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European Bank
for Reconstruction and Development

Egypt, Jordan, Morocco and Tunisia

Key trends in the agrifood sector



COUNTRY HIGHLIGHTS



FAO INVESTMENT CENTRE

Egypt, Jordan, Morocco and Tunisia

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Nuno Santos

Economist, Investment Centre Division, FAO

Iride Ceccacci

Food Security Economist, EBRD

COUNTRY HIGHLIGHTS

prepared under the FAO/EBRD Cooperation

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For more information on this publication, please contact:

Director

Investment Centre Division

Food and Agriculture Organization of the United Nations (FAO)

Viale delle Terme di Caracalla, 00153 Rome, Italy

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FOREWORD

Countries in the Southern and Eastern Mediterranean (SEMED) region are facing major food security challenges in the aftermath of the 2008 economic crisis and the wave of social and political transformations that started in late 2010. The region needs to produce more with less and be “smarter” in terms of how it participates in world trade and, in particular, regional food trade. It will have to become a more efficient importer and simultaneously add value to its agrifood production to make the best use of its limited natural resources.

Food security in the region is a serious challenge because the population is growing quickly, as is per capita income. Not only will countries in the region need to produce more food to feed a larger population, but they will also need to accommodate the growing demand for more varied types and qualities of food items. While progress has already been achieved, the current structure of the agrifood sector still largely reflects self-sufficiency concerns and a particular focus on cereals, which – given the region’s agro-climatic conditions – has resulted in widening food trade deficits for most countries.

Moreover, SEMED countries are facing increasingly tough conditions for the development of the agrifood sector. This is particularly true for primary agriculture and the production of key raw materials because of climate change (with rising temperatures and increased frequency of extreme climatic events) and growing water scarcity. The agrifood sector is also under pressure to limit its greenhouse gas (GHG) emissions and this means that more emphasis will have to be placed on efficiency of energy and natural resource use and issues such as water productivity.

In the short- to medium-term, it is likely that many governments in the region will continue to face social pressure given fragile domestic political situations, especially in the post-Arab spring context. Promoting economic growth requires sound, market-driven policies alongside measures that ensure political transition and maintain stability. This will require public investments in critical infrastructure to sustain growth in the agrifood sector as well as an adequate level of social safety nets to protect the poor and vulnerable.

On the bright side, there are many opportunities that can be exploited to build on key assets of the agrifood sectors in the SEMED countries and maximize their potential contribution to the region's sustainable development. At present, this is high on the agendas of the region's policymakers.


The following collection of notes was initially disseminated at the "Private Sector Forum on Food Security in the Southern and Eastern Mediterranean Region" jointly organized by the Food and Agriculture Organization of the United Nations (FAO), the European Bank for Reconstruction and Development (EBRD) and the Union for the Mediterranean (UfM) in May 2015. The notes aim to inform EBRD agribusiness investments in the SEMED and disseminate knowledge on current trends in agribusiness and food security. The EBRD called upon FAO's technical assistance to carry out an analysis of key trends in the agribusiness sector of four specific countries: Egypt, Morocco, Tunisia and Jordan. This process resulted in four country notes with analyses of food consumption patterns, production and trade, as well as agricultural policies. While the individual notes were mostly descriptive, it was felt that a document providing a comparative analysis across countries would add value to the target audience, namely public officials, development experts, the private sector and members of the civil society. This publication thus sought to reframe the analysis of sector trends in the region into a readily-accessible format in order to contribute to more effective and efficient policies for improved food security and nutrition. While the focus of the publication is on four SEMED countries – Egypt, Morocco, Tunisia and Jordan - many of its key findings and conclusions will also be of interest in other regional and country situations, where FAO and the UfM are active.



Laurent Thomas
Assistant Director-
General
Technical Cooperation
Department
Food and Agriculture
Organization of the
United Nations



Philippe Le Houérou
Vice President
Policy and Partnerships
European Bank for
Reconstruction and
Development



Claudio Cortese
Senior Deputy Secretary
General
Union for the
Mediterranean



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Boris Sterk, Economist, Investment Centre, FAO and Fabrizio Moscatelli, Economist, Investment Centre, FAO co-authored the report, making substantial contributions in terms of research and writing of all sections. In addition, Arianna Carita, Economist, Investment Centre, FAO conducted research and supported drafting and reviewing of section four. The document was based on agrifood notes drafted by different authors during 2014: Lisa Paglietti, Investment Centre, FAO for Tunisia, Boris Sterk for Egypt, Stefania Manzo, Investment Centre, FAO for Jordan and Luciano Sobral, Investment Centre, FAO for Morocco.

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ACRONYMS AND ABBREVIATIONS

AAA	Agriculture Analytic Agency
CIS	Commonwealth of Independent States
CMU	Cabinet of Ministers of Ukraine
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EBRD	European Bank for Reconstruction and Development
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FSU	Former Soviet Union
GDP	Gross domestic product
GDR	Global depository receipt
IPO	Initial public offering
NPC	Nominal protection coefficient
OECD	Organisation for Economic Co-operation and Development
PP	Private placement
SCT	Specific commodity transfers
TRQ	Tariff-rate quota
UAH	Ukrainian hryvnia
VAT	Value added tax
VHP	Very high polarization
WHO	World Health Organization
WSE	Warsaw Stock Exchange
WTO	World Trade Organization

Chapter 1 - Rising food demand and the nutrition challenge

At a glance

Highlights

- Food consumption in the southern and eastern Mediterranean (SEMED) region is expected to increase due to growth in population and gross domestic product (GDP) per capita;
- Consumption patterns are changing: consumers are becoming more demanding about food quality and safety - and as incomes rise, there is higher consumption of meat and dairy products, oilseeds and sugar;
- Domestic food supply is not expected to match growing domestic demand, especially for cereals (mainly wheat). The share of cereals in daily caloric intake is 40 percent higher in the region than in the rest of the world;
- The region faces an important and complex nutrition challenge stemming from high levels of child malnutrition and growing obesity problems.

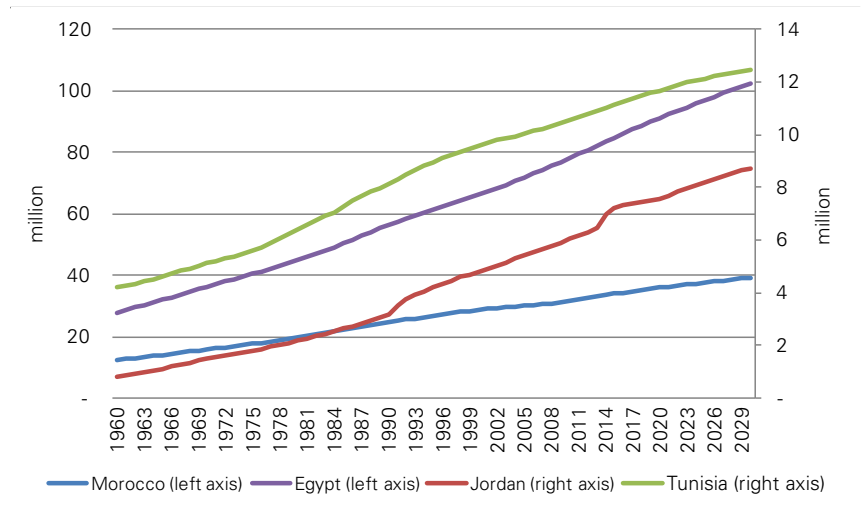
Policy Relevance

- Policies and institutional attitudes regarding quality assurance and promotion of agricultural products will become increasingly important as consumers become more informed and demanding;
- Supportive policies and an enabling environment for private businesses, including streamlined bureaucratic procedures, are key to leveraging domestic market opportunities in agrifood processing that may arise from evolving consumption patterns;
- Creating job opportunities for the youth and designing and successfully implementing social protection policies will be necessary for social stability and food security;
- Incorporating a nutrition lens in agrifood sector-related policies is essential given current and growing challenges related to malnutrition and obesity; this will require a cross-sectoral approach that includes education, health systems and social protection.

Large expected increase in food consumption by 2030

There are two underlying trends that will define the evolution of food consumption in the SEMED region¹ in the medium- to long-term: first, population growth is forecast to continue at a relatively fast pace; and second, GDP per capita is expected to increase. The current population of the SEMED countries is just above 130 million people, more than 80 million of whom live in Egypt, the largest country in the entire Middle East and North Africa (MENA)² region and the Arab world. The total population of the SEMED countries is expected to grow by about 7 percent in the next five years, reaching 146 million people in 2020; and by almost 20 percent in the next 15 years reaching 162 million people by 2030. By then, Egypt's population alone will number more than 100 million people (Figure 1).

Figure 1: Population and population estimates for SEMED countries, 1960-2030



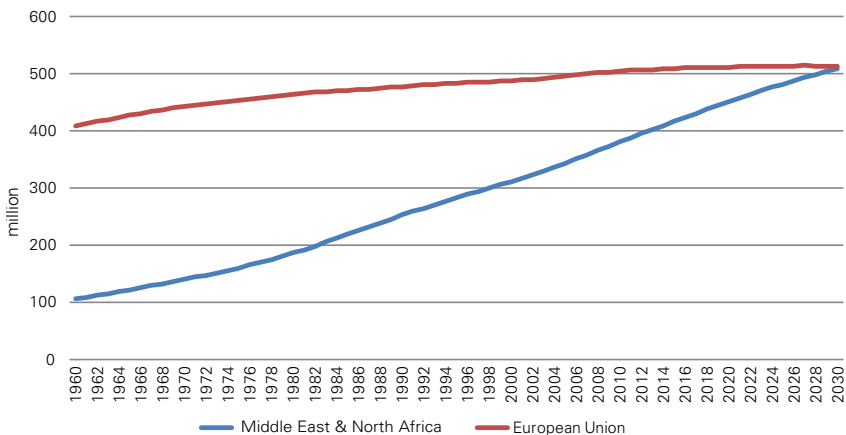
Source: World Bank, Health Nutrition and Population Statistics

1 The four SEMED countries addressed in this report are Egypt, Morocco, Jordan and Tunisia.

2 The 21 MENA countries are Algeria, Bahrain, Djibouti, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates and Yemen.

This trend is confirmed by the total population growth of the entire MENA region as illustrated in Figure 2. It is also possible to note the opposite trend in European Union (EU) countries, which are predicted to see their population growth flatten until 2030 and then decline. In parallel, the significant economic growth in SEMED countries that started in the early 2000s is forecast to continue, with average per capita GDP levels increasing by more than one-quarter by 2019. More importantly, GDP per capita in Egypt – the region’s demographical “giant” – is expected to rise by 50 percent during that time period, and in Morocco – a country with a population of 34 million people – by 30 percent (Figure 3).

Figure 2: Population and population estimates EU and MENA countries, 1960-2030

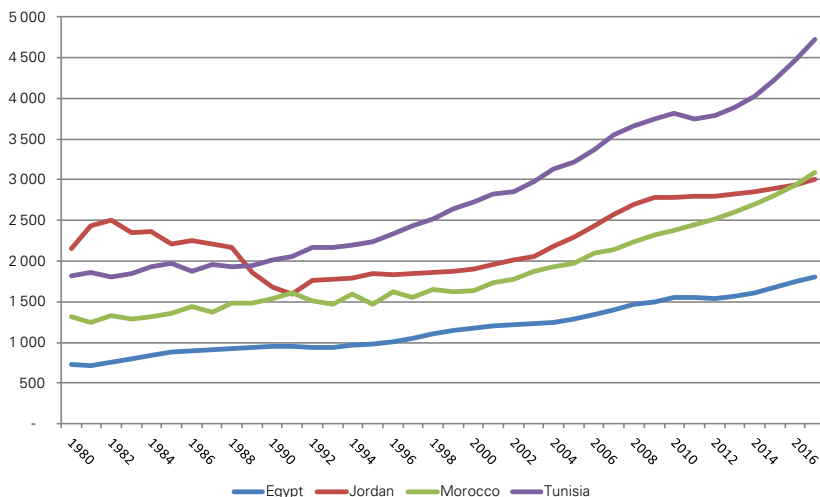


Source: World Bank, Health Nutrition and Population Statistics.

Changing consumption patterns

A growing population and higher GDP per capita mean that it will be necessary to feed more people while accommodating changing consumption patterns. Demand for meat and dairy products, oilseeds, and sugar and is expected to increase. Higher incomes and a more educated urban population will also translate into more demand for quality food products. Such changes in demand patterns towards more diversified and premium products can be an opportunity for producers to differentiate their goods

Figure 3: GDP per capita in SEMED countries, 1980-2017



Source: Author's calculations using data from International Monetary Fund (IMF) and World Bank.
Note: Data after 2010 are IMF forecasts.

on the market and can potentially lead to further development of processing activities. Moreover, such trends should stimulate new public policies, namely improved food safety and quality standards linked to efficient regulatory institutions and governance mechanisms.

A more detailed look at current consumption levels (Table 1) shows some striking commonalities across the SEMED countries, the most noticeable of which is the extremely high consumption of cereals, primarily wheat. Cereals on average provide more than one-half of the region's daily per capita energy intake, which is almost double the EU level of around 28 percent. This proportion is greater in Egypt and Morocco, which display lower GDP per capita levels, when compared to Jordan and Tunisia, which exhibit higher per capita income and where the share of animal products and vegetable oils is higher. As shown in Table 1, the contrast with the EU is striking but expected given that consumers in poorer countries tend to eat more staples: at similar total daily caloric intake levels, the share of daily animal product consumption in the

EU (29.1 percent) is almost three times higher than in the SEMED countries (where it varies between 9.2 and 12.4 percent). High consumption levels of cereals in general, and of wheat in particular, in the SEMED region result from a number of factors including GDP per capita, cultural norms and related consumption habits. It is thus expected that cereals will continue to play an important role in consumption despite the expected significant growth in per capita GDP. The OECD-FAO Agricultural Outlook estimates an increase in consumption levels for all product groups, including a slight increase in per capita cereals consumption by 2023 for the North Africa region (Table 2). The most significant increase in per capita consumption is expected for sugars (+12 percent) followed by vegetable oils, meats, dairy products and fish (all expected to increase by about 7 percent).

Table 1: Consumption of main food products in the SEMED countries

Product	Morocco		Jordan		Tunisia		Egypt		EU	
	FS	Share, %	FS	Share, %	FS	Share, %	FS	Share, %	FS	Share, %
Cereals (excl. beer)	1 933	58.0	1 432	45.5	1 702	50.6	2 217	62.3	950	27.8
Animal products	307	9.2	391	12.4	344	10.2	336	9.4	993	29.1
Sugar and sweeteners	381	11.4	407	12.9	347	10.3	304	8.5	363	10.6
Vegetable oils	262	7.9	523	16.6	433	12.9	147	4.1	485	14.2
Vegetables	104	3.1	81	2.6	131	3.9	104	2.9	81	2.4
Total	3 334	100.0	3 149	100.0	3 362	100	3 557	100	3 416	100

Source: FAOSTAT, 2011.

Note: "FS" stands for food supply in daily per capita kilocalories (kcal/cap/day), while % stands for share of total daily caloric intake. The table shows the five main categories of consumed food products in the region and excludes other categories which are otherwise included in the total.

In absolute terms, this means a considerable increase in consumption levels for all product groups in North Africa, taking into consideration population growth (Figure 4). Cereals consumption is expected to increase by 13 percent, or 10 million tonnes, by 2023 – this will represent the most significant absolute value rise of all product groups. Fish and fish products consumption is expected to increase

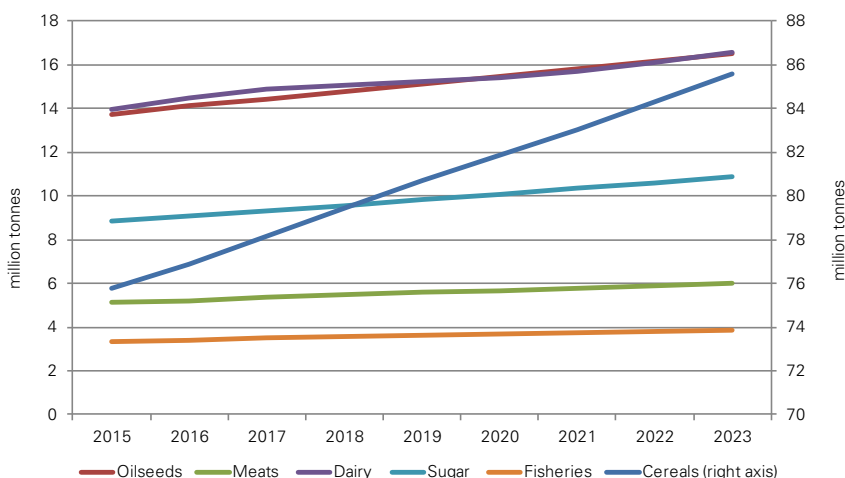
3 Region includes Algeria, Egypt, Libya, Morocco and Tunisia.

Table 2: Consumption forecast for selected product groups for North Africa,³ kg/capita/year

Group	2015	2023	Change (%)
Cereals	262.9	264.9	0.7
Vegetable oils	20.6	22.1	6.9
Meats	23.6	25.3	7.2
Dairy	70.6	75.3	6.7
Sugars	40.7	45.6	12.1
Fish	16.5	17.6	6.9

Source: OECD-FAO Agricultural Outlook.

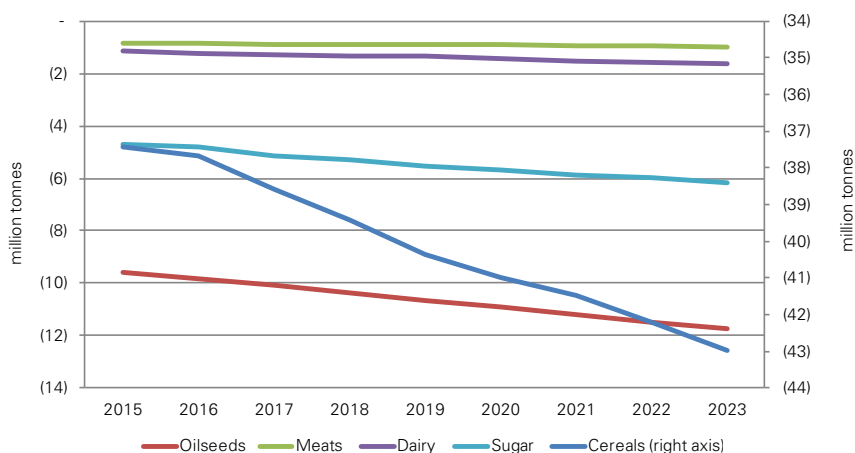
by 16 percent; meats, dairy products and oilseeds consumption by 20 percent; and sugars by 23 percent. Increasing food demand poses a notable challenge for SEMED countries, all of which are important food importing countries. In aggregate terms, agricultural trade deficits are expected to rise since domestic supply is not anticipated to meet growing domestic demand for agricultural goods. For instance, in North Africa the trade deficit for dairy is expected to grow by 40 percent by 2023; for sugars by 30 percent; for oilseeds by 23 percent; for meats by 15.5 percent; and for cereals by 15 percent (Figure 4). Naturally, aggregate figures hide many country specificities.

Figure 4: North Africa, total consumption outlook by product group, 2015-2023

Source: OECD-FAO Agricultural Outlook.

A closer look at Egypt – the only country in the SEMED region for which individual FAO-OECD Agricultural Outlook data is available – supports the above analysis. It shows that consumption of wheat, the main staple food, will continue to grow at a relatively stable rate (Figure 6) with a corresponding growth in wheat imports (Figure 7). Meat consumption will increase faster than wheat and will also be one of the factors responsible for the rising consumption levels of both wheat and coarse grains (including maize), since these are partially used as animal feed. Over the span of one decade (between 2012 and 2022), Egypt is therefore expected to experience a widening trade deficit in

Figure 5: North Africa, trade balance by product group, 2015-2023



Source: OECD-FAO Agricultural Outlook.

volume terms for key agricultural commodities: from 10.5 to almost 11 million tonnes for wheat; from 5.8 to 6.3 million tonnes for coarse grains; and from 567 thousand to 666 thousand tonnes for meat.⁴ This expected increase in the trade deficit in wheat alone is equivalent to Tunisia's total wheat imports in 2013, while the increase in the trade deficit in meat and coarse grains is higher than the total amount of yearly consumption of these commodities

⁴ Data refers to the period 2013-2023 (source: OECD –FAO Agricultural Outlook data for trade balance in selected agricultural commodities).

in Jordan in 2011. In addition, the growing need for protein meal (oilseeds) for animal feed and other uses is expected to result in an increase in the commodity's trade deficit from 1.9 to 2.3 million tonnes between 2013 and 2023.

The importance of cereals and nutritional outcomes

The high regional consumption of cereals, and especially wheat, results from several factors beyond relatively lower income levels as previously mentioned. In fact, SEMED countries have high cereals consumption even when compared with countries of similar GDP per capita in other regions of the world. Out of the

Figure 6: Egypt consumption forecast, 2013-2023

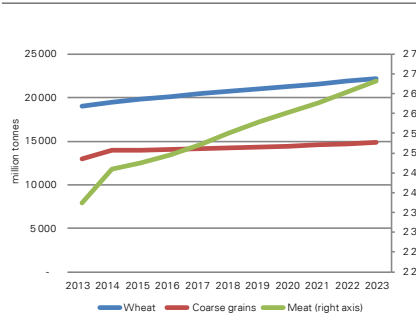
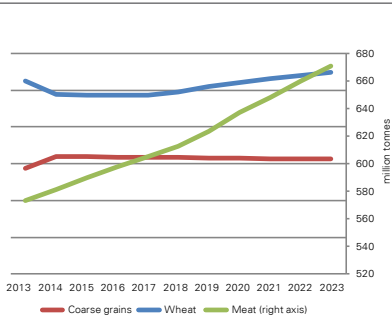


Figure 7: Egypt import forecast, 2013-2023



Source: FAO-OECD Agricultural Outlook.

