FOOD MILES CARBON FOOTPRINTING AND OTHER FACTORS AFFECTING TRADE

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So for NZ

- To access high value markets need to assess attributes of product
- This includes being aware of market requirements and watching policy developments which reinforce these
- Market assurance schemes becoming more and more important and can lead to win win situation for NZ with greater social and environmental outcomes

Food Miles

- ‘the number of miles (kilometres) a product has to be transported from the farmer/grower to various stages of production until it reaches the supermarket and finally the plate of the consumer’.
- Simplistic concept .. But traction with popular press and some environment and other ‘groups’
- Ignores energy use and emissions in production
- We compared UK produce to NZ produce delivered to UK market

Dairy – NZ and the UK

Item	**Energy MJ/Tonne MS**		**CO_2 Emissions kg CO_2/Tonne MS**	
	NZ	UK	NZ	UK
Direct energy (diesel, elec.)	9,558	14,482	385	847
Indirect energy (fertiliser, feed, chem.)	11,331	32,877	739	1,950
Capital energy (tractors, buildings)	2,023	1,009	174	124
Total Energy	22,912	48,368	1,298	2,921
Shipping (NZ to UK) (17,840 km)	2,030		125	
Total Energy Input/Emissions	**24,942**	**48,368**	**1,423**	**2,921**

Dairy total GHG– NZ and the UK

Item	GWP_{100} kg CO_2 equivalent/ha		GWP_{100} kg CO_2 equivalent/kgMS	
	NZ	UK	NZ	UK
Energy	1,145	2,825	1.37	3.47
Methane	5,780	5,310	6.63	6.52
Nitrous Oxide	3,150	3,655	3.66	4.49
Total Emissions (85% allocation to milk)	8,585	10,020	9.89	12.31
Total Emissions (100% allocation to milk)	**10,080**	**11,790**	**11.61**	**14.49**

Dairy NZ - UK

- NZ uses under half energy than the UK does
- Even despite not being able to obtain as detailed data on UK capital inputs
- Even when methane and nitrous oxide included the UK produces 34% more GHG emissions per kgMS and 30% more per ha

Lamb: NZ versus UK

Item	**Energy MJ/Tonne carcass**		**CO_2 Emissions kg CO_2/Tonne carcass**	
	NZ	UK	NZ	UK
Direct sub total	4,158	17,156	256	1,117
Indirect sub total	3,698	27,452	241	1,607
Capital sub total	731	1,251	66	125
Total Production	8,588	45,859	563	2,849
Shipping NZ to UK (17,840 km)	2,030	-	125	-
Total Production Energy Input/Emissions	**10,618**	**45,859**	**688**	**2,849**

Lamb: NZ versus UK

- NZ is 4 times more energy efficient that the UK in lamb production
- Information on production system for UK not as comprehensive as dairy so the 4 times could be higher!!!
- Reflects different production systems!!!

