Cooperative Management

Michel Petit
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Samir Mili *Editors*

Sustainable Agricultural Development

Challenges and Approaches in Southern and Eastern Mediterranean Countries

Springer

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Foreword

The role of cooperative management entails the formulation and execution of operating policies that are feasible, sustainable, and sound from a financial, social, and environmental perspective. Thus, the Book of Series on Cooperative Management was initiated to provide an invaluable forum for generating theoretical knowledge and advancing the knowledge on policy, economics, organisational, financial, and marketing aspects. Within this rationality, the current book is published with main focus on the sustainability of Mediterranean communities, which over the last years try very much to find a sustainable way of coexistence and economic growth. Scholarly papers appearing in this series relate to several of cooperative management aspects, contributing in empirical analyses, methodologies and their application, and also to policy designing.

The present book in the series is devoted to presentation of the collective work of a research consortium funded by a EU (FP7) project: *Sustainable agri-food systems and rural development in the Mediterranean Partner Countries/SustainMED.* The main aim of this project was to examine and assess the impacts of EU and national agricultural, rural, environmental, and trade policies in the southern and eastern Mediterranean region, namely in the so-called Mediterranean Partner Countries (MPCs), as well as in Turkey. Though the main focus on Mediterranean countries, the book chapters attract a wider audience of readers since several technical and methodological tools are used and their application is demonstrated. To accomplish those objectives, thirteen research and educational institutions from eleven countries worked intensively for more than three years. All socioeconomic and political issues such as resource management, income distribution, and employment and migration trends are tackled in the book.

Hence, this book will be of interest to scholars, practitioners, and policy actors working in the fields of economics, trade, cooperative management, risk management, and agricultural policy. Moreover, EU policy makers will gain useful scientific insights and policy lessons on how to monitor the changing environment, to account for the rapidly changing patterns, and to assess decisions and policies aiming to tackle issues such as public welfare and rural poverty alleviation. Moreover, special

attention was paid to sustainability aspects, the role of the private sector, food security and risk management, trade liberalization, and Euro-Mediterranean integration.

We would like to thank all members of the CIHEAM—IAM Montpellier *SustainMED* research team who coordinated this attempt, as well as all the research teams that contributed in the compilation of this book. Moreover, we extend our appreciation to all those involved in the proof reading of this book and Springer Academic Publications, for their assistance in producing this book.

Constantin Zopounidis
George Baourakis

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Contents

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Chapter 1
The Challenges of Sustainable Agricultural Development in Southern and Eastern Mediterranean Countries

Michel Petit

The development of agriculture and rural areas in Southern and Eastern Mediterranean countries (SEMCs) faces very serious challenges. This is well understood, as illustrated by the following statement from the meeting of the CIHEAM Ministers of Agriculture held in Malta in September 2012[1] (CIHEAM 2012): "Current food consumption and production patterns are not sustainable in the Mediterranean basin due to biodiversity loss, degradation of natural resources, pesticide contamination, climate change, high energy and water consumption, dietary patterns and changes in eating habits, and high dependency on imports, as well as poverty and vulnerability of many rural and urban Mediterranean communities, and particularly the erosion of the Mediterranean diet".

This statement is quoted here because all the ingredients of the historical challenges faced today by SEMCs[2] in the field of agriculture and rural development are mentioned in this five-line summary. Another formulation of the problems faced by SEMCs has been well summarized by Bessaoud, quoting in particular

[1]CIHEAM, the 'Centre International des Hautes Etudes Agronomiques Méditerranéennes' is an inter-governmental organization, gathering 13 governments of countries located around the Mediterranean sea (Morocco, Algeria, Tunisia, Egypt, Lebanon, Turkey, Albania, Greece, Italy, France, Spain, Portugal and Malta). In recent times, the Ministers of Agriculture of these countries have met about every second year to exchange ideas, formulate diagnoses, suggest policy recommendations and identify potential areas of collaboration. Strictly speaking, the statement quoted here was not formally adopted by the Ministers but appears in the conclusion of a seminar organized on the occasion of the ministerial meeting. It does however represent a broad consensus view among government circles in these very diverse countries.

[2]This grouping of countries refers to countries belonging to the Mediterranean geographic area, characterized mainly by its climate and flora, located on the Southern and Eastern shores of the Mediterranean sea. It is made up of nine so-called Mediterranean Arab countries (MACs: Morocco, Algeria, Tunisia, Libya, Egypt, Palestine territories, Jordan, Lebanon and Syria), plus Israel and Turkey. Situations vary much among these countries, which limits the validity of any general statement; yet, there are common elements and they all face more or less similar challenges.

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a CIHEAM-AFD set of studies (Bessaoud and Montaigne 2009; Bessaoud 2013), and listing the major problems to be faced: "crisis of peasant agricultures, poverty and fragility of rural societies, advanced degradation of natural resources, major inequalities in the access to resources: land, finances and material".

In this introduction, we will first come back to each one of these main challenges, trying to be specific on the nature and magnitude of the challenges. Secondly, since the main purpose of this book is to report the results of a large research project on the sustainability of agriculture in SEMCs (the SustainMED project), we will briefly describe the project and then introduce the chapters of the book as contributions from the SustainMED project.

1.1 Import Dependency

Although import dependency is not the first challenge or concern mentioned in the statement above, we choose to discuss it first here because it is indeed a major structural feature of many countries, but mainly because it is the starting point of most projection and foresight analyses of the region.[3] The main concern expressed then is that of a region depending on outside suppliers for the provision of its basic foodstuff. Actually, the region depends heavily on imports for only a few commodities in addition to tropical products which cannot be produced locally: cereals, sugar, oils and oilseeds, as well as dairy products. It is for cereals that the total import bill for the whole region is the largest (more than US$12 billion in recent years) in spite of Turkey often being a net cereal exporter. Given the importance of cereals in the diet of most people, particularly the poorest, this cereal import dependency is the source of a major concern with economic, social and political ramifications. The root cause of this concern is the awareness that the demand for cereals has been growing and will continue to do so—due mainly to demographic and economic growth—while there are serious constraints limiting the growth of domestic production.

As a result, IPEMED experts (Bourgeois et al. 2012) wrote at the very beginning of their report devoted to a proposal for a new Euro-Mediterranean agricultural and food policy: "In 2008, the agricultural and food import bill of the SEMCs reached the abyssal figure of 57 billion dollars, that is almost three times as much as in 2000… Food insecurity in the region unfortunately keeps growing and constitutes one of the factors of the unprecedented political crisis the SEMCs are going through." A similar concern is expressed by Abis (2012a, b), a keen observer of the geopolitical situation in the region, when he writes: "The dependency of the Mediterranean Arab countries on international markets is growing, as a consequence of a multidimensional regime of constraints (ecological, demographic, logistical) and of a stronger and stronger purchasing power of the population,

[3]Cheriet (2013), Abis (2012b), Cheriet (2009).

having led to a major diversification of food demand. Between 1990 and 2010, the volume of agricultural imports of the four North African countries (Algeria, Egypt, Morocco and Tunisia) trebled, from 9 to 27 billion Euros. These sums represent a considerable share of public budgets" (Abis 2012a, b).

These citations reflect the fact that food import dependency has several important economic and political consequences. Firstly, there is a security dimension: with the Middle East and North African regions being the most food import dependent regions of the world, officials legitimately worry about their ability to secure supplies in times of crisis. Indeed, the experience of the 2008 crisis showed that governments of the region were willing to go to great lengths in order to ensure a reasonable degree of food supply security at the national level (Lerin et al. 2009). This leads immediately to the next dimension: the huge costs of that security, in terms of both balance of payments and public budgets. Finally, the fact that most governments of the region intervene massively on the markets for basic foodstuff illustrates the high political sensitivity of the food security issues resulting from that import dependency.

Given the magnitude of this concern, one wonders whether or not something can be done about it. Two challenges are thus identified by this question: (1) Can domestic production be increased? (2) Can agricultural and food imports be better managed?

The common wisdom on production is that natural resource constraints are so limiting that little can be done to increase domestic agricultural production. Yet, a look at past trends over several decades suggests that the past performance of agricultural growth in the region was not as dismal as commonly believed. According to the Agrimonde[4] exercise, which examined scenarios for world agriculture until 2050, based on past performances between 1961 and 2003, total agricultural production—measured in Kilocalories (an energy equivalent)—in the Middle East and North Africa regions, where SEMCs have a very important weight, increased at a faster rate than the world average, less rapidly than in Asia and Latin America but faster than in the former Soviet Union and even in the OECD countries. Similarly, according to Belghazi (2013), the share of SEMCs (minus Palestine and Libya) in world agricultural production remained constant at 5.5 % throughout the 1994–2007 period.[5] Again here, there were significant differences among countries: "In 2005–2007, five countries, Turkey, Egypt, Morocco, Algeria and Syria, made up more than 91 % of the total agricultural production of the SEMCs (minus Palestine and Libya). During the same period, Turkey accounted for about 39 % of the SEMC-9 agricultural GDP, Egypt for 25.5 %, Morocco for nearly 10 %, and Algeria for slightly more than 9 %. The average growth of agricultural output between 1994–1995 and 2005–2007 was the highest for Algeria and Syria, slower for Egypt, Israel and Tunisia and the slowest for Morocco, Jordan, Turkey

[4]Paillard et al. (2010).

[5]For the sake of comparison, this 5.5 % figure should be compared to the share of world population in the SEMCs, which is about 4 %.

and Lebanon."[6] In the same vein, available evidence suggests that most of the production growth can be attributed to productivity growth. Thus, the average land productivity increased by a factor of about 3 in four decades, but at about 15,000 kcal/day/ha, it remained well below that of Asia and Latin America (Paillard et al. 2010).

Another important feature of domestic agricultural production in the SEMCs is its extreme variability from year-to-year. The yields of cereals, the main product in these countries, depend very much on rainfall. This influence of the weather is so important that in some countries, notably Morocco, it has a significant macroeconomic implication, as it affects the overall economic growth performance of the country.

Of course, cereals are but only one among many categories of agricultural products, albeit a major one, and their relative importance, both in production and consumption, is declining. Many past debates have focussed on the appropriate level of diversification of agricultural production, particularly on how much SEMCs should give up on cereals and specialize in fruits and vegetables, products for which they have a clear comparative advantage on international markets. Of course, such a choice would risk increasing the import dependency for cereals and, as further discussed below, it would have implications for the many poor semi-subsistence farmers located in dry remote areas, who are producers and sellers of cereals. Given all these considerations, it should be clear that accelerating the rate of growth of domestic production involves many challenges for public authorities in SEMCs.

The second question raised above, whether or not agricultural and food imports could be better managed, has not received much attention by analysts and observers, as reflected by the small number of references on this topic in the literature. Yet, the question is important. As already indicated, governments of the region took far-reaching decisions in response to the 2008 crisis. Analyzing those decisions, their rationale and their impacts would be both interesting—to understand how governments behave—and useful for decision makers—to assess whether or not decisions of this type could be improved, in terms of public welfare, in future crisis situations. This is an interesting agenda for research, which however was not tackled in the SustainMED project. Another dimension of the management of food imports has to do with infrastructure and logistics. This was not investigated either in the SustainMED project. For interesting reflections on this topic, showing its importance in particular, see Abis (2012a, b).

1.2 Stubborn Rural Poverty

Poverty, particularly rural poverty, has been and remains a major issue in SEMCs. In this respect, Israel and Turkey face a set of specific problems, less acute that those faced by most Mediterranean Arab countries, even if they are at times

[6]Belghazi (2013).

politically important. Thus, the focus of this section will be mainly on the Arab countries. For them, the challenges associated with increasing agricultural production, which we just discussed, are compounded by those arising from the need to fight rural poverty, which makes the choice and pursuit of an appropriate agricultural and rural development strategy particularly difficult. Rural poverty situations vary much from one country to another. So, to be meaningful, discussions in this section will be conducted at the national level. To illustrate the problems and the progress made in recent decades, we will focus here on four key countries: Egypt, Morocco, Tunisia and Turkey. Those are the countries which received particular attention in the SustainMED project. First a few figures for each country will illustrate the magnitude of the problem and the real progress made in recent decades:

- In Egypt, the real expenditures per capita (as measured by household expenditure surveys, i.e. a robust indicator) increased by 93 % in urban areas between 1975 and 2009, whereas it increased by 78 % in rural areas during the same period. Admittedly, this represents a slow and uneven growth, but still a significant achievement.
- In Morocco, the same indicator, real average expenditures per capita, increased by 66 % between 1990/91 and 2006/07, the year of the most recent household survey, the average rate of growth being slightly higher in rural areas, which however, as further discussed below, continue to lag behind urban areas.
- Tunisia has had an impressive record of poverty reduction over the years, cutting the level of poverty (using the national poverty line) from 40 % in 1960 to 2.8 % in 2010, according to official figures. At the same time, the growth rate of population declined and life expectancy increased markedly while improvements were achieved in education programs, access to health care and basic infrastructure. The distribution of income also improved: the GINI coefficient for income per capita fell from 0.434 in 1985 to 0.408 in 2008 (UNDP 2010), and average per capita expenditures for the country as a whole increased, reaching 3872 (PPP) US$ in 2008.
- In Turkey there has also been great progress in the fight against poverty during the last five decades. The poverty ratio, defined as the proportion of people with income less than 50 % of the median income, decreased from about 49 % in 1968 to 34 % in 1987 and 16 % in 2008. The GINI coefficient for income per capita decreased from 0.56 in 1968 to 0.43 in 1987 and to 0.38 in 2005.

Yet poverty, particularly rural poverty, remains a major issue in all four countries. The greatest challenge is probably faced by Egypt where the population density is generally very high, even in rural areas, particularly in the Nile delta (more than 900 persons per square km in 2007 in rural "Lower Egypt", not including the four urban governorates of Cairo, Alexandria, Suez and Port Said). Generally speaking, the poor are concentrated in rural areas and particularly those in Upper Egypt. Interestingly, the distribution of income, as measured by the GINI coefficient, is less unequal in rural areas; but social well-being indicators show that rural areas continue to lag behind, in terms of literacy and access to sanitation

facilities, in particular, whereas they seem to have caught up in their access to safe drinking water.

Poverty is also a major problem in rural Morocco, as reflected in the average monthly household income of 3900 DH (i.e. around 350 Euros at the official exchange rate, which is probably overvalued) in rural areas, nearly 20 % of households having a monthly income of less than 1930 DH. In spite of real progress in the last 30 years, the UNDP human development indicator ranked Morocco the 130th country in the world in 2010, because of a high incidence of poverty in internal rural regions, poor literacy rates and poor performance of the public health system, as reflected for instance in high levels of infant mortality. Admittedly, the situation of the rural population has improved recently: for instance, the literacy rate for the 15–24 year age group improved from 58 to 79.5 % between 1994 and 2009 —a significant progress indeed—but it is only 72.1 % for girls and young women, and still less in remote rural areas in spite of spectacular advances in the proportion of girls attending school.

The poverty situation in Tunisia is generally less acute than in most other Arab countries. According to the UNDP Human Development Index, Tunisia was ranked 81st in the world in 2010, the value of the index for the country having increased from 0.436 in 1990 to 0.683 in 2010, whereas the average for Arab countries increased from 0.398 to 0.590 during the same period. In addition, poverty seems to be mainly concentrated in urban areas, which account now for about 75 % of the poor population, as compared to about half in 1975. As a result, the rural poor accounted in 2007 for only 27 % of the total poor population. Yet, as the dramatic events of Sidi Bouzid showed, where the 2011 revolution started, rural poverty remains a major problem. Sidi Bouzid is a town of some 50,000 inhabitants located in the interior of the country, in a region where the economy depends heavily on agriculture.

In Turkey the situation is less dramatic. In 2009, about 25 % of the total population lives in rural areas (defined as settlements with less than 20,000 inhabitants) and about 63 % of the rural labor force is employed in agriculture. The main problems facing rural areas have been summarized as follows: a poorly educated and unskilled workforce; an ineffective institutional structure and a lack of efficient farmer organizations; a scattered pattern of settlement in some regions; an insufficient development and maintenance of physical, social and cultural infrastructure; a high rate of dependence on subsistence agriculture; inadequate diversification of agricultural and non-agricultural income-generating activities; a high rate of hidden unemployment and low income levels; increasing migration; and the ageing character of the rural population. In short, the situation in Turkey is less severe than in the other three countries but the nature of rural poverty problems is strikingly similar in all countries.

The challenge for public policies is how to face that complexity. Among poverty alleviation policies, prime place has been given to food policies in many countries, notably in Algeria, Egypt, Morocco and Tunisia. The dilemma faced by public authorities for decades has been striking. The budget share of food is very high among the poor. Thus, keeping the price of food as low as possible is an effective

way to protect the poor. But in North Africa, many farmers are also poor and their welfare is negatively affected by low prices for the products they sell. Hence, in many countries of the region, public authorities have put in place a complex system of market interventions, setting a wedge between producer and consumer prices. Specific measures have varied through time and from country to country; they have generally included border interventions (e.g. import taxes and physical import controls, or, mostly in the past, public monopolies) and subsidies of various sorts. The difference between producer and consumer prices has mainly been born by the public budget. Admittedly, many of these public interventions have been relaxed during the process of domestic liberalization in the 1980s and 90s. But this liberalization has only been very partial and the cereal markets, in particular, remain heavily regulated. As a result, public budget costs have escalated and they will continue to do so in the future if the policy mix is not radically changed. One can seriously doubt that such levels of public expenditures can be sustainable in the long term.

This illustrates one of the thorniest interactions among policy challenges faced by countries in the region: What is the most appropriate market intervention, given the import dependency discussed above? And what is the rural poverty alleviation policy, given the major role given to market interventions in this domain? The link between these two challenges is critical because agriculture remains the main source of income for many rural poor. This is true even in cases where many of them have no, or only limited, access to land and water. Access to these two key inputs for agricultural production has been a source of major problems in all the countries under study. This illustrates a close link between the challenges discussed above and those related to the management of the natural resources which agriculture and other rural activities depend on, the topic of the next section.

1.3 Deteriorating Natural Resources

Soil, water and biodiversity, the main natural resources of interest here, are under threat in many parts of the world. The pressures are particularly acute in the Southern and Eastern Mediterranean region for a variety of reasons. In addition, these pressures will only increase with global warming. Great challenges result for the countries of the region. We will first briefly review here the threats to each one of these resources.

Soil erosion seems to be rapidly increasing in many dry and remote regions because the poor rural population cannot afford the investments which would be necessary for prudent sustainable management of the resource. Short-term pressures resulting from poverty and demographic growth lead to over-consumption (cultivating marginal lands, overgrazing, excessive collection of fuel wood). Besides, uncertain land tenure, poor literacy, and limited access to credit constitute additional obstacles to long-term investments. In more well-endowed regions, particularly in the plains, soils are more fertile and often irrigated. Several types of

degradation can however be observed: soil salinization in some places, pollution by excessive use, or inappropriate application, of pesticides and chemical fertilizers. But there, the greatest threat to agricultural soils is urbanization—particularly diffuse in coastal areas. In spite of the magnitude of these problems, sustainable management of soils does not have in public debates and concerns the urgency which it warrants. One reason may be the difficulty of finding appropriate indicators of land degradation, which could be broadly understood by non-specialists and that could communicate the seriousness of the degradation and could thus become effective to generate policy action. This is reflected in the limited number of synthetic publications on the subject. One notable exception is a report from the Plan Bleu based on an extensive review of the literature, but dating back to 2003.[7]

This report makes it clear that soil degradation takes many forms and results from a multiplicity of causes. But, as just indicated, few meaningful quantitative indicators are available. For instance, the report quotes an estimate from FAO indicating that 15 % of agricultural soils are under an erosion threat in the Mediterranean region. Is this very little or very serious? Several other experiences quoted in the report invoke both intellectual humility on the solidity of past diagnoses and a sense of urgency in spite of past mistakes and failures in efforts to conserve soils. First, the multiplication of catastrophic floods in cities around the Mediterranean basin, e.g. Nîmes (1988), Genoa (1993/94), Algiers (2001), point to the urgency of coping with huge increases in runoff water volumes following the construction of buildings and roads on large tracts of land. Secondly, the example of Israel (Gradus and Lipshitz 1996) illustrates how much fertile agricultural soils can be, and have been, diverted to other uses, particularly in the early 1990s when the country absorbed more than 600,000 migrants from the former Soviet Union in a few years. Land use planning rules were not strong enough, or not forcefully enough implemented, to prevent an anarchic development of construction and to protect agricultural areas. Finally, the relative failure of soil conservation efforts in Algeria over several decades has been well documented (Roose et al. 1998): "Over a total of 350,000 ha treated by the DRS ('Defense and Restauration of Soils'), 60 % were found to be degraded, 20 % had disappeared and it is not clear that erosion was ever a threat on the rest of the surface, where terraces were well maintained." This disappointing impact is attributed to a complex set of interrelated causes: started during the colonial period, the projects were not always well designed, rarely well monitored and followed up, and did not involve the participation of the local populations. These criticisms illustrate the complexity of soil conservation problems, which involve the interaction of several natural and social processes. Taking these limitations into account, new methods of intervention, more inclusive and targeting together the management of soils, water and biodiversity, have been suggested and experimented in recent years. Not enough evidence is available yet to assess their effectiveness. But one thing is sure: the complexity

[7]De Franchis et al. (2003). It is worth noting that in our literature search, we did not find anything comparable that was published more recently.

which these methods attempt to tackle will continue to be a major source of challenges.

Water resources are well recognized as a source of major challenges in the Mediterranean region, which is often presented as a world 'hot spot' in this domain (*United Nations Comprehensive Assessment of the Freshwater Resources of the World*). Much has been written on the water problems in the press, in official documents from governments and various international organizations and also in the scientific literature. A brief synthesis, focusing on fundamentals, will be sufficient for our purpose here. The starting point has to be the concept of water balance, in spite of its limitations briefly discussed below. The basic idea is simple: since water is critical to life, will there be enough water resources to cover water needs? And under what conditions? This indicator reveals for instance the magnitude of one of the water management challenges faced by SEMCs: in 2009, 108 million people in the region were in a situation of 'water stress' (less than 1000 m^3/hab/year available), 58 % of whom had even less than 500 m^3/hab/year (a situation defined as "water scarcity") (Blinda and Thivet 2009). All projection works indicate that this situation can only worsen in the future. Looking first at water needs, it is clear that they will increase with demographic, urban, and economic growth. Besides, with irrigated agriculture being by far the largest user of water, much will depend on whether or not irrigated areas increase and by how much. Two additional considerations regarding water needs or water uses must be taken into account: How much can water wastes be reduced or eliminated? How much can water use efficiency be improved? Reducing wastes and improving water use efficiency are both obviously desirable because this would improve the water balance by reducing water consumption. But achieving either one is challenging because it implies significant changes in the collective behaviour of water users, including new investments, new institutional rules, and often a redistribution of benefits. This is difficult everywhere in the world.

On the supply side, there is no simple solution either. Not much can be done about increasing rainfall. Besides, all the available model simulations of the impact of global warming indicate that total rainfall will decrease in most regions of the SEMCs. Rainfall patterns will become more erratic and less evenly distributed, which will make rainfall harvesting and storage more challenging. In some parts of the region groundwater resources are relatively abundant. But many of these are not renewable and some are already overexploited, as is being done on a large scale in Libya. Several countries rely also on so-called "non-conventional" resources, such as the treatment and reuse of waste water, reflecting the high degree of water stress in the region. Generally speaking, it is the poorest people, in rural areas and also in urban ones, who suffer most from water scarcity. In several countries, the proportion of the rural population without access to drinking water is high by international standards.

What is the public policy agenda resulting from this difficult water situation? Interesting answers to this question can be derived from a comprehensive assessment of water resource availability and use in the region, conducted by the Plan Bleu in 2005 (Benoît et al. 2005). Two scenarios were considered: According to the

first one, based on the extension of past trends, water use would increase significantly by 2025, several countries would increase their use of fossil, non-renewable resources and more than 80 million people would find themselves in a situation of 'water scarcity', compared to 63 million in 2005. The second scenario, based on reducing wastes by 50 % and increasing water use efficiency in agriculture (to 80 %) would radically change the water balance situation. In other words, public policies must target water demand. This does not mean that the supply side should be given up: increasing water storage capacity remains desirable. Much more can be gained on the demand side.

But that, of course, is extremely challenging. Reducing waste and increasing water use efficiency would require major changes in behaviour by a variety of water users. Social constraints of various sorts must be overcome. But the most important obstacle to the necessary changes in behaviour is probably the social and political reluctance to resort to economic policy instruments. Water being scarce, the obvious economic tool to use is to raise the price of water paid by its users, be it for irrigation purposes or for domestic use. But the social, cultural, religious, ethical, and ultimately political obstacles to do so are overwhelming, particularly in this region. For instance, charging poor people, with a price reflecting costs, for urban water services, or farmers, for irrigation water, is socially and politically very difficult. In addition, the social and political obstacles to overcome, when deciding to build new dams, particularly 'large dams,' are also huge. As a result, the sustainable management of water resources has been, and will continue to be, extremely challenging. This challenge will be compounded in years to come by new uncertainties and complexities. Returning to the concept of water balance will help us to illustrate these uncertainties and complexities. Water balance assumes both a space and time scale, e.g. how much water is available and how much is consumed[8] in a given space (be it a country, a region, a watershed, etc.) during a given period (say one year, one season, etc.). But most water management decisions (e.g. building a dam, deciding what prices to charge for water uses, choosing a pattern of devolution of maintenance responsibilities to water users, etc.) involve combining several space and time scales. These combinations are always complex in real situations. As a result, to the uncertainties regarding how much water is available at a given place during a given time period, uncertainties which will increase with climate change, must be added the uncertainties associated with complex social processes involving many actors: Who is going to do what? Where? And when?

Biodiversity is also under threat in the region. The threat is serious because, in the words of the Critical Ecosystem Partnership Fund (CEPF), a prestigious coalition of actors at the world level: "The Mediterranean Basin Hotspot is one of the

[8]A further complication must be acknowledged here. The concept of consumption may not be fully adequate for water, since water use, be it by the human body or by domestic animals or by crops, does not really destroy the water, which is returned to the atmosphere or to the soils or to water streams after use. But it remains that managing the resource for subsequent use most often requires new human efforts and investments. As a result, reasoning in terms of consumption and of demand is appropriate in many instances.

most extraordinary places on Earth and is remarkable for both its high level of biological diversity and its spectacular scenery. Approximately 13,000 of its 30,000 plant species are endemic, or unique, to the hotspot, and many more are being discovered every year" (CEPF 2010). Similarly, Médail and Quézel (1997) pointed out that "about 10 % of the known higher plant species were found in the Mediterranean region on a surface only equal to 1.6 % of the world total land area." There is a surprisingly wide and strong consensus on both the causes behind the threats and on what should be done to protect and conserve biodiversity. Population growth and the strong pressures exerted by tourism, which is massive and still growing, particularly in coastal areas, are seen as the main culprits, straining the limited resources, particularly water, leading to overexploitation, and degradation, even destroying natural habitats. Here again, it is expected that climate change will exacerbate these negative pressures. Thus, the link with the degradation of other natural resources is strong. The same is true for the solutions which are proposed. Thus, the first two strategic directions of the CEPF are formulated as follows:

- to promote civil society involvement in integrated coastal zone management
- to establish the sustainable management of water catchments and the wise use of water resources

For the IUCN, protecting species and protecting ecological sites requires "the integrated management of the environment (ecosystemic approach)" as well as major "communication and training" efforts.[9] In other words, the challenges faced to conserve biodiversity are very similar to those resulting from the imperative obligation to sustainably manage soil and water.

1.4 Worrisome Demographic Trends

All the challenges identified above, regarding national food security in a situation of growing import dependency, stubborn rural poverty, and degradation of natural resources, are compounded by very worrisome demographic trends. Indeed, in spite of the demographic transition, in which several SEMCs are definitely engaged, total population continues to increase, many young people begin to enter the labour market, creating a huge gap between national labour demand and supply, and—most importantly for our purpose—the total rural population continues to increase in most of the region. We will briefly review these trends before drawing implications for agricultural and rural development policies.

All the demographic parameters of importance for agriculture and rural development were reviewed in *Mediterra 2008*, the tenth annual report of CIHEAM, devoted to a prospective exercise on food and agriculture in the region.[10] Although

[9]Cuttelod et al. (2008).

[10]Hervieu et al. (2008).

conducted several years ago, the analysis remains valid and relevant. The following paragraphs are directly drawn from that report. In 2005, the total population of the Mediterranean Basin reached 454 million, i.e. 7.0 % of world population, well on track to a doubling in 50 years (1970–2020). But most of the recent growth took place on the Southern and Eastern shores of the Basin. And this trend is expected to continue in the foreseeable future. Between 1990 and 2020, the population is expected to increase by 14 million inhabitants in the North and by 130 million in the South and the East. Another mega-trend is urbanization. Between 1970 and 2005, total urban population doubled; between 1990 and 2020, urban population in the South and East is expected to increase from 108 to 214 million people, i.e. a rate of growth placing the Maghreb countries (i.e. North Africa) on top of all regions in the world on this score. Yet, rural population continues to increase, even if its share in total population declines. And this, of course, has major implications for agriculture: What are the employment perspectives? And, given the particular conditions of access to land and water resources, for what level of income?

Yet the demographic transition, primarily based on lower infant mortality and lower birth rates, is well engaged in several countries. For instance, in Egypt and Morocco, two countries where poverty remains a tremendous challenge, infant mortality rates are expected to decrease by two thirds between 1990 and 2020. Life expectancy is also increasing and is expected to reach 75 years in all SEMCs. Fertility rates have begun to decline, particularly in the Maghreb countries where the number of children per woman is near 2.1, whereas it is still much higher in Egypt, Syria and Israel. Another striking feature of this demographic transition in SEMCs is that it is taking place very quickly, portending major shifts in the age composition of the population. Yet, because of the strong demographic growth in recent years, the population of the working age has increased very rapidly and job creation linked to economic growth has not kept pace with demographic growth. This trend will continue in the coming decades. Thus, it is estimated that the number of net entries into the labour market in the Arab Mediterranean countries between 1995 and 2025 will be between 80 and 85 million, i.e. a huge increase in the supply of labour.

As already indicated, these demographic trends and perspectives have major implications for agriculture and rural development. Contrary to what happened in Europe and other developed countries during the past century, the modernization of agriculture cannot be driven in SEMCs by a rapid decline in agricultural employment and a massive substitution of capital for labour, with the size of farms increasing. In this region, the number of hectares per agricultural worker, already very small, will continue to decrease, which will make any increase in the average productivity of labour very difficult and will dampen the possibility of improved agricultural income per person working in agriculture. Hence, it will be important to diversify the sources of income for rural households, thereby increasing the urgency of non-agricultural job creation in rural areas, a great challenge indeed, given what was just said about the huge increase in the total supply of labour in the whole economy.

1.5 Erosion of the Mediterranean Diet

The Mediterranean diet is famous worldwide, particularly since it was celebrated by Ancel Keys and his wife Margaret (Keys and Keys 1975). It is often viewed as a model of excellent nutrition to be copied or emulated. Giving prime place to cereals, vegetables, olive oil and fermented milk, and supplemented by small quantities of meat and red wine, this century-old diet turns out to be respecting the most important recommendations of modern medicine, concerned with the excesses, in terms of calories and fat content, found responsible for the obesity epidemics with all their deleterious public health consequences: diabetes, heart disease, etc.[11] Indeed, this ideal diet corresponds more or less to the traditional food habits in many SEMCs. As such, it is both an asset for SEMCs and a source of opportunities.[12] But the situation is not so rosy, as nostalgia would suggest from past patterns.

Food habits are changing in the Mediterranean region as elsewhere in the world. With rising income, people consume fewer cereals and more and more livestock products, which contributes to the deterioration of the nutritious quality of their diets. This change seems to be happening everywhere, including in the SEMCs. Palma and Padilla (2012) provide a thorough analysis of these changes, focusing on the Mediterranean diet and comparing Mediterranean countries with a set of other countries in the world, including notably the USA, Japan and New Zealand. They used first a Mediterranean Adequacy Index (MAI), which is based on "the ratio of Kcalories provided by so-called 'Mediterranean' food groups to those provided by 'non-Mediterranean' foods" in the average national yearly food consumption. The first category includes such products as olive oil, cereals, herbs and spices, fruit and vegetables, nuts, fish and wine, while meats, all other oils, sugar and alcoholic beverages other than wines are included in the second category. On this basis, they found notable differences among SEMCs: Lebanon has a very low MAI, while it is very high for Egypt, followed by Morocco and Algeria, Tunisia and Turkey having an average MAI. They also confirmed that, generally speaking, SEMCs are moving away from the typical Mediterranean diet.[13] They completed their analysis with the use of another indicator, the Diet Quality Indicator (DQI), which is based on

[11]The significance of this recognition was illustrated by the fact that the Mediterranean diet was inscribed by UNESCO on the "Representative List of the Intangible Cultural Heritage of Humanity". Quoting UNESCO: "The Mediterranean diet constitutes a set of skills, knowledge, practices and traditions ranging from the landscape to the table, including the crops, harvesting, fishing, conservation, processing, preparation and, particularly, consumption of food. The Mediterranean diet is characterized by a nutritional model that has remained constant over time and space, consisting mainly of olive oil, cereals, fresh or dried fruit and vegetables, a moderate amount of fish, dairy and meat, and many condiments and spices, all accompanied by wine or infusions, always respecting the beliefs of each community."

[12]For a detailed analysis, see Mombiela et al. (2012).

[13]Note that this deterioration is also accelerated by the development of large retail stores which tend to be more interested in mass production of food.

"scores attributed to levels of consumption of certain foods, in relation to … WHO and USDA (healthy nutrition) recommendations". On that basis, they found "a marked decline in food quality, especially in the Mediterranean."

What are the implications of these worrisome trends for public policies? This question is not trivial because the fact that Egypt and Morocco score best on the MAI, while they are the two countries with the most serious rural poverty problems, suggests that this index is ambiguous. But there is no doubt however that a deterioration in the nutrition quality of the diet portends serious public health problems, associated in particular with the spread of obesity. This concern justifies enhanced attention to food safety measures and institutions (Malorgio and Solaroli 2012), as well as a major education effort on healthy nutrition. In addition, the link with agricultural and rural development policies, illustrated by the motto of the Mediterranean Diet, 'from landscape to the table', adds another dimension to the complexity of the challenges identified above.

1.6 The SustainMED Research Project

Entitled "Sustainable agri-food systems and rural development in the Mediterranean Partner Countries", and supported by the European Commission within the 7th Framework Program for Research and Development, the SustainMED project undertook to examine and assess the impacts of EU and national agricultural, rural, environmental and trade policies in the Southern and Eastern Mediterranean region, namely in the so-called Mediterranean Partner Countries (MPCs), as well as in Turkey. The impacts to be analysed were very diverse, including socio-economic structural changes, employment and migration trends, income distribution and poverty alleviation, resource management, trade liberalisation, as well as commercial relations with major trading partners (in particular the EU) and competitiveness in international markets. The rationale for such a wide research agenda was the realization that trade liberalization alone, which has been the linchpin of Euro-Mediterranean cooperation for decades, will not be sufficient to promote sustainable development in the Mediterranean region.

The research consortium put in place for this project gathered 13 research institutions from 11 countries (see table below), building on the well-established networks of MAICh and IAMM, two institutes of CIHEAM. The project has focussed on four MPCs (Egypt, Morocco, Tunisia and Syria—the latter was subsequently dropped because of the political events in that country), as well as Turkey. A wide range of complementary methods and analytical tools were used, including quantitative modelling, structured surveying, indicator building and qualitative data analysis, in order to provide (i) orders of magnitude of the impact in MPCs of changes in important policy parameters, and (ii) qualitative insights into processes which will be important for the future welfare of MPCs but which cannot be fully captured by quantitative indicators. The research done under this project has been mainly of an applied nature, focussing on a few major socio-economic

issues and policy domains: the poverty situation and how to reduce it; sustainability issues, the role of the private sector; food security and risk management; trade liberalization; and Euro-Mediterranean integration. These are the topics covered in this book.

List of participants

Participant no.	Participant organisation name	Short name	Country
1 (Co-ordinator)	Institut Agronomique Méditerranéen de Montpellier	CIHEAM-IAM.M	France
2	Ecole Nationale d'Agriculture Meknès	ENA	Morocco
3	Consejo Superior de Investigaciones Científicas	CSIC	Spain
4	Institut National Agronomique	INAT	Tunisia
5	Kent Business School—University of Kent	KBS	United Kingdom
6	Mediterranean Agronomic Institute of Chania	CIHEAM-MAICh	Greece
7	Pellervon taloudellisen tutkimuslaitoksen kannatusyhdistys r.y.	PTT	Finland
8	Università degli Studi di Napoli	UNINA	Italy
9	Universidad Politécnica de Valencia	UPV	Spain
10	National Agricultural Policy Center	NAPC	Syria
11	Zagazig University	ZU	Egypt
12	National Institute for Agricultural Research (INRA-Montpellier)	INRA	France
13	Akdeniz University	AU	Turkey

1.7 Outline of the Book

After this introductory chapter reviewing the main agricultural and rural development challenges faced by SEMCs, the diagnosis of the problems will be further specified and elaborated in four successive country chapters devoted to the cases of Egypt, Morocco, Tunisia and Turkey, followed by one chapter reviewing past agricultural and rural development policies in SEMCs. This will be followed by a series of thematic chapters analyzing specific sets of issues and policies, regarding respectively trade, value chains, food security, food safety, and sustainable management of natural resources. Finally, a concluding chapter will come back to the main lessons learnt regarding the challenges introduced above and discussed throughout the book.

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Chapter 2
Diagnosis and Challenges of Sustainable Agricultural Development in Egypt

Ibrahim Soliman

2.1 Introduction

Sustainable agricultural development seeks not only to preserve and maintain natural resources, but also to develop them, as future generations would have much more demand quantity-wise and quality-wise for agricultural and food products. Such goals should ensure a balance with the development of livelihoods enjoyed by the individuals concerned. Livelihood should not be restricted to an indicator of sufficient income levels but should also include public health concerns and education standards. The objective of this study was therefore to diagnose the challenges facing sustainable agricultural development in Egypt.

The analysis examined six dimensions: trade trends with an emphasis on agricultural trade; rural poverty indicators and causes; degradation of agricultural resources (soil and irrigation water); agricultural labor employment in relation to migration and the technological packages adopted; public health criteria; and education indicators. The final section was allocated for a profile of the strategy towards rural development.

The deficit in the trade balance showed an increase due to the deterioration of Egyptian exports in the world market, in particular the EU, due to the impacts of non-tariff barriers. Inequalities and rural poverty showed the extent of the unequal distribution of agricultural resources. They also demonstrated whether or not income generated from agriculture was capable of alleviating poverty in small-scale farming households and whether or not poverty in rural Egypt runs deeper than in urban areas. The appraisal of the degradation in natural resources focused on agricultural land and irrigation water. Whereas the agricultural land resources

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analysis concerned social and economic attitudes as well as the deterioration in soil fertility and quality, the analysis dealt with the types of quantitative and qualitative waste in irrigation water resources.

Worrying demographic issues were examined via migration trends and unemployment indicators as well as through the labor force and employment by sector. Public health indicators showed that the imbalance between access to piped water and the sanitation network in rural regions was the worst of all Egyptian regions. While piped water reached 97 % of rural households, only one-third of them have access to the sanitation network and only 13 % of rural households in Upper Egypt had access to sanitation in 2008. The public health indicators recorded 30 beds and 13 doctors for every 10,000 citizens in major cities, there were fewer than 20 beds and 2 doctors per 10,000 citizens in rural towns. Surprisingly, there is a higher ratio of nurses to doctors in rural regions than in urban regions in Egypt. This implies a lack of doctors in rural regions and the preference of rural women to work as nurses in the vicinity of their home villages for social reasons, in particular the fact that other employment opportunities in rural areas for women are rare. Literacy rate estimates would appear to show that the lowest literacy rate is in rural Upper Egypt at about 57 % and that the highest rate is in urban Lower Egypt at around 79 %. The literacy gap between rural and urban areas in Egypt nevertheless fell from 45 % in 1995 to less than 21 % in 2010.

The study was concluded with the definition of a profile for a strategy aimed at rural development in Egypt including a proposed program to alleviate poverty.

2.2 Trade Balance Degradation

This section presents some of Egypt's major agricultural trade performance criteria, including export flows, with a special focus on EU markets and the impacts of the revolution of January 25, 2011.

2.2.1 Egyptian Exports to the World Market

The old regime in place before the revolution of January 25, 2011 had introduced a development strategy built on a series of 5-year plans implemented since 1982. The last of these was the sixth development plan (2007–2011). Among the main objectives of that plan was the task of increasing export value with a view to overcoming the considerable trade deficit, in particular with regard to food. Table 2.1 shows significant annual growth in the value of total exports of about 16.6 % over the period 2007–2011. It was nevertheless smaller than the 21.3 % annual growth in the value of total imports. The Egyptian agricultural exports to the EU represented less than one-fifth of the agricultural imports from the

Table 2.1 Average annual growth rate of Egyptian foreign trade flow 2007–2011

Trade flow	Average annual growth 2007–2011 (%)
Imports from the rest of the world	21.3
Exports to the rest of the world	16.6
Imports from EU-27	7.8
Exports to EU-27	7.8
Agricultural imports from EU-27	21.4
Agricultural exports to EU-27	4.3

Sources Compiled from: (1) Eurostat (Comext, New Cronos), IMF (DoTS)

EU market to Egypt. Therefore, it can be assumed that the agricultural trade balance between the two markets developed in favor of the EU and not Egypt over the final 5-year development plan (2007–2011).

The profile of Egyptian exports over the period 2007–2011 shown in Table 2.2 provides some important indicators. Although total agricultural exports increased significantly over the period, it decreased from US$2887 million in 2010 to US $2774 million in 2011 while its share in total exports decreased from 11 to 9 %. It seems that the onset of the revolution of January 25, 2011 had a negative impact on agricultural exports. A dramatic fall in all categories of Egyptian exports, both agricultural and non-agricultural, was observed between 2011 and 2012, as shown in Table 2.3. The ratio of export earnings to import expenditure (either the total trade or the agricultural trade) also decreased over the period 2011–2012 (Table 2.3). This trend implied that the outflow of imports is much more than the inflow of exports, which means increases in the drainage of foreign currency associated with a shrinking of tourism activities. The expected result is a further fall

Table 2.2 Share of Egyptian agricultural products in total exports

Year	2007	2008	2009	2010	2011
Total exports in million US$	16,181	26,204	23,102	27,324	30,611
Agricultural products, without cotton	1048	1875	2819	2887	2744
Total (%)	6	7	12	11	9
Food industries	224	536	758	1355	1274
Total (%)	1	2	3	5	4
Leather and its products	84	86	108	182	151
Total (%)	0.52	0.33	0.47	0.67	0.49
Cotton and textiles	768	1858	2210	3094	3211
Total (%)	4.7	7.1	9.6	11.3	10.5
Exports of agricultural origin	1076	2480	3076	4631	4636
Total (%)	6.6	9.5	13.3	16.9	15.1

Source Compiled and calculated from CAPMAS, Central Agency for Public Mobilization and Statistics (2013), Nasr City, Cairo, Egypt

Table 2.3 Influences of January 2011 revolution on Egyptian exports (value in million US$)

Year	Exports to the world market			Exports to the EU-27		
	Jan–Sep 2011	Jan–Sep 2012	Growth Rate (%)	Jan–Sep 2011	Jan–Sep 2012	Growth Rate (%)
Total exports	23,038	21,958	−5	7630	6485	−15
Total imports	43,486	51,690	19	13,072.8	15,441.4	18
Exports/imports (%)	53	42		58	42	
Exports of agricultural products, without cotton	2273	1936	−15	525	449	−15
Imports of agricultural products, without cotton	5473	5910	8	627	612	−2
Exports/imports (%)	42	33		84	73	

Source Compiled from CAPMAS, Central Agency for Public Mobilization and Statistics (2013), Nasr City, Cairo, Egypt

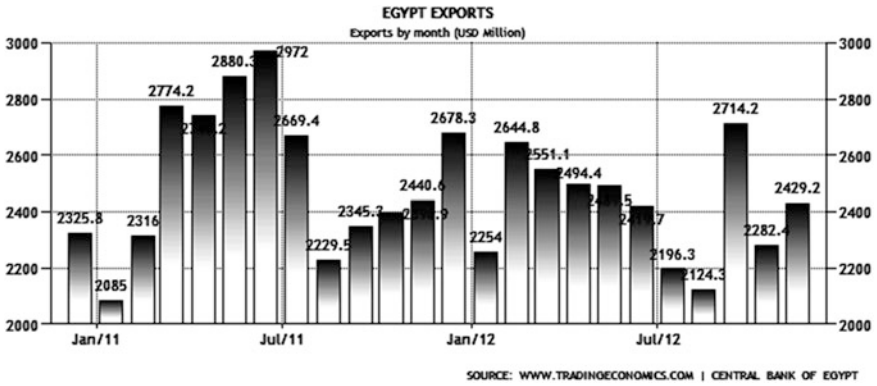

Fig. 2.1 Monthly changes in Egyptian exports (2011–2012)

in foreign currency monetary reserves. Figures 2.1 and 2.2 confirm the monthly increase in the deficit of the aggregate Egyptian balance of trade over the period January 2011–July 2012.

2.2.2 Egyptian Exports to the EU

The EU market is the world's biggest market for Egyptian agricultural product exports. In 2011, Egypt increased exports of agricultural, processed agricultural, fish and fishery products to the EU, with a total value of US$9404 million, i.e. 15 % more than in 2010 (Table 2.4). More than 80 % of these products benefit from duty-free and quota-free access to the EU market. The main agricultural products exported by Egypt to the EU are fresh table grapes, potatoes, sweet oranges, beans,

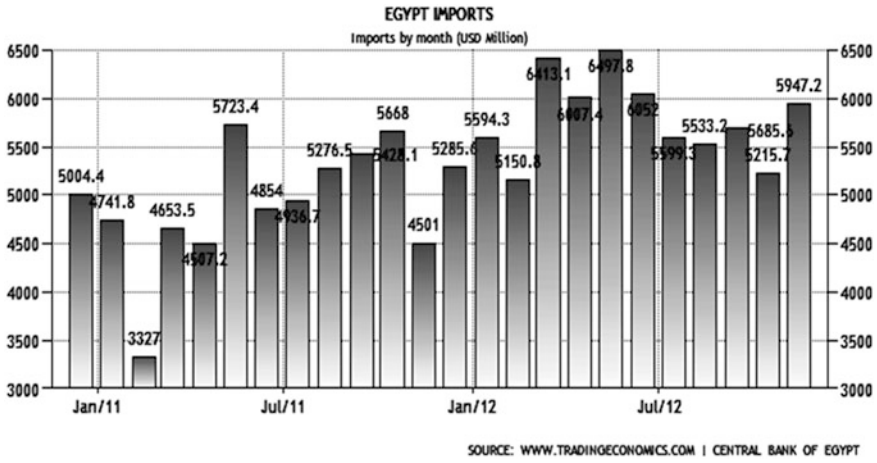

Fig. 2.2 Monthly changes in Egyptian imports (2011–2012)

onions and strawberries (IMF 2013). If other agricultural products exported to EU markets were taken into account, the role of the European market would be vital to Egyptian trade. Surprisingly, Egypt pegged its currency value to that of the US$ rather than the euro. While the annual growth rate of total Egyptian imports and exports from and to Egypt and the EU was 7.8 %, Egyptian agricultural exports to the EU recorded a growth rate of only 4.3 %, i.e. less than one-fifth of the comparable rate of agricultural imports from the EU, which was 21.4 % over the period 2007–2011.

2.2.3 Impacts of Non-tariff Barriers

It would appear that non-tariff barriers (NTBs) have a considerable impact on the competitiveness of Egyptian agricultural products on the EU market (Bassiony 2012). The study applied the gravity equation model as a common approach to assessing the impact of domestic and foreign policies on Egyptian trade patterns using cross-sectional data for the year 2010. The results showed that the impacts of NTBs were significant with a positive sign. This indicated that NTBs have a strong trade impact on Egyptian agricultural exports of vegetables and certain roots, tubers, fruits (including fresh oranges), nuts, peeled citrus fruits, melons and cotton. The positive sign may indicate the revealed competitiveness (RC) of these products on the EU market. Egyptian exporters should therefore satisfy EU requirements with regard to non-tariff barriers to raise their share on the EU market. This paper examined six types of measures: sanitary measures, technical barriers to trade, licenses, quotas, prohibitions and financial measures, applied in EU countries. Moreover, it examined the export-related measures applied by the Egyptian government.

Table 2.4 Egyptian exports to the EU markets (value in million US$)

Year	2007		2008		2009		2010		2011	
	Exports to the EU-27 markets	Total Egyptian exports (%)	Exports to the EU-27 markets	Total Egyptian exports (%)	Exports to the EU-27 markets	Total Egyptian exports (%)	Exports to the EU-27 markets	Total Egyptian exports (%)	Exports to the EU-27 markets	Total Egyptian exports (%)
Total exports	9146	57	10,704.2	41	7946	34	9404	34	12,363	40
Agricultural exports without cotton	619	59	579	31	679	24	666	23	707	26
Food industries	99	44	108	20	74	10	169	12	151	12
Leather and its products	51	60	74	86	70	65	121	66	127	84
Cotton, textiles, clothes	652	85	1022	55	892	40	1036	33	1195	37
Exports of agricultural origin	1420	67	1794	41	1714.7	29	1991.6	26	2180	30

Source Compiled and calculated from CAPMAS, Central Agency for Public Mobilization and Statistics (2013), Nasr City, Cairo, Egypt

All agricultural products sold in the EU, either imported or locally produced, must comply with EU requirements in terms of food safety. This involves an integrated approach (from farm to fork) covering food and feed safety, animal health and welfare as well as plant health. Consequently, in the case of food products of animal origin, only establishments that comply with these requirements are approved with a view to exporting to the EU (Delegation of the European Union to Egypt 2013). Therefore, the available approach to expand agricultural product exports from Egypt to EU markets are to comply with these requirements, otherwise such constraints would restrict efforts to develop Egyptian exports.

2.3 Inequalities and Rural Poverty

To assess the poverty level and performance indicators, the study used data from successive household budget surveys conducted by Egypt's Central Agency of Statistics and Public Mobilization (CAPMAS) between 1975 and 2009. These surveys allowed some major indicators for the standard of living in rural and urban regions of the country to be estimated (Table 2.5). The table shows that while food price levels rose at an annual rate of 9.4 % in rural regions between 2000 and 2005, it increased at an annual rate of 2.1 % in urban regions. This shows the bias of the Egyptian government in favor of urban areas at the expense of rural areas with respect to food price subsidy policy and market control functions.

Table 2.5 also shows that the parity current income (the ratio of rural annual per capita income to urban income)[1] rose from 55 % in the year 2000 to 84 % in 2005 at the current price level. However, at the constant price level of 2000, this ratio decreased from 55 % in 2000 to only 39 % in 2005. This was due to a rapid decrease in the real annual rural per capita income at 9 % while it decreased by only 2 % in urban areas. Consequently, the standard of living in rural regions was much lower than in urban regions and worsened over time due to price inflation, which reflected less economic growth and more poverty depth in rural than urban regions.

2.3.1 How Large Are the Inequalities in Agricultural Resource Distribution?

In general, the Egyptian farming system has two major features. It is highly intensive in production and too fragmented in farm size pattern. The first Egyptian land reform law was enacted in September 1953. It limited land holdings to 84 ha

[1]Instead of annual income, total annual expenditure was used as the household budget surveys were unable to measure income precisely.

Table 2.5 Indicators of standard of living in Egyptian rural and urban regions

Economic indicators	2000		2005	
	Urban	Rural	Urban	Rural
Average value/kg of food consumed	2.73	1.43	2.97	2.29
Annual food price inflation rate (%)			2.10	9.40
Annual per capita expenditure (L. E.)	2653	1455	2769	2328
Expenditure (rural/urban), where 2000 = 100 (%)	100	55	100	84
Annual growth rate between the two successive periods (%)			0.90	7.71
Real annual per capita expenditure (L. E.)	2653	1455	2391	928
Expenditure (rural/urban), where 2000 = 100 (%)	100	55	100	39
Annual economic growth rate between 2000 and 2005 (%)			−2	−9

Source Estimated from Central Agency for Public Mobilization and Statistics (CAPMAS), "The Household Budget Survey of Egypt", from the surveys of 2000 and 2005, Cairo, Nasr City, Egypt

(200 Feddan[2]) for a family (parents and children under 21 years of age) and to 41 ha (100 Feddan) for a single person. The second law was passed in 1969, adjusting the size of land holdings to half the limit established by the first law, i.e. 40 ha per family and 20 ha per single person. The period between the two laws saw another presidential decree, referred to as the nationalization decree enacted in 1961, which placed all firms under state management, including those in the agricultural sector. Tenant farmers benefitted considerably from the land reform law, which established numerous barriers protecting them from landowners when the latter wanted to repossess their land from the tenant. Furthermore, the law set land rent at 7 times the land property tax. Under that past regime the tenants used to bequeath the rented land by dividing it between their sons and daughters, thereby exacerbating land fragmentation through increasingly small farm sizes. However, the land market was completely liberalized in 1997 when the land reform law was cancelled, a fact which had a dramatic impact on land holding patterns.

Tables 2.6 and 2.7 present the relative frequency distribution of agricultural land holdings in Egypt from the period before the Egyptian Revolution in July 1952 until the year 2000, covering all structural changes in the land holding policy of Egypt. Unfortunately, no recent data on farm structure is available beyond 2000.

Estimates of the GINI coefficient and the Lorenz curve are two parameters used to assess the equality and justice of wealth and resources in an economy. The GINI coefficient is useful in illustrating the principal factors that characterize equality and inequality in nation states and communities within these states. When focusing on social equity, the GINI coefficient serves as a useful guide (Litchfield 1999). Expressed as a percentage, the GINI coefficient ranges between zero, which means full equality of the probability distribution of the variable concerned, and 100 %, i.e. full inequality (Lui 1997). The GINI coefficient was therefore estimated by this

[2]1-Feddan = 4200 m^2.

Table 2.6 Distribution pattern of agricultural land holdings before and after land reform low

Land holding category (Feddan)	Before 1952		After the 1st reform law, in 1953	
	Numbers (%)	Area (%)	Numbers (%)	Area (%)
<2	94.3	35.4	94.4	46.5
2−	97.1	44.2	97.0	55.3
4−	98.8	54.9	98.6	66.0
8−	99.6	65.8	99.6	79.7
21−	99.8	73.0	99.8	86.9
42−	99.9	80.3	99.9	94.1
84+	100	100	100	100
GINI coefficient	61.1		49.4	

Source Compiled and calculated from the Ministry of Agriculture and Land Reclamation (2009)

Table 2.7 Distribution pattern of agricultural land holdings (1969–2000)

Land holding category (in Feddan)	Contemporary to the nationalization Acts in 1961		After the 2nd land reform law in July 1969		In 2000, after the law of land holding liberalization	
	Numbers (%)	Area (%)	Numbers (%)	Area (%)	Numbers (%)	Area (%)
<2	94.1	52.1	95.8	56.3	90.4	47.8
2−	96.7	60.6	98.1	66.0	96.7	63.4
4−	98.8	71.2	99.2	75.8	98.9	75.2
8−	99.6	84.7	99.7	85.0	99.7	85.5
21−	99.8	91.8	99.9	91.5	99.9	89.5
42−	100	100	100	100	100	100
GINI coefficient	43.3		40.3		44.9	

Source Compiled and calculated from the Ministry of Agriculture and Land Reclamation (2009)

study for the frequency distribution of farm holdings of agricultural land in Egypt over the period running from before 1992 until 2000.

The estimated GINI coefficient of land holding distribution shows that the lower the GINI coefficient, the greater the fragmentation in terms of land holding size. Before the first land reform law (during the Egyptian royal era), it was about 61.1 % before falling to 49.4 % after the first land holding law was introduced, indicating a shift towards greater equality. After the nationalization decrees of 1961, the GINI coefficient fell even further to 43.3 % due to the absence of economic incentives to establish large farms with stagnation in the land market. The absence of incentives was the result of several factors. Among these is the fact that the land reform law prevented owners from repossessing land from the tenants, even if they did not pay their rent on a regular basis. The rent was set at a too low rate—only 7 times the land tax, which was in itself very low at US$7–10 per hectare. By the time the second land reform law was introduced in 1969, the GINI coefficient had decreased

Table 2.8 Share of small farms in land holding patterns of Egypt

Category of farm area (Feddan)	No. holdings (%)	Farm area (%)	No. cattle (%)	No. buffalo (%)
<1	34.72	6.17	16.81	21.54
1 to less than 2	26.11	12.49	20.07	26.92
2 to less than 3	18.87	15.47	19.03	23.67
3 to less than 4	8.35	9.84	10.50	9.32
4 to less than 5	3.64		5.36	5.71
Sub-total	5.63		71.77	87.16
5 to less than 6	49.61	8.16	6.32	6.12
6 to less than 7	1.58	4.62	2.84	2.63
7 to less than 10	1.10	4.62	1.97	1.61
10 to less than 15	0.50	2.95	1.00	0.85
15 to less than 20	0.51	4.26	0.85	0.69
20 to less than 30	0.34	4.52	0.77	0.59
30 to less than 50	0.16	3.54	0.40	0.28
50+	0.04	17.73	0.11	0.07
Total	100	100	100	100

Source Compiled and calculated from the Ministry of Agriculture, Egypt (2010)

even further to 40.3 %. In the year 2000, i.e. three years after the liberalization of the land market following the cancellation of the land ownership limits and the decision to allow land rent to be determined by the market mechanism, the GINI coefficient had rebounded slightly around 45 %, i.e. towards less equity. Therefore, land holding patterns changed to reflect a much higher centralization of larger farm sizes. Small farms, therefore, still account for the majority of agricultural land holdings in Egypt. By Egyptian standards, small farms measure less than 5 Feddan (less than 2 ha) (Soliman et al. 2012). Table 2.8 shows that 91.68 % of holdings are smaller than 5 Feddan, accounting for 49.61 % of land, i.e., less than 10 % of the owners hold almost half the agricultural land area. Nevertheless, small farmers hold the majority of livestock in Egypt, i.e. 71.77 % of cattle and 87.16 % of dairy buffaloes. Livestock is seen as a sort of capital intensification on small farms to generate a daily income for the family (Soliman et al. 2012).

2.3.2 *Does Agricultural Income Alleviate Household Poverty on Small Farms?*

Table 2.9 presents the household income structure in both rural and urban regions in Egypt. While agricultural activities are the main source of income in rural areas, i.e. about 62 %, such activities represent only 16 % in urban regions (some urban citizens hold agricultural assets in rural areas). While income from wages and salaries accounts for almost one third of urban household income, this figure is only

Table 2.9 Role of agriculture in rural household income in 1999/2000

Source of income		Urban	Rural	All sample
Agricultural income	Owned agricultural land	9.57	44.53	28.06
	Agricultural machinery	2.38	2.92	2.66
	Agricultural projects	1.74	1.13	1.41
	Farm animals	2.13	13.39	8.09
	Sub-total (1)	15.82	61.97	40.22
Other sources of income	Residential buildings	6.38	1.62	3.86
	Financial activities	19.54	10.71	14.87
	Commercial projects	24.05	7.52	15.31
	Sub-total (2)	49.97	19.85	34.04
	Wages and salaries (3)	34.21	18.18	25.74
Total (L.E./household/year)		100	100	100

Source Calculated from Had-hood, Mashhour (1999)

18 % in rural regions. The remainder of the income is derived from residential building rent, commercial projects and financial activities. Such sources represent about half of an urban household's income but only one-fifth of household income in rural regions. In other words, until the end of the last century, the opportunities for non-agricultural sources of income in rural areas were much more limited than urban. However, it would appear that the size of the agricultural share changed drastically during the first decade of the current century.

As shown in Table 2.8, the small-scale farmers represent the majority of agricultural landholders in Egypt. Poverty measurements should therefore focus on this category of the agricultural community in Egypt. Accordingly, a recent farm sample survey consisting of 120 small-scale farm holdings from 4 villages in the Sharkia Governorate, where the University of Zagazig is located, was conducted under the supervision of the author. The purpose of this survey was to investigate small-scale farmers' economics for the agricultural year 2010/2011. Table 2.10, presents the

Table 2.10 Sources of small farm income

Source of income	L.E./year	US$/year	%
Sale of crops	4478	740	18
Income from livestock business	8296	1371	33
Income from poultry business	236	39	1
Working for other farmers	876	145	3
Salaries from non-agricultural jobs	10,145	1677	40
Remittances from working abroad	1200	198	5
Total income	25,231	4170	100

Source Estimated from a new sample survey of 120 farms, supervised by the author for the agricultural year 2010/2011 in four villages of the Sharkia Governorate

annual average of the share of agricultural and non-agricultural income in the earnings of small-scale farms. It showed that while 52 % of the total annual income of a farm household was generated by agricultural activities, 48 % was derived from non-agricultural activities. This would imply that the share of agricultural income decreased in 2010/2011 in comparison to the results presented in Table 2.9 for the year 1999/2000, i.e. from 62 to 52 %. It would also appear that small-scale farmers could not generate higher agricultural income due to the limited land endowments available. It is quite clear from Table 2.10 that whereas the sale of arable crops provided only 18 % of annual household income, livestock provided 33 % and poultry provided 1 %. Livestock activities rather than crops have therefore become the major source of agricultural income for the majority of farm households in Egypt. Among non-agricultural income sources, wages from non-agricultural jobs represent the majority, i.e. 40 % of annual small-scale farm household income, followed by the share of remittances from working abroad (5 %) and finally working for other farmers (3 %).

Accordingly, the increase in the non-agricultural population in rural areas will in time prove to be a major burden on the national economy of Egypt. In other words, rural communities will become residential regions for employees rather than mainly being home to farmers and agricultural workers as it was fifty years ago.

According to the small-scale farms survey mentioned above, the average household size was 5.2 people per farm. Considering the poverty threshold of US $2/capita/day determined by the World Bank, the author assessed the extent to which the annual earnings of small-scale farm households were sufficient to surpass the poverty threshold. Summing all income sources from agricultural activities earned by small-scale farming households, including working as a laborer on other farms as shown in Table 2.10, the daily per capita income would not surpass US $1.2, i.e. there would be a poverty gap of 40 % between the minimum income level of US$2/capita/day and actual agricultural earnings. It had not only that but agricultural income sources provided US$1.03/capita/day, which would hardly even exceed the absolute poverty line. However, the average daily per capita income per household (agricultural and non-agricultural) would be US$2.2, a little (10 %) above the poverty threshold (US$2/capita/day).

2.3.3 Is Poverty in Rural Egypt Less Deep Than in Urban Areas?

While the gross national product (GNP) per capita expresses a national average of wealth, it does not provide an insight into the levels of actual wealth distribution to individuals within the state. Accordingly, the GINI coefficient illustrates the principal factors that characterize equality and inequality for communities within states, serving as a useful guide focusing on social equity. GINI coefficients can be put to good use as a means of assessing the impacts of economic and social reform and to

forecast trends towards civil violence and rural to urban migration rates (Litchfield 1999). Consequently, that study estimated GINI coefficients from the household expenditure surveys that were conducted in Egypt between 1974/1975 and 2009/2010 (CAPMAS). The estimates concerned both urban and rural regions.

The poverty rates, as shown in Table 2.11, indicate the concentration of the poor in rural areas, particularly those in Upper Egypt. Even though rural regions are poorer than urban ones, the inequality in income distribution is less marked in rural areas than urban regions in Egypt. Nevertheless, greater income distribution equality associated with a lower income level than in urban areas is a disadvantage as it means that poverty is widespread and deeper in rural areas than in urban areas.

The estimate of the rural/urban parity food price ratio, shown in Table 2.12, shows that the level of food prices had apparently decreased between 1975 and the end of last century. This was due to a very low rate of inflation in food prices in rural regions in comparison to urban regions over the period 1990–2000. Although the last decade of the 20th century was an era of drastic changes in the Egyptian economy, shifting from a centrally-planned economy to a free market system, it seems that rural regions resisted food price inflation due to a high rate of consumption of farm-produced products. The consumption of home-produced items is valued at cost price. The monetary burden of such a cost represents only the inputs purchased (Soliman and Eid 1995).

However, the rural/urban parity food price ratio increased rapidly during the last decade (2000–2010). The food price inflation rate in rural regions exceeded that

Table 2.11 Income distribution and poverty in urban and rural Egypt

Region	Expend/capita (EGP)	Income share of the lowest 40 % of people (%)	GINI coefficient (%)	Poor persons (of total population %)		Wages of poor households (%) of total employees	
				Ultra poor (%)	Total (%)	Income (%)	Total wages (%)
Urban governorates	5832	20.10	35	0.50	6.90	43.50	4.60
Lower Egypt	3556	26.30	23	2.00	14.20	41.00	10.30
Urban	4327	15.10	27	0.80	7.30	38.40	4.90
Rural	3275	32.30	20	2.50	16.70	41.40	12.50
Upper Egypt	2916	23.40	28	12.80	36.90	41.00	27.70
Urban	3879	12.80	33	6.30	21.30	41.60	14.70
Rural	2501	43.7	23	15.60	43.70	40.90	34.60
Egypt	3712	22.30	31	6.10	21.60	41.30	15.20
Urban	4843	20.70	34	2.60	11.00	41.40	7.20
Rural	2924	26.00	22	8.50	28.90	41.20	21.80

Source Estimated from CAPMAS (Center Agency for Public Mobilization and Statistics of Egypt) (2010b), Household Income Expenditure and Consumption Sample Survey (HIECS) of 2008/2009

Table 2.12 Trend of food price level inflation rate in rural versus urban Egypt

Region	Urban			Rural			Rural/urban parity food price (%)
Comparative indicator	Average value/kg of food consumed	Food prices index (%)	Annual food prices inflation rate (%)	Average value/kg of food consumed	Food prices: inflation index (%)	Annual food prices: inflation rate between two successive periods (%)	
1975	0.14	100	–	0.12	100	–	86
1990	1.55	1107	16.0	1.39	1158	16.3	90
1995	1.74	1243	2.3	1.25	1042	−2.1	72
2000	2.73	1950	9.0	1.43	1192	2.7	52
2005	2.97	2121	2.1	2.29	1908	9.4	77
2009	3.40	2431	3.4	3.13	2606	7.8	92

Source Estimated from CAPMAS (2010b)

observed in urban regions by a relatively large margin. This was due to heavy subsidization of food items devoted to urban regions compared to rural areas. It was also due to the urbanization of wide tracts of rural land adjacent to cities, thereby increasing the demand for food commodities in these newly urbanized rural regions. A third reason may stem from the changes in rural consumers' behavior towards simulating the behavior observed in urban regions due to the expansion of communication tools, commercial promotions and the media.