21 world subregions defined in the United Nations geoscheme, North Africa by far has the highest daily per capita intake from cereals (Table 3). The arithmetic average for daily per capita caloric intake from cereals in the four SEMED countries is extremely high at about 40 percent more than average world consumption.

Another important characteristic of SEMED countries is that wheat consumption constitutes the majority of overall cereals consumption: it is the highest in Tunisia, where it accounts for 96 percent of total cereal consumption, and lowest in Egypt, where it nevertheless accounts for more than one-half of all daily per capita calories from cereals (Table 4).

Table 3: Daily per capita caloric intake from cereals

Region	kcal
World	1 296
North Africa	1 787
South-East Asia	1 536
Southern Africa	1 508
Western Asia	1 448

Source: FAOSTAT, 2011.

As can be observed from Figure 8, the four SEMED countries are amongst the top 10 consumers of wheat worldwide in terms of the share of wheat in total daily caloric intake. Tunisia has the highest level in the world (almost 50 percent), compared with a world average of 18.5 percent.

Table 4: Consumption of main cereals in SEMED countries

Product	Egypt		Jordan		Morocco		Tunisia	
	kcal/ cap/ day	% share of cereal consumption	kcal/ cap/ day	% share of cereal consumption	kcal/ cap/ day	% share of cereal consumption	kcal/ cap/ day	% share of cereal consumption
Wheat and products	1 161	52.4	1 200	83.8	1 373	71	1 632	95.9
Maize and products	604	27.2	24	1.7	273	14.1	n/a	n/a
Rice	414	18.7	204	14.2	6	0.3	14	0.8

Source: FAOSTAT, 2011.

Poverty in SEMED countries

Significant poverty levels, combined with higher food prices since 2008, pose an important challenge to the food security and nutrition of the most vulnerable groups with possible repercussions on social and political stability. Since poverty is expected to persist in both absolute and relative terms, especially in Egypt, creating job opportunities for the youth and designing and implementing social policies for food security will thus be crucial in the coming years – and the agrifood sector can play an important role.

Figure 8: Consumption of wheat as a share of total caloric intake



Source: FAOSTAT, 2011.

Egypt and Morocco are not only the SEMED's largest countries, but they have also the largest rural populations and the highest prevalence of both overall poverty and rural poverty in particular. In parallel, according to the World Bank poverty forecast,⁵ the MENA region is the only one in the world where overall extreme poverty levels (at the USD 1.25 per day line) are expected to increase, reaching 2.4 percent of the population in 2030 from the current 2 percent (Figure 9). Such a projection seems to result mainly from poverty growth in Egypt and the relative weight of this large country within the region. Poverty levels measured at national poverty lines have decreased in Jordan, Morocco and Tunisia in the last decade, while the latest data for Egypt indicates that its poverty has risen from 16.7 percent in 2000 to 25 percent in 2011, with extreme poverty levels decreasing only marginally, from 1.81 percent in 2000 to 1.68 percent in 2008.

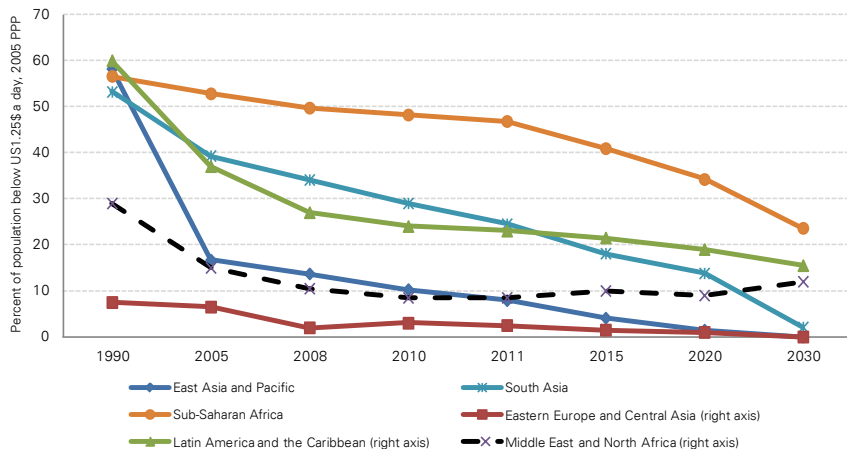
5 World Bank Group. 2015. Global Monitoring Report 2014/2015: Ending Poverty and Sharing Prosperity.

Improving nutritional outcomes in SEMED countries

Given these consumption trends and poverty levels, the SEMED countries face an important nutrition challenge both from high levels of child malnutrition and growing obesity problems.

Figure 10 depicts the prevalence of stunted⁶ children in a number of Mediterranean countries (including the four SEMED countries). It shows that the percentage of stunted children under five years of age, an accepted measure of childhood malnutrition, is above 5 percent for all countries measured. Egypt has the highest prevalence (31 percent), while Jordan, Tunisia and Morocco have rates of 8, 10 and 15 percent, respectively. Figure 10 also suggests that GDP per capita is not the only important factor for cross-country differences in prevalence of stunting because of the lack of clear correlation between the two variables. As previously discussed, one of the possible explanations is the relationship between low GDP per capita and poor dietary diversity,⁷ which in the MENA region

Figure 9: Poverty forecasts, 1990-2030



Source: World Bank, 2014.

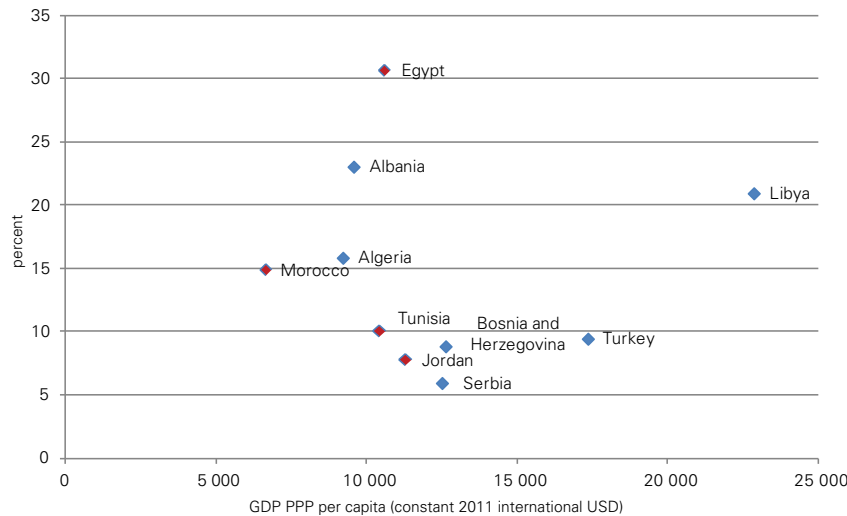
Note: Poverty defined as under USD 1.25 per day in 2005 purchasing power parity (PPP).

⁶ The indicator for stunting is low height-for-age, a measurement that is calculated by comparing the height of a child against the WHO international growth reference for a child of the same age (WFP glossary).

⁷ Defined as the number of unique foods consumed by household members over a given period.

is expressed in high consumption of certain high-calorie foods like cereals, and wheat above all. In addition to economic growth and job creation, factors such as nutritional education, efficient health systems and social security programmes have a role to play in addressing this critical problem in the coming years.

Figure 10: Prevalence of stunting in children under five years of age, 2010-2014



Source: Author's calculations based on World Bank data.

Obesity, including childhood obesity, is a worldwide public health problem with significant cross-country differences generally linked to per capita income disparities, economic transition, and changes in food consumption habits towards diets higher in fats (namely saturated fat) and sugar. There are also significant within-country differences according to socioeconomic population groups.⁸ A systematic review by Musaiger (2011) of published articles between 1990 and 2011 concluded that obesity is reaching alarming levels across all age groups in the Eastern Mediterranean

⁸ Wang, Y. 2001. Cross-national comparison of childhood obesity: the epidemic and the relationship between obesity and socioeconomic status. *International Journal of Epidemiology*.

countries.⁹ The article found that the proportion of overweight or obese children in the Eastern Mediterranean region nearly doubled from 23.5 million in 2001 to 41.7 million in 2010. These numbers put the region second only to the United States in terms of child overweight and obesity levels. There are many reasons for this, but generally it is found that obesity is linked to socioeconomic status. Obesity, however, does not exclusively affect population groups with a higher socioeconomic status but it actually tends to shift towards groups with lower socioeconomic status. Among SEMED countries, the prevalence of obesity is already similar to that of high-income countries: in Jordan and Egypt, 27.3 and 22.5 percent of the adult population is obese.¹⁰

Besides socioeconomic status, other inter-related factors such as culture, physical inactivity and eating habits also contribute to obesity. In addition, agricultural policies that impact relative food prices play a role in nutritional outcomes. For example in Egypt, Asfaw (2006) suggests that the food subsidy programme implemented during the Second World War resulted in price reductions for energy-dense, nutrient-poor food items such as bread, sugar and oil in real and in relative terms as compared to healthier items such as fruits and vegetables.¹¹ In turn, such high differential in energy costs leads households to choose high energy but poor diet quality foods.

Other policy interventions in the region aimed at maintaining social cohesion through low prices of poor diet quality food products may have similar effects. This is the case of trade policies, subsidies and other distortionary interventions. Tackling nutritional issues in food security in the region will therefore require a more nutrition-sensitive set of policies, i.e. policies that take into consideration possible negative consequences of the distortions introduced in the final household food consumption mix.

9 Musaiger. 2011. Overweight and Obesity in Eastern Mediterranean Region: Prevalence and Possible Causes. *Journal of Obesity*, vol. 2011, Article ID 407237. Note: Eastern Mediterranean countries in this case refers to the WHO definition which includes all Arab countries, excluding Algeria, in addition to Afghanistan, Iran and Pakistan.

10 WHO. 2008. Prevalence of adults of both sexes 20 years and above with a body mass index of 30kg/m² or higher.

11 Asfaw, A. 2007. Do government food price policies affect the prevalence of obesity? Empirical evidence from Egypt. *World Development*, 35:687-701

Chapter 2 - Agriculture as part of the solution

At a glance

Highlights

- The agrifood sector plays a different role across countries in the region in terms of weight in the economy, employment and poverty. In global terms, Southern and Eastern Mediterranean countries (SEMCs)* can be classified mostly as urbanized or transforming countries;
- Agriculture can play an important role in the SEMCs, namely in reducing unemployment (in particular youth unemployment);
- Cereals are the main source of nutrition but none of the SEMCs are self-sufficient (for example Jordan imports 98 percent and Morocco 40 percent of its cereal needs);
- Land productivity has improved dramatically, but yields are still low and yield gaps suggest significant potential for improvement;
- Private investment is by far the main source of investment in the agrifood sector above public investment and international aid. The private sector is therefore a key part of solving the region's food security equation;
- The State is an important investor in agriculture, albeit one of declining importance and with limited room for fiscal expansion. Simultaneously, food subsidies as part of social protection measures have important fiscal implications (for example reaching 2.5 percent of Egypt's GDP in 2011).

Policy Relevance

- Strategic planning of policy options is fundamental, especially for some of the SEMCs, which need to take into account social issues in often delicate domestic political situations;
- Policies focusing on building skills and sector linkages (for example between primary agriculture and agro-processing), among others, can be important if the agrifood sector is expected to play a bigger role in employment (in particular for young people);
- Policies focusing on reducing the gap between potential and real yields by addressing its key binding constraints will continue to be very relevant in the near future;
- Government policies can help support the private sector through appropriate regulations, the supply of essential public goods and the creation of a good business environment favouring responsible private investment in agriculture;
- A weaker fiscal situation is creating pressure on the region's governments to adopt innovative policies that are able to simultaneously promote agrifood sector growth and maintain critical social protection levels. Improving efficiency of public spending and in particular targeting of food subsidies will continue to be high on the region's policy agenda.

* The analysis in this note refers to a selection of Southern and Eastern Mediterranean countries, which are part of the group that constitutes the Euromed partnership countries of the EU and the four EBRD SEMED region countries, namely: Algeria, Morocco, Egypt, Israel, Lebanon, Tunisia, Jordan and Turkey.

The strategic role of agriculture

Two rural worlds

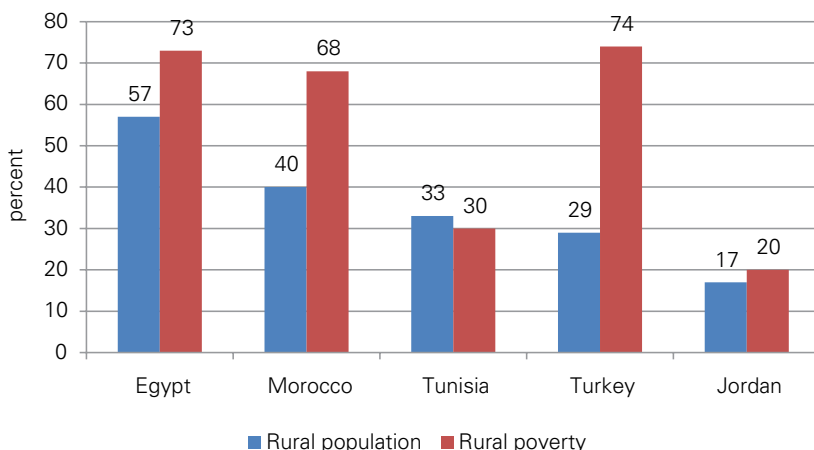
Economically, the agricultural sector plays a role of varying importance across the SEMCs: it is significant in Egypt and Morocco, of relative importance in Algeria, Tunisia and Turkey, and much less so in Israel, Jordan and Lebanon, which are highly urbanized countries.¹² However, it is important to underline that in all SEMCs, agriculture maintains a prominent role in terms of social stability at a delicate moment in the region's transition.

Two types of SEMCs can be identified, with differences between them underlined not only by differences in their respective strategic plans, but also through a selection of socio-economic indicators. Differences can first be noticed at the demographic level. While more than one-half of the population in Egypt and about 40 percent of the population in Morocco are rural, in Tunisia and Jordan a vast majority of the population (more than two-thirds and four-fifths, respectively) lives in urban areas (Figure 11). The share of rural population in Jordan is in fact even lower than the Organisation for Economic Co-operation and Development (OECD) average of about 25 percent. In parallel, important differences can also be observed concerning the extent to which poverty affects the rural populations in different countries. More than two-thirds of Egypt and Morocco's poor¹³ are rural, while this is the case for less than one-third of Tunisia's poor and for about one-fifth of Jordan's poor (Figure 11). The case of Turkey is quite striking in that of all SEMCs for which data is available, it has the highest share of rural poverty out of total poverty (74 percent) – a number comparable to Egypt – while at the same time it remains a largely urbanized country with less than one-third of its population living in rural areas.

12 More than 80 percent of people in these countries live in urban areas; as a matter of comparison, the 2013 EU average was 74 percent.

13 At national poverty lines as per World Bank data.

Figure 11: Rural population and rural poverty in selected SEMCs¹⁴



Source: World Bank and author's calculations.

The World Bank 2008 World Development Report (WDR)¹⁵ drew a distinction between three types of countries based on agriculture's social and economic role: "the way agriculture works for development varies across countries depending on how they rely on agriculture as a source of growth and an instrument for poverty reduction".¹⁶ In this study, we use an adaptation of the report's original typology by looking at agricultural GDP's share in total GDP instead of agriculture's contribution to growth, as a proxy for agriculture's significance in the economy. While the way we measure this significance is slightly different, the divide between countries is still apparent.

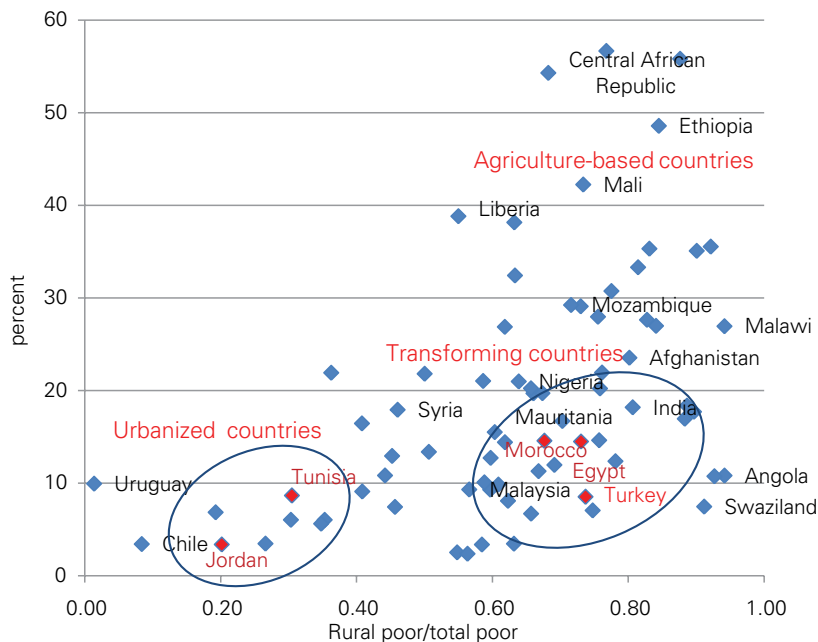
¹⁴ The share of rural poor out of total poor referred to in figures 2.1 and 2.2 has been calculated based on latest available data for the following three indicators from the World Bank: (1) Rural poverty headcount ratio at national poverty lines (% of rural population), (2) Rural population (% of total population), (3) Poverty headcount ratio at national poverty lines (% of population). Only countries for which data has been available after 2001 have been taken into consideration. For SEMCs, data for each country and each indicator is as follows: Egypt – (1) 2011, (2) 2013, (3) 2011; Morocco – (1) 2007, (2) 2013, (3) 2010; Tunisia – (1) 2009, (2) 2013, (3) 2010; Turkey – (1) 2012, (2) 2013, (3) 2012; Jordan – (1) 2010, (2) 2013, (3) 2010. Data on rural poverty for Tunisia is based on an IFAD country fact sheet from 2011, available at: <http://www.ifad.org/events/gc/34/nen/factsheet/tunisia.pdf> (last accessed: 23 April 2015).

¹⁵ Data are author's adaptation of the World Bank. 2007. World Development Report 2008. Washington D.C.

¹⁶ Ibid. p. 4.

Accordingly, **SEMCs seem to be split in two different groups** (Figure 12): Jordan and Tunisia, countries where the share of agriculture in GDP and agriculture's contribution to GDP growth are relatively low and where poverty is mostly urban, can be classified as *urbanized countries*. Egypt, Morocco and Turkey, in contrast, while also displaying a relatively low importance of agriculture for the economy, are countries where poverty is still predominantly rural and thus fall in the category of *transforming countries*.¹⁷ In fact, as the WDR observes, 92 percent of the population of the MENA live in such countries.¹⁸

Figure 12: Agriculture's share of GDP and rural share of poverty¹⁹



Source: World Bank data and author's calculations.

¹⁷ Data for the other three SEMCs was not available.

¹⁸ Ibid.

¹⁹ Please, refer to footnote no. 2. Please, also note that the graph shows the agricultural value added as percentage of total GDP in a single year, and not the growth of the agricultural value added as percentage of total GDP.

A closer look at the evolution of agriculture's contribution to overall GDP shows that it has generally been falling in all countries (Figure 3). Jordan clearly stands out as a country which has completed the "transformation process" towards an urbanized country: after a sustained decrease in agriculture's value added to GDP until the early 2000s, it stabilized at a level of about 3 percent. Lebanon is in a similar situation with a contribution of agriculture to GDP of about 5 percent. The decrease has also been quite dramatic in Algeria, Tunisia and Turkey. In the latter two, agriculture's contribution to GDP was the same as in Egypt and Morocco (17-19 percent) in the early 1990s but has currently fallen to levels of around 9 percent. Turkey is a peculiar case in that, while agriculture's importance in the economy has decreased, reaching levels more typical of urbanized countries, poverty remains overwhelmingly rural (74 percent of total). In Egypt and Morocco, the decrease started in the early 2000s and has been more modest, with current levels of around 14-15 percent. As a matter of comparison, the OECD average of agriculture's contribution to total GDP was 1.4 percent as of 2012 and the EU average was 1.6 percent.

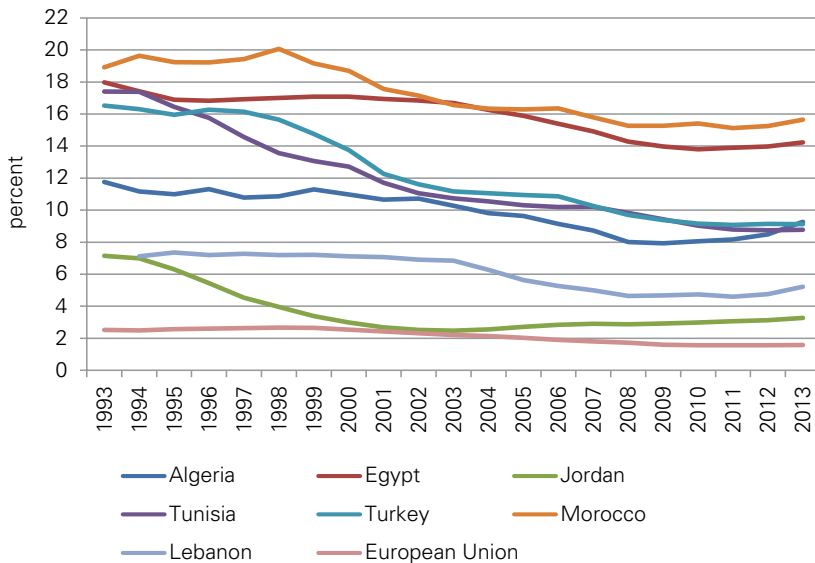
In all SEMCs, GDP per capita levels have risen dramatically in the last 35 years. Nevertheless, inequalities can be observed in this regard too. The divide between Jordan and Tunisia on the one hand, with GDP per capita levels²⁰ in the range of USD 4 500-5 000, and Egypt and Morocco on the other, with levels in the range of USD 3 000, persists. Overall, however, income levels remain considerably lower than the average levels in the OECD (USD 38 000) or in the EU (USD 35 000).