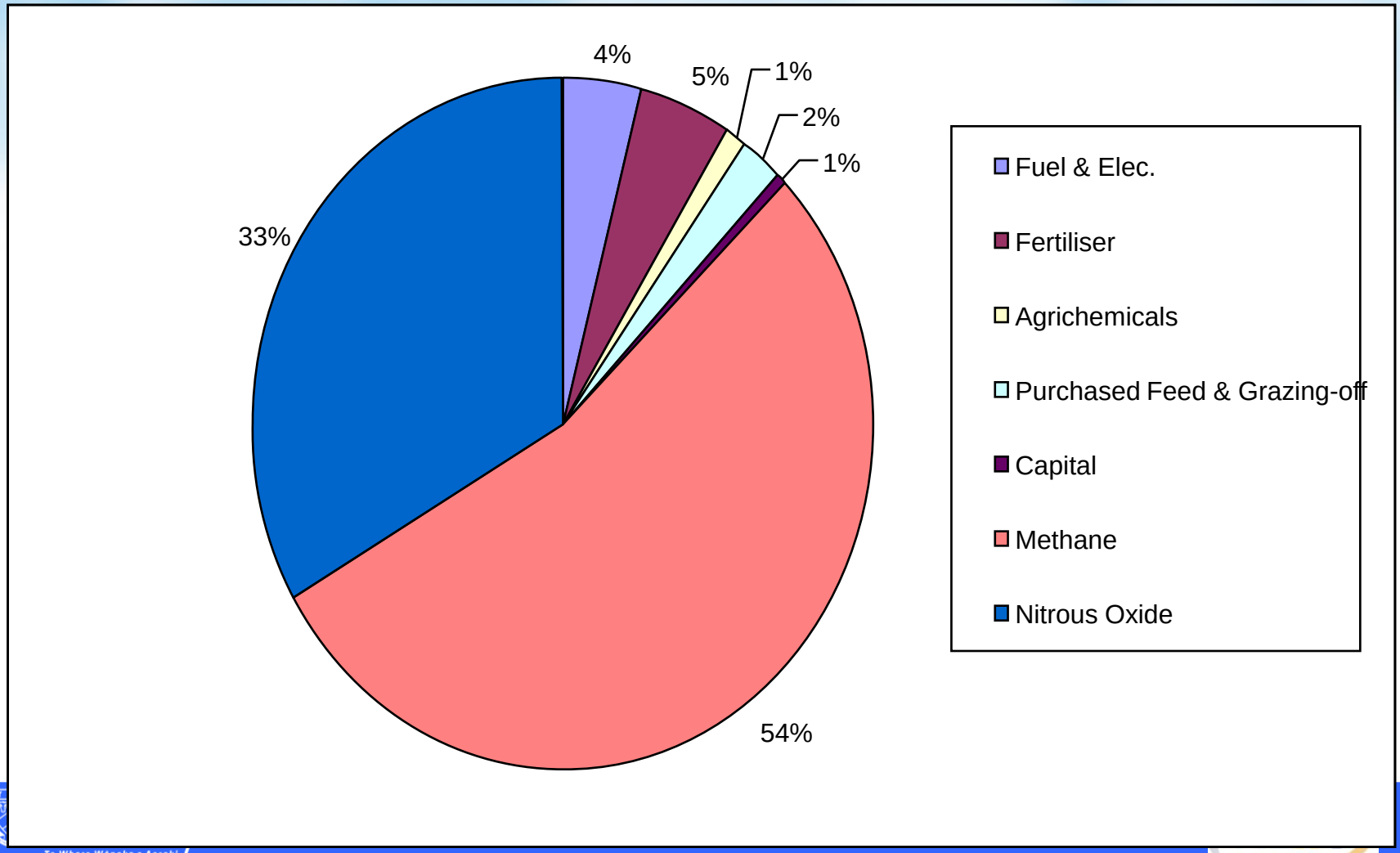
NZ and UK production

- Food miles report assumes UK could replace supply at same intensity
- NZ supplies 18% of sheepmeat; 13% butter and 58% apples; of UK supply
- To replace this would require increase in UK production intensity and consequential environmental damage which the CAP reforms are ameliorating

Carbon footprinting Methodology

- Food miles recognised as flawed concept
- Retailers and others now carbon footprinting
- Keen to develop standard methodology
- DEFRA, Carbon Trust and BSI have done this
- PAS Publically available standard
- Offsetting not allowed and reduction is key
- WRI also developing standard with ISO

Typical Dairy GHG emissions to the Farm Gate – Partial Life Cycle Assessment



GREENHOUSE GASES – LUDF & "Typical" NZ Dairy Farm

Table 1 Carbon Footprint of the LUDF vs. a "Typical" NZ Dairy Farm

	Carbon Footprint ($kgCO_2eq$/t MS)		Carbon Footprint ($kgCO_2eq$/ha)		Carbon Footprint ($kgCO_2eq$/cow)	
	Lincoln Uni. Dairy Farm	Typical NZ Dairy Farm	Lincoln Uni. Dairy Farm	Typical NZ Dairy Farm	Lincoln Uni. Dairy Farm	Typical NZ Dairy Farm
Direct Energy	380	360	755	375	185	135
Indirect Energy	730	780	1,455	815	350	290
Capital	50	140	105	145	25	50
Methane	4,770	5,570	9,510	5,805	2,300	2,070
Nitrous Oxide	2,950	3,070	5,875	3,200	1,420	1,140
Total	**8,875**	**9,920**	**17,700**	**10,340**	**4,280**	**3,690**

Fonterra Carbon Footprint

- Carbon footprint 940g per litre of liquid milk
- 85% emission on farm (59% methane 17% Carbon Dioxide and 24% Nitrous Oxide)
- Processing and manufacturing 10% emissions
- Distribution 5% of total emissions
- (improvements in quality of herds have reduced footprint by 1% cumulatively since 1990)