Egyptian statistics lack a continuous estimation of CPI for both urban and rural regions. Therefore, as food consumption expenditure represents more than 50 % of total household expenditure in most Egyptian households, the estimated index presented in Table 2.12 was applied to obtain the real annual per capita income in both urban and rural areas over the period 1975–2010. As shown in Table 2.13, dramatic changes occurred in the Egyptian economy during the period 1975–1990, moving from a centrally planned economy to a free market economy without a proper institutional policy view (Hazell et al. 1995). These changes generated severe disadvantages, which outweighed the few advantages. In reality, both urban and rural communities suffered from reduced purchasing power with negative economic growth in both communities. The great expansion in foreign investments, mainly from the West, was combined with significant positive economic growth between 1990 and 1995. Real income and economic growth then deteriorated until 2010, in both the urban and rural communities, due to a distortion of the applied economic policies. Successive governments over the period 2005–2010, i.e. until the January revolution, focused attention on the rent and paper economy, a fact which was only reflected in certain categories of urban communities, while the rural regions did not derive any benefit from this policy. The urban households in the categories which did benefit therefore enjoyed advantages in terms of economic growth while the rural real economy deteriorated. Accordingly, the new regime should emphasize rural development to bridge the rural/urban development gap as quickly as possible.

Sørli et al. (2004) claimed that the lack of economic and political opportunities among the communities within a certain country provide a fertile soil for frustration and opposition. They added that poor countries or groups within a nation, trapped in poverty, have a greater propensity for violent conflict with a higher probability of conflict breaking out than the global average. Bloomberg and Hess (2002) stated that "reduced levels of domestic economic activity tend to create incentives for increased external and internal conflict, which in turn reinforces low levels of domestic economic activity". Therefore, a conflict-poverty trap emerges where conflict plays a role in reducing capital accumulation and the lack of capital accumulation results in further conflict. Nevertheless, there is a recognized causal relationship between inequity and violence with Collier (1999), concluding that even if economic inequity is significant in causing civil war, the "Collier and Hoeffler model of civil war" lacks the means of measuring its influence.

Table 2.13 Income level and income distribution in rural versus urban Egypt

Region	Urban				Rural			
Year	Annual per capita expenditure (EPD)	Annual growth rate (%)	Real annual per capita expenditure	Economic growth rate (%)	Annual per capita expenditure (EPD)	Annual growth rate (%)	Real annual per capita expenditure (EPD)	Annual economic growth rate (%)
1975	103	–	103		63	–	63	
1990	1058	15.5	96	−0.50	703	16.1	61	−0.25
1995	1793	10.6	144	8.24	1038	7.8	100	9.92
2000	2653	7.8	136	−1.17	1455	6.8	122	4.06
2005	2769	0.9	131	−0.83	2328	9.4	122	−0.02
2009	4843	11.2	199	8.48	2924	4.6	112	−1.69

Source Estimated from Table 2.5 and CAPMAS (2010b)

2.4 Degradation of Natural Resources

Each community has granted a stockpile of natural resources and human resources. Man has generated a new economic factor—capital—using natural resources together with technology to satisfy the growing quantitative and qualitative demands of the population of such a community. The expanded demands therefore exacerbate the scarcity of these limited natural resources. The Egyptian economy has suffered considerably from the impacts of this economic process as a result of the policies adopted over the past five decades, in particular with regard to agricultural land and water resources (Soliman 2006a, b).

At the turn of the twenty-first century, the Egyptian economy is therefore confronted with a major challenge. It has to create a new development system aimed at ensuring an efficient combination of natural resources and human resources while curbing the depletion of agricultural land and water resources both in quantitative and qualitative terms. Sustainable development should ensure that future generations have their share of present-day resources and this share should be developed by taking into account the increasing quantitative and qualitative future demand due to the evolution of civilization and expected economic and social development (Soliman 1995). This section aims to investigate the changes that have occurred in the natural agricultural resources in Egypt over the past four decades, focusing on the quantitative and qualitative deterioration of these resources.

It should be noted that the agricultural and water resource management policies implemented in Egypt have lacked social costs and price implementation which caused the market to fail, thereby exacerbating the deterioration in the quantity and quality of both natural resources.

2.4.1 Agricultural Land Resources

Despite the scarcity of data and accurate information regarding the area of agricultural land appropriated for non-agricultural use, the study tried to extrapolate the validity of the data available to obtain a time trend for the changes in these areas. The study also tried to identify the classification patterns of non-agricultural uses to specify the economic attitudes of rural communities towards land use. The study used a procedural definition for the pattern of appropriations of agricultural land for non-farming purposes. Some of the non-agricultural uses were associated with agricultural development, such as animal and poultry production and agricultural industries. However, the argument is still valid that while these purposes are concerned with agricultural activities, they eliminate fertile agricultural land within the Nile Delta which is difficult to offset in the absence of the Nile flood.

The study used several methods to track the appropriation of agricultural land for non-agricultural purposes between 1970 and 2012. The official time-series statistics show the total agricultural land and the reclaimed land as presented in Table 2.14.

Table 2.14 Time series estimates of Egyptian farmland, and reclaimed area (in 000 Feddan), 1977–2010

Year	Agricultural land	Annual change in farmland	Reclaimed land area
1977	5796	–	–
1978	5838	42	5
1979	5826	−12	7
1980	5820	−6	127
1981	5876	56	81
1982	5822	−54	78
1983	5797	−25	45
1984	5853	56	52
1985	5943	90	100
1986	6019	76	120
1987	6093	74	132.8
1988	6183	90	132.8
1989	6270	87	132.8
1990	6918	648	132.8
1991	7023	105	132.8
1992	7131	111	57.63
1993	7179	45	57.63
1994	7173	−6	57.63
1995	7813	1377	57.63
1996	7563	−250	24.5
1997	7726	163	27.9
1998	7761	35	40.7
1999	7848	87	22
2000	7833	−15	12.7
2001	7946	113	28.7
2002	8148	202	18
2003	8113	−35	23.5
2004	8279	166	14.5
2005	8385	106	7.8
2006	8411	26	2.22
2007	8423	12	2.1
2008	8432	9	0.7
2009	8783	351	0
2010	8741	−42	0
Aggregate change	2945	3682	1734.84

Source (1) Center Agency for Public Mobilization and Statistics of Egypt, and (2) Public authority for agricultural development and reconstruction projects, Egypt (2010)

These data are insufficient to obtain logical estimates of the land appropriated for non-agricultural purposes. The aggregate increase in agricultural land was 3682 million Feddan, according to the official statistics; it surpassed the reclaimed area by 1210 million Feddan.

This inaccuracy in agricultural land estimates forced the study to collect all published studies on the agricultural use of land resources to determine a realistic chronological trend for agricultural land use over time. There are few studies available on agricultural land appropriated for non-agricultural purposes. These studies presented the changes over discrete periods rather than on a continuous annual basis. One of the main conclusions from these studies was that land re-appropriation has two main patterns. The first is a legal appropriation of agricultural land with official approval for either public utilities and/or private enterprises. The second could be for related agricultural activities. Patterns of legal appropriation of land include the establishment of animal and poultry farms, stores for seed and fertilizer, shelters for machines and/or finally the construction of houses within the planned urban belts. The second pattern involves the illegal appropriation of agricultural land. Some people simply leave the land fallow until they have the opportunity to build on it. Other illegal practices include dredging the agricultural land and selling the silt for making bricks for construction before building on this degraded land at a later date. Some individuals build concrete buildings either for activities related to the agricultural sector, such as cattle and poultry pens, or for warehouses and storage/packaging plants. However, an increasing area has been used for residential construction, particularly in villages adjacent to big cities. Such residential areas are the nucleus of "slums" which are called "Ashoaiatt" in Egypt. Such slums have become the focus of social unrest as the inhabitants demand the provision of services and infrastructures through social pressure, despite the fact that they are illegal residents.

Table 2.15 shows the estimates of the total land appropriated for non-agricultural purposes during the period from 1970 to 2010. The cumulative total of agricultural

Table 2.15 Total agricultural land withdrawn for non-agricultural purposes (in 000 Feddan), 1970–2010

Time interval	Total farmland withdrawn in successive time periods	Annual average
1970–1980	(1)500	50
1980–1990	(1)270	27*
1990–2000	(2, 1)140	14**
2000–2010	(2)350	35***
2011	14.3	14.3
Total	1274.3	40

*Act 116 of 1983 to prevent construction on the agricultural land
**Issuing of the military Governor (Prime Minister) Command in 1996
***Issuing of the new urban space map of the villages and rural towns for the period 2008/2012
Source Compiled and calculated by (1) Soliman and Rizk (1991)
(2) Ministry of Agriculture and Land Reclamation, Directorate General of Land Protection, unpublished data

land re-appropriated over the period concerned reached 1274 million Feddan with an average annual rate from 40,000 to 50,000 Feddan/year. This rate fluctuated periodically. While 40 % of the total land was appropriated for non-agricultural use during the 1970s, this rate decreased to only 27,000 Feddan during the 1980s as a result of Law No. 116 issued in 1983 concerning the prevention of construction on agricultural land. During the 1990s, the figure fell even further to about 14,000 Feddan/year due to the military rule witnessed in 1996 which prohibited all non-agricultural construction on agricultural land. Between the beginning of the 21st century and January 2011, the annual rate of agricultural land appropriated for non-agricultural use has once again increased to 35,000 Feddan/year due to implementation of the planned program of urbanization, particularly in the Nile Delta Governorates that do not have desert borders. Lawlessness has been dominant in Egyptian society since the revolution of January 25, 2011, which resulted in a boom in construction on agricultural land. The General Directorate for the Protection of Land reported that more than 14,000 Feddan had been re-appropriated by mid-February 2012.

The total agricultural land illegally appropriated (Table 2.16) represented no more than 9.1 % of the total land appropriated for non-agricultural purposes over the same period. This means that most of the land withdrawn was done so legally. The appropriation of agricultural land for non-agricultural use was therefore influenced by government policies rather than individuals.

2.4.1.1 Social and Economic Attitudes

The intensive demand for withdrawing agricultural land for non-agricultural uses was the result of the estimated price of land for non-agricultural purposes being 10–15 times higher than the price for agricultural use (Soliman and Rizk 1991). Such a price difference was responsible for 71 % of the area re-appropriated for other non-agricultural purposes. The same study showed that the agricultural land market was oriented by the demand for non-agricultural purposes. Soliman and

Table 2.16 Agricultural land withdrawn illegally for urban purposes (1987–2011)

Time interval	Total	Annual average
1983–1987	19,325	3865
1988–1992	17,290	3458
1993–1995	7734	2578
1996–2005	11,743	1174
2011	14,296	14,296*
Total	70,388	2427

*Since the 25th of January 2011 until 15 February 2012

Source Compiled and calculated by (1) Abdul Aziz (2007)

(2) Report of the Directorate General for the protection of land, The Seventh Day (newspaper), 15 February/2012

Rizk (1991) estimated the price elasticity of demand for land for non-agricultural use as 0.9, while it was close to zero for the demand for land for agricultural purposes. However, the same study showed that a 10 % improvement in soil fertility reduced the demand for urban purposes by around 3 %.

The increase in population was another important factor behind the increased demand for land for non-agricultural purposes in the Egyptian countryside. The same study showed that a 10 % population increase would increase the re-appropriation of agricultural land for the purposes of construction by about 4.4 %. This figure doubled in villages near the cities.

2.4.1.2 Deterioration in Soil Fertility and Quality

A study of the economic efficiency of agricultural resources in Arab countries (Soliman 2006a, b) showed how valuable irrigated land is in comparison to rain-fed areas. Agricultural production in Arab countries did not show a significant response to changes in rain-fed areas. However, each additional acre of irrigated land showed an additional value in agricultural production of about US$4000 per year (2004, constant price). The study also showed that the value (price) of one acre of irrigated land in Arab countries was about US$100,000 (at 2004 prices).This value is assumed to be much higher as agricultural land in Egypt is fully surface-irrigated with a high density of cultivation, as the crop density coefficient reached nearly 1.76 in the agricultural season in 2009 (Egyptian Ministry of Agriculture 2010). Furthermore, as the Nile flood no longer occurs following the construction of the High Dam in Aswan, the opportunity cost of Nile valley agricultural land is assumed to be much higher because no more silt is added to this soil. An acre lost could not, therefore, be replaced by a newly reclaimed one as Abdul Aziz (2007) estimated the costs of reclaiming one acre at US$2200. In addition the productivity of an acre of newly reclaimed land would be less than the old one in the Nile valley.

As shown earlier in this section, the higher the soil fertility, the lower the demand for Egyptian agricultural land for urban use. However, Soliman and Rizk (1991) provided evidence that the main reason behind the decline in Egyptian agricultural soil fertility is that the groundwater level has been raised closer to the surface due to the imbalance between the speed of expansion of the drinking water network and the very limited expansion in the sewage network in rural areas. This is responsible for 25 % of the deterioration in soil fertility in Egypt. That study also showed that a 10 % increase in the groundwater level resulted in an 8.6 % deterioration in soil fertility. The latest statistical report (CAPMAS 2010a, b) showed that the proportion of Egyptian village houses connected to drinking water had reached 81.6 % while the houses connected to the sewage network did not exceed 12.8 % in the Egyptian countryside

The extended contamination of agricultural land due to the many sources of pollution is another dimension underlying a qualitative waste of land resources. Numerous villages release household and other waste directly into the soil, making

it a source of environmental pollution. A recent study (AlSaid 2011) showed the deterioration in soil fertility due to the increase in its salt content as a result of poor drainage. The negative externalities of degradation in the chemical and physical characteristics of the soil result from excessive use of chemical fertilizers, especially nitrogen, the irrational use of pesticides and the release of sewage and industrial waste into water canals and at the farmland borders. Moreover, the desertification of farmland results from the moving of the sand dunes which cover the soil and lead to a degradation in soil fertility, especially in Upper Egypt where the strip of fertile land is very narrow.

2.4.2 Irrigation Water Resources

Although water resources govern any agricultural development program, the water available in Egypt has reached a level below the critical per capita water poverty line. The per capita share has dropped annually from about 1024 m^3 in 2002 to about 901 m^3 in 2010 (CAPMAS 2012). Egypt is located within the dry belt. However, Egyptian water resources amounted to around 70.9 billion m^3 in 2010. Although 78.27 % comes from the sustainable source of the Nile, it will become an unsecured water source due to ongoing conflicts relating to water distribution between the countries upstream and downstream. Non-renewable sources included about 8.88 % from depleted groundwater in the valley and the delta in 2010 while 1.83 % was derived from unstable natural resources and water harvesting. The recycling of agricultural drainage water accounted for 9.16 % of Egyptian water resources in 2010 while the recycling of wastewater represented 1.84 %. About 10.7 % was therefore derived from unstable natural sources (groundwater and rainfall) and about 11 % from water resources of unstable quality, i.e. exposed to potential contamination (recycling of drainage water and wastewater).

Agriculture accounted for roughly 82.5 % of total water resources used to irrigate nearly 8.7 million acres. The irrigating network covers more than 10 million fields and measures about 40,000 km via a network of canals and channels. The agricultural drainage network stretches about 20,000 km. Households use approximately 12.9 % of the total water supply, followed by industry, which consumes 1.6 %. Water lost to the sea was about 3 % of the total water available in 2010. Such huge surface irrigation networks face technical and economic difficulties with regard to management and suffer from numerous sources of waste. Furthermore, as the old agricultural system was deeply rooted in human culture, a number of inherited social traditions remain which guide the farmers' behavior towards water use. These customs also contribute to either quantitative or qualitative waste. The latter has negative externalities which cause pollution that in turn affects human, animal and fish health as well as the agronomic production in Egypt (USAID, Egypt, 2002).

2.4.2.1 Types of Quantitative Waste in the Water Resources

From the literature, the study identified four types of quantitative waste in water resources. The first type stems from inefficient water delivery. Previous studies (Abdul Aziz 2007; AlSaid 2011) estimated the efficiency of irrigation water from Aswan to the fields as shown in Table 2.17. The most important conclusions drawn from the findings of these studies were that losses from the irrigation network were much higher than suggested by official statistics. The latter estimated the annual loss at 2.2 billion m^3, which is equivalent to only 2.5 % of the amount of water at Aswan, while the studies estimated the loss at between 19.5 % and more than 29.21 %. These studies confirm the frequent complaint of farmers, especially in the summer season, of insufficient water flow reaching their fields. They claim that the fields receive even less than the quantity determined theoretically by the Ministry of Irrigation. In conclusion, it seems that the agricultural sector is not only the major consumer of the limited water resources; it is also the main culprit with regard to water loss. This loss is the result of using the huge network of open channels which carry water to the fields. Huge water loss is therefore expected through evaporation and seepage as well as poor maintenance of pumping stations.

The second type of loss is caused by inefficient irrigation systems. Emad El-din (1990) showed that it would be possible to save about 2 billion m^3 of water if the irrigation water distribution and consumption patterns were rationalized. Al Saied (1997) cited the lack of efficient surface irrigation. He estimated an average irrigation efficiency of 60 % for crops and about 50 % for rice irrigation.

The third source of water loss is inefficient water management at the farm level, which is incompatible with the principle of sustainable development. It also stems from uneven withdrawal from groundwater reservoirs and the lack of rainwater surplus reserves. A case study in "Kafr El-Sheikh governorate" in the Nile Delta region provided evidence of such water loss. It showed that there was a loss in the current charge of irrigation water of around 68 % above the recommended charge. Another study showed that the current flow of mixed water (freshwater and irrigation drainage water) exceeded the recommended flow by about 17.6 % (Moftah and Al Safty 2005).

Table 2.17 Water charge at Aswan and loss percentage from source to destination (1981–2008)

Period	Water charge at Aswan (milliard cubic meter)	Losses (%)			
		From Aswan to canal openings	From canal openings to the fields	Total loss	Water delivery efficiency
1981–1986	51.69	10.2	15.4	25.6	74.4
1987–1992	55.04	9.8	9.6	19.5	80.6
1993–2008	53.99	17.4	11.7	29.1	70.9
Official statistics	53.57	NA	NA	2.2	97.8

Source (1) Suhair (1997)
(2) AlSaid (2011)
(3) Central Agency for Public Mobilization and Statistics (2012)

The fourth source of water loss is indirect. It is derived from existing cropping patterns which make inefficient use of irrigation water (Al Kholi 2009; AlSaid 2011). The studies concerned with rationalizing the use of water according to an economic rationale usage had obtained varied results due to different times and different crop and input prices. Some did not accurately estimate the rental value of an acre of land, in particular after the liberalization of the land market in 1997. There is now a distinct difference in rental prices between agricultural areas as well as between the old and new territories in Egypt. For example, the study of AlSaid (2011) indicated that the proposed cropping pattern based on economic rationale did not differ greatly from the existing one. Another study by Al Kholi (2009) showed that there would be no place for grain crops if the economic costs of a cubic meter of water were taken into account and there would only be a room for the expansion of fruit and vegetable farming at the expense of cereals.

This study concluded that the misuse of water at the farm level derived from the third and fourth types of water loss was mainly the result of the water market failure. Keeping the economic principals, the irrigation water in Egypt is provided free of charge. The farmers bear only the cost of lifting the water from the tertiary canals to their fields, while the energy price used for water pumps is subsidized (Soliman and Owaida 1998). Thereof, the farmers take their decisions on the basis of the profit calculated from a financial budget, ignoring the opportunity cost of water and considering only its operating costs.

2.4.2.2 Waste in the Quality of Water Resources

The growing waste in water quality means deterioration in the validity of water for different uses due to harmful changes in its physical and chemical characteristics and/or its microbial content (Guweili et al. 1988; The Shura Council 1997; AlSaid 2011). The main reason underlying the deterioration of water quality is the disposal of municipal waste, agricultural drainage, the remnants of chemical fertilizers and pesticides and industrial waste in canals. Such materials seep into the water courses and aquifers. Another reason lies in the imbalance between the expansion of drinking water networks to villages and rural towns and the limited commitment to similar sewage network programs. An indirect cause results from saltwater intrusion in the groundwater due to excessive withdrawal of the fresh aquifer water. Successive governments over the past five decades have paid insufficient attention to pollution of the Nile which is combined with an absence of environmental awareness, not only among members of the community but also within the official institutions.

Egyptian literature has provided some estimates of the social costs of the negative externalities resulting from pollution suffered by the individual members of the community (Soliman 1995).These externalities range from chronic disease to potential death. This study evaluated the positive and negative externalities associated with the establishment of the High Dam and showed that the social cost of the death of a person due to pollution amounted to 150 thousand US$ using 1994 prices (Soliman 1995).

2.5 Worrying Demographic Trends and Migrations

This section presents an analytical profile of the indicators of migration, employment and unemployment in rural communities throughout Egypt over time together with some major impacts of the changes occurring in these indicators on the community concerned.

2.5.1 Migration Indicators

The demographic changes in population structure (Table 2.18) highlighted a very important issue that has greatly affected the performance of the Egyptian economy and the rural community in particular. While the total population size grew from about 52 million inhabitants in 1986 to around 78 million in 2008 at an annual growth rate of about 1.9 % and the urban population grew at 1.8 % per year, the rural population showed vital demographic changes over that period. The share of the agricultural population in rural society declined from almost 50 % in 1986 to only 29 % in 2008 at an annual rate of decline of 0.5 %. At the same time, the non-agricultural rural population increased from only 7 % of the total rural population in 1986 to more than 27 % in 2008 at an annual growth rate of 8.2 %. The result was a growth in the total non-agricultural population living in either rural or urban regions from 51 % of the total population to more than 71 % between 1986 and 2008. This phenomenon, i.e. the rapid increase in the non-agricultural rural population at the expense of agricultural inhabitants, has been more drastic during the past few years. Table 2.18 shows that the agricultural population in rural territories decreased from 29 % in 2008 to 27 % in 2012, at a larger annual rate of decline of 0.7 % than the comparable rate between 1986 and 2008. Furthermore, the share of the non-agricultural rural population in the rural community as a whole increased from 27 % in 2008 to 30 % in 2012. It seems that the shrinkage of the agricultural population in rural territories to the benefit of the non-agricultural sector was due to the fall in manual farming employment, to be replaced by mechanization. Moreover, the agricultural sector has become unable to offer a satisfactory wage (income) to rural people to ensure a reasonable standard of living. A previous section in this study presented the poverty profile in rural regions over time while the following section will show the impact of agricultural mechanization on human labor employment.

It seems that the newly urbanized rural population has not only shifted from being food producers to mere consumers, but they have also adopted the urban propensity to consume, in terms of both quantity and quality. In addition to this, such a large non-agricultural population usually faces a lack of employment opportunities offering satisfactory income, either in rural or urban regions. They have therefore placed extra pressure on demand in the agro-food sector without contributing to expanding its supply (Soliman 2000).

Table 2.18 Population structure and growth rate by demographic category in Egypt (1986–2012)

Population structure	1986		2008		1986–2008	2012		1986–2012
	(000) Inhabitants	Total population (%)	(000) Habitant	Total population (%)	Annual growth rate (%)	(000) Inhabitants	Total population (%)	Annual growth rate (%)
Total population	52,063	100	78,323	100	1.86	83,958	100	1.74
Urban	22,884	44	33,840	43	1.78	36,696	44	2.03
Rural	29,179	56	44,483	57	1.92	47,262	56	1.51
Agricultural	25,607	49	22,949	29	−0.50	22,325	27	−0.69
Non-agricultural	3,572	7	21,534	27	8.17	24,937	30	3.67
Total non-agricultural	26,456	51	55,374	71	3.36	59,256	71	1.69

Source Calculated from FAOSTAT; Statistical Data Base, FAOSTAT/© FAO Statistics Division 2013/February 2010 www.FAO.org, and Ministry of Agricultural and Land Reclamation, Egypt (2010) Economic Affairs Sector

Irrespective of whether the non-agricultural population have stayed in rural communities or migrated to new urban communities, they continue to suffer from a lack of satisfactory jobs to cover their ambitious acquired desire to improve their consumption attitudes. Accordingly, they have become a main factor in the expansion of the categories under the poverty line and an increase in the government budget for food and service subsidies (ILO 2008).

The reasons for leaving rural societies outweigh the reasons for staying, particularly with the liberalization of the agricultural market by 1986/1987. This was due to the lack of integrated rural development programs. Since 1994, Egypt's Human Development Reports and the growing number of indicators of well-being have consistently shown the persistent level of deprivation of rural communities. They are deprived in terms of physical infrastructure facilities as well as access to education. Moreover, the quantity and diversity of job opportunities is far more restricted in rural Egypt and can explain the strong tendency towards rural-urban migration and the very fast expansion of the informal slums (Ashwaiyat) which offer intermediate earnings and living conditions between rural and urban regions (UNDP Egypt Human Development Report 2010).

Migration broadens young people's opportunities while offering them a means of earning higher income and gaining skills (World Bank 2004). However, while many Egyptian youths hope to migrate, few actually succeed in doing so. According to SYPE (2010), 15 % of young Egyptians aged 18–29 want to live or work abroad, but only 1.6 % manages to do so. By now, it is well established that migration from Egypt is mostly made up of temporary migration to other Arab countries, whereas the proportion of young returning migrants from European destination countries is almost negligible, perhaps because those who go there do not return (UN Department of Social and Economic Affairs 2009).

Surprisingly, education appears to be a powerful motivator for the migration of both young men and young women. Both the intended and actual migration rates increase steadily with education. It ranges from 4.5 % for those with no school certificates to 20.9 % for those with a university education (ILO and Ministry of Manpower and Migration 2009). University-educated young men are nearly 3.5 times as likely to migrate as men with no school certificates and university-educated women are more than 8 times more likely to migrate than their counterparts with no school certificates. This would suggest that the higher the education level in Egypt, the fewer employment opportunities there are (Migration (DRC) 2007). However, El-Kogali and Al-Bassusi (2001) add that the increase in both intended migration levels and actual migration as the education level increases reflects the role of education in facilitating migration. Men from urban slums and rural areas are much more likely to migrate than men from urban non-slum areas (El-Kogali and Soliman 2001). The lack of job opportunities (51 %), poor living conditions (33.9 %), the relatively low income in Egypt compared to other countries (33.0 %), the need to assist their families financially (14.7 %) and the need to earn money (12.7 %) are the main motivations underlying migration.

Table 2.19 shows that a high proportion of the Cairo and Giza populations are the result of internal migration. The majority of migrants are from rural areas in

Table 2.19 Internal migration as percentage of total population in 2008

Region	Internal migration	Region	Internal migration
Cairo	11.9	Bani Suif	2.2
Alexandria	6.7	Fayoum	0.6
Port Said	34	Menia	0.7
Suez	37.9	Asyut	1.2
Ismailia	31.3	Suhag	0.6
Damietta	5.4	Qena	1.4
Dakahlia	1.9	Luxor	1.3
Sharkia	4.6	Region	3.6
Kalyoubia	14.4	Red sea	28.7
Kafr El Sheikh	2.6	New valley	16.7
Gharbia	1.7	Matrouh	13.5
Menoufia	2.1	North Sinai	14.1
Behera	4.1	South Sinai	27.4
Giza	20.4	EGYPT	6.6

Source Collected from data of several issues of "The Official Labor Force Survey", carried out on a quarterly basis

Upper Egypt, which are communities with the lowest relative incomes. This may explain the increase in the numbers of slum-dwellers in Cairo and Giza, which amounted to more than 6 million people, representing about 50 % of slum-dwellers in Egypt in January 2008 (ILO 2008). According to data from the Central Agency for Public Mobilization and Statistics, some studies point to the negative impact on the educational process of this massive immigration to the "Cairo and Giza" peril-urban metropolitan region (El-Kogali and Soliman 2001). Furthermore, the three cities along the western bank of the Suez Canal—Port Said, Ismailia and Suez—have showed the highest rate of migration among their populations. However, this was mainly due to dual migration (from and to) during the conflicts around the Suez Canal over the period 1967–1973 (UN 2009). Most rural immigrants to Arab countries and their job opportunities are observed in the farming and construction sectors, as unskilled labor came from rural areas in Egypt. These opportunities were the main source of savings in the form of remittances of young rural household members working abroad. Such income sources are invested by those young entrepreneurs in projects (Zohry and Harrell-Bond 2003).

2.5.2 Labor Force and Employment by Sector

A small proportion of young people in Egypt (about 11 % in 2006) have never been enrolled at school. These young people have never been unemployed. If they enter the labor force, they usually work at an early age, generally in either agriculture or the informal economy (ILO 2008). The economic slow-down resulting from the

onset of the world financial crisis in 2008 led to an increase in male joblessness for all educational categories except university graduates, which enlarged the proportion of unemployment.

The total residential population of Egypt approached 84 million inhabitants in 2012, of which about 27.5 million were economically active, i.e. approximately one-third, and agricultural labor approached 24 % of the labor force. There has been a declining trend in the share of agricultural labor in the total labor force over the last two decades. This share was more than one-third in 1997 but decreased to almost 23.5 % in 2012 (Table 2.20). It seems that the major reason behind the shrinkage in the share of agricultural labor in the total active labor force was a decrease in agricultural male labor of 0.3 % a year over the last two decades. Surprisingly, the female share in agricultural labor increased, at the expense of the male share, from 35 % in 1997 to 41 % in 2012. Non-agricultural male labor increased over the same period by 3.2 %. The share of agricultural female labor increased at a positive annual rate of 0.3 %. Nevertheless, non-agricultural female labor expanded quickly at an annual growth rate of 4.6 %. One main reason behind the decrease in agricultural labor, particularly for men, was an increase in mechanization in agricultural production over the last three decades, as shown in Table 2.21, where less area per tractor over time means a greater density of mechanization.

Table 2.20 Agricultural population and labor force (in 000) in Egypt

Year	1997	2007	2008	2011	2012
Total population	64,200	76,942	78,323	82,537	83,958
Rural population	36,763	43,750	44,483	46,599	47,262
Rural/total population (%)	57.3	56.9	56.8	56.5	56.3
Agricultural population	23,642	23,070	22,949	22,501	22,325
Agricultural population/rural population (%)	36.8	35.3	34.5	33.3	32.4
Total economically active	18,540	24,550	25,167	26,977	27,560
Total labor force/total population (%)	28.9	31.9	32.1	32.7	32.8
Male economically active	14,443	18,350	18,763	19,998	20,403
Male labor force/total labor force (%)	77.9	74.7	74.6	74.1	74.0
Total economically active in agriculture	6210	6630	6635	6599	6569
Labor force in agriculture/agricultural population (%)	26.3	28.7	28.9	29.3	29.4
Labor force in agriculture/total labor force (%)	33.5	27.0	26.4	24.5	23.8
Male economically active in agriculture	4033	3998	3984	3925	3899
Male labor force in agriculture/total agricultural labor (%)	64.9	60.3	60.0	59.5	59.4

Source Compiled and calculated from FAO Statistics Division (12 March 2013)

Table 2.21 Time trend of machinery and human labor density per hectare in Egypt (1986–2008)

Year	Agricultural area (000) hectares	(000) Tractors	Hectare/tractor	Agricultural labor (h/year/ha)
1986	2567	52,000	49	3335
1987	2547	52,290	49	3400
1988	2581	53,000	49	3395
1989	2571	55,000	47	3445
1990	2648	57,000	46	3377
1991	2643	59,000	45	3415
1992	2900	61,000	48	3139
1993	3246	78,099	42	2821
1994	3246	78,846	41	2800
1995	3283	89,080	37	2837
1996	3286	88,000	37	2856
1997	3300	86,000	38	2877
1998	3300	86,000	38	2910
1999	3483	86,000	41	2789
2000	3291	86,255	38	2987
2001	3338	92,203	36	2979
2002	3424	93,340	37	2931
2003	3409	94,482	36	2983
2004	3478	96,265	36	2965
2005	3523	98,051	36	2965
2006	3533	100,317	35	2979
2007	3538	102,584	34	2994
2008	3542	105,121	34	3018

Source (1) Calculated from FAO Statistics Division, December 2010, http://faostat.fao.org/site/570/default.aspx#ancor
(2) Ministry of Economic Development, Economic Indicators http://www.mop.gov.eg/English/english.html, December 2010

The author of this paper conducted a series of studies on the agricultural mechanization system in Egypt for major summer and winter crops and with different mechanization systems. Those studies concerned the estimated substitution relationships between human labor and machinery. Some major findings were drawn from those studies. The marginal return per one dollar spent on machinery was much higher than the marginal return of one dollar spent on human labor. They also showed that the least cost combination of labor forces (human and machinery) was for increased expansion in machinery at the expense of human labor. Use of machinery would increase the yield of major crops much more than human labor would. Mechanization would also reduce the production costs due to fewer seeds, saving irrigation water due to leveling the soil and consequently saving on chemical fertilizers. Therefore, higher farm income can be achieved by decreasing human

labor on farms, which means that rural inhabitants cannot acquire satisfactory opportunity income from agricultural labor (Soliman 1992; Soliman et al. 1994a, b, c, d; Soliman and Owaida 1998).

Egypt, like much of the Middle East, faces a major unemployment problem exacerbated by its relatively young population. Agriculture continues to dominate the Egyptian employment market with more than 30 % of the population working in the agricultural sector. The end of the 20th century saw a huge population shift towards the cities, particularly Cairo, because rural agricultural workers have moved in search of better wages.

Employment grew at a slower rate than the population and the labor force, resulting in a worsening unemployment situation. Official figures kept the rate of unemployment around 12 %. This figure probably understated the problem, because other informed sources put the rates at 20–25 % (Gualdoni 2013). Analysts cited a multitude of reasons for the rapid increase in unemployment including high population and low economic growth rates, the inability of industry to absorb a larger numbers of workers, high capital intensity in new industrial enterprises and the focus of successive Five-Year Plans on the infrastructure over the last four decades.

Although Egypt had a high percentage of high school and college graduates, the country continued to face shortages in skilled labor. An estimated 35 % of civil servants and 60 % of people working in public-sector enterprises were unskilled or illiterate. The lack of skilled labor was blamed, among other things, on the cultural bias against manual work, the theoretical nature of courses provided by the higher educational institutions and the emigration of skilled personnel abroad where they received higher wages. There were complaints that the implementation of development plans was hampered by the insufficient supply of skilled labor.

2.5.3 Unemployment Indicators

The number of unemployed people in Egypt increased to 3,519,000 in the fourth quarter of 2012 from 3,357,000 in the third quarter of 2012 (Fig. 2.3). As reported by CAPMAS (2012), the number of unemployed in Egypt from 2003 to 2012 averaged 2,500,000, reaching a record high of 3,519,000 in November 2012 compared to 2,022,000 in February 2003. In Egypt, the unemployed are deemed to be individuals who are without a job and actively seeking work.

The unemployment rate in Egypt, reported by CAPMAS (2012) increased to 13 % in the fourth quarter of 2012 from 12.50 % in the third quarter of 2012. Historically, from 1993 until 2012, unemployment in Egypt averaged 10.26 %, reaching a record high of 13 % in December 2012 and a record low of 8.10 % in June 1999. In Egypt, the unemployment rate measures the number of people actively looking for a job as a percentage of the labor force. In addition to unemployment, economists point to underemployment, or disguised unemployment. There was a consensus that underemployment was rampant in government bureaucracy, because of overstaffing and low remuneration.

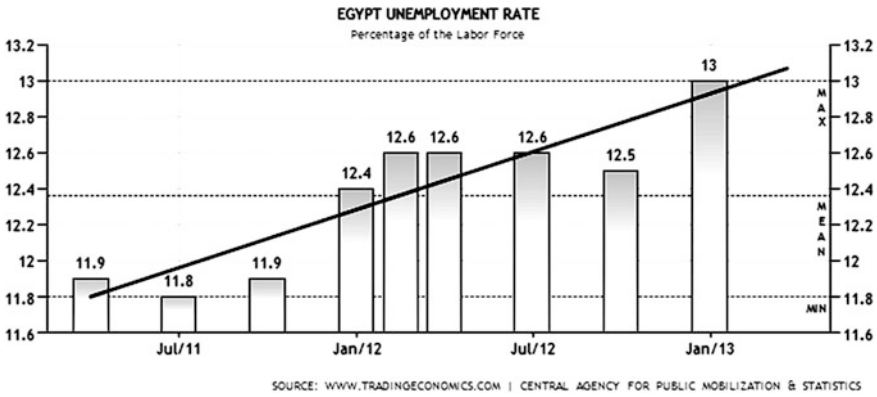

Fig. 2.3 Monthly trend of unemployment rate in Egypt (2011–2013)

Although the private sector has been the leading investor for development plans over the last two decades in Egypt, the formal private sector has not expanded its employment sufficiently to absorb the large number of educated individuals streaming into the job market every year. On the other hand, government hiring of secondary school and university graduates has been severely curtailed in recent years. Faced with poor prospects of getting formal jobs in either the public or private sectors, young people are forced to accept any jobs they can get in the informal economy. Youth unemployment is the dominant form of unemployment in Egypt. In 2006, over 80 % of the unemployed were under the age of 29 and 82 % of the unemployed had never worked before (ILO 2008).

The unemployment rate is a very partial measure of the health of the labor market that depends as much on the level of expectations about getting formal employment. Thus, to ascertain what a decline in unemployment rates means, it is necessary to examine a number of other labor market indicators including alternative definitions of unemployment. The unemployment rate is based on two alternative definitions, namely the "standard unemployment rate" and "the broad unemployment rate". The International Conference of Labor Statisticians that takes place under the auspices of the International Labor Organization (ILO 2009) bases both definitions on recommendations.

The standard definition of unemployment requires a person not to have worked a single hour during a reference week, to want to work, to be ready and available to start work within two weeks and to have actively searched for work during some past reference period, typically the past month. The standard unemployment rate decreased from about 27 % of the labor force (15–59 year-olds) in 1996 to 18 % in 2008. In cases where labor markets are less structured or where searching for work appears futile, international recommendations allow for a broader definition that drops the active search criterion. Thus, the broad definition of unemployment includes, within the ranks of the unemployed, individuals who are not working, ready and available for work, but have not engaged in any search activity. That

Table 2.22 Standard and broad youth unemployment rates (% of 15–59 year olds)

Region	Standard rate (%)		Broad rate (%)	
	2006	2008	2006	2008
Urban	21.5	17.9	24.2	23.0
Rural	13.9	15.8	15.5	22.2
Egypt	16.9	16.7	19.1	22.6

Source (1) The Egypt Labor Market Panel Survey Carried out by the Economic Research Forum (ERF) in cooperation with CAPMAS (Central Agency for Public Mobilization and Statistics), Cairo, Egypt, 1998 and 2006
(2) The Survey of Young People in Egypt (2009), carried out by the Population Council in cooperation with the Information and Decision Support Center of the Council of Ministers

group is often referred to as the "discouraged unemployed". The definition includes individuals who have worked an hour or more during the reference week, but who wish to work more hours. The latter are considered employed but are considered visibly underemployed (Assad et al. 2009).

As shown in Table 2.22, both standard and broad unemployment rates decreased in urban regions while they increased on aggregate between 2006 and 2008. A different face of unemployment can be seen in the unemployment rate in both urban and rural regions of Egypt. Rural unemployment was only 7 % of the total labor force while this figure rose to more than 11 % in urban regions. However, unemployment in rural regions requires further specialized research study. There are specific rural labor market behaviors. Such behaviors are related to farm family labor, seasonal demand for hired labor and the impact of an expansion in agricultural mechanization over the last three decades (Soliman 2006a, b).

2.6 Public Health Concerns

The interdependence of factors influencing health outcomes in a vision of sustainable human development was exemplified in the Millennium Development Goals (MDGs) that place health at the heart of development with health-related aspects in each of the eight goals. Accomplishing each goal can therefore have a positive impact on health outcomes. Health is ultimately dependent on the vitality of nature's life-supporting processes and the fact that investment in stronger multi-sector public health and primary preventive capacities within national policies can provide quick and positive health returns (League of Arab States and United Nations 2007).

Although household access to piped water has reached almost 100 % in both urban and rural Egypt, the rate of households with access to sanitation networks reached on average 62.5 % of Egyptian households in 2008. Whereas the sanitation network reached about 97 % of households in urban governorates, and 93 % of Lower Egypt urban households, it was accessible to only 76 % of urban households in Upper Egypt.

In rural regions, the imbalance between access to piped water and sanitation network was the worst of all Egyptian regions. While piped water reached 97 % of rural households, only one-third of them have access to the sanitation network. Only 13 % of rural households in Upper Egypt had access to sanitation in 2008.

On the other hand, estimates of the density of hospital beds per 10,000 people were only available for urban regions, obviously because hospitals are centralized in cities and towns. Whereas there are 30 beds for 10,000 people in major cities, fewer than 20 beds are available for the same number of people in the rest of Egypt, with 13 doctors serving 10,000 urban citizens but only 2 doctors treating the same density of rural citizens (Table 2.23). There is a higher ratio of nurses to doctors in rural regions than urban regions in Egypt. This phenomenon probably implies not only the lack of doctors in rural regions but also the fact that rural females prefer to work as nurses within the vicinity of their home villages for social reasons and because other employment opportunities in rural areas, particularly for women, are rare.

2.7 Education System Performance Indicators

The Egypt Human Development Report of 2010 (UNDP 2010) measures the performance of the education system as a basic human development criterion by using a weighted average of the literacy rate (over 15 s) and combined basic, secondary and tertiary (higher) education as a gross enrolment ratio for all educational levels. This is because data on enrolment by age are not available, especially for primary education ratios. Similarly, data on enrolment in university and higher education per governorate are not available. The combined gross enrolment ratios for various governorates are derived after distributing total tertiary enrolment at the national level according to the relative shares of the governorates in pre-university (basic and secondary) enrolment. The literacy rate represents the percentage of young people who can both read and write—and understand—a simple, short statement related to their everyday life. These data are published through population censuses while CAPMAS provides data on the illiterate population.

Literacy rates are almost the only educational indicator available, at present, for both rural and urban areas (Ministry of Education and CAPMAS 2007). As rural regions are the ultimate target for the estimates in this study, several indicators were omitted because certain values were absent for rural areas in the approved public references. Therefore, only the estimated literacy rate was presented in Table 2.24. It is concluded from these estimates that the lowest literacy rate is to be found in rural Upper Egypt, i.e. about 57 %. Even though the highest rate of about 79 % can be found in urban Lower Egypt, more than one-fifth of the population is nevertheless illiterate.

One of the major measurements of the human development indicators (HDI) is the literacy gap between rural and urban areas (Table 2.25). It is obtained by

Table 2.23 Some major health service performance indicators in Egypt

Region	Sub region	Households with access to		Ministry of health capabilities			Beds/10,000 persons		Health units/10,000 persons
		Piped water (%)	Sanitation (%)	Doctors/10,000 persons	Nurses/10,000 persons	Nurses/doctors (%)	Total	Ministry health	
Urban governorates		99.90	96.80	12.9	15.5	120	29.8	9.9	3.6
Lower Egypt	Urban	99.80	93.10	24.6	47.7	194	14	7.3	1
	Rural	98.10	52.60	2.3	10.3	448			
Upper Egypt	Urban	100.00	76.50	16.8	30.6	182	19.2	11.9	2.8
	Rural	95.00	13.50	1.9	6.7	353			
Total Egypt	Urban	99.80	89.80	13.1	21.6	165			
	Rural	96.70	37.50	2.1	8.9	424			
	Total	98.20	62.50	6.9	14.3	207	18.2	8.4	2.6

Source Ministry of Health Cairo, Egypt, with El Zanaty and Associates, and Macro International (2009) "Egypt Demographic and Health Survey 2008"

Table 2.24 Literacy rate (15+ year olds) (%)

Region	Urban governorates	Lower Egypt			Upper Egypt			Egypt		
		Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Literacy rate (15+) (%)	77.6	77.2	78.8	65.8	64.4	76.9	57.1	70.4	78.1	62

Source Extracted from UNDP (2010)

Table 2.25 Relative gap between rural and urban

Rural/ urban	1995	1997/1998	2000/2001	2003	2004	2005	2008	2010
Literacy rate (%)	55.0	62.5	63.7	67.6	67.7	67.7	78.4	79.4

Source UNDP Egypt Human Development Report in 1990, 1996–1997, 2001, 2002–2003, 2004, 2008, and 2010

calculating the rural literacy rate as a percentage of the urban literacy rate with a clear reduction in the gap over the past two decades. Between 1995 and 2010, the gap in the literacy rate decreased from 45 to 21 % in 2010.

2.8 Strategy Towards Rural Development

Income is only a means of reducing poverty and not the ultimate goal (UNDP 1990). A successful strategy for rural development must therefore recognize three challenges. First, the rate of transfer of people out of low-productivity agricultural work and related activities into more rewarding spheres will be slow; given the relative size of the modern sector, it will remain slow. Second, the majority of people in rural areas face varying degrees of poverty and their position is likely to get worse if the population expands at unprecedented rates while limitations continue to be imposed by the resources and technology available as well as the institutions and organizations. Third, rural areas have labor, land and at least some capital which, if mobilized, could reduce poverty and improve the quality of life (El Hydari 1998). This implies more extensive development of existing resources including the construction of infrastructure such as roads and irrigation systems, the introduction of new production technology and the creation of new types of institutions and organizations.

Rural development is concerned with the modernization and monetization of rural society and the transition from traditional isolation to integration with the national economy. Since rural development is intended to reduce poverty, it must be clearly designed to increase production and raise productivity. However, improved food supplies and nutrition, together with basic services such as health and education, would not only improve the physical well-being and quality of life of the

rural poor, but could also, indirectly, enhance their productivity and their ability to contribute to the national economy (Bush 2007).

Rural development is a strategy designed to improve the economic and social life of the rural poor. It involves extending the benefits of development to the poorest among those who seek a livelihood in rural areas. This group includes small-scale farmers, tenants and the landless. The objectives of rural development therefore extend beyond any particular sector. They encompass improved productivity, increased employment and thus higher incomes for target groups as well as minimum acceptable levels of food, shelter, education and health. To achieve such goals, a national program of rural development should include a combination of activities including projects to increase agricultural output or to create new output. Such a program might be made up of single-sector or multi-sectorial projects with components implemented concurrently or in sequence. The components and phasing must be formulated both to remove constraints and to support those forces prevailing in the target area, which are favorable to development (World Bank 1975).

Rural development programs influence rural people's livelihood patterns. These patterns are environmental including soil erosion, water supply and forest cover; economical including work opportunities, income and the cost of living; social including culture, access to healthcare and education; and institutional including farmers' organizations, women's groups and political leadership. The focus should therefore be on understanding these patterns within a particular community and how they interact with the intermediate and macro-level patterns (Wilde 2001).

The human development concept is focusing on the human resource development and enlarging rural people's choices as the ultimate benefits of its fruits (UNDP 1990). Accordingly, there are three issues to be considered for rural development planning. First, explicit attention is given to the linkages between economic, environmental, social and institutional patterns that together constitute the development context. Second, understanding gender, wealth, caste and other social differences in communities should be considered as fundamental to understanding livelihood strategies and development priorities. Third, planning for the future should be founded on the analysis of the current situation and should stem from incorporating ideas and methods from rural people.

At the onset of this century all development concepts were brought under the umbrella of sustainability, which is based on the fact that the development objective should seek to generate sustainable economic growth while ensuring future generations' ability to do the same by not exceeding the regenerative capacity of nature. In other words, sustainable development is a pattern of resource use that aims to satisfy human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations. The term was used as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations 1987).

2.8.1 The Road Map

It seems that being poor is very much a characteristic of residing in rural Egypt and thus having less access to public goods and services. Lack of access to schooling in turn becomes a major determinant of low-quality work opportunities throughout life and thus the poverty cycle reproduces itself (Smith and Rees 2003). The poverty assessment indicates the concentration of the poor in rural areas and particularly those in Upper Egypt. Even though rural regions are poorer than urban centers, inequality in income distribution is less prevalent in rural areas than urban centers in Egypt. However, more income distribution equality in rural areas combined with much lower income levels than in urban areas is a disadvantage, as it means that poverty is broad and more pervasive in rural areas than in urban centers.

Several lessons were learned from the application of previous strategies in the eighties, nineties and at the onset of this century. The price liberalization element of the structural reform program has, to a great extent, reached its ultimate goal, while the associated institutional reform suffered from a major response lag and needs further reform. The limited water resources have not been handled with proper policies targeting the rationalization of water use. Although small farm holdings account for more than 91 % of the Egyptian agricultural system, such a majority of holders have not been supported with policies that protect them from the negative impacts of market liberalization and globalization and enable them to adapt to the dramatic changes that have occurred since the nineties of the 20th century in the Egyptian agricultural sector.

The newly reclaimed land, which totals about one million hectares, has generated communities that lack the foundations of settlement and an efficient institutional framework as well as an efficient marketing system. The system of distributing the newly reclaimed land was biased against the real stakeholders in the agricultural system, i.e. small-scale farmers and agricultural graduates either from universities or agricultural high schools (Soliman and Jabber 2011).

Previous strategies lacked proper vision of how to achieve sustainable agricultural development through an integrated rural development program. Unemployment, risky migration to urban areas or abroad and the poverty gap have therefore all expanded in rural communities (Soliman 2011). Little attention has been paid to the environmental impacts of production, marketing and foreign trade on the agricultural system in Egypt, in particular the impacts on output specifications, yield losses and barriers to exportation.

2.8.2 The Proposed Program to Alleviate Rural Poverty

The approach is based on the definition of a national program to improve the livelihoods of the poorest rural households in Egypt, which means:

(A) Determining the poorest 25 % of Egyptian villages
(B) Identifying the needs of households which are eligible for care and support

(C) Determining the households most in need with regard to social welfare
(D) Monitoring the appropriateness of services provided by the State to meet these needs
(E) Developing social welfare policies and programs in a way that suits the needs of households
(F) Consideration precautions: the program should be based on geographic targeting, i.e. on villages, with a view to ensuring the strong relationship between public services and poverty, as the approach is to break the vicious circle of poverty by removing the poor infrastructure conditions that perpetuate it.

2.8.2.1 Determining the Poorest Egyptian Villages

A new "poverty assessment survey" was conducted to draw a "poverty map" in Egypt relying on a model that determines the criteria underlying the low standard of living and high rate of poverty in Egypt.

The implementation of this model requires a detailed and comprehensive map to be prepared for each household's condition (through social field research) together with a file for each household which determines the human and financial capacity of the households in addition to their livelihood needs. The measures should call on economic and social indicators of the household that are strongly related to the level of household expenditure. Each one reflects one or more of the economic and social dimensions related to poverty and the standard of living. These indicators can be divided into six categories:

The first relates to the head of the household (education, work, the existence of insurance or a pension and land ownership).

The second comprises housing data (type of dwelling, number of rooms, the value of the electricity bill and telephone, the ownership of a washing machine, color TV and vacuum cleaner).

The third relates to data concerning family members (family size, dependency ratio, the number of working individuals, the presence of an individual in special education and the presence of a sick or disabled person).

The fourth concerns utilities (the percentage of houses connected to a safe water network, connection to a sanitation network and connection to an electricity network).

The fifth relates to the education of the household members (literacy and enrolment rates).

The sixth focuses on employment (unemployment rates, the percentage of permanent workers, casual workers and temporary workers).

According to the resulting poverty map, the poorest 25 % of the villages are determined within all governorates. Accordingly, the total population of the poorest villages in Egypt is geographically determined. This map should identify the unequal distribution of public goods, including physical infrastructure (water, sanitation and roads), and public services, namely education and health facilities.

2.8.2.2 Identifying the Needs of Households Which Are Eligible for Care and Support

Households are divided into four groups according to the degree of poverty, namely the extremely poor, the poor, the near-poor and non-poor. Each group has specific characteristics determining the extent and quality of the benefits they will receive. These characteristics are:

1. Family size
2. Percentage of working individuals among the household members
3. Household members per room
4. Existence of any social security for the household head
5. Availability of a private bathroom
6. The value of electricity consumption
7. Availability of communication facilities
8. Living in an independent apartment built of red brick or better

2.8.2.3 Monitoring the Appropriateness of Services Provided by the State

A ministerial group for social development should be formed to include the Ministers of Housing, Utilities and Urban Development, Environmental Affairs, Social Solidarity, Education, Higher Education, Health, Transport and Local Development, the Secretary of the Social Fund for Development, the Minister of Family and Population, the National Youth Council, the National Sports Council and the General Authority for Literacy and Adult Education. The group will be responsible for coordinating the design and implementation of the projects between the different ministries whose mission is to upgrade service delivery in the villages covered by the project.

Some restrictions and problems still prevail, reducing the positive impact of the newly enacted laws relating to agricultural investments. To eliminate such obstacles, a single entity responsible for allocating areas suitable for agricultural investments must be established with representatives from all the ministries concerned.

Globally speaking, the success or failure in applying programs for the 1000+ poorest villages in Egypt will rest on the ability of all parties to sustain the financial requirements necessary for this huge and ambitious project in all its phases. It will also require a high degree of coordination amongst all ministries and government bodies involved. In addition to the allocations provided for in the state investment budget, the program will be financed through the collaboration of the civil society organizations, businessmen and the private sector.

Activating the participation of civil society organizations in every local unit to assist in the implementation of housing and waste recycling projects is a vital element contributing to the success of integrated rural development.

For geographic targeting, financial availability, accessibility and adequacy, this largely expanded national project must be implemented in successive phases.

2.8.2.4 Developing Appropriate Policies and Programs

The integrated rural development program for the poorest villages must be carried out through numerous developmental interventions:

1. Prioritizing the beneficiary households in providing housing units for each village from within the "National Project for Housing".
2. Improving the drinking water and sanitation services through the establishment or expansion and renovation of water networks and stations.
3. Establishment of stations for sanitation with home network connections.
4. Developing an integrated system to deal with the problems of collection and recycling of solid waste and the clearance of canals and drainage canals.
5. Establishing a fire-fighting and civil defense department and providing a fire truck in every local unit.
6. Training selected citizens in the work of fire-fighting and civil defense.
7. Upgrading the health units, providing equipped ambulances, organizing the medical convoys and providing qualified medical crews.
8. Improving the quality of basic education by developing or establishing new schools and training teachers.
9. Expanding the coverage of social security and social services and providing a social worker for every 50–70 households.
10. Eliminating illiteracy among 15–35 year-olds by making the education faculties in regional universities assume the task while also preparing trainers and training courses, by providing classrooms, textbooks and training assistance with the support of the Adult Literacy Authority and conducting the exams.
11. Providing employment opportunities for young people.
12. Paving and lighting the entrances to villages.
13. Improving environmental conditions and dealing with solid waste.
14. Improving the health, paramedic and emergency services.
15. Enhancing the quality of basic education.
16. Establishing a pilot project in one village of each governorate and providing training for youth in construction and building skills, carpentry, plumbing, etc., via training centers.
17. Preparation by the government of Egypt of a clear map for investing in agriculture, which defines areas assigned to the different types of investments and is periodically updated. The government authorities concerned have to design and implement an integrated program for upgrading human resource needs and skills to manage the information system. A special law should be enacted to regulate agricultural financial assistance procedures, with special incentives offered to small-scale farmers, particularly those who farm strategic crops and comply with the task of achieving the national objectives of agricultural

development. The Principal Bank for Development and Agricultural Credit (PBDAC) should relinquish its role in the procurement and distribution of agricultural inputs to concentrate on its principal role of financing agricultural and banking activities.

18. Providing appropriate support to encourage cooperative organizations is at the top of the list of agricultural institutional reforms:
    (a) Such support implies amending the current Cooperative Law (122/1982) in light of market economy requirements and international agreements. Reorientation of the role of the administrative mechanism to serve the interests of the members in a democratic manner is needed, associated with merging the small cooperatives into one economically viable entity and establishment of a training program for the staff based on a professionally functional structure and a defined business plan.
    (b) A special program for funds to provide cooperatives with satisfactory credit facilities is required.
    (c) The involvement of cooperatives in the agricultural development plan as centers for disseminating modern technology is also needed and a new regulation should be enacted to allow the cooperatives to establish and/or participate in agricultural banks and agricultural companies.
19. The civil society and other organizations should be involved in defining research plans, their execution and follow-up, as well as in applying the results. A unified law to regulate the establishment of special associations should be enacted instead of enacting a special law for each category of the special associations. Finally, the Ministry of Agriculture should provide technical support to all institutions and organizations and consider them as principal partners of the agricultural extension service in implementing extension plans and programs.
20. Rationalizing the existing subsistence food-price subsidy policies without fazing them out should be a main objective of food security, in accordance with a practical system to identify beneficiaries on the basis of incontestable criteria. A monitoring system should also be designed to assess its relevance and impact on low-income groups.
21. The experience acquired over a number of decades has shown that attempts to impose limits on the demand for housing in villages due to population increase were not respected because of the pressure of high price demand for agricultural land for urban use in adjacent towns. This urban demand pressure outweighed the influence of legislations issued to stop such depletion of agricultural land. Therefore, urban planning to face future population expansion in Egyptian villages (4702 villages) and adjacent cities must be a main parameter of rural development. It implies a final identification of distinct boundaries between residential and service areas within agricultural areas. In addition, the establishment of new villages in recently reclaimed land at the adjoining desert frontiers of the old agricultural land of the Nile Valley is absolutely necessary to absorb the increasing rural population of old village lands.

22. The planning policy for the sustainable development of rural Egyptian areas must be decentralized by applying the decentralized planning and monitoring of rural areas and strengthening the participation of local communities. Such a readjustment of village administration would accelerate the impacts of the programs in improving livelihoods in poor villages (The World Bank 2004).

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Chapter 3
The Challenges of Sustainable Agricultural Development in Southern and Eastern Mediterranean Countries: The Case of Morocco

Abdelkader Ait El Mekki and Ezzobir Ghanmat

3.1 Introduction

This chapter aims to contribute to setting out the problem of sustainable development in Morocco. It focuses on rural development in order to help overcome the main constraints and cope with the precariousness and poverty conditions, food insecurity, and natural resource management in rural areas.

Indeed, despite significant efforts that have been implemented by successive governments, the rural population remains on the sidelines of significant progress that Morocco has known since its political independence. It is still marked by poverty which seems to be a rural phenomenon since two-thirds of the poor live in rural areas. This precariousness is accentuated by the shortage of infrastructure and basic social services, on one hand, and the problem of natural resource management, on the other hand, which negatively affects the well-being and food security of this population.

According to these facts, this chapter will try to analyze the main issues regarding rural development in Morocco by starting with a report on the poverty issue. Then, socio-demographic and migration trends followed by education and health concerns will be addressed using the most recent official data. The next section will stress the food security and the last will point out the problem of natural resources, especially land and water, as they determine the sustainability of rural development.

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3.2 The Rural Poverty Issue

Rural development in Morocco continues to be a foreground question due to its socio-economic importance for the country. As for the 2020 rural development strategy kicked off in 2000, government action showed a political will to boost rural development through mobilization of human and financial greater means to achieve targeted goals.

Today, the standard of living of a significant part of the population, whatever the applied method of calculation, is below or just above the poverty line and it is characterized by precariousness or great vulnerability. However, according to the usual indicators for measuring income poverty, human development and human poverty, the general trend of the evolution of poverty was rather down but remains at relatively high levels especially in rural areas.

3.2.1 Evolution of the Poverty and Vulnerability Indicators

Like many developing countries, Morocco does not escape the scourge of poverty. On the basis of the well-known poverty indicators, the population living below the poverty line was estimated in 2007 at 8.9 %, that is to say 2.77 million inhabitants (Table 3.1).[1] But this national figure hides inequalities, because poverty still remains a rural phenomenon. Indeed, as many as 14.5 % of the rural population lives below the poverty line against 4.8 % in urban areas, that is to say nearly 66 % of the total poor population of Morocco. As we can see below, the resources available to the rural populations are used in priority to cover food expenditure.

According to official figures, the poverty rate was reduced by more than 7 % points, falling from 16.3 to 9 % between 1998 and 2007 for the whole country. This reduction was in fact more pronounced in rural areas than in urban areas with respectively 9.7 and 4.7 points. It means that nearly 2.8 million people lived below the poverty line in 2007. However, we note that between 2001 and 2007, nearly 1.7 million people have been elevated out of the poverty line and 1.2 million have escaped vulnerability (MEF 2009).

Nevertheless, the vulnerability indicator remains high in 2007 with slightly more than 26.5 % for the whole country, 17.5 % in urban areas and 38.1 % in rural areas (HCP 2008).[2] Thus, the lower rate of poverty in its various forms is needed to continue a sustained growth rate, creating jobs and strengthening mechanisms of social equity. In this context, the Millennium Development Goal for poverty and hunger aims at reducing the incidence of poverty by half by 2015 in Morocco.

[1]These are the most recent official data from the High Directorate of Planning (2008).

[2]It is recalled here that the members of a household are called vulnerable if the annual per capita expenditure of the household is between the poverty line and 50 % value above this threshold (depending on the place of residence).

Table 3.1 Poverty rates in Morocco (numbers in thousands, rates in %)

	1998–99		2000–01		2006–07	
	Size	%	Size	%	Size	%
Urban	1439	9.5	1235	7.6	829	4.8
Rural	3085	24.2	3225	25.1	1945	14.5
Total	4534	16.3	4461	15.3	2773	9.0

Source HCP (2008)

But such an objective faces two major challenges. The first challenge is to sustain significant improvements that have been registered in terms of hunger and poverty relief since 1990 as food poverty has been cut by 80.4 %, absolute poverty by 71.2 % and relative poverty by 58.1 %. The second challenge is to face rigidity of social inequalities. Indeed, in Morocco poverty is mainly more sensitive to the distribution of income than to economic growth. Social inequality was just stabilized during the year 2000, after an upward trend along the 1990s.

Meanwhile, Morocco tried to constitute a pragmatic federator space to increase coordination, convergence and synergy of the various stakeholders that are implied in human development. These actors are in particular government agencies, the civil society, the private sector and international cooperation. With this intention the Ministry for Social Development, the Family and Solidarity worked out, with the technical support of the UNDP, and in dialogue with all partners, a National Strategic Framework of Reduction of Poverty which fits completely within the vision of the Human Development National Initiative (HCP 2009). However, efforts are still needed to improve the situation, especially in the rural areas, and that is the main objective of a series of rural development programs that have been triggered since the beginning of the last decade.

3.2.2 Rural Development Programs

The negative impact of structural adjustment policies on the social sectors has forced the government to implement a social policy to fight poverty and regional inequalities, especially between urban and rural areas. The social development strategy adopted by the government in 1993 is the basic reference for these programs that have been designed, among others, to improve access of the poor population to basic social services, in particular drinking water, sanitation and health services, to increase enrollment rates in basic education, to develop social housing programs, increase employment opportunities and reinforce social assistance and protection, by appropriate targeting of vulnerable groups.

Regarding rural development during the two last decades, the evolution of the development policy records the installation of programs supported by the public authority's intervention. These programs include the new generation of the integrated development projects in rain-fed areas, the 2020 Rural Development Strategy, the National Initiative for Human Development (*Initiative Nationale de*

Développement Humain, *INDH*) and very recently the launching of the Moroccan Green Plan strategy (*Stratégie du Plan Maroc Vert*, *PMV*).

3.2.2.1 Integrated Rural Development Projects in Rain-Fed Areas[3]

These projects have been implemented in rural areas which did not profit from significant public investments in the past. They are governed by the 33–94 Act that determines the basis of the development strategy of the rain-fed areas, and are in conformity with the objectives of the Rural Development strategy of the World Bank, also known as the '*Reaching the Rural Poor*' strategy. Activities of the DRI —MVB projects started in 2004 for an execution period of 6 years with a strategic context that stresses the following pillars (World Bank 2003):

- Promotion of human development and inclusion policy of the vulnerable populations in the underprivileged and marginal areas;
- Reinforcement of the economic growth conditions and development of the private sector, and
- Improvement of the governorship and management of development actions.

In parallel, on the agricultural professional side, the Moroccan Confederation for Agriculture and Rural Development (Comader) was born in 2006 to play the role of development partner of the government. This confederation involves about thirty agricultural professional organizations and aims to set effective coordination between them and policy makers in terms of agricultural and rural development.

3.2.2.2 The 2020 Rural Development Strategy

This strategy, launched in 2000, considers that rural development is necessary for the valorization of the potential of the rural environment, including that of the agricultural production, the natural resources and the population, through the following basic principles (Ministry of Agriculture 2000):

- Human development is the finality of rural development,
- Equity and solidarity are regarded as the basis of social equilibrium,
- Research of economic efficiency is a value to be shared by all.

The policies adopted by the strategy tend to increase employment and incomes in agriculture, create and diversify para-agricultural activities and protect the environment against degradation through revegetalization of natural spaces and control of the renewal of the water resources. Other actions are also being undertaken regarding the improvement of the education and professional training of rural men and women, improvement of the related services of health, drinking water,

[3]Referred to as 'Projets de développement rural intégré–Mise en valeur bour (DRI-MVB)'.

electricity and transport, as well as the correction of regional imbalances regarding infrastructure, trade and territorial planning.

3.2.2.3 The National Initiative for Human Development

The National Initiative for Human Development has acted nationwide by Royal Decree since May 2005. Its main goals are explored in 'improving the Human Development Index through poverty alleviation in the poorest communities' (INDH 2005).

In this context, the NIHR contributes with the programs which already operated for poverty combat, including projects for integrated rural development. Moreover, its objectives are fully consistent with those of the International Alliance against Hunger implemented by FAO with a budget of 10 billion dirham[4] for the period of 2006–2010. Such a promising plan has been conducted through four priority programs:

- The program to combat rural poverty,
- The program to combat social exclusion in urban areas;
- The program against mobility, and
- The cross-cutting program.

Regarding the first program, the NHRI targeted 360 rural communities with an average population of 10,300 persons per municipality and a budget of 2.5 billion dirham. One of its main activities is boosting the local economy through Income-Generating Activities (IGA). The link with food security is directly due to the income effect on the consumption levels. In late May 2013, almost 29,000 projects have been launched for the benefit of as many as 7 million citizens with an investment of 7 billion dirham (INDH 2013).

3.2.2.4 Green Morocco Plan

The Green Morocco Plan (GMP) is the instrument for implementing a new agricultural development strategy which aims to enable the agricultural sector to have a better appreciation of its potential to meet new socio-economic challenges. For success implementation, the philosophy of GMP is based on the strategic foundations that govern its design and implementation, namely (Hajjaji 2009):

- Its role as a tool for economic growth in the next 10–15 years,
- The use of aggregation as a tool that will encourage the philosophy of the value chain, starting with production, then commercial and industrial activities,
- Encouragement of private and public investments in an annual goal of 10 billion dirham for the targeted projects,

[4]1 Moroccan Dirham is roughly equivalent to 0.09 Euro.

- The adoption of the contractual approach between various operators of agricultural sectors including the State,
- Natural resource conservation for sustainable agriculture through the preparation of special programs with the Global Environment Fund (GEF) and the Hassan II Fund for Economic and Social Development,
- Modification of the sectoral framework concerns regarding land policy, water policy, tax policy and the operation of the domestic market.