Agriculture and unemployment

An important indicator of agriculture's socio-economic impact is its share in employment. As expected, it is the highest in Morocco and Egypt, where respectively 40 percent and 30 percent of all employed people work in the agricultural sector, which are then followed by Tunisia (about 15 percent) and Jordan (about 2 percent). In the last ten years, employment in agriculture as a share of total employment has been decreasing very slightly (between 2 and 4 percent), mostly to the benefit of the services sector, which

20 Data is from 2014, in current USD.

Figure 13: Agriculture value added to GDP (five year moving average), 1993-2013



Source: World Bank.

has generally been gaining importance except in Egypt where it has remained relatively stable. Nevertheless, even in Egypt and Morocco, the services sector currently provides most jobs.

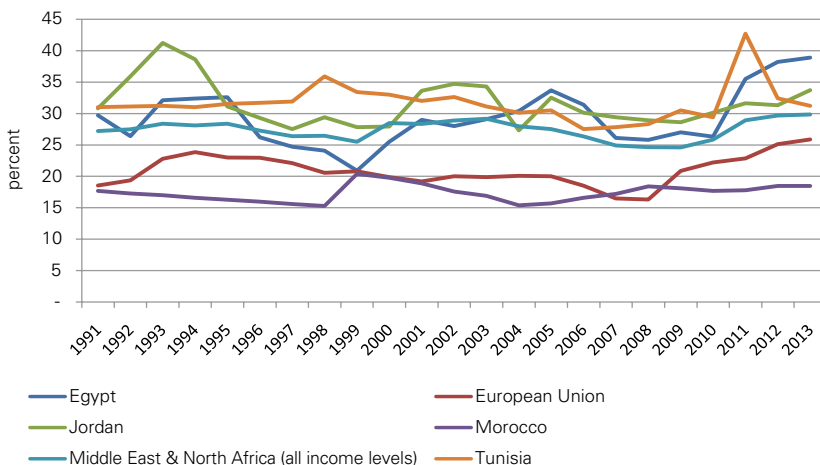
The agricultural sector is also perceived as playing a key role in fighting youth unemployment, which is a major problem in the SEMCs and one that can decisively impact their current delicate political transition. Many organizations and policy-makers argue that agriculture can be the “missing link” for youth employment. For example, the International Labour Organization (ILO) argues that “the agricultural sector has a huge potential to create jobs but needs to polish its image in order to attract more young people. To do this, governments should provide relevant education and training.”²¹

21 Cognac, Matthieu. 2 June 2014. Agriculture and Youth Employment: The Missing Link. Huffington Post (available at http://www.ilo.org/global/about-the-ilo/newsroom/features/WCMS_235524/lang-en/index.htm).

Recent data shows youth unemployment increasing for almost all the MENA countries, with the exception of Tunisia, which had a peak in 2011 (42 percent youth unemployment rate), the highest for SEMED countries, but then registered a decline in subsequent years. Egypt is the country where the youth unemployment rate has the most worrying trend, having reached 39 percent of the total labour force ages 15 to 24. Jordan too has a very high rate of youth unemployment with a recent trend of growth reaching a level of 34 percent, while Morocco has a slightly lower rate ranging between 15 and 20 percent.

This, however, is neither surprising nor a phenomenon unique to the SEMED region: youth unemployment has also risen in many EU Mediterranean countries to extremely high levels: 55.5 percent in Spain, 58.3 percent in Greece, 40 percent in Italy and 37.7 percent in Portugal, for example.²²

Figure 14: Youth unemployment, 1991-2013



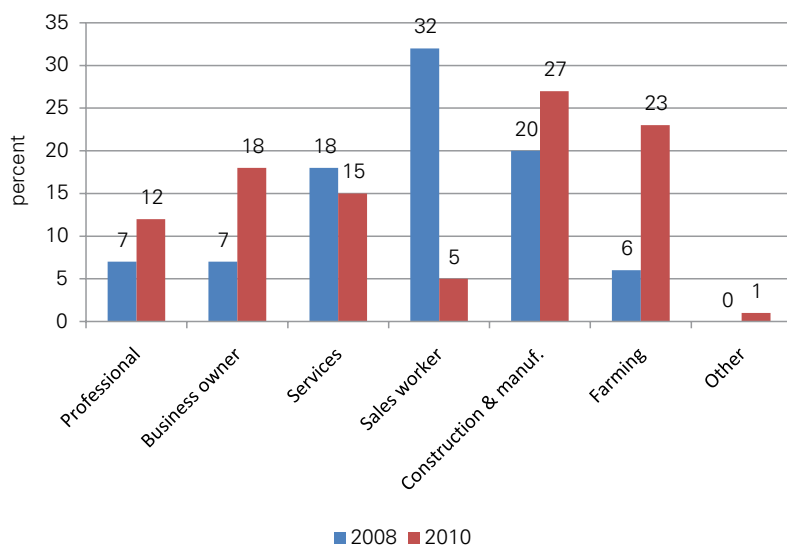
Source: World Bank (modeled ILO estimate).

Note: Youth unemployment is measured as unemployed percentage of labour force, ages 15-24.

²² EUROSTAT reported youth unemployment rate for 2013. Youth unemployment rates have to be taken with caution as the denominator is the labour force (i.e. only those young people working or looking for a job). An additional indicator is the unemployment ration, which calculates share of youth unemployed as percentage of all young population. Naturally this is much lower: 16.6 percent in Greece, 20.8 percent in Spain, 10.9 percent in Italy and 13.5 percent Portugal.

While youth unemployment has risen in all countries following the 2008 economic crisis, agriculture seems to have played a part in downplaying its effects: the African Economic Outlook 2012 has found that “**informal sector activities and farming have absorbed the impact of the [2008] crisis**.”²³ Data for a set of African countries (which includes Algeria, Egypt and Tunisia among others) shows that while agriculture employed 34 percent of youth in 2008, its share had risen to 38 percent in 2010. From the countries of interest to us, this evolution has been most striking in Egypt, as Figure 15 below suggests: agriculture’s share in youth employment increased from 6 percent before the crisis to 23 percent in 2010.

Figure 15: Egypt youth employment by occupation, 2008 and 2010



Source: African Economic Outlook, OECD 2012.

While this is an indication of the agriculture sector’s capacity as a “buffer” for employment in times of economic stress, for it to become part of a long-term solution to the youth unemployment problem, important changes have to take place. For example,

²³ OECD Development Centre. 2012. African Economic Outlook 2012: Promoting Youth Employment.

improvements have to be made in order to attract the young and to make agriculture profitable, competitive, and dynamic. For rural young women and men, who typically cannot afford to be unemployed or inactive, working in agriculture largely means having to engage in low-productivity, low-income jobs and unpaid family work in areas that generally provide fewer social services, and where they are trapped for lack of alternatives and adequate skills. This pushes many of them to move to urban areas or abroad, where they often end up in informal employment, unemployment or poverty, leading to exploitation, marginalization, social unrest, and in some cases political instability.²⁴

According to the WDR 2008,²⁵ there are good prospects for promoting rural incomes in transforming countries (see also Figure 12 above). The rapid expansion of domestic markets for high value added products such as horticulture, poultry, fish or dairy offers an opportunity to “diversify farming systems and develop a competitive and labour-intensive smallholder sector”²⁶ In parallel, export markets present another opportunity as transforming countries normally have a comparative advantage in labour- and management-intensive activities. This point is also highlighted in the OECD’s African Economic Outlook for 2012, which considers the rural sector as having the potential to be “an engine of inclusive growth and youth employment”

Finally, while agriculture is certainly part of the solution, rural unemployment should also be addressed through a broader approach that focuses on other sectors. For example, the WDR 2008 dedicated to agriculture underlined the importance of confronting rural unemployment by promoting “a dynamic rural nonfarm sector in secondary towns, linked both to agriculture and the urban economy”. The concept is to focus on agriculture-related activities that may be more attractive to young people. For example, in Morocco, a recent World Bank report on youth employment observes that the food processing and marketing subsectors seem to be much more attractive for young people

24 Promoting decent and productive employment of young people in rural areas (ILO-IFAD, 2012).

25 World Bank. 2007. World Development Report 2008. Washington D.C.

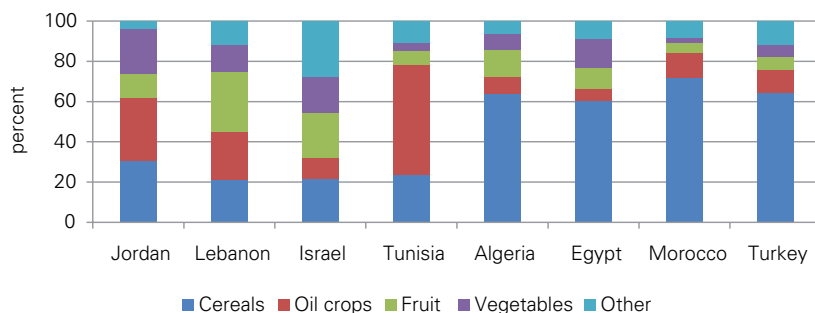
26 Ibid.

than primary agriculture.²⁷ As the report further states, these subsectors are more attractive in that they offer higher pay and better career development opportunities. As the role of the agricultural sector naturally diminishes as a share of the economy of transforming countries, facilitating labour mobility to the dynamic sectors of the economy (such as agri-processing) can be accelerated through appropriate policies, for example through investments in skills for the young.

Trends in productivity

A quick analysis of production statistics for the SEMCs reveals marked differences in land use. On one hand, Jordan, Lebanon, Israel and Tunisia dedicate only between one-fifth and one-third of their total harvested area to growing cereals (Figure 16) despite the fact that such crops are the main source of nutrition (by a large margin – see section 1 for details). These countries use most of their land resources for growing fruit, vegetables and oil crops (especially olives), which are competitive export commodities (for more detail see section 3), and rely on imports to meet domestic demand for cereals (Figure 17). On the other hand, Algeria, Egypt, Morocco and Turkey use most of their land resources (between 60 and 70 percent) for growing cereals – overwhelmingly wheat

Figure 16: Harvested area share by crop groups

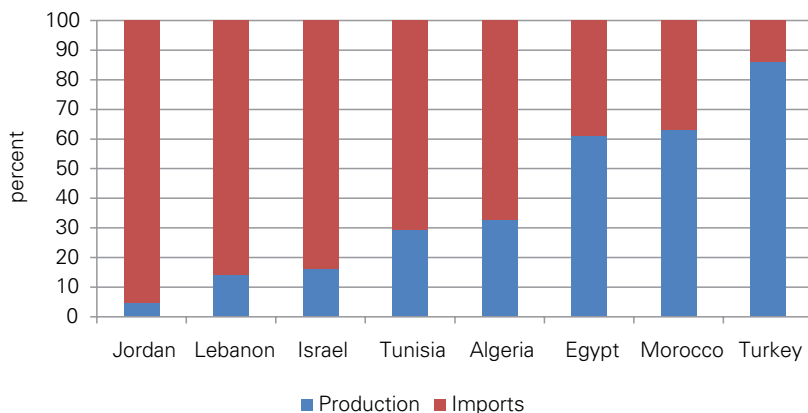


Source: FAOSTAT, 2011.²⁸

27 Kingdom of Morocco: Promoting Youth Opportunities and Participation, World Bank Report No. 68731 – MOR, June 2012, Middle East and North Africa Region, Sustainable Development Department.

28 Vegetables also include melons. The “Other” category includes roots and tubers, tree nuts, pulses and fiber crops.

Figure 17: Domestic production versus imports of cereals²⁹



Source: FAOSTAT for domestic supply; For imports: AMIS for Egypt (2012/2013 imports), USDA PSD for Morocco (2012/2013 imports) and GTIS for all other countries.

– which is mainly intended to meet domestic demand (Figure 6). These countries are, as a consequence, more self-sufficient in meeting domestic demand for cereals (Figure 17).

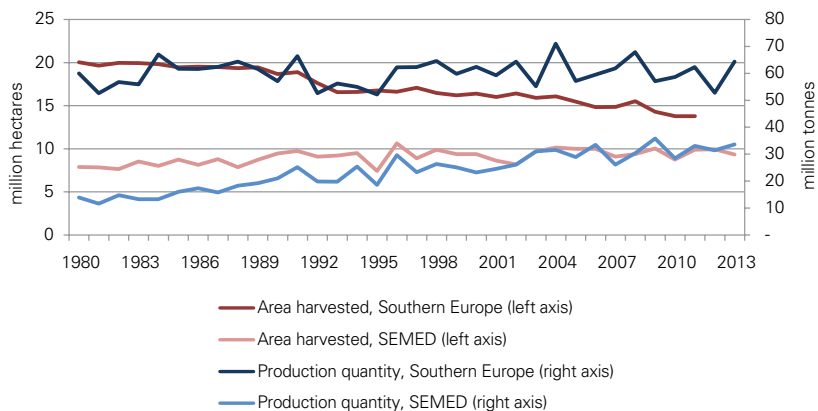
An interesting historical perspective can be obtained by comparing the cereal harvesting areas and production quantities of the four SEMED countries with those of southern Europe.³⁰ As shown in Figure 18, the SEMED region has increased both cereal areas harvested and production from 1980 to date. In the same period, southern European countries on aggregate have witnessed a major reduction in cereal hectares harvested (from about 20 million to below 15 million), while maintaining approximately the same production level (albeit with some volatility as can be seen in Figure 8).

Yields for cereals have increased at high rates for all four SEMED countries between 1980 and 2013 (by around 80 percent on

²⁹ Imports and production as percentage of total imports plus production.

³⁰ Southern Europe includes: Albania, Andorra, Bosnia and Herzegovina, Croatia, Gibraltar, Greece, Holy See, Italy, the Former Yugoslav Republic of Macedonia, Malta, Montenegro, Portugal, San Marino, Serbia, Slovenia, Spain; SEMED countries include: Egypt, Jordan, Morocco and Tunisia.

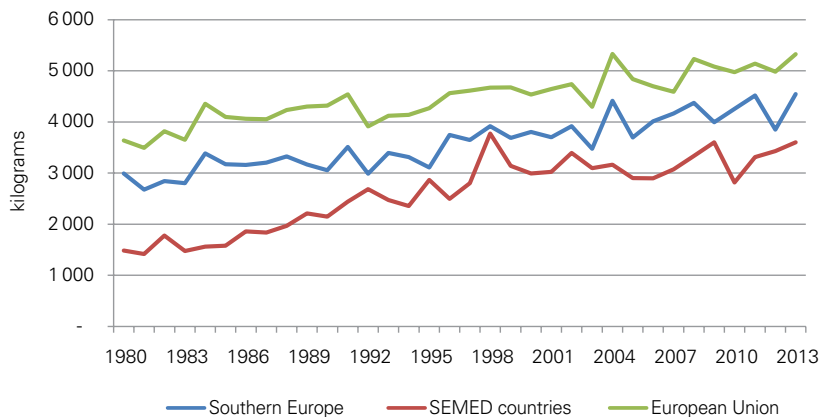
Figure 18: Cereals, area harvested and production quantity, 1980-2013



Source: FAOSTAT and author's calculations.

average) (Figure 19). Still, as highlighted in Figure 19, cereal yields in the SEMED countries have remained relatively low at around 3 400 kg/ha compared to southern European countries (3 850 kg/ha); and 40 percent lower than the European Union aggregate (around 5 300 kg/ha). Interestingly, according to FAOSTAT data the only exception is Egypt where, at a level of

Figure 19: Cereals, average yield per hectare, 1980-2013



Source: FAOSTAT and author's calculations.

7 200 kg per hectare, cereal yields even surpass the EU average. Part of the explanation could be the higher share of irrigated cereal area in Egypt compared to other countries.

As a result of the yield and area evolution, SEMED countries have achieved noticeable increases in total cereal production between 1980 and today. In aggregate terms, SEMED countries increased cereal production by 138 percent in the last three decades, passing from 14 million tonnes in 1980 to 34 million tonnes by 2013; in contrast, during the same period, production in southern Europe has remained fairly stable at around 60 million tonnes.

Regarding the dynamics by country, the only exception to the SEMED trend is Jordan, where the increase in yields was lower than the reduction in harvested cereals area resulting in a 40 percent decrease in total cereal production. The total quantity of cereals produced in Egypt has almost tripled in 30 years, reaching 23 million tonnes; and it has doubled in Morocco to a value of 10 million tonnes in 2013. The increase in production in Tunisia was slightly above 10 percent. In addition, Jordan and Morocco display high variability of annual cereal production levels (it is much less pronounced in Egypt and Tunisia).

As already suggested above by looking at the evolution in cereal yields, analysis of labour and land productivity, as well as total factor productivity (TFP) seems to indicate the region has made great progress over the past 30 years.

Looking at agricultural value added per worker (Figure 20) below shows that in all four SEMED countries, there is a positive trend consistent with the general positive trend observable in the larger MENA region. In absolute terms, Egypt is interestingly the country displaying the lowest values: in 2013, agricultural value added per worker was USD 2 470, almost one-half the average value in the other three countries considered (USD 4 500).

Unsurprisingly, the entire region still displays values far below the ones registered in Euro-Mediterranean countries (which exhibit figures that are on average ten times higher). The only SEMED country that reaches values comparable to EU countries is Turkey,

which has an agricultural value added per worker level comparable to that of Portugal. Turkey has also displayed a very high growth rate in recent years (Figure 10).

Agriculture value added per hectare of agricultural land (Figure 11) suggests that Egypt displays much higher productivity than the other three SEMED countries. It is important to note that such indicators should be taken with caution since they account for total agricultural land without distinguishing between irrigated and rain-fed areas. In fact, most of the SEMCs have poor irrigation coverage (in North Africa, according to FAOSTAT, only 21 percent of cropped land is irrigated). Egypt, however, is an important exception in this respect as almost all agricultural activity is concentrated in the 3 percent of land situated along the Nile and in its delta. This means that, with the exception of some parts of the Mediterranean coast, all crop land in Egypt is irrigated.³¹

While productivity has been increasing in the region, it seems there is still much room for improvement. For example, as suggested by the FAO-OECD Agricultural Outlook 2012, there is much potential to reduce the region's yield gap.³² Table 1 shows the yield gap for different regions and suggests that North Africa has a huge potential for improvement with a yield gap of 60 percent. This is similar to regions such as Central America, Eastern Europe or Central Asia.

Increasing cereal productivity in the SEMCs and MENA is usually seen as a valid policy agenda item. Still, it can be questionable when it is part of a major push towards self-sufficiency. This is because focusing on cereals can have major opportunity costs and result in poor resource allocation (especially for the region's water resource). It is different when promoting increases in grain productivity coupled with other policies creates a level playing field across agricultural crops and allows for the re-allocation of

31 El-Sherif, M. 1997. Section on Egypt in *Plant Nematode Problems and their Control in the Near East Region (FAO Plant Production and Protection Paper - 144)* (available at: <http://www.fao.org/docrep/v9978e/v9978e0e.htm>).

32 Taking into account differences in agro-environmental factors, deviations from potential yields are due to a number of reasons that include farm size, management capacities, access to markets and institutional and regulatory factors. Moreover, human capital, fertilizers and other inputs negatively affect the difference between potential and actual yields.

more land to higher value-added crops. Naturally, food security (including nutrition) concerns need to be carefully considered. For example, the 2008 World Development Report³³ as well as a recent joint FAO-IFPRI publication³⁴ put forward arguments for an overall shift of SEMCs focus to high value export crops such as fruit and vegetables as their production “gives landowners more entrepreneurial opportunities, creates more employment for women and landless workers, and raises agricultural wages.”³⁵ In countries with a mix of rain-fed and irrigated agriculture such as the Maghreb, “water pricing could create a natural split” whereby “cereal would be grown primarily under rain-fed conditions, and high-value crops under irrigation.”³⁶ Such a transformation could increase the dependence on imports of cereals (depending on the exact policies and market situation), but could also generate more income to cover for the costs of the additional imports and finance social protection measures to support food security targets. Ultimately, these are clearly important policy issues that will be relevant in the short to medium term as food demand in the region increases and resources are increasingly under pressure.

Figure 20: Agriculture value added per worker, 1980-2013

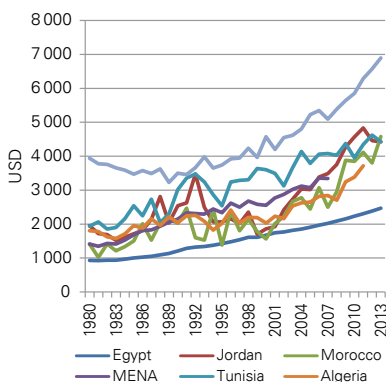
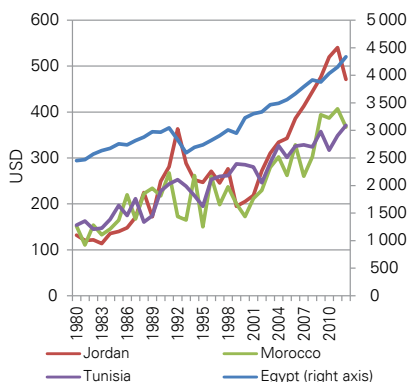


Figure 21: Agriculture value added per ha of agricultural land, 1980-2012



Source: World Bank data and author's calculations.

33 World Bank. 2007 World Development Report 2008. Washington D.C.

34 World Bank, FAO and IFPRI. 2009. Improving Food Security in Arab Countries.

35 Ibid.

36 Ibid.

Table 5: Estimates of yield gaps by region³⁷

Region	Actual yield in 2005 (% of economically attainable yield)	Yield gap (%)
Northern Africa	40	60
Sub-Saharan Africa	24	76
Northern America	67	33
Central America and Caribbean	35	65
South America	48	52
Western Asia	51	49
Central Asia	36	64
South Asia	45	55
East Asia	89	11
Southeast Asia	68	32
Western and Central Europe	64	36
Eastern Europe and Russian Federation	37	63
Australia and New Zealand	60	40
Pacific Islands	43	57

Source: FAO-OECD Agricultural Outlook 2012.