Carbon Labels

- Started with the Carbon Trust introducing the Carbon Reduction Label in 2006 on 3 products
- Tesco announced that it would footprint 70,000 product lines in 2007; now done; potatoes; orange juice ; washing detergent: light bulbs: milk: kitchen and toilet roll
- Climatop in Switzerland a label indication products better for the environment

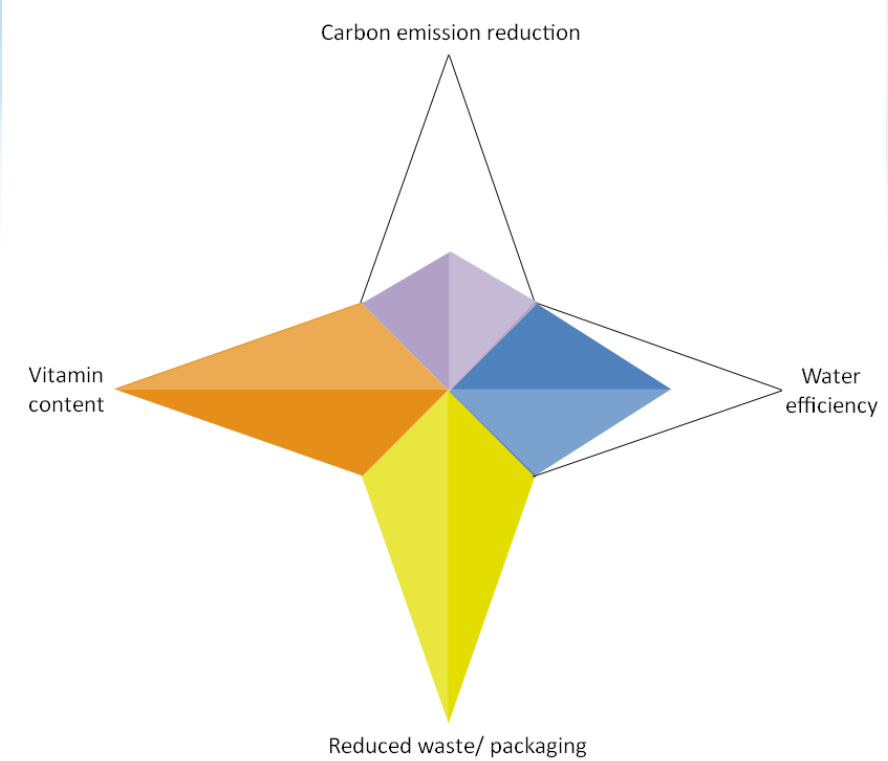
Carbon reduction labels

- Japan; 30 firms introduced label April 2009
- Thailand introduced Carbon Reduction Label (CRL) in 2008 now covers 40 products. Also has an internal Carbon Footprint Label being tested
- South Korea introduced a carbon labelling in 2009, and plans to adopt the international standard by 2011.

Issues with Carbon Labelling

- Cost of carbon footprinting especially for developing countries and small suppliers
- Concern re methodology and science
- Concern that a monopoly certifier will emerge
- Potential for acting as a trade barrier
- Unidimensionality of carbon footprint against other sustainability criteria
- Lack of understanding of the footprint

