une forme de mise en réseau. Et pour y parvenir, il faut donc effectivement que puissent se construire des rapprochements, des liens entre eux.

C'est là qu'un surcroît de réflexivité collective peut être très utile, à la fois à l'intérieur et à l'extérieur des réseaux visés. Les acteurs intéressés peuvent sentir qu'ils font partie de réseaux et essayer d'agir sur la configuration et le fonctionnement de ceux-ci, voire d'intervenir sur des réseaux connexes. L'intention de ce travail sur les réseaux peut être là de faciliter les échanges d'expérience ou de faire circuler les pratiques qui paraissent porteuses de changement.

5. Conclusion : Ramer à contre-courant peut-il inverser le courant ?

Le rapprochement de cette série d'enjeux, d'autant plus importants qu'ils sont interdépendants, montre l'effort réflexif que tend à nécessiter à une échelle collective une transition orientée vers un objectif de « décroissance soutenable ». Ce genre d'objectif à prétention globale suppose le rassemblement d'une multitude d'interventions intentionnelles dans un tissu dense de processus socio-économiques pour en réduire les effets dommageables. Mais entre dénoncer une situation et trouver des voies pour en sortir, il y a une véritable étape de réflexion collective à installer. Cette étape est d'autant plus cruciale que le changement visé se situe à un niveau systémique et pas sur quelques domaines séparés, et qu'il est destiné à durer dans un temps long pour éviter de voir revenir des menaces difficilement supportables. Un tel changement semble devoir passer par un encouragement généralisé à faire croître et converger les multiples initiatives, plus ou moins

²⁰ Cf. Sophie Dubuisson-Quellier, Julien Barrier, « Protester contre le marché : du geste individuel à l'action collective. Le cas du mouvement anti-publicitaire », *Revue française de science politique*, vol. 57, n° 2, avril 2007, pp. 209-237.

²¹ Pour des éléments de présentation, voir par exemple Denis Bayon, « Les SEL, vers un nouveau monde citoyen et solidaire ? », *Revue du MAUSS semestrielle*, n° 11, 1998, pp. 309-339 ; Smaïn Laacher, *Les SEL. Une utopie anticapitaliste en pratique*, Paris, La Dispute, 2003.

²² L'expression est empruntée à Pierre Rosanvallon. Cf. *La contre-démocratie. La politique à l'âge de la défiance*, Paris, Seuil, 2006, p. 31.

éparpillées, plus ou moins embryonnaires, cherchant à inverser une ou des tendances jugées non soutenables (effort qui peut être encore plus compliqué et difficile si ces dernières sont globales). À ce niveau d'ambition, il faut une appréhension théorisée du changement à engager, et pas seulement la présentation d'un vague horizon à atteindre. Pour que le projet de « décroissance soutenable » soit crédible, il serait au moins utile d'avancer dans la clarification des processus ciblés et des leviers d'action envisageables.

En dehors de grands principes, la littérature sur la « décroissance » donne cependant peu de bases d'analyse qui permettraient d'imaginer comment un tel projet, potentiellement dérangeant, pourrait gagner en reconnaissance et être largement adopté dans la population, alors qu'il se trouve face à de puissantes forces d'inertie et d'opposition, liées à un régime économique d'accumulation, à des orientations technicistes, à des tendances à l'individualisme consumériste, etc. Le recul historique peut de ce point de vue être utile, voire nécessaire. Il peut aider à comprendre comment des transitions se sont déroulées par le passé dans des systèmes techniques, économiques ou culturels. Ce genre de remise en perspective peut éclairer la permanence de certaines options et permettre d'expliquer l'enfermement dans des orientations problématiques²³. Des épisodes passés peuvent indiquer des pistes ou au moins nourrir des réflexions. Le sociologue américain Mike Davis a par exemple rappelé que les États-Unis avaient bien été obligés d'adapter leur économie pour assumer l'effort collectif qui leur a permis la victoire lors de la Seconde guerre mondiale. La préservation de certaines ressources devenait alors un impératif et amenait à réviser certaines formes de consommation²⁴. Le cas est bien entendu particulier puisqu'il s'agissait d'une économie de guerre, et nul n'a envie de voir la situation se reproduire, mais il est éclairant dans les possibilités d'adaptation qu'il révèle.