For its implementation, the GMP has launched a device that causes radical changes which are realized through:

- The development of regional farm plans (RFPs) and the creation of regional agriculture directorates (RAD),
- The restructuring and strengthening of the functions of chambers of agriculture,
- The restructuring of the Central Services at the Ministry of Agriculture via the promising comprehensive renovation of existing management partners and the creation of new directions for focused duties,
- The creation of a Food Safety Office,
- The creation of the Agricultural Development Agency as a tool for the implementation of GMP,
- Wrapping up of program contracts with practitioners to ensure a better co-pilot of the main agricultural sectors.

Thus, the GMP provides the implementation of 1500 projects for the entire investment estimated at 147 billion dirham in 10 years. All of these projects would benefit all farmers in the country through two pillars located at the center of its strategic vision. The first pillar is represented via modern agriculture, with high value added practiced by the farms in irrigated areas and areas with favorable rainfall (560,000 farms). The second pillar is agriculture solidarity which is located in mountain areas, oases and unfavorable rainfall areas (840,000 farms).

The socio-economic challenges of GMP are numerous and interrelated. Certainly, this plan creates enormous expectations regarding the creation of employment, the promotion of investment in agriculture and improving the incomes of rural communities. Its relationship with food security is available through its objective to reduce the rate of poverty especially in rural areas, improving the purchasing power of consumers and increasing the availability and quality of food consumed at affordable prices. The last point is important for the recent crises in the international market which are interpreted in the booming of essential commodities prices.

Thus, awareness has been expressed by both government and practitioners in the interests of national production to fulfill the country's needs. In this context, the government signed with the practitioners special program contracts regarding practically all key commodities. The production objectives of major sectors as they occur in the contracts in question are reported in Table 3.2. For the grain sector, the program contract is securing an output of 70 million quintals in an area of 4.2 million hectares in 2020, which would directly yield an average of nearly

Table 3.2 Production projection under program contracts

	Total production				
	2008/2009	Future	Evolution %	Horizon	Investment billion DH
Cereals (million qx)	50.0	70.0	40.00	2020	29.0
Sugar (1000 T)	466.0	675.0	44.85	2013	3.6
Red meat (1000 T)	386.0	450.0	16.58	2014	6.0
Meat poultry (1000 T)	370.0	500.0	35.14	2013	4.5
Eggs (billion units)	3.3	5.0	51.52	2013	
Milk (billion liters)	1.7	3.0	76.47	2014	12.0
Olive (million T)	0.7	2.5	257.14	2020	29.5
Horticulture (million T)	1.7	3.5	105.88	2020	21.0

Source Agence de Développement Agricole (2009)

17 quintals/ha instead of 10–15 quintals/ha at present. The expected economic results should increase production value by 20 billion dirham and reduce imports by 15–20 %.

For the red meat sector, the program contract addresses an increase of production by 16.6 % from around 386,000 to 450,000 T in 2014. Thus, consumption per person would pass from 11.7 to 13.4 kg respectively and can reach 15 kg in 2020. These quantities are still relatively low compared to developed countries (35 kg per person as an average).

Regarding the dairy sector, the objective of the contract program aims to align its productive performance on the international standards. Thus, milk production should increase from 1.7 billion liters in 2008 to 3 billion liters in 2014 and completely cover the country's demand. Consumption per person would then reach 350–400 g per day, which corresponds to the nutritional standards recommended internationally. In addition to improving productivity, expansion of artificial insemination and implementation of prophylactic measures, the practitioners are committed to improving the quality of milk to meet the standards required along the dairy industry. The required amount of investment to achieve these objectives is about 12 billion dirham of which the bulk (93 %) will be funded by the inter-profession.

For the sugar sector, the objective is to increase production by 44.85 % from 466,000 T in the present to 675,000 T in 2013. The amount of planned investment is about 3.6 billion dirham and the expected impact on the coverage needs should change from 43 to 55 % during the period in question.

Concerning the poultry sector, a program contract with a budget of 4.5 billion dirham will be implemented to enhance production of meat and eggs by 35.14 and 51.52 % respectively in 2013. The level of consumption would then increase from 12.1 to 14.7 kg/person/year for meat and 110 to 147 units for eggs, an increase of 21.5 and 33.64 % respectively.

For olive oil, the objective is to increase agricultural production by 2.57 times to reach 2.5 million tons in 2020. The planned investment program for olive oil

amounts to 29.5 billion dirham from which nearly 74 % will be financed by the private sector. Consumption of olive oil and table olives could reach an average of 2–4 kg/person/year and 3–5 kg/person/year respectively. Achieving these objectives will require the production of 14 million seedlings per year for the implementation of the provided planting programs.

Concerning vegetable production, the contract program aims to increase production by 106 % from 1.7 to 3.5 million tons in 2020. The investment plans to reach 21 billion dirham of which 90.5 % will be funded by the practitioner.

In addition, the GMP has also paid special attention to the selected seeds including those of cereals, legumes, fodder, sugar beet, sugar cane, potatoes, corn, sunflower, rice, rapeseed and vegetable crops. The planned investment for this sector is about 725 million dirham from 25 projects to be completed in 2020.

All measures to accompany the program contracts will be managed by the Agricultural Development Agency.

3.3 Socio-Demographic Trends and Migration

3.3.1 Evolution of the Rural Population

According to the last general census of the population conducted in Morocco in 2004, Morocco's population has reached 29.840 million inhabitants. The rural population accounted for roughly 45 % against 55 % for urban. In 2012, the total population was estimated to almost 32.6 million with 58.8 % urban and 41.2 % rural (Table 3.3).

The rural population was estimated at 8.2 million in 1960 and almost 9.8 million in 1970. It increased from 11.4 million in 1980 to 12.7 million in 1994 and then to 13.4 million in 2004. The average annual increase of this population has registered a significant reduction since it dropped from 1.7 % during 1960–1970 to 0.3 % for the decade 2000–2010.

Under the effect of the natural increase and migration from rural areas, the country has seen an upward trend of urbanization contributing to a considerable

Table 3.3 Evolution of the Moroccan population

Year	Total (×1000)	Urban %	Rural %
1960	11,635	29.18	70.82
1970	14,952	34.58	65.42
1980	19,380	41.11	58.89
1990	24,167	48.65	51.35
2000	28,466	54.24	45.76
2004	29,840	55.07	44.93
2010	31,894	57.84	42.16
2012	32,597	58.77	41.23

Source HCP (2004) census and later estimates

increase in the demand for jobs in urban areas. Indeed, according to the HCP data, the phenomenon of urbanization registered is still high, with an increase of 1.8 % in 2012. It would be the same until 2020 while the rural population could depict negative scores for the first time since its evolution rate may pass from 0 to −0.1 % for the same period.

3.3.2 Migration

Regarding migration, there is very little data for regional figures other than those related to the evolution of the population. But we know that rural-urban migration has been one of the most important escape routes for the surplus agricultural labor. Between 1994 and 2004, the HCP estimated that the urban net migration (that is, urban immigration less urban emigration) reached on average 100,000 persons a year. In 2009–10, this number was 127,000 persons. This wave of migration, which began from the 1970s, is associated with rapid mechanization of agricultural systems and seeking better living standards. Most migrants are looking for higher incomes, better access to education and health and improved prospects for their children.

Turning to international migration, the United Nations Population Division uses the net migration rate to indicate the contribution of migration to the overall level of population change in a country. That is, the total number of immigrants less the annual number of emigrants, including both citizens and non-citizens, over a five-year period. The data to calculate official migration estimates come from a variety of sources, including border statistics, administrative records, surveys, and censuses. For Morocco, the international net migration rate was −3.77 ‰ in 2010, meaning that there was a small excess of people leaving Morocco for foreign countries.

3.3.3 Employment

In Morocco, agriculture is the biggest employer of the active population with a 40.3 % occupation rate in 2012. It is followed by services (38.7 %) and then manufacturing (20.8 %). As expected from these figures, employment in rural areas is dominated by agriculture with a rate of 76.4 %, showing that relatively weak diversification of sector activities remains notable in rural areas (Table 3.4).

Table 3.4 Employment by sector 2012 (%)

Sector	Urban	Rural	Total
Agriculture	5.0	76.4	40.3
Manufacturing	30.9	10.5	20.8
Services	63.9	13.1	38.7

Source HCP (2013)

Between 2000 and 2011, the volume of employment increased by nearly 1,787,000 (or a 162,000 annual average), with quasi-stagnation in the structure of employment by gender. In 2011 the national unemployment rate was 8.9 %. This indicator has strong differences between youths and adults and between urban and rural areas, to the detriment of young and urban people. Indeed, for the same year, the urban unemployment was 13.4 % against 3.9 % in rural areas.

Moreover, unlike developed countries and some emerging countries such as China, the rural non-farm activities (tourism, crafts, public and private services, food industry, and other industries) still represent a very small part of the income and employment of the rural population in Morocco. In 2011, industry and construction accounted for only 4.3 and 4.5 % in rural employment respectively (against 9.3 and 22.5 % in urban) and services 11 % (against 63 % in urban).

3.3.4 Public Education and Health Concerns

According to the latest official data, the literacy rate in Morocco was 60.3 % in 2009 (Table 3.5). This score is significantly hampered by women's illiteracy rate which is evaluated at 50.8 % (28.2 % for men) for the same year. It is also negatively affected by the rural illiteracy rate which was 55.6 % (28.4 % in urban areas). Indeed, in Morocco, rural areas are generally more affected by illiteracy than urban areas and this figure mainly stands for girls. The main cause is an early dropout for economic or cultural reasons, especially in rural areas where lack of transportation services and residences for students is not helping.

Despite these gloomy figures, between 1999 and 2009, the literacy rate recorded a gain of 13.5 % points in rural areas (from 30.9 to 44.4 %), against 6.9 points in urban areas (64.7 to 71.6 %) (Fig. 3.1). The number of primary schools increased from 3.9 million students during the school year 2009/10 to 4,000,000 students in 2010/11. The public sector alone provides 88.2 % of primary schooling and 47.9 % of enrollment in primary schools are in rural areas (Fig. 3.2).

Furthermore, almost 4 million students were enrolled during the 2010/11 school year. College secondary education received nearly 1.46 million students, 44 % of which are girls. The share of this sector in rural areas is continuing albeit a slow rise. Indeed, it was 25.3 % at the end of the school year 2010/2011 against 24.9 % during the previous school year.

Net enrollment in college has nearly tripled in twenty years from 17.5 % in 1990–91 to 28.2 % in 2000–01 and to 51.0 % in 2010–2011. This was mainly due to the progress made for rural girls who have seen their rate passing from 1.1 to 5.9 and 21.3 % during the same period.

Regarding health indicators, official data from the HCP report that average life expectancy at birth was 74.8 years in 2012. However, a significant difference is to be underlined between urban and rural areas where this indicator is 77.3 and 71.7 years respectively. Moreover, infant mortality rate was 30.2 ‰ in 2010. It is much higher than that of the Mediterranean developed countries which displays

Table 3.5 Evolution of budget coefficients of household consumption

Level	Survey year	Food	Clothing	Housing and energy	Household equipment	Hygiene and medical care	Transport and communic.	Education culture and recreation	Other goods and services
Urban	1970/71	44.7	9.3	18.5	4.6	5.1	7.5	4.0	6.3
	1984/85	43.1	7.4	22.8	5.0	5.4	5.9	4.3	6.1
	2000/01	37.9	5	22.6	3.8	8.3	8.2	4.3	5.9
	2006/07	36.8	3.5	21.1	3.7	7.6	12.8	5.2	6.0
Rural	1970/71	63.5	11.6	11.4	3.9	3.1	2.8	0.9	2.8
	1984/85	56.5	7.1	16.2	5.5	3.5	4.3	2.0	4.9
	2000/01	49.9	4.3	21.0	4.0	5.6	5.6	1.8	5.1
	2006/07	49.3	3.1	18.2	3.6	6.3	9.1	2.5	5.6
Total	1970/71	54.0	10.4	15.0	4.3	3.1	5.2	2.5	4.5
	1984/85	48.6	7.3	21.1	5.2	4.6	5.2	3.4	5.8
	2000/01	41.3	4.8	22.1	3.8	7.6	7.5	3.6	9.3
	2006/07	40.6	3.3	20.3	3.6	7.2	11.7	4.4	5.9

Source Haut-Commissariat au Plan (2009)

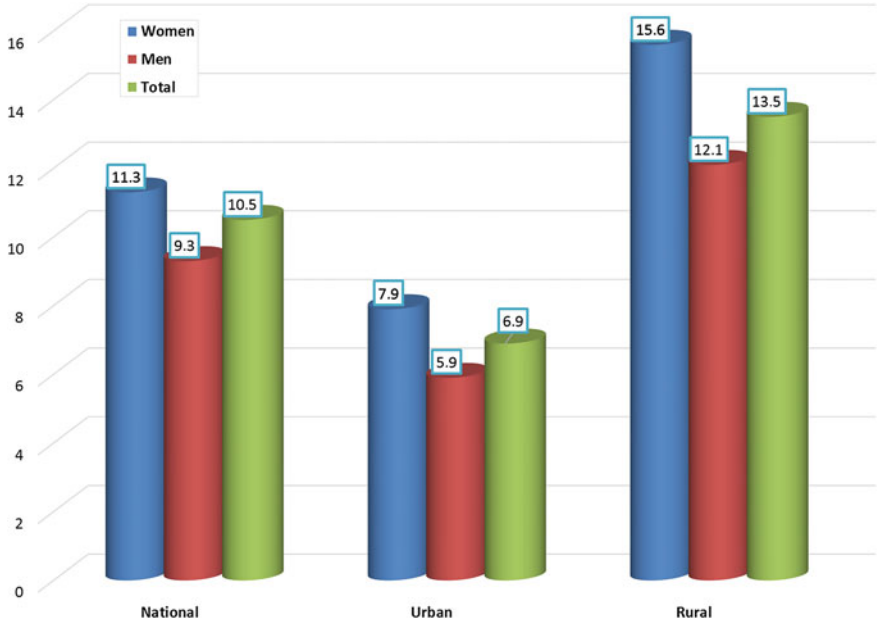


Fig. 3.1 Gain in literacy between 1999 and 2009 by sex and place of residence (in % points). *Source* HCP (2012)

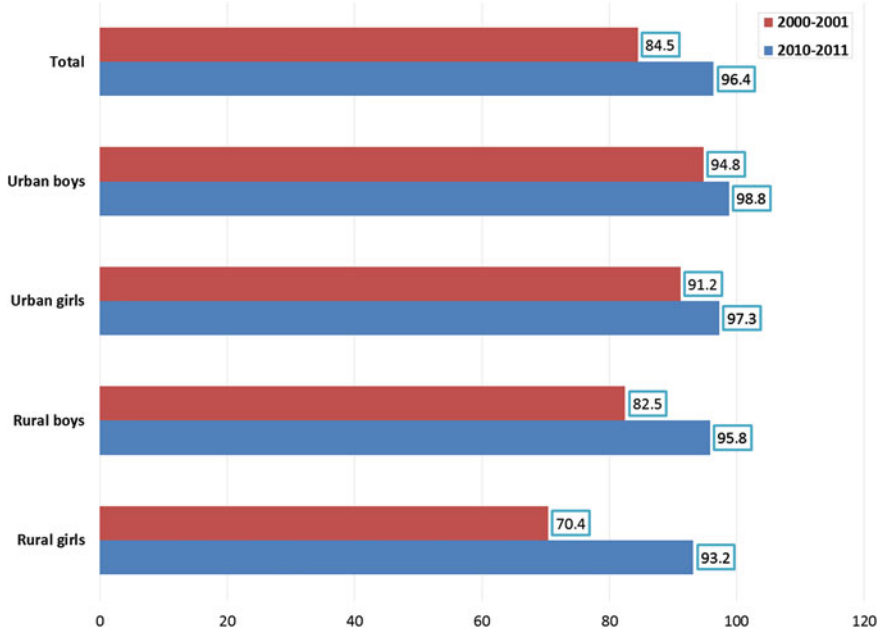


Fig. 3.2 Net enrollment ratio in primary education (6–11 years) by sex. *Source* Ministry of National Education (2013)

a score of 3–4 ‰, but lower than that of the majority of developing countries. Here again, the rural rate overcomes the urban rate by 10,000 points (respectively 35.3 and 25.3 ‰). This worsens the whole problem of childhood in rural areas because the maternal mortality indicators in these areas are 148 for 100,000 live births (73 in urban areas and 112 at the national level). This situation has to be improved, starting among others, by increasing the physician density indicator which is up to 7 doctors per 10,000 persons only.

3.4 Food Security

3.4.1 Income and Living Standards

The most recent survey on income and living standards of households was conducted by the High Planning Directorate (HCP) in 2006–2007. It shows the valuation of income per capita at constant prices, with an annual increase of 3.6 % between 2001 and 2008 on average. In nominal terms, the average annual income per capita reached 23,889 dirham in 2008 against 15,798 in 2001.

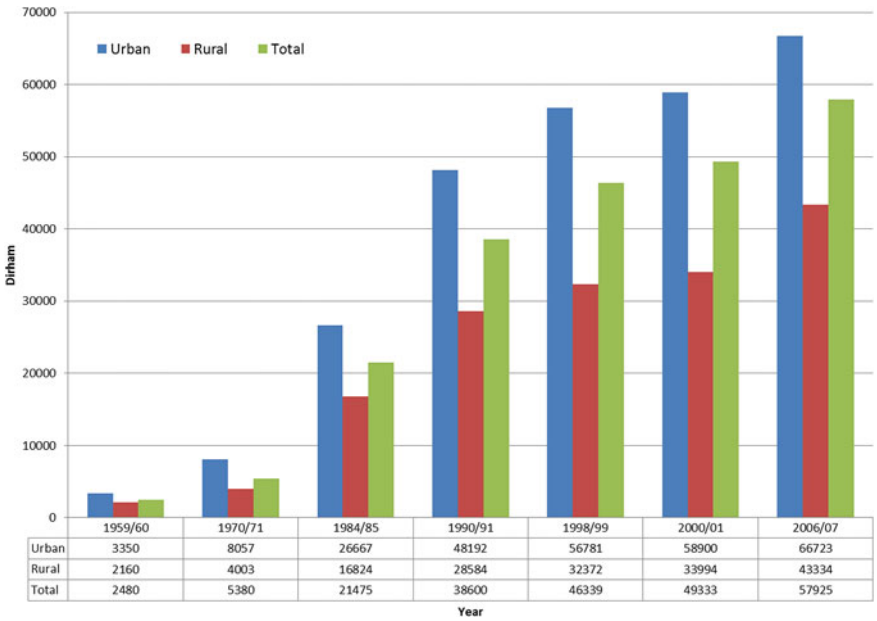
On the other hand, the average income per month for Moroccan households is about 5300 dirham against 6100 dirham in urban areas and 3900 dirham in rural areas. Nearly 20 % of households have a monthly income of less than 1930 dirham and 80 % less than 6650 dirham. Household income is generated largely by labour wage and the independent non-agricultural activities (around 73 %). In rural areas, 41 % of income comes from farming activities.

Regarding the entire household income, the survey results show that 20 % of households with the highest incomes share 52.6 % of the entire income. In comparison, 20 % of those with the lowest income share 5.4 % of the entire income.

Based on the annual average expenditure per household (AAEH) as an indicator of living standards, the survey results show a significant improvement between 2001 and 2007. Indeed, during this period the AAEH increased at a rate estimated at 2.7 % from 49,333 dirham in 2001 to 57,925 dirham in 2007 (Fig. 3.3). In urban areas, the rate reached 2.1 % (58,900–66,723 dirham respectively) against 4.1 % in rural areas (from 33,994 to 43,334 dirham).

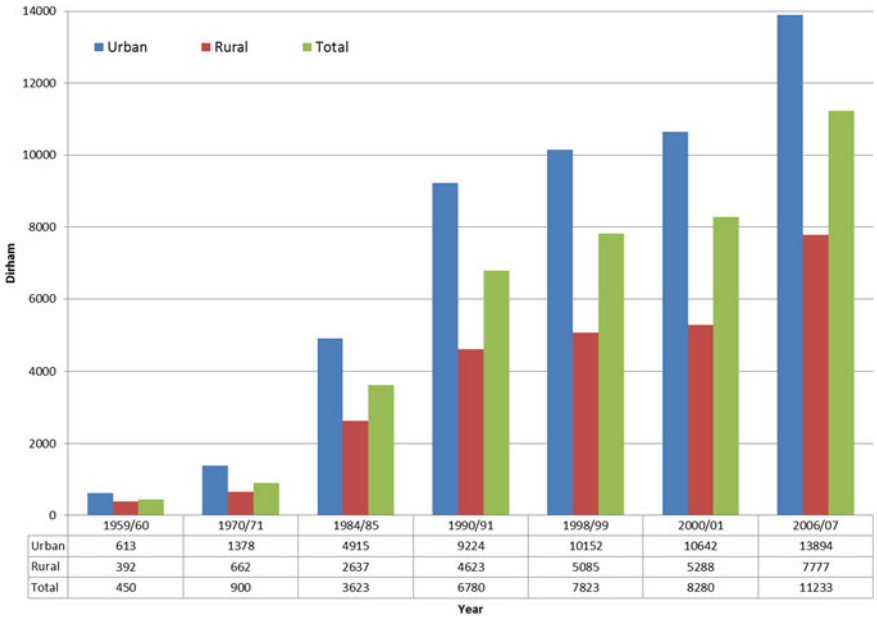
Concerning the Annual Average Expenditure per Person (AAEP), it increased from 8280 dirham in 2001 to 11,233 dirham in 2007; the average will increase to 5.2 % per year (Fig. 3.4). The improvement has benefited urban areas with 4.5 % on average (10,642–13,895 dirham, in 2001–2007 respectively) rather than rural areas with 6.5 % (from 5288 to 7777 dirham).

The overall improvement in living standards has been observed at the national level in both urban and rural areas and the impact has experienced a remarkable reduction in the poverty rate between 2001 and 2007.



	1959/60	1970/71	1984/85	1990/91	1998/99	2000/01	2006/07
Urban	3350	8057	26667	48192	56781	58900	66723
Rural	2160	4003	16824	28584	32372	33994	43334
Total	2480	5380	21475	38600	46339	49333	57925

Fig. 3.3 Evolution of average annual expense by household (AAEH). *Source* HCP (2008)



	1959/60	1970/71	1984/85	1990/91	1998/99	2000/01	2006/07
Urban	613	1378	4915	9224	10152	10642	13894
Rural	392	662	2637	4623	5085	5288	7777
Total	450	900	3623	6780	7823	8280	11233

Fig. 3.4 Evolution of average annual expense by person (AAEP). *Source* HCP (2008)

3.4.2 Food Expenditure

Household consumption in Morocco is dominated by 'food' and 'housing and energy'. The latest survey results on the living standards of households show that the budget coefficients of these two positions are 40.6 and 20.3 % respectively at the national level in 2007 (Table 3.5). They are followed by those of 'transport and communication' (11.7 %) and 'hygiene and medical care' (7.2 %).

The analysis of the total budget coefficients evolution reveals that following the improvement of living standards of households, the weight of food has declined relatively modestly from 41.3 to 40.6 % between 2001 and 2007. A slightly larger decrease is recorded for some items including 'other goods and services' with a coefficient that dropped from 9.3 to 5.9 %, 'housing and energy' (22.1–20.3 %) and 'clothing' (from 4.8 to 3.3 %). In contrast, 'transport and communications' bounded to the third largest item of expenditure after 'food and clothing', with an increase of 112 %. The same is shown for 'education expenditure, culture and leisure' which grew over 63 % between 2001 and 2007. Overall, the same behaviour is found in both urban and rural areas with relatively higher changes for 'food', 'transport and communication' in urban areas and 'housing and energy' in rural areas.

On the other hand, the budget shares of meat and poultry, fish, dairy, eggs, fruits and vegetables showed a remarkable increase during the above period, while fat products show a relative stagnation. Thus, in general, the pattern of food consumption is moving increasingly towards a formula of "less grain and sugar" to "more animal products, fruits and vegetables". Such a formula is bound to increase with improvements in household incomes and the growing influence of Northern models on the consumer, especially in urban areas.

The rate of inflation linked to food is higher than for non-food products. Positively, based on the Cost of Living Index (CLI), measured by the High Planning Commission, food prices rose to 118.5 % in 2012, compared to levels recorded in 2006 (base year). This increase is well above the prices of non-food products which showed a rate of 105.4 % over the same year.

3.5 Natural Resource Constraints

Access to resources constitutes a key issue in understanding the dynamics of agriculture, in terms of the role of farming in the fight against rural poverty, the capacity of the sector to modernise, or the linkages between agricultural activity and natural resource conservation. Although farming requires access to several resources (capital, labour, knowledge), we underline that for Morocco, the key issues are mostly related to land and water resources. Such issues have been pointed out in several government reports and projects of working documents. Moreover, the way land and water resources combine also determine the capacity of holdings to access to credit sources or to the introduction of technical change.

3.5.1 Land Resources

According to the results of the latest general census of agriculture (*Recensement Général de l'Agriculture*) undertaken in 1996, Moroccan agriculture is practiced in 1,496,349 farms covering a total Utile Agricultural Area (UAA) of 8.7 million hectares. Units of less than 5 ha represent 71 % of the total number and occupy only about 24 % of the total UAA. Those who occupy the largest part of the area (43.2 %) have a size lying between 5 and 20 ha and account for 25 % of the total. The large estates (>100 ha) accumulate 8.7 % of the UAA even if their number is limited to 3182 farms, which is an average of 238.65 ha UAA per unit. This imbalance in the structure of agricultural land in Morocco is a serious handicap to the development of effective land tenure.

Besides, land tenure in Morocco shows that the property status is 76 % of the total UAA. The remaining area is allocated to the collective land (17.7 %), *Guich* land ceded to the tribes who used to fight in favor of Moroccan Sultans (2.8 %), *Habous* which is the land of religious brotherhoods (0.6 %) and land that belongs to the state (3.1 %) (Ministry of Agriculture 2007). Apart from the property status, the common factor in other statutes is that the beneficiaries are just profiting from the usufruct right. Therefore, those land statutes raise serious problems that limit the investment incentives to improve production systems within farms that are mostly of small acreage because of heritage considerations.

On the other hand, the development of agricultural land is intended to improve efficiency of agriculture both in irrigated and rain-fed areas. For irrigated areas, the Ministry of Agriculture has maintained and strengthened its efforts to extend and rehabilitate irrigation schemes. In 2009, these efforts were realized through the start or completion of works on more than 140,000 ha.

Similarly, the rehabilitation has involved areas that are part of integrated development projects focused on small and medium irrigation (*Développement Rural Integré sur la petite et moyenne hydraulique, DRI-PMH*). In this regard, the rehabilitation of perimeters located in the provinces of Khénifra, Azilal and Haouz has exceeded 11,100 ha, set within an integrated development approach targeting the local population.

To overcome such constraints, successive governments have responded by implementing sector programs that aim to improve the performance of farms, particularly through the launch in 2000 of the Rural Development Strategy 2020 reported above. Since then, structural policies related to agriculture and food sectors continue their focus on investment incentives in primary production as well as in the processing and marketing steps. Such a policy choice has been strengthened during the last three years in the public goal of modernizing production systems capable of competing with foreign markets. The measures taken in this regard are largely funded by the state budget. The actions are increasingly conducted within the framework of integrated projects that are developed on the basis of a partnership management. In addition to investment incentives, they concern the development of agricultural land and land tenure.

3.5.2 Water Resources

The rainfall contribution to water resources in Morocco is estimated to be about 150 billion m^3. The useful rain accounts for only 20 %, that is to say 30 billion m^3. If we deduce the evaporation losses and the uncontrollable flow towards the sea, the mobilizable hydraulic potential is estimated at 20 billion m^3 including 16 billion m^3 of surface water and 4 billion m^3 coming from subterranean water (Laouina 2006).

Since the end of the 1960s, significant efforts have been taken by successive governments to develop irrigation in order to satisfy food sufficiency, improve the living conditions of the rural populations and contribute to the development of agricultural exports. Such efforts include the construction of 130 large dams with a capacity of nearly 17.5 billion m^3 and the completion of 13 water transfer structures with a total length of nearly 785 km. Also, hydro-agricultural works including authorized well digging and farm equipment for drip irrigation benefit from a significant subsidy that could reach 100 %. On the institutional framework, Morocco has set the 10–95 Act which has consolidated the integrated, participative and decentralized water resource management through the establishment of water basin agencies and the introduction of financial mechanisms to protect and safeguard water resources by implementing a "user-pays" and "polluter-pays" system (Ziyad 2013).

These efforts allowed the installation of a total irrigated area of nearly 1.5 million ha of which 67 % are equipped by the state. This surface accounts currently for about 16 % of the useful agricultural surface of the country. They also have made it possible to allow 100 % generalized and secure access to drinking water in urban areas and 92 % in rural areas.

Nevertheless, water resources face major constraints that are mainly linked to the uneven importance of annual rainfall, the overexploitation of groundwater in some rain-fed areas, the increasing demand for drinkable water in expanding cities and the soil erosion and siltation of dams.

3.6 Concluding Remarks

Despite the whole efforts undertaken since its political independence to improve the standards of well-being of the population, Morocco still faces serious problems of poverty, especially in rural areas. Women's conditions are also of great concern as they need to be among the top development priorities. The challenge now is to comply with the Millennium Development Goals in terms of poverty alleviation and improvement of living standards. Women's illiteracy is also a key scourge that must be wiped out. To succeed in the whole mission, authorities may improve public and private intervention through a better coordination of all institutions that are involved in this issue. For this, relevant socio-economic regional data are needed to point out the real development constraints and solutions on a separate scale for urban and rural areas.

Regarding natural resources, namely land and water, the management of their structural issues has to adopt participative and comprehensive approaches with farmers. Any 'punishing' or coercive government intervention should best be avoided to prevent negative reactions because the issue of natural resources needs the commitment of all stakeholders (as in the cases of water pumping and exploitation of forests). Among the solutions, the government would have to keep encouraging and promoting land expansion through land improvement (e.g. stone removal). Improvements of production systems are also of great interest and justify the implementation of research studies which could investigate the feasibility of designing specific and relevant regional agricultural policies. Such policies would pay attention to production systems with a high role in food security for small farmers (in the case of cereals and small livestock) on the one hand, and encourage high value-added crops in irrigated areas, on the other hand. To help all farmers benefit from such policies, there is the need for better inclusion of competitive small farms to the market through better management of structural constraints (land fragmentation, illiteracy and financial issues), alleviation of market transaction costs and reinforcement of professional organizations.

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Chapter 4
Agricultural and Food Policies in Tunisia: From a Seemingly Solid Performance to Unsustainable Revealed Achievements

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4.1 Agriculture in the Macroeconomic Setting

While declining through time, the agriculture and forestry sectors in Tunisia continue to play significant roles in the general economy, both at the macro and micro levels, particularly at times of general economic instability as the country has recently been experiencing.

At the macroeconomic level and while no longer at the 30 % level, as was the case four to five decades ago, the present relative share of agriculture in GDP has recently been on average around 12 %. More importantly and in addition to its continuous decline, the share of agriculture has been fluctuating over the past decades as well, and with increasing amplitude. Table 4.1 shows that overall performance of the sector in average terms, trends and variability.

The year-to-year contribution to the overall GDP of the country depends on the overall performance of the rest of the economy but varies also in relation to the prevailing agro-climatic conditions which directly affect the supply of agricultural produce.

Under circumstances of relative economic stability, increases in agricultural supply result in additional exports and sometimes decreases in imports, such as for cereals. Conversely, under economic instability the opposite occurs and general economic indicators start flashing. Hence a direct link exists between the performance of the sector and that of the overall economy. Using a SAM multiplier model, Ben Moussa (2010) argued that the agricultural sector has the most important effects

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Table 4.1 Agriculture in the overall economy

Indicator	Share of agriculture relative to GDP	Share of agricultural exports/total	Agricultural trade balance	Overall trade balance
Average	11.8	9.3	71.1	74.2
Annual growth rate	**−2.59**	**−2.58**	**−0.60**	**−0.16**
Coefficient of variation	**11.7**	**17.5**	**26.3**	**5.3**

Period: 2000–2010, Unit: %
Source Own calculations based on INS statistics
INS for National Institute of Statistics

on the rest of the Tunisian economy than all the other sectors through its upstream and downstream transmission channels.

The trade balance deficit of both agricultural products, and in general, seems to be stabilizing as the respective negative annual growth rates are low and less significant than that of the performance of the entire agricultural sector. This means that there are offsetting effects between sectors as far as their contributions to the overall trade balance. In terms of variability though, as measured by the coefficient of variation, the balance of agricultural trade is about five times higher than that of the overall trade balance.

Now under extraordinary economic circumstances such as those that have prevailed during the last two crop years, as the country has been experiencing political and social uprisings resulting in a general slowdown of its economic activity, a salient dampening role of agriculture has surfaced in attenuating the amplitude of the overall economic downturn of the country.

Enhanced by climatically the favorable years of 2011 and 2012, the contribution of agriculture to GDP has surprisingly picked up to reach the 13–14 % level,[1] whereas in years past, particularly in years of drought, that contribution declined to levels even below 10 %.

Despite the relative downsizing of agricultural activities and the variability of their outputs, however, agriculture continues to play a significant positive role in the overall socioeconomic activities of the country. In addition to the classical role of providing food for a population that has quadrupled over the last five decades, no significant food shortages were experienced, neither in global terms nor at the level of specific commodities. Moreover agriculture and rural areas continue to provide a livelihood for about 35–40 % of the population.

Agriculture itself also provides employment for no less than 16 % of the labor force. As a result, agriculture provides total or partial incomes to about half a million farm households, corresponding to a quarter of the total population approximately.

[1]Final and agreed upon statistics for the last two disturbed years are not included in the calculations.

Agriculture is also contributing to general exports by about 9–10 %. It is attracting about 10 % of total investment and is increasingly feeding an agro-food industry with the required primary commodities, a sector that is rapidly growing and providing increasing value added and hence contributing to economic growth. Today, that sector represents about 25–30 % of Agricultural GDP.

The historical relative slowdown feature of the agriculture sector does not however imply stagnation of the agricultural economy but rather faster rising of other sectors of the economy. Moreover, the sign of apparent salient strength that agriculture has shown since the political change that occurred in the country since the beginning of the year 2011 has turned out to be a stabilizing factor of the overall economy in view of the revealed greater fragility that the non-agricultural sectors have exhibited, particularly those dependent on foreign investment.

In view of all of these considerations, agriculture has constantly been the target of numerous and discontinuous sets of policies which will be overviewed in the following section.

4.2 Retrospective Policy Diagnostics

Agriculture and rural development concerns along with the need to secure the increasing and changing Tunisian population's food needs have always been at the forefront of public priorities throughout the recent history of the country, as expressed in all national economic and development plans and programs. As a result, agriculture and food policies have been quite active in orienting and affecting the performance of agricultural activities, in one way or another (Laajimi et al. 2012).

From an inherited market liberalism system that prevailed prior to its political independence,[2] the country moved quickly into a state-run economy, materialized by a generalized cooperative movement, both of the production and service types, which were implemented through the end of the sixties.

This period was also characterized by the introduction of new commodities in the bundle of commodities offered to the consumers, such as bread wheat, flour and vegetable oils. These new commodities were introduced as part of a world food aid program (US PL480) as donations initially, which then became staple commodities with time but were offered at the start either freely or at very low market prices. In a parallel fashion their world prices started picking up and kept increasing ever since.

These policies, coupled with high demographic growth rates at the time, initiated the Tunisian food dependence of world markets as local diets changed significantly as a result of the introduction of these inexpensively provided commodities and the relative gradual phasing out of traditional diets utilizing locally produced agricultural commodities such as durum.

[2]In 1956.

The termination of the cooperative movement at the end of the sixties gave way to a new wave of market liberalization which returned to the country during the seventies. This was coupled with significant increases in the prices of those imported commodities (bread wheat and vegetable oils, mainly) which necessitated the creation of a National Compensation Fund (CGC).[3]

The main purpose of the CGC was to help facilitate access to the food requirements of the increasing population who got used to consuming those commodities, by keeping their prices low, and equivalently protecting the purchasing power of the needy. Since the prices at the final consumption levels could not be increased, the general compensation mechanisms were generalized to include agricultural production inputs such as fertilizers, chemicals, mechanization, fuel, irrigation water and equipment, animal feed, etc.

In a parallel and simultaneous fashion and in view of the growing demand for "industrialized bread", soft wheat was introduced to cereal farmers as a substitute crop for the indigenous durum and barley, using imported seeds initially developed at CIMMYT in Mexico which never got acclimatized enough to local conditions. Despite the significant research progress that took place in the country to obtain suitable seed varieties, domestic bread wheat culture did not get developed enough to meet the country's food needs, as they never exceeded 1/4 of the area that cereal farmers spontaneously devote to durum, in view of its higher requirements in terms of soil fertility and rainfall, as compared to durum. Consumption of subsidized and almost entirely imported bread wheat and totally imported vegetable oils kept increasing over time.

The share of public compensation funds as a percentage of GDP which was initially around 0.5 % kept increasing to reach 3.4 % in 1975, following the first world energy crisis of 1973, then declined during some years to pick up again in the early 80s, to exceed 4 % in 1984, to decline again during several years to return to the 2 % level following the creation of the WTO in 1995. The table provided in the appendix shows the annual evolution of the public expenditures on food commodities in absolute and relative terms to Tunisia's GDP.

In the mid-80s the Tunisian economy was put on a World Bank/IMF stabilization program, and the agricultural sector itself was the subject matter of an agricultural sector adjustment program (ASAP).

The main features of the ASAP were to reduce, and in some cases eliminate, the internal support measures publicly provided to agriculture and to ease country market access. This was carried out under the paradigm of government disengagement from the economy.

To some extent, such disengagement took place as the trends of the share of compensation funds in GDP declined and dampened out, following the official adoption by the then Government of the WTO guidelines during the nineties.

[3]Corresponding to the French equivalent CGCz (for Caisse Générale de Compensation), which is more commonly known in the country.

The absolute amounts of funds allocated to food expenditures however reached their maximum and almost doubled during the food crisis years (2007 and 2008).

A 2006 World Bank study which examined the evolution of Tunisian agricultural policies over a decade, since the adoption of the WTO guidelines, demonstrated that the agricultural and food economy in Tunisia was in actuality not liberalized enough. In fact, despite the public rhetoric, effective protection rates in agriculture did not decline over the decade. It rather doubled (from 30 to about 60 %).

4.2.1 Recent Trends in Supply and Demand for Food

Past agriculture and food policies in Tunisia have almost always attempted to reach the following set of objectives: (i) Food self-sufficiency evolving towards the more relaxed concept of food security; (ii) Promoting agricultural exports such as those of olive oil by continually subsidizing competing vegetable oils, thus freeing additional quantities of olive oil for exports for the purpose of covering increasing import costs; (iii) Increasingly seeking to preserve natural resources (soil and water), and (iv) Putting emphasis on improving competitiveness of agricultural products in order to better compete in world markets which were meant to be increasingly liberalized.

On the supply side, the implementation of past policies involved the intensification of agricultural activities through irrigation primarily and through the use of increased industrial inputs (machines, chemicals, fertilizers, use of genetically bred higher yielding varieties, animal feed, etc.). Almost all of these inputs were serviced to farmers at prices below their respective costs. This systematic intervention which prevailed through the seventies and the first part of the eighties was an attempt to push farmers to maximize input use and production, as opposed to optimizing them, without proper consideration to the likely farmer response to those incentives, nor to other limiting local environment aspects.

As a consequence, the quantitative achievement of objectives has been rather modest as materialized by the limited supply response to the given incentives, in spite of the important and increasing budget expenditures that were allocated to them. As an illustration of the policies that were introduced following what many refer to as the world food crisis years (2007 and 2008), there was the quasi-doubling in just one year of the producer prices of the three main cereal commodities (durum, bread wheat and barley) and no significant response was registered in terms of production expansion of these commodities. This is obviously not a negation of the expected positive impact of producer prices on production; it simply suggests that other factors are limiting the production process such as the quantitative and qualitative potential of resources or the structural farm sizes which are of small scale in nature by-and-large.

On the other hand, other structural, environmental and natural resource problems have begun to emerge, such as the almost full utilization of water resources, problems of soil degradation due to over-mechanization and erosion, phenomena of

deforestation of large areas and rangeland, and pollution of water resources (soil salinity and nitrate aquifer pollution), etc.

On the demand side, public policy continued the pursuit of the objective of cheap or inexpensive food policies through the provision of staple commodities at low prices via a universal subsidy set of programs (cereals, vegetable imported oils, dairy products, sugar, etc.), all for the sake of protecting the consumer's purchasing power and consequently achieving an apparent social stability. Hence implemented policies on the demand side were based on quantitative and normative consumption parameters with no clear or systematic consideration of health and nutritional considerations of the followed diets.

As a result, the consumption of certain commodities reached record quantitative levels (soft wheat, bread itself, milk, vegetable oil, sugar, etc.), translating into extremely high import bills and systematic deficits in the balance of agricultural trade, as increasing domestic budget outlays were provided to make up for the discrepancies between producer prices and import prices, on the one hand, and subsidized consumer prices, on the other hand. Moreover, the Tunisian food diet was increasingly characterized by a high consumption of cereals, a moderate and slow evolution of animal protein consumption and little diversification in terms of fruit and vegetables.

Thus, if the quantitative dimension of the daily ration of the Tunisian was rather satisfactory, the same could not be said about the qualitative dimension and the dietary aspects. In fact, the excessive consumption of high caloric and unbalanced intakes resulted in increasing average human body weights, which, ceteris paribus, increases the risk exposure of the population to health problems.

The increasing demand for staple food commodities continued to be met by domestic supply, and by imports but in very variable proportions. If the domestic production of durum corresponds to approximately 80 % of national needs, that of bread wheat does not exceed 20 %. In the case of vegetable oils and sugar,[4] it is total dependence of world markets as they are all imported; this is a direct consequence of the artificially distorted market of basic commodities (cereals, vegetable oil, milk, sugar, etc.) through the use of increasingly debatable food policies. Such heavy dependence of domestic consumption of basic commodities on world markets has not only been public budget devouring, but it has also put the Tunisian society before an important source of risk materialized on the one hand in the extremely high levels of consumption which can only be met by increasing imports and on the other hand by the world market which revealed instability and increasing price trends as a result.[5]

In terms of expenditures on imports, cereals take up the largest share with bread wheat being at the top, followed by animal feed grains (corn and barley). For all

[4]In the case of sugar, total dependence of world markets has begun only since the mid-eighties when sugar beet production was discontinued following the adoption of the ASAP in view of the then lower world prices as compared to the domestic producer supported prices of that period.

[5]As confirmed by international studies, eg OECD.

Table 4.2 Expenditure breakdown on food items (year 2011)

Items	Amount (10^6 dinars)	Share (%)
Cereals	883.2	76.8
Vegetable oil	214.4	18.7
Milk	23.0	2.0
Sugar	10.9	0.9
Tomato concentrates	9.5	0.8
Couscous and pasta	4.2	0.4
Other products	28.9	2.5
Total charges	1149.5	100.0
Total charges in relation to GDP (%)	1.78	

Source Central Bank of Tunisia (2012)

imported commodities the import bill has been affected by both price increases and by the increasing volumes of imports. Expenditures become compounded when domestic production levels are low, thereby increasing the excess of demand of the country for those commodities. Consequently food subsidies increase alarmingly and at the same time there is a mounting and recurrent public pressure to supply the domestic market at almost any cost. Table 4.2 shows the breakdown of public expenditures on various food items corresponding to the year 2011 for which data are complete.

As is universally perceived, public assistance is justified in the name of the economically needy segments of the population. Actual beneficiaries of that assistance in Tunisia up to the eighties have turned out to be the not so needy segments, as only 25 % of public budget outlays went to 75 % of the population and the rest (75 %) went to the rather well to do (25 %) (Rejeb and Lahouel 1990), suggesting the existence of (i) significant deviations from the intended objectives, and (ii) inequities among population income brackets.

More recent statistics indicate that enterprises located along the cost take up as much as 90 % of public assistance that goes to enterprises in comparison with only 10 % of that assistance that go to activities taking place inland of the country (La Presse 2013). This suggests the existence of other types of inequities in the public transfers relating to the regional distribution of the public assistance which the recent popular uprisings helped uncover.

Recent efforts were made to smooth out the global public expenditures that were allocated to final consumption of agricultural commodities and geared towards their assumed destination. In that vein alternative targeting schemes have been tried by public authorities. These policies started with subsidizing dark flour using barley or oat flour using breads, on the assumption that these types of breads would be economically inferior commodities and therefore primarily usable by the poor. Over a short period of time and with a little experimentation, these new types of "complete" and/or "farm" breads have turned out to be somewhat luxury goods in view of their rediscovered high nutritive value. As a result such policies have

skewed even further the distribution of the public assistance towards the rather well to do and educated segments of the population, instead of the opposite.

A new cereal subsidy targeting scheme is presently being experimented with. It is based on the geographic location of the bakeries providing bread throughout the country. Bakeries located in remote and/or rural areas specialized in big loaf bread-making are entitled to more subsidized quantities of flour than those located in other residential areas. A third type of public expenditure curbing has also taken place for more than two decades. It is based on reducing the weight of bread itself, thereby reducing the quantity of subsidized flour. As an illustration, the big loaf of bread that used to weigh near a kilogram back in the sixties is now weighing near 400 grams.

Despite these measures, consumption of bread in Tunisia seems to be approaching world record levels. Bread being made for the most part out of flour which is derived from bread wheat has made the import bill of that commodity to be ever increasing. Recent upward trends of cereal prices have made the situation even more critical for Tunisia.

As a result, the per capita annual consumption of all cereals in Tunisia is presently exceeding 250 kg per person which is about double the world average cereal consumption. Many attribute it to the staple nature of cereal products. Others would attribute it also to the undervalued nature of these commodities as reflected through their artificially maintained prices at low levels.

4.2.2 Natural Resources: Use and Misuse

The water resources in Tunisia are scarce and their quality is degrading. Traditionally, the water policy was oriented much more towards supply than demand management. However, the increase in supply seems to have reached its limits and several problems emerged, such as overexploitation of the resource, increase of the marginal cost of its mobilization, low cost recovery, and intra-sector conflicts, in addition to its misallocation resulting in inefficiencies and sometimes pure waste of the resource.

As the per capita availability of water supplies decline over time and the marginal costs of securing additional supplies rise, water authorities have moved to exploring new approaches to improve the management of water resources. Since the nineties, international organizations (FAO, OECD, World Bank, etc.) and some experts (Horchani 1994; Mattoussi 2002; Chohin-Kuper et al. 2002) have suggested that water policy should shift more towards water demand management to warrant better valorization and sustainability of the water resource.

Policies towards natural resources have concerned both soil and water. The latter has almost always been perceived as the most limiting factor of agricultural production, for the obvious reason that agricultural vegetation is much more intense and as a result crop yields are higher. Hence most of the public investment in the agricultural sector (over 70 %) has been in the hydraulic infrastructure, so as to mobilize as much of the available and potential water resources as possible.

Table 4.3 Mobilized versus potential water resources in Tunisia (values in Mm^3)

	Potential ($10^6 m^3$)	Mobilized resources (10^6 m^3)				
		1990	2000	2005	2010	2015 (projection)
Surface water (56 %)	**2700**	**1179**	**1876**	**2200**	**2400**	**2500**
Large dams		1170	1688	1927	2080	2170
Hill dams		5	125	160	190	195
Artificial lakes		4	63	113	130	135
Groundwater (44 %)	**2140**	**1576**	**1818**	**1860**	**1900**	**1940**
Shallow aquifers		740	740	740	740	740
Deep aquifers		836	1078	1120	1160	1200
Total resources	**4840**	**2755**	**3694**	**4060**	**4300**	**4440**
Mobilization ratio (%)	–	**59**	**80**	**88**	**93**	**96**

Source Al Atiri (2007)

In that spirit, 27 large dams, more than 182 hill dams and around 700 artificial lakes were constructed in the country over the past four to five decades. The general balance in terms of water mobilization, confronted to the estimated potential, is shown in the Table 4.3.

Such water mobilization policy has enabled the development of near 450,000 ha of irrigable land, corresponding to about 7–8 % of Tunisia's total arable land, but contributing by about 30 % of agricultural production.

Public policies with regard to water face two main challenges. First, not all irrigable land has been put into actual irrigation as around 80,000 ha of equipped areas (about one fifth) have not been put to use. A variety of reasons could explain that situation. Chief among these are the concerns about possible price decreases if supplies were to increase too rapidly, along with other potential marketing difficulties on the input or output sides.

Second, efforts were made to push farmers to devote about a third of their irrigable land to cereal cultivation, as part of the national policy to bring about food security. This encountered resistance as well for the simple reason that farmers find it more profitable to allocate irrigable land to other crops.

Furthermore, the emphasis on the development of irrigated agriculture has had unexpected results in the form of soil salinity, as irrigation water in a number of areas of Tunisia has quite a high salt content. In other rainy areas of the north east of the country, cases of aquifer nitrate and other chemical pollution resulting from the excessive use of those products have been registered.

Hence the general public perception is that nearly all potential water resources will soon be exhausted and severe shortages could occur. In this eventuality, particularly if present water policies continue to under-price the resource, this will increase the likelihood of severe water shortages and could even shorten its horizon. However if policies were to be revised to value the resource at its true cost and/or discourage water waste, prospects may perhaps be less gloomy.

Preserving natural resources has always been among the central declared objectives of successive development plans. Indeed, natural resources, mainly water, soil and its organic content, are considered as the main factors that contribute to the enhancement of quantitative as well as qualitative production levels of agriculture and therefore to its growth.

In actual fact, past policies have indirectly contributed to the non- or partial achievement of those objectives. Take the example of agricultural mechanization which has been encouraged first through subsidized fuel and nowadays via direct subsidies on the purchase of the equipment itself by as much as 25 or 40 %.[6] As a result, most farm land cultivation has shifted into the mechanical mode, including small scale farms with difficult and hilly landscapes, and has driven out animal traction of the Tunisian farm scenery. Excessive mechanical cultivation has resulted in devastating soil erosion and organic matter impoverishment.

In the livestock sector, public subsidies allocated to animal feed have incentivized otherwise non-livestock raisers to develop local feed-independent livestock activities, even in urban areas. In a number of cases, the incentives pushed animal raisers to increase herd numbers irrespective of grazing potential which resulted in overgrazing and a rapid destruction of vegetation on grazeland and in some cases forestland as well.

The rapid destruction of vegetation has not only amplified the disequilibrium between the domestic supply of and the demand for feed resources, with the budget consequences thereof, but it has also facilitated rain water runoffs and therefore limited water infiltration in the soil.

4.2.3 Demographics, Human Development Indicators and Migration

In terms of **demographics**, the Tunisian case is perhaps unique among Arab/Muslim countries in the sense that early policy makers saw the need to slow down the rate of population growth, as the country was experiencing over 3 % annual increase for the purpose of containing global food demand even though the population was then about only a fourth of what it may be today.[7] INS statistics reveal that the last estimation of Tunisia's population growth rate was at about 1 %. This is at variance with the even lowest estimates of such rates for other Arab countries (2 % for Morocco). Quantitatively at least, this has been a major burden taken away on population food demand.

As for the **labor structure**, major changes took place following the urbanization process that has taken place in the country. It is estimated now that nearly 70 % of

[6]The percentage varies according to the subsidy requester, an individual farmer or a society.

[7]Most sources would agree that the present population of Tunisia is between 11 and 12 million people.

the Tunisian population lives in urban areas, primarily along the costal line in view of the explosion of the construction sector and its derived demand for labor. The part of the population that continues to live in rural areas exceeds the capacity of those areas to provide competitive jobs. Significant numbers of laborers, usually of the unskilled type, still seek job opportunities beyond Tunisian borders, not always through legal means and ways.

The new jobs that are found in non-farm areas are providing in many cases additional incomes to agricultural activity sources and constitute social stabilizing factors. Nevertheless, actual labor supply activities are declining as farm wages are on the rise. Tunisia, which used to be classified as a labor surplus economy during the sixties, no longer qualifies for that category, as for a number of activities in agriculture and outside labor coming from other countries. The same type of flow is also taking place between different regions, primarily from the rural parts to the urban ones and from the interior to the coast.

In terms of **human development,** the general macroeconomic indicators of Tunisian society were considered rather satisfactory. Whether in terms of per capita GDP (US$5000), or GDP expressed in terms of PPP (US$7520), Tunisia was ranked up to the year 2010 ahead of other non-oil producing Arab countries. Even in terms of the UNDP Human Development Index (HDI), including not only income but also health and education considerations, while the image was not as favorable, Tunisia was still better ranked than neighboring countries. Even if we go to more elaborate and comprehensive indices such as the **well-being composite index** (WCI) which integrates additional qualitative aspects of life (environment, gender equality, income distribution, etc.), Tunisia was still ahead of other neighboring and similar countries.

Schooling records of Tunisia at all levels (primary, secondary or even university) have been more than impressive: the figure reaches nearly 100 % for schooled children in primary school, with high graduation levels from high schools, increasing numbers of university and technical school graduates in almost all fields, diversification of specializations, etc.

Health facilities are available everywhere in the country in the form of hospitals, private health care facilities in many parts of the country, local health facilities, etc. Furthermore, sound road infrastructure crosses the country in all directions, even in rural areas. Poverty levels as judged by international institutions such as the UNDP are among the lowest worldwide, particularly in aggregate.

4.2.4 Recent Social Unrest and Structural Changes and Revelations

Recent social unrest in Tunisia has not changed the overall positive aggregate economic performance of the country. It has however revealed severe problems of distribution of wealth hidden behind the overall positive economic picture.

The major revealed disparities were not only between segments of the population; they were also between regions, namely the coast and the interior. Even in terms of poverty, the globally modest national rate was hiding tremendous discrepancies between regions and particularly at the level of enclaved zones and remote places.

There are disparities in unemployment as well, reaching levels as high as 30 % in certain places and for certain categories, particularly the young and the educated. The high numbers of schools and graduates, instead of contributing to the facilitation of the unemployment issue, rather added to its magnitude, which is raising new issues about the quality of the training programs that are provided throughout the country.

In view of the amplitude of the revealed social problems, serious questions are being raised as to the relevance of the various trade agreements to which the past Government of Tunisia has adhered to insofar as their reliance on the market liberalization paradigm (WTO, free trade zone with the European Union, etc.). Many are questioning the validity of such paradigms to Tunisia's acute social problems of poverty and unemployment. Many go as far as accusing such an economic model orientation for being the main cause of these problems.

The structural changes that Tunisia is presently undergoing have so far had a number of positive impacts in terms of the free public debates about past policy choices and contents. The real issues are that policies that would be flaw-proof may be difficult to find. It is clear that there is an ever-mounting public impatience to identify policies that would address all identified problems in a rather rapid way. No doubt the economy has been weakened over the last 2–3 years as a result of the expressed frustrations over the past political conduct of the country. But real ways for development can be found only through compromises and trade-offs between alternative components of society. These require less passionate public debates than what is presently taking place in the country.

4.3 Future Perspectives: The Need for a New Agenda

In view of the new revealed economic and social realities in Tunisia, the new orientations in farm and food policy are yet to be known as the governing body of the country is transitory and future policy courses of action are awaiting future outcomes of the democratic process being put into place.

4.3.1 Supply and Demand Adjustments

Support to consumers through administrative price control is not likely to disappear in a near future; the "street power" in particular in Tunisia has proven to be strong and effective. There is however an increasing awareness that constantly pursuing

cheap, or inexpensive in some cases, food policies has resulted in world record consumption levels of certain commodities (cereals globally, bread specifically, other cereal by-products, sugar and fats).

Beyond the budgetary considerations, there is a growing social concern that these policies have resulted in, or at least contributed to, increasing obesity and health problems of the population. Hence future prospects for public consumer policy are likely to give more attention to qualitative and safety aspects of consumption and progressively deviate from the exclusively quantitative feeding objective of the consumer that has been pursued so far.

4.3.2 Increasing Public Budget Limitations and Scrutiny

While it is not popular at the moment to present to the public the increased emphasis on public accountability, as a main principle that the social unrests have publicly expressed, it will inevitably lead to increased scrutiny of the Government use of public assets. This will certainly involve the examination of alternative public choices and their corresponding opportunity costs. Questions of the type that consider whether it will be more socially pertinent to continue to support quantitative consumption of the poor as opposed to improving living conditions (health facilities, education of children, rural infrastructure in certain areas, etc.) will certainly surface. It is only through the examination of alternative choices that are of relevance to the consumer, and particularly to the poor, that acceptable compromises can be reached.

4.3.3 Poverty Reexamined: Rural and Urban Trends

Poverty levels in some cases and poverty disparities are among the top priorities that the social unrests have revealed. Some aspects of poverty are localized in specific landlocked areas and require appropriate and targeted assistance. Other aspects are more horizontal and cover large areas. Analyses have indicated that they result from the lack of investments in some areas such as the interior part of the country. Present public attention in terms of direct production and rapid income-generating activities is already given to those areas. However quick analyses have shown that income generation though new activities that could be undertaken in the interior part of the country require more urgent investment in infrastructure as the 2012 public expenditures allocated to those areas was consumed only partially (70 % in the highest cases). Hence, time is required for productive investments to follow investments in infrastructure.

4.3.4 Emerging Environmental Issues and Concerns

Tunisia covers a surface of about 16 million hectares divided into 30 % of agricultural lands, and 27 % of forests and pasture, with the remaining 43 % being non-cultivable. This implies that only half of the total area contributes to the agricultural production. However, arable land is also subject to degradation by erosion and desertification which causes an irreversible loss of an important amount of arable land each year (Ministry of Agriculture).

The geographical distribution of these lands is also critical since 39 % of the agricultural surface is located in the North of the country (average annual rainfall more than 350 mm and exceeding 600 mm in certain areas with high land fertility), whereas the remainder (61 %) is located in the Center and the South, characterized by an annual rainfall ranging from 100 to 250 mm and poor land fertility.

Land ownership trends in Tunisia are causing concerns. These concerns are about land fragmentation, limited farm size, and limited involvement of younger farmers. In this context, according to the latest survey on farm structures conducted by the Ministry of Agriculture (2005),[8] 90 % of farmers growing early vegetables are cultivating less than 2 ha. Furthermore, it is estimated that 50 % of citrus and cereal farmers do not reside on their farms. Land ownership data reflects that land fragmentation is advancing and 73 % of land holdings are currently less than 10 ha in size, up from 64 % in 1976.

In view of the aridity of the Tunisian climate, natural resource (soil and water) preservation will certainly continue to be at the center of future policies, as it has been in the past. Conservation programs and their corresponding budgets have hitherto been geared towards water mobilization through dams and hill reservoir construction, in the case of water, and erosion breaks and contours, in the case of soil.

Alternative ways of preserving and regenerating basic resources for agriculture such as soil moisture and fertility are critical issues to be addressed in the years to come in order to warrant true and sustainable agricultural development for the country.

4.4 Trade and World Market Instability Challenges

In terms of trade of agricultural commodities, Tunisia has been a **member of the WTO** organization ever since its creation in 1995. As such it has committed itself to the WTO principles and guidelines of progressive trade liberalization for all of its commodities, be they agriculturally originated or otherwise. While a WTO comprehensive agricultural agreement has not been agreed upon yet, the general spirit of easing up access to foreign commodities into the national market and gradually reducing internal policy distortions resulting from domestic support in the form of

[8]The Tunisian Ministry of Agriculture conducts a national survey each decade intended mainly to examine the evolution of a farm's structure. The latest survey was conducted in 2004, 2005.

subsidies or taxation has often been publicly debated and to some extent implemented as well. The substantial removal of subsidies on a number of farm inputs (fertilizers, herbicides, etc.) is a case in point.

Subsequently, Tunisia got engaged in the establishment of a **free zone area** with the **European Union** which was supposed to be operational by now. Membership in the **European Free Trade Association** providing trade preferences for a number of Tunisian products has also been active for a number of years. Other memberships in regional associations (**Agadir agreement** between eight Arab countries, trade flows among five **Maghreb countries**, etc.) have been in effect for a number of years.

Extraneous factors, political or otherwise, have prevented these agreements from impacting significantly on the trade of agricultural commodities. For the most part, the trade of Tunisian agricultural commodities nowadays remains dominated by flows from and to the European Union, concentrated principally on France, Italy and Spain with proportions varying over the years between 75 and 80 % of all traded agricultural commodities.

The overall trade of Tunisian agricultural and food commodities remains characterized by exchanges in bulk (over 90 %) and heavily concentrated on a limited number of countries and localized markets thereof. This situation results in limited valorization of these commodities and any increases in trade earnings usually result from increases in volumes rather than unitary value improvements. These are by-and-large the main challenges facing Tunisian agricultural trade (Thabet 2011).

4.4.1 Agricultural Trade Liberalization: Advantages and Issues

Liberalization of agricultural trade remains founded on the paradigm of the potential gains that the country can achieve by gearing its limited resources according to its comparative advantage in as much as possible. A given country always faces a choice between alternative ways of allocating its resources, additional protection of its economy or additional openness of its economic borders. The former option generally implies missing opportunities while the latter could lead to seizing opportunities. Excessive protection always resulted in slow growth while the opposite almost always induced wealth creation.

The dilemma for Tunisian policy makers is which road to take, particularly at a time when the Tunisian society is particularly dissatisfied with the past management of the economy which in rhetoric emphasized the market liberalization choice as the adequate path.

The liberalization of the economy while it rests on a sound set of economic concepts and principles requires adequate implementation in order to bring about the expected positive results. Furthermore, its positive repercussions on the economy may not be immediate and could involve important transitional costs for those activities that lack competitiveness which may be socially intolerable. Hence transitional

measures are needed to smooth out the social difficulties that may be encountered, otherwise the whole process could break down in spite of its economic legitimacy.

4.4.2 Trade Agreements: Multitude, Diversity and Coherence

As indicated above, trade agreements have increased in numbers over the years. In terms of content, they do not always imply the same trade discipline. The specifics of each agreement are quite variable and industries could find it difficult to conform to a number of them simultaneously. However, each agreement could be interpreted as implying a set of opportunities which can be seized by different entrepreneurs. The world market being as diverse as it is, a number of restrictions that a given agreement could imply can be interpreted rather as a set of opportunities. Seeking opportunities within the framework of each exiting trade agreement can be a sound strategy of diversification against possible forms of market risk.

4.4.3 Increasing Non-Tariff Trade Barriers

While most agreements call for quantitative reductions in barriers to trade, most of them are increasingly stressing qualitative measures and restrictions. This may appear as new forms of trade barriers which are substituting for traditional quantitative ones, which are expected to gradually be phased out. In some sense, this is true and nowadays trade is not as fluid as it may have been in the past. However, taking into account future consumer perspectives, the qualitative and in some cases health requirements may not be evitable. Hence, the sooner the country integrates expected targeted market requirements, the less cost it would have to assume in the long run to adapt to increased competition in the world market. It is just a new reality that countries have to take into account if market openness is their policy choice.

4.4.4 Persisting Trade Preferences for Development and Social Considerations

Economically speaking, the general spirit of world market liberalization rests on very solid economic concepts. Its drawbacks however center on possible social adjustment costs that a given country assumes as it moves from an existing situation to a "more liberalized" one.

Another concern, and at the same time a basis of criticism, has to do with the fact that not all countries promoting free trade policies are applying the same principles on their own markets. The issue of unfair trade is increasingly raised by a number of countries, and particularly in Tunisia at the present time.

As an illustration, olive oil produced and marketed in the European Union collects roughly as many public subsidies as it does from the market. The same product coming from other countries is expected to compete on world markets with that trade disadvantage.

4.5 Concluding Observations

Throughout its independent history, Tunisia has adopted policies that were not always efficiency-promoting, even though the objective of growth and development were always at the forefront of almost all development plans.

Specific objectives and policies to protect the consumer purchasing power of food items and at the same prevent the erosion of farm incomes by continually subsidizing most agricultural inputs and implicitly outputs as well (cereals, milk, organic farming, etc.) has led not only to unsustainable budget expenditures but also world record consumption of certain food items.

Emphasis put on intensive use of industrial inputs to promote the supply of agricultural supply has had limited and insufficient response on the part of the existing resource endowment, and in a number of cases resulted in resource depletion and impoverishment (soil and vegetation erosion, loss in soil fertility, water and soil pollution etc.), necessitating new and more appropriate policy choices to curb those trends.

On the other hand, among all Arab countries, Tunisia has dared to slow down population growth (1 %). Otherwise its food concerns would have been much more significant in view of the registered performance of the agricultural sector.

Tunisia is now at a crossroad. Its future will depend on much of the past achievements it will manage to maintain and how much of the ongoing euphoria it will manage to control.

Farm policies in Tunisia have always been designed on the basis of partial analyses related to individual commodities and/or inputs and not in an integrated way. The comprehensive concept of a "farm bill" takes into account a bigger set of activities and examines their overall cost consequences. Such a tool can be relevant for analyzing and comparing alternative policy options as opposed to looking at individual subsectors separately.

In spite of the economic validity of the market liberalization concept, its virtue improves when world markets are stable. Reality has shown that it is not the case. This calls for the integration of the risk and uncertainty dimension in analyses of alternative policy courses of action.

The main challenge facing future trade policy makers in Tunisia will center on the search for an optimal mix between publicly defending prior country commitments to international agreements aiming at capitalizing on potential efficiency gains that world economic integration can bring about and the new demands for inequity reductions that recent social unrest revealed.

Appendix

See Table 4.4.

Table 4.4 Public CGC budget outlays on food commodities

Years	Expenditures (10^6 dinars)	GDP (10^6 dinars)	Share in GDP (%)
1970	1.3	755.6	0.17
1971	2.8	881.2	0.32
1972	8.8	1067.5	0.82
1973	8.5	1151.3	0.74
1974	27.3	1547.8	1.76
1975	58.7	1741.4	3.37
1976	34.1	1933.0	1.76
1977	33.6	2191.9	1.53
1978	48.2	2483.9	1.94
1979	60.0	2922.0	2.05
1980	67.0	3540.5	1.89
1981	157.3	4162.0	3.78
1982	168.3	4816.0	3.49
1983	174.6	5668.1	3.08
1984	260.1	6412.4	4.06
1985	262.2	7018.3	3.74
1986	218.0	7160.3	3.04
1987	196.0	8035.3	2.44
1988	274.4	8660.6	3.17
1989	393.8	9589.8	4.11
1990	317.0	10815.7	2.50
1991	270.0	12028.8	2.42
1992	291.0	13505.7	2.32
1993	314.0	14662.4	2.07
1994	304.0	15813.8	2.17
1995	343.0	17051.8	2.56
1996	436.0	19066.1	1.94
1997	370.0	20898.2	1.61
1998	336.0	22560.8	0.91
1999	206.0	24671.6	0.91
2000	225.0	26650.8	0.93
2001	248.0	28757.2	0.79
2002	226.0	29923.8	0.68
2003	203.0	32170.1	0.81

(continued)

Table 4.4 (continued)

Years	Expenditures (10^6 dinars)	GDP (10^6 dinars)	Share in GDP (%)
2004	260.0	35192.0	0.69
2005	243.0	37663.5	0.81
2006	306.7	41407.8	1.61
2007	598.0	49856.8	1.20
2008	1048.0	55267.8	1.90
2009	800.0	58677.2	1.37
2010	730.0	63440.9	1.15
2011	1149.5	64730.6	1.78
2012	1700	60733.0	2.80

Period: 1970–2012

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Chapter 5
To What Extent Are Rural Development Policies Compatible with Achieving Sustainable Agriculture in Turkey?