Surveyed with other attributes UK and Japan



UK
Ranks
Vitamins, water and waste/recycling and then carbon

Japan
Water, waste vitamins and then carbon

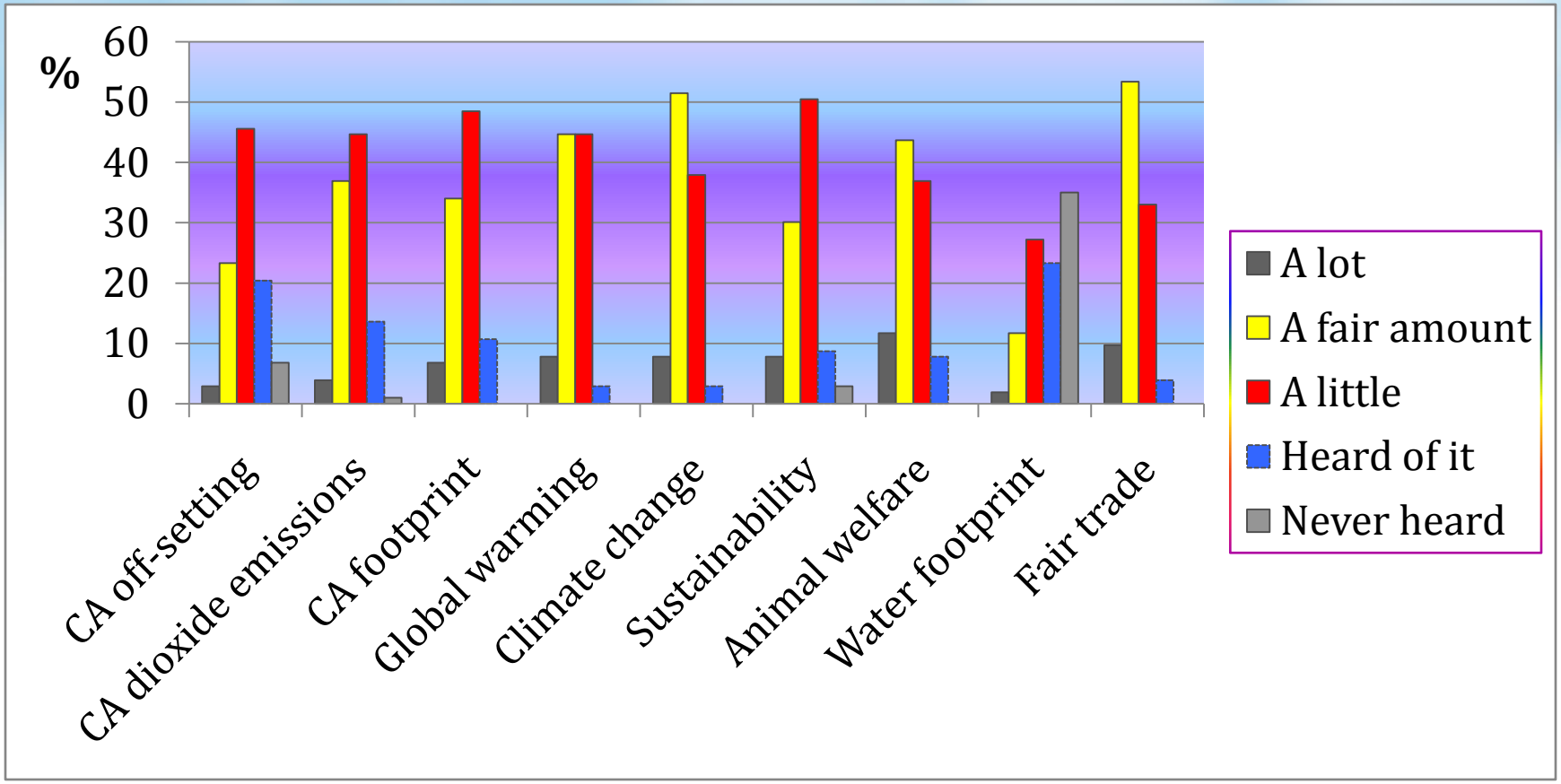
Attributes

- **Price** (PR) ↕
- **Carbon emissions** (CA) ↓
- **Water efficiency** (WA) ↑
- **Waste/ packaging** (WP) ↓
- **Nutrition** (NU) ↑

Example of a choice set

	Product A	Product B
Carbon/greenhouse gas	30% reduction in carbon emission	20% reduction in carbon emission
Waste/Packaging	40% less waste in production and packaging	20% less waste in production and packaging
Water efficiency	60% greater water efficiency	20% greater water efficiency
Price	10% increase in the price	No change in the price
Vitamins	Twice as much vitamins	2/3 times more vitamins
Selection	○	○

Results from the UK study: General sustainability issues



Cutting carbon footprints!

- Modelled producer assuming unrealistic cuts in inputs of 50% and 15% increases in yield – affected footprint by -4%
- However modelling consumers making half trips to supermarket (or combine with other trips) and dropping waste from 11% to 9 % reduces footprint by 14%
- More emissions in trip to pick up air frieghted vegetables than the air freight
- Hence most impact is made by changes at top of supply chain – by consumers

Sustainability & Market Access Issues

- Carbon Footprinting
- Local food and seasonal consumption
- Lower meat and dairy consumption
- Ethical food - fair trade and organic!
- Biodiversity and wildlife
- Water quality and quantity
- Animal welfare

2020

- Producers with carbon and water footprinting, wildlife management plans and animal welfare standards
- Nutritional and functional food marketing
- Levering off these to obtain differentiated high value premium segments
- Marketing through direct ‘bar codes’ to producers
- Using our unique market access to empower the supply chain and obtain market advantage