The private sector in the driver's seat

Private investment is key

Investment in the agrifood sector can be divided into four key categories depending on its source: domestic private, domestic public, foreign private and foreign public. According to FAO's 2012 *State of Food and Agriculture* (SOFA) report, private domestic investment, measured as on-farm changes in capital stock, is globally the most significant category in terms of value by far.

³⁷ Percentage of potential for cereals, roots and tubers, pulses, sugar crops, oil crops and vegetables combined for rainfed cultivated land across regions in 2005.

The data available is not perfect,^{38, 39} but still sufficient to draw the conclusion that at the global level the value of on-farm investment is over triple that of the other forms of investment combined⁴⁰ and annual investment in on-farm capital stock is estimated to exceed government investment by more than 4 to 1 and other resource flows by an even larger margin. Government expenditures are the second-largest source of investment in agriculture and play a central role in creating an enabling environment for agrifood sector investments, as they are also positively correlated with the formation of on-farm capital stock per worker.⁴¹ Government spending data includes different types of expenditures and investment.⁴² In order to only focus on investment, SOFA 2012 assumes an average of 50 percent of total government spending is on investment.⁴³ Foreign direct investment (FDI) appears to be a growing source of investment in the agrifood sectors in low- and middle-income countries, although most of it is directed toward the food, beverages and tobacco subsectors rather than toward primary agriculture (including hunting, forestry and fisheries). FDI is thus estimated to come third in terms of its share in financial flows to agriculture and the agrifood sector globally. Official development assistance (ODA) usually constitutes the least significant source of investment in terms of financial value. Looking at the SEMCs,

38 Given the lack of data, FAO's estimation of private domestic investment in agriculture includes only land development (clearance, contouring, creation of wells, etc.), livestock assets, machinery and equipment (tractors, harvesters, etc.), plantation crops (trees for fruits and nuts, sap, resin and other products), structures for livestock (including sheds). The data therefore does not include major investment typologies in the agrifood sector such as agro-processing facilities. Overall the measurement approach can therefore be seen as constituting just a lower boundary for the private sector role in agrifood sector investment.

39 An empirical analysis of investment poses important challenges because of data availability. For details see Lowder, S., Carisma, B. & Skoet, J. 2012. *Who invests in agriculture and how much? An empirical review of the relative size of various investments in agriculture in low- and middle-income countries*. ESA Working Paper No. 12-09, Rome, FAO.

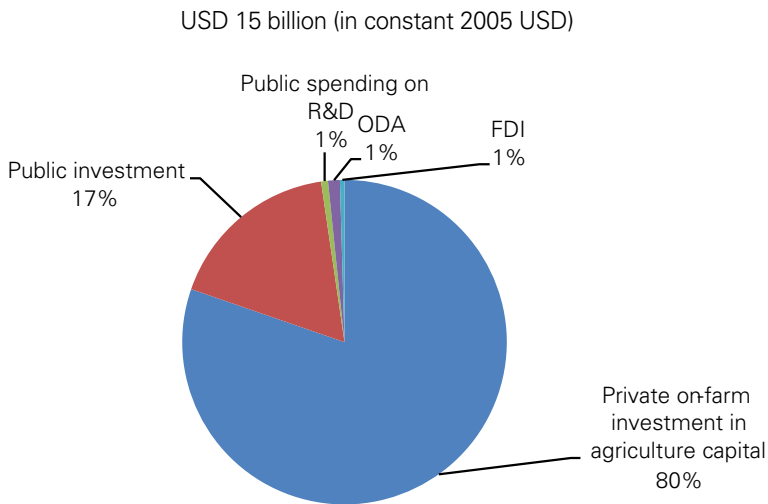
40 FAO. 2012. *The State of Food and Agriculture 2012*, p. 10. Rome.

41 Ibid, p. 22.

42 The data is based on IFPRI's SPEED database, which relies on IMF Government Financial Statistics and other country specific publications. The data covers agricultural crops and livestock and includes public spending on extension, construction and operation of irrigation, flood control and drainage systems, technical assistance and administrative services. In addition, it includes subsidies to farmers in connection with agricultural activities and operation or support of programs to stabilize or improve farm prices and incomes. It does, however, not include all type of food subsidies and other social protection measures.

43 This is based on the results of a survey of public expenditure reviews in 12 countries.

Figure 22: Average breakdown of investment sources in the agrifood sector for SEMCs,⁴⁴ 2005-2007



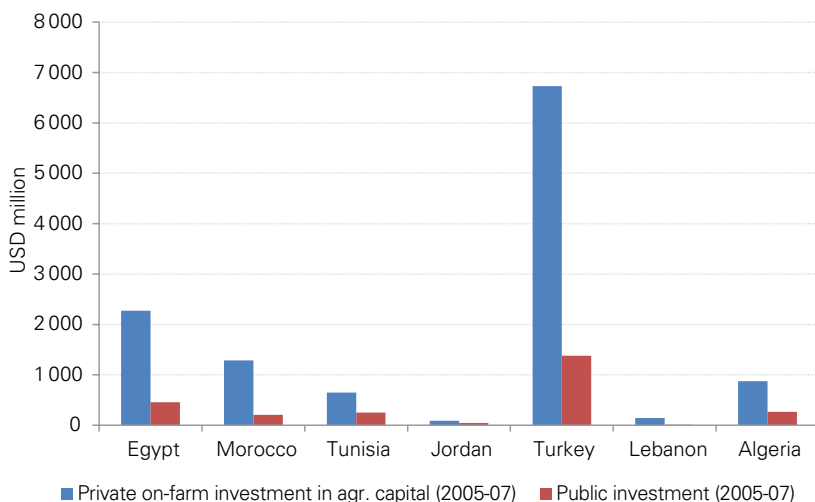
Source: Lowder, Carisma and Skoet, 2012 and author's calculations.

there is a similar pattern (Figure 22): **domestic private investment constitutes the most important form of investment in the agrifood sector**. In particular, private investment far exceeds public investments for all countries (Figure 13) by a factor of five, which is slightly above the global average.

Another source of private investment is FDI, which as indicated above accounts for about 1 percent of total investment in the agrifood sector in these countries. Data for FDI in the agrifood sector is scarce, yet from the little that is available, it would seem that **foreign direct investment was increasing⁴⁵ until 2008-2009 when the economic crisis slowed it down**. The food, beverages and tobacco subsectors usually receive the bulk of foreign direct investment in the agri-food sectors. Nevertheless, from the little data available for Egypt and Tunisia, it seems that the total value of FDI in the subsector is still

44 Data in the figure is total for the following countries: Egypt, Morocco, Tunisia, Jordan, Turkey, Lebanon and Algeria.

45 Data covers agriculture, hunting, forestry and fishing and food, beverages and tobacco.

Figure 23: Private versus public private on-farm investment, 2005-2007

Source: Lowder, S., Carisma, B. & Skoet, J. 2012 and author's calculations.

marginal as a share of agricultural GDP. The only exception amongst SEMED countries is perhaps Morocco, where FDI in food, beverages and tobacco has boomed and reached record levels of more than USD 700 million, equivalent to around 4.5 percent of agricultural GDP. FDI originated mainly from the EU (70 percent), France (21 FDI projects), and Spain (13 FDI projects), followed by Gulf countries and the United States, each with a 10 percent share.⁴⁶

Improving the quality of public spending

Following farmer investment in on-farm capital stock, the second-largest source of investment in agriculture is government expenditures. Public expenditure in agriculture is important to create an enabling environment for farm investment and has been found to be positively correlated with the formation of on-farm capital stock per worker.⁴⁷

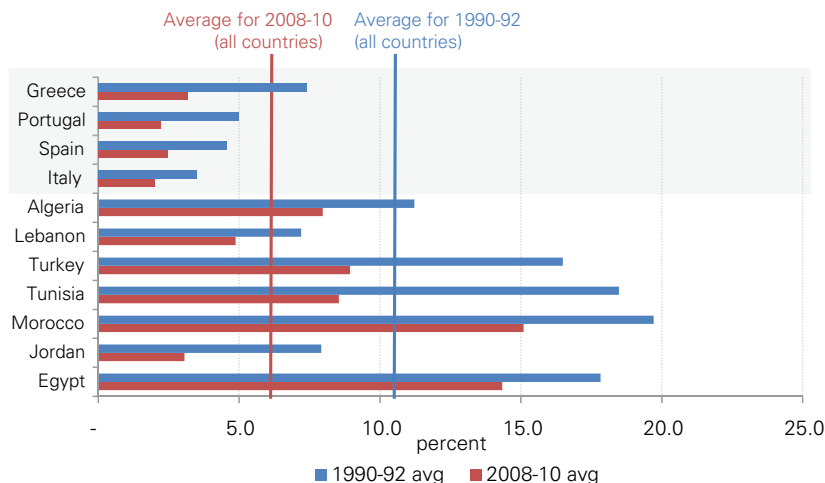
46 European Commission. 2013. Opportunités d'affaires en mediterrannee – focus sur l'agro-alimentaire au Maroc (available at <http://www.meknesinvest.ma/sites/default/files/Focus%20sur%20l'Agroalimentaire%20au%20Maroc.pdf>).

47 FAO. 2012. The State of Food and Agriculture 2012, p. 10. Rome.

Overall, government spending in agriculture has been growing in low- and middle-income countries over the last three decades, although it has tended to do so more slowly than expenditures in other sectors of the economy. As a consequence, the share of government spending in agriculture out of total government spending has tended to decline. SEMCs are no exception to this trend: the share of government spending in agriculture out of total spending has been decreasing as agriculture's importance in the overall economy has diminished. Figures 14 and 15 below show the share of agriculture value added in the economy's total and agricultural spending as a percentage of total government spending. This is shown for a selection of Mediterranean countries.

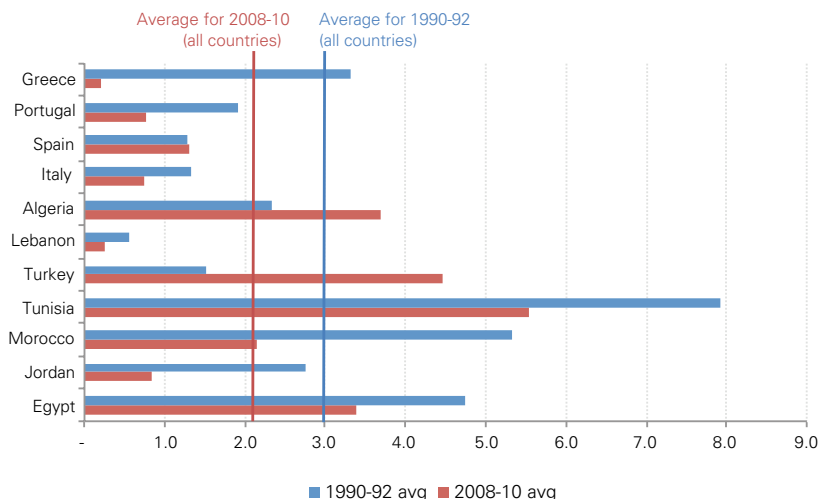
On average, the share of agriculture in the economy declined from about 14 to 9 percent of value added between 1990-92 and 2006-08 for our selection of SEMCs (all in the figure except Italy, Spain, Portugal and Greece) while the share of agriculture in total public spending declined from 3.6 to 2.9 percent in the same period. For the higher income

Figure 24: Agriculture value added as percentage of total GDP⁴⁸



Source: World Bank and author's calculations.

48 Not all countries use 1990-92 data because of availability - 1994-96 for Lebanon, Algeria; 1995-97 for Spain, Portugal and Greece; also not all countries use 2008-10 data: 2005-07 for Egypt and Morocco; 2006-08 for Turkey and 2007-09 for Lebanon and Algeria.

Figure 25: Public spending in agriculture as percentage of total spending

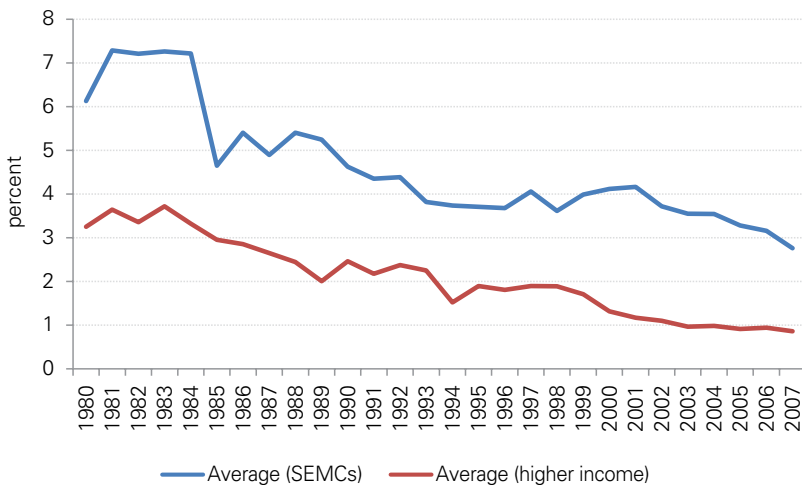
Source: IFPRI SPEED database and author's calculations.

countries, the share of agriculture in total government spending was already low in 1990-92 (an average of 2 percent for the four countries) and was reduced to an average of 0.8 percent in 2008-10. In the same period, the share of agriculture in the overall economy was halved to an average of just 2.5 percent of total value added in 2008-10.

The decrease has been most spectacular in Tunisia where this share fell from 20 percent to 5 percent in 30 years. In the other countries this decrease has been slower. As a result, Tunisia and Egypt were not able to reach the target set at the 2003 Maputo Declaration on Agriculture and Food Security in Africa, whereby African States committed "to the allocation of at least 10 percent of national budgetary resources to agriculture and rural development policy implementation within five years".⁴⁹ Moreover, since the mid-2000s, average public spending in agriculture as a percentage of total spending in the SEMCs has reached the level of higher income Mediterranean economies in the early 1980s (Figure 26).

49 From the SEMED countries, only Tunisia and Egypt are members of the African Union. The Maputo Declaration on Agriculture and Food Security, 2003 is available at: http://www.nepad.org/system/files/Maputo_percent20Declaration.pdf.

Figure 26: Average public spending in agriculture as percentage of total spending, 1980-2007⁵⁰



Source: IFPRI SPEED database and author's calculations.

Strategic directions

Subsidies: a delicate balance

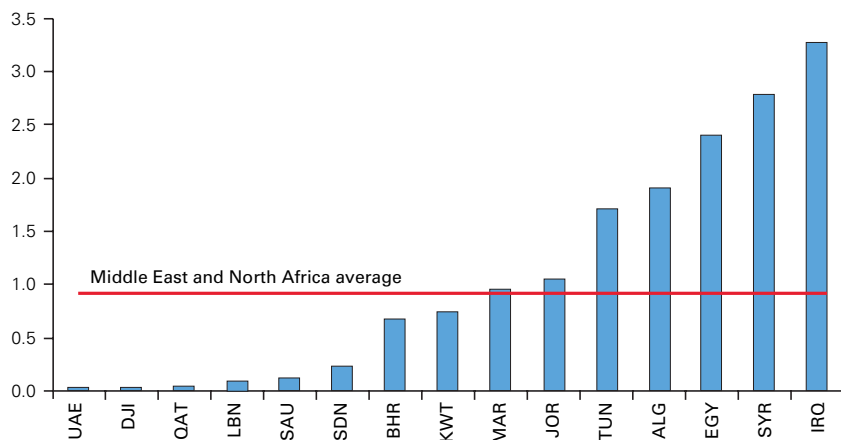
A common feature across SEMCs is the significant public spending in the form of subsidies as part of their social security nets. For decades, governments in the Arab world have relied on subsidies to lower the costs of energy and food for the final consumer with the aim of protecting the poor and redistributing wealth. Subsidies have increased in response to the commodity price increases of 2008 and also as a reaction to a fragile political equilibrium following the wave of political upheaval and change that has affected the region since late 2010. Nevertheless, they have often been said to be expensive, inefficient, more beneficial for the rich than poor, and have distorting effects on consumption and economic

⁵⁰ Average (SEMCs): un-weighted average including Egypt, Morocco, Jordan, Tunisia, Turkey, Lebanon and Algeria; Average (higher income): un-weighted average for Italy, Spain, Portugal and Greece; data for Lebanon, Algeria and Portugal only available respectively from 1993, 1994 and 1995 onwards.

activity.⁵¹ Food subsidies in the MENA region are lower than fuel and electricity subsidies but are still sizeable: on average they represent almost 1 percent of GDP (MENA region average according to IMF data for 2011; Figure 17 below).⁵²

Food subsidies take several forms including in-kind transfers, government production and distribution of foodstuffs, government-managed sale of foodstuffs at below market prices, price regulation. Moreover, the data presented here (from the International Monetary Fund [IMF]) is in addition to the SPEED database information on public spending, which has been shown above. As an example, Egypt in 2007 was

Figure 27: Food subsidies in MENA countries, percent of GDP, 2011



Source: Sdravovich, C., Sab, R. Younes, Z. & Albertin, G. *Subsidy Reform in the Middle East and North Africa*, IMF 2014.

spending almost USD 900 million (in 2005 constant USD) as part of public domestic outlays in the agrifood sector, which translated into around 0.8 percent of total Egyptian GDP. This includes investments but also expenditures in farm level subsidies and other farmer income measures. This is still quite

⁵¹ Ibid.

⁵² Sdravovich, C., Sab, R. Younes, Z. & Albertin, G. 2014. *Subsidy Reform in the Middle East and North Africa*. IMF (available at <http://www.imf.org/external/pubs/ft/dp/2014/1403mcd.pdf>).

small compared to the value of food subsidies, which reached about 2.5 percent of Egyptian GDP (IMF data for 2011).

While subsidies can play a key role in the political transition, they also have many well-recognized disadvantages. Besides the fiscal burden (which may remove budgetary space for other types of spending) and governance problems, subsidy schemes may also create distortions in the allocation of resources (for example higher energy intensity because of cheaper energy) and in consumption decisions because of relative price changes (for example toward wheat products). In addition, analysis conducted by the IMF⁴² seems to suggest that subsidies in the MENA region are not well targeted. Food subsidies generally perform better than fuel and energy because of self-targeting mechanisms through product quality (for example only subsidizing the price of low quality bread which is not bought by higher income households) and food rationing schemes/queuing (which raise access costs). However, food subsidies still perform worse than an even cash handout would: based on household survey data for 2004 and 2009, IMF reports⁴² that the three richest quintiles in the Egyptian population receive an estimated 37 percent of benefits from wheat subsidies. In Morocco and according to the same analysis, only around 27 percent of total wheat subsidy benefits go to the two poorest quintiles of the population. The same can be said regarding bread subsidies: the top 40 percent richest households in the income distribution receive an estimated 50 percent of the baladi bread benefits in Egypt and about one-third of the bread subsidies in Jordan and Lebanon.

By representing significant proportions of SEMCs' GDPs, food subsidies are an important reason for **the overall tight fiscal space available, which in turn limits any substantial increase in public spending in agriculture.** In fact, all oil-importing SEMCs had fiscal deficits in 2012 and they all increased since 2010 in parallel to a large and rising public debt level (except in Turkey where the situation has been improving). Morocco, for example, is currently in a process of fiscal consolidation with government having set a target of a 3 percent fiscal deficit by 2017, mainly through a reduction in

subsidies (and to a lesser extent the wage bill) given that tax revenue is already among the highest in the region.⁵³

In the short and medium-term, it is clear that many governments in the region will continue to face social pressure given fragile domestic political situations and especially in a post-Arab spring context. Promoting economic growth requires sound, market-driven policies but also measures to assure political transition and maintain macroeconomic stability. This will require public investments in critical infrastructure to sustain growth in the agrifood sector, but also an adequate level of social safety nets to protect the poor and vulnerable. The efficiency of public spending can be improved to gain fiscal space and this includes, *inter alia*, increasing the quality of public spending in the agrifood sector (with a focus on critical public infrastructure, regulation, the creation of a business enabling environment, and public-private partnerships) and improving efficiency of social protection policies (improved targeting, use of appropriate policy instruments). The latter has already started to take place. For example, the IMF review reports that the Moroccan Government is currently looking into options to reduce the cost of sugar and wheat flour subsidies. In addition, in a recent move the Egyptian government has started reforms in the subsidy system and, among others, introduced a subsidy smart-card which has been rolled out in 19 out of Egypt's 27 governorates as of January 2015. Although there are no signs that the government is considering a transition to cash subsidies any soon, this move may pave the way for better targeting of the subsidies.

Medium and long-term plans and strategies

Medium and long-term plans and strategies, which have been developed in almost all the SEMED countries, aim at improving economic and social development starting from improvements in the agricultural sector, taking into account environmental sustainability, and the related efficiency of domestic natural resources, rural poverty and food safety. Due to the different "weights" of the agricultural sector in each economy of the four SEMED countries, it is not surprising that strategic targets

53 IMF. 2015. Morocco – First Review under the Arrangement under the Precautionary and Liquidity Line, staff report.

and the strategic role assigned to agriculture are different. On one hand, Morocco and Egypt, where agriculture still has a fundamental role in the economy, have strategies covering all the aspects related to rural development. On the other hand, Jordan and Tunisia – already part of the “urbanized countries”, and where agriculture’s role in GDP has decreased – put a greater emphasis on specific issues, such as the use of natural resources (e.g. water scarcity, land depletion, etc.) or food security in selected areas of the country.

In 2009, **Egypt** developed the **Sustainable Agricultural Development Strategy 2030**, which includes six major strategic objectives: (i) using natural resources more sustainably by enhancing water-use efficiency in irrigated agriculture; (ii) increasing the productivity of both land and water units; (iii) raising the degree of food security with regard to strategic commodities; (iv) increasing the competitiveness of agriculture products; (v) improving the economic climate for agriculture investments; and (vi) enhancing the creation of job opportunities, particularly for rural youth. In addition, the Strategy draws the attention to the need of improving the institutional context, highlighting the importance of producers’ associations for the better marketing of small-holder farmers’ production, making market information more freely available, enforcing laws and regulations on product standards, linking agricultural extension more closely to research and developing the private sector’s role in providing extension services.