Selim Cagatay, Taylan Kıymaz and Reyhan Özeş

5.1 Introduction

This chapter aims to assess the sustainability of the agricultural sector in Turkey by focusing on diagnosed problems and on the relevant policy framework. In the first part of the chapter, descriptive information regarding household livelihoods in rural Turkey is provided to diagnose economic, social and environmental problems that might be crucial in terms of sustainability. We place particular emphasis on five topics including agricultural trade balance, inequalities and rural poverty, natural resources, demographic trends and migrations, and public health concerns. Wherever possible, we focus our attention on developments over the past 2–3 decades while analyses provide statistical information on possible sourcing factors underlying the diagnosed problems. In the second part, the policy framework regarding rural and sustainable development in Turkey is presented based on development plans, projects, policy documents and agri-environment related regulations. The study aims to draw a link between implemented rural programs and the sustainability of agriculture by focusing on diagnosed problems. Hence, the main aim given the information in the first and second parts is to highlight the main shortcomings of the policy framework in terms of reaching sustainability and the problematic areas.

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5.2 Household Livelihood and Diagnosed Problems in Rural Turkey

This part consists of five sections: fluctuating agricultural trade balance, inequalities and rural poverty, deteriorating natural resources, worrisome demographic trends and migrations, and public health concerns. The problems diagnosed in each section are elaborated based on the possible underlying sourcing factors. These sections consist of descriptive analyses which aim to establish the causal relationships between problems and sourcing factors.

5.2.1 Fluctuating Agricultural Trade Balance

The definition of agriculture here covers both livestock and crops. Over the last 15 years, the agricultural trade balance has fluctuated, with deficits observed in some years and surpluses in others, although the value of the latter is much higher than the former (Table 5.1). Even if the balance is in surplus, the total share of agricultural exports has been falling since 1997 (Appendix Table 5.24). Turkey's main exports are fresh fruit and vegetables while major imports include meat products and oil seeds. For some selected cereals and industrial crops, Turkey is a net exporter while for others it is a net importer. With regard to food industry products, Turkey is a net exporter and the trade surplus increased until 2006 before stabilizing (Table 5.2).

The observed trend in the agricultural trade balance may be a result of both domestic and international factors. On the domestic front, we see certain supply side developments as possible factors that might have impacted on the trade balance in the short and long term such as changes in human and physical capital (fixed capital

Table 5.1 Agricultural sector trade balance (million dollars)

	1997	2000	2003	2006	2009	2012
Trade balance	543	−300	−8	1.348	1.559	−364
Change in exports (%)	10.5	−13.2	29.7	3.9	−2.5	4.7
Change in imports (%)	1.3	22.3	31.8	12.4	−26.1	−6.9
Export/import (%)	111.0	92.8	99.8	118.5	116.2	97.8

Table 5.2 Food industry trade balance (million dollars)

	1997	2000	2003	2006	2009	2012
Trade balance	2.484	1.410	1.944	4.446	4.474	4.618
Change in exports (%)	12.7	−13.2	29.1	2.8	−1.1	5.8
Change in imports (%)	−6.4	4.7	46.0	6.2	−28.0	−2.2

Source TGTHB (http://www.tarim.gov.tr/ABDGM/Sayfalar/IcMenuDetay.aspx?rid=21)

investment in agriculture), yield, the share of graduates in rural areas and relative input-output prices. On the international front, developments in the exchange rate, relative domestic-world prices, revealed comparative advantages and comparative export performance might also provide some clues to the trend in trade balance.

In Turkey, rural-urban and gender gaps in education indicators still exist. This possibly affects labor market conditions in rural areas as most of the agricultural labor force consists of unpaid family members and most of the women are employed in agriculture. Improvement in social capital is expected to affect both household livelihoods and agricultural production. Over the past five years, there has been a slight improvement in women's education levels, especially in secondary schools, and all levels above that (Appendix Table 5.25). However, the same improvement is not observed for physical capital investment in agriculture which includes machinery, buildings and storage facilities, etc. Over the last 15 years, the total share of fixed capital agricultural investment has decreased from 5.6 to 4 %, and at some points it fell as low as 3.2 % (Table 5.3).

Table 5.4 presents yield levels for selected products in Turkey. With the exception of tomatoes and sugar beet, Turkey is a net exporter of other products in some years but is a net importer in others. Over the past 20 years, there has been a rise in yield levels for all products, although these levels are still low compared to other countries. For example, the yield in France is about 10,000 kg per hectare for maize, 94,000 kg for sugar beet and about 2500 kg for sunflower seed, whereas in Turkey figures for maize, sugar beet and sunflower seed are 7260, 54,510 and 2060 kg per hectare respectively. The French tomato yield is twice that observed in Turkey while wheat yields in France are more than twice as high. Yield levels are affected by the use of chemicals, irrigation, soil structure, seed etc. but have a definite impact on production and exports.

Table 5.3 Share of fixed capital investment in agriculture

	1990	1993	1996	1999	2002	2005	2008	2009	2010
Agriculture (%)	5.1	4.7	5.6	4.4	4.0	4.0	3.2	3.8	4.0

Source TKB (www.kalkinma.gov.tr)

Table 5.4 Yield (kg/ha)

	1990	1995	2000	2005	2010
Wheat	2116	1915	2234	2324	2426
Sugarbeet	36,819	35,774	45,902	45,208	54,510
Cotton	1021	1125	1345	1579	1700
Sunflower		1540	1480	1720	2060
Maize	4080	3689	4144	7000	7260
Tomatoes			4270	4330	5612
Rice	4340	5000	6030	7060	8690

Source TGTHB (www.tarim.gov.tr), TUIK (http://www.tuik.gov.tr/UstMenu.do?metod=temelist)

Domestic agricultural prices may become significant incentives for farmers in determining their production choices. Tables 5.5 and Appendix Table 5.26 provide relative input-output prices for selected crops and livestock products respectively. For crops, the relative prices of three inputs (fertilizers, pesticides and diesel) to six outputs (wheat, barley, maize, soybeans, sunflower and tomatoes) are given in the table for the period between 2000 and 2011, with price ratios indexed at 2000 = 1.

For crops, the increase in fertilizer and diesel prices would appear to be greater than the increase in output prices, especially in the second half of the 2000s. Furthermore, the rise in diesel prices is higher than that of fertilizer prices. The increase in the price of pesticides is smaller than the rise in output prices, especially after 2005 and in 2011 (Table 5.5). With regard to livestock, the relative prices of two inputs (feed and barley) to three outputs (bovine meat, ovine meat and cow's milk) are considered (Appendix Table 5.26). The price rise in feed seems to be higher than that of cattle meat, although it demonstrates a falling trend in the second half of the 2000s. The rise in feed price is smaller than the rise in cow milk and ovine meat prices. The price of barley is observed to increase more than bovine meat and cow's milk prices but less than ovine meat prices. Again during the mid-2000s, there was a turning point in general trends. In most cases, the trends in relative prices do not favor farmers. This might create a disincentive for production due to rising production costs and hence a fall in exports and a rise in imports. On the other hand, rising output prices can reduce the competitiveness of exports.

Table 5.5 Relative price index-crops (2000 = 1)

	2000	2001	2003	2005	2007	2009	2011
Fertilizer/wheat	1.00	1.17	0.81	0.97	1.04	1.31	1.23
Pesticides/wheat	1.00	1.23	1.53	1.57	1.56	1.23	0.96
Diesel/wheat	1.00	1.05	0.78	1.35	1.41	1.16	1.62
Fertilizer/barley	1.00	1.19	1.01	0.91	0.98	1.21	1.24
Pesticides/barley	1.00	1.25	1.92	1.47	1.47	1.14	0.96
Diesel/barley	1.00	1.07	0.97	1.27	1.33	1.07	1.63
Fertilizer/maize	1.00	1.19	0.96	0.94	0.97	1.21	1.28
Pesticides/maize	1.00	1.25	1.82	1.52	1.45	1.13	1.00
Diesel/maize	1.00	1.06	0.92	1.32	1.31	1.07	1.68
Fertilizer/soybeans	1.00	1.23	0.88	0.88	1.13	1.17	1.07
Pesticides/soybeans	1.00	1.30	1.67	1.43	1.70	1.09	0.83
Diesel/soybeans	1.00	1.10	0.85	1.23	1.53	1.03	1.40
Fertilizer/sunflower	1.00	1.04	0.89	1.00	1.02	1.25	1.04
Pesticides/sunflower	1.00	1.10	1.69	1.62	1.54	1.18	0.81
Diesel/sunflower	1.00	0.94	0.86	1.40	1.39	1.11	1.36
Fertilizer/tomatoes	1.00	1.26	0.98	1.35	1.25	1.56	1.19
Pesticides/tomatoes	1.00	1.33	1.87	2.18	1.88	1.46	0.93
Diesel/tomatoes	1.00	1.13	0.95	1.88	1.70	1.38	1.57

Source TUIK (http://tuikapp.tuik.gov.tr/tarimsalfiyatapp/tarimsalfiyat.zul)

In this case, input subsidies may be introduced, a practice which is not easily defended in WTO negotiations, as input subsidies are covered in "amber box" policies.

Exchange rate fluctuation is one of the factors that might affect trade balance, and which is related to developments in international markets as well. Movement of the Turkish lira against the US dollar and the euro is shown in Appendix Table 5.27. The Turkish lira has fallen in value against both the US dollar and the euro, creating a favorable environment for Turkish agricultural exports; about 50 % of Turkey's agricultural exports are to the EU. However, for a more tangible outcome, domestic prices should also be compared with international prices. In Table 5.6, the ratio of domestic to world prices is provided for three crops and three livestock products for the period between 1995 and 2010. In the table, the average of 2000–2002 is set to 1. Among the products in the table, Turkey is a net importer of bovine meat and rice, is self-sufficient with regard to cow's milk and poultry, while its net trade balance fluctuates for wheat and maize. It is observed that, especially since 2002, domestic price rises are quite low compared to world price rises. While lower domestic prices create a favorable environment to export, for example, wheat and maize, especially with higher exchange rates, the latter obviously causes the cost of imports to rise. Moreover, lower domestic prices might create a disincentive to produce.

Measurements showing the competitiveness of agricultural goods are also well-known indicators to explain the trade balance. In Table 5.7, the revealed comparative advantage of the major agricultural commodity groups is presented for every five years since 1995. It is clear that fresh fruit and vegetables have the highest comparative advantage throughout the period among all others and this is followed by cereal products and tobacco. For all the other groups, Turkey is at a comparative disadvantage on international markets. These findings are also supported by comparative export performance indicators (Appendix Table 5.28).

In brief while some improvements are observed in yield and human capital formation in rural areas, the major problems observed concerning the agricultural sector are the insufficient development in human and physical capital. Moreover, the developments in domestic input-output prices in particular are unfavorable to agricultural exports. The trend in exchange rates and world commodity prices

Table 5.6 Domestic over world price index (2000–2002 avg. = 1)

	Wheat	Maize	Rice	Cattle meat	Poultry meat	Cow milk
1995		0.74	0.61	0.75		0.93
2000	1.18	1.14	1.18	0.90	1.10	1.09
2002	1.00	0.96	1.12	0.99	1.21	1.07
2004	0.96	1.04	0.85	0.96	0.78	0.86
2006	0.77	0.89	0.57	0.66	0.57	0.75
2008	0.60	0.59	0.33	0.42	0.41	0.46
2010	0.65	0.71	0.43	0.54	0.53	0.55

Source TUIK (http://tuikapp.tuik.gov.tr/tarimsalfiyatapp/tarimsalfiyat.zul)

Table 5.7 Calculated revealed comparative advantage of agricultural sub-sectors

	Animal and vegetable oils	Beverages	Cereals and preparations	Dairy products and eggs	Feedstuff for animals	Meat and preparations	Sugar, preparations, honey	Tobacco and manufactures	Fruit and vegetables
1995	1.40	0.20	6.40	0.20	0.10	0.10	0.30	3.60	
2000	0.40	0.10	4.40	0.20	0.10	0.04	0.30	4.03	10.00
2005	0.80	0.10	5.40	0.30	0.04	0.10	1.40	2.70	13.00
2009	0.70	0.10	6.50	0.80	0.10	0.10	0.40	2.70	12.10

creates an advantage for exports, although Turkey's main comparative advantage over the last 15 years now only exists for fresh fruit and vegetables and, to a lesser extent, for cereals and tobacco.

5.2.2 Inequalities and Rural Poverty

One of the major problems regarding rural livelihoods in Turkey is the continued existence of gender inequality and inequality which can be seen in regional divergence and the rural-urban gap in certain indicators. We examine poverty, income distribution and labor market statistics to diagnose the problem of inequality.

Table 5.8 presents the regional distribution of poor people in Turkey since 1987. Although the regional classification changes from 1994 to 2006, it still gives a clear idea where the poor live. No significant changes are observed in the regional distribution of poor people since 1987. Southeast Anatolia has the highest percentage (in 1987 together with East Anatolia) followed by the Mediterranean region. In third place we see Central and Central East (CE) Anatolia. The Marmara and Aegean regions (either as a group or divided into subgroups as in 2006 and 2011) have the smallest poor population. The statistics show that, unfortunately, this distribution of poor people among regions has changed very little in the past 35 years.

Table 5.9 examines poor people in rural areas from another angle: by gender and by education level. As expected, the number of poor people decreases as the education level increases, while it also decreased from 2002 to 2008. The only exception is for illiterate people, but this is to be expected. The same general trends

Table 5.8 Regional poverty

	1987	1994		2006	2011
Marmara	3.9	6.5	Istanbul	4.3	3.8
Aegean	3.9	7.7	W Marmara	2.7	3.2
Mediterranean	19.7	17.4	Aegean	8.5	6.1
Central Anatolia	13.7	15.8	E Marmara	3.0	4.4
Blacksea	10.4	16.4	W Anatolia	4.9	5.1
E Anatolia	21.9	13.0	Mediterranean	16.6	12.2
SE Anatolia	21.9	30.5	Central Anatolia	3.6	5.1
			W Black Sea	7.4	5.7
			E Black Sea	2.2	2.6
			NE Anatolia	6.4	6.1
			CE Anatolia	10.6	13.4
			SE Anatolia	29.9	32.3

Source Nüfus Etüdleri Enstitüsü (2006)

Table 5.9 Poverty by gender and education in rural Turkey (%)

Years	Gender	Illiterate	Primary school (5 years)	Primary school (8 years)	Secondary school and equivalent	High school and equivalent	Undergraduate and graduate degree
		Rural					
2002	Total	46.42	31.08	34.25	30.11	17.65	4.37
2008	Total	54.73	27.39	33.03	17.64	14.93	2.44
2002	Male	54.36	32.43	37.87	29.05	18.18	0.45
2008	Male	60.89	30.48	36.13	20.90	15.24	3.13
2002	Female	44.41	29.82	29.17	33.25	16.75	9.08
2008	Female	53.04	24.19	29.86	10.22	14.33	0.90

Source TUIK (2012a)

are observed for males and females considered separately. Appendix Table 5.29 presents labor market statistics by gender since the year 2000. There is a significant difference between male and female labor participation rates and this difference decreased only slightly over the last decade. With regard to the participation rates, female employment is relatively low compared to males and the employment rate decreased for both genders during the decade, mirroring the fall in labor participation. Non-agricultural unemployment increased for both genders over the decade and is higher for the female labor force.

Another inequality indicator uses the GINI coefficient for income distribution in urban and rural areas (Table 5.10). Raw data shows a global 0.025-point improvement for Turkey as a whole since 1987. Rural and urban data are available since 2006 and a 0.02-point increase is observed for both regions until 2011.

The main problem observed in terms of inequality is the regional distribution of poor people. However, a promising finding is that an increase in rural education helps to reduce the problem. Gender inequality in rural areas can be seen in the lower female labor participation and lower female employment rates. Value added created and income sources might shed some light on the problems of inequality and poverty. Appendix Tables 5.30 and 5.11 present agricultural GNP and value added figures respectively. As anticipated, the share of agriculture in GNP has decreased from about 24 to 10 % over the past 30 years, demonstrating a fluctuating growth rate during this period. The fall in agricultural value added is smaller (from 12 to 9 %) over the last decade while also demonstrating a fluctuating growth rate.

Table 5.10 GINI coefficient for income distribution

	1987	1994	2006	2007	2008	2009	2010	2011
Turkey	0.430	0.490	0.428	0.406	0.405	0.415	0.402	0.404
Urban			0.415	0.394	0.395	0.405	0.389	0.394
Rural			0.406	0.375	0.378	0.380	0.379	0.385

Source TUIK (2012b)

Table 5.11 Agricultural value added

	Growth rate (%)	Share (%)
2000		12.2
2005	7.2	10.6
2006	1.4	10
2010	2.4	9.5
2011	5.3	9.3

Table 5.12 Share in total employment in rural Turkey

	Agriculture (%)	Non-agriculture (%)
2000	70.2	29.8
2002	68.1	31.9
2004	70.1	29.9
2006	61.9	38.1
2009	62.6	37.4

Source TUIK (2012b)

The last decade also witnessed a rise of about 8 % in non-agricultural employment opportunities in rural areas (Table 5.12). This is a promising development which might help to increase both agricultural productivity and non-agricultural income, especially when sectorial poverty rates are compared (Appendix Table 5.31). Poverty is more common among individuals employed in the agricultural sector. During the last decade, an increase in the share of poor people working in agriculture was even experienced. The services sector has the lowest share of poor people and it has been falling over the past decade. The share of the poor population in industry has been more stable over the past decade.

5.2.3 Deteriorating Natural Resources

In Turkey, more than 70 % of water consumption is used for agricultural irrigation. This is followed by household consumption (about 15 %) and industrial use (Table 5.13). Interestingly, these consumption shares have not changed for many years although the economic structure has changed and the population has grown. According to per capita water consumption, which is 1642 m^3/year, Turkey is considered to be a water-scarce country.[1]

Water resources (potential) in Turkey in 2011 are presented in Table 5.14. Surface water is the main source of usable potential, although almost half of the source is not used for various reasons. Withdrawal potential is quite low compared to surface potential. The main causes of water pollution in Turkey are

[1]If this amount is lower than 1000 m^3/year, the country is water-poor; if it is between 8000 and 10,000 m^3/year, the country is water-rich.

Table 5.13 Consumption of water

		1990	1998	2000	2004	2008
Irrigation	Million m^3	22.016	29.200	31.500	29.600	34.000
	%	72	5	75	74	74
Household consumption	Million m^3	514	5.700	6.400	6.200	7.000
	%	17	15	15	151	151
Industry	Million m^3	3.443	4.000	4.100	4.300	5.000
	%	11	10	10	11	11
Total	Million m^3	306.000	38.900	42.000	40.100	46.000

Source TKB (2001), DSİ

Table 5.14 Potential water resources

Yearly average rainfall	643	mm/year
Turkey land area	784	km^2
Annual rainfall	501	Billion m^3
Evaporation	274	Billion m^3
Leakage	41	Billion m^3
Surface water		
Yearly surface flow	186	Billion m^3
Usable surface water	98	Billion m^3
Underground water		
Yearly withdrawal	14	Billion m^3
Total usable potential (net)	112	Billion m^3
Consumption		
State hydraulic works (irrigation)	32	Billion m^3
Household consumption	7	Billion m^3
Industrial consumption	5	Billion m^3
Total consumption	44	Billion m^3

Source TÇOB (2011)

industrialization, urbanization, population growth and agricultural chemicals. About 63 % of underground water sources are polluted. Interestingly, the agricultural sector is the main water consumer, although this same sector is also one of the main water polluters.

Table 5.32 presents wastewater treatment facilities in Turkey. Over the last fifteen years there has been a significant increase in the number of treatment facilities, although the growth in population connected to those treatment facilities is smaller than the increase in physical capacity. The percentage of municipalities that have a treatment facility was only about 15 % in 2010.

Another significant issue in rural Turkey is the deterioration of agricultural land. Appendix Table 5.33 summarizes the severity of this problem according to the factors that cause it while Table 5.15 explains it in terms of the erosion observed on

Table 5.15 Agricultural lands and erosion

	Agricultural land (ha)	Non-agricultural land (ha)	Total (ha)
Without erosion problem	4,778,399		4,778,399
Main erosion problem	11,416,396	5,009,563	16,425,959
Secondary erosion problem	2,749,471	1,004,487	3,753,958

agricultural land. In Turkey, erosion is witnessed in about 87 % of the total area with only about 1 % caused by wind. In about 36, 22 and 20 % of the total area respectively, there is very heavy, heavy and medium erosion. Salinization due to irrigation can be seen in about 3.5 of the total area, representing about 25 % of agricultural land in south-eastern Anatolia. When agricultural land is considered, erosion is the main problem in about 60 % of the total farming land and is the secondary problem in a further 15 % (Table 5.15).

Various sources are noted as causes of soil pollution in Turkey. Table 5.16 ranks sources of pollution by the number of provinces that the pollution is observed. Household waste constitutes the main source and is observed in 35 provinces, reaching about 50 % of total. This is followed by urbanization, in 14 provinces (19 %) and by agricultural chemical use, in 13 provinces (8 %). In 26 provinces, fertile agricultural land is also used for tourism purposes and/or the construction industry due to the pressure of migrants/urbanization, a lack of strict environmental regulations, a lack of zoning map/plans, etc.

Since the year 2000, forest area in Turkey has been measured at around 20.2 million ha, accounting for 25 % of total area. However, approximately 51.7 % of this forest area consists of neglected and unmanaged forests which have very low-yield trees, bushes and scrub. About 11 % of total forest area is depleted and, other than as a result of legal regulations, the main sources of depletion are fires, unsuccessful processing and agricultural practices (Table 5.17).

We may conclude that agricultural land, which is the main source of income in rural areas, is under threat from soil erosion while the sector itself is one of main factors behind both water/soil pollution and forest depletion.

Table 5.16 Sources of soil pollution

	Number of provinces	%
Industrial waste	10	13.7
Household waste	35	47.9
Urbanization	14	19.2
Overuse of fertilizer	9	12.3
Overuse of pesticides	4	5.5
Other	1	1.4

Table 5.17 Sources of forest depletion in Turkey

	%	Hectare
Legal regulations	56	1,456,000
Fires	27.2	707,000
Unsuccessful and false processing	8.8	231,000
Agricultural purposes	7	182,000
Residential	1	26,000
Total	100	2,602,000

Source TKB (2001)

5.2.4 Worrisome Demographic Trends and Migrations

Rural-urban migration is another long-standing problem in Turkey. Table 5.18 provides information on regional net migration in the last decade. A value greater/less than one represents net emigrant/immigrant regions. At the beginning of the decade all the Anatolian regions, except Western Anatolia, and all Black Sea regions were net emigrant regions with the Western Black Sea demonstrating the highest ratio followed by South-eastern Anatolia, while the Istanbul and Aegean regions had the highest immigrant ratios. At the end of the decade, all the Anatolian regions, except Western Anatolia, and all Black Sea regions except the Eastern Black Sea were net emigrant regions, North-eastern Anatolia showing the highest ratio followed by South-eastern Anatolia while the Eastern Marmara and Western Anatolia regions had the highest immigrant ratio. An interesting development during the decade was that the gap between net emigrant and immigrant regions (in terms of the ratio) closed slightly, which might be due to fewer people going to net immigrant regions and fewer people leaving net emigrant regions. However, there was no significant change among regions during the decade regarding net migration.

Table 5.18 Net migration: emigrant/immigrant migration

	2000	2009
Istanbul	0.558	0.898
W Marmara	0.718	0.868
Aegean	0.645	0.909
E Marmara	0.811	0.780
W Anatolia	0.806	0.847
Mediterranean	0.993	0.975
C Anatolia	1.463	1.185
W Blacksea	2.058	1.073
E Blacksea	1.501	0.984
NE Anatolia	1.780	1.522
CE Anatolia	1.642	1.387
SE Anatolia	1.988	1.449

Source TUIK (http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul?kod=4)

We try to identify some of the reasons underlying migration trends by examining the findings of the field surveys conducted in rural Turkey every year since 2003. We focus on satisfaction levels with regard to household income, relationships at work, jobs and earnings by gender. Unfortunately, the data is not available by region, but we believe it will still provide important information. Table 5.19 presents satisfaction levels concerning household income by gender. Two common findings observed in the table are that more than 50 % of women are satisfied with household income but about the same percentage of men are dissatisfied. Furthermore, percentages in both groups increased throughout the decade. Apparently only a minority of men and women are highly satisfied with the household income levels and on average about 10 % of both are not satisfied at all, though percentages are falling among both sexes. For both genders, the total of satisfied and highly satisfied individuals barely reaches 40 %. However, if we sum the percentages below a neutral opinion, the total is close to 50 %. The satisfaction levels declared by households are probably dependent on the number of people in the household and it should be noted that in rural areas, almost all women are unpaid family workers and the majority of men are employed in agriculture.

Table 5.20 presents the findings regarding job satisfaction. Interestingly, a majority of both men and women are satisfied with their jobs and the percentages increased throughout the decade. Less than 10 % of both sexes are either highly satisfied or not at all satisfied. This is an interesting finding because almost all women and a majority of men are employed in agriculture and most of them are unpaid family workers. We should note that the sample surveyed can create a bias here as the respondents might be chosen in equal numbers from various economic sectors.

Table 5.21 shows satisfaction levels regarding individual earnings by gender since 2003. One notable observation is that the percentage of very satisfied people of both sexes is less than 3 % and this does not change significantly over the decade. About 30 % of men are not satisfied with their earnings and on average about 12–13 % are not at all satisfied. There is an increase in the percentage of men who are satisfied with their earnings, although the average for the decade is less than the percentage of dissatisfied individuals. Another notable point is that percentages at all levels of satisfaction for women are very low. This must be due to the fact that women predominantly work as unpaid family workers. There is also an increase in the percentage of women who are satisfied with their earnings. In Appendix Table 5.34, findings regarding satisfaction levels concerning relationships at work by gender are provided; interestingly, the majority of respondents of both sexes are satisfied with their relationship in the work environment.

A certain degree of caution should be exercised when interpreting these findings. While the data presents regional migration, our findings with regard to various satisfaction criteria represent the country as a whole. Bearing this in mind, we can conclude that gender still creates a significant difference in terms of income and job satisfaction. Migration cannot be explained solely by the characteristics of the agricultural sector and the conditions of rural life might in fact be more important in explaining the factors underlying migration. This is primarily due to the fact that in

Table 5.19 Satisfaction with regard to household income (%)

	Female					Male				
	Very satisfied	Satisfied	Neither satisfied nor dissatisfied	Not satisfied	Not satisfied at all	Very satisfied	Satisfied	Neither satisfied nor dissatisfied	Not satisfied	Not satisfied at all
2003	1.7	17.6	42.8	25.3	12.6	0.8	15.2	42.2	27.4	14.4
2004	1.6	29.0	25.6	33.9	10.0	1.6	25.4	22.6	36.3	14.1
2005	1.8	32.2	25.7	29.7	10.6	1.0	19.8	24.7	38.5	16.0
2006	2.1	31.8	28.3	27.7	10.1	1.2	24.6	22.6	36.8	14.8
2007	2.7	39.5	21.7	26.7	9.4	1.5	29.9	21.7	36.0	10.9
2008	1.3	32.7	23.8	30.1	12.1	0.8	25.9	22.1	37.6	13.6
2009	3.6	33.0	25.3	28.9	9.3	1.6	23.5	23.2	39.5	12.1
2010	2.5	37.8	24.4	27.6	7.8	1.8	32.0	23.2	35.4	7.7
2011	3.6	34.4	25.2	29.3	7.6	3.3	26.2	28.5	35.4	6.6
2012	2.1	33.8	27.5	28.1	8.4	1.0	30.1	24.2	37.5	7.1

Source TUIK (2012a)

Table 5.20 Satisfaction with regard to jobs (%)

	Female					Male				
	Very satisfied	Satisfied	Neither satisfied nor dissatisfied	Not satisfied	Not satisfied at all	Very satisfied	Satisfied	Neither satisfied nor dissatisfied	Not satisfied	Not satisfied at all
2003	4.1	35.1	34.6	18.5	7.7	7.2	31.6	36.1	16.5	8.6
2004	3.3	60.5	19.0	14.0	3.2	6.6	58.3	13.7	16.8	4.7
2005	2.6	64.9	16.1	12.3	4.2	7.3	53.4	13.9	20.7	4.6
2006	8.0	50.6	20.4	15.9	5.1	5.7	56.6	13.1	22.3	2.3
2007	8.1	64.1	15.3	9.6	2.9	7.5	60.6	11.3	17.1	3.6
2008	4.8	51.8	18.5	19.7	5.3	5.2	52.1	16.6	19.3	5.8
2009	7.6	56.0	18.3	12.6	5.5	6.7	48.7	17.4	18.0	9.3
2010	2.7	67.2	12.1	14.3	3.8	9.5	55.7	16.2	13.3	5.3
2011	6.1	58.3	17.5	14.6	3.5	7.6	56.0	15.2	18.5	2.6
2012	5.0	58.7	17.8	15.2	3.4	7.1	53.4	18.8	15.9	4.7

Source TUIK (2012a)

Table 5.21 Satisfaction with regard to earnings (%)

	Female					Male				
	Very satisfied	Satisfied	Neither satisfied nor dissatisfied	Not satisfied	Not satisfied at all	Very satisfied	Satisfied	Neither satisfied nor dissatisfied	Not satisfied	Not satisfied at all
2003	0.2	3.7	9.7	10.4	4.8	2.2	13.8	35.5	25.1	14.6
2004	0.9	7.2	9.0	16.4	2.5	1.4	22.7	23.2	31.0	12.0
2005	0.0	8.3	7.3	10.0	2.3	1.1	17.2	22.8	36.2	13.9
2006	0.4	9.4	15.0	12.2	1.9	0.5	26.6	21.1	36.2	9.0
2007	2.8	19.5	12.0	12.9	5.6	1.8	27.5	22.4	34.0	8.4
2008	1.3	8.4	12.4	11.5	4.2	2.9	26.5	17.4	33.9	12.0
2009	1.9	19.1	12.3	18.1	7.3	2.1	21.9	18.1	31.7	22.1
2010	1.6	9.0	9.5	10.0	3.4	3.4	29.8	20.6	25.5	9.1
2011	1.3	19.7	11.7	17.6	6.7	1.9	26.8	24.9	32.0	11.6
2012	0.6	18.8	14.0	14.2	8.7	1.0	30.1	22.7	28.0	14.0

Source TUIK (2012a)

Turkey, rural-urban migration, and not regional migration, is the main issue. Rural-urban migration therefore also occurs in regions where we observe positive net migration (Eastern Marmara, Western Anatolia). Secondly, regions to which the population primarily migrates demonstrate significant levels of agricultural production and the same sector absorbs a large volume of unemployed and unpaid family workers. Placing the entire burden on the agricultural sector would therefore be misleading. Instead, it is important to look at the whole picture, which entails the conditions surrounding rural livelihoods.

5.2.5 *Public Health Concerns*

In this section, some basic indicators regarding food supply, physical conditions and public policy are given with a view to reviewing health concerns. Table 5.22 presents the prevalence of undernourishment over the past two decades. Measurements show that less than 5 % of the total population is undernourished and that this ratio has not changed since 1990. While this percentage accounted for about 2.75 million people in 1990, it represented some 3.65 million in 2012, an increase of about 32 % in the absolute number of undernourished individuals over the last twenty years.

In Appendix Tables 5.35 and 5.36, we present per capita food supply by source as well as per capita for fat and protein consumption. Food sources are grouped under crops and livestock products. The data covers the last thirty years and the main crops in terms of food sources are cereals, fruits, oil crops, pulses, starch roots, vegetables and sugar-sweeteners while the main livestock products are eggs, fish, meat and milk.

Over the past thirty years, cereals have remained the main source of food among the crop products in Turkey (about 650 g/capita/day) followed by vegetables (about 600 g/capita/day) and fruit (about 300 g/capita/day). Their weights in food consumption have not changed significantly over the last three decades. Daily consumption of oil crops and pulses is less than 50 g while that of sugar-sweeteners falls between 50 and 100 g. The calorie content of this consumption pattern shows that cereals are the main calorie source in Turkey with an average consumption of about 1800 kcal/capita/day. This is followed by sugar-sweeteners

Table 5.22 Prevalence of undernourishment

	As % of population	Total population (million)
1990–1992	<5	55.1
1999–2001	<5	63.6
2004–2006	<5	68.1
2007–2009	<5	70.9
2010–2012	<5	73.6

Source TSB (www.saglik.gov.tr)

Table 5.23 Number of people per healthcare provider

	Physician	Dentist	Nurse	Officer	Midwife	Pharmacist
1980	1631	6279	1653	3810	2798	3685
1985	1381	6057	1630	4780	2797	4336
1990	1088	5243	1225	2558	1812	3490
1995	862	5100	930	1740	1511	3130
2000	754	4039	924	1238	1545	2930
2010	591	3406	636	735	1450	2754
2011	587	3505	592	667	1425	2835

Source TSB (www.saglik.gov.tr)

(about 290 kcal/capita/day) and fruit. The main protein sources are cereals (about 58 g/capita/day) and vegetables (about 7 g/capita/day) and their weights have not changed significantly over the last 30 years. Cereals are also the main fat source among all crops.

Milk and meat remain the main source of food among the livestock products in Turkey (about 400 and 55 g/capita/day on average respectively). While per capita consumption of milk has fallen over the past 3 decades, per capita meat consumption has risen. The per capita supplies of eggs and fish are almost equal but while consumption of the former has risen, consumption of the latter has fallen in the period analyzed. In terms of daily calorie supply, milk (about 230 kcal/capita/day) is the main source followed by meat, but the daily supply of eggs and fish is less than 50 (kcal/capita/day). Milk and meat are also the main sources of protein and fat among livestock products. Eggs and fish provide only a small proportion of protein, and fat consumption follows. When compared with crops, livestock products are observed to be less significant in food consumption patterns. With the exception of milk, consumption of other livestock products is relatively low.

Table 5.23 presents the number of people per healthcare provider over the last thirty years. For each indicator, an improvement has been observed since the 1980s, although the resulting figures are still quite high. Health expenditure by the Ministry of Health is presented in Appendix Table 5.37. The share of this expenditure in the consolidated budget and public investment has increased since 1985. Unfortunately, neither of the tables in this section is available for rural regions separately.

5.3 Policy Framework Related to Sustainable Development in Turkey

This section provides a review of the policy framework governing rural development and agri-environmental priorities. The main policy framework is based on the harmonization of Turkey's agricultural policies and institutional framework with those of the EU. Integration of environmental concerns and good practices in land

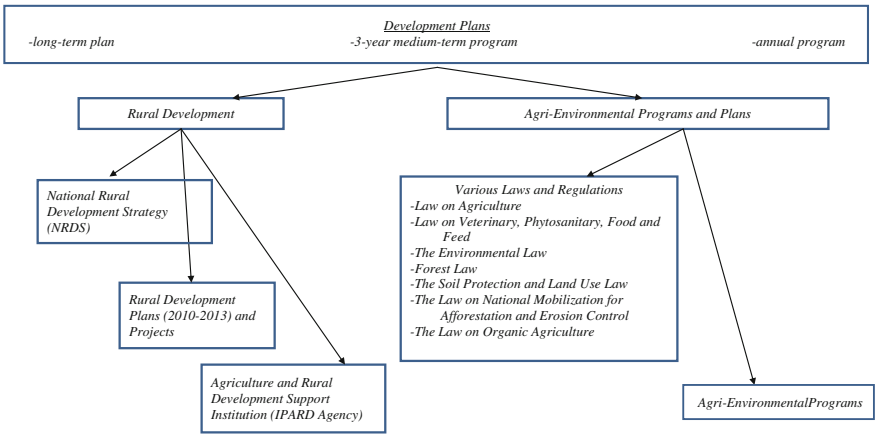

Fig. 5.1 Development Policy Framework

management and rural development is expected to be an important part of Turkey's compliance. There are a number of policy documents that the Turkish government implements to maintain sustainable agricultural production and environmental protection by monitoring the situation of agriculture, food and sustainability within the country. These policy documents are development plans, annual programs, implementation laws and policies, etc. The EU's recently allocated Instrument for Pre-Accession Assistance on Rural Development (IPARD) sources and national programs to support rural investments are two of the main tools facilitating Turkey's policy implementation. IPARD is intended to facilitate Turkey's gradual alignment with the credentials concerning the EU Common Agricultural Policy (CAP). A sufficient number of foreign-financed regional rural development projects are proof of the country's efforts to maintain sustainable agricultural production and implement environmental protection. A schematic overview of the rural development and agri-environmental policy framework is provided in Fig. 5.1 and more detailed information is provided in the following sections.

5.3.1 Long-Term Plans

The objectives of the environmental and agricultural policies set out in the Development Plans and published as Parliamentary Decisions are to fulfill international obligations within the framework of the principle of sustainable development and to raise levels of self-sufficiency, usually on food security grounds. Turkey's latest plan, namely the Ninth Development Plan (2007–2013),[2] stated the

[2]TKB (2006b).

main principles regarding development and sustainability in light of various pillars and these pillars constitute the long-term framework/perspective for policies/projects/programs with regard to sustainable development.

> With regard to the pillar of "Increasing Competitiveness" and in the section "Protecting the Environment and Improving the Urban Infrastructure", it is stated that 'conditions for protection and utilization of natural resources will be determined by taking the needs of the future generations into consideration and environmental management systems will be established in order to ensure equitable utilization of natural resources by everyone'. Further, it is intended that 'fulfillment of international obligations will be realized in the framework of the principle of sustainable development and the principle of common but differentiated responsibility' and 'agricultural, environmental and technological policies will be assessed in an integrated manner in order to minimize the risks related to bio-security'.

In the section "Improving Efficiency of the Agricultural Structure" it is stated that 'achieving food security and safety and sustainable use of natural resources will be taken into account in creating an agricultural structure that is highly organized and competitive'.

Additionally, in the section referred as "Ensuring Regional Development" it is said that, 'it will be ensured that the operation and management of irrigation infrastructure is realized with participatory mechanisms, programs targeting producers will be implemented for efficient and sustainable utilization of soil and water resources' and in addition 'to reduce the relative unproductivity in the agricultural sector, which is the most important economic activity of the rural area; priority should be given to issues such as accelerating land consolidation activities, strengthening producer organizations and making the education and dissemination activities effective'.

5.3.2 Medium-Term Programs

The three-year medium-term programs[3] are policy documents falling between long-term plans and annual programs.

In the "Protecting the Environment and Improving the Urban Infrastructure" section, sustainable utilization of natural resources is stated to be ensured through works for the protection, improvement and productive use of natural resources, particularly to ensure biodiversity. It is also planned for the actions conducted within the context of climate change mitigation to be carried out within the National Climate Change Strategy framework.

In the "Improving Agricultural Structure" section of the latest Medium-Term Program (2012–2014) the basic objective in the agricultural sector is defined as the development of a well-organized and highly competitive structure by taking food security and safety concerns into account along with the sustainable use of natural resources. Additionally, other actions included in this document are the prioritization of methods and means for preserving and making effective use of land and

[3]TKB (www.kalkinma.gov.tr).

water resources, the increased scale of agricultural holdings through land consolidation efforts and required legal arrangements and the protection of exploitation of forests in accordance with a sustainable management approach. Afforestation, rehabilitation and urban forestry will also be improved while activities against desertification and erosion will be accelerated.

In the section "Achieving Rural Development", the policy priority is to design financial support programs in rural areas and to ensure consistency and complementarity among agriculture and rural development programs.

5.3.3 Annual Programs[4]

The Annual Program is the annual implementation handbook of the Development Plan and Medium-Term Program for the government. The objective for the environmental sector in this document is defined as achieving a sufficient level of environmental protection through the protection of human health, natural resources and aesthetic values, as well as to make cities clean and safe places offering a high quality of living in line with the principles of sustainable development. Moreover, the related work for the realization of given objectives is summarized along with expected future developments.

In the same document, the primary objective for the agricultural sector is defined as ensuring food safety and security and establishing an organized and highly-competitive structure while observing the sustainable use of natural resources. The ongoing work and measures are summarized under the relevant headings related to this sector.

5.3.4 Rural Development

5.3.4.1 National Rural Development Strategy (NRDS)

The NRDS was prepared within the context of Turkey's economic and social harmonization with EU standards with a view to membership. It was prepared in accordance with the National Development Plans and with the intention of harmonizing Turkish policy with the EU's rural development policy and provides the country's first rural development strategy plan.

The main goal of the NRDS is to develop and ensure that the sustainability of the rural community's living and working conditions within their territory is compatible with that in urban areas based on the use of local resources and protection of the rural environment as well as the natural and cultural heritage. Through four

[4]TKB (www.kalkinma.gov.tr).

strategic objectives achieved by protecting and improving the rural environment, it is expected to extend environmentally-friendly agricultural practices, protect forest ecosystems, protect the sustainable use of forest resources and improve protected areas. These strategic objectives and priorities comply with the EU's rural development objectives. For example, in addressing the needs of agriculture and the wider needs of rural society in a sustainable way, the NRDS adopts a cross-cutting, holistic approach to the development of rural areas. This approach also aims to ensure coherence with the EU's strategy for rural areas. Like the EU, the NRDS sets priorities for the next programming period to improve the competitiveness of the agriculture, forestry and food sectors. It is also aimed at improving environmental conditions and the quality of life in rural areas as well as diversifying the rural economy and strengthening local capacity building.

According to the findings in the NRDS, the strengths and weaknesses of Turkey with regard to sustainability issues as a matter of rural development can be summarized as follows:

Strengths

- Great extent of extensive rain-fed farming, with relatively low use of fertilizers and chemicals
- Existence of necessary legislation for organic farming and increasing domestic and foreign demand for organic products
- Low pollution of soils, surface water and underground water
- Rich biodiversity
- Great number of nature conservation areas (135 wetlands deemed internationally important sites)
- Many local crop varieties and indigenous farm animal breeds
- Adoption and ratification of almost all international conventions on the environment and biodiversity
- Action plans for combating soil degradation, erosion and drought, and protecting biodiversity.

Weaknesses

- Soil degradation due to different degrees of erosion
- Overuse of irrigation water
- Risk of water pollution in areas practicing intensive farming
- Forest degradation
- Loss of biodiversity through destruction of ecosystems, illegal hunting, fishing and inappropriate farm management
- Inefficient protection of prime quality farming land, against land allocation pressure of other sectors
- Fragmented and small farm structure
- Educational and vocational training deficiencies among farmers
- Weak administrative structure and coordination among institutions to manage agri-environmental issues
- Inadequacy of data needed to analyze environmental situation in rural areas

5.3.4.2 Rural Development Plans (2010–2013) and Projects

Rural Development Plans (RDPs) are prepared on the basis of the NRDS which lays out Turkey's policies and strategies in the sphere of rural development for the remainder of the Ninth Development Plan period. The actions and activities identified in the NRDS form the basis of the RDP.

The main intended contribution of the NRDS is to improve the working and living conditions of the rural population by using the human and natural resource potentials in a sustainable development approach. In the Ninth Development Plan, rural development has been assessed in the regional development context and with a multi-sectorial and horizontal structure. In rural areas, rural development—which contains all the components of the EU rural development and thus foresees not only agricultural production but also non-agricultural interventions—is a process of coordination and organization. One of the main necessities of the RDP is thus to ensure coordination between sectors. This process requires the joint planning and implementation of investments and services aimed at improving the living conditions of the rural population. The main framework of the goals and priorities are the same as that of the NRDS. The RDP includes additional priorities relating to improved irrigation infrastructure, agricultural land management, enhanced producers' organizations and the adoption of sustainable agriculture.

The objectives of rural development projects have generally been to raise income and living standards through the diversification of economic activities in underdeveloped areas. Rural development projects cover activities relating to the development of agriculture and livestock production, irrigation, the rehabilitation of wetlands, the construction of village and forest roads, drinking water ponds, drinking water supply, increased agricultural and livestock production and reforestation. Rural development projects are generally financed through foreign resources and have been implemented since the 1970s. There are a number specific rural development projects supported by IFAD implemented in one province or in a number of provinces: Erzurum, Bingöl-Mus, Yozgat, Ordu-Giresun, Sivas-Erzincan and Diyarbakir-Siirt-Batman. A number of regional or watershed-based projects also incorporate rural development features and contribute to agricultural development. For example, the South-eastern Anatolia Project (GAP) funded by the national budget, the EU-funded Eastern Anatolia Development Program (EADP), the World Bank-funded Anatolia Watershed Rehabilitation Project, the JICA-funded Coruh River and IFAD-funded Murat River Basin Development projects. The first rural development project was the "Çorum-Çankırı Rural Development Project", supported by the World Bank and IFAD and initiated in 1972.[5] The success of the rural development projects may be limited due to financial and organizational problems. Very few rural development project impact analyses have been accomplished due to technical deficiencies.

[5]Aksoy (2005).

There are only very few recent rural development projects based entirely on the same elements as the EU LEADER approach. The recently implemented IFAD-funded rural development projects implemented in two combined provinces Ordu-Giresun and Sivas-Erzincan are partly built on this approach.[6] Although numerous rural development projects have been implemented in the different regions of Turkey, an objective analysis could succeed in identifying the impact of rural development projects on sustainability and agricultural development.

5.3.4.3 Support for Rural Development

IPARD Program

Accession negotiations between Turkey and the EU were opened in 2005. The EU's Instrument for Pre-Accession Assistance on Rural Development (IPARD) is expected to facilitate Turkey's gradual alignment with the *acquis* concerning the EU Common Agricultural Policy (CAP). Furthermore, the IPARD program includes provisions for the implementation of pilot agri-environmental measures. The programming of the second phase of IPARD will be finalized by the end of 2013.

In the IPARD Program, priority in the agricultural sector is given to dairy, meat, fisheries and fruit and vegetables and the program is implemented in 42 provinces. More specifically, the global policy aims of the IPARD program are to contribute to the modernization of the agricultural and processing sectors by increasing efficiency and competitiveness; compliance with EU *acquis* related to food safety, veterinary, phytosanitary and environmental standards; capacity building and preparatory actions for the implementation of agri-environmental measures and the LEADER method; development and diversification of the rural economy; and an increase in the quality of life and the attractiveness of the rural areas counteracting rural emigration.

The Agriculture and Rural Development Support Institution (IPARD Agency) was established for the implementation of the Program, receiving conferral of management from the European Commission to start implementing the IPARD Program with an ongoing process of the Commission launched in 2011. The IPARD funds (EUR 874 million or 18 % of total EU IPA financial aid) are to be implemented through a single, multi-annual "Rural Development Program" covering the period 2007–2013. Including Turkey's contribution of EUR 291 million, the total budget is EUR 1.165 million. It is planned for 25 % of the project budget to be financed by beneficiaries, 25 % by the Turkish government and 50 % by the EU. The delay in the receipt of conferral is expected to lead to a contraction in the absorption capacity, thus a reduced use of funds.

[6]TKB (2006a).

Support for Rural Development Investments

The basis of this support program was formed by a World Bank project, namely the Village-Based Participatory Investment Program (VBPIP) as a part of the ongoing Agricultural Reform Implementation Project (ARIP) of 2001. The VBPIP was launched in 2005 and completed by the end of 2008. The VBPIP supported investments in agricultural production and economic activity through investments in: (a) the processing of raw materials by the agro-processing firms that increased capacity and/or improved technology; (b) support for new firms entering the market, (c) greenhouses; (d) the provision of cold storage facilities; (e) the rehabilitation of existing irrigation schemes; and (f) small-scale modern irrigation systems. The VBPIP can be considered a pilot program implemented in 16 provinces that were selected at the beginning of the project and it served as a specific example of Turkey complying with the EU pre-accession programs. In three years of operations, the VBPIP disbursed over TL 50.5 million (USD 38 million).

Complementary to the VBPIP, the Support for Rural Development Investments project was launched in 2006 in 65 provinces and later expanded to 81 following the conclusion of the VBPIP. The program aims to support nation-wide activities in small-scale agricultural processing, marketing and other off-farm businesses as well as the rehabilitation of the public irrigation infrastructure. A machinery equipment component, supporting the modernization needs of farm-level holdings, was incorporated into this program in 2007. Projects relating to maize-drying and storage; the collection, cooling and processing of milk; the storage, processing and packing of fruit and vegetables; and the processing and packing of a number of other crop products, were programmed to provide support. Furthermore, the program provided support for the purchase of new agricultural machines, pressurized irrigation systems and new cold storage transportation vehicles. Individual farmers and other private individuals engaged in small rural businesses are eligible to participate in this program together with groups of farmers, co-operatives, and other farmers' organizations. Grants of 50 % and 75 % have been established for private-sector investment proposals and for investments by farmers' unions and irrigation unions respectively.[7, 8] Support for rural development investments increased from TL 80 million in 2007 to TL 309 million in 2012 (Annual Program 2013).

In rural development projects, a higher volume of support is allocated to processing and packaging agricultural products, cold storage and water-saving irrigation investments. More equipment used in planting and harvesting benefits from this support and the production and marketing capacity of agricultural producers increased over the period 2007–2012.

[7]TGTHB (2011).

[8]OECD (2011).

KÖYDES

In 2005, a village support program (Turkish abbreviation: KÖYDES) was launched to cover the infrastructural needs of villages in Turkey. By including small-scale irrigation systems in 2010 and wastewater treatment systems in 2011, KÖYDES has become an integrated rural infrastructure program. A budget of about TL 8.5 billion was allocated to the program over the period 2005–2013. The main achievements of this program are the rehabilitation/construction of village roads and the construction of a drinking water infrastructure in the villages rather than improving agricultural infrastructure.

5.3.5 Agri-environmental Plans and Programs

Economy-wide environmental policies also affect agriculture. The National Environmental Action Plan, which came into force in 1998, provides for national and regional plans to generate information to combat land desertification and reduce discharges of nutrients while stipulating a number of regulations designed to control water and soil pollution and protect biodiversity.

A Nitrate Directive was adopted in February 2004 as part of the action to harmonize national policy with EU policies, but there is still a need to specify the responsibilities of the organizations defined under the Directive. The Regulation on Water Pollution Control (1988) defines water quality criteria according to the purpose for which the water is intended, including treated wastewater used for irrigation. There are also several initiatives underway to implement various EU Environmental Directives, such as the Habitats and Birds Directive and the Water Directive. In the context of adopting and implementing the EU Water Directive, the Regulation on the protection of water from nitrate pollution caused by agricultural resources was introduced in 2004.

With regard to agri-environmental issues, the absence of a widespread system of soil conservation practices has failed to improve soil quality, with over-grazing and the ploughing of grassland being important sources of the soil erosion.[9]

5.3.5.1 Various Laws and Regulations

Law on Agriculture

Law no. 5488 on agriculture compiles the agricultural targets and support policies implemented to achieve them. The Law describes the priorities as increasing

[9]OECD (2011).

agricultural production in accordance with total demand, conserving and developing natural and biological resources, increasing efficiency in agricultural supports, improving food security and safety conditions, improving producer organizations, strengthening agricultural markets and ensuring rural development. Agricultural support tools are used to sustain agricultural production as well as environmentally-based agricultural land use.

Veterinary, Phytosanitary, Food and Feed Law

Law no. 5996 of 2010 aims to ensure that Turkish food safety legislation complies with that of the EU. In this context, the secondary legal provisions on the use of pesticides and other environmentally-harmful materials called on during agricultural production are put into force according to the relevant provisions of the Law.

The Environmental Law

The Environmental Law no. 2872 of 1983 aims to protect the environment, the common asset of all living things, in accordance with the principles of sustainable environment and sustainable development while also determining and providing for the basic principles related to protecting and improving the environment and preventing its pollution. Law 5491 of 2006 amending the Environmental Law states the importance of protecting biological diversity and introduces penal sanctions against damage to the environment, including the destruction of biological diversity, when detected through inspections and audits.

The Forest Law

The Forest Law no. 6831 states the principles concerning forest management such as the planning, operation and conservation of forests. Protection of forests, gene protection of forests and seed sources are also designated under this Law.

The Soil Protection and Land Use Law

The Soil Protection and Land Use Law no. 5403 of 2005 establishes the procedures and principles ensuring the conservation and development of soil by preventing its loss and degradation through natural or artificial processes and the planned use of land in accordance with the principle of sustainable development, prioritizing the environment.

The Law on National Mobilization for Afforestation and Erosion Control

Law no. 4122 of 1995 and the Regulation on Afforestation specify the principles and procedures concerning the afforestation and erosion control activities to be undertaken by governmental agencies and natural and legal persons in order to enhance the forest area and forest wealth, to restore and improve the balance between soil, water and plants, and to protect environmental values. The Regulation specifically determines the principles concerning the activities of afforestation, erosion control, pasture improvement, tree improvement, seed production, nursery and energy-forest establishment, development and restoration to be undertaken in accordance with the provisions of Forest Law 6381.[10]

Other

According to the report prepared in Turkey for the Rio+20 Conference in 2012, namely *Claim Our Future,* increasing productivity and quality in the agricultural sector is specified to support Turkey's development process and green growth approach. Agriculture depends on biological diversity and natural resources, primarily water and soil. While agricultural activities create pressure on natural resources, the degradation of these resources exercises a negative effect on agricultural activities. Consequently, Turkey's priority in the agricultural sector is to arrange this inter-linkage to serve rural development within the framework of green growth.

Forest villages have to be considered in the same structure, contributing to sustainability with the activities accomplished by the villagers.

In the aforementioned report, Turkey's aim is defined as creating a sustainable and highly-competitive agricultural sector while protecting biological diversity, water, land and forests. It is intended to protect and register gene resources; protect "carbon capture" areas such as pastures, forests and agricultural lands with a view to combating climate change; raise producer and consumer awareness in terms of food safety; prevent land fragmentation for the effective and efficient use of agricultural fields and conduct land consolidation; enable efficient use of water resources with effective irrigation methods; accelerate flood prevention and combat erosion in order to protect agricultural lands; create a balanced use of resources in all agricultural sub-activities (fishing, forestry, livestock breeding, plant production, etc.); and finally provide agricultural and rural development support with a view to protecting the environment. Moreover, additional targets include the improvement of training and extension services for raising the consciousness of the producers; the extension of good agricultural practices and organic production; the implementation of the effective use of resources through support and investment policies; the modernization and rehabilitation of irrigation systems; etc.

[10]TÇOB (2008).

5.3.5.2 Agri-environmental Programs

Agri-environmental programs in Turkey are somewhat limited. The Environmentally-Based Agricultural Land Protection Program (CATAK) is the first program to specifically address the negative impacts of agricultural practices on the environment. The CATAK Program displays certain similarities with EU agri-environmental measures in rural development programs. The objectives of the Program were to protect the quality of soil and water resources in agricultural lands, to ensure the sustainability of renewable natural resources and to curb the adverse effects of intensive agricultural activities. This activity was implemented in 27 of the 81 provinces. The payments per decare of farm land vary according to the type of activity. The CATAK Program was expanded in Turkey and the funds provided under this program increased from TL 3 to 34 million between 2007 and 2012 (Annual Program 2013).

Furthermore, Turkey started adapting Good Agricultural Production (GAP) standards relating to major Turkish export products, such as greenhouse vegetables. Moreover, GlobalGAP (formerly used as EurepGAP) was adapted to Turkish legislation and published as the 'Regulation on Good Agricultural Practices' in 2004 while this regulation was revised by another regulation with the same name at the end of 2010.

After the first GAP certification was awarded in 2007, a total area of 5360 ha and 651 farmers were producing under the certificate in 18 different provinces. In 2010, this figure rose to approximately 78,000 ha and 4540 farmers in 48 provinces and for the first time, farm production using GAP standards was supported by the government in Turkey. Support was granted per hectare of production. In 2012, the implementation area was 83,700 ha divided into 3676 units. Major retailers in Turkey started to contract with farmers using GAP standards and purchase fruit and vegetables from them. The decisions taken by retailers also helped to increase the number of farmers using GAP standards.

As another policy implementation, organic production was launched when the Law on Organic Farming was enacted in 2004 followed by the By-law on Principals and Application of Organic Farming in 2005 to regulate organic agriculture in a similar way to the EU. MFAL is responsible for overseeing the cultivation of organic crops. By the beginning of 2011, 17 firms were authorized by MFAL to issue organic certificates. Until 2006, no support payments were provided for organic farming. Although it may not create a sufficient source, the "Farmer Transition Program" provides financial incentives to encourage farmers to divert from over-produced commodities to alternative commodities while offering the opportunity to introduce environmentally-neutral management practices. Despite the strong increase in organic farming since 1997, its share in total agricultural land area remained low at less than 1.0 % until 2008, subsequently rising to 1.5 %. The major organic products farmed are wheat, hazelnuts, raisins, figs, cotton, apricots, chickpeas, lentils and olives. Organic livestock production is very limited and

regional.[11] Organic production has been supported since 2011 by an area-based payment in order to stimulate the interest of farmers and entrepreneurs alike. Furthermore, agricultural enterprises and farmers are entitled to benefit from interest concessions on loans offered for applying good agriculture practices, organic farming and the production of organic inputs. Recent data shows that area of organic production grew by five times in relation to the figures in the mid-2000s.

As water is a constraint and an important input in agriculture, the efficient use of this resource is of utmost concern in Turkey. To save water in agricultural activities, new investments in pressurized irrigation systems (drip and sprinkler irrigation) have been supported through credit concessions offered by TCZB since mid-2007. Farmers have once again had the chance to use Agricultural Credit Cooperative (ACC) credits since the beginning of 2009 with a 100 % subsidy rate on the credit. For other irrigation credits, the subsidy rate was 60 % and on January 1, 2011, the subsidy rate for other irrigation credits was also increased from 60 to 100 %.

5.4 Conclusion

In Turkey, rural development has long been considered as part of the regional development context, hence national development plans during the planned period (after 1963) stipulated the main targets regarding rural livelihood and determined the policy instruments. It was only after the year 2000 that both rural and sustainable development concepts were introduced into policy frameworks as separate matters. Various approaches could be used to conduct an impact analysis regarding the effects of the policy framework on the sustainability of the agricultural sector. In other words, to evaluate how the policy framework—summarized in the third section of this chapter—affected the diagnosed problems mentioned in the second section, more than one approach could be used. One approach might be to conduct a quantitative analysis in those cases where we have enough data and specific policy changes. This is not the aim here. Another option is a qualitative approach monitoring policy changes and examining their impacts on the relevant indicators while evaluating the policy programs from various angles such as participating actors, macroeconomic policies and constraints, the implementation area, the contribution to regional development, institutional requirements, the legal point of view, the contribution to social development, the contribution to agricultural development and financial feasibility, etc.[12] Unfortunately, this would not be the case here as this sort of analysis would require too much space. Instead, we will highlight some of the main challenges facing Turkey as it shifts its strategies towards achieving sustainable agriculture and rural development. Even if this approach were to be followed, it would not be straightforward for two reasons. First

[11]OECD (2011).

[12]Çelik (2005).

of all, as mentioned earlier, rural and sustainable development concepts have only come to the forefront in the last decade. Hence, not enough time has passed to derive any healthy and conclusive outcomes. Secondly, before the early 2000s, rural development was just a part of the national development plans but the details of these plans were not summarized in this chapter. We could therefore only derive certain general lessons and conclusions from the above data and policy presentations.

Recalling the problems diagnosed in the second section very little improvement has been observed regarding the qualifications of human capital and there was even a slight deterioration in physical capital investment in agriculture. Apparently, physical and human capital are related, with most of the indicators concerned by rural development such as agricultural productivity, exports, wages, poverty and migration, etc. Relative prices have not been favorable to farmers for many years, thereby increasing the pressure on farmers' production decisions. In spite of the favorable trend observed in exchange rates, Turkey's main agricultural exports have not changed for many years and Turkey has even become a net importer of some products for which it used to be a net exporter. Nevertheless, there is a lack of off-farm job opportunities and agriculture is used to absorb unemployment, in particular female family workers. The distribution of poor people between the regions has changed very little over the last 35 years and agriculture as an economic sector remains the main source of poverty in rural areas. Domestic migration, in particular from rural to urban areas, still exists in every region. Very little progress has been made in terms of protecting water resources, land and forests.

The planned-economy period observed in Turkey after 1963 yielded only moderate improvements and only with regard to certain aspects of rural development. Many reasons could be cited for this moderate progress, but one promising outcome was that Turkey realized the need to deal with the "rural economy" and the "sustainability of the agricultural sector" as separate matters. It is obvious that the recent policy framework (including all relevant plans, programs and instruments explained in section three) introduced in the early and mid-2000s placed the "sustainability of the agricultural sector" at the very forefront of concerns. Specific policy instruments and laws were introduced to tackle all the issues mentioned above. Unfortunately, there would appear to be an overlapping of responsibilities, mandates and authorizations between the different plans and programs, resulting in very a cumbersome procedure. Furthermore, a legal framework was developed and adopted but the institutional framework/transformation remained incomplete, resulting in a lack of inspection/supervision/monitoring and evaluation. Nevertheless, very little time has passed to be able to identify specific conclusions, develop policy advice and determine future policy priorities from these recent policy packages.

From the analysis above, it may be argued that Turkish agricultural and rural problems are not unique, and rural problems mostly find their roots in the agricultural sector. Rural development must therefore be an integral component of an agricultural policy that places a strong emphasis on natural resources. A comprehensive policy setting with a more weighted and strategic use of better-tailored rural

development policies that seeks to achieve a delicate balance between liberalization and social policies may better serve Turkey in coping with problems such as unemployment, migration, economic inequality, an uneducated labor force, etc. Any agricultural reform process should be carefully designed and gradually implemented, as an abrupt decline in the agricultural labor force may lead to serious problems rather than speed up development efforts. Such a reform should be combined with the facilitation of increased investment in human capital and an entrepreneurial infrastructure in rural areas may generate off-farm employment and improve agricultural competitiveness.

However, in the case of Turkey, a number of dilemmas exist at the crossroads between agricultural policies and rural development. The agricultural incomes of most small-scale producers (the majority of farms) are quite low and fail to provide an acceptable standard of living. Furthermore, even if they produce more, very few have access to national or regional markets. These producers therefore either have to find off-farm employment opportunities in the rural areas or they have to migrate. Neither of these options solves the problem for two reasons. First, in rural areas of Turkey, there is a lack of off-farm job opportunities and this forces qualified people to migrate, thereby lowering the quality of the local labor force; this in return works as a disincentive to investment in the area. Second, the low level of education of most of the rural population makes it difficult for them to find off-farm job opportunities, making migration a problem. Consequently, this may increase the poverty rate which has a negative impact on the possibility of obtaining a high-quality education. We need to draw attention to the fact that the shrinking agricultural sector—due to technological reforms—may generate more unemployment due to the inflexibility of the agricultural labor force mentioned above.

In countries like Turkey, another dilemma is implicit in subsistence production.[13] Subsistence and semi-subsistence agriculture with low productivity levels may create an advantage in eliminating the malnutrition threat due to local safety nets. The opportunity to absorb unemployment and the safety-net function of the agricultural sector helps reduce the social costs of any economic crises. Therefore, policies that strongly promote commercialization by encouraging structural change might undermine the safety net. However, the flip side of the coin is that local/rural safety nets hide rural poverty behind survival strategies.

To ensure the success of the rural development plans and/or programs, the policy design must be determined at the micro level. Local involvement in the preparation and implementation period is seen as the major issue. In Turkey, as in the EU's LEADER program, it will be necessary to support the pilot applications by making the necessary arrangements to increase producer participation and producer organizations for an integrated rural development. Local society, local government and NGOs must therefore be active to ensure good governance.

[13]Köse (2012).

The new regional development approach in Turkey has been developed by newly established regional development agencies. The agencies have a remit to deal with rural development and are responsible for the monitoring and coordination of regional and rural development efforts. The overall impact assessment of rural development efforts might be determined by these entities and new regional policies would be put into effect to accelerate rural and regional improvements. Monitoring and evaluating agencies would help central administrations to change their local and rural policies and priorities. It is therefore crucial to facilitate coordination and cooperation between the different agencies in different regional structures.

Finally, other specific suggestions could be made. The new investment incentives program might promote the creation of off-farm employment opportunities in accordance with the potentials of the provinces and economies of scale. In Turkey, forest villages also play an important role in maintaining sustainability. However, their contribution to rural economies remains unknown. The forestation, rehabilitation and production activities within the forests must be considered in order to increase rural development efforts while specific programs should be implemented. Turkey has a huge potential in terms of "locally characterized agricultural products and foodstuffs". "Geographical indications" guaranteeing origin and traditional know-how might be used as instruments to create extra value added and to promote local/rural development, which would also create its own service industry. The bio-economy can be perceived as an economy based on sustainable production and the conversion of biomass can be used as a major resource in a wide variety of industries. The locality of biomass production and low sustainability of its transportation over long distances leads to potential in rural areas through new enterprises.[14] The potential and opportunities of a bio-economy in rural areas must be discussed and seriously considered in an innovative manner to further serve sustainability in the country.

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Appendix

See Tables 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32, 5.33, 5.34, 5.35, 5.36, and 5.37

[14]Gustafsson et al. (2011).