En tout cas, il n'est pas possible de prétendre vouloir engager un processus de changement sans chercher à comprendre ce qui peut conditionner ou affecter celui-ci. Une transition ne se déroule pas par le simple fait qu'elle paraisse désirable à certains, *a fortiori* lorsque leur position n'est pas majoritairement partagée. S'il y a prétention à intervenir consciemment dans un tel processus, la réflexion doit dépasser la tendance à ressasser les mêmes séries de problèmes de « soutenabilité » pour enfin aller chercher les facteurs qui vont déterminer les possibilités de réajustement dans la phase de transition souhaitée. Sur quelle temporalité cette transition peut-elle s'étaler ?²⁵ Quelles sont les

contraintes économiques, technologiques, culturelles, politiques, géographiques, à prendre en compte ? Un projet social et politique ne vaut jamais uniquement par l'horizon idéal qu'il décrit ; ses conditions de réalisation comptent tout autant, et peut-être plus.

²³ Des recherches académiques ont commencé à se développer dans ce type de perspective et dans des logiques de recherche de prolongements opérationnels, lesquelles peuvent d'ailleurs avoir tendance à les maintenir dans l'orbite de préoccupations institutionnelles. Voir par exemple le programme « Transition Studies and Sustainability » de l'Université de Technologie d'Eindhoven : <http://www.transitionstudies.org/index.html> .

²⁴ Cf. Mike Davis, « Écologie en temps de guerre. Quand les États-Unis luttèrent contre le gaspillage des ressources », *Mouvements*, n° 54, 2008/2, pp. 93-98.

²⁵ La pertinence de l'idée d'un changement rapide est par exemple contestée par Adriaan Perrels, « Wavering between radical and realistic sustainable consumption policies: in search

for the best feasible trajectories », *Journal of Cleaner Production*, 2007, pp. 1-15.

Why denial and inaction?

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It is difficult to make predictions, especially if they relate to the future, said Pierre Dac or Woody Allen. Especially as it emanates from certain data on the ecological disaster and some scenarios on the future such a feeling of dread that the human being, on the verge of collapse, implements strategies likely to blindness reassure him and spare him any radical change in behaviour. It could indeed surprising that before the signs increasingly evident from environmental disaster, so little is done to avoid it at the individual as well as collective level. The banal answer of a "lack of information" for citizens and policy makers is not sufficient, even if it is always useful to continue again and again to inform and be informed. Indeed, many of our fellow citizens and policy makers already know all or part of the ecological problems, and these are not the books, articles, broadcasts, Internet sites that are missing, not to mention the exhortations of Nicolas Hulot and Al Gore that we all heard. Rather, it is an ironic quirk of the human mind that the philosopher Jean-Pierre Dupuy sums up: "We do not believe what we know¹." This oddity will be discussed at greater length below. Also inadequate response in the form of "defending the interests of the rich" and other capitalists. Because, to speak only of climate change, the Stern report shows that inaction will soon lose much more money than some immediate investments, and it does so in terms even from the standpoint of capitalist. But also because the majority of capitalists have children and take care of their future until misfortunes swoop down on them when the ecological disaster will intensify. In short, they know, we know, and we do not believe, therefore we do nothing, or almost. Why such consent to the disaster ?

The philosopher Jean-Louis Vullierme² gives the most convincing cognitive explanation of this paradox of denial of reality. The social psychology which structures societies is in part an emerging phenomenon that occurs when individuals come together, for a second part it is a generic process of their constitution, of human nature itself. The human being is at once shaped by the world around him and modeller of the world by the actions he undertakes. Thus a child enriches his abilities to model the world experiencing differences between himself and the world as he models it. I act on the world by issuing tracks, signs of my model of the world (by my body postures, my words, my actions...) and adjust back the model based on the responses that I see. Actually, it's not a model of the world that I own, but a pattern of modeling, a matrix of alternative models, the

¹ Jean-Pierre Dupuy, *Pour un catastrophisme éclairé*, Seuil, Paris, 2002.

² Jean-louis Vullierme, *Le concept de système politique*, Presses universitaires de France, Paris, 1989.

ability to generate relatively different models. My daily life, bathing in the stream of pure experience, takes place in an incessant alternate models of the world which reorganize whenever my whole being in the world. For some time I have my profession repairman clocks, and then I met some friends for lunch in commenting on the proposed extension of the tramway on Parisian boulevards of marshals, I return to concentrate on my exhaust springs while dreaming sometimes to meet tonight with my son, then I go out of my shop for deliciously hug my beautiful girlfriend, I see my son soon to dinner, and I finally participates in the meeting of my local group of the Greens in preparation for the upcoming elections . In all these investments, and there are a thousand possible others, it is the same person who painted his living by tapping into its range of models of the world one which corresponds to his experience of the moment. These models are evolving, disparate, even contradictory to each other. Such a fragmented being who accepts this fragmentation is to be as regular as possible. Human beings are multidimensional, variegated, ambiguous. This view opposes the unidimensional vision of homo oeconomicus, reduced to a unitary rational self constantly on the lookout for its consistency and maximizing its utility (liberalism). She also opposed to the design of a mass individual whose conscience would be entirely determined by the position he occupies in the classes relations (Marxism).