In 2008, **Morocco** adopted the “**Plan Maroc Vert**” (PMV) strategy to lead and reform the agricultural sector, promote the integration of agriculture into international markets and help agriculture achieve sustainable growth. Most importantly, the PMV recognizes how the agrifood sector is of critical importance for the socio-economic development of the country. The PMV relies on two pillars supported by structural reforms: pillar one focuses on developing high value-adding, highly productive farming systems and agro industry through an integrated value chain model (including improved farmer linkages) and pillar two promotes poverty reduction in rural areas through increasing incomes of small scale agriculture in unfavoured areas. Structural reforms

in the Plan targeted land tenure policy, water policy and development of regional agro-tech platforms. They also focused on institutions and governance, especially through the **creation of the Agricultural Development Agency**, which is in charge of (i) monitoring the implementation of the new agricultural strategy, (ii) linking with private or social investors and (iii) promoting and managing the implementation of the integrated value chain model ("aggregation"), providing linkages between the different partners. The PMV brought two interesting strategic innovations: first, it stressed the importance of promoting a modern, profitable agriculture sector, which is integrated in world markets (pillar one) and uses agriculture as a means for raising incomes in rural, unflavoured areas (pillar two). Second, the PMV seeks to increase overall value-addition of Morocco's agricultural sector through focusing on products for which the country can be competitive internationally (olives, fruits and vegetables) while simultaneously seeking to improve cereal productivity to be able to lower planted areas.

In **Jordan**, the **National Strategy for Agricultural Development (2002-2010)** focused on sustainable agricultural and protection of natural resources. It promoted sustainable agricultural development and improving food security in selected areas (highlands, Jordanian Badia and the Ghor) by (i) improving rural people's access to technology and resources, (ii) ensuring optimum use of resources such as soil and water and (iii) improving access to financial services and marketing support. As water is the most precarious natural resource in the country, the Government of Jordan pays specific attention to water scarcity. The most recently developed strategy is the "Jordan's Water Strategy 2008-2022: Water for Life" that specified drinking water as the main priority in water allocation, followed by industry and agriculture. It focused in particular on reducing the annual water allocation for irrigation (in favour of domestic and industrial demand) by improving efficiency through appropriate water tariffs, the use of new technologies, and incentives for farmers to improve the efficiency of on-farm irrigation.

The recent strategic plans of **Tunisia** focus on the development of the agri-food industries sector than primary agricultural production. In addition, its development strategy “Stratégie de Développement Economique et Social 2012-2016” highlights the sustainable use of soil and water, while recognizing the special role of agriculture in the development of certain regions. The most recent **11th five-year plan for agricultural policy (2010-2014)** was based on four main pillars: (i) the consolidation of food security as a national sovereignty vector, (ii) improving the competitiveness of the sector, (iii) the promotion of exports as an engine of growth and (iv) the promotion of natural resources as a fundamental basis for sustainable agricultural development.

Chapter 3 - Focusing on comparative advantage

At a glance

Highlights

- The total agrifood trade of SEMCs is growing significantly, reaching almost USD 100 billion in 2013;
- With the exception of Turkey, these countries have large and widening agrifood trade deficits ranging between 1 and 6.5 percent of GDP;
- Food trade deficits in the region are highly vulnerable to world prices of grain and oilseeds and their derivatives given that they account for about one-half of the food import bill;
- Agrifood exports from the region are on the rise and with a growing share of processed goods in total exports;
- For many of these countries there is still a low degree of trade diversification both in number/typology of products and/or number of key trade partners;
- Countries in the region show low comparative advantage in cereals but high comparative advantage in fruit and vegetables and processed goods.

Policy Relevance

- Policies that improve the efficiency of import value chains, and cereals in particular, are critical to supporting food security in the region;
- Improving import efficiency will require infrastructure investments and simplified administrative procedures, among other changes. It will require both public and private sector interventions given the type and size of investments needed;
- A policy mix that aims to leverage comparative advantages should support the export growth of higher value-added products, which would constitute a substantial shift away from self-sufficiency-oriented food security policies currently in place.

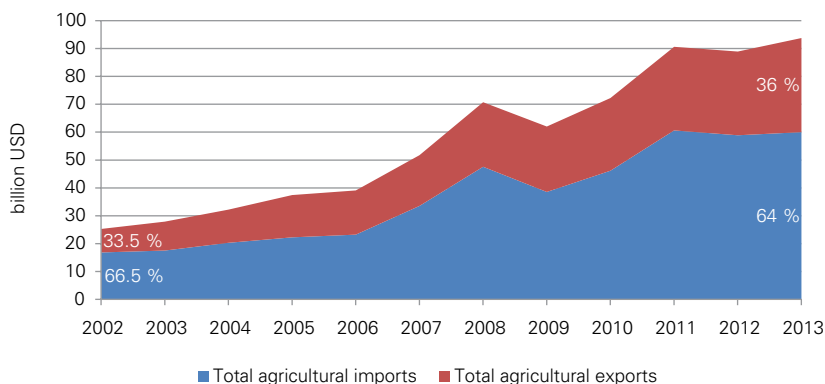
Growing trade and increasing cereal dependence

Total trade in agricultural and food products between selected SEMCs and the rest of the world has increased approximately four-fold since 2002, reaching almost USD 100 billion. This spectacular increase is due to growth in both imports and exports, although imports accounted for the bulk of the USD 69 billion increase in trade between 2002 and 2013 (around 63 percent). The region as a whole therefore remains in a trade deficit, with agricultural exports representing only slightly more than one-third of total agricultural trade flows.

As can be seen from Figure 2, all countries in the region with the exception of Turkey are net importers of food – and their trade deficits have widened over the last decade. Algeria and Egypt's trade deficits are particularly high and witnessed considerable growth between 2002 and 2013, from USD 3 to 19 billion in Algeria and from USD 2.5 to 9 billion in Egypt. Turkey is the only Euromed partnership country with a trade surplus in agriculture, and it has in fact grown quite substantially in the last decade from USD 700 million to USD 3.5 billion.

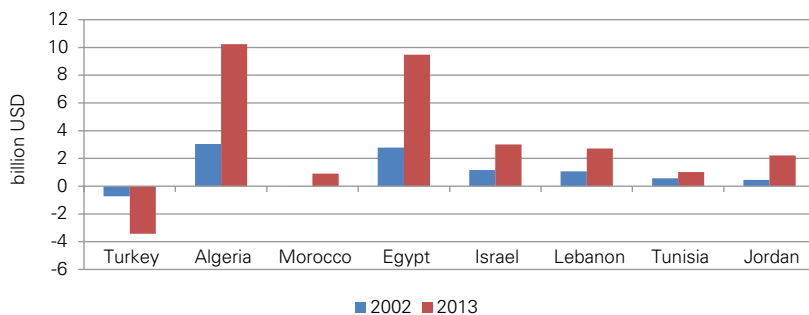
Trade deficits in agricultural and food products in the analyzed countries are often significant proportions of their respective GDPs: the figure is as high as 3.5 percent in Egypt, 5 percent in Algeria and more than 6 percent in Jordan and Lebanon (Figure 3). In the net

Figure 28: SEMC agricultural trade with world, 2002-2013



Source: GTIS and author's calculations.

Figure 29: SEMC agricultural trade deficit with world, 2002 and 2013

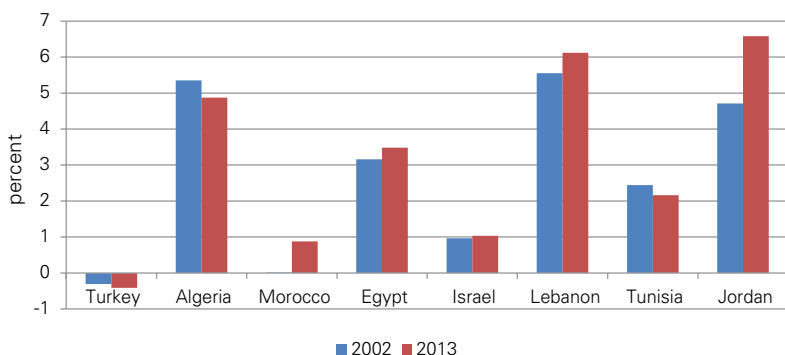


Source: GTIS and author's calculations.

food importing countries in the region (i.e. all except Turkey), trade deficits in agriculture are equivalent to or higher than 1 percent of the respective country's GDP, and in most cases this number has increased over the last decade.

As has been mentioned in other sections of this report, the SEMED region is characterized by an extremely high consumption of cereals despite limited local production. Cereals thus account for a very large proportion of most agricultural trade deficits in the region (see Table 6) and the increasing value of trade deficits can largely be

Figure 30: SEMC agricultural trade deficit with world as percentage of GDP, 2002 and 2013



Source: GTIS and author's calculations.

attributed to an increase in cereal imports. As an illustration, between 2002 and 2011 trade deficits in cereals increased by USD 4 billion in Egypt, the world's largest wheat importer; by almost USD 3 billion in Algeria; and by more than USD 1 billion in Morocco⁵⁴. Given demand patterns, imports of cereals in the region can be expected to continue increasing since the SEMCs have a low comparative advantage in producing them. Most of the increase in the value of imports since 2002 has, however, been due to price increases given the evolution of international cereals and oilseeds prices: around two-thirds of the rise in regional import values is due to growing prices rather than volume.

Already in 2011, the total USD value of cereal imports from the eight selected countries in Table 6 was approximately double of that of the EU-28 countries combined. Thus, improving the inefficient cereal import chain alone can already have important positive consequences on most countries' import bills and contribute to the region's food security. For instance, a recent FAO wheat sector review for Egypt⁵⁵ estimates that the complexities in the wheat import tender system for the General Authority for Supply Commodities (GASC), a state agency importing almost one-half of

Table 6: Trade deficit in cereals for selected countries ordered by 2011 USD value

Country	Share of cereals imports in total agrifood imports (average 2009-2011), %	Trade deficit in cereals in 2002 (USD million)	Trade deficit in cereals in 2011 (USD million)
Egypt	37	1 305	5 376
Algeria	35	1 285	4 022
Morocco	34	707	1 938
Israel	20	383	1 049
Turkey	13	253	888
Tunisia	33	426	847
Jordan	20	217	551
Lebanon	11	113	350

Source: FAOSTAT and author's calculations.

⁵⁴ Discrepancies with the figures observed in Figure 29 are due to differences in the values of agricultural trade deficits in 2011 and 2013. For instance, Morocco's agricultural trade deficit in 2013 was about USD 1 billion in 2011 but USD 2.5 billion in 2011.

⁵⁵ FAO Investment Centre. 2015. Egypt: Wheat Sector Review (unpublished draft).

imported wheat in the country, account for more than USD 30 million annually. The report also identifies another USD 43 million that could be saved through modernizing wheat storage systems. Reducing burdensome bureaucracy and updating technology and supply chain logistics could moderate the cost of importing wheat in SEMCs.

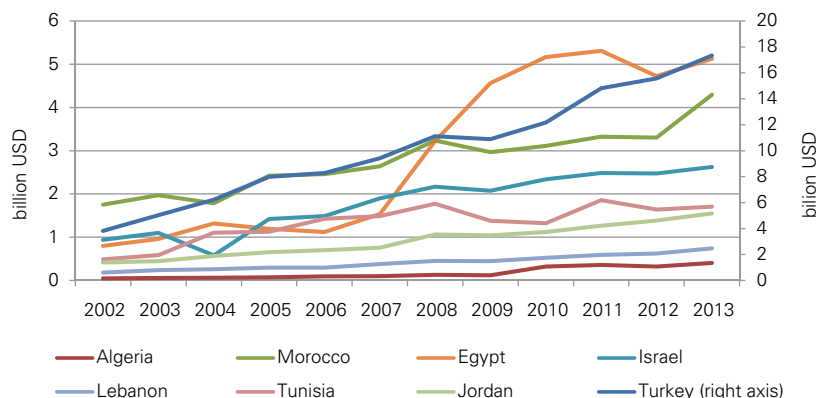
Growing and increasingly “sophisticated” agrifood exports

While the countries in the region have witnessed a substantial increase in trade deficits, they have also experienced growing agricultural and food exports, in some cases quite dramatically (Figure 31). In absolute terms, Turkey led the group with an increase of about USD 4 billion in agrifood exports over the past decade. In relative terms, however, it is Egypt that has witnessed the most significant increase, surpassing Morocco to become the largest exporter of such goods in the region after Turkey (Box 1).

Box 1: A closer look at Egypt’s agrifood exports

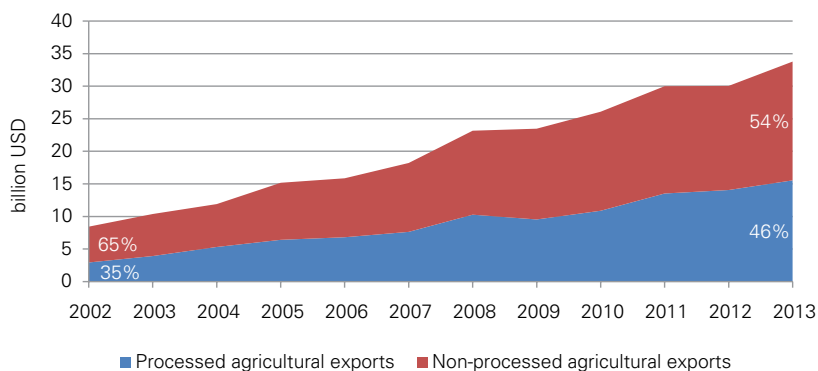
Egypt’s impressive growth in agri-food exports is mainly due to a six-fold expansion in fruit and vegetable exports from 2006-09, rising to about 40 percent of the country’s total. In particular, oranges, which accounted for more than one-half of the country’s fruit exports in 2013, registered an almost eight-fold growth in the same period. Export growth has been most spectacular for dairy products, which increased 13 times from 2006-2009. By 2013, their share of total agrifood exports was 10 percent, up from about 3 percent in 2005. Vegetable oils such as sunflower and maize oil also registered substantial gains, reaching values well above USD 300 million in 2013 from the mere USD 10-15 million that they represented before 2006. The growth in dairy exports is mainly due to an increase in cheese exports to other countries in the MENA region. Similarly, most vegetable oil exports are almost exclusively destined to the lower-income countries of the region. This is in stark contrast with fruit and vegetables exports, a large proportion of which make it to higher-income markets such as the United Kingdom, Germany, the Netherlands or Italy. This could be explained by the fact that Egypt produces low-value dairy products that can be exported to the lower-income MENA countries but face difficulties being marketed in the EU as consumers there have higher quality demands and these products often do not meet EU quality standards. As an example, the average price of one tonne of exported cheese from Egypt was about USD 4 500 in the period 2011-13, while it was about USD 7 000 for exports from the EU.

Figure 31: Evolution of agrifood exports from SEMCs, 2002-2013



Source: UN Comtrade.

Figure 32: Total agricultural exports from SEMCs to the world, 2002-2013



Source: UN Comtrade.

Another positive trend that can be outlined is the increasing “sophistication” in SEMC exports: in 2013, processed goods represented 46 percent of total agrifood exports as compared to 35 percent in 2002 (Figure 32). This is due to higher exports of products such as canned fish, canned vegetables and vegetable-based preserves, pasta, olive oil and cheese, which have developed in part because of the emergence of a local food processing industry.

Figure 33: Sophistication of exports by country, 2002

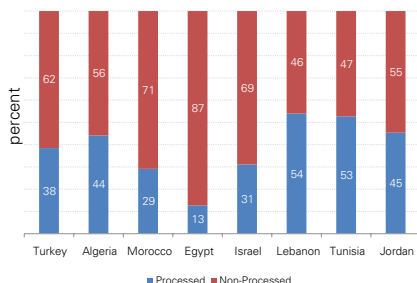
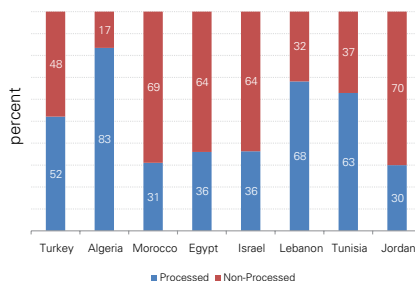


Figure 34: Sophistication of exports by country, 2013



Source: UN Comtrade.

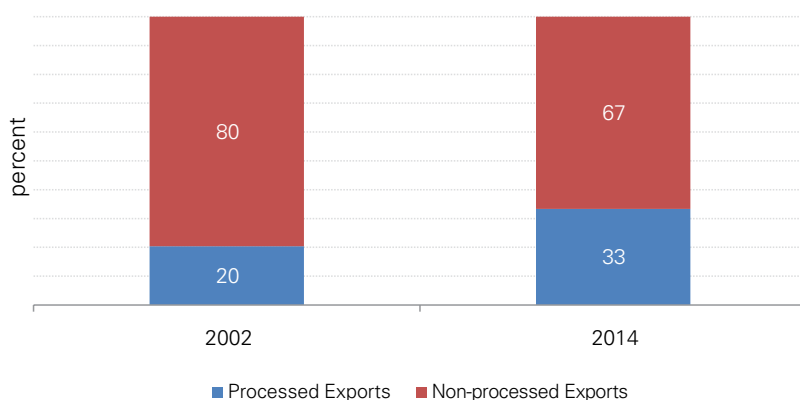
Looking more in-depth at individual country dynamics, increasing export sophistication seems to be a trend common to all the countries (Figures 33 and 34) with the exception of Jordan, where an important increase in the export of fruit and live animals has caused a decreasing share of processed goods in total exports. Processed agrifood export categories that have increased significantly include: wheat flour and food preparations in Turkey (from values below USD 100 million in 2002 to about USD 1 billion and USD 750 million respectively in 2013), refined sugar in Algeria (from marginal levels to more than a quarter of a billion dollars in 2013), olive oil in Tunisia (from less than USD 40 million in 2002 to almost USD 300 million in 2013) and vegetable oils and cheese in Egypt as previously mentioned.

Trade with the EU is a good example of the trend towards more sophisticated exports from the region. In fact, processed exports have grown faster than non-processed ones and currently constitute about one-third of total agrifood exports to the EU (Figure 35). In addition to the traditional fruit and vegetables, agrifood exports from the region to the EU increasingly include other, higher value-added products: food preserves and other food preparations (from fruit, vegetables, fish, meat, etc.), animal and vegetable oils (mostly olive oil and maize oil), as well as refined sugars and sugar confectionary. Figure 36 provides more detail on the growth of exports to the EU of processed agrifood products relative to other types of export commodity groups (mainly fruit and vegetables).

Agrifood export diversification and comparative advantage

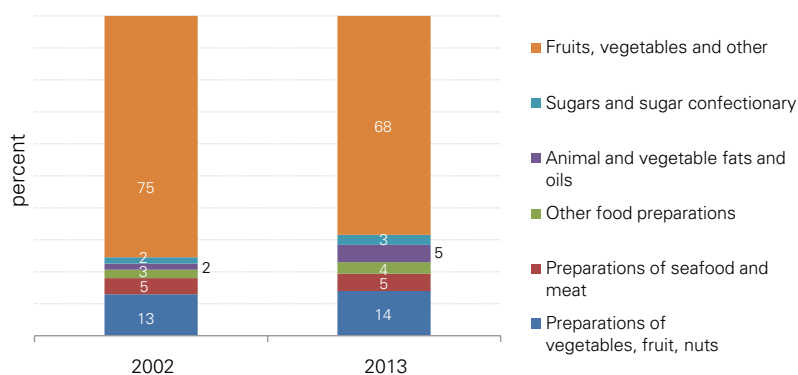
Another interesting characteristic of agrifood trade in the region is the low degree of export product diversification with a few products, sometimes just one or two, constituting the bulk of agrifood exports. This is visible in Table 7, which shows the top five agrifood

Figure 35: Share of SEMC processed agrifood exports to the EU, 2002 and 2014



Source: GTIS and author's calculations.

Figure 36: Main processed agrifood product groups as share of SEMC total agrifood exports to the EU, 2002 and 2013



Source: UN Comtrade.

Table 7: Top five agrifood exports by value by country (USD million) and their cumulative share of total exports, 2013

Agrifood export ranking	Turkey			Egypt			Lebanon			Israel		
	Product	Export value (USD million)	Cumulative share of total (%)	Product	Export value (USD million)	Cumulative share of total (%)	Product	Export value (USD million)	Cumulative share of total (%)	Product	Export value (USD million)	Cumulative share of total (%)
1st	Hazelnuts	1 024	6	Oranges	487	10	Non-alcoholic beverages	49	7	Peppers	226	9
2nd	Wheat or meslin flour	948	11	Cheese	233	14	Prepared nuts and seeds (excl. peanuts)	40	12	Food preparations (not fruit, vegetables or meat)	218	17
3rd	Baked dough products	879	16	Onions and shallots	202	18	Chocolate and other cocoa preparations	40	17	Fruit juice	217	25
4th	Prepared nuts and seeds (excl. peanuts)	675	20	Grapes (Fresh)	179	22	Prepared vegetables	38	23	Sowing seeds	141	31
5th	Poultry meat	608	24	Potatoes	169	25	Potatoes	37	28	Dates	132	36

Agrifood export ranking	Morocco			Jordan			Tunisia			Algeria		
	Product	Export value (USD million)	Cumulative share of total (%)	Product	Export value (USD million)	Cumulative share of total (%)	Product	Export value (USD million)	Cumulative share of total (%)	Product	Export value (USD million)	Cumulative share of total (%)
1st	Edible Molluscs	532	12	Tomatoes	316	20	Olive Oil	482	28	Refined Sugar	272	67
2nd	Preserved sardines	440	23	Live sheep	198	33	Dates	234	42	Dates	30	75
3rd	Tomatoes	425	33	Peaches and nectarines	96	39	Pasta	66	46	Non-alcoholic beverages	29	82
4th	Mandarins	239	38	Food preparations (not fruit, vegetables or meat)	75	44	Maize oil	59	49	Mushrooms	18	86
5th	Frozen fish	174	42	Processed tobacco	56	48	Baked dough products	46	52	Pasta	14	90

Source: FAOSTAT, 2011.

exports⁵⁶ in terms of value for a selection of countries in 2013. In addition, the table also shows the cumulative share of total agrifood exports that each of the top five products represent. Finally, the countries have been ordered from highest degree of export product diversification to the lowest level (starting from the top left with Turkey

⁵⁶ The different products taken into consideration correspond to Harmonized Commodity Description and Coding System (HS) product categories at the 4-digit level. This harmonized system of tariff nomenclature is an internationally standardized system of names and numbers to classify traded products. It came into effect in 1988 and has since been developed and maintained by the World Customs Organization (WCO). Morocco's agricultural trade deficit in 2013 was about USD 1 billion in 2011 but USD 2.5 billion in 2011.

to the bottom right with Algeria). This simple analysis indicates two different country groups and paths of export diversification.