Table 5.24 Share of agricultural exports

	%
1997	9.0
2000	6.0
2003	4.5
2006	4.1
2009	4.3
2010	4.3

Source TUIK (http://tuikapp.tuik.gov.tr/disticaretapp/menu.zul)

Table 5.25 Share of graduates by gender in rural areas (6 + age) (%)

		Illiterate	Primary and equivalent	Secondary and higher and equivalent	University and higher and equivalent
2008	Male	21	52	69	69
	Female	79	48	31	31
2009	Male	21	52	69	67
	Female	79	48	31	33
2010	Male	20	51	68	67
	Female	80	49	32	33
2011	Male	19	50	68	66
	Female	81	50	32	34
2012	Male	19	50	68	65
	Female	81	50	32	35

Source TUIK (http://www.tuik.gov.tr/PreTablo.do?alt_id=1018)

Table 5.26 Relative price index—livestock products (2000 = 100)

	2000	2001	2003	2005	2007	2009	2011
Feed/cattle meat	1.00	1.15	0.99	1.02	1.17	1.07	1.06
Feed/sheep meat	1.00	1.19	0.87	0.92	1.10	0.73	0.71
Feed/cow milk	1.00	1.14	0.85	0.81	0.92	0.85	0.99
Barley/cattle meat	1.00	1.17	1.05	1.27	1.39	1.42	1.22
Barley/sheep meat	1.00	1.21	0.92	1.15	1.30	0.98	0.82
Barley/cow milk	1.00	1.16	0.90	1.01	1.09	1.13	1.14

Source TUIK (http://tuikapp.tuik.gov.tr/tarimsalfiyatapp/tarimsalfiyat.zul)

Table 5.27 Exchange rates—average*

	US$	EURO
1990	0.003	
1993	0.011	
1996	0.081	
1999	0.420	0.446
2002	1.506	1.430
2005	1.341	1.670
2008	1.293	1.896
2010	1.500	1.989

*An increase in the rate signifies depreciation

Table 5.28 Calculated comparative export performance of agricultural sub-sectors

	Animal and vegetable oils	Beverages	Cereals and preparations	Dairy products and eggs	Feedstuff for animals	Meat and preparations	Sugar, preparations, honey	Tobacco and manufactures	Fruit and vegetables
2000	1.30	0.50	2.10	0.10	0.30	0.10	3.30	1.50	7.70
2005	1.90	0.80	2.20	0.20	0.20	0.20	1.40	0.70	6.40
2009	1.50	0.60	1.90	0.50	0.30	0.40	1.80	0.60	4.50

Table 5.29 Labor market statistics for people aged 15–24—rural Turkey

		Labor participation	Unemployment	Non-agricultural unemployment	Employment
2000	Female	39.10	3.80	16.10	37.60
2002	Female	40.00	6.20	27.10	37.50
2004	Female	33.90	7.40	31.90	31.40
2006	Female	28.60	9.90	31.00	25.80
2009	Female	29.00	12.10	36.40	25.50
2000	Male	67.90	11.20	22.80	60.29
2002	Male	60.40	15.40	28.60	51.08
2004	Male	58.40	14.80	29.90	49.70
2006	Male	54.90	16.00	24.30	46.10
2009	Male	56.50	22.60	33.60	43.70

Source TUIK (http://tuikapp.tuik.gov.tr/isgucuapp/isgucu.zul)

Table 5.30 Agricultural GNP

	Share (%)	Growth rate (%)
1980	24.2	1.3
1985	19.4	−0.3
1990	16.3	7.0
1995	14.4	1.3
2000	13.1	3.8
2005	11.4	5.7
2009	10.1	

Table 5.31 Poverty rate for people who are employed and aged 15 or over

	Agriculture industry (%)	Industry	Services (%)
2002	36.77	25.87	34.16
2003	40.91	28.02	18.95
2004	42.32	27.69	18.01
2005	38.80	14.44	13.76
2006	34.89	21.71	13.54
2007	33.81	22.25	17.68
2008	40.09	23.39	14.00

Source TUIK (http://tuikapp.tuik.gov.tr/yasamapp/yasam.zul)

Table 5.32 Wastewater treatment facilities

	1994	1998	2002	2006	2008	2010
Number of municipalities that have wastewater treatment facilities	71	115	248	362	442	470
Rate of population connected to wastewater treatment	13	22	35	51	56	66

Table 5.33 Degree of soil erosion

	Area (ha)	Share in total (%)
Irrigated and salinized base	2,783,781	3.58
Base area	2,382,846	3.06
Light erosion	5,611,892	7.22
Medium erosion	15,592,750	20.04
Heavy erosion	28,334,933	36.42
Very heavy erosion	17,366,463	22.33
Rocky surface	2,930,933	3.77
Light wind erosion	165,664	0.21
Medium wind erosion	231,041	0.30
Heavy wind erosion	64,385	0.08
Very heavy wind erosion	7,304	0.01
Sandy shore	37,915	0.05
Total area	77,797,127	

Table 5.34 Satisfaction with regard to relationships at work (%)

		Female							Male	
	Very satisfied	Satisfied	Neither satisfied nor dissatisfied	Not satisfied	Not satisfied at all	Very satisfied	Satisfied	Neither satisfied nor dissatisfied	Not satisfied	Not satisfied at all
2003	6.0	59.4	25.6	6.5	2.5	7.3	50.9	30.4	7.4	3.9
2004	6.6	75.0	12.9	4.8	0.8	7.8	75.8	14.0	2.1	0.3
2005	4.9	81.2	10.5	3.0	0.5	9.0	76.2	10.8	3.7	0.3
2006	7.8	67.7	19.1	4.9	0.6	7.1	78.4	11.2	2.9	0.5
2007	11.1	79.4	7.3	1.5	0.7	7.7	81.4	8.4	2.0	0.5
2008	9.1	75.8	11.8	3.0	0.2	7.9	79.6	11.0	1.5	0.0
2009	10.5	75.5	10.4	3.0	0.6	7.5	75.5	14.3	2.6	0.1
2010	8.0	80.5	8.3	1.5	1.7	10.2	77.1	9.8	2.7	0.1
2011	7.4	78.7	11.1	1.4	1.4	6.7	76.5	12.1	3.7	1.1
2012	5.8	75.2	15.0	3.5	0.5	7.6	77.8	11.2	2.6	0.7

Source TUIK (http://tuikapp.tuik.gov.tr/yasamapp/yasam.zul)

Table 5.35 Food supply—crops

	Fat supply quantity (g/capita/day)			Pulses	Starchy roots	Vegetables
	Cereals	Fruits	Oilcrops			
1980	6.9	0.8	5.2	0.5	0.1	1.2
1985	7.4	0.7	3.2	0.6	0.2	1.3
1990	7.4	0.7	5.6	1.1	0.2	1.3
1995	7.1	0.7	3.5	1.2	0.2	1.5
2000	6.8	0.7	6.4	1.0	0.2	1.6
2005	6.6	0.7	5.9	1.0	0.1	1.6
2009	6.7	0.8	6.6	0.9	0.1	1.5
	Protein supply quantity (g/capita/day)			Pulses	Starchy roots	Vegetables
	Cereals	Fruits	Oilcrops			
1980	56.1	2.0	0.7	4.4	2.5	5.6
1985	60.4	1.8	0.7	5.9	3.2	6.0
1990	60.0	1.7	0.9	8.4	3.1	6.3
1995	57.7	1.6	0.8	8.4	3.0	7.2
2000	55.2	1.7	1.0	7.6	3.1	7.3
2005	53.0	1.8	1.5	7.7	2.2	7.2
2009	54.3	1.9	2.8	6.1	2.3	6.8
	Food supply (kcal/capita/day)			Pulses	Starchy roots	Vegetables
	Cereals	Fruits	Oilcrops			
1980	1770	191	54	74	103	121
1985	1917	168	35	100	132	130
1990	1926	160	59	144	128	134
1995	1842	146	38	145	124	158
2000	1768	148	68	131	131	153
2005	1717	154	65	133	94	151
2009	1748	161	82	106	97	141
	Food supply quantity (g/capita/day)			Pulses	Starchy roots	Vegetables
	Cereals	Fruits	Oilcrops			
1980	636	370	20	22	146	521
1985	689	333	11	29	187	569
1990	692	323	21	42	181	583
1995	662	306	13	42	176	661
2000	634	318	24	38	185	685
2005	613	330	23	39	133	678
2009	626	351	45	31	138	639

Table 5.36 Food supply—livestock

	Fat supply quantity (g/capita/day)			Milk
	Eggs	Fish	Meat	
1980	1.1	0.6	5.6	15.1
1985	1.2	0.8	6.6	13.9
1990	1.7	0.5	6.7	12.4
1995	2.3	0.8	6.5	12.6
2000	3.2	0.6	6.6	10.7
2005	2.7	0.5	6.3	11.5
2009	2.6	0.6	6.7	12.1
	Food supply (kcal/capita/day)			Milk
	Eggs	Fish	Meat	
1985	17.0	19.0	92.0	256.0
1990	25.0	12.0	96.0	230.0
1995	33.0	21.0	91.0	233.0
2000	46.0	16.0	94.0	199.0
2005	39.0	14.0	92.0	213.0
2009	37.0	16.0	99.0	227.0
	Food supply quantity (g/capita/day)			Milk
	Eggs	Fish	Meat	
1985	12.0	24.0	55.0	441.0
1990	17.0	17.0	59.0	396.0
1995	23.0	28.0	57.0	401.0
2000	32.0	22.0	60.0	344.0
2005	27.0	20.0	62.0	366.0
2009	26.0	23.0	69.0	392.0
	Protein supply quantity (g/capita/day)			Milk
	Eggs	Fish	Meat	
1985	1.4	2.9	7.7	15.4
1990	2.0	1.9	8.1	13.8
1995	2.6	3.2	7.7	13.9
2000	3.6	2.4	8.1	11.9
2005	3.1	2.2	8.2	12.6
2009	3.0	2.4	9.1	13.4

Table 5.37 Health expenditure incurred by the Ministry of Health

	% share in consolidated budget	% share in total public investment
1985	2.8	0.6
1990	4.7	3.3
1995	3.3	2.7
2000	2.4	2.2
2005	4.6	3.6
2010	5.4	3.3

Source TSB (www.saglik.gov.tr), TKB (www.kalkinma.gov.tr)

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Chapter 6
Agriculture and the Evolution of Agricultural Policies in the Mediterranean Partner Countries: Putting a Retrospective Overview in Context with Future Prospects

Konstadinos Mattas, Konstantinos Galanopoulos and George Baourakis

6.1 Introduction

Agriculture constitutes a crucial element of the national economies of Mediterranean Partner Countries (MPCs) and is particularly the major source of employment in most cases. Given the importance of agriculture not only in terms of economic contribution, but also as a pillar for social cohesion and a key means to addressing two of the major problems that most MPCs have been facing for decades (i.e. high unemployment rates and poverty), national agro-food policy agendas have traditionally relied on intervention, subsidisation and protectionism.

In general, the majority of the MPCs are faced with considerable deficits in external food trade, low self-sufficiency rates even for staple food and a large reliance on food imports (Awwad 2003). The national agro-food policy agendas that relied extensively on state protectionism (e.g. high levels of duties and tariffs), subsidies and aid to farmers as well as consumer subsidies for staple goods had little impact on improving the productivity and competitiveness of the agricultural sector, but instead, distorted producer decisions, generated market inefficiencies and promoted a misuse of scarce natural resources.

This paradigm however, has been changing as MPCs gradually began liberalising their economies in recent years, but the adaptation process has neither

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concluded nor will it be an easy one; liberalisation will increase the exposure of domestic sectors to global competition, and given their generally low levels of competitiveness, adaptation to changing market needs remains a question.

Moreover, the unstable political situation in the region further complicates the analysis; the social turmoil in the last couple of years, fuelled by the 2007/08 food prices crisis which has given rise to social unrest in a number of MPCs (e.g. Tunisia, Egypt, Libya and Syria) and stressed the need for democratic governance and transparency, will have a—yet uncertain—impact on agricultural sectors and the continuation (or not) of these policy reforms.

Within this context, this chapter aims at providing a brief description of the main characteristics of the agricultural sectors in the MPCs, together with a short retrospective overview of the evolution of national agro-food policies, in order to highlight the changes that occurred in the agro-food policy agendas in recent years. In this respect, some insights to the future evolution of natural agricultural policies are also made.

6.2 Importance and Role of the Agro-food Sector

Agriculture is a significant contributor to the national economies of MPCs. In particular regarding the employment rates, agriculture constitutes the main force for absorbing considerable amounts of the workforce in these countries. Given the high rate of rural population in these countries, the generally low economic development and the low income levels, agriculture is also a significant contributor to social cohesion. One should bear in mind that almost all MPCs are net food importers and that the global food prices crisis in 2007/2008 that resulted in escalating food prices also gave rise to social unrest, riots and revolts.

The value-added contribution of agriculture to GDP ranges from around 15–20 % for Syria and Morocco to a low of less than 3 % for Jordan and Libya (Table 6.1). ***Morocco***, ***Egypt*** and ***Algeria*** exhibit figures well-above 10 %, while all countries, with the exception of ***Algeria***, ***Morocco*** and ***Syria,*** have experienced a considerable downsizing of their agricultural sectors' contribution to the GDP since the 1960s and 1980s so that today agriculture's contribution is about 50 % less than two decades ago.

The countries with the largest agricultural sectors in terms of value of agricultural production are by far ***Turkey*** and ***Egypt***, with 35 and 23 billion int. $ respectively; their sectors are around three to four times larger than the following country, namely ***Morocco*** (Table 6.2). No other country has a value of agricultural production greater than 6.5 billion int $, while for ***Jordan***, ***Lebanon*** and ***Libya*** it is below 2 billion. ***Algeria***, ***Jordan*** and ***Morocco*** have increased their value of agricultural output by over 50 % in the period 2001–2009, followed by ***Tunisia*** and Egypt (30–40 %). The remaining countries exhibit a much lower growth pattern that ranges from 15 to 20 %.

Table 6.1 Agriculture, value added (% of GDP)

Country	Middle East and North Africa	Algeria	Egypt, Arab Rep.	Jordan	Lebanon	Libya	Morocco	Syrian Arab Republic	Tunisia	Turkey
Code	MEA	DZA	EGY	JOR	LBN	LBY	MAR	SYR	TUN	TUR
1965		12.88	28.60	15.44					23.74	47.51
1966		9.14	27.94	11.02					20.66	48.59
1970		9.21	29.43	11.64					19.70	40.17
1971		9.57	29.17	13.35					22.29	38.47
1972		8.42	31.08	13.30					24.61	35.40
1980		8.51	18.26	7.89			18.48		16.33	26.50
1981		9.24	20.09	6.08			12.91		15.62	24.52
1982		8.39	19.57	6.07			15.44		14.95	22.69
1990		11.36	19.37	8.08			18.26	29.81	17.74	18.09
1991		10.17	17.57	8.52			20.72	32.84	19.11	15.80
1992		12.13	16.54	7.89			16.10	34.44	18.60	15.56
1993		12.10	16.71	5.98			15.38	32.18	16.97	16.07
1994	11.32	10.06	16.87	5.23	7.11		19.09	31.10	14.45	16.03
1995	11.48	10.50	16.78	4.32	7.60		15.09	31.58	13.04	16.29
1996	11.39	11.77	17.26	3.83	6.89		19.60	29.95	15.69	17.39
1997	10.45	9.48	16.95	3.33	7.48		15.80	27.88	12.61	14.97
1998	11.88	12.53	17.11	3.07	6.91		20.22	30.61	11.97	13.58
1999	10.71	12.20	17.32	2.38	7.17		17.46	25.18	11.99	11.54
2000	9.47	8.88	16.74	2.35	7.11		14.94	23.75	11.33	11.31
2001	9.14	10.41	16.56	2.27	6.68		16.55	27.04	10.68	9.95
2002	8.83	10.00	16.46	2.55	6.67	5.20	16.54	26.83	9.33	11.71
2003	8.68	10.49	16.34	2.83	6.58	4.34	17.29	25.70	10.38	11.39

(continued)

Table 6.1 (continued)

Country	Middle East and North Africa	Algeria	Egypt, Arab Rep.	Jordan	Lebanon	Libya	Morocco	Syrian Arab Republic	Tunisia	Turkey
2004	8.38	10.19	15.18	2.81	6.37	2.99	16.32	21.80	11.01	10.92
2005	7.73	8.22	14.86	3.08	6.25	2.34	14.68	19.49	10.13	10.80
2006	7.63	7.99	14.07	2.82	7.17	1.99	16.89	19.22	10.15	9.52
2007	7.32	8.03	14.07	2.73	7.12	2.08	13.73	17.94	9.41	8.68
2008		6.92	13.22	2.58	6.94	1.87	14.64	17.00	8.54	8.61
2009		11.73	13.68	2.89	5.89		16.39	22.93	8.93	9.35
2010			13.99	2.93	6.39		15.38		8.01	9.60

Source World Bank national accounts data, and OECD national accounts data files

Table 6.2 Gross production value (constant 2004–2006 1000 I$) (1000 Int. $)

	1961–1970	1971–1980	1981–1990	1991–1900	2001	2002	2003	2004	2005	2006	2007	2008	2009
Agriculture (PIN) + (Total)													
Algeria	1,977,835	1,952,600	2,509,671	3,600,907	4,057,115	4,144,704	4,830,065	5,324,779	5,383,008	5,588,501	5,067,481	5,155,511	6,359,240
Egypt	5,067,665	6,421,077	6,623,781	14,221,607	16,901,004	17,733,247	18,532,489	19,278,525	19,564,598	20,631,305	21,859,780	22,159,525	22,908,436
Jordan	321,623	232,807	412,748	700,565	700,799	912,484	866,761	974,559	954,901	1,008,528	1,016,857	1,052,185	1,074,264
Lebanon	449,593	567,170	824,128	1,284,430	1,130,497	1,232,581	1,201,668	1,300,863	1,215,750	1,232,544	1,249,783	1,289,738	1,309,228
Libya	240,598	477,566	722,225	961,364	973,079	1,055,613	1,094,616	1,061,595	1,095,500	1,075,528	1,132,693	1,111,161	1,124,843
Morocco	2,314,570	2,907,030	4,051,672	5,296,170	5,624,354	6,099,621	6,965,868	7,070,836	6,752,929	7,875,038	6,612,710	7,614,690	6,436,467
Syrian Arab Republic	1,484,255	2,240,625	3,510,918	4,692,489	5,705,456	6,651,638	6,306,332	6,596,369	6,969,382	7,287,291	6,445,881	6,014,484	6,641,955
Tunisia	988,743	1,556,605	1,882,679	2,767,435	2,505,184	2,541,298	3,748,062	3,212,303	3,470,723	3,627,488	3,595,042	3,746,994	3,540,230
Turkey	13,552,088	18,254,024	23,882,982	28,817,225	29,452,309	31,318,702	31,658,962	32,012,787	33,804,135	34,444,562	33,103,945	34,367,363	35,225,036
Cereals, Total + (Total)													
Algeria	255,302	276,035	256,004	337,521	395,430	290,608	622,374	585,502	513,187	582,153	518,325	225,866	739,260
Egypt	1,247,075	1,474,815	1,719,261	3,105,439	3,453,739	3,812,095	3,894,271	3,942,150	4,150,646	4,252,229	4,120,953	4,363,003	4,527,845
Jordan	29,219	19,173	13,342	13,646	6,686	15,677	11,401	7,358	14,412	8,798	7,170	5,354	6,963
Lebanon	12,072	9,365	7,286	13,844	23,737	21,387	21,988	25,106	26,844	28,682	22,918	26,844	28,958
Libya	18,631	28,274	41,365	28,908	31,172	31,065	30,992	31,229	33,038	29,904	30,097	29,821	28,924
Morocco	510,017	619,178	755,893	756,249	685,183	769,493	1,156,080	1,249,893	637,298	1,358,997	368,365	791,781	1,499,339
Syrian Arab Republic	219,584	315,924	394,777	694,435	1,012,746	896,671	937,122	809,507	855,794	945,262	757,411	408,959	711,988
Tunisia	127,785	161,057	179,746	249,695	214,026	87,120	360,072	329,810	322,562	247,879	302,147	188,153	379,896
Turkey	2,292,957	3,235,225	4,030,263	4,416,423	4,361,301	4,528,048	4,523,787	5,009,475	5,348,295	5,094,234	4,332,117	4,390,608	5,008,524
Crops (PIN) + (Total)													
Algeria	1,604,307	1,332,844	1,440,776	2,013,382	2,276,181	2,327,199	2,972,738	3,389,912	3,395,876	3,504,952	2,954,038	3,038,389	4,172,383
Egypt	4,337,630	5,450,331	7,160,369	10,782,650	12,876,324	13,512,284	13,685,276	14,471,256	14,780,058	15,939,410	16,297,808	16,710,389	17,448,885

(continued)

Table 6.2 (continued)

	1961–1970	1971–1980	1981–1990	1991–1900	2001	2002	2003	2004	2005	2006	2007	2008	2009
Jordan	270,995	160,228	277,336	427,562	397,872	609,750	534,061	623,382	599,874	654,939	613,524	599,485	667,791
Lebanon	357,110	453,081	643,302	1,053,481	838,040	908,022	864,042	953,564	874,959	900,244	893,120	908,963	926,648
Libya	165,857	327,973	479,460	617,873	590,049	676,219	707,831	659,292	688,157	659,779	676,232	675,767	689,033
Morocco	1,691,179	2,130,057	2,893,468	3,652,770	3,707,529	4,087,921	4,967,627	5,042,325	4,574,129	5,614,268	4,471,268	5,135,026	5,923,840
Syrian Arab Republic	1,098,903	1,725,047	2,520,590	3,428,263	4,233,590	5,065,301	4,593,439	4,680,315	4,897,917	5,146,586	4,117,179	3,993,861	4,600,400
Tunisia	782,096	1,266,979	1,450,984	2,078,075	1,583,731	1,647,808	2,884,517	2,351,036	2,592,106	2,733,873	2,651,077	2,783,426	2,594,652
Turkey	9,767,644	13,618,191	17,901,163	22,126,842	22,841,323	24,932,892	24,432,990	24,605,456	26,222,886	26,607,920	24,636,351	26,034,386	26,659,139
Livestock (*PIN*) + (*Total*)													
Algeria	373,528	619,755	1,068,896	1,587,525	1,780,934	1,817,505	1,857,326	1,934,867	1,987,132	2,083,549	2,113,443	2,117,122	2,186,856
Egypt	730,035	970,746	1,463,412	3,438,957	4,024,680	4,220,963	4,847,213	4,807,270	4,784,539	4,691,896	5,561,972	5,449,136	5,459,551
Jordan	50,628	72,579	135,412	273,003	302,927	302,735	332,700	351,177	355,027	353,588	403,333	452,700	406,474
Lebanon	92,482	114,089	180,826	230,950	292,457	324,559	337,626	347,299	340,791	332,300	356,663	380,776	382,580
Libya	74,741	149,593	242,766	343,491	383,030	379,394	386,786	402,303	407,344	415,749	456,461	435,394	435,810
Morocco	623,392	776,973	1,158,204	1,643,400	1,916,825	2,011,700	1,998,241	2,028,511	2,17,8,801	2,260,770	2,341,443	2,479,864	2,512,627
Syrian Arab Republic	385,351	515,579	990,328	1,264,226	1,471,867	1,586,337	1,712,893	1,916,053	2,071,465	2,140,705	2,328,703	2,020,623	2,041,555
Tunisia	206,647	289,626	431,695	689,359	921,453	893,490	863,545	861,267	878,617	893,615	943,965	963,568	945,577
Turkey	3,784,444	4,635,833	5,981,818	6,690,383	6,610,986	6,385,810	7,225,972	7,407,331	7,581,250	7,836,643	8,467,595	8,332,977	8,565,897
Non food (*PIN*) + (*Total*)													
Algeria	27,264	37,229	53,483	48,059	47,144	47,134	47,154	50,406	58,782	49,947	54,343	58,009	61,484
Egypt	680,887	682,099	584,913	451,250	501,047	437,475	304,890	443,273	315,301	319,544	342,336	167,333	166,587
Jordan	6,468	5,433	9,682	11,449	5,408	10,488	7,322	6,922	7,879	7,877	8,424	5,344	8,515
Lebanon	12,304	12,792	6,762	15,283	23,797	18,921	19,287	21,374	18,233	17,443	19,001	18,409	18,600
Libya	8,380	14,723	15,895	17,369	20,935	21,199	21,788	20,539	20,591	19,400	19,572	19,700	20,227

(continued)

Table 6.2 (continued)

	1961–1970	1971–1980	1981–1990	1991–1900	2001	2002	2003	2004	2005	2006	2007	2008	2009
Morocco	45,753	52,626	77,829	87,449	91,304	92,423	90,636	98,594	109,212	99,392	106,508	107,787	111,013
Syrian Arab Republic	249,117	255,290	301,978	471,329	579,556	452,262	509,212	594,150	606,907	469,892	438,018	451,207	455,319
Tunisia	13,295	20,560	30,246	27,635	25,841	25,297	24,472	23,944	27,616	26,313	26,017	26,129	25,230
Turkey	1,062,957	1,538,698	1,685,083	2,016,430	2,068,199	2,166,804	2,052,741	2,153,686	2,107,376	2,184,556	1,945,813	1,690,308	1,621,325

Source FAOSTAT

It is worth noting that for all countries but ***Algeria***, ***Jordan*** and ***Libya***, the value of non-food products has dropped in the last decade; in Egypt it fell by more than 65 %, in ***Turkey***, ***Syria*** and ***Lebanon*** by around 20 %, while in ***Libya*** and ***Tunisia*** it fell by merely 2–3 %.

Nevertheless, the importance of agriculture for MPCs is more noticeable when considering its contribution to employment. Almost all MPCs suffer from very high unemployment rates (the average being just less than 10 %), despite the fact that unemployment rates have shown a decreasing trend during the last decade. ***Tunisia*** and ***Turkey*** had the highest unemployment rates in 2008 followed by ***Jordan*** and ***Algeria***. Noticeably, of all the studied MPCs, only ***Lebanon*** and ***Syria*** have unemployment rates below 10 %.[1] The agricultural sector is the major source of employment for most MPCs; on average, 23 % of total employment is in the agricultural sector regarding all MPCs (Table 6.3). Out of the studied countries, ***Morocco*** exhibits the highest figure: more than 40 % of the labour workforce is employed in agriculture, followed by ***Egypt*** and ***Turkey*** with over 30 and 20 %, respectively. Only in ***Jordan*** are agricultural employment levels around 3 %.

The number of people employed in agriculture has been dropping steadily in the last three decades in most countries, especially in ***Lebanon*** and ***Libya*** (Table 6.4). In ***Egypt***, ***Morocco*** and ***Turkey*** the decline of agricultural labour is more modest, while in ***Jordan***, ***Syria*** and especially Algeria there has been a significant increase of people employed in agriculture. The breakdown of the economically active population in agriculture reveals some interesting points: Although the total number of agricultural labour has been falling in most MPCs, this is largely due to the drop of male agricultural labour; in all countries but ***Lebanon*** and ***Libya*** the number of female workers in agriculture has been increasing in the last thirty years.

In fact, agriculture represents the most important employment opportunity for women in the MPCs. Although women's access to jobs in the overall economy is very low in the MPCs, as it does not exceed 30 % (***Algeria***) and can be as low as 17 % (***Jordan***), women are the majority in agricultural labour in ***Algeria***, ***Jordan***, ***Libya***, ***Syria*** and ***Turkey***. Only in ***Lebanon*** and ***Tunisia*** is it below 40 % of the total population employed in agriculture. 68 % of the employed women in ***Turkey*** are working in agriculture and similar figures are noticed in ***Syria*** (57 %), ***Morocco*** (50 %) and ***Egypt*** (41 %). As before, only in ***Lebanon*** and ***Libya*** does agriculture constitute a fraction of total female employment (2.7 and 9.7 % respectively).

In essence, agriculture is very important to MPCs' economies because of the large number of rural population and the high levels of poverty. Taking also into consideration the high share of young population and the steady high population growth, along with the fact that most MPCs are net food-importing countries and thus highly exposed to external shocks such as the 2007–2008 food crisis and the global recession, it becomes apparent that agricultural growth could contribute to improving employment levels, reducing poverty levels and ultimately achieving food security through incomes, domestic provision of food, and export earnings (Breisinger et al. 2010).

[1]Data for Libya are not available.

Table 6.3 Employment in agriculture (% of total employment)

Name	Middle East and North Africa	Algeria	Egypt, Arab Rep.	Jordan	Lebanon	Libya	Morocco	Syrian Arab Republic	Tunisia	Turkey
Code	MEA	DZA	EGY	JOR	LBN	LBY	MAR	SYR	TUN	TUR
1980			42.40			18.90			33.40	
1981			40.30						32.50	
1982			39.10						31.60	4.30
1983			41.00	6.70		15.30		30.60		4.80
1984			40.60					25.50		4.40
1985						16.80				45.00
1986				5.50		19.70				
1987				6.60						
1988										47.40
1989			42.40					26.50	25.80	48.20
1990			39.00				3.90			46.90
1991			31.30				3.90	28.20		47.80
1992			38.40				3.60			44.70
1993			35.30				3.20	31.10		42.20
1994			35.20				40.00	23.40		43.60
1995			34.00				6.30	28.40		43.40
1996			31.20				7.20			42.80
1997			31.30				5.10	17.80		40.80
1998			29.80				4.90			40.50
1999			28.70				5.70	27.80		41.40
2000			29.60	4.90			5.10	32.90		36.00
2001		21.10	28.50	4.10			4.90	30.60		37.60

(continued)

Table 6.3 (continued)

Name	Middle East and North Africa	Algeria	Egypt, Arab Rep.	Jordan	Lebanon	Libya	Morocco	Syrian Arab Republic	Tunisia	Turkey
2002			27.50	3.90			44.40	31.20		34.90
2003		21.10	29.90	3.60			43.90	27.00		33.90
2004		20.70	31.80				45.80			34.00
2005			30.90				45.40			29.50
2006	25.55		31.20				43.30			27.30
2007	23.94		31.70				42.10	19.10		23.50
2008	23.41		31.60				40.90			23.70
2009				3.00						22.90

Source World Bank National Accounts Data, and OECD National Accounts Data Files

Table 6.4 Breakdown of agricultural labour by gender

	1980–1989	1990–1999	2000–2005	2006–2010		1980–1989	1990–1999	2000–2005	2006–2010
Total economically active population in Agr (1000)					*Male economically active population in Agr (% male active population)*				
Algeria	1.728	2.288	2.871	3.120	Algeria	22.4	17.3	16.2	15.5
Egypt	6.767	6.282	6.453	6.620	Egypt	40.9	29.5	24.4	21.2
Jordan	87	123	115	115	Jordan	10.4	7.4	4.6	3.3
Lebanon	100	60	42	32	Lebanon	9.7	4.7	2.7	1.9
Libya	166	116	95	77	Libya	11.9	4.9	2.4	1.4
Morocco	3.199	3.348	3.234	3.089	Morocco	41.8	30.3	23.3	19.1
Syrian Arab Republic	778	1.054	1.226	1.316	Syrian Arab Republic	24.2	18.2	13.5	10.9
Tunisia	679	708	769	796	Tunisia	28.2	21.8	20.4	19.4
Turkey	9.245	9.956	8.967	8.295	Turkey	41.9	33.7	26.5	22.2
Male economically active population in Agr (1000)					*Female economically active population in Agr (% female active population)*				
Algeria	959	1.133	1.384	1.486	Algeria	63.3	50.9	41.5	35.1
Egypt	4.615	4.056	4.007	3.976	Egypt	71.4	55.7	47.1	41.3
Jordan	52	69	54	46	Jordan	49.6	35.8	28.5	23.8
Lebanon	70	40	28	21	Lebanon	15.3	7.2	4.1	2.7
Libya	103	58	36	24	Libya	45.3	21.2	13.6	9.7
Morocco	2.191	2.036	1.835	1.644	Morocco	67.8	59.8	54.4	50.5
Syrian Arab Republic	503	570	580	548	Syrian Arab Republic	73.4	66.0	60.9	57.3
Tunisia	475	464	504	528	Tunisia	47.5	37.4	30.5	26.1
Turkey	5.195	5.157	4.448	4.000	Turkey	85.2	79.3	73.1	68.2

(continued)

Table 6.4 (continued)

	1980–1989	1990–1999	2000–2005	2006–2010		1980–1989	1990–1999	2000–2005	2006–2010
Female economically active population in Agr (1000)					*Female economically active population in Agr (% total active in agriculture)*				
Algeria	769	1.155	1.487	1.634	Algeria	44.5	50.5	51.8	52.4
Egypt	2.152	2.226	2.446	2.644	Egypt	31.8	35.4	37.9	39.9
Jordan	36	53	61	69	Jordan	40.7	43.6	53.2	59.9
Lebanon	30	19	14	10	Lebanon	29.9	32.4	33.2	32.9
Libya	63	58	60	53	Libya	37.9	49.7	62.7	68.4
Morocco	1.007	1.312	1.399	1.445	Morocco	31.5	39.2	43.3	46.8
Syrian Arab Republic	275	484	646	769	Syrian Arab Republic	35.3	45.9	52.7	58.4
Tunisia	204	244	266	267	Tunisia	30.0	34.5	34.5	33.6
Turkey	4.050	4.799	4.518	4.295	Turkey	43.8	48.2	50.4	51.8
					Female economically active population (% total active)				
					Algeria	22.1	25.7	29.6	32.7
					Egypt	21.1	22.5	24.0	25.4
					Jordan	12.5	13.7	15.5	17.1
					Lebanon	21.3	23.8	25.1	25.8
					Libya	13.8	18.6	22.6	24.3
					Morocco	22.1	24.6	24.6	24.9
					Syrian Arab Republic	15.3	19.0	19.8	21.0
					Tunisia	20.3	23.5	26.0	27.3
					Turkey	27.7	28.3	26.9	25.9

Source FAOSTAT

The main agricultural commodities in *all* the studied MPCs are fruit and vegetables and meat products. Citrus fruit, melons, dates, grapes, olives and apples are the most important fruits and potatoes, tomatoes and onions regarding vegetables. Cereals (predominantly wheat as well as rice in ***Egypt***), sugar crops (sugarcane in ***Egypt***, sugarbeets in ***Morocco*** and ***Syria***) and cotton (in ***Egypt***, ***Syria*** and ***Turkey***) are the most important other crops. Olive oil is also produced in most MENA countries but its production is mainly concentrated in ***Tunisia***, ***Syria***, ***Turkey*** and ***Morocco***. Regarding livestock production, milk and chicken/turkey production are the main products in most MPCs.

Crop production constitutes by far the most important element of agriculture, accounting for 60 % (***Libya***) to 76 % (***Egypt***) of the value of agricultural production. Livestock production on the other hand represents the remaining lesser portion. Still, the share of livestock production has been steadily rising in all MPC countries, excluding Turkey which is the only country where the share of livestock production in 2009 is lower than in the 1960s.

Cereals are a major product for the majority of the MPC countries; in fact a clear cluster formation can be observed: One cluster includes ***Egypt***, ***Turkey*** and ***Morocco*** accounting for a 14–19 % of the total value of agricultural production, another with ***Algeria***, ***Syria***, ***Tunisia*** (around 10 %) and the final one includes the remaining countries (***Lebanon***, ***Libya***, Jordan) where cereal production constitutes a lesser part of the total value (0.6–2.6 %). Interestingly, the share of cereals in the period 1961–2009 shows a slow downward trend in all countries, with the exception of ***Jordan***, where the drop has been more dramatic: cereals in the 1960s accounted for a little less than 10 %, only to drop to less than 1 % in 2009.

6.3 Agro-food Trade

The Middle East and North Africa (MENA) region (in which all studied MPCs belong) is the most food import–dependent region in the world, as food imports accounted for 25–50 % of national consumption and they are projected to rise even further in the future, primarily because of the exponential population growth in the region on the one hand and the limited potential for land expansion and scarce availability of valuable resources such as water and land on the other (Breisinger et al. 2010; Alvarez-Coque 2012). In this sense, food security is a matter of great concern in the MENA region; the escalating food prices worldwide and the worrying FAO projections for the next decades further stress the importance of agricultural and food production in the region.

MPCs included in the study are—all but ***Turkey***—food importers with an agricultural trade deficit that in most cases appears to be growing. As illustrated in Table 6.5, ***Algeria*** and ***Egypt*** have by far the greatest deficit in the agricultural products trade, followed by ***Morocco***, ***Libya*** and ***Lebanon***. Interestingly, the MPCs exhibited a surplus in the agricultural products trade in the 1960s, as only ***Jordan***, ***Lebanon*** and ***Libya*** had a deficit. This is an indication of poor adaptation to

Table 6.5 Agricultural products (total) trade

	1961–1969	1970–1979	1960–1969	1990–1999	2000–2009		1961–1963	1373–1973	1380–1983	1330–1333	2000–2009
Import value (1000$)						Agric. products trade as % of total merchandise trade					
Algeria	193,776	855,940	2,335,268	2,732,782	4,300,122	*Imports*					
Egypt	275,104	1,035,258	3,243,513	3,112,120	4,562,030	Algeria	26.5	187	24.3	29.9	20.4
Jordan	49,527	214,092	583,029	796,153	1,499,249	Egypt	33.5	35.7	37.6	26.1	17.1
Lebanon	134,911	300,042	582,131	1,098,049	1,537,493	Jordan	32.1	26.5	21.2	22.8	15.7
Libya	56,325	470,844	1,097,750	1,155,293	1,416,797	Lebanon	29.4	21.2	21.4	18.9	15.2
Morocco	147,859	486,628	805,619	1,322,661	2,633,208	Libya	14.9	17.2	17.9	20.7	21.8
Syrian Arab Republic	57,745	289,455	633,638	807,187	1,543,438	Morocco	30.8	24.0	18.9	16.0	12.1
Tunisia	60,233	224,391	523,118	744,347	1,330,772	Syrian Arab Republic	22.4	18.5	17.9	20.1	16.1
Turkey	74,157	177,970	728,129	2,756,252	5,267,062	Tunisia	25.1	17.7	15.4	10.6	9.4
Export value (1000$)						Turkey	11.3	5.1	6.5	8.3	4.9
Algeria	210,859	156,296	58,165	65,705	72,832	*Exports*					
Egypt	400,284	688,832	662,294	478,809	1,426,495	Algeria	31.2	3.9	0.5	0.6	0.2
Jordan	13,194	54,928	150,080	235,693	623,737	Egypt	71.6	52.1	22.7	11.9	10.2
Lebanon	47,823	109,152	148,914	121,182	282,210	Jordan	52.9	33.5	18.7	15.6	14.4
Libya	3,135	2,451	628	39,549	15,002	Lebanon	44.1	22.6	21.4	17.2	12.7
Morocco	191,599	353,220	445,775	723,345	1,209,645	Libya	0.3	0.0	0.0	0.4	0.1
Syrian Arab Republic	145,7 00	229,522	274,795	768,278	1,172,516	Morocco	46.3	29.9	17.5	14.8	10.6
Tunisia	66,269	147,205	167,266	429,539	907,763	Syrian Arab Republic	87.1	30.3	14.7	21.5	13.8
Turkey	396,154	1,011,838	2,477,401	4,115,939	6,358,792	Tunisia	49.7	19.6	7.8	9.0	8.4

(continued)

Table 6.5 (continued)

	1961–1969	1970–1979	1960–1969	1990–1999	2000–2009		1961–1963	1373–1973	1380–1983	1330–1333	2000–2009
Trade balance (1000$)						Turkey	88.8	69.0	33.0	20.6	9.0
Algeria	17,083	−699,644	−2,277,102	−2,667,077	−4,227,290						
Egypt	125,180	−346,426	−2,581,219	−2,633,311	−3,135,535						
Jordan	−36,333	−159,164	−432,949	−560,460	−875,513						
Lebanon	−87,088	−190,890	−433,217	−976,867	−1,255,283						
Libya	−53,190	−468,394	−1,097,122	−1,115,743	−1,401,795						
Morocco	43,741	−133,408	−359,844	−599,316	−1,423,563						
Syrian Arab Republic	87,956	−59,933	−358,843	−38,909	−370,922						
Tunisia	6,036	−77,186	−355,852	−314,808	−423,008						
Turkey	321,997	833,868	1,749,272	1,359,687	1,091,730						

Source FAOSTAT

changing dynamics in the globalised markets; for most MPCs agricultural productivity lagged behind the growing incomes and most importantly the rising population.

A study by Galanopoulos et al. (2011) assessed the Total Factor Productivity of agricultural sectors for a number of European and MENA countries and concluded that productivity growth in the MENA countries is quite low when compared to other countries and regions, and also that there is no evidence of convergence among the growth rates between the different geographic regions. In fact, the only MPCs that were found to be converging in the high-productivity club were ***Egypt***, ***Turkey*** and ***Lebanon***.

The most export-oriented agricultural sectors are in ***Turkey***, ***Tunisia***, ***Lebanon*** and ***Jordan***, as the value of exports represent around 20 % of the value of domestic agricultural products. By contrast, in ***Algeria***, ***Libya*** and (to a lesser extent) ***Egypt***, exports constitute only a fraction of agricultural production. Agricultural exports still constitute a major part of national exports in most MPC countries (excluding oil-exporting countries) although their share has been gradually dropping in the last decades. In ***Jordan*** they account for more than 14 % of total merchandise exports, 13.8 % in ***Syria*** and 12 % in ***Lebanon***. In all countries agricultural exports' share is higher than 8.4 %; only in ***Algeria*** and ***Libya*** do they constitute a negligible portion of 0.1–0.2 %. On the other hand, for these two countries, food imports represent a considerable share of over 20 % of total imports, while for the rest of the countries this figure ranges from 9.5 % (***Tunisia***) to 17 % (***Egypt***). Only in ***Turkey*** do agricultural imports account for a much lesser percentage (4.9 %). It is indicative that trade coverage (i.e. percentage of agricultural exports to agricultural imports) is for all countries but Turkey very low, ranging from 1 % (Algeria) to 60 % (Tunisia).

The country that achieves the highest per capita exports of fresh food is ***Jordan***: 101 US$, followed by ***Turkey*** (76 US$) and ***Morocco*** (66 US$). ***Egypt***, ***Lebanon***, ***Syria*** and ***Tunisia*** exhibit similar figures of around 30 US$, whereas the lower per capita exports are recorded in ***Algeria*** and ***Libya***. Turning to processed foods, it is apparent that Tunisia becomes the most export-oriented country: Per capita exports of processed foods exceed 90 US$, followed by ***Jordan*** (75), ***Lebanon*** (73) and Turkey (71). ***Egypt*** and ***Syria*** have much smaller numbers (19.5 and 12.6 respectively), indicating a less export-oriented food processing sector.

Some more interesting insights on the exporting profile and the competitiveness of the food sectors in the MPCs are revealed by the Revealed Comparative Advantage (RCA) and the Constant Market Share (CMS) analysis provided by ITC[2]: Competitiveness is, as elsewhere indicated in the text, quite low and it appears stagnant during the period 2005–2009; with the exception of Egypt that exhibits a modest 0.06 % annual increase of world market shares, all the remaining countries have either negative, or no change.

[2]www.itc.org

6.4 Key Obstacles to Growth

The relatively limited contribution of agriculture to national GDPs, despite both the significant percentage of employment as well as the high levels of agricultural protection[3], could be attributed—at least to a certain extent—to the low productivity of the sector. Low productivity in agriculture also results in a relatively large share of poverty in rural areas (IFAD 2003). This in turn, has an adverse impact on the countries' ability to modernise their agricultural sectors and boost the sector's ability to provide employment opportunities (that are needed in countries with low per capita incomes and scarce job opportunities) and reduce imports of agricultural products (that do not only pose a severe fiscal budget, but expose MPCs to price fluctuations similar to the food price crisis in 2007/08).

In fact, most studies that showed that agricultural productivity in the MPCs is quite low often related it to (a) the low degree of market openness; (b) natural constraints; (c) poor infrastructure. One key reason for MPCs' low productivity is the fact that they are faced with adverse climatic and soil conditions (low and highly variable annual rainfall patterns, severe limitations in water resources, as well as soil erosion and degradation due to increased salinization and soil compaction, salt water intrusion, desertification, etc.) (Minot et al. 2010).

6.5 Retrospective View of Agro-food Policies: The Reform Process

The MPCs have introduced a series of reforms in their agricultural sectors in the last few years; protectionism has been reduced gradually, the role of state intervention was reduced. Most quantitative import controls were abolished and tariff rates have been reduced. Nevertheless, many reforms have been introduced, but have not always achieved the desired effects. Several MPCs still have protective agricultural sectors that operate under schemes of duties, tariffs as well as producer subsidies. Guaranteed prices for staple as well as industrial crops are still common practice in countries such as ***Morocco***, ***Tunisia***, ***Egypt*** and ***Syria***, as are also input subsidies (World Bank 2008). In all countries, the tariffs for agricultural products remain quite high, ranging from 23.6 % in Jordan to as high as 98.5 and 116.1 in Egypt and Tunisia, respectively (Table 6.6). The *applied tariffs for agricultural imports are higher than the* tariffs applied for non-agricultural products. Given the uncertainty and the volatile political situation in several MPCs, it is yet unclear whether the political and social unrest could hold the process to additional trade liberalisation and market openness.

[3]Egypt, Morocco, and Tunisia are among the 15 most protected economies in the world (Minot et al. 2010).

Table 6.6 Trade protection indicators, 2011

	Year of MFN applied tariff	Simple average	
		Bound	MFN applied
EU	2011	13.8	13.9
Algeria	2010		23.3
Egypt	2011	98.5	66.3
Jordan	2010	23.6	17.9
Lebanon	2010		16.5
Morocco	2011	54.4	41.2
Tunisia	2011	116.1	32.7
Turkey	2011	61.0	41.7

Source WTO Trade Profiles and Tariff Profiles, 2011

Although each country had different objectives in their agricultural policy reform agenda, there are several common key reasons that motivated the reform process in the MPCs. These are:

- The low self-sufficiency rates and the reliance on imports
- The scarce natural resources, especially water
- The high unemployment rates
- The high poverty rates, especially in the rural areas
- The low productivity and competitiveness of domestic agricultural sectors
- MPCs' willingness to participate in international trade organizations and increase their access to world trading markets

In this respect, the main common objectives of agricultural policies in the MPCs could be summarised as the following (Lindberg et al. 2006):

- Increase the volume and yield of agricultural production
- Increase the competitiveness of the agricultural sector
- Address food security issues by achieving partial or total food self-sufficiency
- Support farmers' incomes
- Improve the living standard in the rural areas
- Protect the natural resources with special consideration given to water

It is evident that several objectives are rather contradictory in their nature (i.e. increasing productivity and reducing subsidies and protection, while also preserving the small farmers' income and reducing poverty in rural areas), a fact that may also explain the limited impact of these reforms.

In ***Algeria***, the plan to renovate the agricultural sector, the *Plan du renouveau agricole et rural*, accelerated in 2010. Under this plan, a significant part of the debt owed by farmers has been written off, while the implementation of provisions for the disposal of private state land also accelerated and the first civil, joint-stock agricultural companies aimed at opening up the capital of agricultural holdings to national savings were created (African Economic Outlook 2011).

In ***Egypt***, the Structural Adjustment Program (SAP) in the agricultural sector is composed of five instruments. These are: (i) removal of farm price control, (ii) elimination of restrictions on crop area, (iii) cancellation of government control in purchasing crops, (iv) phasing out subsidies on agricultural production inputs, and (v) cancelation of governmental deregulation. The strategy for agriculture development 1997/98–2016/17 aims at increasing agricultural productivity and output, attracting domestic and foreign investment and increasing agricultural research. Particular emphasis is put on promoting animal production, while subsidized inputs (electricity and water) are also provided (Soliman et al. 2011).

In ***Jordan***, under the agricultural sector restructuring program—National Strategy for Agricultural Development for 2002–2010—subsidies have been abolished and support is now provided through other, non-market distorting means. In addition, export subsidies for agricultural products were bound at zero. Given the concerns about national food security issues and the high reliance on imports, there are plans to increase crop production since the last decade of the past century. However, despite increasing investment there is a slow pace of progress. Consequently, Jordan is implementing a two-pronged agricultural development policy. *The long-term strategy* aims at increasing the total area under cultivation by better harnessing water resources to increase irrigation of arid desert areas for the cultivation of cereal crops. In the *short term*, the government is attempting to maximize the efficiency of agricultural production in the Jordan River valley through rationalization or use of resources to produce those items in which the country had a relative advantage (Soliman 2011).

In ***Lebanon***, agricultural policy is carried out in a highly fragmented, disconnected manner and as a low priority. A wheat and sugar beets subsidy is managed by the Directorate General of Cereals and Sugar Beets at the Ministry of Economy and Trade and a tobacco subsidy program is run by the Régie des Tabacs at the Ministry of Finance. The Ministry of Agriculture is responsible for other crops, agricultural services and cooperatives. It also supervises the Lebanese Agricultural Research Institute and the Green Plan, which helps rehabilitate lands and rural roads neglected or destroyed during the war. An export-promotion program is managed by the para-governmental Investment Development Authority of Lebanon and the Council for Development and Reconstruction manages infrastructure projects, including irrigation and mobilizing foreign funding. The current agro-food policy objectives of the ***Lebanese*** Government are focused on:

- Providing the necessary infrastructure such as roads, irrigation systems and extension and research services,
- Securing a steady stream of reasonably priced produce for the Lebanese consumer, giving assistance and support to the local producers,
- Creating a suitable environment for competition and the efficient flow of information,
- Coordinating market activities to protect the economy from the negative effects of market failure (El Hindi and Al Ashkar 2011).

Libya had begun some market-oriented reforms after 2000. Initial steps have included applying for membership in the World Trade Organization, reducing subsidies, and announcing plans for privatization. Even since the eighties the Libyan government had paid more attention to agricultural development: Agricultural development became the cornerstone of the 1981–1985 development plan, which attached high priority to funding the Great Man-Made River project, designed to bring water from the large desert oasis aquifers of Sarir and Al Kufrah. Interest-free agricultural credit was provided by the National Agricultural Bank, which in 1981 made almost 10,000 loans to farmers at an average of nearly 1500 Libyan dinars each. The substantial amounts of funds made available by this bank may have been a major reason why a large number of Libyans, nearly 20 % of the labour force in 1984, chose to remain in the agricultural sector (Thabet 2011a).

Agriculture and rural development are a strategic issue for ***Morocco*** given its importance for the economic development of the country. Currently, the government policy aims at strengthening human and physical resources that are needed to reach the goals of the 2020 strategy for rural development. The overall vision is to increase food security, improve farmers' incomes and conserve natural resources. Key instruments for the implementation of the national agro-food policy include the Agricultural Development Fund (ADF), the Green Morocco Plan (GMP) and the National Strategy for the Development of Water Sector. The new *Plan Maroc Vert* adopted in 2008 is based on two pillars: support for the high value-added activities which include a strong export performance, and the "Agriculture Solidaire" oriented toward the small farmers' sector (Belghazi 2012; Akka Ait El Mekki 2011).

Tunisia's agro-food policy in the past relied on subsidizing staple food commodities at the consumption level, namely cereal products, sugar and vegetable oil. This translated into much higher consumption levels of these products than otherwise would be the case. At the same time, nominal prices at the production levels were maintained constant during decades which, together with fluctuating production resulting from climatic conditions, led to increasing import needs for these products. Hence, policy in ***Tunisia*** as regards staple food commodities has always tried to seek a compromise between the desire to boost producer prices so as to support farm incomes and, at the same time, take advantage of the relatively low prices that have prevailed in the world market during several decades. In the case of cereals, this resulted in putting a ceiling on domestic producer prices throughout the seventies, eighties and nineties. This situation prevailed practically all the way through the world food crisis of 2007 and 2008. In the meantime, Tunisian cereals imports kept increasing, mostly in terms of quantities. The resulting public compensation was initially somewhat manageable, anywhere between a third and half of the price of imports for durum wheat and 50 to 75 %, in the case of soft wheat. During the food crisis period (2007 and 2008), the amount of subsidies was multiplied by 2 or 3 and, during some months of the year 2008, by 4. On the consumption side, public policy has been for a long time that of maintaining low cereals prices to preserve the income purchasing power of the middle to poor income segments of the population.

Studies have shown that the universal Tunisian subsidy program allocated to the cereals sector, as practiced during the seventies and early eighties, resulted in an uneven distribution of public budgets between various segments of the population, particularly the rich and the poor. While public subsidies were designed to help the poor, in the first place, they ended up helping rather the least needy; i.e., the higher income brackets of the population. This has resulted in a major economic reform that the country went through during the eighties and nineties.

During recent decades, attempts were made to identify ways to target the subsidies to the truly needy people of the country. First timid attempts were made to target food subsidies to the poor by gearing them towards economically inferior products (large size bread, bread made by bakeries located in remote areas, etc.). Then there was the adjustment in the weight of bread itself, which was gradually reduced from initially near a kilo per bread to about 400 g nowadays. In parallel fashion, timid but continuous increases in the prices of basic bread, as well as other basic cereal by-products, were initiated. Apart from what is usually considered in the country as basic food commodities, i.e., other categories of bread and cereal by-products destined as pastries became marketed freely of any administrative control (Thabet 2011b). It should be noted that input subsidies have been abolished in all products other than wheat, while state monopolies have been cancelled, leading to a more liberalised agricultural production environment (Belghazi 2012).

Turkey's key policy objectives for agriculture, as mostly set out in successive Development Plans are: improving productivity; ensuring food security and food safety; stability of food supply; raising self-sufficiency and exploiting export potential; providing stable and sustainable income levels in agriculture; enhancing competitiveness; fostering rural development; and intuitional-capacity building to come into alignment with EU agricultural and rural development policies. Historically, government intervention in agriculture has been considerable, with price support, input subsidies and high border protection being the main policy instruments. Over the mid-1980s–2000, domestic agricultural support measures in Turkey were almost entirely based on commodity price support for crop commodities and variable input subsidies. Although the rates of support on products and input use fluctuated considerably prior to 2000, there were no fundamental changes to the kind of policies and delivery mechanisms used.

Agriculture was one of the sectors that were targeted for structural reform in order to stabilise the ***Turkish*** economy. Aside from promoting allocative efficiency in the agricultural sector, reforms were necessary for fiscal stabilisation. "The Agricultural Reform Implementation Project (ARIP)", was launched in 2001 and implemented during 2001–2008. The project was underpinned by the World Bank and it was also a pre-condition of obtaining International Monetary Fund (IMF) support for the macroeconomic stabilisation programme, which aimed to reduce the high inflation rate and stabilise the general price level. Under ARIP, Turkish agriculture policy has been oriented towards closer alignment with the EU's CAP. Under the reform programme, agricultural related measures have been taken in four main areas: (i) reducing output intervention purchases financed from the budget leading to price cuts; (ii) phasing out price support, credit and fertiliser

subsidies, and replacing them by a less distorting direct income support (DIS) scheme to farmers based on a uniform per-hectare payment; (iii) withdrawing the state from direct involvement in production, processing, and marketing of crops; and (iv) making available one-time transition grants to farmers. ARIP is implemented to set up NFRS and provide technical and financial assistance to restructure ASCUs, to facilitate the reform program described above. Within the reform framework, indirect support policies (price and input subsidies) were phased out at the end of 2002 and replaced with the DIS programme. DIS payments (about USD 90 per ha) were independent from crop type and quantity of agricultural production and were made to those farmers (individual persons or legal entities) dealing with land-based agricultural activity, regardless of the status of land tenure. Farmers must be registered in the National Farmers' Registry System (NFRS), which was initiated in 2002. DIS payments were started in 2002 according to NFRS for land between 0.1 and 50 ha. Agricultural land either needed to be tilled or otherwise sustained for agricultural use. Farmers must be associated with agricultural activity for a minimum of one production season (8–10 months) on the same land. State-owned land, deserted or inaccessible agricultural land with no current use, forestry areas and communal property, such as pastures, were excluded from DIS payments. Additional DIS payments were granted to farmers who undertake soil analysis, practice organic farming or utilise certified seeds on their land. Payments for soil analysis were limited to a maximum area of 6 ha. DIS payments were applied to over 16.4 million ha of land (around 63 % of total agricultural land) and have benefited 2.8 million farmers (89 % of the total).

A key element of ARIP was the privatisation of SEEs and the restructuring of ASCUs. The state-owned Turkish Sugar Company (TURK SEKER) and the state-owned Tobacco Company (TEKEL) were to be privatised, whereas the TMO and quasi-governmental ASCUs, which had previously administered support prices for certain commodities, were to be restructured. ARIP supported the implementation of the 2000 ASCU Law. Prior to this date, most of the ASCUs had been acting as government purchasing agencies, and were highly overstaffed and lacked working capital. It foresaw to lay off, with severance payments, more than half of the workers in the ASCU system (WB 2001). In addition, TRY 250 trillion was made available from the budget as a credit to the ASCUs in order to increase their working capital.

The third element of ARIP comprised one-time payments to farmers to cover the cost of switching away from crops in excess supply, such as hazelnuts and tobacco, to alternative activities (net imported products). Initially, the programme intended to cover the costs of shifting from producing hazelnuts, tobacco and sugar beet to the production of oilseeds, feed crops and corn. Participation in the scheme has been limited, and is mostly made up of tobacco farmers; as with the privatisation of TEKEL, prices are determined by a bidding mechanism.

The ARIP has been amended and extended to the end of 2008. The amendment included new sub-components such as cadastral works, rural development activities and agri-environmental policies. The ARIP, which is restructured by the ASP, is supported by a World Bank Loan Agreement (Çağatay 2011).

6.6 The Aftermath of the Reforms

The reform process of national agro-food policies in the MPCs has resulted in a more liberalised agricultural sector, lower input subsidies and relaxation of import protection. It is argued that liberalisation will ultimately result in more efficient and competitive agricultural sectors, thereby enabling the countries to overcome problems induced by over-protected economies, such as heavy costs incurred by protecting agriculture using consumer and producer subsidies, distortion of production decisions, causes of market inefficiencies, etc.

On the other hand, the real impact of these reforms is often put under questioning, as it is argued that liberalisation (given the low productivity in most MPCs) could have adverse impacts especially to small farmers and low-income households, while also serving as an incentive for a more extensive exploitation of the scarcely available natural resources and increasing the MPC's susceptibility to international price fluctuations.

Overall, the structural adjustments have indeed led to decreased levels of support and more open economies, but evidence thus far, does not show compelling progress in productivity/competitiveness which is a necessity in order to increase food security. Moreover, poverty in rural areas has hardly been tackled as the gap between rural and urban incomes remains very high.

6.7 Agro-Food Policies: Future Outlook and Suggestions

The MENA region is comprised of countries with a considerable deficit in external food trade, low self-sufficiency rates even for staple food and a large reliance on food imports. At the same time, several MPC still have highly protective agricultural sectors that operate under schemes of duties, tariffs as well as producer subsidies. In recent years this protectionism has been reduced gradually as MPCs are being incorporated in the globalised economy, entering world trade organisations and signing bilateral and multilateral trade agreements. However, liberalisation has not yet been fully adopted, while several critical aspects of food policy agendas have not been addressed as not all reforms have met their intended objectives. In this respect, the main challenge for future agro-food policy in the MPCs will be to **achieve a sustainable growth of agricultural output in order to alleviate poverty and reduce dependency on imports, preserving at the same time the scarcely available natural resources**. This involves a carefully planned policy agenda that will tackle four main issues, namely resources availability, reduction of food dependency, productivity growth and alleviation of rural poverty.

For the past decades, agricultural sectors in the MPC relied on state protectionism and subsidies, and aid to farmers as well as consumer subsidies for staple goods. This paradigm has been changing as MPCs are liberalising their economies, but the adaptation process has neither concluded nor will it be an easy one; liberalisation will increase the exposure of domestic sectors to global competition, and

given their generally low level of competitiveness, adaptation to changing market needs remains a question. As an illustration, even in the EU—which is the biggest trading partner of the MPCs—the relaxation of its trade barriers (due to WTO agreements) appears to have offset the advantages of the EU—Mediterranean preferential agreements for the benefit of other, more competitive, third countries (Galanopoulos et al. 2009).

In the past, attempts by governments to increase self-sufficiency had limited effectiveness, as they were based on producer (and consumer) subsidies that led to resource mismanagement, while also favouring the larger producers. In the next years agricultural policies in the MPCs will have to shift not only to a more open system, but also to a well-targeted scheme that will have certain key priorities, so as to improve infrastructures and human capital. In addition, particular emphasis will have to be placed in designing and implementing effective rural development plans that will attempt to reduce the poverty in rural areas. The EU, being the most important trading partner of the MPCs, could play a critical role in assisting the reform process. The EU would need to strengthen its relations with the region and introduce more mechanisms to support the modernisation of agricultural sectors in the MPCs. Specific policies for assisting cooperation in research and rural development are necessary as agricultural extension and research, along with public support on infrastructures can have a significant impact on the productivity of MPCs' agriculture. In fact, agricultural extension and research, along with public support on infrastructures, can likely have a significant impact on the productivity growth of MPC agriculture, while also achieving a minimal distortion impact on production and trade. R&D investments are quite necessary to be targeted on efficient use of fresh-water and/or re-use of treated water, new varieties, harvesting and post-harvesting techniques, etc. (CEDARE 2009).

The gradual modernisation of the agricultural sectors in the MPCs and the liberalisation of their trade policies could have a positive impact not merely on agricultural sectors, but on the whole national economies. Byerlee et al. (2009) showed that agriculture can be a driving force acting as a trigger to the whole economic growth of an emerging country, by having a favourable impact on four other pillars, i.e. poverty reduction, equity by gender, food security and environmental sustainability.

However, these are not the only problems faced by the MPCs. There are several others that may not refer directly to the agricultural sector but may have a considerable impact on its structure and performance. The political and social turmoil in the last couple of years, fuelled by the 2007/08 food prices crisis, has given rise to social unrest to a number of MPCs (mainly Tunisia, Egypt and Syria) and stressed the need for democratic governance and transparency. Agriculture in these countries will definitely be affected and predictions are difficult to make. In this respect, future agro-food policies in the region in order to have a meaningful impact will ultimately have to "… be an integral part of national and regional development agendas … the chief aim should not be to liberalize trade but to set trade policies that secure social, economic, and cultural rights for all, as illuminated in the UN Millennium Development Goals" (Mohamadieh et al. 2007).

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Chapter 7
Issues in Trade Liberalisation in Southern and Eastern Mediterranean Countries

Lorena Tudela-Marco, José María García Álvarez-Coque and Victor Martínez-Gómez

7.1 Introduction

In the framework of their trade policies aiming at a gradual opening of their agricultural markets, Southern and Eastern Mediterranean Countries (SEMCs) are involved in deepening their relationships with the EU. The Euro-Mediterranean relationship framed by the European Neighborhood Policy pursues a trade liberalization agenda covering agriculture, fishery and processed agricultural products. On 14th December 2011, the Council authorized the Commission to open bilateral negotiations to establish Deep and Comprehensive Free Trade Areas (DCFTAs) with Egypt, Jordan, Morocco and Tunisia. These DCFTAs go beyond trade liberalization to cover other regulatory issues relevant to trade, such as investment protection and public procurement. The process also encompasses agreements among SEMCs themselves. This process joins the Agadir Economic Agreement between Tunisia, Morocco, Jordan and Egypt (2004), which remains open to other Arab Mediterranean countries or to a set of bilateral trade agreements involving SEMCs.

Trade liberalization is combined with an "accompanying" program concerning rural development, the promotion of Mediterranean products, and plans to liberalize services and investments. The result of this process of trade liberalization has been a large network of agreements which covers trade but also cooperation in a vast range of areas of mutual interest including security, democracy, justice and sector policies, with the aim of promoting peace, stability, and prosperity in the region.

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In the following pages, a set of critical aspects regarding trade policies in the region is discussed. After examining the trade patterns in some major food staples in the region, we discuss the link with domestic concerns and food security in the region. Then, we refer to the lack of understanding on the way agriculture has been considered by agricultural and trade policies in the Mediterranean region. We will move to the analysis of the main issues in the EU-Mediterranean association, with reference to some specific topics, myths and realities of trade liberalization in the region. After that, we focus on policy recommendations for the future agenda of cooperation.

7.2 Trade Background

To date, the EU has largely dominated the agricultural trade relations of SEMCs. Morocco shows a positive agricultural trade balance with the EU but other SEMCs, in particular Algeria and Egypt, show a large deficit vis-à-vis the EU. The preponderance of the EU is also explained by the absence of understanding among SEMCs themselves and their failure to achieve South-South integration in spite of initiatives such as the Agadir Agreement. Trade flows between the two shores of the Mediterranean indicate a high degree of complementarity: SEMCs are traditional importers of EU's temperate products and simultaneously exchange Mediterranean products. Some instances from the last few years' trade data illustrate this complementarity: while on average about 10 % of EU agricultural exports have SEMCs as their destination, SEMC markets account for close to 20 % of sugar and sugar confectionery exported by the EU and a noticeable 45 % of EU's cereals exports. On the other hand, SEMCs are the origin of about 7 % of EU imports, but for vegetables this share is close to 40 % and for fruits it is about 20 %.

However, the EU as a trading partner is losing relevance as trade diversifies towards other countries outside the EU, in particular extra-regional powers like the US and large emergent countries (Brazil, China, India, Russia and South Africa). In fact, nowadays about two-thirds of food imports in SEMCs are purchased at countries outside the Euro-Mediterranean zone. The United States ranks as the leading supplier for basic agricultural commodities (mainly grains, in particular maize and soybeans) in Turkey, Egypt, Jordan, Morocco and Algeria. Imports from Brazil are also increasing (mainly beef, soybeans and sugar), and Russia and the Ukraine are becoming major exporters of cereals to the Mediterranean region. Figures 7.1, 7.2, 7.3 and 7.4 illustrate the main origins of SEMC imports for a set of basic products. While trade diversification is a valuable strategy, these developments can reflect the lack of confidence on the possibilities to create a common economic space in the Euro-Mediterranean region.

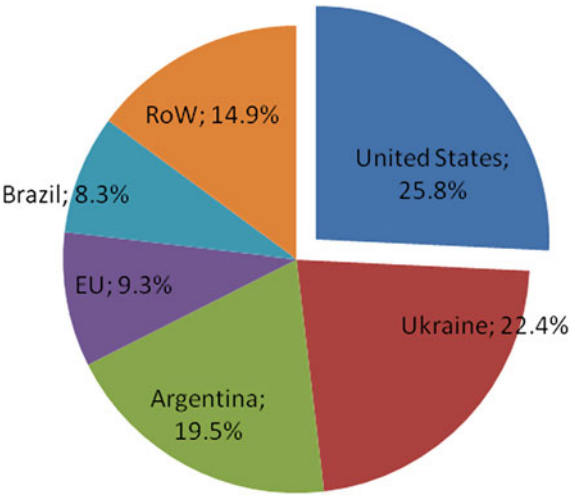

Fig. 7.1 Main origins of SEMC maize imports (2009). *Note* The SEMCs aggregated are Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia and Turkey. *RoW* Rest of the World. *Source* FAOSTAT

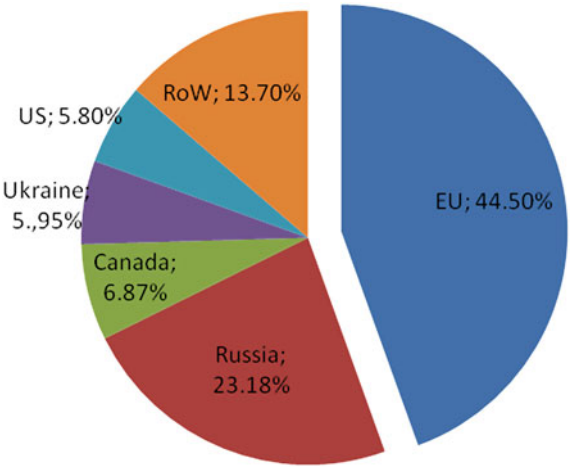

Fig. 7.2 Main origins of SEMC wheat imports (2009). *Note* The SEMCs aggregated are Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia and Turkey. *RoW* Rest of the World. *Source* FAOSTAT

7.3 Links Between Trade Patterns and Agricultural Policies

Trade patterns in the region are clearly connected with the domestic situation, as regards to natural conditions and farm and social structures (Garcia Alvarez-Coque 2012). In most SEMCs, there is a sharp dualism between traditional agriculture and modern agriculture. Traditional agriculture continues to be poorly integrated into the market and is highly dependent on weather conditions in rain-fed areas. In contrast, modern agriculture, consisting of large farms oriented toward exporting, is found mainly in irrigated areas devoted to fruit, vegetables and cultivated plains of grain and olive trees.