If there is a human nature, it is done through interaction with others. If there is a society, it emerged from interactions between individuals. This assumption is called the specular interaction. I realized by exchanging with other models of the world formed by these exchanges and which contain a model for such exchanges. The society is a system of mutual perceptions between individuals : I represent how others represent things and myself. In other words, models of the world that an individual has, in particular his model of himself, come from the models of the world owned by others, such as a model of him. What determines the behavior of an individual is the system of models that have this individual of the world in which he finds himself. This system, this generic capacity to model the world is a changing pattern likely to create multiple models for all of the situations encountered. Two individual patterns are not identical, of course, but they tend to adapt to each other as social relationships multiply and opportunities to respond to the behaviour of others, which allows us to predict and anticipate the actions and reactions of others, coordination capacity which founds any society ever so slightly durable. The mimesis of the models is what ensures the unification of societies. The specular distinction is what provides the necessary diversity. That is the beginning of social ecology. The hypothesis of the specular interaction allows us to bury the old epistemological debate on the antecedence of the individual and society. Both forme each other.

Let us examine again the denial of the ecological disaster in the light of the specular interaction, at the level of citizens and at the level of policy makers. An average citizen whose ecological model of the world is informed enough so that he can sometimes feel the need to act by changing his life and that of his family does not think about his own

behavior, but think about the image of itself in the eyes of others. If he was the sole judge, his will would undoubtedly transform his habits to reduce its ecological footprint. It is likely that the same is true of the majority of our citizens, more or less well aware of the ecological disaster. If enough to add individual wills to change attitudes, the ecological paradise long reign throughout the world, which is not the case. Why ? Because, in accordance with our hypothesis, the will is not the first reality, but a reality derived from the specular interaction. Everyone warned of the disaster did not ask if he wants to change his life, but only if he would do if a number of others would too. Everyone is in the same situation as others, so the disaster will be averted not by the willingness of all, but by their cross-perceptions, i.e. based on the expectations that everyone will perform on the actual capacity of those which surround him to change their lives. Many historical examples show that a situation rejected by (almost) everybody remains despite the aspiration of the majority for another life. However, such a situation can change quickly so too are sometimes unpredictable the social dynamics due to the specular interaction.

Here we find a social system whose evolution, like that of some natural systems, can suddenly turn to other attractors if some thresholds are exceeded. Illustration inspired by the work of sociologist Mark Granovetter³ and the economist André Orléan⁴ : Consider a group of one hundred people participating in a panel discussion on the ecological disaster and faced with a binary choice : change his life on the spot by becoming « degrowing » or not to do so. Let's assume simple specular hypothesis where, for each individual, the choice to change his life immediately is an increasing function of the total number of degrowings. For simplicity, suppose that the distribution of thresholds to be degrowing among the hundred individuals of the group is as follows: one individual has a threshold equal to 0 (an already degrowing, convinced in advance!), Another individual has a threshold of 1, another a threshold of 2... until last with a threshold of 99 (a productivist no doubt). What will happen when the debate begins at the end of the conference ? The individual who possesses a model of the world of degrowth to zero threshold will immediately claim that he has changed his life drastically reducing its ecological footprint. So, the individual whose threshold is 1 will become degrowing as well. Then, the behavior of these two initial degrowings will spread to the individual whose threshold is 2... until every one hundred people are now degrowings (including the productivist !). We end to a situation of new equilibrium, a new attractor of the group, which has completely changed the political situation, to the point that new converts to the immediate degrowth organize for mutual assistance and the spread of their lifestyle at all the neighborhood. Suppose now that the initial distribution of thresholds is slightly different : the individual whose threshold was 1 now has a threshold of 2, while all other thresholds remain the same. You will concede that the