First, the countries in the second row (Algeria, Tunisia, Jordan and Morocco) all show a low degree of export product diversification: for instance, refined sugar exports alone account for more than two-thirds of Algeria's agrifood exports; preserved fish and molluscs, tomatoes and tangerines account for one-third of Morocco's exports; and olive oil represents almost one-third of Tunisia's agricultural and food exports.

Second, countries such as Turkey, Egypt, Israel and Lebanon (first row in Table 2) have a more diversified set of agrifood export products and this seems to have been increasing over the years. In fact, the top five agrifood export product categories represent between 24 and 36 percent of total exports for this group of countries. This is similar to the level of developed economies: as a matter of comparison, the five top agrifood export products of the EU-28 countries combined account for 26 percent of total exports, while those of a major exporter such as France comprise around 34 percent.

Although countries in the region exhibit different patterns of export product differentiation, there seem to be similarities in terms of the products that display a comparative advantage. This characteristic is shown in Table 3 below, which shows the Balassa Export Revealed Comparative Advantage index (XRCA) for HS chapters 01 to 24 for the countries under study. The XRCA provides an indication of products for which a country has a comparative advantage but it is by no means a perfect indicator, first because it is static and second because it can be highly influenced by distortive policies of both the exporting country and its trading partners.

Table 8 shows the top and bottom three agrifood export products ranked by their XRCA. An XRCA above unity suggests a country has a comparative advantage in that product since the share of that good in total country exports is higher than the same ratio at the global level. An XRCA below one indicates the country would not have a comparative advantage in that product. The data analysis suggests that countries in the region have a comparative advantage primarily in fruit and vegetables, olive oil, and processed goods. In addition, certain countries exhibit a particular advantage in specific product groups. This is the case of olive oil in Tunisia and fish products in

Table 8: Revealed comparative advantage (XRCA): top and bottom three product groups out of 24 HS 2 digit groups

Rank	HS Code	Group	Turkey			Egypt			Lebanon			Israel								
			2011	2012	2013	HS Code	Group	2011	2012	2013	HS Code	Group	2011	2012	2013					
#1	11	Products of the milling industry; malt; starches; inulin; wheat gluten	7,59	6,91	7,19	7	Edible vegetables and certain roots and tubers	9,45	8,48	10,21	20	Preparations of vegetables, fruit, nuts or other parts of plants	8,85	7,52	8,80	7	Edible vegetables and certain roots and tubers	2,58	2,61	2,41
#2	8	Edible fruit and nuts; peel of citrus fruit or melons	5,60	5,04	4,82	8	Edible fruit and nuts; peel of citrus fruit or melons	7,02	6,77	6,71	11	Products of the milling industry; malt; starches; inulin; wheat gluten	2,36	3,72	7,55	6	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	2,21	1,86	1,83
#3	20	Preparations of vegetables, fruit, nuts or other parts of plants	3,46	3,49	3,42	13	Lac, gums, resins and other vegetable saps and extracts	15,90	9,34	5,89	21	Miscellaneous edible preparations	2,89	3,60	5,21	8	Edible fruit and nuts; peel of citrus fruit or melons	1,40	1,61	1,67
#22	10	Cereals	0,12	0,17	0,17	3	Fish and crustaceans, molluscs and other aquatic invertebrates	0,15	0,13	0,15	10	Cereals	0,21	0,12	0,11	2	Meat and edible meat offal	0,07	0,04	0,03
#23	13	Lac, gums, resins and other vegetable saps and extracts	0,10	0,09	0,14	16	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	0,01	0,05	0,08	2	Meat and edible meat offal	0,06	0,10	0,10	14	Vegetable plating materials; vegetable products not elsewhere specified or included	0,01	0,01	0,01
#24	1	Live animals; animal products	0,04	0,05	0,07	2	Meat and edible meat offal	0,04	0,02	0,01	3	Fish and crustaceans, molluscs and other aquatic invertebrates	0,06	0,04	0,06	24	Tobacco and manufactured tobacco substitutes	0,00	0,00	0,01

Source: Comtrade data and author's calculations.

Table 8 Continued: Revealed comparative advantage (XRCA): top and bottom three product groups out of 24 HS 2 digit groups

Rank	HS Code	Morocco			Jordan			Tunisia			Algeria									
		Group	2011	2012	2013	HS Code	Group	2011	2012	2013	HS Code	Group	2011	2012	2013					
#1	16	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	10,66	12,54	12,08	1	Live animals; animal products	13,45	14,87	23,00	15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	6,35	6,47	7,21	17	Sugars and sugar confectionery	1,26	1,04	1,58
#2	7	Edible vegetables and certain roots and tubers	7,66	7,11	10,56	7	Edible vegetables and certain roots and tubers	18,41	18,45	16,07	8	Edible fruit and nuts; peel of citrus fruit or melons	3,21	3,08	3,36	7	Edible vegetables and certain roots and tubers	0,02	0,04	0,09
#3	3	Fish and crustaceans, molluscs and other aquatic invertebrates	7,69	8,90	8,46	8	Edible fruit and nuts; peel of citrus fruit or melons	3,51	4,71	4,53	5	Products of animal origin, not elsewhere specified or included	3,18	3,10	2,12	8	Edible fruit and nuts; peel of citrus fruit or melons	0,08	0,07	0,09
#22	18	Cocoa and cocoa preparations	0,09	0,15	0,14	6	Live trees and other plants; bulbs; roots and the like; cut flowers and ornamental foliage	0,10	0,07	0,09	12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	0,07	0,04	0,04	5	Products of animal origin, not elsewhere specified or included	0,00	0,00	0,00
#23	10	Cereals	0,02	0,02	0,08	3	Fish and crustaceans, molluscs and other aquatic invertebrates	0,15	0,25	0,08	2	Meat and edible meat offal	0,07	0,03	0,02	6	Live trees and other plants; bulbs; roots and the like; cut flowers and ornamental foliage	0,00	0,00	0,00
#24	2	Meat and edible meat offal	0,00	0,01	0,01	13	Lac; gums, resins and other vegetable saps and extracts	0,04	0,08	0,07	10	Cereals	0,38	0,02	0,00	13	Lac; gums, resins and other vegetable saps and extracts	0,00	0,00	0,00

Source: Comtrade data and author's calculations.

Morocco. Interestingly, the analysis also indicates that cereals, a product favoured by support policies in most countries of the region, rank very low: with an average XRCA of 0.2 in 2013, it ranks between 16th and 24th out of 24 group categories in the eight countries.

These results seem broadly in line with agronomic and other economic considerations, which could suggest that the region could benefit strategically from further development of the food processing sector as well as higher value-added products that are suitable to its climate.

Trade diversification through more trading partners

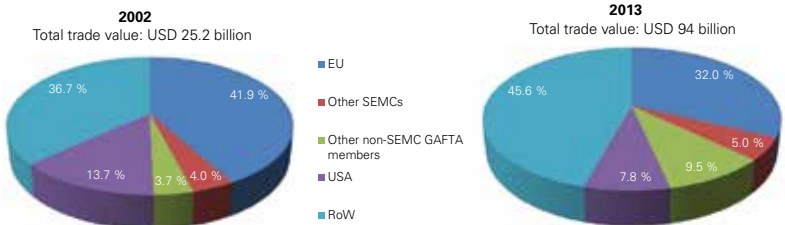
Trade diversification in terms of trade partners (for both export and import markets) is another important regional trend. In fact, as agrifood trade expanded for SEMCs, it also seems to have become more evenly spread across the key trading partners. The share of total agrifood trade with the EU dropped from 42 percent in 2002 to 32 percent in 2013, and the share of total trade with countries in the Greater Arab Free Trade Area (GAFTA)⁵⁷ increased from about 4 percent to about 10 percent. Most notably, trade partners outside both the EU and the MENA region gained importance during this time period (Figure 37).

The increase in total agrifood trade of the eight countries between 2002 and 2013 is mainly explained by import growth: imports to the region grew by USD 43 billion, or 1.7 times the absolute increase in exports in the same period. Interestingly, the EU-28 has been able to keep its leading role as the region's main source of agrifood products (with almost USD 20 billion in agrifood exports from the EU-28 to the eight countries in 2013), but has lost in terms of share of total exports from the region. In fact, the EU-28 is currently the destination for around 35 percent of total agrifood exports from the region (accounting for around USD 12 billion), while it accounted for 60 percent of a much smaller export figure in 2002 (USD 5 billion in exports from SEMCs).

In trade with the EU-28, the key driver for the increase in agrifood imports was the significant growth of cereal imports (85 percent of which were accounted for by wheat in 2014), in particular from

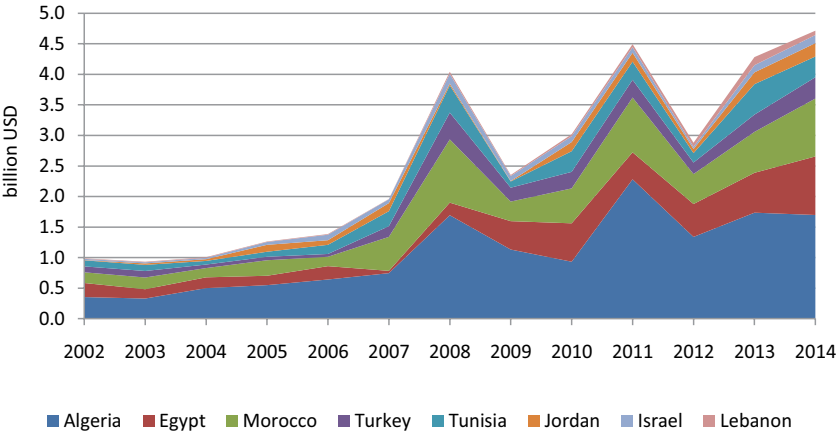
57 Bahrain, Iraq, Qatar, Kuwait, Oman, the United Arab Emirates, Saudi Arabia, Sudan and Yemen.

Figure 37: Geographic breakdown of total agrifood trade of SEMCs with the world, 2002 and 2013



Source: GTIS and author's calculations.
 Note: total trade includes total exports and imports for all products within the WTO definition of agricultural trade, but also including fishery and aquaculture products for Algeria, Morocco, Egypt, Israel, Lebanon, Tunisia, Jordan and Turkey.

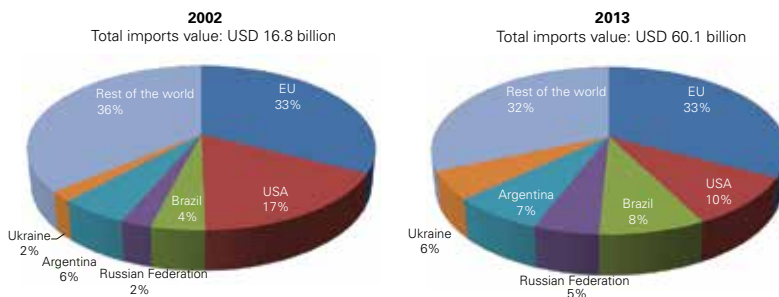
Figure 38: EU cereals exports to SEMCs, 2002-2014



Source: GTIS and author's calculations.

France. Imports have risen from USD 1 billion in 2002 to more than USD 4.5 billion in 2014 (Figure 38). Among our selection of eight countries, Algeria, Egypt and Morocco alone account for more than three-quarters of cereal imports from the EU and have consistently ranked as the top three importers of EU wheat and French wheat in particular. In the cases of Algeria and Morocco,

Figure 39: Geographic breakdown of world imports to SEMCs, 2002 and 2013



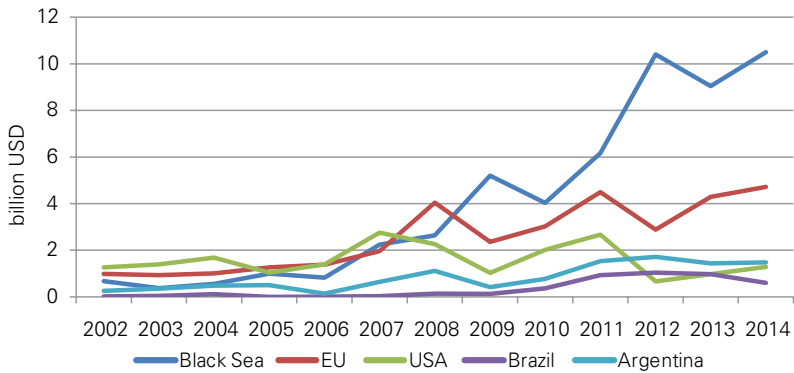
Source: GTIS and author's calculations.

dependence on French wheat is particularly strong: Algeria imports one-half of its wheat from France, and in Morocco this share varies between one-quarter and one-half depending on the year. Despite the importance of the EU, new import partner countries for cereals have become increasingly important as indicated in Figure 40.

As previously mentioned, another trend is that key trade partners outside the EU, United States and MENA have become important import sources (Figure 39). For instance, trade with the Russian Federation has grown from about USD 1 billion in 2005 to USD 8 billion in 2014 and with Ukraine from USD 740 million to USD 4 billion, largely because of increases in grain imports. Trade with Brazil has also increased significantly from USD 1.6 billion in 2005 to more than USD 5 billion in 2014, mostly due to growing imports of sugar and meat.

In particular, the countries of the Black Sea basin have already overtaken the EU as the main suppliers of cereals to the region. Exports of this commodity to the SEMCs from Ukraine, the Russian Federation and Romania have increased from USD 1 to USD 10 billion since 2006. Exports from the EU as explained above have grown sizeably since 2002 but have vacillated around USD 3-4 billion per year since 2006 (Figure 40). Imports of cereals from Argentina and Brazil have also been growing, surpassing imports from the United States in 2012. This diversification of cereal import suppliers beyond the region's traditional grain suppliers, the EU and the United States, accounts to a large extent for the overall

Figure 40: Major cereal exporters to SEMCs, 2002-2014



Source: GTIS and author's calculations.

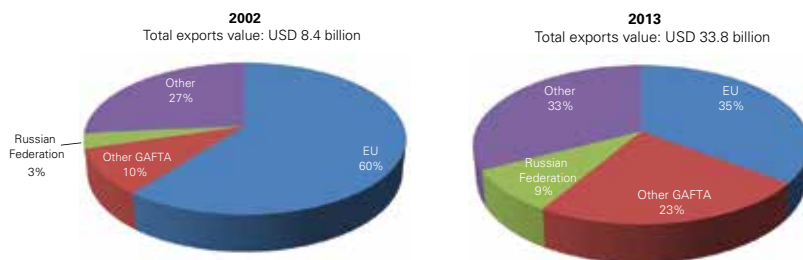
diversification of agrifood suppliers to the Euromed partnership countries. The Russian Federation and Brazil, for instance, have doubled their share in a decade.

In terms of total exports, the increase of USD 25.4 billion between 2002-2013 was more modest than that of imports, and was mainly driven by higher exports to the EU (a USD 6.9 billion increase). However, in relative terms, the increase was most spectacular for exports to other GAFTA countries. The trend of diversification and sophistication of agrifood exports to the region's main market, the EU, has therefore been accompanied by a diversification of key export outlets. In 2002, the EU was the destination of almost 60 percent of the region's agrifood exports. In a bit more than a decade, its share has shrunk to less than one-third. More specifically, exports to other GAFTA countries (mostly Iraq and Saudi Arabia), have increased eight times in the same period (from USD 0.8 billion in 2002 to USD 7.8 billion in 2013) and currently account for almost one-quarter of total agrifood exports from the region, compared to a mere one-tenth in 2002. If current rates of growth in exports persist, other GAFTA countries will outgrow the EU as the region's main outlet for agrifood exports by the end of 2016.⁵⁸

⁵⁸ For this estimation, the average yearly growth rate of exports to the EU and other GAFTA countries in the last five years of available data has been used (2009-2013).

It is important to highlight that exports of agrifood products to Iraq have been a fundamental part of this increase in exports from the region: Iraq accounted for around one-fifth of the total growth in agrifood exports from the region between 2002 and 2013, importing almost exclusively from Turkey (Figure 42). Iraq currently accounts for almost one-half of all agrifood exports to other GAFTA members from SEMCs (USD 3.5 billion in exports). This export growth is even

Figure 41: Geographic breakdown of SEMC agrifood exports to the world, 2002 and 2013

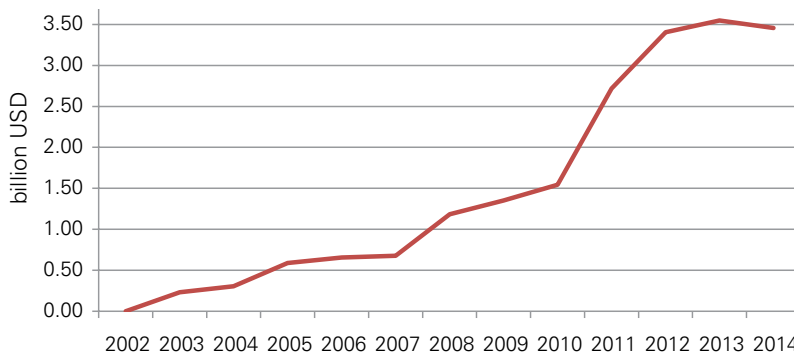


Source: GTIS and author's calculations.

more notable because it started at zero and Turkey is currently Iraq's main supplier of basic food commodities such as vegetable oil (20 percent of exports), wheat flour (15 percent), meat (12 percent), eggs (10 percent) and bread (5 percent). Some of the reasons that could explain this trend are low self-sufficiency in agricultural and food commodities following the Iraq War, a lack of port infrastructure, well-developed road links to Turkey and the latter's strategic position as a regional agricultural superpower.

In addition, Egyptian agrifood exports to Saudi Arabia, while much lower in terms of total value, account for approximately another 10 percent of Euromed partnership countries' exports to other GAFTA member states. The exports are mainly constituted by fruit (25 percent), vegetables (17 percent) and dairy (15 percent). In this case, geographic proximity and low prices seem to be the primary drivers of export growth to this petroleum-rich but still highly unequal country.

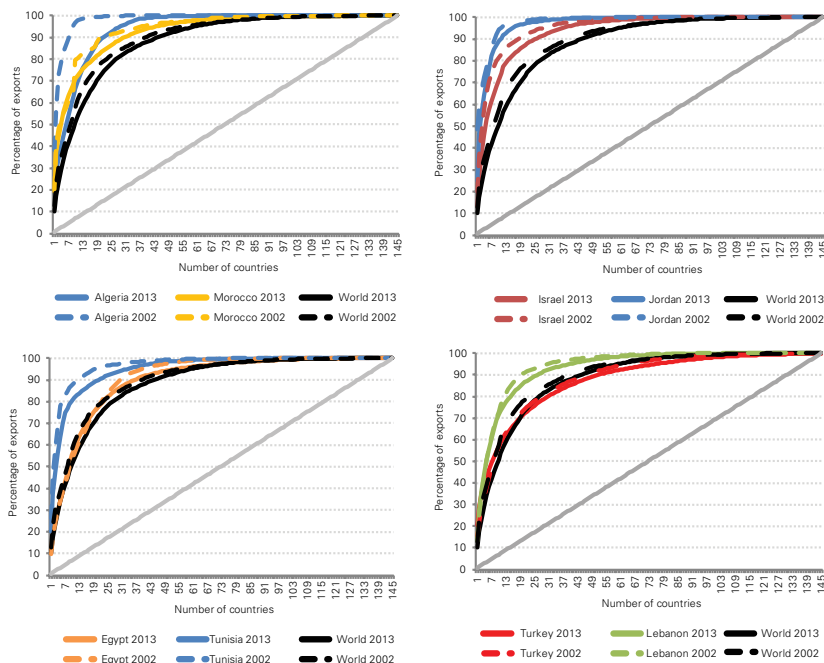
Figure 42: Agrifood exports from Turkey to Iraq, 2002-2013



Source: GTIS and author's calculations.

The increased diversification of export markets between 2002 and 2013 is a ubiquitous phenomenon for the eight SEMCs analysed. This is illustrated in Figure 43 below, which depicts an adaptation of a Lorenz curve to analyse the geographical concentration of exports: on the x-axis, 145 potential trade partner countries are represented, while the y-axis represents the cumulative percentage of the total value of exports starting with the largest trade partner (value 1) and adding each consecutive export partner ranked by total agrifood export value. In addition, the world average is also included in the figure as a reference. The flatter the curve (i.e. the closer it is to the 45 degree line), the more “equal” the distribution of exports is from a given country to world trade partners. The results indicate that for all countries (as per the world trend), there has been a decrease in geographical concentration of agrifood exports. This trend is strongest in the case of countries such as Algeria, Tunisia and Israel, but less so in Turkey, which already had an above world average geographic diversification of exports. Nevertheless, geographic concentration of exports in the eight countries is still overall much higher than in the EU.

Figure 43: Geographic concentration of agrifood exports



Source: GTIS and author's calculations.