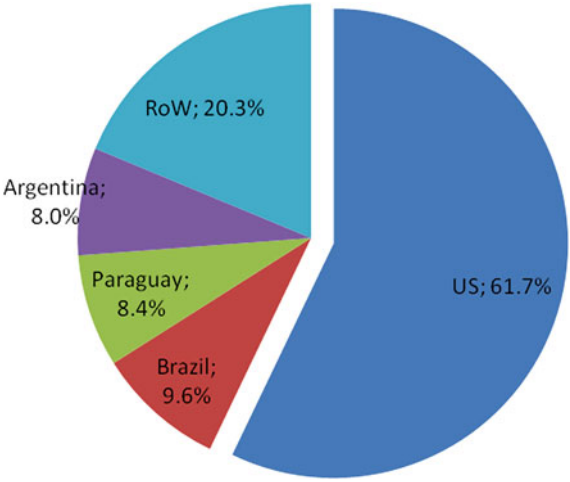

Fig. 7.3 Main origins of SEMC soybean imports (2009). *Note* The SEMCs aggregated are Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia and Turkey. *RoW* Rest of the World. *Source* FAOSTAT

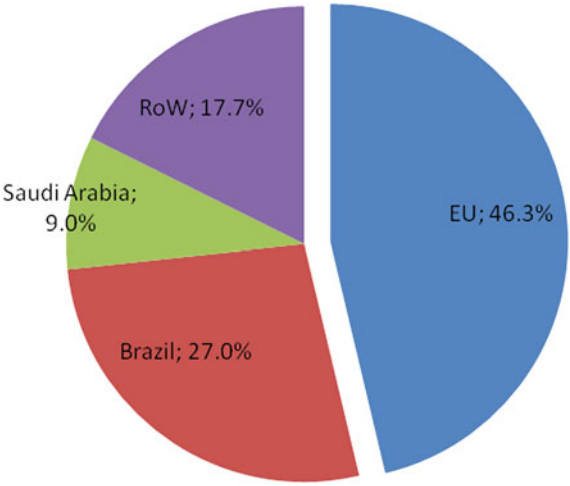

Fig. 7.4 Main origins of SEMC refined sugar imports (2009). *Note* The SEMCs aggregated are Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia and Turkey. *RoW* Rest of the World. *Source* FAOSTAT

Although SEMCs have made considerable efforts to improve their agricultural conditions, in general terms they continue to struggle with a poor endowment of cultivable land and water. Grain yields in rain-fed areas remain low in Morocco, Tunisia and Algeria, where the yield per hectare is between 1 and 2 tons. Agriculture is still the main livelihood of a substantial part of the rural poor in the region. Close to three quarters of the poor in SEMCs live in rural areas. Although agricultural production has increased in the region due to the efforts to enlarge the irrigated agricultural area, it remains highly variable due to harsh weather conditions. Food dependency has a lot to do with the agricultural constraints.

Simultaneously, there are also demand-side problems: food consumption continues to grow in a context of demographic change and urbanization. The

dependency problem is paradoxically aggravated by the emergence of the middle classes, keen to shift their diet and consumption patterns. This has been a consequence of economic growth and, at the same time, a reflection of the failure of domestic agricultural production to meet the food needs of the population. The direct consumption of cereals has been declining while being replaced by indirect consumption as feed for livestock. Another crucial element in food dependency is demography. Its evolution is quite varied in the region, with populations in the Maghreb countries growing a little over 1 % annually after the decrease in population growth experienced in recent decades, and significantly higher growth, about 2 % annually, in Egypt.

Fostering the productive sector has been a recurrent *leitmotiv* in many SEMCs to increase food security and alleviate poverty. In the past century, development options chosen in the fifties and sixties did not get the expected results: the revitalization of the agricultural sector, often based on land reforms accompanied by large-scale irrigation projects, had limited impact. Later in the eighties the structural adjustment programs included trade liberalization measures and the reduction of public transfers to agriculture. In the last decades, SEMC policies have hesitated between the exploitation of their comparative advantages in production and exports of fruits and vegetables, and the support of their more vulnerable traditional farming to reduce dependency on imports of the basic staples. For these objectives, programs like the Green Morocco Plan, launched in 2008, have given to irrigated agriculture a strategic role in national development. With the political crisis after the Arab revolutions, agricultural policies in many countries in the region remain weak and still need to build up confidence of economic agents. In fact, the governance deficits and the lack of a transparent regulatory environment constrain investment and international cooperation.

Turning now explicitly to trade policies, the first thing to state is that the situation is not the same for all SEMCs. In spite of the wide range of shared problems faced by agriculture and development in the region, there is still a long way to go until the Mediterranean countries reach a common vision on the role of agricultural policies in the future. Policy convergence across the region is not a *must* per se. But existing differences reflect the difficulties for international cooperation and coherence of policies. The lack of a common view can be illustrated by the approaches followed by different countries in the region as to how agriculture can be inserted in the multilateral trading system. The experience of agricultural trade negotiations shows a variety of positions among SEMCs with respect to the Doha Agenda. While the EU argues the need to reform farm policies through reallocating support towards policies of a less distorting nature, namely policies addressed to decoupled payments and public goods (e.g. "green payments"), other countries in the Mediterranean region seem to be reluctant to farm subsidies. Moreover, the EU direct payments are normally seen by SEMCs as a signal of the double standards in the interpretation of the world trading system that favours EU farmers with respect to farmers in the South and East of the Mediterranean basin.

What is common in agricultural policies in the region? Perhaps the defence of flexible rules for trade liberalization, as most countries in the region have vulnerable

agricultural areas and many of them suffer import dependence on basic food staples (Abis 2012; García Alvarez-Coque et al. 2012). However, as indicated in the previous section, even with this significant pressure, many countries in the region point to improving their exporting agriculture and see their market access in other countries increased. The case of Turkey is different and takes a more protectionist stand, as it argues for limited trade liberalization for special products.

Let us consider two case studies of Mediterranean countries with two alternative approaches for agricultural and trade policies, Morocco and Turkey (see Compés et al. 2013, for further details). Both cases reflect policies that accept trade specialization, but with a more open trade setting in the case of Morocco than in Turkey. Policy approaches are different as Morocco insists on improving the competitiveness of its export sector, while Turkey remains more cautious about how to adapt the more vulnerable farms. Turkey is one of the more developed and richer countries in the region. It is also its biggest agricultural producer. Turkey has an incomplete Custom Agreement with the EU and it has been a candidate country for decades. Morocco, at a lower human development rank, has evolved from preferential trade status towards advanced association status.

7.3.1 Morocco

Morocco has relied on agriculture for its economic development but its performance has usually been below expectations. Morocco's agriculture has clear advantages in land and labour, a long producing season, relative proximity to the EU markets, and a history of trading relationships with European countries, especially France. A dynamic exporting cluster is combined with traditional agriculture.

However, Moroccan agricultural potential is restricted by severe dry conditions in many regions, over-exploitation of water resources, inadequate irrigation techniques, weak farm structures, complexity of the land tenure system, illiteracy, unequal land property, weak institutional capacity, insufficient extension, research and marketing services, weak farming structures and high dependency on very few export commodities and export destinations.

Since 2008, Morocco has been implementing the Green Morocco Plan (GMP) as a major tool to reduce poverty and to improve competitiveness. Under its Pillar 1, the Plan is expected to create 1.15 million jobs by 2020 with a projected annual investment of 0.9 billion euro. Irrigation plans involve the transformation of 550.000 ha until 2020. The plan is intended to have an impact on more than 400,000 farms, both small family-run ones and intensive agri-food firms. The GMP's Pillar 2 focuses on the solidarity support of small-holder agriculture through improving the most vulnerable farms, especially in remote areas. Under this Pillar, 300–400 social projects are registered under the regional agricultural plans.

In the years previous to the GMP, Morocco signed a set of trade agreements with the aim of promoting agricultural exports as a means to ensure earnings that help to alleviate its dependency on foreign basic staples. Among them, the aforementioned

Agadir agreement and the FTA with Turkey are two examples of South-South cooperation, while the US–Morocco agreement and the Association Agreement with the EU are cases of North–South integration. While the US–Morocco agreement has certainly not translated into a boom of Moroccan exports (Akesby 2010), the Association Agreement witnesses less straightforward assessments.

The approach followed in the Association Agreements for agricultural goods follows a stepwise procedure: gradual liberalization extensions are agreed once evaluations of the previous compromises and political negotiations are carried out.

The agreement grants preferential access to agricultural products from the other partner. Preferential concessions to Morocco take several forms: in the most cases, there is full exemption from tariffs, while for other products this exemption is limited to a tariff-rate quota, often limited seasonally. In addition, another concession for certain fruits and vegetables consists of a reduced entry price, which acts as a sort of minimum import price for a series of fresh fruit and vegetables, quite often coupled with quantitative limits and seasonal application.

The last review of this EU–Moroccan Free Trade Agreement faced strong opposition in the European Parliament due partly to additional concessions to Morocco, though the final vote was favorable in February 2012.[1] This can be understood as a sign of political support to Morocco's reforms and as a clear step towards further trade integration. In an attempt to offer something to the opponents, in an accompanying resolution, Parliament called on the Commission to monitor strict application of border measures, such as the tariff quotas applied on tomato imports, and controls on the entry price system. The resolution also requested an assessment of the impact on European farming.

7.3.2 Turkey

Turkey is a country with a diversified agriculture, to a great extent based on small farms, many of them not very productive. Agriculture is not only an economic sector, but plays an important social role. Its agricultural adjustment follows the trend of the emerging countries. Plans for the conversion of Turkish agriculture have led to a gradual liberalisation and a paternalistic agricultural policy, based on payments recently linked to production. Turkey's huge export potential is based on value chains yet to be organised, with significant orientation towards extra-EU markets and limited harmonisation of quality standards with the EU. Food security concerns also apply in Turkey, with changing consumption patterns. The variety of climatic zones allows the production of grains, but this is vulnerable to international competition.

[1]In the following section, an assessment of the value of the preferences given under this review is presented.

The extent of the liberalization of agricultural products in the Custom Union is still limited so full membership of Turkey in the EU could have significant effects on agriculture on both sides. EU accession began in 2005. In May 2012, the Turkish government and the European Commission declared the need to implement a "positive agenda" to push the negotiations. Difficulties are amplified in a political setting of growing nationalist pressures in both Turkey and the EU, and an unstable macroeconomic climate. Closing positions are also constrained by the substantial differences that still exist in approaches to agricultural policy and rural development.

Turkey's agricultural policy tends to pursue self-sufficiency. Turkey applies market distortions through compensatory payments and subsidies linked to output. In 2001, Turkey introduced direct payments not too different from decoupled payments but they were withdrawn in 2009. So the policy evolution has been contradictory to that of the reformed CAP, which introduced decoupled payments (Ruiz et al. 2012). The interventionist approach of agricultural policy in Turkey is a special case in the OECD area. Most transfers to agriculture remain based on support mechanisms related to production and at market prices. Green box payments are practically non-existent.

Accession to the EU is expected to cause a significant impact on agricultural systems in certain geographic areas, forecasting a significant drop in the levels of protection for potatoes, table grapes, sunflower, corn and barley. These falls could be softened in the context of future international markets, with an expected rise in prices of livestock products. Although the costs of membership may be attenuated by a gradual transition, the family farm model is threatened, which is a common challenge in both the EU-27 and Turkey. Farm structures are atomized and over 90 % of holdings do not exceed 20 ha, with an average farm size of 6 ha.

EU membership will be a challenge for small producers, who will have to adapt not only to a new type of consumer or concentrated distribution, but also to the food safety standards in force in the Union. The integration of producers into cooperatives and other types of organizations varies by sector, with examples of cooperative unions such as Marmarabirlik Taris and the olive oil sector, with less success in the fruit and vegetable sector. The impact of accession would require adjustments in Turkish agriculture. But the market exposure of small farms in the Member States and in Turkey involves more or less similar challenges.

7.4 Issues in the Euro-Med Partnership

In the Euro-Mediterranean partnership, trade is not the least controversial topic. A great number of studies have underlined the need to overcome the controversies fuelled by the interest groups opposed to trade liberalization. In Europe, pressures emerge from firms and workers of import-sensitive sectors. There are also concerns related to the impact on the environment, in particular the impact of intensive agriculture on global warming and water resources. Critics also argue that trade

liberalization hampers small-scale farmers, who represent the majority of the poor in rural areas. Lack of trust also appears in many SEMCs, where the EU approach to extend the scope of trade liberalization is seen supposedly as "colonialist". These views usually present Euro-Mediterranean agreements as tools through which developed countries transfer their economic values into developing countries.

All in all, the distribution of trade impacts results in winners and losers within the countries concerned, and these can be regions, sectors, consumers, workers or firms. The role of agricultural policies in the region is to define an agenda that makes it possible for both the SEMCs and the EU to favour the impact on losers that can be minimized, compensated or avoided.

A great number of reports have studied the effects of the Euro-Med Agreements, including aspects of agricultural trade liberalization.[2] These works pay attention to the following outcomes:[3]

- In general, the Barcelona process has not had significant impact on EU-SEMC trade. Progress in expanding trade, fostering investment, and accelerating convergence is below expectations.
- The agreement with Turkey has had significant effects on imports and exports.
- The Agadir agreement had a positive (but not significant) effect on increasing trade between country partners.
- Aggregate liberalisation impacts on sensitive products in the Northern shore of the Mediterranean basin (fruits, vegetables, and olive oil) are expected to be small, but concentrated in certain producing areas and seasons. This concentration of losses in specific areas would make it easy to devise accompanying policies for the losers, but this is not taken into account in EU policies. The SustainMED project's WP4 suggests that a great deal of effort should be put into strengthening the value chains.
- The production potential in SEMCs is not unlimited. Water resources are a constraint in all the countries except for Turkey. The lack of organisation of the fruit and vegetables sector and the weak implementation of standards are currently constraining the export potential. However, an increase in direct foreign investment has been observed in recent years (mainly in Turkey and Morocco), which have contributed to the exporters in the region complying with EU standards.
- Consumers of SEMCs, particularly in urban areas, will gain significantly from cheaper food prices, particularly prices of cereals and cereal-based food products. However, prices should not be artificially cheaper through untargeted subsidy programs (see below).

[2]Some of them have been supported by the EU research programmes, such as SustainMED (or the previous project EUMED-AGPOL) or are linked to international organisations (e.g. IFPRI, IEMED, CSER/CEPS, CEPR, CIHEAM, IMF, etc.).

[3]See Garcia Alvarez-Coque (2002), Kuiper (2004), De Wulf, and Maliszewska (2009), Rastoin (2009), Emlinger (2010) and Abis (2011).

- Small holders in the SEMCs, mainly in rain-fed crops, directly suffer from trade liberalization.
- The growth potential of EU agricultural exports to the SEMC markets is probably significant.
- Environmental pressures emerge linked to the increase of activities and urbanisation in coastal areas and the intensification of agriculture. The improved transport infrastructure will increase pressures on natural resources and biodiversity.
- The Mediterranean diet is negatively affected by the agro-industrial model of mass production.

Can trade liberalization continue? The answer depends partly on the SEMC countries to take advantage of the new opportunities. And this fact is related to their capacity to overcome domestic weaknesses, which have been enumerated above.

7.5 Selected Topics in Trade Liberalization

In this section we highlight some recent findings related to agri-food trade in this area. These findings, stemming from some of the research carried out within the SustainMED project found that some of the conventional thoughts about the impact of trade policies are confirmed, while others have to be qualified. In particular, the current section below discusses the following points: (i) The scope of the preferences given to Morocco as a result of the last review of the Morocco–EU protocol; (ii) The impact of trade liberalization in fruit and vegetables, which are among the main exporting interests of SEMCs; (iii) The extent to which non-tariff measures (NTMs) are applied similarly by the countries in the Mediterranean region; and (iv) The underlying factors affecting NTMs applied by the EU on developing countries, in particular on some exporters in the region. We discuss, using EU data, to which extent food alerts and border notifications are related to certain variables, namely whether the implementation of NTMs depends on the import country within the EU or the export countries supplying the EU market.

7.5.1 The Scope of Trade Preferences in the Reviewed EU–Morocco Protocol

As indicated in previous sections, one of the cornerstones of the integration has been the signature of the Association Agreements. The agricultural protocols in such agreements have been reviewed, to various degrees, depending on the country, leading to gradual trade liberalization between the EU and the corresponding SEMC. In the case of Morocco, the Association Agreement was signed in 1996, coming into force in 2000. The first review of agricultural protocol took effect in 2003 and the European Parliament approved the last review in 2012.

As a result of such a review, the majority of Moroccan products are nowadays exported duty-free to the EU. Indeed, this is the main trade preference granted to Morocco. However, for certain products that are sensitive for certain EU producers, some restraints remain and preferences are then limited.

In particular, the entry price system remains in application and, for some fresh products, the preferences granted to Moroccan goods consist of a reduced entry price. This provision applies to tomatoes, cucumbers, courgettes, artichokes, sweet oranges, clementines, table grapes, apricots and peaches. The last three products were added in the last review from 2012, while the other six had already been granted a reduced entry price since 2000. For other products that are not protected with the entry price such as garlic or strawberries, the preference granted consists of a tariff-rate quota.

In addition to the restrictive effect of the entry price system itself—see Agrosynergie (2008), Cioffi and dell'Aquila (2004), Goetz and Grethe (2009) and Santeramo and Cioffi (2012) for thorough evaluations of the system—a seasonal quota is set for some of these products. They are tomatoes—with monthly quotas gradually increasing until the full implementation of the reviewed agreement—cucumbers, courgettes and fresh clementines. Quantities exported beyond this quota do not benefit from the reduced entry price, but usually still enjoy reduced tariffs. The reduced entry price is not constrained by a quota on the other products.

With this framework, an assessment of the last review of the Agricultural Agreement is presented here. The aim of this assessment is to compute the monetary value of the preferences given to Moroccan exporters, also comparing it with the same value in the previous preferential conditions. To do so, the Value of the Preference Margin (VPM) granted by the EU to Morocco is calculated. This indicator corresponds to the tariff revenue forgone by the EU as giving Morocco a preferential border treatment compared to the Most Favored Nation (MFN) conditions, and hence indicates the monetary size of the potential economic transfer to Morocco due to the preference. In fact, the preference can be transformed in market advantages compared to non-preferential competing products, either through a lower market price that permits gains in market share, or through a greater price received by exporters per unit sold (Grethe 2005). By definition, it is the difference in prices received by preferential and non-preferential exporters multiplied by the quantity that is exported under these conditions.

When the preference is expressed in terms of an ad valorem tariff reduction, the formula to calculate the VPM is (7.1):

$$VPM = \frac{(t_{MFN} - t_P)}{1 + t_{MFN}} P_P q_P \tag{7.1}$$

where t stands for the ad valorem tariffs (or ad valorem equivalents) for the exporters, each type noted by the subscripts MFN and p (MFN and preferential). P and q correspond, respectively, to the prices and quantities exported under the preferential regime. Martinez-Gomez (2008) proposed a modification of formula (7.1) to consider cases where entry prices are applied and the preferences consist of

reduced entry prices. In this case, two elements of the value of the preference were added, one due to the reduced entry price and the other related to the reduced ad valorem custom duty for countries benefiting from preferences.

We have used these formulae in two fruits—clementines and oranges—and two vegetables—cucumbers and tomatoes. All of them are relevant products in the trade of fruit and vegetables from Morocco to the EU. In the last years, among all the fresh tomatoes imported by the EU, about three quarters have originated in Morocco, and about 90 % of tomatoes exported by Morocco are sent to the EU. In the case of cucumbers, Morocco sends about one half of its exports to the EU and Morocco represents about 12 % of the value of extra-EU imports of this product. Among the citrus fruits, clementines from Morocco account for about 40 % of extra-EU imports, and this market represents close to 20 % of total Moroccan clementine exports. In the case of Moroccan fresh sweet oranges, they cover more than 10 % of EU imports, while the EU is the destination of above 50 % of the Moroccan fresh orange exports.

The VPM of the previous and the current agreements are compared in Table 7.1. The last review of the Agricultural Agreement increased by more than one third the value of the potential transfers granted to Morocco in the group of fruit and vegetables considered, reaching about 50.5 million Euros after the full implementation of the agreement. Another remark is that the gains calculated in the VPM are due to the enlarged quotas with reduced entry price, with the exception of oranges, where the quota is eliminated but trade flows are experiencing a downward trend.

Source: authors' calculations

In particular, tomatoes accrue about 60 of the VPM of the group of products considered. Whereas this figure might seem quite high, it is not, considering that the yearly value of Moroccan tomatoes exported to the EU is about 250 million Euros. Therefore, preferences account for about 10 % of the trade value in this product. In the other products, the VPM values are more modest in absolute terms, also being modest relative to the trade value in the case of the two citrus fruits—about 15–20 % of the trade value. Conversely, for cucumbers the potential gains boost up to 4.6 million Euros, which is greater than the current trade value. It reflects the fact that the new quotas set increased significantly in this case compared to the

Table 7.1 Comparison of the value of preference margin for selected Moroccan products: previous and current agreement

	VPM (€) Previous agreement	VPM (€) Current agreement (full implementation after 4 years)
Tomatoes	21,877,477	30,628,468
Cucumbers	1,702,768	4,597,474
Oranges	6,057,621	6,057,621
Clementines	7,553,175	9,214,873
Overall VPM (€)	37,191,041	50,498,436

quantities currently traded; therefore, there might be a wide opportunity for Moroccan exporters to increase their consignments to the EU under the new preferential circumstances.

In any event, what is uncertain is the medium-term evolution of the productive potential of these products, as a result of the investments made in the light of the GMP which may foster the sectors with good market perspectives.

7.5.2 Simulating F&V Trade Liberalization

Literature on the Euro-Mediterranean trade liberalization provides some insights from different theoretical approaches. From a general equilibrium perspective, a recent paper by Boulanger et al. (2013) produced simulations considering simultaneous trade liberalization and increased foreign direct investment and capital flows. While their results indicate general productivity gains, in the agri-food sector the effects are not fully conclusive, such as in the case of food security for SEMCs. Their results also highlight the distorting role played by NTMs in trade in the area —subsequent sessions of this chapter discuss NTMs.

From another approach, the partial equilibrium models allow representing in more detail trade policies that may affect sectors or groups of products (Paris et al. 2010). Among this perspective, trade in the Mediterranean area is framed by a series of regulations such as TRQs, entry prices or seasonality that make this approach advisable. Several studies on this token have been carried out by Britz et al. (2006), Bunte (2005), Garcia Alvarez-Coque et al. (2009, 2010) and Kavallari (2009).

As mentioned above, the policies applied by the EU to protect its fruit and vegetable markets consist of tariffs, TRQs, entry prices and seasonal variations. Hence, a set of partial equilibrium simulations was carried out under the SustainMED project considering these specificities to depict the EU import market for fruit and vegetables.[4] The simulations were carried out for monthly or shorter periods, taking into account seasonality in the preferential and MFN trade policies.

We considered a number of origins for every product—namely intra-EU origins, Morocco, other SEMCs of relevance depending on the product, and the rest of the world. The import demand is distributed following a two-stage Armington approach, meaning imperfect substitutability among products from different origins, assuming similar elasticity of substitution. The first stage differentiates between intra-EU and the other suppliers, and the second among the other suppliers. The composite price "P_c" for the good from the "i" different origins are calculated as shown in (7.2)

[4]See the Ph.D. dissertation of Hassan Oaubouch for further details on methods and findings. The methodology is explained in Garcia Alvarez-Coque et al. (2009, 2010).

$$P_c = \left[\sum \alpha_i^{\sigma} P_i^{1-\sigma}\right]^{1-1/\rho} \tag{7.2}$$

where α_i^{σ} is a weight factor, σ, the elasticity of substitution weight, and $\rho = (\sigma - 1)/\sigma_2$.

The market prices for every origin were computed considering their respective export prices, the tariffs applied "t" and a price wedge "w" that incorporates the effect of entry prices and quotas. This is illustrated in Eq. (7.3):

$$P_i = P_i^* \cdot (1 + t_i + w_i) \tag{7.3}$$

The model is also fed with import demand and export supply behavior parameters—the trade elasticities. They were calculated departing from domestic supply and demand elasticities, and consumption, production, import and export FAO data for every country.[5]

Three different scenarios were discussed for the same four products considered in the previous section: oranges, clementines, tomatoes and cucumbers. The three scenarios account for different stages of trade liberalization on the EU fruit and vegetables market. These scenarios evaluated the expected changes in trade flows and prices compared to the baseline scenario—the average trade flows and prices for the period 2007–2009. Again, we took Morocco as a reference in two of the studied scenarios but we also explored the effect of a full removal of trade barriers by the EU. The scenarios were defined as follows:

Scenario 1: Elimination of the entry price system for Moroccan Fruit and Vegetables. Other policy instruments such as quotas or the ad valorem tariffs were kept as they are currently. Thus, this scenario means a *partial liberalization* of EU imports from Morocco.

Scenario 2: Full liberalization of imports from Morocco. In this case, besides the entry price, ad valorem tariffs and quantity limits are eliminated. Therefore, here we assess a *full access of Morocco's exports* to the EU.

Scenario 3: Full trade liberalization of imports from all SEMCs. In this scenario, the EU eliminates the entry price system, the tariffs and all the quantitative restraints affecting their imports. Then, it is a *full liberalization of EU import* markets granting SEMC products full access.

The average yearly results are shown in the Tables 7.2, 7.3, 7.4 and 7.5 for every product.[6] Changes in sales and in prices refer to each product (origin) sold in the EU market.

For tomatoes, the first and second scenarios resulted in significant increases for Moroccan exports, with moderate losses to other partners—inclusive of intra-EU

[5]See McCalla and Josling (1985, pp. 36–41) to review the methodology of the trade elasticities calculation.

[6]The monthly detailed results are available upon the authors' request, and more details are also available in Ouabouch (2013).

Table 7.2 Trade impacts of liberalization scenarios: comparison with 2007–2009 data—tomatoes

	Scenario 1: EP removal for Morocco		Scenario 2: full trade liberalization to Morocco		Scenario 3: full trade liberalization to SEMC	
	Change in sales (%)	Change in prices (%)	Change in sales (%)	Change in prices (%)	Change in sales (%)	Change in prices (%)
Intra-EU	−2.11	−0.39	−2.43	−0.46	−3.68	−0.70
Morocco	92.13	−6.22	111.05	−7.20	109.16	−7.47
Turkey	−4.32	−0.16	−5.03	−0.21	92.15	−7.14
Israel	−2.46	−0.35	−3.36	−0.36	66.12	−5.86
Tunisia	−6.64	−0.02	−6.57	−0.03	93.70	−8.50
Rest of the world	−4.06	−0.20	−4.72	−0.22	84.56	−6.79

Table 7.3 Trade impacts of liberalization scenarios: comparison with 2007–2009 data—cucumbers

	Scenario 1: EP removal for Morocco		Scenario 2: full trade liberalization to Morocco		Scenario 3: full trade liberalization to SEMC	
	Change in sales (%)	Change in prices (%)	Change in sales (%)	Change in prices (%)	Change in sales (%)	Change in prices (%)
Intra-EU	−0.06	−0.06	−0.11	−0.11	−0.63	−0.63
Morocco	73.58	−9.48	121.51	−13.88	119.01	−14.24
Turkey	0.01	−0.08	−0.14	−0.11	83.54	−12.08
Rest of the world	15.81	−1.21	15.72	−1.25	65.07	−8.37

Table 7.4 Trade impacts of liberalization scenarios: comparison with 2007–2009 data—oranges

	Scenario 1: EP removal for Morocco		Scenario 2: full trade liberalization to Morocco		Scenario 3: full trade liberalization to SEMC	
	Change in sales (%)	Change in prices (%)	Change in sales (%)	Change in prices (%)	Change in sales (%)	Change in prices (%)
Intra-EU	−0.08	−0.08	−0.08	−0.08	−1.49	−1.49
Morocco	13.91	−1.27	13.91	−1.27	8.76	−2.37
Turkey	−0.47	−0.04	−0.47	−0.04	36.79	−4.43
Israel	−0.49	−0.04	−0.42	−0.04	8.43	−2.28
Tunisia	−0.49	−0.05	−0.45	−0.05	2.72	−2.05
Rest of the world	−0.78	−0.01	−0.78	−0.01	246.95	−10.87

Table 7.5 Trade impacts of liberalization scenarios: comparison with 2007–2009 data—clementines

	Scenario 1: EP removal for Morocco		Scenario 2: full trade liberalization to Morocco		Scenario 3: full trade liberalization to SEMC	
	Change in sales (%)	Change in prices (%)	Change in sales (%)	Change in prices (%)	Change in sales (%)	Change in prices (%)
Intra-EU	−0.41	−0.19	−0.51	−0.25	−1.63	−0.82
Morocco	9.63	−2.06	16.68	−3.33	16.22	−3.63
Turkey	−0.41	−0.19	−0.51	−0.25	11.09	−4.42
Rest of the world	−0.24	−0.24	−0.29	−0.29	22.57	−5.04

sales. In the third scenario, all the extra-EU partners increase their exports to the EU at the expense of the intra-EU sales. A noteworthy instance is that the Moroccan results do not differ significantly between the second and third scenarios. Preference erosion is observed in Scenarios 1 and 2 with slight losses for Mediterranean countries other than Morocco. Prices at the EU market of each of the origins liberalized go down significantly, but the general intra-EU prices don't fall significantly, given the large size of the EU market for tomato. So the conclusion is that the results of a trade liberalization do not show dramatic changes for the EU tomato market.

For cucumbers, the first and second scenarios result in significant increases for Moroccan exports with a little reduction of intra-EU sales. If trade is liberalized for all the SEMCs, Turkey also greatly benefits from this. All in all, the losses for intra-EU sales are small. MPC countries would become more competitive with trade liberalization but the effect on EU internal prices for EU producers would not be significant, in a context of product differentiation.

Removing barriers in the orange market would only result in noticeable variations if trade is liberalized for all the SEMCs. In this case, Turkey would be the country that benefits most. As a consequence of this scenario, the intra-EU sales would be affected by a small but noticeable reduction.

In the case of clementines, when trade is liberalized for the SEMC, the gains for them are moderate in terms of additional exports to the EU, and they happen at the expense of intra-EU sales. In the other scenarios, the increases in exports that Morocco experiences are moderate.

In general terms, the results presented here show that trade liberalization, including the removal of entry prices for Morocco would boost its exports for the two vegetables. These are the cases where its effect seems more protective. In all the products, eliminating the entry price for Morocco would not affect domestic prices in the EU to a significant extent. Moreover, our results indicate that trade liberalization in EU markets would not result in dramatic price and sales changes for EU producers, in spite of the fact that extra-EU import flows could rise significantly.

This is one of the myths that we want to qualify in this section. That the marginal impact of trade liberalization does not provoke substantial trade impact does not mean the absence of problems in the value chain for exporters and farmers. Pressures on prices are in many cases related to the lack of transparency, lack of organization and asymmetric information among the different agents in the value chain. Very often, market pressures are attributed to foreign competition when the source of problems may be perfectly related with the weak functioning of the value chains.

7.5.3 NTMs in SEMCs

Recent research has clearly illustrated the trade restrictiveness of NTMs (Hoekman and Nicita 2008; Lloyd et al. 2009; Manole and Spatareanu 2010). However, NTMs do not necessarily restrict trade; on the contrary, some evidence indicates that many rules are precisely set to facilitate transparency and predictability. For example, Sanitary and Phytosanitary measures (SPS) and Technical Barriers to Trade (TBT) can bring significant social benefits even to low income countries (Chemnitz et al. 2007), such as reduced agrochemical use and a framework that guides good agricultural and management practices.

As part of their integration process, SEMC countries are in different stages of harmonization concerning their NTMs (Gonzalez-Mellado et al. 2010). For this reason, providing knowledge and fostering better harmonization of NTMs in the Mediterranean area may be helpful in fostering trade rather than restricting it.

We present here a quick view of the estimates of ad valorem equivalents of NTMs (AVE) by Kee et al. (2009) calculated for the Mediterranean Partner Countries. Calculating AVE involves converting a non-ad valorem tariff into a percentage of the value of the product (see Tudela et al. 2013). The group of countries considered in our study consisted of Algeria, Egypt, Jordan, Lebanon, Morocco and Tunisia. AVEs were considered for products defined at tariff lines up to 6 digits of the Harmonised System (HS).

Summarizing the main results, the first element that should be pointed out is that most SEMCs have AVEs that can be considered as peaks.[7] Concretely, 79 % of products present an AVE value that can be considered as an AVE peak, if we define it as a value greater than 0.20. In addition, the total AVE peaks over 0.75 is 47.8 %. Figure 7.5 reflects the situation for the set of products selected, but detailed results

[7]We keep the "usual" criteria for identifying peaks: the literature identifies as tariff peaks those above 0.2 (mentioned in ICTSD 2009). Among these peaks, the modalities document circulated in the WTO current negotiations, suggests that the highest tariff reductions shall be done in those where the final bound tariff or ad valorem equivalent is greater than 75 % (World Trade Organization 2008). Following this, we will identify as "high AVE peaks" those AVE values greater than 0.75.

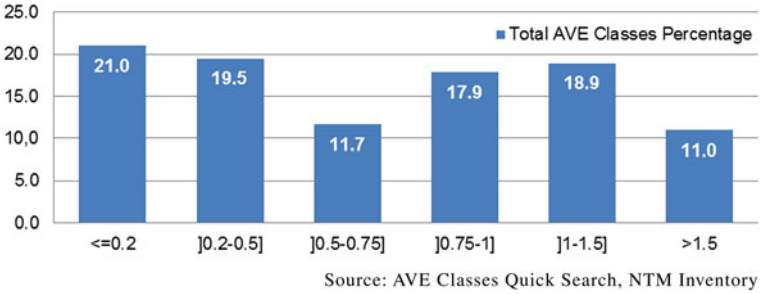

Fig. 7.5 Total AVE of NTMs in MPCs, by AVE class: percent of products in each class. *Source* AVE Classes Quick Search, NTM Inventory

Table 7.6 Number of high AVE peaks by product code

Chapter	Product description	Number of highest AVE peaks	Percentage of high AVE peaks (%)
02	Meat and edible meal offal	83	13
20	Prep. of vegetables, fruit and nuts	80	12
08	Edible fruits and nuts	72	11

show that this situation persists in all the studied countries.[8] These results suggest there is still a long way to go until NTMs lose relevance in constraining trade in SEMCs.

Another finding to highlight is that higher AVE peaks take place mostly in a set of products: chapters 02 (meat), 08 (fresh fruits) and 20 (processed fruit and vegetables) show the highest number of AVE peaks over 0.75. These three chapters account for above one third of these high peaks. Table 7.6 illustrates the results concerning the number of high AVE peaks for the countries considered.

The three leading categories in SEMC exports to the EU are fruit, vegetables and preparations based on these two fresh products. Altogether, they represent 54 % of MPC exports. The large AVE applied to these products seems somewhat contradictory with the aim of building up at the intra-regional market. Apart from the "protectionist hypothesis", sensitiveness to sanitary and phytosanitary problems may lead to exigent NTMs on certain products. It is interesting to note that all countries have NTMs with high AVE values for the product code 020629 (edible offal of bovine animals). That might correspond to concerns regarding consumers' health protection.

[8]These country results are omitted for space reasons, but are available upon the authors' request. More details can be found in Tudela et al. (2013).

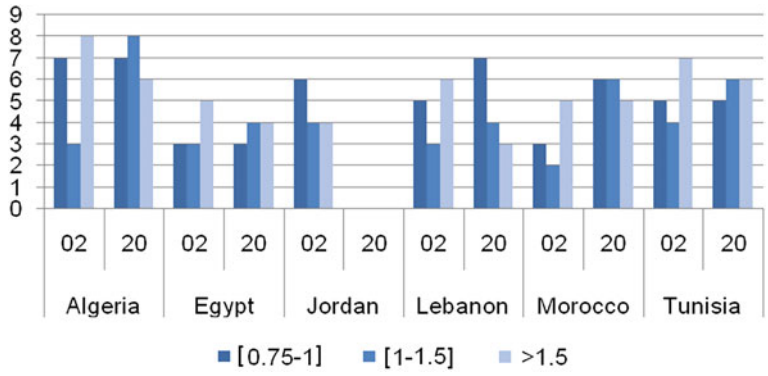

Fig. 7.6 Number of AVE by Country by AVE classes and by product: high AVE peaks. *Note* As a rule, missing country/period data means that the reporting country had not reported data for that specific year, e.g.: Jordan chap. 20 in this figure. *Source* Kee et al. (2009) Authors' calculations

NTMs in the region are far from being harmonized. Focusing on AVE over 0.75, Algeria is the country with a larger number of AVE peaks (22 % out of the total) and Jordan with the least (4 %). It might be understood that Jordan is the country which is less trade-restricted by NTMs.

Focusing on the two chapters with the greatest number of high AVE peaks (meat and preparations of fruit and vegetables), the Fig. 7.6 provides a breakdown of the distribution of the high AVE peaks (over 0.75). For both products, Algeria and Tunisia show the highest absolute frequency of the high AVE peaks. Egypt and Jordan have the lowest frequency of high AVE peaks, whereas Morocco seems to apply more restrictive NTMs on preparations of fruit and vegetables than on meat.

7.5.4 Food Alerts and Notifications by the European Union

Limited resources in developing countries preclude their participation effectively in the World Trade Organization (WTO) and they are still unable to fully benefit from the opportunities generated by multilateral agreements (Michalopoulos 1999), given their lack of capacity to comply with standards and controls. The EU applies strict standards compared to other standards required in the OECD area. Indeed, accomplishing the EU standards is still a challenge for import products. However, according to Grazia et al. (2009), the main exporting sectors from SEMCs are less affected by border rejections as a consequence of a higher compliance effort undertaken by exporting countries, including infrastructure, skills, human resources, control and test procedures.

7.6 Reputation Effects

Literature on the effect of NTMs is still scarce and does not provide a complete image on NTMs and the reputation effect on the cross-trade system. This reputation effect is the core point of the analysis introduced in this section. The underlying idea under this concept is that one product's rejections in one year may affect the probability of future rejections, and that such effects may appear at the product, sector and country level. All constitute a set of so-called *reputation effects*.

To our knowledge, there are only two studies that have focused on the reputation effect regarding the exports of developing countries: the analyses by Baylis et al. (2010) and by Jouanjean et al. (2012). Departing from these two documents, we extended knowledge on the reputation effect concerning EU imports.

To do so, the notifications registered by the EU and included in the Rapid Alert System for Food and Feed (RASFF) were used. The database used consists of 6757 observations representing the number of notifications registered by the EU during the period of 2000 and 2012 from 21 developing countries, including Turkey and some other SEMCs. Suppliers in the sample were selected on the basis of their export volume to the EU and the number of registered notifications. A conditional fixed-effects negative binomial regression was applied to determine the effects of certain variables in the number of notifications in the year "t". Among the explanatory variables, there are a set of reputation effects—related to the product and sector, and related to the geographic area and country of origin—as well as GDP per capita of the originating country, and the growth and volume of imports.[9]

Taking into account the conventional thoughts stated regarding the effect of trade policies, the main result from this analysis is that the product reputation effect is found to be statistically significant, suggesting that NTM decisions are affected by the past history of the notifications registered: at the product level, the notifications in the year "t − 1" increase the likelihood of expected notifications in the year "t" for that same product.

In contrast, sector and country reputation effects are found to be not statistically significant. Regarding the regional reputation effects, only the variable representing the reputation effect of the Latin American region shows a positive statistically significant coefficient. Nevertheless, the quantitative contribution of such an effect is fairly low. No positive regional effect takes place for the SEMC taken as a region. Hence, another conventional thought that can be qualified is that the agri-food exports from the Mediterranean region are particularly discriminated in the EU border, since the empirical evidence found suggests that it does not happen.

[9]All the details of the analysis can be found in Taghouti and Garcia Alvarez-Coque (2013).

7.7 Differences Between EU Member States

Another conventional thought that can be discussed is as follows: there are different propensities to issue notifications across different EU borders. One of the reasons for those different propensities to report notifications might arise from the likelihood of new blights and animal and plant diseases contaminating domestic productions in the importing countries. This argument is sometimes used by EU producers' organizations, indicating that the "zeal" of border authorities diminishes in the customs located in countries with low productive levels.

To empirically test this statement, we explored 1123 notifications for fruit and vegetables, considering which EU Member States issued them.[10] We also distinguished between notifications related to exports from all the extra-EU origins from the ones related to the SEMC origins.

The first focus was put on the EU Member States that are big producers of fruit and vegetables and import low volumes of these products—that includes the majority of the EU Mediterranean countries. Slovenia, Malta and Cyprus tend to issue fewer notifications than the rest of the EU Mediterranean countries in general terms. But the situation switches when the test is restricted to SEMC origins, as these three countries then have a significantly higher frequency of notifications than the rest of the EU Mediterranean countries.

Besides this case, Greece's frequency is more significantly ahead than Italy's and Spain's. Another finding that might be surprising is that Spain issues the least frequency of notifications out of this entire group of EU Mediterranean Member States. This again seems to contradict the use of sanitary and phytosanitary rules as barriers to foreign competitors, since Spain is one of the European fruit and vegetable producers more affected by SEMC exports.

Turning our attention to the big EU importers, again some changes in the ranking appear according to the different origins considered. The most remarkable fact is that Germany's frequency is the lowest considering all the extra-EU origins, while it passes to first position when only SEMC origins are taken into account. Maybe the strong trade flows with Turkey together with a big number of notifications affecting the same Turkish product are responsible for this fact. A second element to stress is that the Northern EU countries show a statistically higher frequency of notifications than the Benelux, irrespective of the origin considered. Like in the Spanish case, we could then state that there is little argument for a disguised barrier to trade posed by the Benelux countries although representing a significant share of the EU supply for certain vegetables.

In summary, there is no evidence that the implementation of NTMs, included in the RASFF database, are used by large EU producers of fruit and vegetables as a disguised form of protectionism.

[10]As in the previous case, more details can be found in the SustainMED report "Agricultural trade liberalization in the Mediterranean region" SustainMED, Deliverable D10. Available at http://sustainmed.iamm.fr/index.php/publications/project-reports.

7.8 Concluding Remarks and Policy Implications for the Euro-Mediterranean Space

The main aim of this chapter has been to analyse the increasing opening of SEMCs' agricultural markets. In the last decades there has been an increased trend towards trade liberalization. The trend is confirmed by a set of bilateral trade agreements involving SEMCs, which have been implemented in recent years. Our analysis contributed towards illustrating the complex nature of trade liberalization in the Mediterranean area. Moreover, it drew on the lessons learned from trade policies and the monitoring of trade liberalization.

Inspite of the important differences between social and political situations among the SMECs, they share experiences regarding their agricultural situation. Trade liberalization involves pressures on Mediterranean agriculture and there is a place for a comprehensive approach that highlights the situation of small farmers and their vulnerabilities across the region. The key points to underline from our study are the following:

a. **The scope of trade preferences in the reviewed EU–Morocco protocol**, based on a comparison of the value of preferences granted between the previous agreement and the current situation for selected Moroccan products.
b. **Simulating F&V trade liberalization**: The results of the different scenarios studied suggest that the trade liberalization process does not have an overall negative impact on EU producers. Certainly, it should be noted that problems and vulnerabilities observed for sectors in the Northern shore are mainly due to the functioning of the value chains, related to the lack of transparency, weak organization and inefficient and asymmetric information, rather than competition from SEMC exports.
c. **NTMs in SEMCs and notifications by the EU**: According to the results, SEMCs are in different stages of harmonization of their NTMs. The higher AVE peaks vary across countries depending on the products, although they are concentrated on product chapters 02 (meat), 03 (fish), 20 and 22 (processed fruit and vegetables). Those products are especially sensitive to sanitary and phytosanitary problems. This is consistent with the main result from the analysis of the RASFF database. Notifications are statistically related to product reputation effects. By contrast, sector and country reputation effects are found to be not statistically significant. Specifically, the EU does not show separate regional effects for the SEMCs taken as a region, so there is no sign of discriminatory implementation of NTMs by the EU on Mediterranean exporters.

From the facts observed, we can highlight the following elements of the discussion:

Challenges faced by small farmers in the value chains in the SEMCs are similar to those observed in Europe, particularly in many parts of Southern and Central Europe. Linked to different production systems in the region, in the Mediterranean region various value chain models exist with very different levels of organization.

Value chains aimed at the domestic market tend to have a lower level of organization than chains aimed at agricultural exports. The small farms that dominate are poorly organized and suffer from poor infrastructure and considerable loss of product. By contrast, large-scale farms, able to meet the demands of European retailers in terms of plant health and quality, characterize the agro-export chains. It is not surprising that SEMCs mainly export to Europe, since a South-South regional market fails to consolidate. Few policies have explored the organization of the value chain or considered the opportunities offered by transnational cooperation in the Euro–Mediterranean region. The development of marketing partnerships could strengthen quality, predictability and speed of supply for all actors in the value chain.

The decision to reform the CAP in 2013 did not explicitly consider the possibility of partnerships with SEMCs. However, the new CAP discussed some elements that could be included in a future partnership between countries in the Mediterranean basin. Among them, two relevant approaches are (i) the organization of agricultural production chains to ensure the sustainable distribution of value added, including transnational cooperation; and (ii) measures to help the competitiveness of rural areas based on innovation, preservation of ecosystems, development based on local governance and social inclusion. Both approaches support the idea that it is not only with trade liberalization that a shared development will be reached in the Euro–Mediterranean region.

We cannot deny the local impacts of agricultural trade liberalization on vulnerable agricultural systems. However, this debate has been distorted by the lack of understanding about the real problems of rural areas. First of all, we have to identify what should not be observed as problems but as normal challenges related to the rapid changes in the international economy. Most of these effects can be managed through targeted policies equipped with adequate instruments. The standard approach of agricultural policies, which has been based on a large subsidy component to farming (including the last CAP's single payment scheme), might have been helpful to soften the social impacts of adjustments but it is less effective to guarantee a sustainable development in rural areas. The new CAP represents a move to a more targeted support, but links with the provision of public goods are not yet completed (Mathews 2013).

Why then not talk about a common agenda for agricultural cooperation including the whole region? The need to strengthen agricultural cooperation between the EU and Southern Mediterranean countries is urgent. Trade liberalization alone is not sufficient to alleviate the urgent need for new jobs for rural youth in SEMCs, which lack infrastructure, education, health, human rights and peace. It is necessary to support more effective partnerships, which promote an emergent civil society seeking to build a basis for developing democracy. Trade liberalization in SEMCs must be accompanied by increased development aid and support to civil society.

The EU initiative for Euro-Mediterranean cooperation is the European Neighbouring Programme for Agriculture and Rural Development (ENPARD) which puts agriculture at the core of the relationship between the EU and SEMCs. It recognises the key role of agriculture in terms of food security, sustainable

production and rural employment and tries to respond to the challenge of modernizing agriculture and rural areas in their countries.

As for agriculture, more efforts have to be taken to consolidate cooperation between economic and social agents. The paper by Compés et al. (2013) lists some successful initiatives in the field of agricultural and rural cooperation. The conditions for dialogue are being established. The EU and SEMCs can take advantage of the available expertise in strengthening local initiative networks, involving stakeholders, NGOs, and public research and extension institutions.

Cooperation can be extended to cover regulatory areas of mutual interest. As far as agriculture is concerned, the Deauville Partnership launched an agenda in 2011 which covers six priorities: improving market access for agricultural products and encouraging investment, upgrading standards, promoting agricultural research and extension, and delivering efficient and sustainable irrigation services. Priority has to be given to building capacities to provide farmers with adequate information and training.

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Chapter 8
From Value Chain Analysis to Global Value Chain Analysis: Fresh Orange Export Sector in Mediterranean Partner Countries

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8.1 Introduction

Preceding chapters outlined some of the challenges facing Mediterranean Partner Countries (MPCs), from stubborn rural poverty to a crisis in its rapidly changing demographics. The region is facing a predicament over agricultural policy and competitiveness in its agri-food sector. MPCs and the wider region of the Middle

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East and North African (MENA) are failing to meet the challenge of averting heavy rural-urban migration and the current policy strategy has not brought the economic growth to the region that it desperately needs (Baldacci et al. 2008). Poor economic opportunities are pushing rural households into the city where instead of finding new prospects, poverty is merely concentrated in urban slums and unemployment continues to be a looming threat for the region (Nabli 2004). The population in MPCs that depend on agriculture coupled with a job crisis that must be confronted over the next decade suggests that the agri-food sector is, at least in the short term, the only realistic sector to bring economic improvements to rural areas in MENA. Yet growth in value-added agriculture in MENA is on par with sub-Saharan Africa and is significantly less than all other developing regions (Binswanger-Mkhize and McCalla 2010). Agricultural policies in the region continue to link competitiveness, with volume being the overarching aim (Lindberg et al. 2006). All of this suggests that the region presents fertile ground to test a new value-orientated tool that goes beyond 'conventional industry studies' (Kaplinsky and Morris 2002).

The present chapter contrasts with other chapters in this book. Rather than an analysis from the subject area of economics, a method that is more aligned with the business management discipline is presented.

Using a methodology adapted from the work of Taylor (2005) and taken from the Supply Chain Management (SCM) literature, this chapter applies a Global Value Chain Analysis (GVCA) which identifies where value is created in the eyes of the end consumer and highlights bottlenecks based on the flow of materials, the flow of information and the strength of relationships between actors, from spot market and opportunistic to integrated and trusting relations. The contribution is primarily methodological in that it is an attempt to link process tracing and consumer-orientated demand pull concepts in the SCM literature (Collins 2009; Fearne 2009) with creating policy recommendations within the context of export competitiveness.

The chapter begins with a literature review of value chain thinking concepts and a review of past methodological approaches in the SCM literature to value chain analysis, leading to our justification for contributing to the literature with a sectoral level of analysis and combining it with qualitative key informant information to create policy recommendations. Then an overview of the fresh orange sector in the region is described and justification for using MPCs as a context is offered. Based on the methodology we adapt from Taylor (2005) which provides a multi-faceted view of the global value chain, a set of insights are gathered about the nature of value creation and where constraints exist. Resulting policy recommendations provide examples of how a value-chain-centric approach could be used to highlight innovative policy solutions to MPCs' agri-food export sector, for instance, disseminating consumer information to relevant stakeholders and incentivising investment in supply chain activities that add value for European consumers. A broad aim of our chapter is to generate a discussion over how value chain thinking can be used as a tool to inform policy debate.

8.2 From Value Chain Analysis to Global Value Chain Analysis

The concept of a value chain was first introduced by David and Goldberg (1957) and popularised by Porter (1990). The value chain presents the input-output structure of supply chains as one which is composed of particular value-adding activities. Value chain thinking starts from the basic and widely held assumption that the value of a finished product is decided by the final consumer and thus, the value chain is defined as the activities that add value to a product from basic raw materials to the final consumer (Lindic and da Silva 2011; Slywotzky and Morrison 1997; Soosay et al. 2012; Walters and Lancaster 2000). It therefore advocates a *demand pull* strategy where consumer value dictates the value attributed to activities along the chain rather than a supply-push approach (Walters and Lancaster 2000). The end result from this line of thinking is that all components of the value chain play a role in formulating and creating consumer value; therefore a weakness with one component has an adverse effect on the creation of value for the whole value chain.

Value chain thinking requires this broad analysis because constraints or opportunities can exist in any part of the chain (Campbell 2008), rather than just focusing on a single actor which only tells a fraction of the story. Effective chain practises, built on holistic concepts of strong strategic partnerships founded on inter-firm trust and a high degree of quantity and quality in information sharing between firms, create a competitive advantage that, in turn, improves organizational performance, and conversely, a spot market relationship where little information is shared and relations are opportunistic and could have a detrimental impact on performance (Carson et al. 2003; Delbufalo 2012; Dyer and Singhe 1998; Handfeld and Bechtel 2002; Kannana and Tanb 2005; Li et al. 2006; Zaheer et al. 1998). This presents a strong argument against firms acting in 'functional silos' (Christopher 2011). The implication is that competition is moving away from 'between firms' to 'between value chains' where it is the entire chain which becomes the vehicle for adding value and eliminating waste and not the individual organization in isolation (McGuffog and Wadsley 1999). This holistic, multi-dimensional view of agri-food chains sets the conceptual basis for Value Chain Analysis (VCA).

There is a variety of different approaches and conceptions of what constitutes a VCA, each stemming from different sub-disciplines in the literature.[1] One such approach is from SCM where VCA finds its origins in Value Stream Mapping (VSM) (Womack and Jones 1994). VSM is a lean manufacturing method, based on the work by Hines and Rich (1997), to analyse the efficiency of material and information flows between segments in the value chain with the aim of eliminating waste through the facilitation of efficient flows. This kind of technique to eliminate waste has a strong record of revealing and eliminating waste along the value chain

[1]Trienekens (2011) outlines four distinct theoretical models for VCA; Global Value Chains, SCM, New Institutional Economics and the Network Approach.

(Francis 2000; Jones and Simons 2000). VCA borrows from this but with the added dimension of relationships between chain members which relates to the organisation, management and control of the chain (Taylor 2005) and has a significant impact on supply chain outcomes (Christopher and Juttner 2000; Cousins and Menguc 2006; Li et al. 2006). In line with Porter's (1990) notion of value addition and based on the idea that consumers have the final say on what constitutes value (Slater and Narver 1992), a number of studies have incorporated consumer research into the methodology (Adhikari et al. 2012; Bonney et al. 2007, 2008; Soosay et al. 2012).

Therefore, in accordance to its evolution in the SCM literature, VCA is a diagnostic tool to assess the strengths and weaknesses within a value chain based on three constructs: (1) the material flow, judged based on where value lies *in the eyes of final consumers*, identifying where investment should be targeted and what activities should be eliminated; (2) the dynamics of information flow between actors; and (3) the strength of relationships, constructed from notions of trust and commitment between actors. VCA looks at the stages a product goes through, all the way from raw materials to final consumption (Rieple and Singh 2010). While VCA has had a strong presence in the motor and I.T. sectors, the agricultural sector presents a more challenging picture of transactional, arms-length relationships between partners (Simons et al. 2003).

A number of studies have built on the VCA tool to analyse different dimensions of agricultural value chains and competitiveness, demonstrating the versatility of VCA to tackle a variety of concepts and issues. Bonney et al. (2007) use VCA to identify the processes and key factors for co-innovation between value chain stakeholders. Expanding the scope of VCA to environmental sustainability, Soosay et al. (2012) modify the methodology into Sustainable Value Chain Analysis (SVCA) by quantifying the environmental impacts of activities in the value chain. Focusing on the notion of consumer value, Adhikari et al. (2012) demonstrates how segmentation could be a powerful tool for reforming the tomato value chain in Nepal.

While the applications of VCA have varied, to date it has tended to be utilized as an in-depth tool bounded by an inter-/intra-firm unit of analysis (Fearne et al. 2012). However because current methods choose contextual depth over generalizability, a single chain method restricts the ability to make the broader generalizations necessary to inform agricultural policy. The findings from VCA studies within the SCM literature have been mostly restricted to the chain in question. In the past, research on agricultural policy has been informed by conventional industry studies from the economics profession based on a focus on size and growth, especially in terms of gross output rather than value addition (Kaplinsky and Morris 2002). The necessary step to bring VCA into relevance for policy makers would be to make a move towards a sectoral level of analysis (Schmitz 2005).

To reflect a change in the unit of analysis, we shift terms from 'value chain' to a 'Global Value Chain' (GVC) defined as value-adding activities that typify an industry and go beyond borders, typically from developing country suppliers to developed country consumers, and representing a multitude of stakeholders bound

by their participation in the same sector (Gereffi 1999; Gereffi et al. 2005; Kaplinsky 2000; Kaplinsky and Morris 2002). Mirroring the change in the unit of analysis, we also redefine the method of VCA to Global Value Chain Analysis (GVCA). It is important to note that we use this term not for the same purposes as in the framework offered by Gereffi et al. (2005) and Humphrey and Schmitz (2002). These authors' framework is more in line with the governance paradigm of power relationships and lead firm coordination, rather than the lean concepts contained in SCM. Therefore, while there have been policy implications drawn from the GVC governance framework (Kaplinsky and Morris 2002; Schmitz 2005), these implications have not been fully considered in a SCM approach to policy problems.

The novelty of our contribution is the combination of a methodology developed by Taylor (2005) with a GVC aggregated view of the fresh orange sector, placed within the context of sustainable development in the Middle East. There is scope for making a methodological contribution to the literature by demonstrating the lessons learnt in adapting VCA from a single value chain with a low number of participants and a narrowly defined value stream, reflecting current VCA methods in SCM, towards a more aggregated level that involves a larger sample of participants. At the same time, we also wish to demonstrate how value chain thinking can be utilized as a lens to view policy.

8.3 Research Methods

8.3.1 Data Collection

As noted in the review of the literature, the research methods used in the study are different to those used in previous VCA in that we take process tracing from the SCM literature and aggregate it to the industry level as a means to generate broad policy recommendations. As a result, the research was expanded from a small number of participants to a larger sample. Participants included:

- Citrus input suppliers who provide fertilizer and pesticides to growers
- Orange growers
- Extension services that, despite not participating in the flow of materials, provide advice and training to growers
- Orange packers
- Citrus exporters
- Citrus buyers from UK, France, Germany, Spain and Russia
- Consumers from UK, France, Germany and Russia

European countries were chosen based on their prominence as destination markets for oranges coming from the region. The data that makes up the GVCA comes from both quantitative and qualitative sources through survey and interview methods. Two areas are examined as part of the methodology: consumer value and global value chain dynamics (material flow, information flow and relationships).

Consumer value was constructed through three exploratory focus groups in the UK, with eight participants in each, and segmented by place of shop, to build a basic understanding of shoppers' attitudes towards oranges. From this, formalized surveys were implemented in France, Germany, UK and Russia using consumer panels. Consumer surveys were completed by 1031 participants in total, out of which 266 were from the UK, 248 from France, 258 from Germany and 259 from Russia. The whole sample had a gender split of 50/50 and a one third split across three age groups: 18–34 years; 35–64 years; and 65+ years. All survey respondents were responsible for most of the household food shopping and were themselves a consumer of oranges. To enhance the consumer element of the GVCA, the study incorporated Dunnhumby's UK consumer data using two years of Tesco supermarket transactions from the period 23rd February 2009 to 14th February 2011.

A European buyers' survey was also implemented and completed by 27 participants. Out of the sample respondents, there were: three from the UK; 19 from France; two from Germany; and one from Russia. To enhance the data, secondary data was used from a study on Spanish orange buyers (Mili and Martínez 2012), even though Spanish consumers were not analysed in the consumer value construct.

In addition to the above data sources associated with consumer value and European buyers, surveys were distributed to stakeholders along the fresh orange value chain for all five case study countries:

- Egypt—surveys from stakeholders completed by: 10 input suppliers; 1 extension/agronomy service; 31 citrus growers; 9 citrus packers; 10 exporters; 3 logistic companies; and 27 European buyers.
- Morocco—surveys from stakeholders completed by: 7 input suppliers; 4 extension/agronomy services; 45 citrus growers; 7 citrus packers; 12 exporters; 5 logistic companies; and 27 buyers.
- Syria—surveys from stakeholders completed by: 9 input suppliers; 14 extension/agronomy services; 113 citrus growers; 15 citrus packers; 12 exporters; 11 logistic companies; and 27 European buyers. Interviews were also carried out with: one fertilizer and pesticide input supplier; one agent; and a chamber of commerce meeting, including one farmer/packing house/export owner who became a principle informant.
- Tunisia—surveys from stakeholders completed by: 20 input suppliers; 9 extension/agronomy services; 89 citrus growers; 11 citrus packers; 12 exporters; 6 logistic companies; and 27 buyers.
- Turkey—surveys from stakeholders completed by: 10 input suppliers; 10 extension/agronomy services; 107 citrus growers; 50 citrus packers; 30 exporters; 10 logistic companies; and 27 buyers. Interviews were also carried out with: one fertilizer and pesticide input supplier; two growers; two packaging/exporting firms; and one logistics firm.

Surveys distributed to stakeholders were concerned with information flow and relationship constructs throughout the chain. Interviews with Syrian and Turkish stakeholders also sought to qualitatively measure these constructs, as well as setting the basis for mapping the material flow. To augment the data gained from these

interviews, key informant information compiled from local experts were utilized to better understand how materials flowed through the chain and to generate policy implications from the research.

8.3.2 Data Analysis

Findings from focus groups were thematically organized into a list of potential attributes that informed the survey tool for consumer panels. From our consumer panel surveys, orange attributes were ranked based on a mean average of our 5-point Likert scale, from 'not at all important' = 1 to 'very important' = 5, such that a framework could be developed where activities in the value chain are judged based on their contribution (or lack of contribution) towards attributes regarded as important to European consumers. In addition, a comparison of means using independent t-tests and one-way ANOVA tests were undertaken to determine how gender, age group and country of residence impacted on attitudes towards fresh oranges. We also analyzed promotional data to understand the impact on orange sales using a multiple regression model developed by Felgate et al. (2011). The model used to measure the effect of promotions was specified as follows:

$$\begin{aligned} \text{SALESit} = {} & \beta 0 + \beta 1\text{PCit1} + \beta 2\text{YXit2} + \beta 3\text{BOGOFit3} + \beta 4\text{EXFit4} \\ & + \beta 4\text{MBit5} + \beta 4\text{SPit6} + \text{eit} \end{aligned}$$

In the model, SALES represents the dependant variable sales value per store for a given product sub-group, *i*, in a given time period, *t*. Sales value per store was used rather than total sales, since it takes into account fluctuations in distribution over the time period and growth in the total number of Tesco stores. The parameters of the model are β0, which represents a fixed unknown parameter, and a series of 0–1 dummy variables representing the different types of price promotion for product sub-group *i* in the time period *t*. The types of promotion incorporated in the model were price cuts (PC), Y for £X offers (YX), buy one-get-one-free (BOGOF), extra free promotions (EXF), 3-for-2 multi-buy promotions (MB) and special promotional packs (SP). The error term, e, incorporates all the immeasurable factors which may also be influencing sales aside from promotions.

The material flow was thematically analysed from qualitative interviews and key informant information. A 'map of the chain' was created which shows all the activities along the chain (Fig. 9.1). The efficiency and effectiveness of the material flow in the fresh orange global value chain is judged based on:

- Timeliness in allowing continuous, efficient flow through processing, while avoiding unnecessary inventory and product movements;
- Minimising waste caused by unnecessary processing or by production of unusable raw material or by-products; and
- Maximising areas for adding value.

From the classification of consumer attributes and the evaluation of whether activities were necessary to bring the product to market from qualitative interviews and key informants, we labelled activities along the chain as: value adding (V); non-value adding but necessary (N); or wasteful (W).In addition to the material flow, mean averages were taken from stakeholder surveys based on a 5-point Likert scale, ranging from 'strongly disagree' = 1 to 'strongly agree' = 5, with a set of statements reflecting information flows and strength of relationships. Qualitative interviews supplemented survey data such that triangulation could take place and a more in-depth understanding of potential barriers and enablers could be implemented. Using our GVCA findings, key informants proposed policy recommendations.

8.4 The Fresh Orange Export Sector in Mediterranean Partner Countries

The Food and Agriculture Organization (FAO) data (2013) shows that the value of global orange exports increased significantly during the period of 2000–2008, although a small decline took place between 2004 and 2005. From 2000 to 2008, the value of global orange exports doubled with an increase of 122.1 %. Spain, US and South Africa are the three largest orange exporters with respect to value. Spain dominates the European market with over 50 % of its export quantity and value for fresh oranges going to Germany and France alone (FAO 2013).

Within the region, fresh fruit is the third largest crop and citrus dominates fresh fruit production (Montgomery 2009). The quantity of exported oranges from case study countries varies significantly, from 821,812 tonnes exported from Egypt in 2009 compared to 18,016 tonnes exported by Syria (FAO 2013). Egypt represents a unique case where the growth in exports has exponentially risen by 1343 % between 2000–2008; between 2007 and 2008 alone, export value rose by 141 % (FAO 2013). In 2008, Egypt overtook Morocco to become the highest orange exporter (by value) within the selected case study countries. Case study countries have in general seen growth in the value of fresh orange exports since 2005, although Morocco and Tunisia reached a peak in 2008 and then fell slightly in 2009.

As Table 8.1 shows, the fresh orange export price per tonne for MPCs and globally has risen substantially since 2005, reflecting wider global food inflation figures (World Bank 2012). In 2011, only Turkey and Morocco have a higher export price than the world average and other MPCs are substantially lower. Indeed from the FAO data (2013), the leading exporters in the world market such as Spain and the US are able to capture significantly higher prices for their exported oranges than MPCs.

Many countries in the MPCs have initiated programs that directly have an impact on orange production. The Egyptian government has implemented the 'Sustainable Agriculture Development Program' to improve irrigation systems and

Table 8.1 Fresh orange export price per tonne (2001–2011)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Egypt	$196	$209	$235	$298	$350	$231	$365	$526	$602	$625	$516
Morocco	$331	$365	$416	$471	$450	$448	$413	$664	$631	$653	$720
Syria	$535	$399	$525	$235	$442	$217	$327	$365	$397	$377	$487
Tunisia	$358	$371	$536	$633	$618	$542	$654	$689	$655	$574	$541
Turkey	$325	$301	$333	$385	$392	$326	$382	$592	$621	$674	$718
World	$383	$439	$491	$556	$521	$516	$602	$675	$657	$694	$698

Source FAO (2013)

water resource management, and put into practise a modernization programme to improve the production of its fruit and vegetable exports by incentivising the adoption of new production techniques. The Morocco Green Plan, a state-implemented rural development strategy by the Moroccan government, is seeking to generate 30,000–35,000 ha of new citrus plantations over the next several years through extensive projects and financial incentives for farmers. Other MPCs offer similar support mechanisms to the citrus sector.