micro-society of hundred people had changed very little, the average propensity to degrowth is almost the same. However, group behaviour is radically different : apart from the permanent degrowing individual which always chooses to change his life, nothing is happening because all the other members of the group have a threshold for degrowth strictly greater than 1. A journalist of the bourgeois press who observed the two situations would be titrated for the first, « a crowd of agitators causes a radical social change », and for the second situation « a crazy agitator calls into question our society, under the eyes of a group of reasonable citizens ». In other words, the journalist analyses the two scenes describing fundamental differences in the propensity to degrowth in both groups, whereas the composition of these two groups is identical to a small threshold around in one person. This example shows that, even in apparently simple situations of specular interaction, the overall dynamic is important. According to the original terms of the situation and the exogenous shocks - even as low as the lowering or the increase of the threshold to degrowth in a single individual - that may suffer the group, the trajectory of the social dynamics and the final situation can be very different. The specularity produces social self-organization. It may give rise to qualitatively new societies, impossible to imagine when one reduces analysis of the society to those of its components separately.

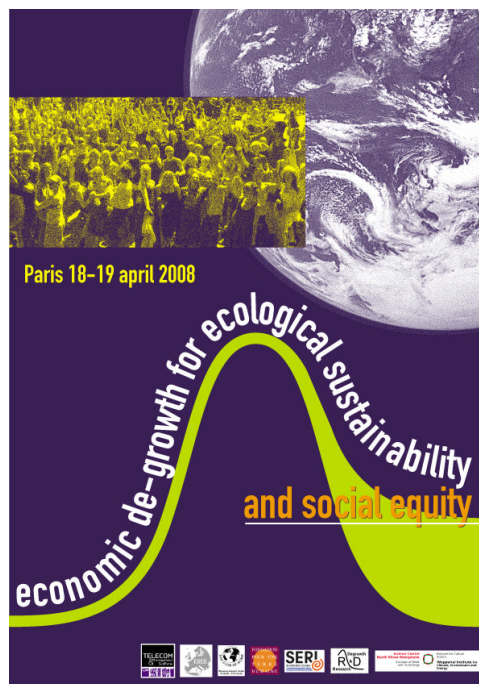
What is finally denial of the ecological disaster at the level of decision-makers ? The specular dynamic is still imperative. This describes the beliefs and actions of political actors, forged through interaction with their rivals for places. Whether any of these political actors, such as Nicolas Sarkozy, suddenly converted to the impending ecological disaster by Nicolas Hulot, he will read in the eyes of other politicians the credibility that they attached to his new creed, or lose its authority. His political action will be determined less by the strength he gets into this new belief that the assessment it might make on the strength of this belief among its rivals or friends. Unaware of this strength and fearful of criticism from its rivals, it will be poorly motivated to translate it into political action as strong as his belief. This will be even impossible. The spread of belief in the imminence of the ecological disaster can be only slow in a world obsessed with political rivalry. So much so that even if all the world leaders, like under a revelation, were suddenly inhabited by the political belief of the impending environmental disaster, they will begin by asking if their friends and political rivals share or not this belief. Everyone would know the impending disaster, but he would not know that the other know. Everyone watching missteps of others, i.e. public disclosure of the strength of their beliefs, none finally reveal it. Known to everyone, this belief would not be common knowledge. And even less common action since then that would disrupt public policies by radically changing patterns of production and consumption in industrialized societies. This would mean that citizens themselves have this model of the world - this belief - of an impending ecological disaster and accept the consequences in terms of radical change in their lifestyle. The denial of the ecological disaster is not in the minds of everyone as it would be unreasonable or inadequately informed, it is a systemic result that emerges from the specular dynamics.

³ Mark Granovetter, « Threshold Models of Collective Behavior », *American Journal of Sociology*, Vol. 83, No. 6, November 1978, pp 1420-1443.

⁴ Jacques Lesourne, André Orléan, Bernard Walliser, *Leçons de microéconomie évolutionniste*, Odile Jacob, Paris, 2002, chapitre 5.

In addition to their exact measure beyond our senses, environmental issues are normally fairly technical and opinion that is formed into everybody about them is necessarily mediated by experts, scientists, others that we must rely on to build this opinion. These scholars can all agree on the basic questions and answers in one precise area : what is the amount of carbon dioxide in the atmosphere ? What is the minimum number of anchovies in the Bay of Biscay, which allows this population to breed ? What is the likelihood of developing cancer ten years after receiving such a dose of ionizing radiation in one day ? Soon, however, there are differences among scientists because the ecology is a complex area and reproducibility of the experiments is low, even assuming that we can experiment. It is then necessary to introduce models of reality, based on choices that are not always technical. Within each model, the findings are certain, but the choice between the models is not. The findings of a model may contradict those of another, especially if one of these models are a warning of upheaval. Then it is ideology (the political model of the world) which will guide some decision-makers toward productivism, others toward the precautionary principle. Each will have its own experts. But policy-makers decide themselves under certain constraints, including election, budget or international. These constraints, highly specular, will guide policy-makers' decisions rather than their beliefs on the ecological disaster. The relation to the truth is not of rational nature, it is of a social nature. We cannot be right alone, in a specific area, in a given society. Galileo knew that.