Strategic considerations

As was seen in section 1 of this report, growth in cereal imports in the region is likely to continue in the foreseeable future. The significant weight of cereals in general, and wheat in particular, in the import baskets of the region means that this product group should continue to benefit from special attention from governments and there is a need to address the challenge posed by an increasing demand for wheat and growing wheat imports with appropriate policy measures. Reducing dependence on wheat imports from the two “wheat giants” – the EU and the United States – through a diversification of wheat suppliers with countries such as the Russian Federation, Ukraine, Romania, Argentina and Brazil is certainly a positive trend in ensuring more food security for the region. However, there is room for improvement

in reducing the financial burden imposed by food imports. Tangible opportunities for this exist on at least two main fronts: first, by making import value chains more efficient by developing import infrastructure and logistics (for instance, by modernizing port infrastructure and storage) and by alleviating bureaucratic burdens (for example, by simplifying procedures for wheat imports) thus reducing overall import costs. Second, the burden of food imports can be reduced by developing higher value-added crops for export such as fruit and vegetables (citrus fruit, dates, tomatoes, peppers, etc.) in which the region has a comparative advantage. This will require an appropriate policy mix that levels the playing field between such agrifood products and the more traditional cereals, which receive significant support in most countries in the region.

An alternative policy mix that support reallocation of factors of production to higher value-added agricultural sub-sectors from the usually low-yielding production of cereals might be a more sensible way of tackling increasing trade deficits in agriculture and ensuring the region's food security than supporting self-sufficiency in wheat or other cereal crops. Stimulating the further development of the food processing industry, which could rely on locally produced primary agricultural products, would be another step in this respect. The recent growth in exports of processed agrifood commodities, especially to high-income European markets, suggests that there might be considerable trade opportunities in this sector. Finally, investment in the development of higher value-added crops and the production of processed agrifood products should be accompanied by appropriate policies stimulating improvements in the quality and marketing of local production if export opportunities to geographically close high-income markets (namely the EU and Gulf countries) are to be fully exploited.

Chapter 4 - Producing more with less

At a glance

Highlights

- Water availability has always been a key constraint to the development of the agrifood sector in the southern and eastern Mediterranean countries SEMCs and is increasingly so;
- The outlook is not very bright as the projections of global climate models suggest that rainfall is expected to be significantly lower in the SEMCs; and simultaneously water demand is expected to increase due to population growth and expansion of agricultural and industrial activities;
- Emissions of all agricultural sub-sectors are on the rise even though they are decreasing in percentage of total emissions and the agricultural sector has been asked to step up its contribution to reduce greenhouse gas (GHG) emissions.

Policy Relevance

- Policies need to be adjusted to promote technologies, innovations and farm practices that use water efficiently;
- Creating conditions for private sector participation in development and promoting penetration of key sustainable climate technologies in the agrifood sector will be increasingly important in the SEMCs;
- Overall policy consistency for a more resource use-efficient agrifood sector is important. This requires a broader analysis of agrifood sector support policies and the distortions they may create that lead to sub-optimal use of limited resources.

Water scarcity, agriculture and climate change

A water scarce region

The SEMC region is water scarce in aggregate, although there are significant inter-country differences in the level of water availability and renewable water resources. Large-scale water management problems are already apparent: aquifers are over-pumped, water quality is deteriorating, and water supply and irrigation services are often rationed—with negative consequences for human health, agricultural productivity, and the environment. In the SEMCs, water scarcity is characterized by low per capita water availability, low level and uneven distribution of rainfall, frequent recurrence of droughts, and high human pressure on existing water resources.

Average water availability per person in SEMCs with the exception of Turkey is already very low when compared with key technical thresholds⁵⁹ (Figure 44). Jordan is far below the 500 m³ per capita per year threshold for absolute water scarcity; and Tunisia, Algeria and Israel are all also below that level. Egypt, Lebanon and Morocco are at higher levels but still below the 1 000 m³ per capita per year level, which would classify them as suffering from chronic water shortage. The average water availability indicator is not a perfect measure because of often substantial intra-country variability, but it still provides an indication of the magnitude of the water scarcity problem in the region. As a comparison, the MENA region average is approximately 1 200 m³ per person per year and the world average is around 7 000 m³ per person per year.⁶⁰ Not only is water availability at the country level quite critical, but it has also been declining in all SEMCs (Figure 44). The fastest decline has been observed in Jordan (an almost 50 percent decline between 1992 and 2014), a country that ranks among the ten driest in the world. The other seven countries

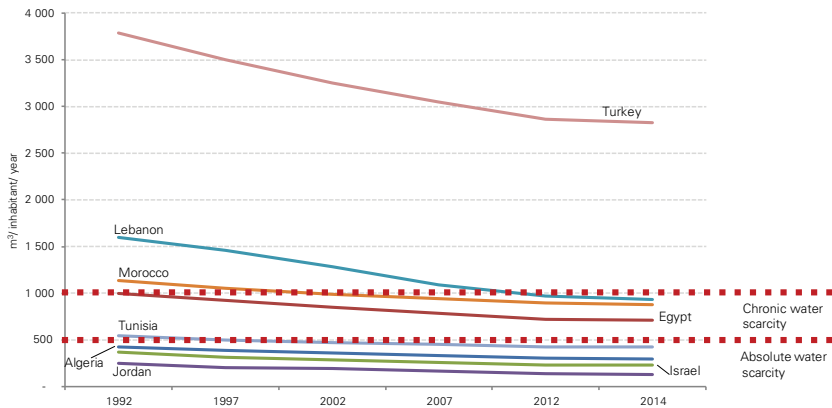
59 The indicator normally used to assess national water scarcity is the total renewable water resources per capita. On this criterion, countries or regions are considered to be facing absolute water scarcity if renewable water resources are <500 m³ per capita, chronic water shortage if renewable water resources are between 500 and 1 000 m³ per capita, and regular water stress between 1 000 and 1 700 m³ per capita. Despite being widely used, this indicator tends to oversimplify because it just describes an average country situation (overlooking regional variations, ignoring local factors determining access to water, etc.). See for details “Coping with water scarcity - An action framework for agriculture and food security”, FAO water reports nr38, 2008.

60 Data on water availability per person have been extrapolated from FAO Aqdata online database and *Regional Initiative on Water Scarcity in the Near East. Preliminary Regional Review and Gap Analysis* – DRAFT. FAO RNE, May 2013.

registered declines ranging between 23 and 41 percent when comparing 1992 with 1992 data. Finally, as previously suggested, country averages hide important regional disparities. For example, according to Figure 44, Turkey would be classified as a country exhibiting only occasional or local water stress. However, a closer look at the country's 25 river basins indicates that four would already be considered under chronic water shortage or absolute scarcity and a further six would be under regular water stress (total annual renewable freshwater between 1 000 and 1 700 m³ per person per year).⁶¹

The region's **countries also show very high levels of water exploitation**.⁶² In fact, withdrawal-to-availability ratios are close to

Figure 44: Trends in total annual renewable freshwater per capita in SEMED countries, 1992-2014

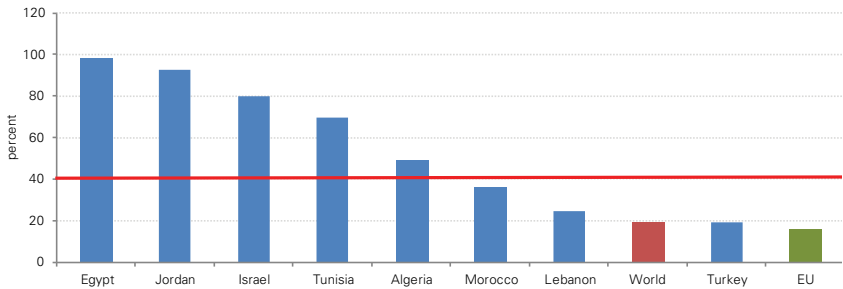


Source: FAO Aquastat.

61 Muluk, Ç. B., Kurt, B., Turak, A., Türker, A., Çalışkan, M. A., Balkız, Ö., & Zeydanlı, U. 2013. *State of water in Turkey and new approaches to water management: environmental perspective*. Turkey: Business Council for Sustainable Development Turkey (SKD) and The Nature Conservation Centre (DKM).

62 The water exploitation index (WEI), or withdrawal ratio, in a country is defined as the mean annual total abstraction of fresh water divided by the long-term average freshwater resources. It describes how the total water abstraction puts pressure on water resources. Thus it identifies those countries having high abstraction in relation to their resources that are therefore prone to problems of water stress.

Figure 45: Water exploitation index⁴ in SEMCs, freshwater withdrawal as percentage of total actual renewable



Source: FAO Aquastat and author's calculations.
Note: Data provided is for different reference years: Egypt 2000, Algeria 2001, Turkey 2003, Israel 2004, Jordan and Lebanon 2005, Morocco 2010 and Tunisia 2011. World and EU averages are computed using weighted averages using total country cultivated area (arable land plus permanent crops) as weights.

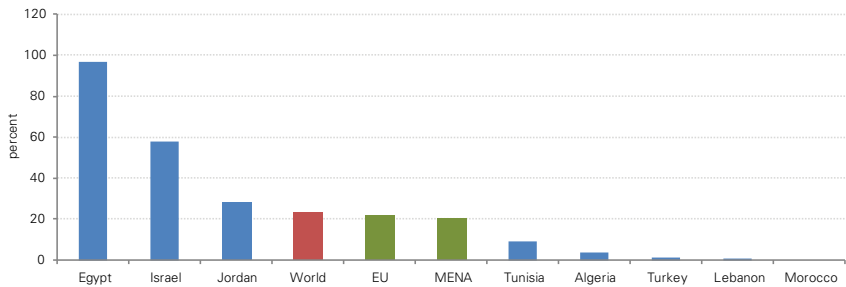
or dramatically exceeding the critical threshold of 40 percent⁶³ for five out of the eight countries (Figure 45 above). This is particularly true in the cases of Egypt and Jordan, where total national water withdrawals are close to exceeding the average annual volume of renewable natural resources.

According to FAO data **there is also significant diversity among SEMCs in terms of dependency from renewable water resources originating outside the country** (Figure 46). Because of its dependency on water from the Nile that flows in from other countries, Egypt exhibits the highest dependency ratio (97 percent of total renewable water resources originate outside its borders) while Morocco has the lowest with zero. Dependency ratios provide a quick snapshot indicating whether a country needs to put more efforts at a regional level to manage its water resources.

There are major differences in inter and intra country distribution of precipitation, resulting in large sections of the SEMCs region's land area being covered by dry-lands and deserts. Average annual

⁶³ There is some diversity of opinion as to what should be considered a critical level of water exploitation. According to most of the literature, the warning threshold can be 20 percent, which distinguishes a non-stressed region from a stressed one. Severe water stress can occur for an index above 40 percent, which indicates strong competition for water, which does not necessarily trigger frequent water crises. See more details here: <http://www.eea.europa.eu/data-and-maps/indicators/water-exploitation-index>.

Figure 46: Dependency ratio for SEMCs, percent of total renewable water resources originating outside the country, 2013

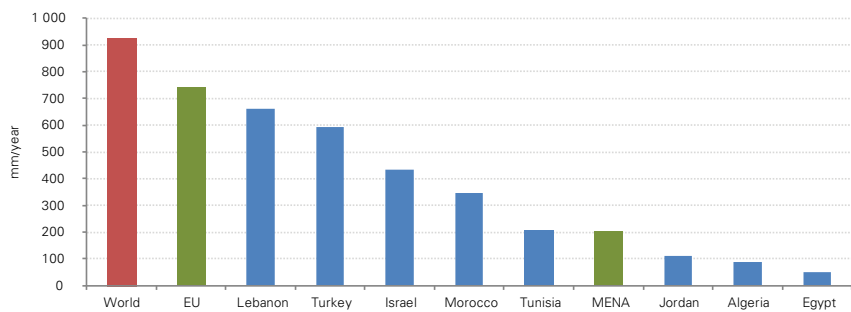


Source: FAO Aquastat and author's calculations.
Note: World, MENA and EU averages are computed using weighted averages and total country cultivated area (arable land plus permanent crops) as weights.

precipitation levels are very low in Algeria, Egypt and Jordan: all equal or around the 100 mm/year level (Figure 47). In fact, the three countries have very small areas with cultivated land: 3.4 percent for Jordan and around 3.6 percent for Algeria and Egypt. Even in the other five countries that have higher annual rainfall, the country average hides significant regional disparities, with rain-fed agriculture only being possible in specific geographical areas of each country. For example, in Morocco mean annual rainfall varies between less than 100 mm (Saharan bioclimate in the South and inland areas) and above 800 mm (humid bioclimate in certain parts of the Rif and middle Atlas mountains). Only around 20 percent of Morocco's land area is cultivated and rain-fed agriculture is only possible in specific northern and western parts of the country. In Egypt, cultivated areas are situated almost entirely along the Nile river (accounting for around 94 percent of all cultivated area) and limited parts of the northern coast (where there is rainfall and oases can be found).

In contrast to aridity, which is a permanent feature of climate in low rainfall areas of SEMCs, drought is a temporary deficit in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts

Figure 47: Annual average rainfall for SEMCs, long-term average precipitation in depth, 2013



Source: FAO Aquastat and author's calculations.

Note: World, MENA and EU averages are computed using weighted averages using total country cultivated area (arable land plus permanent crops) as weights.

on farming activities and/or people.⁶⁴ For instance in 1986, a drought year, Jordan produced 31 000 tonnes of wheat, down from 63 000 tonnes in 1985; and then produced 80 000 tonnes in 1987⁶⁵ when the rains returned. Drought is a recurrent feature of climate in the SEMCs, varying significantly from one country to another both in terms of frequency and duration.

Another common feature of the entire region is that in line with the global situation, agriculture accounts for the highest water withdrawal (Figure 48) when compared to industrial and municipal water use. The agricultural sector is responsible for a higher proportion of water used in Turkey, Tunisia, Egypt and Morocco (all above the world average), while Jordan, Algeria, Lebanon and Israel range between 58 and 65 percent of water used in agriculture.

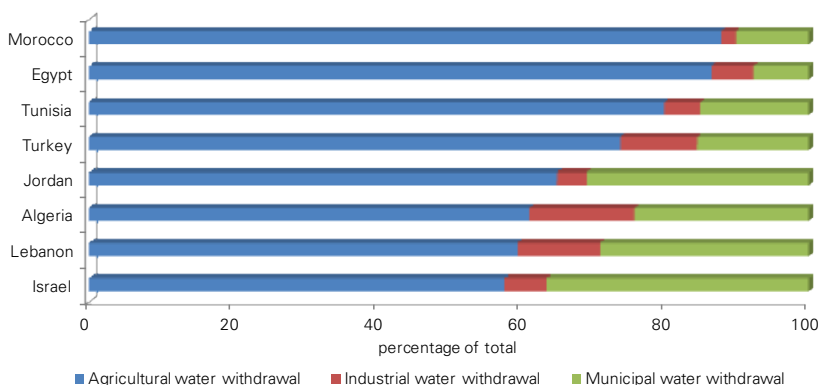
Prospects for the future

Despite the difficulty in producing reliable precipitation projections, there is strong agreement of global climate models regarding a projected gradual reduction in precipitation in the SEMCs in the

⁶⁴ Drought should not be viewed just as a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demands people place on water supply.

⁶⁵ FAOSTAT online database.

Figure 48: Agriculture, industrial and municipal water withdrawal as percentage of total water withdrawal in SEMED countries



Source: Most recent available data from FAO AQUASTAT online database for different countries in different years (Egypt 2000, Algeria 2001, Turkey 2003, Jordan and Lebanon 2004, Israel 2005, Morocco 2010; Tunisia 2011).

coming decades.⁶⁶ In particular, the annual and seasonal drying/warming signal over the northern African region (north of Morocco, Egypt and Tunisia), is a consistent feature in the global and regional climate change projections for the 21st century. According to analysis reported by the World Bank,⁶⁷ northward movements of air moisture are projected to reduce rainfall in North Africa, Maghreb and Mashreq⁶⁸ by the end of the 21st century. In a 2°C scenario, this is expected to result in 10 to 20 percent less rain in the Mediterranean's southern coast compared to the 1951-1980 average. In a 4°C scenario, countries along the Mediterranean's southern shore such as Algeria, Morocco, Egypt and Turkey are expected to receive substantially less rain (up to 50 percent less

66 According to the latest IPCC data, global temperature has risen 0.85 °C over the period 1880-2012 and is expected to increase further to 2 °C (RCP2.6 low emission scenario, with application of a range of technologies and strategies for reducing GHG emissions) and/or 4 °C (RCP8.5 business-as-usual/high emission scenario, with insufficient mitigation measures undertaken) or more by the end of the 21st century above pre-industrial levels. Globally, warming of close to 1.5°C above pre-industrial times – up from 0.85°C today – is already locked into Earth's atmospheric system by past and predicted GHG emissions.

67 World Bank. 2014. Turn Down the Heat.

68 Maghreb refers to Algeria, Morocco and Tunisia; Mashreq refers to Egypt, Jordan, Lebanon and Syria.

precipitation compared to the 1951-1980 average) and drying is expected to be a year-round phenomenon. Moreover, already in a 2°C world heat extremes are expected to be more frequent across the MENA region by the end of the century: every year, one of the summer months is expected to exceed average 1951-1980 temperatures by more than three standard deviations. In a 4°C world, heat extremes will be even more accentuated. Lower annual rainfall will have consequences in terms of green water availability (plant-available water in soils, directly resulting from precipitation). In countries like Morocco, this could lead to the exacerbation of the overexploitation of groundwater resources for agricultural purposes.

Climate change will affect weather and precipitation patterns with the consequence that the SEMCs may see more frequent and severe droughts. An increase of more than 50 percent in the number of drought days is expected around the entire Mediterranean area from 2070 onwards, relative to the 1976–2005 period, under a 4°C global warming scenario.⁹ The overall expected trend toward increased drought periods in the SEMED countries will be compounded by higher variability and more extremes, such as flooding, leading to a loss of reliability and increasing uncertainty in water management. Examples of previous severe flooding events include those in Morocco in 2002, Tunis in 2003, and, most recently, in Morocco in November 2014.

Given population growth estimates, a decline in per capita availability of water is expected and water shortages across the MENA region will be a key challenge in the near future. Overall, per capita freshwater availability is projected to fall by more than 50 percent by 2050 in the region.¹³ Still, 80 percent of that shortage will be attributable to a steep increase in demand owing to population growth and fast economic development (including the rising demand of a growing and wealthier middle-class, with different dietary habits shifting from vegetable proteins and minerals to increased processed foods, sugars, fats, and animal products), and about 20 percent may be attributed to climate change. In Egypt for instance, with a national population expected to grow from around 80 million today to around 97 million in 2025 (UN Population data), current per capita water availability is projected to be reduced by 40 percent to reach around 500 m³

per year by 2025.⁶⁹ Similarly, in Turkey (one of the SEMCs that still exhibits a relatively high level of freshwater availability per capita at present), available water per capita is expected to decrease by as much as 1 100 m³ annually.⁷⁰

Water demand is expected to increase in the SEMCs and exploitation indices are expected to grow, mostly due to increases in population and agricultural and industrial development. In 2011, a World Bank study⁷¹ provided an assessment of the impact of change in climate and irrigation, domestic and industrial demand for the 22 countries in the MENA region separately. According to the average climate change scenario,⁷² the average increase in water demand from the four SEMED countries will be about 30 percent in 2020-2030 and 74 percent in 2040-2050 compared to the current situation, with agriculture most likely contributing to the bulk of the increase. Unmet demand for the entire MENA region, expressed as a percentage of total demand, will increase from 16 percent currently to 37 percent in 2020-2030 and 51 percent in 2040-2050. Indeed, all SEMED countries will be confronted with huge deficits in the near and distant future. However, water shortages will vary substantially across countries. Just as an example, Egypt, with the Nile Basin as its single water source, is estimated to experience water shortages in the order of about 20 and 30 km³ per year in 2020-2030 and 2040-2050, respectively. In Morocco, the expected water shortage in 2020-2030 will be about 9 km³ per year, reaching about 15 km³ per year in 2040-2050. For each of the four SEMED countries, the water demand, water shortage and supply for the average climate change scenario is plotted in Figure 49.

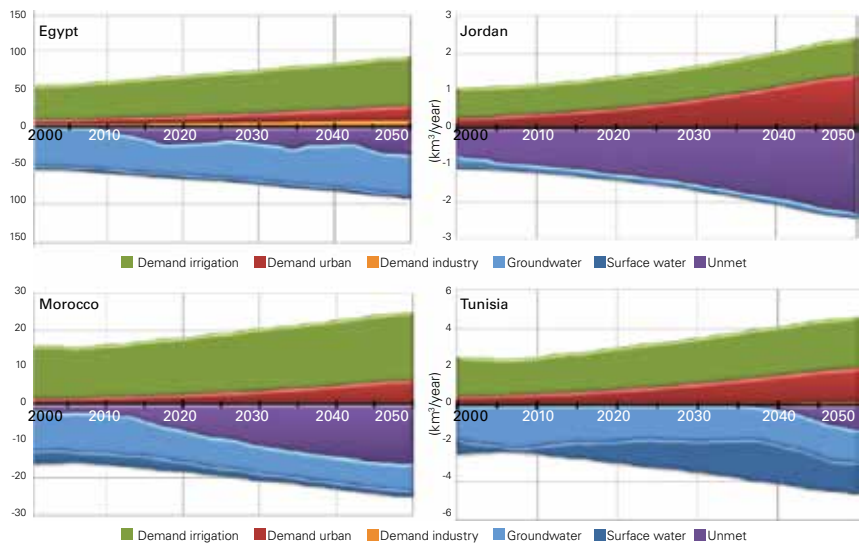
69 Ministry of Water Resources and Irrigation of Egypt. 2014. Water Scarcity in Egypt.