Although fresh orange production in MPCs is being supported through government programs and projects, where it is to position itself relative to its strengths and weaknesses has not been sufficiently addressed. Exports to the European market are immediately impeded by the quota and entry price system set up by the EU, although arguably this is less of a barrier with trade liberalization between MPCs and the EU such as the case of Morocco. Despite liberalization, trade barriers are still an issue for MPCs. MPCs export their fresh oranges to different markets in Europe. For example, the Russian market is important for Morocco and Turkey with 37 and 32 % of total export value respectively, whereas for Tunisia the French market is critical to the industry with a sizeable 91 % share of total export value (FAO 2013). This data also reflects differences in diverse versus concentrated export markets. Morocco exports its oranges all across Europe (as well as the world) but Tunisia is almost completely dependent on the French market with the Tunisian Maltese—a half-blood orange variety. For Syria, the European market is inconsequential compared to its neighbouring Middle East market. Table 8.2 lists the main destination markets for fresh orange exports of MPCs.

Table 8.2 Main destination markets and percentage of total export value for fresh orange exports of MPCs (2007, 2010)

	Main destination market and % of total fresh orange export value
Egypt	Russia (24 %)
Morocco	Russia (37 %)
Syrian Arab Republic	Iraq (78 %)
Tunisia	France (92 %)
Turkey	Russia (32 %)

Source FAO (2013)

The trade system facing orange exporters, coupled with large-scale competitor countries in the US and South America, goes against a strategy where cost disadvantages may push agri-food stakeholders out of the chain if they do not switch to the *creation of value* for their respective end consumers (Drucker 1999). It has been argued that previous agricultural policy in the region has not brought the gains that the agri-food sector desperately needs (Baldacci et al. 2008). In the past, agricultural policy in the region has focused mainly on market liberalization (although still protective of some agricultural sectors) and linked competitiveness exclusively to volume and production yields (Lindberg et al. 2006). Although policy based on maximising productivity has merit and is certainly not dismissed here, there is room for introducing a new approach to competitiveness.

8.5 Findings

8.5.1 Consumer Value

Research from the three UK-based focus groups revealed a number of attributes that were in the forefront of consumers' minds when purchasing oranges which informed the attributes in the consumer survey data. In the focus groups, participants regularly identified 'juiciness' and 'sweetness' as words that came up when thinking about what the best thing about oranges were. This matched the consumer data from consumer panel surveys that showed these two attributes to be the most important attributes for consumers across all four countries (Table 8.3).

When segmenting for consumers' country of residence from consumer panel surveys, peel ability was regarded as being more important for Russian consumers

Table 8.3 Important versus less important orange attributes from consumer panel surveys

Attributes judged quite important or more (>5*)	Attributes judged less than quite important (<5*)
Juiciness	Organic
Sweetness	Variety
Free from pesticide residues	Country of origin
Peelability**	Size of orange
Cost	Promotion
Blemishes	Enough in a pack
Colour	Fair trade
Perishability	Packaging

*1 = not at all important, 3 = not very important, 5 = quite important, 7 = extremely important

**Peelability was statistically more significant in importance for Russian consumers than other countries

than the other three European countries. When segmenting for age and gender, female consumers and those which were considered older attached greater importance to attributes considered generally important by the whole sample, suggesting that these segments are more sensitive to orange characteristics during the purchasing decision than other consumer types. This corresponded with the UK loyalty card data which showed that the main consumers of oranges are pensioners; older families and affluent households were the most dominant purchasers of oranges. Organic oranges appeared to accentuate the effect of affluence where up-market consumers were almost twice as likely to purchase organic than the average consumer.

Using the model developed by Felgate et al. (2011), the effect of promotions on orange sales indicated that, in general, promotions do not have a particularly strong effect on sales and that in some cases it actually had a negative impact. When looking at the impact of promotions on sales of oranges in total, at an aggregated level, only price cuts and buy-one-get-one-free promotions were found to have a significant impact. Promotions were found in total to account for 16.7 % of the change in sales of oranges at the aggregated level. Price cuts were found on average to increase sales per store by £113 per week, while buy-one-get-one-free promotions increased sales by £158 per week, per store. This paralleled with the consumer panel surveys that showed that oranges on promotion was not an attribute consumers found to be particularly important during the purchasing decision.

8.5.2 Perceptions of European Buyers

The buyers' research showed that when deciding whom they source their oranges from, participant buyers look for a large range of characteristics—9 out of 13 characteristics were rated more than 'quite important'. Of the 27 buyers who were interviewed, few judged case study country suppliers in terms of how they compared to their best suppliers. In the case of Syria, nothing could be concluded because no buyers interviewed sourced their oranges from Syria and therefore were not able to be judged. This outcome indicates that Syrian oranges are not well known in the European market, mirroring export data that shows that Syrian fresh orange exports do not primarily go to European consumers (FAO 2013).

Where European buyers judged the supply of fresh oranges from individual case study countries, results were mixed. Egypt has a good rating for volume and cost but rated poorly for the willingness of suppliers to collaborate with buyers for mutual advantage. Turkey failed in its quality of oranges in the eyes of European buyers, an attribute that buyers identified as important in their sourcing decisions. The open-ended answers indicated that one of the principle barriers behind why European buyers do not source more oranges from case study countries is a lack of contacts with exporters, suggesting that it is not necessarily the quality of relationships between exporters and importers in the value chain that is the

principal bottleneck, but rather the existence of relationships at all. This has implications for policy in terms of promotional activity as a common good for the GVC, an issue further discussed in Sect. 8.6.

For Spanish buyers, the attributes they consider to be important to consumers and the characteristics of suppliers that are important to themselves mirror many of those identified by other European buyers. Moroccan suppliers are the dominant supplier of Spanish oranges and the reasons provided for this were based on the low cost of oranges they supply, although the quality of oranges was brought up as a concern. Other MPC suppliers were stated as having deficiencies based on post-harvest handling and cultural differences, particularly concerning conflicts in delivery times where suppliers injected a level 'flexibility' in this regard compared to the tighter schedule required by Spanish buyers. In addition, pre-payment represented a barrier to sourcing from case study countries. Logistics was also identified as being a problem where the poor quality of transportation led to perished and wasted produce when received by Spanish buyers, correlating with findings from the 'mapping the chain' stage where transportation is identified as a value-adding activity. Related to this was the idea of reputation 'contagion', where because a Spanish buyer received wasted oranges from an Egyptian supplier, the buyer then cut off future dealings with all Egyptian suppliers rather than just the single exporter.

8.5.3 Flow of Materials

Using consumer value as the framework for measuring value in the fresh orange chain, activities along the chain are classified as: "value adding" (V) which contribute to the attributes considered at least "quite important" to consumers; "necessary but non value- adding" (N) for activities that do not contribute to attributes important to consumers but are necessary for bringing the product to market; and "wasteful" (W) for activities that are not important to consumers and are unnecessary to bringing the product to market. The classification of activities is presented in Fig. 8.1.

Input suppliers supply fertilizer and pesticide chemicals to growers. Fertilizers, particularly major elements such as potassium, were identified as a value adding activity because they contribute towards the juiciness and sweetness, and negate against blemishes, all of which are deemed as important by European consumers. Pesticide use however does not contribute towards these attributes and could even potentially destroy value because consumers consider 'free from pesticide residues' as an important consideration during the purchasing decision. Strict standards are also imposed by European markets on the level of pesticide use for fruit and vegetable imports, for instance the Ecophyto plan 2018, which seeks to reduce the use of pesticides in France by 50 % which gives some indication of how attitudes are changing. However, pesticide inputs prevent disease and insect infiltration which can destroy the fruit and, as a result, are classified non-value adding but

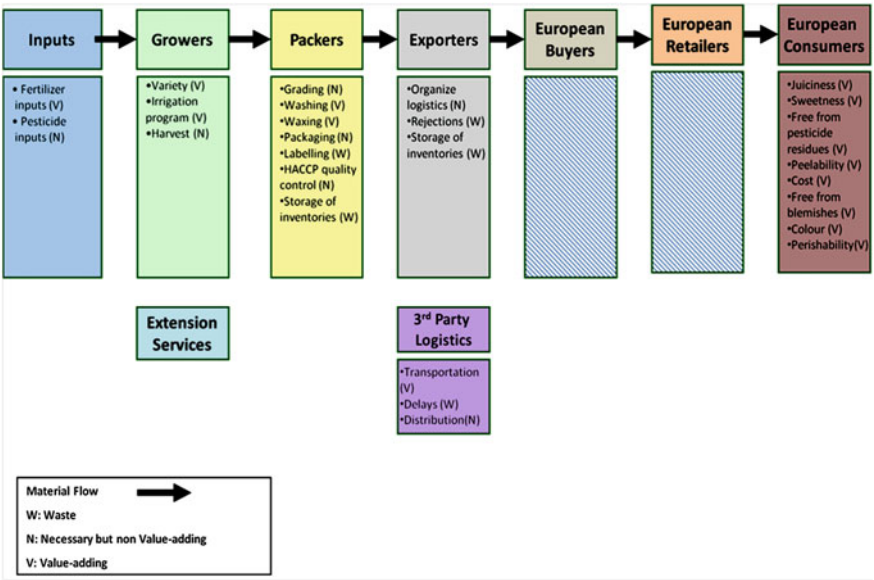

Fig. 8.1 Material flow in the MPCs' fresh orange chain

necessary rather than waste. It is suggested here that there is a tight rope that growers must walk between negating against harmful diseases and destroying consumer value (as well as failing export/import standards).

It was suggested by key informants that varieties grown by producers embody particular attributes, such as sweetness and juiciness, and therefore the variety grown is a value-adding activity. However, according to stakeholder interviews, it typically takes up to 25 years for a seedling to reach maximum yield, meaning that growers cannot easily move between varieties without initial losses in productivity. The irrigation program implemented by growers, and typically advised upon by input and equipment suppliers, is also a value-added activity in that it boosts the juiciness of oranges which is valued by European consumers. The oranges are then harvested according to the harvest calendar organized by packers and informed by the export program coordinated by exporters and European buyers, an activity which is not value-adding in the eyes of consumers but necessary to move the product along the chain while minimising inventories throughout. From the stakeholder interviews, it appeared that inventories are not held at this point in the chain because buyers bring the oranges straight from the orchards to the packing house rather than growers storing oranges prior to purchase.

During the packing stage, oranges are washed to remove dirt and pesticide residue. This is deemed as a value-adding activity because European consumers place value on the lack of pesticide residue on the orange. Waxing is also understood as value-adding because it reduces the perishability of the fruit. Packaging,

although not considered value-adding by European consumers, is still a necessary process because it prevents damage to the fruit during transit and is typically a requirement set by buyers.

The oranges are then labelled, mostly for the purposes of identifying the country of origin for consumers. However, although where an orange comes from is not something that consumers regard as particularly important during the purchasing decision, displaying country of origin is necessary for retailers to follow. Citrus packaging houses must also conform to a traceability system and implement an HACCP quality control process (Hazard Analysis and Critical Control Point) that must be certified by an accredited body or a product quality system control, based on the target importing market to be certified by an accredited body. Prior to despatch, oranges are kept as inventories, meaning that coordination with exporters is key to minimising these costs.

Exporters organize transportation for fresh oranges with logistics firms to move the products to export markets. Oranges are held by the exporter prior to transportation. The principle obstacle that exporters face is meeting the standards and regulatory requirements for international markets. If these standards are not met, then rejections occur either at the EU border (with the exception of Russia) or from buyers' own private standards. Where these rejections occur, exporters must incur the cost which represents a waste in the material flow. In this regard, the need for exporters to coordinate upstream is fundamental to meeting the required standards for export markets.

Logistics is typically organized by exporters to move products to the export market. The quality of transportation affects the perishability and reduces blemishes which consumers value and therefore transportation is considered a value-adding activity. Planning shipping times and coordinating with exporters and buyers over time delivery is essential for avoiding delays at ports which can lead to oranges going to waste. Logistic firms then distribute goods to the importer and buyer which is necessary to bring the product to market.

8.5.4 Information Flow and Relationships

In general, the survey data showed that the information flow and strength of relationships between actors were in most part strong. Tunisia was demonstrated as having particularly strong information flow and relationships along the chain. However there were some relatively weak (but not weak in absolute terms) areas of the chain. The information flows between input supplier-grower, extension service-grower and grower-packers were not very strong in the case of Egypt. Turkey, in a similar fashion, had partial flows between growers-packers and logistics-exporters. What was most notable from these findings was that there was no particular pattern of bottlenecks in the information flows and business relationships, with each country facing a different challenge in its global value chain.

Interviews with Syrian stakeholders indicated that the information flow between actors in the chain was poor, particularly between exporters (or agents) and importers. Commitment and the strength of relationships between packers/exporters and farmers were also signalled as being limited in the interviews. There were suggestions that institutional structures, such as the Syrian chamber of commerce and Turkey's export union, were not particularly effective in bringing actors together to cooperate. The relationship between the interviewed Turkish exporter and the EU policy-setting body was signalled as being particularly problematic.

It was suggested in interviews and from key informant data that cultural norms and behaviour set the boundaries around the degree that actors cooperate and share information, as one farmer said when rationalizing why he didn't ask buyers where his oranges were going: "*it's none of our business*". Building on this concept of culture as a driver/barrier to value chain relationships, Spanish buyers identified that a problem in sourcing oranges from MPCs was attributed to a different cultural understanding of "time" where MPCs' fresh orange suppliers did not keep to strict delivery times that are required by Spanish buyers.

8.6 Discussion: Policy Implications

The above findings provide some key implications for maximizing the competitiveness of the fresh orange export industry of MPCs based on the adopted approach. A broad finding in the consumer research was that the price of an orange is not as important to European consumers as certain quality attributes. The implication of this is that agricultural policies that seek to drive down production costs with little concern about what the impact on *consumer value* could be doing harm the competitiveness of the value chain. Modernization plans in MPCs should be put within the context of maximizing value—driving down production costs and increasing output should not be the only indicator of competitiveness. Farm production capabilities have historically been the focus of agricultural research, especially considering the dominance of traditional theories of rural development over the past century (Cruickshank 2009; Marsden et al. 2001), and MPCs are no exception.

Findings from the GVCA suggest that market information, when made available to growers, technicians, packers and exporters, could contribute towards the competitiveness of the fresh orange export sector. The creation of information networks can be an important component of value chain competitiveness (Asem-Bansah et al. 2012); for instance the creation of a national database or training workshops with relevant organizations can be utilized so that market information is disseminated to stakeholders. This would allow the kind of findings generated from the consumer research in the GVCA to be capitalized on and actors along the chain would have a better understanding of their target market values, thereby negating misconceptions brought up in stakeholder interviews (such as the idea that European consumers attach importance to the country of origin during the purchasing decision).

Consumer value identified key areas for improving main quality attributes considered by consumers: variety selection; rootstock selection; irrigation technology; pest and disease control, that are consistent with ensuring juiciness, sweetness, and reducing perishability. Main actions and programs could:

- assess varieties and rootstock combinations against their ability to create the attributes that European consumers regard as important,
- breed and test the species, and
- incentivise the substitution of old orchards with new varieties that maximize the attributes valued by European consumers.

Extension actions should include adequate training programs on irrigation methods to improve citrus quality. For example, improving irrigation scheduling, especially during sensitive periods of fruit growth, is an important key for guaranteeing juiciness and facilitating peel ability. While modernization programs in MPCs appear to be mainly concerned with boosting volume (Lindberg et al. 2006), there is also some overlap with the value-adding activities identified in the present research. For example, the Sustainable Agriculture Development Program in Egypt is placed within a context of critically scarce water resources in the region, yet its development of irrigation systems is also associated with improving product attributes important to European consumers. In addition, the subsidization of inputs (e.g. fertilizers), a common practise in most MPCs (World Bank 2008), may also be beneficial from this point of view if it encourages producers to improve important quality attributes. While the continuation of these programs from the perspective of value addition would be recommended, there also needs to be reflection over the extent this conflicts with broader institutional reforms under the EU Common Agricultural Policy reform.

Relevant to agricultural policy is the substitution of orchards to new varieties that are in line with the target market. As noted at the beginning of this chapter, MPCs do not export fresh oranges to a uniform European consumer. Even those MPCs which share borders and cultures have diverse destination markets—Tunisia sells 91 % of its exported fresh oranges to the French market whereas Morocco is very much diversified, with Russia consuming the largest share of 37 %. Taking these two examples and linking back to the consumer research, the rationale for the Moroccan export industry (or at least those fresh oranges which are destined for the Russian market) would be to incentivize substitution towards varieties that maximize peel ability whereas the Tunisian market should focus on those that are aligned with the tastes of French consumers. Syria presents a more unique case where regional neighbours that import the majority of its fresh oranges are likely to present a diverse set of tastes compared to potential European consumers (although given the political situation at the time of writing, inroads into the European market are unlikely for the foreseeable future). Since there are a multitude of citrus varieties with different characteristics (Hodgson 1967), a debate over which varieties match the tastes of target consumers while at the same time considering a complexity of trade-offs (e.g. climatic suitability) is needed to shape where policy incentives should be placed.

Production represents a fruitful area for policy. However post-harvest operations are also key, including post-harvest disease control techniques that are important for improving quality of fruits and preserving shelf-life (negating perishability):

- Quality control technology
- Preservation treatments
- Controlled environment storage technology, and
- Incentives for purchasing quality cold-controlled transportation.

Activities that did not add value but were judged necessary to bring the product to market include those which ensure import standards for the European market. Policy makers could assist citrus sector enterprises in improving quality and safety systems, especially those stages that lead up to and including HACCP quality control. Given that a barrier to adoption is the fixed costs involved, credit facilitation could act as a strong enabler. In addition, pesticide usage was revealed as a 'tightrope' where, although it is necessary to negate against disease, it can also destroy value because European consumers have concern over pesticide residues according to the consumer research. Facilitating training could be an important policy tool to ensure stakeholders walk this tightrope successfully. Stages and activities of the chain where intervention could be effective are:

Level 1. Farm: Use of certified rootstocks and fertilization, training in the type of chemicals used, management of irrigation water resources, soil management and plant protection against pests and diseases.
Level 2. Post-harvest Treatment and Packing: Sizing technology, quality control technology, cleaning technology, preservation treatments, controlled environment storage technology, raw materials.
Level 3. Transport and Distribution: Vehicles used, used pallets or containers, temperature and humidity control technologies.
Level 4. Marketing and Export: Transport conditions, insurance programs, etc.

As noted, a lack of known exporters was a significant barrier for buyers in sourcing oranges from MPCs. This suggests that promotion and networking could be areas for policy such that relationships are established between European buyers and exporters. Incentivising the use of trade fairs for exporters could be a start to this process.

The material flow indicated that many of the wasteful activities were a direct result of poor coordination between actors which could be tackled through collective organizations, directing the flow of goods in a timely and cost-efficient manner. The interviews supported these findings where a lack of information flow and poor relationships were concurrent with the lack of effective horizontal organization. Fragmented farms also make it difficult to apply quality systems and disseminate market information (Roy and Thorat 2008).

Based on a New Institutional Economics perspective (North 1990), it is generally understood that horizontal cooperation in developing countries reduces the transaction costs between suppliers and buyers. A supportive policy structure that incentivizes the development and effective management of collective organizations

was recommended by key informants such that coordination problems which cause wasteful activities along the value chain can be tackled. External costs are also incurred to the sector as a whole when one firm fails in this regard. Spanish buyers suggested that there is a 'contagion effect' such that all the exporters from respective countries were tarred with the same brush when just one exporter failed. In Morocco, the Autonomous Establishment of Export Control and Coordination represents a public institution dedicated to regulatory compliance for food exports and plays a role in coordinating export activity (EACCE 2011). This kind of public sector support in the Moroccan context could at least provide a model which other MPCs can follow.

8.7 Conclusion

In this chapter, we have demonstrated how GVCA can make an important contribution when it comes to the issues facing MPCs and the wider agricultural policy-making in the region. Previous ideas on competitiveness in the agri-food sector of MPCs have primarily been approached through a neo-classical lens, based on liberalizing markets and productivity (Lindberg et al. 2006). While we do not dismiss this as a perspective, particularly given the multitude and sometimes conflicting objectives for agricultural policy, a strategy of driving down costs may not be beneficial from a value creation point of view, particularly given the poor state of its value-added agriculture compared to other developing countries (Binswanger-Mkhize and McCalla 2010). It appears evident that up until now, agricultural policy has had little success in tackling the serious economic challenges facing the region (Baldacci et al. 2008).

Prior to this chapter, using a value-stream method such as that proposed by Taylor (2005) was confined to the SCM literature and had not been used to inform policy at the macro-level, arguably because it was restricted to a single-chain case study methodology. Furthermore, using comparable value chain concepts from the SCM literature have only more recently been transferred to a developing country context (Adhikari et al. 2012). To achieve the end of informing policy, the methodology was adapted from a single case study chain method with a small number of participants and a narrowly defined value stream to a sectoral level of analysis analogous to the Global Value Chain literature but conceptually closer to the SCM stream, such that broader generalizations could be made about the fresh orange industry. Policy recommendations resulting from the GVCA and key informant data can be summarized as follows:

- It facilitates the dissemination of market information made available to value chain stakeholders. The creation of information networks such as a national database or training workshops would allow consumer research to be capitalized on and negate misconceived ideas of what European consumers regard as important;

- Given that the main barrier of European buyers in sourcing from MPCs was the lack of known contacts, policy contributes through investing in export promotional campaigns and facilitating networking opportunities, for example funding participation in international trade fairs.
- It provides incentives for investment in those activities that add value to the final consumer, namely: variety selection and substitution where necessary, irrigation systems and methods, and quality cold-controlled transportation.
- Activities that do not add value but are necessary to bring fresh oranges to market are fundamental to enabling access to European markets. Most notably, this includes quality and safety systems along the chain. Stages and activities where policy support could intervene and thereby provide access to the market for stakeholders are: certified rootstocks and fertilization, quality control during post-harvest treatment, and controlled environment storage technology. Not only are these elements necessary, but they were also brought up by European buyers as being a barrier to sourcing from MPCs.
- The elimination of wasteful activities was identified as a problem of poor coordination along the chain. This could be tackled through policy that provides greater support to collective organizations, therefore enabling better coordination along the chain.

While the methodology proposed here has enabled policy recommendations that are value-centric, it also comes with limitations. This was the first time that the single chain method, where the target market can be identified easily, has been shifted to an aggregated sector-level chain. With this methodological shift it was difficult to identify the target market because different individual chains serve different markets (high income vs. low income, price vs. quality, pensioners vs. single mother families, university education vs. school leavers etc.).

The heterogeneity of chain structures, not just between case study countries but within them as well, provides a challenge to aggregating the results into a single map of the chain. The basic problem that emerges from this is one of comparing ‘apples and oranges’, where a global map is constructed with vertically integrated and highly fragmented chains. Within the survey, stakeholders were asked to identify who their customers are. From this a diversity of structures emerged. For instance, in the Moroccan sample, the customer base of growers were almost evenly split between citrus packers, citrus exporters, citrus grower-packers, citrus packer-exporters, fully integrated citrus grower-packer-exporters and non-citrus specific customers.

In addition to the above methodological limitations, the policy recommendations proposed here are broad and do not go into specific policy initiatives in significant detail. What was touched upon however was the way that current initiatives such as Morocco’s Green Plan and Egypt’s Sustainable Agriculture Development Program may have an impact on consumer value, although not intentionally, especially with regard to the development of irrigation infrastructure. Further research that assesses individual policy initiatives based on their ability to contribute towards creating consumer value would be beneficial in furthering value chain thinking as a framework for evaluating policy.

Appendix 1

See Fig. 8.2.

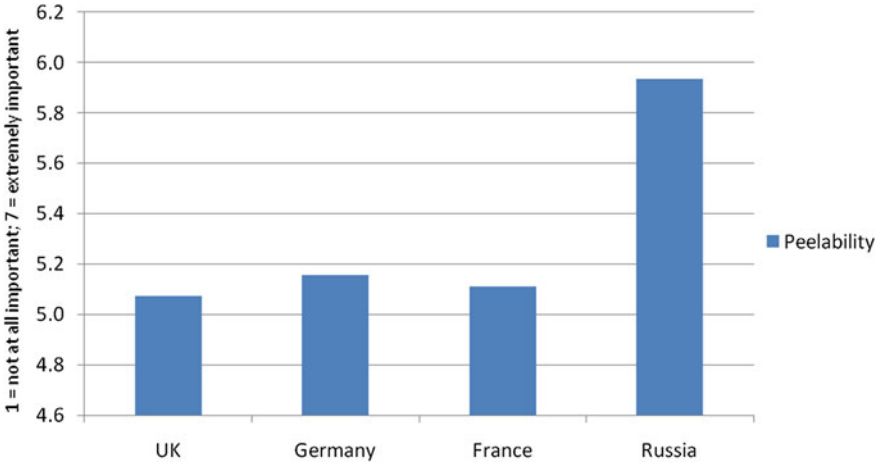

Fig. 8.2 Differences in importance attached to orange attributes based on consumers' country of residence. Attributes presented passed test of significance (2-tailed) if below 0.05, and test of homogeneity of variance

Appendix 2

See Fig. 8.3.

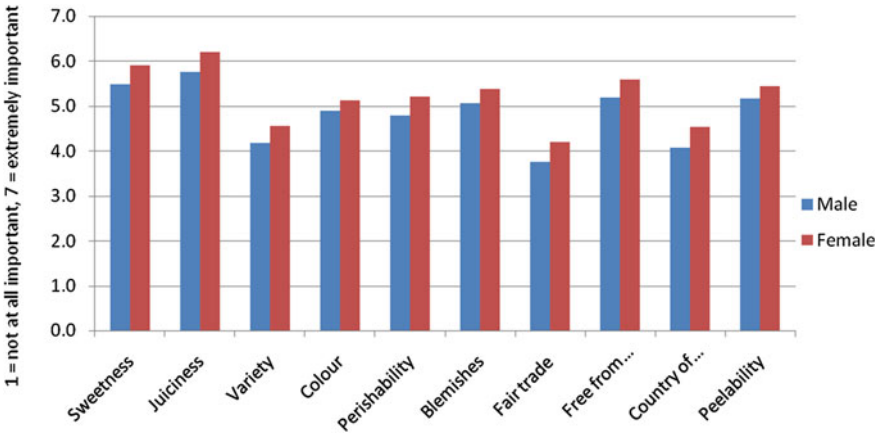

Fig. 8.3 Impact of gender on the importance attached to orange attributes. Attributes presented passed test of significance (2-tailed) if below 0.05

Appendix 3

See Fig. 8.4.

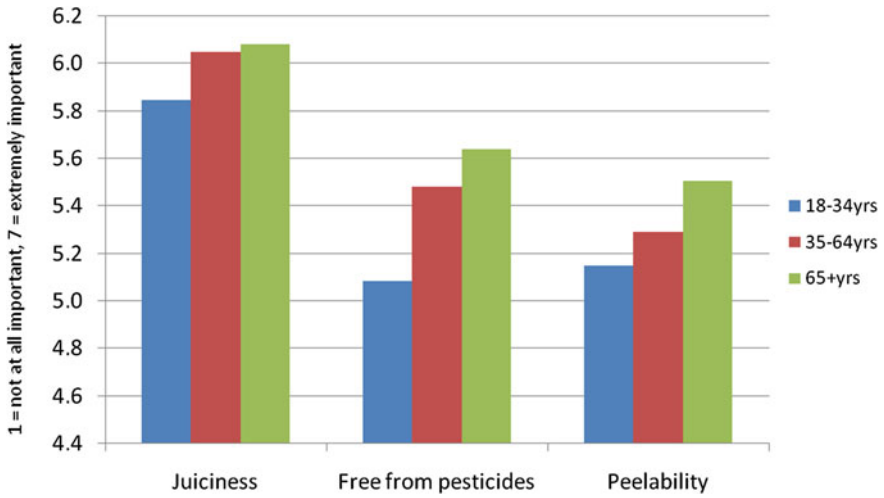

Fig. 8.4 Impact of age on the importance attached to orange attributes. Attributes presented passed test of significance (2-tailed) if below 0.05

Appendix 4

See Table 8.4.

Table 8.4 Strength of information flow and relationships in Egypt's fresh orange global value chain (mean score percentages[a])

Citrus input supplier	
Information flow	47 %
Customer relationships	65 %
Relationship average (downstream)	67 %
Extension services	
Information flow	40 %
Customer relationships	63 %
Relationship average (downstream)	63 %
Growers	
Information flow	52 %
Supplier relationships	70 %
Customer relationships	69 %
Relationship average (downstream)	76 %
Packers	
Information flow	71 %
Supplier relationships	82 %
Customer relationships	82 %
Relationship average (downstream)	85 %
Logistics	
Information flow	81 %
Customer relationships	85 %
Relationship average (downstream)	85 %
Exporters	
Information flow	80 %
Supplier relationships	89 %
Customer relationships	90 %
Relationship average (downstream)	90 %

[a]0–33 % = weak, 34–66 % = partial/basic, 67–100 % = strong

Appendix 5

See Table 8.5.

Table 8.5 Strength of information flow and relationships in Morocco's fresh orange global value chain (mean score percentages[a])

Citrus input supplier	
Information flow	90 %
Customer relationships	88 %
Relationship average (downstream)	81 %
Extension services	
Information flow	88 %
Customer relationships	65 %
Relationship average (downstream)	65 %
Growers	
Information flow	80 %
Supplier relationships	74 %
Customer relationships	75 %
Relationship average (downstream)	80 %
Packers	
Information flow	94 %
Supplier relationships	85 %
Customer relationships	85 %
Relationship average (downstream)	88 %
Logistics	
Information flow	82 %
Customer relationships	85 %
Relationship average (downstream)	85 %
Exporters	
Information flow	87 %
Supplier relationships	92 %
Customer relationships	89 %
Relationship average (downstream)	89 %

[a]0–33 % = weak, 34–66 % = partial/basic, 67–100 % = strong

Appendix 6

See Table 8.6.

Table 8.6 Strength of information flow and relationships in Syria's fresh orange global value chain (mean score percentages[a])

Citrus input supplier	
information flow	80 %
customer relationships	73 %
relationship average (downstream)	73 %
Extension services	
Information flow	85 %
Customer relationships	77 %
Relationship average (downstream)	77 %
Growers	
Information flow	70 %
Supplier relationships	73 %
Customer relationships	69 %
Relationship average (downstream)	74 %
Packers	
Information flow	87 %
Supplier relationships	79 %
Customer relationships	78 %
Relationship average (downstream)	80 %
Logistics	
Information flow	72 %
Customer relationships	66 %
Relationship average (downstream)	66 %
Exporters	
Information flow	85 %
Supplier relationships	82 %
Customer relationships	77 %
Relationship average (downstream)	77 %

[a]0–33 % = weak, 34–66 % = partial/basic, 67–100 % = strong

Appendix 7

See Table 8.7.

Table 8.7 Strength of information flow and relationships in Tunisia's fresh orange global value chain (mean score percentages[a])

Citrus input supplier	
Information flow	74 %
Customer relationships	76 %
Relationship average (downstream)	75 %
Extension services	
Information flow	79 %
Customer relationships	83 %
Relationship average (downstream)	83 %
Growers	
Information flow	77 %
Supplier relationships	73 %
Customer relationships	72 %
Relationship average (downstream)	80 %
Packers	
Information flow	100 %
Supplier relationships	88 %
Customer relationships	88 %
Relationship average (downstream)	80 %
Logistics	
Information flow	80 %
Customer relationships	88 %
Relationship average (downstream)	88 %
Exporters	
Information flow	91 %
Supplier relationships	72 %
Customer relationships	82 %
Relationship average (downstream)	82 %

[a]0–33 % = weak, 34–66 % = partial/basic, 67–100 % = strong

Appendix 8

See Table 8.8.

Table 8.8 Strength of information flow and relationships in Turkey's fresh orange global value chain (mean score percentages[a])

Citrus input supplier	
Information flow	68 %
Customer relationships	64 %
Relationship average (downstream)	66 %
Extension services	
Information flow	80 %
Customer relationships	73 %
Relationship average (downstream)	73 %
Growers	
Information flow	62 %
Supplier relationships	68 %
Customer relationships	67 %
Relationship average (downstream)	68 %
Packers	
Information flow	73 %
Supplier relationships	68 %
Customer relationships	72 %
Relationship average (downstream)	70 %
Logistics	
Information flow	68 %
Customer relationships	69 %
Relationship average (downstream)	69 %
Exporters	
Information flow	74 %
Supplier relationships	69 %
Customer relationships	72 %
Relationship average (downstream)	72 %

[a]0–33 % = weak, 34–66 % = partial/basic, 67–100 % = strong

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Chapter 9
Challenges in Citrus Market Chains in Tunisia and Morocco

Etienne Montaigne, Fatima El Hadad-Gauthier and Leila Khefifi

List of Abbreviations

AKIS	Agricultural knowledge and innovation systems
AVFA	Agence de vulgarisation et de formation agricole
CLAM	Comité de liaison de l'agrumiculture méditerranéenne
CNSTN	Centre National des Sciences et Technologies nucléaires
CTA	Centre technique des agrumes
CTV	*Citrus tristeza virus*
DAP	Di-ammonium phosphate
DGPDA	Direction générale de la production et du développement agricole
DTN	Dinar tunisien
GIFRUIT	Groupement inter-professionnel des fruits
INAT	Institut National Agronomique de Tunis
INRAT	Institut National de la Recherche Agronomique de Tunisie
IOCV	International Organization of Citrus Virologists
SMVDA	Société de mise en valeur et de développement agricole

9.1 Introduction

In a global market, competitiveness of fruit agricultural value chains is essential. This is especially true as plants are perennial and changes are made only slowly. In the citrus industry, the specificities of technical developments do not reduce their importance. They must therefore be understood and supported by the supervisors of the economic policy. In addition, many stakeholders interact, conflict, compete,

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undergo natural constraints and organize themselves to bring their products to the final consumer. These value chains are dynamic and change over time due to various constraints and objectives, mainly in export sectors.

In the tradition of the French school of agri-business and rural economy, the objective of this chapter is to analyse the challenges and opportunities of the citrus industry in two Maghreb countries: Tunisia and Morocco. The method of analysis is not undisputed as choices, mobilized disciplines and methods are different. Although away from academia, this approach of "meso-systems" remains rich, particularly as its results are enhanced with new theoretical frameworks. In this perspective this chapter complements Chap. 7 on global value chain analysis, which stressed consumer value as the most important parameter in value chain analyses.

The heart of the method remains the same with a description of the technical itinerary, the bargaining power of players and the systemic approach with reference to the definition of boundaries, cutting and regulations of the *filière*. But the method was completed by the dynamics of innovation, international links and the firms steering chains, the transactional approaches and the managerial vision. So, for example, in the citrus market chain we observe all the actors involved: farmer, broker, packager, exporter, shipping merchant, importer, wholesaler, and retailer. Each stakeholder could be differentiated by size, market power and localisation. Each producer or firm realises a part of the technical operation, aiming at bringing an orange on the table of the local or foreign consumer. When we pay attention to the question of bargaining power or market power and domination, we can analyse the transfer of productivity gains, the share of value added, and prices. Generally, farmers are not in a dominant position. They suffer the domination of the merchants and are "price followers". A large part of the value added is unequally shared and captured downstream of the market chain.

The production practices in the citrus industry, professional organizations, the supply of labour and implementation, scientific and technical research, and marketing and distribution beyond the farm gate must also be taken into account. Despite conflicts, players often cooperate and establish mutually beneficial contracts generating quasi-rents. Moreover, knowhow on markets and product qualities are defined by feedback loops between stakeholders. In the citrus chain, the quality problem must really be viewed from a systemic perspective. The characteristics of the oranges depend on the variety, the nutrition of the trees, and the storage conditions. Each stakeholder has a precise role to play in its improvement. The major operators, on the one hand, desire to control the relationships with suppliers and customers, while on the other hand, the public authorities want to plan, control and intervene in the industrial sectors.

The citrus market chains are also associated with a group of innovation chains that contribute to both the technology and competition dynamics in the agricultural or industrial sector. The creation, development and implementation of technological change are the result of 'innovation chains'; that is to say, a group of firms and public or private organizations participating in the process (Montaigne 1992). The main technologies concerned are integrated pest management and the creation of new varieties.

The transaction costs are also observed. These costs influence the organizational, contractual and strategic choices in the short and long term. Each stakeholder of the chain minimizes the production and transaction costs; accordingly they choose various forms of organization such as spot markets, contracts or integration.

In Tunisia we place emphasis on the analysis of innovation and issues related to biotic stresses. In Morocco we discuss the Green Morocco Plan to discuss the ongoing changes and major reforms to be implemented, with particular attention to the players and their strategies. We conclude on the similarities and differences in these two countries.

9.2 Innovation in the Tunisian Citrus Fruit Farming

We have endeavoured to incorporate this vision of innovation in the analysis of value chain competitiveness. Our presentation is divided into two complementary sections: the first positions the Tunisian citrus fruit value chain on the international market and describes its originality with a view to hierarchizing the technological factors studied in the second part. This section identifies and examines the technological factors of strategic importance to the international competitiveness of this value chain, including the risk of major biological crises, varietal dynamics, biological combat and reduced use of pesticides. We will see in the following section that some of these issues, in particular the tristeza virus disease, arise under the same conditions in Morocco.

Research work follows a number of paths, some of which are relatively traditional in the field of improving production: improving rootstock for increased efficiency in the use of water and mineral elements, varietal improvement, farming techniques, micro-grafting and techniques for fighting parasites, including biological control. Our aim was not to study all the research programmes but to assess those which underline the risks or concern important economic objectives for the value chain. In the end, we adopted two: the issue of rootstock with regard to the tristeza virus and the difficulties associated with implementing biological control. In the first case, we took into account the risk of the orchard disappearing in its entirety, while in the second case, we examined the commercial importance of a significant reduction in the use of pesticides and in their residues.

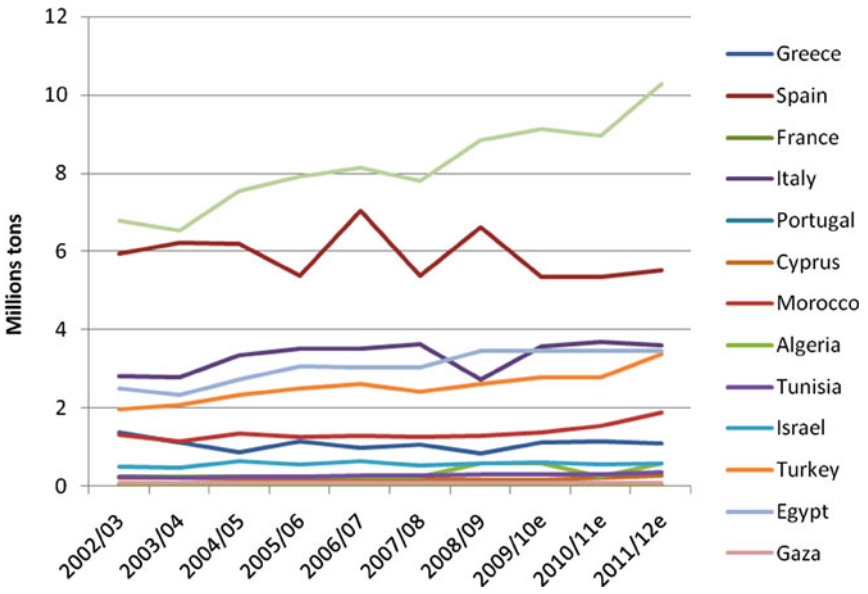
9.2.1 The Particularity of the Tunisian Citrus Fruit Value Chain in the Global Market and Innovation

In this section, we explore the workings of the Tunisian citrus fruit value chain with a view to deriving the characteristics demonstrating the importance of the choice of varietal innovation, and thus to studying the objectives.

Tunisia is a very small producer of citrus fruits (Fig. 9.1). Although production has grown by 60 % over 10 years, it nevertheless totalled only 360,000 tonnes in 2011/2012, i.e. 1.7 % of Mediterranean production, which in turn, accounts for only 20 % of global production. The production of citrus fruits covers a large period of six months, running from November to April. With the new varieties of clementines, navel oranges and tangerines introduced in 1995, the production period was extended to run from October to May, representing a total production period covering eight months.

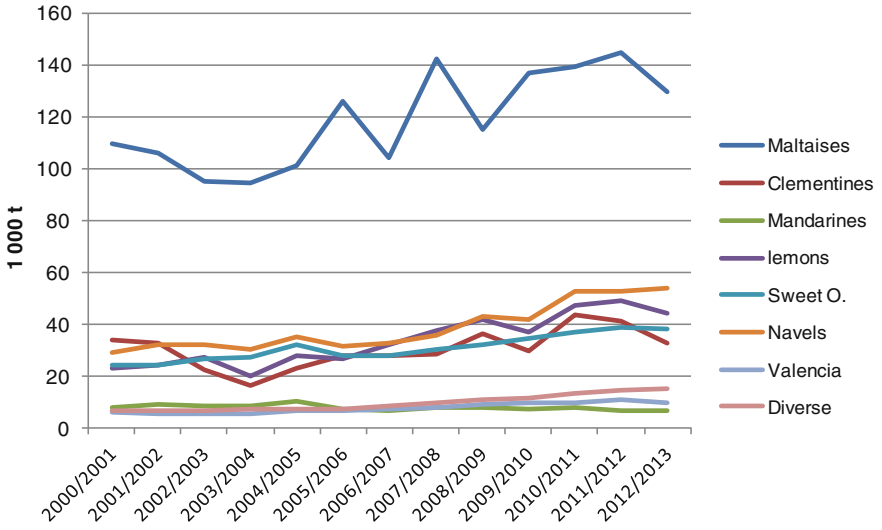
The main varieties of citrus fruit farmed in Tunisia are as follows (Fig. 9.2): (1) Oranges: Maltese (1/2 blood, early Bokhobza, late Barlerin, blonde); navels (Thompson, Washington); Double Fine and Double Fine improved; Sweet (Maltese, Meski, Ansli); Chémi; (2) Clementines: Cassar; (3) mandarins: Arbi; tangerines; (4) lemons: Eurêka, Lunari, Arbi; (5) pomelo (Marsh Seedless, Star Ruby); (6) limes (sweet lime, acid lime, Bearss lime), citron, etc.

The surface area dedicated to citrus fruits totalled 21,000 ha in 2010, i.e. more than 0.4 % of total useful farming land in Tunisia. Three-quarters of orchards are located in Cap Bon. Cap Bon remains the main production zone, accounting for almost 74 % of the total citrus farming area. The structure of Tunisian orange groves has changed and we not only observe an increase in total surface area but also an increase in the number of farmers, with a majority of small-scale farms



Source: CLAM data based on the European Commission AGRI.C.2 / AGR26 / 2012

Fig. 9.1 Citrus fruit production in the Mediterranean basin (million tons). *Source* CLAM data based on the european commission AGRI.C.2/AGR26/2012



Source: GIF ruits, inter-professional fruit group

Fig. 9.2 Citrus fruit production in Tunisia by variety (thousands of tons). *Source* GIFruits, inter-professional fruit group

(32 % of the surface area is occupied by small-scale farms). The number of trees has increased by 26 % since 1999.

The citrus farming sector in Tunisia is highly strategic in Tunisian agriculture as it provides income for more than 11,600 producers and more than 18,000 families. It accounts for casual labour estimated at 3 million man-days per year.

On average, Tunisia exports 25,000 tonnes of citrus fruits, representing 7 % of its production. However, these exports largely consist of the Maltese variety with almost 80 % of production intended for export, primarily to France. For the crop year 2011/2012, exports of oranges per variety were composed of 95.2 %Maltese, 2.8 % Navel, 1.4 %Valencia and 0.6 % others.

With regard to technical innovation, the main characteristics of this citrus farming draw our attention to a number of essential points: first, there is the issue of variety and the importance of the Maltese variety as well as the privileged relations with France on this market. This variety of orange is marketed as a high-quality product at a higher price than other categories. In February 2013, the Marseille border price of Maltese oranges reached one-and-a-half times that of Spanish navels. French consumers appreciate the ease of peeling, the balance of sweetness and acidity, its juice content and the lack of pips. The flesh is very juicy, very aromatic and slightly acidic. The red colour is spread throughout the inside of the fruit with varying levels of stripes depending on the farming conditions (GIFruits).

Nevertheless, the supply of citrus fruits is becoming more diversified. The Maltese orange now faces competition from the Thomson variety as well from as clementines, although these are almost all marketed locally. The prices are

relatively high, encouraging producers to devote more resources to them (land, water, etc.). The development of domestic demand should be analysed from a qualitative point of view.

9.2.2 Research: Innovation, Technical Controversy and Technological Orientation

Following interviews with operators in the Tunisian citrus fruit value chain, we identified certain scientific and technical questions subject to controversy and associated with major economic objectives.[1]

In Tunisia, certain research actions in the field of citrus fruit farming covered the following themes: clonal selection of some varieties of citrus fruit farmed in Tunisia: viral sanitation and the improvement of citrus fruit varieties and rootstock, the study of phytophagous citrus fruit mites and the introduction of methodologies to combat them, citrus fruit mal secco with its diagnosis, chemical measures and varietal resistance, and finally the study of stubborn and tristeza, diseases found in citrus fruits, and their vectors.

In light of the objectives and the focus of the SustainMED study on international competitiveness for the citrus fruit value chain, we chose to explore two essential subjects in detail: the question of rootstock and the tristeza virus on the one hand, and the conditions of implementing measures to combat diseases and parasites on the other.

9.2.2.1 Rootstock: The Bitter Orange or Not?

Very often, in the fields of perennial plants and tree crops, technological progress is achieved through the improvement of plant material, rootstock or variety, depending on the case, with clearly defined selection criteria: plant productivity, fruit quality, production period, adaptation to the edaphic conditions, temperature and soil, and, increasingly, resistance to disease.

In the case of citrus fruits, a technical controversy has arisen concerning the oldest and most widespread rootstock in Tunisia—the bitter orange.[2] The bitter orange is a rootstock which is sensitive to the tristeza viral disease. The biological solution to combat this viral infection involves substituting the rootstock for more resistant varieties.

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[1]To achieve this, we combined an analysis of the literature in the scientific and extension reviews such as Fruitrop, the reports of the Euromed citrus net project, the conferences of the IOCV and a selection of technical manuals to understand and summarise these objectives.

[2]The bitter orange originally comes from south-east India. It was brought to the Middle East by the Arabs before being introduced in Europe during the Crusades in the 11th century.

The Economic Importance of the Illness

The importance of this disease makes it the source of a major economic and technological risk. The *Citrus tristeza virus* (CTV) is the causal agent of the most economically important disease affecting citrus fruits worldwide. During the last century, the disease destroyed almost 70 million citrus fruit trees grafted on bitter orange trees around the world. In Spain alone, 40 million trees were destroyed (Marroquin et al. 2004). The range of tristeza virus hosts is essentially restricted to the *Citrus* spp. genus. CTV is transmitted by grafting and by several species of aphid, the most prolific of which is the brown citrus aphid (*Toxoptera citricida*). The second half of the last century was marked by a considerable extension of this potential vector.

The following prevention strategies can be adopted: (1) consolidation of quarantine measures and vigilance at border posts; (2) controls in nurseries producing seedlings; (3) sensitisation of producers to the significance of tristeza; (4) production of certified seedlings; (5) monitoring of the dynamics of the aphid populations responsible for transmitting CTV; and (6) substitution of the bitter orange with another rootstock which is more resilient (ONSSA sd et al. 2013).

The symptoms caused by CTV differ according to the isolates and species of the host plants. Seedlings grafted on bitter orange trees wither and the size of the fruit is reduced. The trees turn a bronze colour before losing their leaves, then die following the destruction of the conductive tissue for nutrients or sap at the grafting points (ONSSA). In some cases, the primary and secondary veins become lighter, while depressions form on the trunk of the plant, taking the form of longitudinal grooves, hence the term "stem pitting". According to Roistacher and Moreno (1989), the destruction of millions of trees by tristeza between 1930 and 1950 was even one of the main reasons underlying the creation of the IOCV[3]in 1957.

"Historically speaking, when *Toxoptera citricida* is introduced into a country, citrus fruits grafted on the bitter orange leave the country for good. Numerous indexing and eradication programmes were introduced between 1970 and 1980, accompanied by numerous grubbing-up operations in Argentina, California, Spain and Israel. These programmes, supported by the development of ELISA indexing techniques, did not all achieve their objectives. Every attempt to save the bitter orange as a rootstock by means of cross protection failed[4]" (Roistacher et al. 2010).

The Advantages of the Status Quo

In light of this objective, all the citrus fruit producers around the world, and in particular in Tunisia, should renew their orchards. However, Tunisia has as yet remained unscathed by this virus. The rootstock is one of the essential factors of

[3]IOCV: International Organization of Citrus Virologists

[4]Cross-protection consists of infecting the rootstock with mild strains of the virus: it is a kind of pre-immunisation.

production success due to the resistance it confers with regard to biotic constraints (destructive diseases and pests as well as degenerative and abiotic diseases: soil acidity or alkalinity, salinity, reaction to cold or drought) (CTA 2010). The rootstock has a strong impact on factors such as robustness and the first production age, the output and quality of the fruit. Use of the bitter orange presents numerous advantages of which producers are aware.

The quality of the citrus fruits adapts well with the bitter orange—in particular the variety "Maltese half-blood" for which we have already seen the importance, and particularity of the market—and demonstrates a better adaptation and a better quality than with other rootstocks, while also adapting better to both climatic and edaphic conditions, and this for all types of varieties. This is also the case with new varieties such as "*New Hall*", "*Washington Navel*" and "*Navelate*".

Although the other rootstocks adopted in Spain and imported to Tunisia boast the advantage of resisting the tristeza virus, the price of these rootstocks is very high and does not, therefore, encourage small-scale farmers to adopt them. Citrus fruit farmers are familiar with the bitter orange and demonstrate good mastery of the grafting technique.

We must also cite the importance of the link between the rootstock and the demands of the market. On the fresh fruit market, the quality of the "*Maltese half-blood*" makes the difference and it is its organoleptic characteristics which enable it to compete with the oranges of the other countries of the Mediterranean (cf. supra). The definition of organoleptic quality varies between the different countries in line with the ease of peeling, the colouring and the thickness of the bark. All of these elements contribute to defining the quality of the fruit. As a rootstock, the bitter orange preserves the quality of this product. Finally, despite its sensitivity to the tristeza virus, this product remains the most frequently adopted by farmers.

The "*Poncirus*","*Citrange*" *and* "*Citrumelo*" are now available as replacements for the bitter orange, with its sensitivity to "*Tristeza*". New rootstocks are created by hybridisation or through biotechnologies, including "*Citrange Carrizo*", "*Citrumelo 4475*", *"Citrange C-35*" and " *C. volkamérina*". These varieties are more resistant to tristeza and better adapted to the new densities and production techniques (CTA interviews 2010), although their adoption by farmers remains critical.

In conclusion, we identified the adoption of new rootstocks as an indicator of attention to innovation, although we are fully aware that this adoption can be viewed differently by the producers who evaluate the advantages and risks in light of the costs of change.

9.2.2.2 From Chemical Measures to Integrated Mechanisms

As in most producer countries, Tunisian citrus fruit farming has followed an evolution of techniques for combating pests aimed at reducing the quantity of pesticides used, reflecting developments in society including environmental protection, a reduction in residues, the development of import standards, specifications (Global gap), resistance to treatment and the destruction of useful insects (bees).

It is recognised that shifting from a treatment schedule to an integrated mechanism requires very good familiarity with the biology of the plant and its parasites, a much higher level of technicality, a significant technical supervision and the mobilisation of major collective and public resources.

As for all crops, the number of parasites and potential diseases is very high. The "EuroMed Citrus Net"[5] programme presents ten sorts of virus or viroids, one bacterium and one phytoplasm, five types of fungus, four types of nematodes, nine species of spider, seven species of insect and eight species of cochineal. Of course not all of these species have the same economic importance either in terms of the damage caused, their spatial dissemination or the difficulty experienced in eradicating them or limiting their extension.

The Example of the Mediterranean Fruit Fly

In the Mediterranean region, *Ceratitis capitata*, the Mediterranean fruit fly, is the most formidable pest as a result of the favourable conditions observed in a large part of this area, in particular the climate and diversity of crops. Being very polyphagous with a high level of ecological tolerance also enables it to express its biotic potential to the full and to make optimum use of its environment by developing several generations every year and attacking numerous species of fruit tree, demonstrating year-round production (Mazih 1992).

The fly lays between 300 and 1000 eggs throughout its life and the larvae create galleries through which the fungi and bacteria responsible for decomposition and premature falling of the fruit can enter. This damage represents a major obstacle to exports due to the depreciation of the value of the goods and the quarantine measures imposed by certain importing countries. On citrus fruits, the Mediterranean fruit fly targets early varieties and varieties with a thin skin, in particular the clementine. The high risk period is at the start of autumn and the end of spring.[6]

Over the past two decades, Malathion,[7] a non-selective insecticide applied from September until the end of November, a period when the fruit fly causes maximum damage and multiplies the most, was the weapon of choice in the fight against this fly. This product is now prohibited in Europe. Furthermore, the Mediterranean fruit fly has developed resistances through mutation. The chemical measures proved insufficient to control this pest. Despite the treatments carried out, losses due to the Mediterranean fruit fly in Tunisia are roughly USD 10,500,000 per year (Driouchi 1990; quoted by Lachiheb 2008). Nor should we forget the impact of these treatments on the environment, human health and useful auxiliary entomofauna

[5] http://www2.spi.pt/euromedcitrusnet/

[6] Source: http://bacteries-champignons.blogspot.fr/2012/02/methodes-de-lutte-contre-la-ceratite.html

[7] For the European Union: this active ingredient is prohibited by decision 2007/389/EC following the examination of the inscription in appendix I of directive 91/414/EEC—since 2012, the residue rate for this pesticide in food is regulated in Europe.

(Lachiheb 2008). Despite the numerous works carried out on the different parasites, the results are relatively weak due to the difficulties of breeding and the complexity of the host-parasite (Lachiheb 2008).

In looking for substitution solutions, the CTA experimented with the technique of releasing sterile males from 2005 to 2006[8] (Lachiheb 2008). This technique was implemented in 2003 with a partnership between the Ministry of Agriculture and the National Centre for Nuclear Sciences and Technologies (CNSTN) in Sidi Thabet where the insects were bred and sterilised. This project received funding from FAO and CNSTN.

To eradicate the fruit fly, a large number of sterile males must be released for the approach to be successful. However, the number produced in Sidi Thabet was limited to between 8 and 10 million pupae or chrysalis per week to cover all the citrus fruit farming areas. The personnel and logistical resources were also limited. The experts therefore chose a zone measuring 5000 ha, isolated and bounded by the sea around Hammamet. The sterile insects were released three times a week on plots each measuring 1 km^2 at 196 points identified by GPS, with a double dose around the edge to avoid contamination. The sex ratio, weight and quality of the insets released were monitored.

The project lasted two years but did not achieve its objectives. Hammamet is a tourist area, the farmers were absent from their farms and were neither attentive to nor made aware of the presence of the fly. The relay funding of DTN 500,000[9]was not obtained. It also proved difficult to optimise the breeding process and only 2 million pupae or chrysalis were produced instead of the expected 10 million.

The project of releasing sterile males was thus replaced by the installation of a network of traps to monitor the fruit fly population, thereby facilitating the reasoned applications of chemical treatments by the farmer. From an integrated approached, we had returned to the reasoned approach.

We observe here a limit to technological development. The action undertaken requires public investment and collective action which is difficult to implement. A "diffusionist" vision of technical progress is not relevant in this case as an action must be introduced with sufficient resources. If the critical mass is not achieved, the technology cannot be disseminated.

Pursuing Biological Control Actions

The CTA has nevertheless not given up and, as part of a new strategy of the Ministry of Agriculture and the Environment, is pursuing the development of biological control by creating an insectarium with a view to producing auxiliaries which attack the main parasites. The insectarium of the Citrus Fruit Technical Centre Technique has launched the following biological control programmes:

[8]For a detailed presentation of the technique, see Lachiheb (2008)

[9]About €250,000

- biological control of *Planococcus citri* with the predator *Cryptolaemus montrouzieri* and the parasitoid *Leptomastix dactylopii,*
- biological control of the citrus leaf miner[10] *Phyllocnistis citrella,* the exotic ectoparasitoid *Citrostichus phyllocnistoides*.
- biological control of *Icerya purchase* by means of the predator *Rodolia cardinalis.*

The CTA is developing its breeding farms and increasing the number of biological enemies from 30,000 to 50,000. The limitations of these actions can be seen in the technical optimisation of production, the means of disseminating these auxiliaries and thus the size of the protected zones. The resources allocated to developing this type of collective action should probably be increased.

Similarly, the CTA calls on its employees to implement a mass trapping approach by distributing 40–50 traps per ha to the tree farmers at a subsidised price. These traps are sold by specialist manufacturers who combine an attractive substance (DAP[11]) with an insecticide. The product can be purchased directly by the citrus fruit farmers, although the price remains high at about TND 600 (€300).

The integrated approach remains the de facto reference: it is encouraged by research institutions and large farms such as the SMVDA[12]. This practice is based on eliminating weeds, introducing balanced fertiliser, watering the citrus-fruit seedlings regularly, annual pruning to aerate the plants, burying infected plants and the rest of the harvest deeper than 50 cm, and complying with the harvest times before the risk of infection by the pests (AVFA 2010).

9.2.2.3 Improving Production Techniques

Naturally, in the field of citrus farming and in Tunisia, we observe the improvement of a set of production techniques, which are significant when combined, but which are no longer subject to any real controversy or difficulty at the research stage. We have nevertheless made an inventory of these improvements to demonstrate the innovative attitude of the farmers studied.

Irrigation: in dry areas, irrigation is essential. It can be practised by sprinkling under foliage or in a localised manner (diffuser, drip system). In this case, fertilisation can be combined with irrigation (ferti-irrigation) to save on inputs and ensure a regular supply of minerals (Alary et al. 2009). This practice can be seen as modern and efficient. Similarly, it is possible to observe the existence of automatic or computer-operated irrigation. This practice is costly but has been adopted by certain SMVDAs and farmers with the necessary resources (source: our survey).

[10]The citrus leaf miner or "*Phyllocnistiscitrella*" was identified in Tunisia in 1994 having already been detected in other countries within the Mediterranean basin. This pest causes leaves to dry out and makes the citrus plant weak. Its presence can be identified by the symptom of the leaves rolling up (AVFA 2010).

[11]DAP: Di-Ammonium Phosphate

[12]SMVDA: agricultural enhancement and development companies

Fertilisation: mineral fertilisation must offset exports of mineral elements by the fruit and pruning and ensure the growth of vegetative organs. Fertilisation can be based on the results of mineral analyses of the leaves and soil. This practice is an indicator of innovative practices. In the survey, we observed that certain SMVDAs have these analyses conducted in Spain.

Water and soil analysis: before and after installing a fruit plantation, it is essential to know the physical and chemical characteristics of the soil. Similarly, controlling water quality is also an important practice. While nothing new, these techniques are indicative of a farmer's genuine understanding of technical matters.

9.2.3 Conclusion

With regard to the technological dynamics in the citrus fruit value chain in Tunisia, we retain two main questions, which mark its competitiveness: the risk linked to the potential arrival of the tristeza virus and the massive destruction of orchards. The solution of using resistant rootstocks exists. Specific actions coordinated by the CTA are implemented to counter this risk. Nevertheless, major risk management is always faced with the same problem: as long as the producers are not directly concerned, as long as they do not see the consequences of this potential biological crisis,[13] they are not ready to sacrifice their "acquired advantages".

The question of biological control is of a different type. Protection by pesticides is not really called into question. However, the attitudes of society in this respect change very rapidly. We simply have to look at the Ecophyto plan 2018,[14] which recommends reducing the use of pesticides in France by 50 %, to understand one of the main market orientations. The difficulty encountered concerns resources and collective action. The solutions are accessible.

9.3 Reconfiguration and Performance of the Citrus Fruit Value Chain in Morocco

We will now examine the issue of the competitiveness of export value chains in the Mediterranean partner countries (MPCs) against the backdrop of a changing national and international socio-institutional framework. We focus on the example of the citrus

[13]France in the 19th century and California in the 1990s were faced with a major Phylloxera crisis which demonstrated the economic importance of such diseases and epidemics.

[14]Ecophyto 2018: in the wake of the Grenelle Environment Forum, the Ecophyto plan represents the commitment of the stakeholders—who together drafted the plan—to reduce the use of pesticides at the national level. In particular, the Ecophyto plan aims to reduce the dependence of farms on phyto products while maintaining a high level of agricultural production in terms of both quantity and quality.

cultivation value chain in Morocco and we call on qualitative surveys[15] to demonstrate that this value chain is currently undergoing a restructuring process, and that despite notable progress with regard to production, an improvement in the competitiveness of the export value chain continues to be hampered by major constraints.

Upstream in the value chain, we identify the positive impacts and main limitations of the Green Morocco Plan (1). We then examine a number of questions deemed to be important by the professionals, including the translation of production potential into commercial gain (2), logistical organisation (3), economic organisation and the structure of governance within the value chain (4). Finally, we have identified the main recommendations of the operators within the value chain with a view to accelerating the processes of upgrading the value chain and to strengthening the competitive position of Morocco on the international market (5).

Together with early market gardening products, citrus fruits are the country's main export products. Furthermore, since the middle of the first decade of this century and following ten years of stagnation, this sector—which is of prime socio-economic performance[16]—has experienced a resurgence under the impetus of both the policy of privatising Sodea public land (2004) and the reform of the agricultural policy known as the Green Morocco Plan (2008).[17] Finally, the introduction of a new agricultural liberalisation agreement with the EU on 1 October 2012, and the opening of new negotiations with the EU concerning a complete and far-reaching free trade agreement at the beginning of 2013 have offered new business perspectives in the markets of the EU. Nevertheless, despite strong institutional support, the share of exported production has stagnated (30 % compared to 70 % at the beginning of the 1990s) while the value chain has become more vulnerable. At present, one of the main concerns of both the operators within the value chain and the public authorities is to enhance the competitiveness of the value chain abroad with a view to winning back the EU markets and diversifying into other markets (Asia, Africa, Eastern Europe) while consolidating their competitive position in traditional outlets (Russia, Canada, USA).

The EU, which was the main market for Moroccan citrus fruits until the beginning of the 1990s (70 % of the country's total exports), now accounts for only

[15]We conducted field investigations and semi-structured interviews with the heads of public institutions, professional organisations and production and export companies in order to collect their points of view and recommendations for enhancing the competitiveness of the value chain.

[16]According to the statistics of the Moroccan Ministry of Agriculture, the sector contributes Dh 2–3 billion (€186 à 279 million) to the agricultural trade balance, accounting for between 9 and 12 % of the value of agricultural exports. It generates 21 million work days and concerns 13,000 producers working on 92,000 ha.

[17]The objective of the Green Morocco Plan is to place agriculture at the heart of economic development in Morocco. It aims to reduce poverty in rural areas and improve the competitiveness of Moroccan agriculture. By 2020, it is hoped that the GMP will contribute 15.6 billion euros to the country's GDP, create 1.15 million jobs and treble the incomes of 3 million rural inhabitants. It can be divided into two main pillars: the first targets modern agriculture while the second concerns solidarity in agriculture. For the first pillar, the citrus fruit value chain is one of the value chains targeted.

25–30 % of total exports from Morocco. Despite the existence of trade preferences stipulated in the agricultural section of the Morocco-EU association agreement as well as a comparative advantage (production costs, climatic advantages), the operators in the value chain have been unable to resist the highly intensive competition in this market which currently demonstrates very limited absorption capacities. When it joined the Community market, Spain gained a decisive competitive advantage (support for the value chain within the framework of the CAP, and proximity to satisfy the supply requirements of large-scale distribution companies). The difficulty experienced by Moroccan exporters in adapting to the requirements of this market also contributed considerably to the "marginalisation" of this source. Consequently, Morocco turned towards other, more distant markets, primarily Russia. In this expanding market, which is somewhat less demanding than the markets of the EU in terms of quality, Moroccan products have enjoyed longstanding notoriety and Morocco is more competitive (in terms of approach costs by sea transport) than Spain. Depending on the year in question, Russia absorbs 45–50 % of total Moroccan exports. In recent years, however, competition between the countries of the Mediterranean basin[18] has intensified due to the globalization of the markets and the improved performances of new entrants (Turkey and Egypt). In light of the saturation witnessed on the EU market (slow growth of demand in terms of volume), the countries of the Mediterranean basin are now looking for new "growth relays" and are turning towards Russia, the countries of Eastern European and other markets where Morocco has historically been present, i.e. North America (USA and Canada). The competition has thus "shifted" from the EU towards these new markets. This process has caused the cards to be reshuffled throughout the Euro-Mediterranean area and the value chains to be reconfigured. In the case of Morocco, the restructuring and improvement in the value chain's competitiveness and an international repositioning by means of an "offensive" export strategy are major objectives which will decide the future of this value chain as an export sector serving as a source of growth and job creation.

9.3.1 The Green Morocco Plan: Positive Impacts and Main Limitations

9.3.1.1 The Renewal of Orchards, an Increase in Production, but with Uncertainties Surrounding Quality and Productivity Levels

Within a 5-year timeframe, the citrus fruit value chain programme contract between the public authorities and the profession stipulates a production objective of

[18]With 18 % of global production estimated at 121 million tonnes, the Mediterranean basin is the second leading production area (24 million tonnes) after China and the leading global trading area (63 %).

2.9 million tonnes accompanied by an export volume of 1.3 million tonnes (trebling exports in the process). Over the same period of time, global investment totalling Dh 9 billion[19] will be mobilised, two-thirds of which (Dh 6 billion) will be provided by private operators. For professionals, the GMP was an absolute necessity to ensure the development of the citrus cultivation value chain. In terms of production, the aim of the state support policy is to accelerate the upgrade of Moroccan orchards through the renewal of plantations, the dissemination of modern production techniques, the renewal of varieties and improvement in orchard productivity, which is currently insufficient (15 t/ha if we take account of all plantations and 26 t/ha if we only consider orchards which are actually productive).

Since the mid-2000s, major investments have been injected by private operators. The privatisation of Sodea public land (from 2004 onwards) within the framework of public-private partnerships[20] and the subsidies (certified seedlings, localised irrigation equipment, etc.) granted as part of the GMP have provided decisive incentives for renewed investment. Production band plantation renewal demonstrates steady growth.[21] In total, approximately 30,000 ha of orchard should be renewed. The creation of new orchards concerns some 20,000 ha. In light of water stress, extending farming areas is a primary target according to the water potential of each region. It would appear that the objectives set for 2015 as part of the programme contract are exceeded by 35 %.[22] Nevertheless, certain producers and exporters stress that volume-related objectives are predominant and that, despite considerable efforts, many of the operators in the value chain do not pay sufficient attention to two essential performance parameters: the quality level of future production potential and the improvement in orchard productivity (yield). Consequently, uncertainties remain for these two parameters with regard to the progress made.