Final Declaration of the Conference



We, participants in the Economic De-Growth For Ecological Sustainability And Social Equity Conference held in Paris on April 18-19, 2008 make the following declaration:

1. Economic growth (as indicated by increasing real GDP or GNP) represents an increase in production, consumption and investment in the pursuit of economic surplus, inevitably leading to increased use of materials, energy and land.
2. Despite improvements in the ecological efficiency of the production and consumption of goods and services, global economic growth has resulted in increased extraction of natural resources and increased waste and emissions.
3. Global economic growth has not succeeded in reducing poverty substantially, due to unequal exchange in trade and financial markets, which has increased inequality between countries.
4. As the established principles of physics and ecology demonstrate, there is an eventual limit to the scale of global production and consumption, and to the scale national economies can attain without imposing environmental and social costs on others elsewhere or future generations.
5. The best available scientific evidence indicates that the global economy has grown beyond ecologically sustainable limits, as have many national economies, especially those of the wealthiest countries (primarily industrialised countries in the global North).
6. There is also mounting evidence that global growth in production and consumption is socially unsustainable and uneconomic (in the sense that its costs outweigh its benefits).
7. By using more than their legitimate share of global environmental resources, the wealthiest nations are effectively reducing the environmental space available to poorer nations, and imposing adverse environmental impacts on them.
8. If we do not respond to this situation by bringing global economic activity into line with the capacity of our ecosystems, and redistributing wealth and income globally so that they meet our societal needs, the result will be a process of involuntary and uncontrolled economic decline or collapse, with potentially serious social impacts, especially for the most disadvantaged.

We therefore call for a paradigm shift from the general and unlimited pursuit of economic growth to a concept of “right-sizing” the global and national economies.

1. At the global level, “right-sizing” means reducing the global ecological footprint (including the carbon footprint) to a sustainable level.
2. In countries where the per capita footprint is greater than the sustainable global level, right-sizing implies a reduction to this level within a reasonable timeframe.
3. In countries where severe poverty remains, right-sizing implies increasing consumption by those in poverty as quickly as possible, in a sustainable way, to a level adequate for a decent life, following locally determined poverty-reduction paths rather than externally imposed development policies.
4. This will require increasing economic activity in some cases; but redistribution of income and wealth both within and between countries is a more essential part of this process.

The paradigm shift involves degrowth in wealthy parts of the world.

1. The process by which right-sizing may be achieved in the wealthiest countries, and in the global economy as a whole, is “degrowth”.
2. We define degrowth as a voluntary transition towards a just, participatory, and ecologically sustainable society.
3. The objectives of degrowth are to meet basic human needs and ensure a high quality of life, while reducing the ecological impact of the global economy to a sustainable level, equitably distributed between nations. This will not be achieved by involuntary economic contraction.
4. Degrowth requires a transformation of the global economic system and of the policies promoted and pursued at the national level, to allow the reduction and ultimate eradication of absolute poverty to proceed as the global economy and unsustainable national economies degrow.
5. Once right-sizing has been achieved through the process of degrowth, the aim should be to maintain a “steady state economy” with a relatively stable, mildly fluctuating level of consumption.
6. In general, the process of degrowth is characterised by:
 - an emphasis on quality of life rather than quantity of consumption;
 - the fulfilment of basic human needs for all;
 - societal change based on a range of diverse individual and collective actions and policies;
 - substantially reduced dependence on economic activity, and an increase in free time, unremunerated activity, conviviality, sense of community, and individual and collective health;
 - encouragement of self-reflection, balance, creativity, flexibility, diversity, good citizenship, generosity, and non-materialism;
 - observation of the principles of equity, participatory democracy, respect for human rights, and respect for cultural differences.
7. Progress towards degrowth requires immediate steps towards efforts to mainstream the concept of degrowth into parliamentary and public debate and economic institutions; the development of policies and tools for the practical implementation of degrowth; and development of new, non-monetary indicators (including subjective indicators) to identify, measure and compare the benefits and costs of economic activity, in order to assess whether changes in economic activity contribute to or undermine the fulfilment of social and environmental objectives.

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