70 Turkey, General Directorate of State Hydraulic Works, <http://en.dsi.gov.tr/land-water-resources>.

71 World Bank. 2011. *FutureWater. Middle East and North Africa Outlook*, study commissioned by the World Bank.

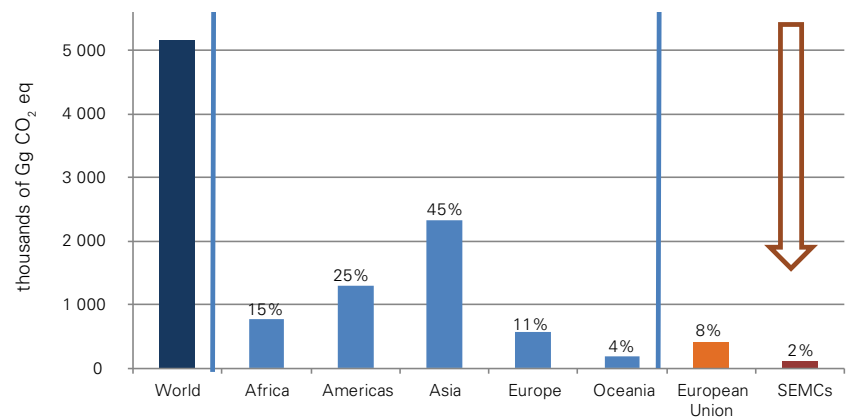
72 Three different scenarios are described in the Study commissioned by World Bank (see previous footnote), i.e. average, dry and wet; and here only the average climate change scenario is considered.

Figure 49: Evolution in water demand up to 2050 for the four SEMED countries



Source: World Bank.

Figure 50: Contribution of agricultural emissions from SEMCs to total world agricultural emissions compared to other regions, average 2005-2012



Source: FAOSTAT and author's calculations.

Agriculture and Greenhouse Gas Emissions

Globally, the agriculture sector, including forestry and changes in land use, is responsible for just under one-quarter of GHG emissions. According to FAO,^{73, 74} this corresponds to a total of around 10.1 Gigatonnes (Gt) CO₂ equivalent per year, of which around 5.2 GtCO₂ equivalent per year stem from agricultural production (therefore accounting for around 11.2 percent of global emissions) while the annual GHG flux from land use and land use change activities accounted for 4.8 GtCO₂ equivalent annual emissions. According to the IPCC's fifth assessment report, "leveraging the mitigation potential in the sector is extremely important in meeting emission⁷⁵ reduction targets".

Agricultural emissions from SEMCs are small at the global scale but have been increasing

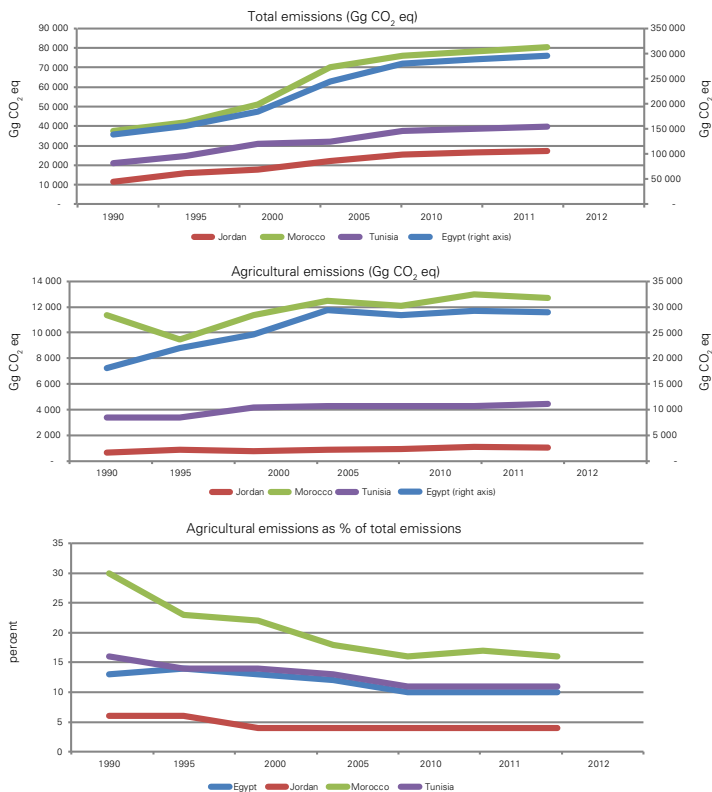
Compared to other regions in the world, including emission "giants" such as Asia and the Americas, emissions from agriculture alone (without forestry and land use change) from the SEMCs contribute a relatively minor share to global levels (Figure 50). Nevertheless, agricultural emissions from the SEMCs have been increasing in past decades (Figure 51 shows data for the SEMED countries), following trends in the economy. This is particularly true in the case of Egypt, where available data suggests agricultural emissions have risen from just 13 805 Gg CO₂ equivalent in 1980 to 29 020 Gg CO₂ equivalent in 2012, i.e. by 110 percent (Figure 51).

73 Tubiello, F. N., Salvatore, M., Ferrara, A. F., House, J., Federici, S., Rossi, S., Biancalani, R., Condor Golec, R. D., Jacobs, H., Flammini, A., Prosperi, P., Cardenas-Galindo, P., Schmidhuber, J., Sanz Sanchez, M. J., Srivastava, N. & Smith, P. 2015. The Contribution of Agriculture, Forestry and other Land Use activities to Global Warming, 1990–2012. Global Change Biology (available at <http://onlinelibrary.wiley.com/doi/10.1111/gcb.12865/abstract>).

74 FAO. 2014. Agriculture, Forestry and Other Land Use Emissions by Sources and Removals by Sinks. Rome, pp.90 (available at www.fao.org/docrep/019/i3671e/i3671e.pdf).

75 Agricultural emissions include GHG emissions released by: Enteric Fermentation, Manure Management, Rice Cultivation, Synthetic Fertilizers Manure applied to Soils, Manure left on Pasture, Crop Residues, Cultivation of Organic Soils, Burning - Crop residues, Burning - Savanna and Energy Use - from FAOSTAT online database.

Figure 51: Emissions in the SEMED countries, 1990-2012⁷⁶



Source: FAOSTAT and EDGAR online databases.

Figure 51 above shows that both total emissions⁷⁷ and agricultural emissions have experienced growing trends in all the four SEMED

⁷⁶ Agricultural emissions in these graphs do not include those linked to energy.

⁷⁷ For the purpose of the present note, total GHG emission data have been extrapolated from the online *Emissions Database for Global Atmospheric Research* (EDGAR) database, available at <http://edgar.jrc.ec.europa.eu/>. The GHG total, expressed in metric tonnes CO₂ equivalent is calculated using the GWP100 metric of UNFCCC (IPCC, 1996). The GHG are composed of CO₂ totals excluding short-cycle biomass burning (such as agricultural waste burning and Savannah burning) but including other biomass burning (such as forest fires, post-burn decay, peat fires and decay of drained peatlands), all anthropogenic CH₄ sources, N₂O sources and F-gases (HFCs, PFCs and SF₆). However, the EDGAR data has not yet been officially used nor published by FAO. Therefore, it is considered just as preliminary data.

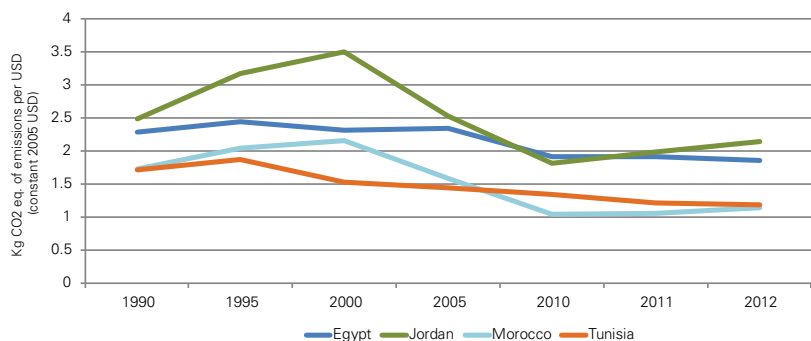
countries in past decades. Moreover, the share of agriculture's contribution to total GHG emissions has been on a declining trend. The highest reductions have been observed in Morocco, where the share of agri-emissions over total emissions decreased from 30 percent in 1990 to around 15 percent in 2012. The overall relative decline of emissions generated from agriculture in all four SEMED countries has corresponded to a decreasing trend in the value added generated by this sector in terms of total GDP, as reported in section 2 of this document. Today, agricultural emissions represent a variable share of total emissions across the SEMED: around 15 percent in Morocco, 10 percent in Egypt and Tunisia, followed by Jordan, which is much lower with about 5 percent.

GHG emissions and economic growth

An interesting indicator to characterize trends in GHG emissions and assess the environmental pressure caused by economic activities is one that relates emissions and value added in a given sector. By combining kilograms of emissions produced per agriculture value added created from the sector, an estimation of the "GHG emission intensity" (expressed as GHG emissions per unit of value added created) associated with agriculture activities can be obtained.

Figure 52 shows the evolution of emission intensity based on agriculture value added in SEMED countries. Overall, there has been a reduction of GHG emission intensity at regional level. However, substantial differences persist: in Tunisia and Egypt, the emission intensity in the agriculture sector improved, following trends in the overall economy. In Morocco and Jordan, the ratio of agriculture GHG emissions to agriculture value added seems to have been increasing in recent years (2010-2012), in a context of stable/slightly decreasing ratio of emissions to GDP.

Figure 52: Kg CO₂ equivalent of emissions per USD value added for the agricultural sector, 1990-2012



Source: World Bank and FAOSTAT and author's calculations.

The livestock sector plays a key role in GHG emissions in the SEMED countries

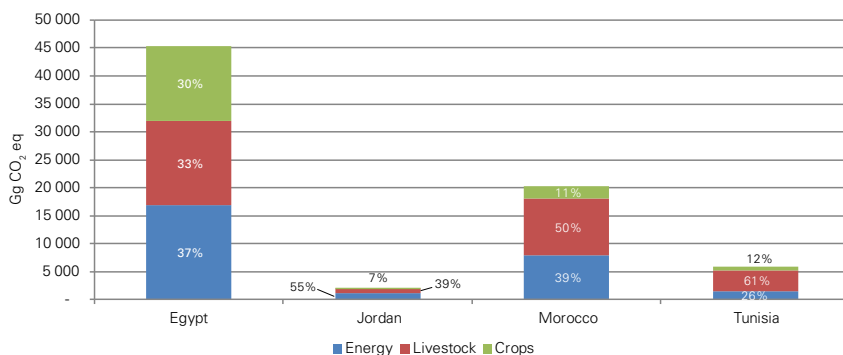
Among the four SEMED countries, the magnitude of GHG emissions made by various agriculture subsectors and energy used in agriculture varies considerably, mostly depending on production patterns, but also due to differences in technologies/practices and different mixes of inputs involved in production processes. In all four SEMED countries, it appears that the livestock sector is a major contributor to agricultural emissions (Figure 53).

In Egypt, the three main components of agricultural emissions have almost the same weight in terms of percentage on the total agricultural emissions (Figure 53). In contrast, both in Morocco and Tunisia livestock emissions largely exceed emissions from crops and energy, representing respectively 50 percent and 61 percent of total agricultural emissions. In Morocco, the main sources of emissions from the livestock sector are as follows: feed production and processing (45 percent of total livestock emissions), outputs of GHG during digestion by cows (39 percent of total livestock emissions) and manure decomposition (10 percent of total livestock emissions). The remainder is attributable to the processing and transportation of animal products.⁷⁸

⁷⁸ FAO. 2013. Tackling Climate Change through Livestock: A global assessment of emissions and mitigation opportunities.

Interestingly, in Jordan 55 percent of total agricultural emissions is released by energy use in the sector. Ideally, reducing emissions arising from livestock production activities should be prioritized in all SEMED countries, in part by stimulating the adoption of alternative agrifood practices, technologies and/or systems.

Figure 53: Emissions from crops, livestock and energy related to agricultural activities, average 2009-2011



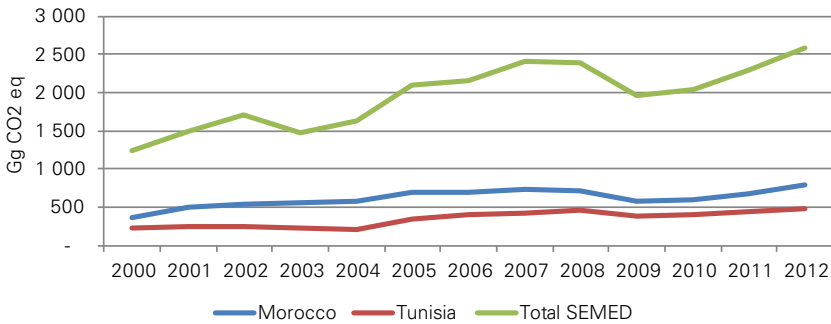
Source: FAOSTAT, 2015.

GHG emissions arising from food processing-related activities

Agrifood sector emissions are dominated by emissions from primary agriculture activities. Nevertheless, emissions from agro-processing activities are also relevant, especially as downstream activities are expected to increase in importance in the SEMCs. As an illustration, Figure 54 shows GHG emissions released by the food processing sector in Morocco and Tunisia, compared to the total SEMED region. As it is possible to note, the trends are positive, showing that food processing-related activities have increased as well as the GHG emissions associated with them.

In Morocco, emissions from the food and tobacco subsectors increased from 360 Gg CO₂ equivalent in 2000 to 800 Gg CO₂ equivalent in 2012, i.e. they have more than doubled their value in a time span of ten years. Similarly, Tunisia has doubled its emissions from the food processing sector (increasing from 236 Gg CO₂ equivalent in 2000 to 470 Gg CO₂ equivalent in 2012).

Figure 54: Trends in emissions associated with food processing (food and tobacco industry), 2000-2012



Source: FAOSTAT, 2015 and UNSD Energy Statistics DB, 2014; author's calculations.

Strategic considerations

Agriculture in the SEMED region will have to adapt to significant impacts of climate change in the coming decades, while at the same time providing food to a growing population. This means employing a wide range of technologies and innovations that can help meet a variety of (increasing) and heterogeneous demands from consumers for food, energy, fibre and other products. Green technology adoption is required not only at farm level (where most emissions at present seem to originate) but also in other sections of food supply chains, including processing, storage and transport.

Available evidence suggests that SEMCs will be negatively affected by climate change and increases in water demand over the coming 40 years. As reported by the World Bank⁷⁹ as well as FAO in its Regional Initiative on Water Scarcity in the Near East (2013),⁸⁰ the MENA regional annual cost to overcome water shortages in 2050 has been evaluated at approximately USD 100 billion per year, depending on different climate scenarios.

⁷⁹ World Bank. 2011. FutureWater. *Middle East and North Africa Outlook*, study commissioned by the World Bank.

⁸⁰ FAO RNE. May 2013. *Regional Initiative on Water Scarcity in the Near East, Preliminary Regional Review and Gap Analysis – Draft*.

In particular, it is anticipated that there will be a need for investment in efficient irrigation systems that maximize the value extracted from increasingly scarce water resources. Irrigation systems in some cases are major consumers of energy, which also present big opportunities for efficiency improvements and associated co-benefits in terms of CO₂ emission reductions. However, important trade-offs may exist between energy and water efficiency in the choice of technologies, e.g. investments in drip irrigation, which is locally water-efficient, can have implications in terms of increased energy consumption and also hydrology. Therefore, solutions will have to be adapted to local contexts and carefully assessed in terms of both economic and environmental costs and benefits.

Improved water management through the adoption of alternative and innovative water saving/recycling technologies such as, for instance, waste-water treatment, can potentially help cope with scarce water resources in agriculture. In the Jordan Valley, there have been major recent developments in this connection, and treated waste water currently accounts for about one-sixth to one-fifth of the country's surface water resources.⁸¹

Finally, while improvements in agricultural water management technologies and practices are required (a process which usually involves specific national public institutions), national and regional level "water smart" agrifood sectors will require a careful analysis of a given country's policy mix at a broader level. In order for countries to achieve a "water smart" orientation, they must first find innovative ways of involving the private sector in technology development and adoption. Second, they must ensure they do not distort incentives that may lead to lower agrifood sector water efficiency. This is highlighted in Box 1 with an analysis of Turkey's agricultural support policies.

81 FAO. 2015. Jordan. Water along the food chain, an analytical brief of selected food chains from a water perspective (unpublished draft).

Box 2: Turkey agricultural support and water efficiency⁸²

According to OECD (2015), the Producer Support Estimate (PSE)⁸³ for Turkey in the year 2013 was similar to the average producer support share of gross farm receipts in all OECD countries. This implies that the average Turkish farmer did not receive a substantially larger share of her or his income from governmental transfers and protectionist border policies than the average farmer in all OECD countries. However, the composition of this support in Turkey involves a much larger share of direct support based on commodity output, (around 16.1 percent of Producer Support versus 8.5 percent in all OECD countries combined) and a minor share of payments based on input use (1 percent of Producer Support). Other payments account for

2 percent of Producer Support while payments not requiring production (“decoupled payments”) were not in place in 2013 and 2014, but had been in place in the previous decade. From an economic perspective, support based on commodity output is potentially more market distorting than payments not requiring production, because the former type of support does not only improve farm incomes but also distorts markets through providing additional incentives for production of specific agricultural commodities.

This type of analysis is interesting to combine with a measure of water efficiency of different agrifood sectors in the country. To do this, we have combined PSE information with data on the water footprint of different Turkish agricultural commodities. The results are shown in Figure 55, which compares the different levels of support and protection (PSE %) that major agricultural products in Turkey receive to the amount of water that is necessary for USD 1 in revenue to be obtained on international markets. Figure 55 plots the average OECD PSE for 2013-2011 on the vertical axis. In the horizontal axis the figure plots total blue and green water (in m³) used to produce USD 1 in revenue according to international prices. Approximately three clusters of agricultural products can be identified in three areas: (i) the grey area with a number of agricultural products that can be considered to have rather low water consumption for generation of the equivalent value of one dollar in international markets (at the same time, the products in this grey area also receive little support; this group of products can be considered as generating the highest value for Turkish water); (ii) potatoes and apples tend to receive a relatively high level of governmental support

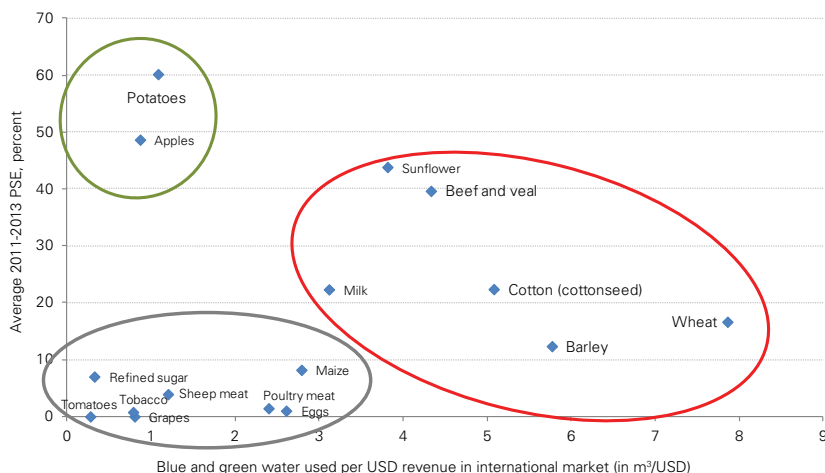
82 Analysis entirely based on FAO. 2015. Water along the food chain – The case of Turkey’s red meat processing sector (draft unpublished).

83 Producer Support Estimate (PSE) is defined as the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policy measures, regardless of their nature, objectives or impacts on farm production or income. See Agricultural Policies in OECD Countries: Monitoring and Evaluation 2000: Glossary of Agricultural Policy Terms, OECD. The support measures to agriculture can take various forms: for example border protection, production-based subsidies, input-based subsidies, etc.

while requiring relatively little water in order to generate the equivalent value of USD 1 in international markets and (iii) the red area, which marks agricultural outputs with relatively high water consumption to reach USD 1, while at the same time receiving significant support (PSE between 10-50 percent). This group of agricultural products that also includes beef and veal must be considered the one that generates the lowest value to Turkish water.

The analysis indicated in Figure 55 illustrates a simple point: while Turkey is making a remarkable effort in improving efficiency of water use through investments in irrigation efficiency and work on a new water law, among others, there is a need to look at the bigger policy picture and the distortions that overlapping policies may introduce. In the case under analysis, products with a lower monetary value per water consumed may end up receiving an important level of support. Such support measures to different agricultural sectors (that may actually be justified in certain instances) have important implications for private sector incentives and therefore need to be carefully taken into consideration in policy-making.

Figure 55: Turkey's blue and green water consumption per USD international output value relative to average 2011-2013 producer support estimate



Source: Author's calculations using Water Footprint data from Hoekstra, A. et al.⁸⁴ and OECD PSE data.

84 Mrabet, R. No-Tillage systems for sustainable dryland agriculture in Morocco, INRA Publication, 2008. Fanigraph Edition; and Moussadek, R. 2012. Impacts de l'agriculture de conservation sur les propriétés et la productivité des vertisols du Maroc Central, PhD thesis, University of Ghent, Belgium, 2012.

In addition to the above, there is also a need to promote policy measures that can help maximize the agrifood sector's contribution to GHG emission reduction at all stages of food supply chains and in different agrifood subsectors (crops, livestock, forestry, etc.). Overall, there are significant opportunities depending on the role the country and the private sector play in developing and scaling-up such sustainable technologies and practices. Potential technology groups include the use of renewable energy technologies, such as wind and solar power. Solar dryers for fruit and vegetables or solar water pumping systems hold potential for development in the SEMCs due to geographical conditions. In addition, conservation agricultural (CA) practices in dry areas can be a valid response to issues of soil conservation, drought mitigation and soil quality management. For instance, CA research in dry areas of Morocco recognized that no-till management increases soil aggregation, improves water conservation and availability and increases soil organic matter across a range of soil types and cropping systems. Possible interventions to reduce emissions also include technologies and practices that improve production efficiency at animal and herd levels. Better feeding practices, animal husbandry and health management provide opportunities for mitigation in the livestock sector. Manure management practices that ensure the recovery and recycling of nutrients and energy contained in manure, and energy savings and recycling along supply chains, are further mitigation options.

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