One of the reasons put forward for this is the limited dissemination of modern production techniques which perpetuates uneven production quality and major disparities between farms. Furthermore, to optimise orchard management, it is important to take account of a series of parameters including localised irrigation, the choice of plant material, tillage, treatments, etc. The sector, however, suffers from a lack of technical and agronomic competencies in these domains. The main issue is not access to technology but its implementation. The dissemination and optimisation of modern production techniques and innovation remain restricted to

[19]1 Dh is worth approximately 0.09€

[20]In 2005, management of public land was transferred to national and foreign private operators. SODEA rents land with leases of between 17 and 40 years. The Green Morocco Plan (GMP) provides for a new allocation of Sodea land, emphasising win-win partnerships between Moroccan and foreign producers. It explicitly encourages foreign investment in agriculture.

[21]Professionals call on data from nurseries. The sale of seedlings would appear to have increased threefold.

[22]Production should reach 2.1 million tonnes by 2015.

producer-exporters boasting the highest capital and, more particularly, human resource endowments. Furthermore, certain producers question the quality level (dependent on orchard management, as well as on the effects of climate change and the state of the health of the plantations) of future production potential, as it would appear that the majority of producers—for the most part older and with a lower level of education—are not aware of this issue.

9.3.1.2 "Reactivating" the Production Areas with a High Citrus Cultivation Potential

The public authorities pay particular attention to the region of le Gharb (located in north-west Morocco), perceived as "the cradle" of Moroccan citrus cultivation. This production area, where Sodea enjoyed a strong presence (45 % of the citrus growing area in the region) until the mid-1990s, is characterised by a considerable technological lag. The state's priority is to renew the plantations, as one-third of these plantations is more than 35 years old, and to upgrade the farms. Of the 50,000 ha concerned by the GMP, the region of le Gharb accounts for some 17,730 ha including almost 10,000 ha (representing half) falling under the extension of areas.

Citrus farmers, who are often older, boast large land assets with orchards covering 1000–2000 ha. Judging by the Regional Agricultural Plan (RAP), the value chain should enjoy significant development. It is scheduled to reach a production level of almost 1.4 million tonnes and an export volume estimated at 90,000 tonnes (compared to 33,000 tonnes at present) with a value added of about Dh 6.5 billion.[23]

The privatisation of Sodea land and the advantages of this region—a relatively high water potential, the soil quality and the proximity of logistical infrastructures (Tanger-Med)—have encouraged major citrus fruit producer-exporters from the Souss-Massa-Draa region (south) to set up business. In this region, the country's leading production area for citrus fruit and early fruit and vegetables, the possibilities for extending citrus farming areas are very limited due to land constraints, water deficit and a structural labour problem (social management and availability). These new arrivals are a driving force in modernising the value chain as they bring with them a transfer of technology and know-how. However, while the region of le Gharb enjoys certain advantages, there are also a number of major constraints which must be taken into account as they condition the upgrading of the sector.

The constraints most often voiced are the technological lag, the lack of skilled labour and technical competencies and the cost of investment in hydraulic infrastructures. The development of citrus cultivation in this region, blighted by high

[23]Gharb-agrumes le plan regional compromis, L'Economiste no. 3305 of 24/06/2010, http://www.leconomiste.com/article/gharbagrumes-le-plan-regional-compromis.

poverty,[24] could have positive socio-economic impacts, in particular with regard to job creation and increasing incomes among the rural population. It would appear that small-scale producers (1 ha) who formerly produced sugar beet are now reconverting to the production of citrus fruit to complement their breeding activity.

9.3.1.3 The Arrival of New "Entrants"

We have identified three typical profiles:

- Investors from other sectors (real estate, industry, services). For this profile of investors, tax exemption in the agricultural sector, the prospect of higher profitability rates and limited risks compared to other economic sectors would appear to be the main reasons behind their arrival in the citrus fruit value chain.
- Producer-exporters of early fruit and vegetables (primarily tomatoes) from the region of Souss-Massa-Draa who are looking to diversify into the citrus fruit sector. These companies follow a rationale of diversification for two reasons: first, they believe that the development of tomato production has reached a ceiling. The existence of quotas on the EU market (main outlet) and the constraints on access to factors of production (water, land and labour resources) have curbed the potential for expansion. Furthermore, labour management (social demands and availability) has become highly problematic in the market gardening sector (highly labour-intensive). Boasting numerous advantages including distribution networks in the large-scale distribution market in particular in France, the existence of supply chain platforms and marketing offices in the export markets (e.g. the Saint-Charles market in Perpignan), expertise in modern production techniques and a high capacity to incorporate innovations, these new arrivals could make a considerable contribution to upgrading the value chain as they target the development of high-value-added production. These considerations must be qualified, as the same production rationales do not apply to orchards as to market gardens.
- Foreign investors who have access to significant capital, for example French importers specialising in citrus fruits. The main rationale driving these operators is to secure their supplies (volume and quality) to large-scale European distributors. These investments in production take the form of joint-ventures or partnerships with local producers within the framework of aggregation contracts supported financially by the GMP (example of a leading French importer in the organic fruit and vegetable sector).

[24] According to the statistics of the High Commission for Planning (HCP), the poverty rate is 20.5 %, which is higher than the national average of (14.1 %). In rural areas, agriculture represents 85 % of employment.

9.3.1.4 Research and Development, Innovation, Training: Major Objectives

Research and development—varietal and genetic improvement and orchard management—has become essential to improve the economic performance of farms (output, productivity, resistance to disease) and to adapt to consumer demands relating to gustatory quality (juice content) and the appearance of the fruit (calibre, ease of peeling, lack of pips).

In the 1970s, in the field of varietal innovation and rootstocks, Morocco was one of those countries which had stolen a lead over its rivals and it was recognised around the globe for its scientific production. Over the years, this heritage has disappeared. The provisions and public investment in research and development are highly insufficient. Since the dissolution of the Société Agricole des Services du Maroc (SASMA)[25] following the liberalisation of the sector in 1986 (bringing to an end the monopoly of the Commercialisation and Exportation Bureau), only a few individual producers with both capital and skilled human resources have been in a position to undertake research and development activities, for the most part calling on international expertise (from France, USA and Spain).

In light of this situation, innovations (varieties, rootstocks, etc.) remain limited and when they do exist, they are poorly disseminated. The progress made in adapting orchard varieties and preventing disease is as yet insufficient. With regard to the health protection of the orchards, the dissemination and use of new rootstocks instead of bitter orange trees are still very limited. The risk is the same as in Tunisia for the tristeza virus. Morocco is not immune to this problem and experts believe that there is a major risk of transmission in Morocco due to the proximity of contaminated production areas (Spain and Portugal), the importation of non-certified seedlings and the presence of vectors capable of transmitting the disease. This is why the dissemination of new rootstock has become a matter of urgency. Despite this situation, insufficient attention is paid to pressure concerning health issues and the associated risks, while little is done to increase producer awareness.

Furthermore, for want of sufficient technical supervision of the producers, we can note that no thought has been given to arbitrating the choice of varieties and rootstock. This choice is highly complex because it requires a high level of agronomic knowledge while decisively impacting the period when productivity begins, the yield, the level of profitability and the quality (intrinsic and calibre) of the fruit. Training is also a priority. Despite considerable efforts on the part of producers who foresee a fall in the profitability of the sector and thus the need to improve productivity, the citrus farming sector is generally characterised by a low level of technicality and training among producers.

[25]Created in 1968 to accompany the development and modernisation of the citrus farming sector, SASMA—a public entity—was assigned three main missions: to collect information on the state of production, to undertake research and development, and to disseminate information to the producers.

9.3.2 Translating Production Potential into Commercial Gain

9.3.2.1 A Limited Range of Products and a Production Schedule Highly Concentrated Over Time

Recent plantation decisions have primarily concerned small citrus fruits.[26] This rationale corresponds to a desire to focus on exports and in particular on varieties with high value added (for example Nadorcott). Perceived as products with low value added and which are not highly competitive as exports, oranges have not enjoyed such an extensive development.[27] As an export product, oranges are becoming marginalised; in 2011–2012, exports totalled 140,000 tonnes, accounting for 15 % of production. With producer prices doubling, the local market has become more lucrative than exports. Consequently, certain producers have left the export sector altogether. Most producers agree that orange farming intended for the local market is very profitable as production costs are low and "sales of standing crops" to intermediaries (dominant marketing system) does not require investment in order to market the products. Some operators, however, who wish to have a wide range of export products and sufficient volume to amortise their investments in packaging centres, reject the dominant rationale by developing the production of oranges, in particular by means of aggregation contracts. These companies also distinguish themselves by adopting a strategy of complementarities (of products, markets and schedules) and exporting oranges intended for the processing industry in Europe (quality of juice deemed superior to that of Spanish oranges).

We witness a reconfiguration of the value chain with three types of strategy consolidating the duality of the value chain between the local market and exports: (1) producers reconverting to the production of oranges exclusively to supply the local market; (2) producer-exporters who have abandoned the production of oranges and who specialise in the production of small citrus fruits, the most dynamic segment on the international market; (3) producer-exporters who wish to establish complementarity between oranges and small citrus fruits.

At present, insufficient renewal of orange plantations makes the value chain "more vulnerable" on the export market and on the local market. On the export market there is a concentration of the marketing season over a period of only 4 months (November to February) with a peak in activity during the clementine season (from 15 October to 15 December) and overlaps (competition between varieties) in the schedule. On the local market, the poor quality of products in the absence of standardisation, the risk of insufficient short-term production to satisfy growing domestic consumption and the appearance of a high level of speculation during Ramadan are the main factors of vulnerability highlighted during our interviews.

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[26]In 2011–2012, the production of small citrus fruits totalled 764,000 tonnes (of which 45 % were exported), increasing by 300,000 tonnes over three years.

[27]In 2011–2012, the production of oranges totalled 950,000 tonnes.

The sustainability of production systems has also been stressed. The intensification and high level of specialisation of production and the creation of orchards in new production areas not traditionally known for the production of citrus fruits could weaken the ecosystems and contribute to the pressure exerted on water and land resources.

9.3.2.2 Investment in Production Has not Been Followed by Investments in Downstream Activities

While production is enjoying sustained growth, the increase in and modernisation of packaging and refrigerated storage capacities have not followed suit. Private investment has not been as significant as hoped. In particular, these result from the fact that state subsidies are perceived as offering little incentive (10 % of the total cost of equipment) and can also be traced to the fact that producer-exporters do not have sufficient "visibility" concerning marketing prospects for exports. Furthermore, operators are unwilling to invest heavily in modernising equipment and creating new centres. The sector will be faced with a lack of infrastructures: by 2016–2018 packaging capacities will need to be doubled.

9.3.2.3 The Lack of Proactive Strategies and Economic Organisation Within the Value Chain

By 2018, Morocco has set itself the target of exporting 1.3 million tonnes. Professionals are uncertain as to the absorption capacity of Morocco's traditional markets and the increasing success of new competitors. We can note that exports are not keeping pace with the growth in production, declining from 50–60 % of production at the beginning of the 1990s, to only 32 % today.

Concerning the appropriate marketing strategy to be implemented, while there is a consensus on the need to diversify into markets outside the EU, the same cannot be said with regard to winning back the EU markets—one of the objectives of the GMP. For some, the EU market is too competitive (domination of Spain; non-competitive approach costs) and not sufficiently lucrative. For others, it is an absolute necessity offering opportunities to market products with high value added. These differing points of view bear witness to both the lack of economic organisation within the value chain, despite the creation of an inter-professional entity (Maroc Citrus), and questions concerning the need or otherwise to implement collective strategies (logistical and commercial). In other words, there are at present no clearly defined strategic orientations.

9.3.2.4 The Market in Russia: The End of an "Exclusive Preserve"?

On the Russian market, where Morocco enjoys a strong competitive position due to the historical renown of "produce of Morocco", exporters obtain higher prices than on the EU market. However, we observe an increasingly intense competition, a downward price trend and the erosion of Moroccan market shares. Indeed, there is the increasing success of rival states (Egypt and Turkey) and the presence of new arrivals (Pakistan, Spain). Second, Russian importers are beginning to enjoy more bargaining power in relation to Moroccan exporters, implementing volume-based strategies to ensure a heterogeneous supply within individual rationales.

For about five years, Moroccan operators have been faced with a fall in prices, attributed by some to the quality of the products, and to too great a volume being marketed over a short period of time. The dominant strategy of Moroccan exporters involves "evacuating" supply through importers, in most cases an essential link in the chain in light of the functions they perform (which cannot be undertaken at a lower cost by the exporter). The Moroccan value chain then operates in "flows driven by supply" where price and volume are decisive. Furthermore, it would appear that shipping decisions are more often than not taken unilaterally by the exporters without taking account of the markets' absorption capacities. The development of the container ship has increased this competition even further. Unlike with conventional boats, grouping supplies is no longer a necessity.

With a heterogeneous quality and intense competition between Moroccan exporters, Russian importers bring this competition to bear on prices. This attitude within the value chain, combined with a supply chain which is less than efficient, contributes to creating a situation of product trivialisation with falling prices, which nevertheless globally remain lucrative for the producers. Furthermore, it would appear that supply has become fragmented: the structure previously based on "importer panels" is giving way to "fragmented" commercialisation with numerous intermediaries (importers, brokers, wholesalers, etc.). This change is altering the balance of power: importers are consolidating their bargaining power while Moroccan exporters demonstrate diverging interests for want of a collective supply management strategy (price policy and marketing coordination). To break this cycle, exporters with a supply of quality products attempt to position themselves on the large-scale distribution market which is beginning to expand. For Moroccan operators, Russia remains a market offering strong growth potential. The challenge facing exporters today is to preserve the reputation of "produce of Morocco".

9.3.2.5 Strategies for Winning Back the EU Market

For some producer-exporters, winning back the EU markets is an absolute necessity. It means adopting a value creation rationale rather than focusing on volumes. That is why repositioning Moroccan citrus fruit on the EU markets depends on the operators' capacity to develop a highly-selective quality policy to satisfy the stringent demands of large-scale distribution firms, including among other things

regularity and reactivity (efficient supply chain), compliance with health, phyto-sanitary, environmental and social standards, plot-by-plot orchard certifications and the adoption of a quality label. It also involves enhancing the "produce of Morocco" image, providing a differentiated supply (market segmentation) for a range of top-quality products (gustatory quality, development of pre-packed goods, quality signs such as the Berkane clementine GPI and strong commercial brands such as Afourer for the Nadorcott variety).

Very few companies are committed to this process as market entry costs are high. Initially, these companies are willing to accept less lucrative prices compared to other markets (Canada, Russia) in order to strengthen their subsequent position and increase their market shares. They have undertaken considerable investment in equipment (for example pre-calibration units—only 3 or 4 centres are equipped) in order to position themselves on the large-scale distribution market.

The cases we have identified concern companies already present on the English market (albeit with low volumes) working with very demanding distributors (Tesco, Marks and Spencer) and the French market. Producer-exporters also count on a future fall in Spanish competition (disadvantage in terms of labour costs and land pressure) due to a stabilisation of production.

9.3.3 Logistics: A Lack of Collective Organisation

Until 1999, Moroccan exporters had implemented a common logistics strategy through the Atlas Fruit Board (AFB) created in 1987. This organisation had two primary missions: commercialisation on contract markets (prices negotiated per season)[28] and logistical organisation—grouping shipments, programming the departures of ships and negotiating freight with shipping companies—on all export markets (contract and EU markets). The numerous disagreements among the exporter groups concerning the strategic choice of the favoured export markets resulted in free exportation on contract markets and the break-up of the AFB into two rival organisations: Fresh Fruit (FF) and the Maroc Fruit Board (MFB).

The current logistical organisation no longer serves to concentrate supply and does not allow logistical costs to be optimised. Logistical costs represent more than 60 % of the total commercialisation cost. Inefficient logistics and the lack of a global vision based on a supply chain rationale represent a considerable handicap. Consequently, there is a huge lack of organisation which prevents the supply chain from being optimised (reliability, cost, reactivity, traceability).

The development of container shipping has exacerbated the fragmentation of export supply. Some producers have attempted to break away from the two main groups (FF and MFB) and to adopt a "free riding" approach to exporting by means

[28]Sweden, Finland, Norway, Canada, Saudi Arabia, Russia and Poland. In these markets, commercialisation was not free and AFB enjoyed a monopoly.

of container ships, although without success as transit by container ship takes too long in relation to more conventional ships.

Numerous producers highlight the fact that the introduction of an export coordination mechanism and a common logistics policy to support a genuine commercial strategy is essential. With this in mind, operators are strongly in favour of a collective thought process and believe that there are still numerous obstacles to be removed as this requires far-reaching changes in behaviour involving information sharing, transparency and trust.

9.3.4 Weak Integration of the Value Chain, Coordination Strategies and a Governance Structure Dominated by Market Mechanisms

The citrus fruit sector is characterised by the existence of two value chains which continue to operate independently of one another: an "industrial" export value chain and a "traditional" value chain devoted to the domestic market. The processing industry has become marginalised for want of sufficient supply, as orange production is no longer sufficient to generate a surplus and the prices of raw material become prohibitive. Morocco imports more and more juice from Spain and Turkey. Producers who were involved in this industry are exploring the possibility of planting orchards devoted to industrial use.

Consequently, the domestic market and exports are perceived as two separate sub-value chains. This situation does not allow producer-exporters to benefit from synergies between exports and the potential observed on the domestic market. The latter is expanding rapidly, but the products generate little value due to extensive informal trade, dysfunctions on the wholesale markets and the lack of standards governing products which are marketed in their raw state.

Products intended for exportation are commercialised by ten exporter groups characterised by a semi-integrated organisation structure. These operators are both producers and service providers (commercialisation and packaging) on behalf of other producers grouped into shipping cooperatives (producer-shippers) and/or producers who call on shipping companies (independent packaging centres).

The in-house production of exporter groups, however, represents a small part of total Moroccan exports (30 %). In other words, the value chain demonstrates weak vertical integration. Only the major producers with the necessary capital and commercial networks have incorporated shipping and commercialisation operations. Partnership relations between the different operators in the value chain are rare. One of the consequences of this value chain configuration is the existence of a conflicting imbalance of power between the operators within the value chain: producers, shippers (packaging centres) and exporters.

Furthermore, the means of coordinating between the operators in the value chain represent a major brake on improving the competitiveness of the citrus fruit value

chain. For the most part, the rationales are based almost entirely on market mechanisms. Coordination mechanisms such as specifications or long-term contract mechanisms concerning prices, quality or volumes are rarely implemented. This type of relationship is not founded on a long-term rationale. In these conditions, it is very difficult to organise commercialisation programmes targeting large-scale distribution firms.

It would appear that we are faced with a governance structure whereby each partner endeavours to minimise his risks independently, a situation which leads to major conflict between the operators within the chain. These conflicts concern the conditions of training and the distribution of profit margins.

9.3.5 The Levers for Action Aimed at Improving the Performances of the Value Chain

We have identified the recommendations put forward by the operators:

1. **Strengthen research and development, training and the dissemination of new innovations and production techniques**: This should be done with a view to improving the health protection of orchards, increasing the productivity and economic profitability of the plantations, increasing the value added of the products (absence of pips, external colouring, gustatory quality and calibre) and ensuring a market presence which lasts as long as possible.
2. **Improve the quality and signage within the companies**: This improvement is carried out on two levels—the product (technical production conditions, choice of varieties, work on the product, etc.) and the supply chain by means of service quality (flexibility, meticulous shipping schedules, traceability, etc.). Furthermore, the use of certification systems (ISO9000, 14002, HACCP, etc.) should be generalised as it is a condition of market access.
3. **Implement a supply segmentation strategy and a strong marketing policy**: These strategic focuses are based on a quality policy capable of satisfying consumer expectations (gustatory quality, respect for the environment, social sustainability, health security). In actual fact, the operators must completely rethink the value chain by reversing the dominant order running from production to commercialisation. On markets which are becoming saturated, gap or niche strategies for high-quality products should be explored. From this standpoint, Morocco boasts significant advantages including a potential for recognised gustatory quality and the existence of "*terroirs*". This market approach requires new supply management tools, for example quality or private labels. This type of strategy should be based on the systematic use of strict specifications combined with control mechanisms from the production stage onwards. Quality improvement must also be supported by disseminating

traceability processes on a wider scale. Finally, a marketing policy giving rise to a "produce of Morocco" brand image could help to increase the visibility of Moroccan products on the markets.

4. **Ensure logistical organisation and management of export supplies**: Our survey highlighted the need for strategic considerations at the inter-professional level with a view to introducing a collective logistical organisation. Implementing a collective strategy is a very complex affair as it presupposes the introduction of a new governance structure within the value chain and an economic organisation based on partnership relations between the different operators within the chain.
5. **Develop those markets where Moroccan citrus fruit already enjoys renown**: In Canada, Scandinavia and the US, Moroccan clementines are perceived as a luxury product. Today, it is important to preserve the "produce of Morocco" image by marketing products of irreproachable quality within a growth strategy relating to value rather than volume. The countries of the Middle East which were an important destination for Moroccan products in the 1990s are also mentioned.
6. **Increase the awareness of the public authorities to implement a strategy of market diversification**: The main recommendation of the professionals involves calling on competent entities in this domain, mainly Maroc Export which is primarily concerned with promoting exports.

9.4 General Conclusion

In conclusion, we would like to emphasize both the commonalities and the major differences in the challenges and opportunities of the citrus industry in these two Mediterranean countries.

Many similarities appear in the matter of production and technical constraints. The two countries are alarmed by the major risk of loss of their orchard after a tristeza virus attack. The current solution is to change rootstock, which involves extensive investment in resources for the renewal of the orchard, the extension and the technical implementation of protection and quarantine certification. The effects on the quality of new grafting and the association of root stock varieties also have to be taken into account. In the same vein, the competition, by diversifying the quality and taste, using the adoption of new varieties and small fruits, becomes a major challenge on the market which must be associated with the increasing schedule of the production. Resources are scarce: land and water are subject to strong competition for their use. Pesticide reduction and development of IPM, such as biological control, become binding constraints for European markets, more and more sensitive to the environmental concerns.

In both cases, these countries are seeking comparative advantages enabling them to maintain their market shares: higher yields, development of labels, logistics improvement and better organization of the sector. Both countries also face a reduction in their exports towards developing a more lucrative and less stringent one than the export domestic market. They also face new competition on the European and world market, facing Egypt, Turkey, Pakistan and Spain. The magnitude of the expected reorganization of the export sector bears no relation.

That said, the big difference in the size of orchards, production volumes and exports affect the scale of the challenges facing each country. Tunisia produces only 360,000 tons of citrus and it exports only 25,000 or 7 %, while Morocco produces two million tons and exports 30 %. The place on the markets, the distribution of exports by country and the nature of the competition are not the same. Tunisian exports are concentrated in France with a dominant half-blood Maltese variety. Morocco puts up a fight on global markets. The reorganization of the Moroccan sector including export then appears vital.

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Chapter 10
Sustainable Agriculture and Forestry in Southern Mediterranean Countries: Policy Impacts and Challenges

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10.1 Introduction and Purpose

This chapter aims to assess the impacts of policies on sustainable agriculture and forestry and rural development in the EU Mediterranean Partner Countries and Turkey. This is done by conducting a qualitative policy analysis for Egypt, Morocco, Tunisia and Turkey. The analysis is also benchmarked to Finland and Spain. The impacts of different policy programs are evaluated under the available frameworks for sustainability.

In order to conduct a policy impact analysis, several important specifications need to be made. First, factors describing the essential elements of each dimensions of sustainability need to be defined. Second, indicators approximating the development of each factor need to be defined. Third, policies impacting on the different indicators need to be reviewed. Finally, and most importantly, suitable and sufficient data need to be collected.

For this study, three main objectives have been set.

First, given the defined factors and indicators for sustainability, the aim is to identify the dimensions of sustainability which are emphasised in agricultural and rural policies in the selected countries.

Second, based on the data availability, we aim to draw conclusions on how effectively implemented policy programs have contributed on sustainable development, when sustainable development is measured using the selected indicators. In addition, we benchmark the policy impacts and the level of policy emphasis on the

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different dimensions of sustainability to the EU policies, based on the policy impact analysis carried out in Finland and Spain.

Third, based on the analysis and the relevance and availability of the data, we discuss on the reliability and applicability of the selected approach in policy analysis for sustainable agriculture and forestry.

10.2 Frameworks for Sustainable Agriculture and Forestry

The impacts of different policy programs are evaluated under the general frameworks for sustainability (see Kniivilä et al. 2012). In general, three dimensions are recognised when considering sustainability: economic, social and environmental. Different factors impact on different dimensions, but the sustainability concept brings these dimensions together. Moreover, in analysing the development of sustainability, each aspect has to be taken into account.

10.2.1 Sustainable Agriculture

The main objective of sustainable agriculture and rural development is to increase food production in a sustainable way and to enhance food security. However, sustainability of agriculture does not include only securing of food availability and decreasing poverty. Christen (1996) claims that the sustainable agriculture should: (1) ensure inter-generational equity, (2) preserve the resource base of agriculture and obviate adverse environmental externalities, (3) protect biological diversity, (4) guarantee the economic viability of agriculture, enhance job opportunities in farming and preserve local rural communities, (5) produce sufficient quality food for society, and (6) contribute to globally sustainable development. It can be debated whether it is possible and desirable to fulfil all these objectives simultaneously (see e.g. Tisdell 2007).

In addition to the production volume the methods and production processes in agriculture area key issue for sustainable agriculture. They include a range of issues starting from practical methods used in agriculture and their impact on the surrounding nature, but also more political and wider social and economic issues like social equity, employment, property rights etc. In addition to food security in political declarations e.g., the importance of the enhanced participation of women in sustainable agriculture and food security, guaranteeing well-defined and enforceable land and water use rights, promotion of legal security of tenure, and the support for traditional and indigenous agricultural systems have been emphasized.

FAO has defined sustainable agriculture and rural development as a process, which meets the following criteria (FAO 1995):

- Ensures that the basic nutritional requirements of present and future generations, qualitatively and quantitatively, are met while providing a number of other agricultural products.
- Provides durable employment, sufficient income, and decent living and working conditions for all those engaged in agricultural production.
- Maintains and, where possible, enhances the productive capacity of the natural resource base as a whole, and the regenerative capacity of renewable resources, without disrupting the functioning of basic ecological cycles and natural balances, destroying the socio-cultural attributes of rural communities, or causing contamination of the environment.
- Reduces the vulnerability of the agricultural sector to adverse natural and socio-economic factors and other risks, and strengthens self-reliance.

10.2.2 Sustainable Forestry

Forestry is often considered as a sub-sector of agriculture, but the roles of these two sectors, however, differ. The main role of agriculture is to provide food, fiber and energy for increasing global population. Forests provide fiber, fodder and fuel for industrial and subsistence use. In addition, forests have also a major role in securing ecosystem services both at local (e.g. erosion prevention, wind breaks, temperature locally) and global (biodiversity and carbon sequestration) levels. During the recent years emphasis has been given especially to the role of forests and deforestation in climate change.

There exist several regional processes for formulating and adopting criteria and indicators for sustainable forest management (SFM). According to the United Nations Forum on Forests SFM is a dynamic concept that aims to maintain and enhance the economic, social, and environmental values of forests, for the benefit of present and future generations. In the pan-European policy process (The Ministerial Conference on the Protection of Forests in Europe, currently FOREST EUROPE) for the sustainable management of the continent's forests sustainable forest management has been defined as follows (Helsinki Resolution H1 1993):

> The stewardship and use of forests and forest lands in a way and at a rate that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems.

There are ten different collaborating regional SFM processes including FOREST EUROPE (includes also e.g. Russia), Montreal process for non-European countries with boreal and temperate forests (includes also Russia), Near East process and African Dry-Zone Process.

10.2.3 Sustainability in the Policy Context of the European Union

The renewed European Union Sustainable Development Strategy (EC 2006a) reaffirmed that sustainable development has to be integrated into all policy-making and it aims to link economic development, protection of the environment and social justice. In the strategy sustainable development is defined to be based on the principles of democracy, gender equality, solidarity, the rule of law and respect for fundamental rights, including freedom and equal opportunities for all. The key objectives, approved by the European Council in 2005 and defined in the strategy, are related to environmental protection, social equity and cohesion, economic prosperity, and meeting the international responsibilities of the EU.

As key challenges the renewed EU sustainable development strategy specifically identifies seven issues: climate change and clean energy, sustainable transport, sustainable consumption and production, conservation and management of natural resources, public health, social inclusion, demography and migration, and global poverty and sustainable development challenges.

The strategy is monitored by using sustainable development indicators (SDIs). In total, there are more than 100 identified indicators for sustainable development. Under the roof-themes, eleven of these indicators have been identified as headline indicators (Table 10.1). Issues related to agriculture and forestry among others, include "sustainable consumption and production", "climate change and energy", and "natural resources". However, agricultural and forest sectors have naturally impact on general socioeconomic development and also on social inclusion, which can be measured e.g. by at-risk-of-poverty rate.

In addition to EU's sustainable development strategy, there exist also sub-regional sustainability strategies or initiatives, which aim at adapting international commitments to regional conditions and to guide national sustainable development strategies.

10.2.3.1 Agricultural and Rural Policies

In the EU the frame for agricultural and rural sectors is formulated by the common agricultural policy (CAP). The initial objectives of CAP were set out in the Treaty of Rome (Treaty of Rome 1957). The objectives of the treaty are to increase agricultural productivity, to ensure a fair standard of living for the agricultural community, to stabilize markets, secure the availability of supplies, and to ensure that supplies reach consumers at reasonable prices. Thus, the main emphasis was given to economic sustainability and food security, and to some aspects of social sustainability. Later the need for environmental sustainability of agriculture was more widely recognized and e.g., agro-environment schemes were introduced in Mac Sharry-reform of the CAP in 1992.

Table 10.1 Sustainable development themes and main subthemes for the EU according to report on the sustainable development in the EU

Theme	Subthemes
Socioeconomic development (HI*: Growth of GDP per capita)	Economic development
	Innovation, competitiveness and eco-efficiency
	Employment
Climate change and energy (HI: Greenhouse gas emissions, Consumption of renewables)	Climate change
	Energy
Sustainable transport (HI: Energy consumption of transport relative to GDP)	Transport and mobility
	Transport impacts
Sustainable consumption and production (HI: Resource productivity)	Resource use and waste
	Consumption patterns
	Production patterns
Natural resources (HI: Abundance of common birds, conservation of fish stocks)	Biodiversity
	Freshwater resources
	Marine ecosystems
	Land use
Public health (HI: Healthy life years)	Health and health inequalities
	Determinants of health
Social inclusion (HI: Risk of poverty)	Monetary poverty and living conditions
	Access to labour market
	Education
Demographic changes (HI: Employment rate of older workers)	Demography
	Old-age income adequacy
	Public finance sustainability
Global partnership (HI: Official development assistance)	Globalisation of trade
	Financing for sustainable development
	Global resources management
Good governance (no headline indicator)	Policy coherence and effectiveness
	Openness and participation
	Economic instruments

*HI denotes headline indicator
Source Eurostat 2009

The CAP is implemented under two pillars. The first pillar covers market-related support schemes and direct aid for farmers, supporting thus principally food production. The main aim of the second pillar of the CAP is to support rural development. Rural areas count for more than 90 % of the land area of the EU. Agriculture and in some regions also forestry are significant sectors in rural areas, and thus have a major role in sustainable rural development.

Specific attention has been given to the integration of environmental concerns into the CAP. The Helsinki European Council in 1999 adopted the strategy for integrating the environmental dimension into the CAP (Commission of the

European Communities 2006). The strategy sets environmental integration objectives for water, land use and soil, climate change and air quality, and also landscape and biodiversity. In its conclusions, the Council requested a regular reporting on progress in integration, based on agri-environmental indicators (AEI). By the end of 2005 the development of a set of agri-environmental indicators was finalized. Agri-environmental indicators are used to monitor the environmental impacts of the implementation of CAP.

The agricultural environment within the EU differs amongst member countries. Around the Baltic Sea the water protection has an import role since the vulnerability of Baltic Sea for excess nutrients from amongst others the agriculture. The Mediterranean coastal areas are less prone to nutrient losses due to the dryer climate. There are also common policies e.g. The Nitrate Directive that aims to protect the ground waters from N-leaching. The Nitrate Directive gives a clear per hectare limit on applications of organic fertilizers. However, the implementation of the directive varies amongst the EU countries, depending on the situation of the environment and agriculture.

The sustainable agriculture principles are given in the EU within the community strategic guidelines for rural development (EC 2006b). Based on the strategic guidelines the member states present their own rural development programs (RDP). There is a large set of indicators to use for evaluating the rural development program (for examples of baseline indicators and some of these can be used to evaluate sustainability in general. Furthermore, under the RDP all EU countries have the possibility to add environmental programs for agriculture with some national discrepancy. The overall EU policy tends to promote not only EU's own production, but also to consider possible external effects outside EU.

EU's rural development indicators have been developed mainly to monitor the financing of rural development. Besides the baseline indicators, there are sets of specialized indicators of which most are closely associated with rural development and the Common Agricultural Policy (CAP). In the rural development the forestry and agricultural activities are mostly considered together.

In the Mediterranean strategy for sustainable development, similar objectives and indicators have been developed (Table 10.3). The environment and the existing institutions in the specific countries influence the development of the set of indicators. The OECD has a set of more agricultural specific indicators for overall sustainability. The framework coincides relatively well with the sustainability factors presented in the EU's rural development program, but the approach is more restricted and focused on agriculture alone. The factors that are important from sustainability point of view differ between countries mostly because of the varied environmental, political and economic contexts.

The indicators to focus in the different countries depend on the importance of different sustainability factors, context and the institutional settings of the countries. Different sets of indicators have many similar features. Mostly the scale and

purpose create a bit different indicator needs. For the EU context the baseline indicators are rather well suited for analysing and developing of rural development policies within EU. Likewise the Mediterranean set functions best for the Mediterranean context.

10.2.3.2 Forestry Policies

Within the EU there are considerable differences between countries in natural conditions as well as in economic and social role of forests. Climate zones and ecological site conditions vary in a remarkable way and European forests include boreal, temperate and Mediterranean forests as well as mountain forests, which have clear differences e.g. in tree species and other vegetation. Within the EU there exist semi-natural forests, plantations as well as pristine forests.

The role of forests in the national economy also differs between the countries. For some member countries—especially Finland, Sweden and the Baltic countries—forestry and forest industry have significant economic importance in addition to the environmental and social values related to the forests. Finland, for example, receives 18 % of its export incomes from the export of products of forest industry, and the share of forest sector in the GDP is more than five per cent, whereas in the whole EU the share is only one per cent (Finnish Forest Research Institute 2010).

Compared to agricultural policy, forest policy in the EU is clearly more national and there is no detailed common policy. The Forest Strategy for the EU (1998) states that forest policy lies on the competence of the member states, but that the EU can contribute to the implementation of sustainable forest management (SFM) through common policies, based on the principles of subsidiarity and the concept of shared responsibility. On the basis of the Forest Strategy also the EU Forest Action Plan has been prepared and adopted in 2006.

EU Forestry Strategy (Council of European Union 1999) emphasizes the sustainable forest management and the multifunctional role of forests. Countries participating in the FOREST Europe process have committed to implement sustainable forest management. In addition, in the pan-European process common strategies for member countries and the European Union concerning sustainable management and protection of European forests have been developed. Pan-European policy process is not limited to EU countries. There are 46 countries involved, including Russian federation and Turkey are among the countries participating to the process.

At national level criteria and indicators for sustainable forest management are used in preparation and monitoring of forest policies, for monitoring the sustainability of forest management, reporting on the conditions of forests, setting the direction of forest management and publishing information about forests and forestry to political decision makers. As there are differences between forests in Europe, common quantitative target levels for sustainable forest management have not been defined. There are also differences between countries in the importance of each criterion due to differences in the role of forests in the society, and there are differences in national applications.

10.3 Factors and Indicators for Sustainable Agriculture and Forestry[1]

10.3.1 General Factors

Elements impacting on sustainability are difficult to divide into purely economic, social and environmental sense. To identify these elements we apply a framework presented by Kniivilä et al. (2012) to analyse interlinks between all three dimensions of sustainability. In the framework five different categories (factors), which allow inter-relations between all three different dimensions of sustainability (Fig. 10.1), are defined.

The framework presented in Fig. 10.1 can be considered as a starting point for sustainability assessments. In order to be able to make balanced assessment of sustainability there should be indicators and data available on all five factors.

Factor 1 "Resources and their productive functions" is a basic and fundamental requirement for use and availability of any natural resources. It can be considered as the core of sustainable resource use simply because if there is no resource there are no benefits related to that. It is also closely linked to traditional idea of sustainable use of renewable resources, i.e. that the utilization of the resource during a given time period should not exceed the growth of the resource during the same period. Maintenance of resource does not include only the volume, but as well the quality of the resource, e.g. avoidance of land, soil and water degradation and maintenance the health of forests.

Factor 1 and Factor 3 ("Protective functions") are connected as degraded resources provide less protective functions and beneficial services. Degradation and loss of protective functions is also an easily accelerating process starting e.g. from forest degradation and finally leading to soil degradation and desertification.

Land, soil and water degradation has also direct socio-economic impacts (Factor 2). Degradation undermines possibilities to increase agricultural productivity, self-sufficiency and food production, and thus weakens possibilities to respond to the basic needs of the growing population. It weakens possibilities to earn a decent living from agriculture, increases poverty and may increase rural-urban income inequality, migration and immigration. Degradation may lead to increase in food prices and further to increased social problems.

Similarly as resource existence, biodiversity (Factor 4) is in a long run and at a larger scale a prerequisite for other benefits provided by agriculture and forests. As locally and in a short run the weakening of biodiversity may have positive impacts on agricultural production, maintenance of biodiversity is often overridden by other objectives. Also cultural values (Factor 5) are often considered less valuable, but their dismissal significantly weakens social sustainability and social justification of the actions. This may lead to serious problems in a long run.

[1]For more detailed discussion on the factors, indicators and challenges for sustainable agriculture see Kniivilä et al. (2013).

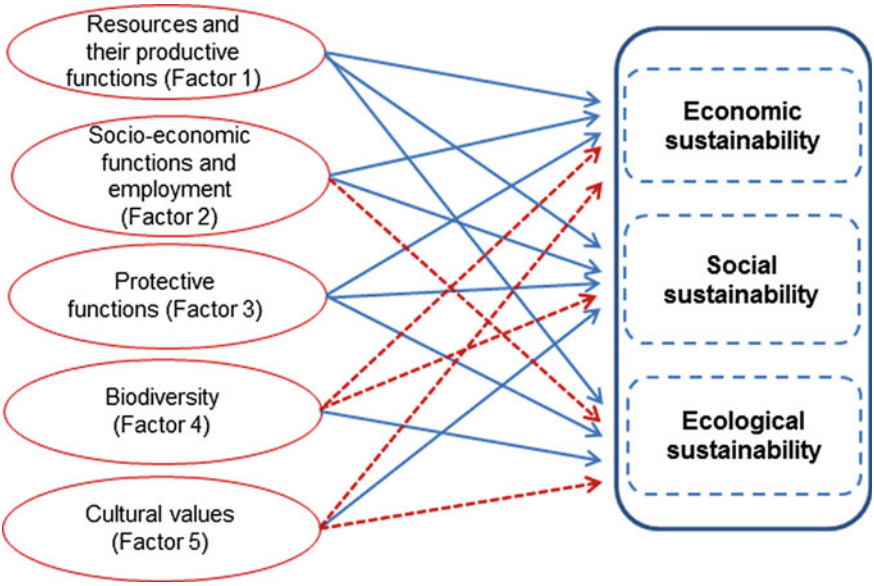

Fig. 10.1 Sustainable agriculture and forestry, factors to be maintained and enhanced. *Source* Kniivilä et al. (2013)

10.3.2 Main Factors in the MPCs and Turkey

The framework for sustainable agriculture and forestry presented in Fig. 10.1 is universally applicable and applies to the MPCs and Turkey as well. Country examples[2] highlight many issues that are generally considered essential in sustainability considerations and have similarities with the general framework. Issues emphasized include resource maintenance (resource quantity and resource quality, Factor 1), socio-economic functions like income and employment generation and poverty reduction (Factor 2), and also the enhancement of the protective functions provided by the resource (Factor 3). As Mediterranean Partner Countries and Turkey are developing economies, in decision-making those issues that have primarily economic and social aspects achieve greater importance.

Land and soil degradation, including salinization, erosion, desertification and deforestation, is a serious problem in the Mediterranean countries analysed in this study. E.g. in Morocco 95 % of the territory is threatened by desertification. The situation can in the future further worsen in the study countries due to climate change. Resource degradation is not limited only to land, soil and forests, but in many regions also water resources are at high risk. Scarcity of water resources

[2]The complete country level evaluation of main factors of sustainable agriculture and forestry and the current state of the sectors in the MPCs and Turkey are presented in Annexes III–VI in Arovuori et al. (2013).

makes the problem even more serious. For example in Tunisia major challenges for sustainability come from the heavy emphasis put on excessive intensification via subsidized farm inputs, which has resulted in near full mobilization of water resources.

In the examined Mediterranean countries direct economic importance of forests is minor compared to agriculture due to minor forest cover. However, forests have especially environmental significance. Reforestation and forestation efforts have been carried out in the countries, but forest fires, unsustainable use of forest, land clearance and illegal logging pose still a threat to them.

The maintenance of cultural values (Factors 5) and to some extent also biodiversity (Factor 4), which are generally considered as important factors of sustainability, were seen less important in actual policy making. This is understandable as their link to basic needs is less direct. As they are, however, essential parts of sustainability, neglecting them would lead especially in a long run to sustainability problems and the need to include them into the sustainability framework is obvious.

In decision-making reasonable balance between different factors has to be found. In practice due to differences e.g. in the development phase of the countries as well as in natural conditions, countries differ in that which factors will be emphasized most. There are also differences in needs and objectives at the different levels of economy. Objectives and related actions which may be rational at the grassroots level may lead to undesired outcomes at national level.

10.3.3 Indicators and Data

The indicator matrix[3] applied in the analysis includes 62 indicators. For about 60 % of these indicators, data at least for one year was provided for three countries or more. Time series data for at least three countries out of four was received for one third of the indicators. Availability of data on environmental and economic indicators was approximately the same. However, it should be noted that the environmental dimension was here considered rather widely and for example many indicators measuring different aspects of land or water use were classified under this category. Time-series data on protected areas was received poorly. Also there was no indicator on threatened species, which should be added. Important environmental indicators are also indicators on greenhouse gas emissions. In most of the countries there was data on that for one year, but basically no time series was yet available, or that data was not provided. Data on landscape diversity, measured by several indicators, was poorly provided, which was, however, an expected outcome.

Most of the indicators can be classified under Factors 1 or 2, as these factors are the widest and most inclusive. On Factor 4 there are only some indicators in the matrix and there are no indicators directly related to the Factor 5. However, division

[3]Complete indicator matrix is presented in Annex I in Arovuori et al. (2013).

of indicators under the five main factors is not straightforward as many of the indicators can be classified under several categories.

In Table 10.2 selected indicators, measuring most directly each factors, are listed, and it is indicated from which countries data were received. Table 10.2 includes also suggestions on additional indicators that should be used in sustainability assessments in order to get more comprehensive understanding of the development. Indicators have been added after the query and country specialists were not asked to provide data on those indicators. Indication on the availability of data is in that case based on other sources. Inclusion of additional indicators is based on their relevance for sustainability of agriculture and forestry in the target countries, as pointed out in the country reports and in general literature of sustainability.

Indicators related to Factor 1 are here divided into indicators measuring either quantity or quality of the resource. There is well data available on Factor 1 when the basic indicators on the quantity of the resources are considered. However, data on resource quality is here rather poorly available. Additional indicators and data would be needed on salinization, erosion and desertification.

Basic data on socio-economic functions and employment (farm income, agricultural employment, food consumption) was also well available and provided (Factor 2). Not much data on agricultural productivity was received. Productivity is of major importance when economic sustainability is considered. Some additional indicators would be needed on rural poverty and unemployment. Some of these can be found in World Bank's World Development Indicators database (2012). Furthermore, it would be important to have data on gender equality. World Development Indicators database provide several candidate indicators, but there are no indicators measuring specifically gender equality in rural areas. Indicator "Share of women employed in the non-agricultural sector" has been included as an additional indicator. Data on this is well available.

In Factor 3 forests have special importance as their role in many of the case study countries is environmental and have importance as a provider of protective services. There is basic data on forest area. More data on foresting would be useful. Limited amount of data was provided on protective forests. Also FAO's Global Forest Resources Assessment (FAO 2010, FAO 2005) provides data on the share of forests designated for protective purposes with possibilities to have also some time series data. Data on desertification rate would be needed.

There is a limited amount of indicators on Factor 4 in the original matrix. Data were available on some issues impacting on biodiversity, e.g. on forest area or organic farming. Share of protected areas has a more direct impact on biodiversity. Some data on that was received, but basically no time series data. Number of threatened species is a basic indicator of biodiversity and is included here now as an additional indicator. Various data on threatened species is provided e.g. by the IUCN (IUCN's Red list of threatened species).

Measurement of cultural values (Factor 5) is more complicated than the measurement of other factors. Based on the European forest indicators (FOREST EUROPE, UNECE and FAO 2011) an indicator measuring the number of sites in

Table 10.2 The main factors of sustainability, data provided (or availability indicated) for the most important indicators measuring the specific factors

	Data for one year	Time series data
Factor 1: Resources and their productive functions		
Indicators measuring quantity		
Indicator 1: Percentage of utilized agricultural land	1, 2, 3, 4	1, 3, 4
Indicator 2: Percentage of arable land	1, 3, 4	1, 3, 4
Indicator 9: Total agricultural water consumption	1, 2, 3, 4	1, 3, 4
Indicator 15: Loss of arable land	2, 3, 4	3, 4
Indicator 38: Rate of forest area	1, 2, 3, 4	1, 3, 4
Indicator 41: Afforestation rate (wooded lands)	2, 3, 4	4
Indicator 43: Tree biomass	3, 4	3
Indicator 45: Rate of burned area	2, 3, 4	3, 4
Additional indicator: Renewable internal freshwater resources (World Development Indicators (WDI) database)	1, 2, 3, 4	1, 2, 3, 4
Additional indicator: Agricultural irrigated land (WDI)	2, 3, 4	2, 3, 4
Additional indicator: Water footprint of agriculture	?	?
Indicators measuring quality		
Indicator 5: Nitrate in groundwater	3	–
Indicator 10: Organic farming	1, 2, 3, 4	1, 3, 4
Indicator 34: Organic animal farms	4	–
Indicator 40: Defoliation	4	4
Additional indicator: Salinization (UN Statistical Division)	–	–
Additional indicator: Soil erosion (UN Statistical Division)	–	–
Additional information: Desertification (UN Statistical Division)	–	–
Factor 2: Socio-economic functions and employment		
Indicator 18: Farm income	1, 3, 4	1, 3, 4
Indicator 19: Agricultural productivity	3	3
Indicator 20: Public Budget RDP	1, 3, 4	1, 3, 4
Indicator 29: Agricultural employment	1, 2, 3, 4	1, 3, 4
Indicator 30: Non-farming enterprises	4	4
Indicator 31: Small farms	1, 2, 3, 4	1, 3
Indicator 33: Food consumption	1, 2, 3, 4	1, 3, 4
Indicator 48: Expenditures for forest services (productive function)	2, 3, 4	4
Indicator 49: Expenditure for forest services (other services)	3, 4	4
Additional indicator: Poverty headcount ratio at rural poverty line (WDI)	1, 2, 4	4
Additional indicator: Share of women employed in the non-agricultural sector (WDI)	1, 2, 4	1, 2, 4
Additional indicator: Rural unemployment	–	–
Additional indicator: Share of rural population of total population (WDI)	1, 2, 3, 4	1, 2, 3, 4

(continued)

Table 10.2 (continued)

	Data for one year	Time series data
Factor 3: Protective functions		
Indicator 15: Loss of arable land	2, 3, 4	3, 4
Indicator 36: Stocking density	1, 3, 4	1, 3, 4
Indicator 38: Rate of forest area	1, 2, 3, 4	1, 3, 4
Indicator 41: Afforestation rate	2, 3, 4	4
Indicator 47: Protective forests	3, 4	4
Additional indicator: Salinization (UN Statistical Division)	–	–
Additional indicator: Soil erosion (UN Statistical Division)	–	–
Additional information: Desertification (UN Statistical Division)	–	–
Factor 4: Biodiversity		
Indicator 10: Organic farming	1, 2, 3, 4	1, 3, 4
Indicator 12: Pesticide intensity	1, 3, 4	1, 4
Indicator 38: Rate of forest area	1, 2, 3, 4	1, 3, 4
Indicator 46: Protected forests	3, 4	4
Indicator 52: Simpson diversity index	3	
Indicator 55: Percentage of terrestrial protected areas	2, 3, 4	4
Additional indicator: Number of threatened species (UNEP, IUCN)	?	?
Factor 5: Cultural values		
Additional indicator: Number of sites in rural areas designated as having cultural values	?	?
Additional indicator: Areas managed for scenic and recreation purposes	?	?

Numbers in the table refer to the countries which provided the data (*1* Egypt, *2* Morocco, *3* Tunisia, *4* Turkey)

rural areas designated as having cultural values has been added. Another additional indicator is an indicator on areas managed for scenic and recreation purposes which has been presented in the indicator list of the Near East Process for the sustainable forest management. Availability of data on these indicators is not known.

10.4 Policy Analysis Design

The qualitative policy analysis framework was developed to capture the impacts of different policy programs on the different dimensions of sustainability. Based on the review of policies and the data available, the qualitative policy analysis was carried out for two main aims.

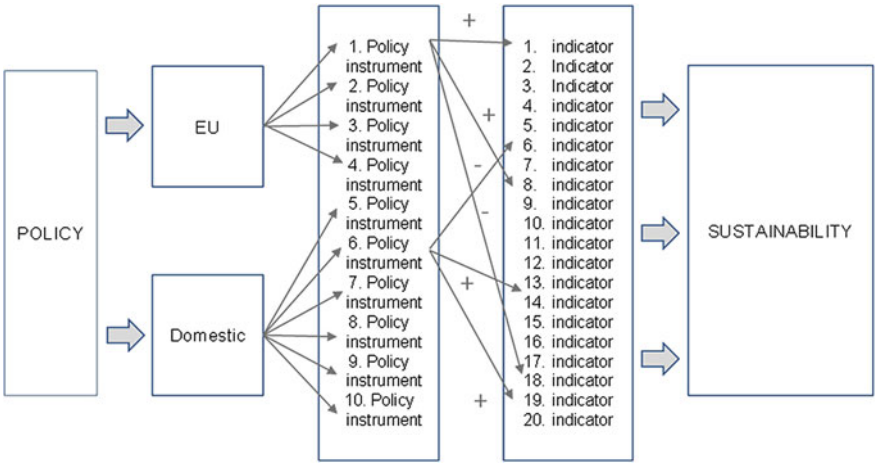

Fig. 10.2 Framework for qualitative policy analysis

First, the aim is to assess whether policies are working towards the desired direction of different elements of sustainability and which of the elements of sustainability are emphasized in policy implementation.

Second, the aim is to reveal, whether the implemented policies have worked towards desired direction based on the indicator data available. Given that there is a lack of time series data at most part, the qualitative policy analysis was carried out for indicators with at least two different data points available.

The analysis is conducted at highly aggregated level. In general, agricultural policy programs are implemented via the use of several policy instruments. These policy instruments may work towards opposite direction in terms of given factors analysed. However, we were not able to collect comprehensive and comparable list of individual policy instruments.

The framework for the qualitative policy analysis is described in Fig. 10.2. There exists a number of different domestic and EU policy programs that are implemented in the MPCs and Turkey. These policy programs consist on different policy instruments. Instruments have different, positive and negative impacts on different indicators. The impact may also be neutral due the design of a particular instrument or by impact mechanism. The overall impact of the policy programs on a given indicator is based on the aggregated impact of different policy instruments. One should, however, bear in mind that policy impact is directly linked to general structural and economic developments in a particular country. These exogenous impacts effect on indicator development, but are not revealed in our analysis.

Despite of these caveats, the developments of the selected indicators approximate the development of the different dimensions of sustainability. Based on the development of these indicators, it is possible to assess the impacts of different policy programs on different dimensions of sustainability and further, to make conclusions to what extend policies are aimed to enhance the overall sustainability.

Table 10.3 Scale for the qualitative policy analysis

+++	Strong positive policy impact
++	Intermediate positive policy impact
+	Positive policy impact
o	No policy impact
-	Negative policy impact
–	Intermediate negative policy impact
—	Strong negative policy impact
×	No policy exists for the indicator/policy impact cannot be determined

A scale for the qualitative policy analysis is described in Table 10.3. When applicable, the aggregated impacts have been formed based on the instrument level impacts of policies. However, as previously noted, for most policies there is a lack of instrument level analysis due to the non-comparability of policy instruments between countries.

In order to benchmark policy programs implemented in the MPCs and Turkey, the similar analysis is conducted for Finland and Spain. The utilization of a similar framework to all countries allows one to compare the role of different dimensions of sustainability in policy setting. Although there are differences on the indicators and the data availability between countries, different indicators can be utilized in measuring the development of sustainability.

The indicators for the analysis were first drawn from the indicator matrix in Arovuori et al. (2013). Country experts in each MPC and Turkey selected the most suitable indicators for their own countries. In addition, they were asked to provide data for each indicator to be used in the analysis. If necessary, in order to include reasonable number of indicators, additional data were drawn from the international data sources mainly from the World Bank database.

In general, the success of a policy impact analysis is directly linked to data availability. In our study, the availability of data ranged from 14 indicators in Morocco to 26 in Tunisia. The main requirement in the selection of indicators was that at least two data points exist. Available indicators cover all dimensions of sustainability. However, the data availability is more comprehensive for the indicators related to the environmental dimension of sustainability. Especially indicators related to land use, the amount of utilized agricultural area and data on fertilizer consumption were available in all countries.

On the social and environmental aspects of sustainability, data was generally available on food consumption expenditures, GDP, rural population and agricultural value added. In total, we received data observations for 83 indicators. Out of these 83 indicators 48 were indicators measuring the development of some environmental, 18 economic and 17 social impacts. However, it should be noted that some of these indicators overlap in terms of elements of sustainability which they measure.

10.5 Policy Impact Analysis and Benchmarking[4]

In this study, we compare the policy impacts on the development of selected indicators. The country level comparison aims to assess which indicators are emphasized at the aggregated level in the MPCs and Turkey as well as Finland and Spain. The indicators are selected in order to assure the comparability. Thus, whether the desired indicator development is in same direction in all countries, and whether policy programs are working towards the desired direction.

This sub-chapter aggregates the more detailed policy impact analysis on a general presentation, where the emphasis is on the policy coherence of the country level policy programs, the most controversial policy impacts and at the country level possibilities to improve policy efficiency in the near future. In addition, the benchmark comparison to EU's Common Agricultural Policies is analyzed via country-pair comparison including Finland and Spain.

10.5.1 Policy Impacts at the Country Level

The number of policy programs with identified direct impacts on the three dimensions of sustainability differs between countries. For Egypt and Tunisia, five policy programs were identified. In Morocco there was ten policy programs included in the analysis, and for Turkey the number of policy programs was four.

In a case of multiple policy programs, the main arising issue is policy coherence between different programs. This is especially due to the multidimensional nature of sustainability. Policies are coherent, when different policy programs are working towards the same direction. Controversially, if different policy programs are working towards opposing direction with respect to same policy targets or policy indicators, there is a clear trade-off between different policies.

In Egypt, Morocco and Tunisia the policy coherence between different policy programs is relatively good. Policies have worked towards desired direction for most of the indicators. Policies are coherent also in terms of the undesired impacts. In example for Egypt, the desired direction for policies is to decrease the use of fertilizers. However, all policy programs analyzed have led to increasing use of fertilizers. Similar impact can be identified for agricultural nitrous oxide and CO_2 emissions. However, it should be noted that this development indicates increased productivity in agriculture via the more intensive production.

[4]Policy programs and country level policy analysis are summarized in the Annexes. For a more detailed policy impact analysis see Arovuori et al. (2013).

10.5.1.1 Egypt

In general, policy programs in Egypt have been able to contribute on the desired direction. The coherence between different policy programs has been good. At the aggregate level, the policy programs have worked towards the same direction relatively well. All programs have enhanced the structural development in agriculture and contributed to increasing agricultural productivity. However, although small in number, the undesired impacts of the policy programs are significant. The Structural Adjustment Program has led to increasing use of fertilizers. Depending on the intensity level of the fertilizer use, this development may indicate harmful environmental impacts of policies. However, while the other policy programs have worked towards the desired direction, the undesired effects are at least partly neutralized.

Given the selected indicators and data availability, assessment on the policy impacts on climate change cannot be drawn. For Egypt, no data exist on greenhouse gas emissions or more particularly on CO_2 or agriculture nitrous oxide emissions. In addition, the policy impact analysis on forestry lacks appropriate data. Although the desired direction for policies is to increase forest area, no actual forestry targeted policies exist. However, according to the policy analysis, four out of five analyzed policy programs have contributed positively on forestry and led to increasing rate of forest area in Egypt. This development may have significant positive impact on reducing soil erosion and desertification both locally and regionally. In addition, forest areas are important in mitigating the overall impacts of the climate change.

It can be concluded that agricultural and rural policies in Egypt impact on all dimensions of sustainability. Although the policy coherence is relatively strong, there exist trade-offs between environmental, social and economic aspects. In order to tackle these trade-offs, agricultural and rural policies need to be extended to cover more effectively also the social aspects of sustainability.

10.5.1.2 Morocco

In aggregate, policy programs in Morocco tend to emphasize structural and thus, mainly economic dimension of sustainability. In addition, more data is available for the economic indicators. For the direct or indirect environmental indicators, policies are not able to respond on the desired direction. This indicates that there exists a clear trade-off among different dimensions of sustainability, given the structure and role of agriculture in Morocco. Social and economic aspects of agriculture are clearly emphasized over the environmental aspects.

For the climate change, the four out of nine implemented policy programs have led to increasing and five to decreasing CO_2 emissions. However, all programs have contributed by increasing the level of agricultural nitrous oxide emissions. The results indicate that agriculture in Morocco has become more intensive, and thus the emissions have increased. However, the environmentally targeted policy programs have reduced the pace at which the CO_2 emissions are increasing.

COUNTRY: EGYPT

								POLICY IMPACT ANALYSIS: NATIONAL POLICIES									POLICY IMPACT ANALYSIS: POLICY PROGRAM: IMPLEMENTED THE EU MPC POLICY, if any
								POLICY PROGRAM: STRUCTURAL ADJUSTMENT PROGRAM (SAP)									
Indicator	Unit of measurement	Data source	Year of first observation	Year of the most recent observation	First observation	The most recent observation	Desired direction	Aggregated effect SAP	Instrument effect Removal of farm Rent control	Instrument effect Elimination of the restrictions on crop area	Instrument effect Cancellation of Government control in	Instrument effect Production input subsidy phase-out	Instrument effect Liberalization of Agri. Land Market	Aggregated effect Technology packages	Aggregated effect Sixth development plan	Aggregated effect National Egyptian Environmental Protection Policies	Aggregated effect EU MPC POLICY
Environmental sustainability																	
Percentage of Utilized Agricultural Land	%	FAO	1987-1992	2008-2012	2,90 %	3,68 %	+	+	+	+	+	-	++		+	x	0
Percentage of Arable Land	%	FAO	1987-1992	2008-2012	2,52 %	2,88 %	+	+	+	+	+	-	++		+	x	0
Pesticide quantity in areas under Ag. A.	Kg/1000ha-Ag. A./year	n.a	1987-1992	2003-2007	2,0	9,4	-	--	--	--	--	+	0	--	--	0	0
Rate of agricultural water consumption	m^3/ha/year	FAO	1987-1992	2008-2012	17486,2	15993,5	-	-	0	+	+	0	+	--	-	0	0
Share of farmland used for organic farming respect to the Utilized Agricultural Land	%	FAO	1987-1992	2008-2012	0,00 %	1,52 %	+	+	0	+	+	+	+	+	+	+	0
Rate of fertilizer consumption	Tons Nutreints/ 1000ha-UAL	FAO	1998-2002	2008-2012	370,9	388,3	-	+	-	+	+	-	+	-	-	0	0
Rate of consumption of pesticides	US$/1000ha-UAL	FAO	1993-1997	2008-2012	51481,8	20614,8	-	--	-	+	+	-	+	-	-	-	-
Ratio of animal waste generated yearly by cattle stock per unit of used agricultural area	tons of waste/ha UAA	Ohaio State, Univ. Manure Mang. Bul. 604	1987-1992	2008-2012	46,1	51,3	+	+	+	+	+	+	+	0	0	+	0
AU Stocking density	AU/ha	FAO	1987-1992	2008-2012	5,7	8,2	-	+	+	+	+	+	+	-	+	0	0
Total number of animal units	nobs	FAO	1987-1992	2008-2012	6220438,6	9631095,5	-	+	+	+	+	+	+	0	+	x	0
Rate of forest area	%	FAO, World Bank	1987-1992	2008-2012	0,05 %	0,07 %	+	+	0	0	0	0	0	0	++	+	+
Economic sustainability																	
Mechanical power in areas under Ag. A.	n° machines/1000ha-Ag. A.	FAO	1987-1992	2008-2012	223,8	460,6	+	++	0	++	+++	0	+	+++	+++	X	0
Density of Agricultural energy consumption	Kgs of petroleum equivalent (TPE)/inhab/year	World Energy Concil	1998-2002	2008-2012	0,1	1,89	+	+	+	+	++	+	+	+++	+	0	0
Annual Farm income	€/ha	FAO	1993-1997	2008-2012	3887,9	5932,9	+	+	-	++	+	--	+	++	+	0	X
Share of Public Investments in agricultural and Irrigation sector	%	Ministry of Finance, Egypt	1987-1992	2008-2012	46,30 %	21,40 %	+	-	0	0	0	0	0	+	+	+	0
Social sustainability																	
Intensity agricultural labor index	AWUs/100 ha	FAO	1987-1992	2008-2012	24,5	22,7	-	0	-	+	+	-	0	--	-	0	0
Full time farmers	%	Foad 1994, Fawzy 2011	1993-1997	2008-2012	57,00 %	82,00 %	+	-	-	+	+	-	-	-	-	0	0
Share of agricultural employment in rural areas	%	FAO	1993-1997	2008-2012	51,36 %	39,27 %	-	-	-	+	+	--	-	--	-	0	x
Share of family income allocated to food consumption	%	Household budget surveys	1987-1992	2008-2012	59,20 %	48,50 %	-	-	+	-	-	+	+	-	+	+	+

SCALE FOR POLICY IMPACT

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Policy programs

1 STRUCTURAL ADJUSTMENT PROGRAM (SAP)
2 Technology packages
3 Sixth development plan
4 National Egyptian Environmental Protection Policies
5 EU MPC POLICY, if any implemented

COUNTRY: MOROCCO

Indicator	Unit of measurement	Data source	Year of first observation	Year of the most recent observation	First observation	The most recent observation	Desired direction	POLICY IMPACT ANALYSIS: NATIONAL POLICIES POLICY PROGRAM: GREEN MOROCCO PLAN Aggregated effect GMP	POLICY PROGRAM: NSSD Aggregated effect NSSD	POLICY PROGRAM: NAPE Aggregated effect NAPE	POLICY PROGRAM: ADF Aggregated effect ADF	POLICY PROGRAM: CSP Aggregated effect CSP	POLICY PROGRAM: EP Aggregated effect EP	POLICY PROGRAM: PPP-LAND USE Aggregated effect PPP-LAND USE	POLICY PROGRAM: DRI GRN Aggregated effect DRI-GRN	POLICY PROGRAM: DRI FOREST Aggregated effect DRI FOREST	POLICY IMPACT ANALYSIS: EU MPC POLICY POLICY PROGRAM: IMPLEMENTED THE EU MPC POLICY, if any Aggregated effect EU MPC POLICY
Environmental sustainability																	
Agricultural irrigated land	% of total agricultural land	World Bank	2004	2009	4	5	+	++	+	+	++	0	+	++	+	x	++
Fertilizer consumption	kilograms per hectare of arable land	World Bank	2002	2009	66	41	-	++	+	+	++	+	+	+++	+	x	+++
Forest area	% of land area	World Bank	1990	2010	11	11	+	-	+	+	-	0	+	x	+	+++	+
Agricultural nitrous oxide emissions	thousand metric tons of CO_2 equivalent	World Bank	1990	2005	4 407	4 799	-	+	+	+	+	+	+	+++	+	-	++
Annual freshwater withdrawals, agriculture	% of total freshwater withdrawal	World Bank	1992	2009	92	87	-	+	--	--	+	0	--	++	--	x	+++
Arable land	ha	World Bank	1990	2009	8 707 000	8 055 000	+	+	x	x	+	0	x	++	x	-	++
CO_2 emissions	kt	World Bank	1990	2008	23 542	47 906	-	+	--	--	+	x	-	++	-	--	++
Economic sustainability																	
Agricultural machinery, tractors per 100 sq. km of arable land	units per 100 sq. km of arable land	World Bank	1990	1999	45	49	+	+++	x	x	+++	+	x	+++	x	x	++
Agriculture, value added	% of GDP	World Bank	1990	2009	18	15	+	+	x	x	+	x	x	+++	x	x	+++
GDP per capita	current US$	World Bank	1990	2011	1 033	3 054	+	+	+	+	+	x	+	++	+	+	+
Unemployment, total	% of total labor force	World Bank	1990	2009	16	10	-	-	-	-	-	x	-	-	-	-	-
Social sustainability																	
Rural population	nobs	World Bank	1990	2011	12 789 280	13 864 147	+	x	x	x	x	0	x	+	x	+	+
Employees, agriculture, male	% of male employment	World Bank	2002	2008	40	34	+	+	0	0	+	+	0	++	+	x	++
Employment in agriculture	% of total employment	World Bank	2002	2008	44	41	+	++	0	0	++	+	0	+++	+	x	+++

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Policy programs

1 Green Morocco Plan
2 National Starategy for Sustainable Development NSSD
3 National Action Plan for the Environment NAPE
4 Agricultural Developmen Fund ADF
5 Environmental Policy EP
6 Consumption Support Policy CSP
7 Public-private partnerships on land use PPP-LAND USE
8 Integrated Development project DRI-GRN
9 Integrated Rural Development of Forest Areas and Periforestrieres DRI FOREST
10 EU MPC Policy

DATA SOURCES:
World Data Bank. World Bank. databank.worldbank.org

Unlike the other MPCs and Turkey, Morocco has implemented specified policy targeted on forestry. The program has had a strong positive impact on the overall forest area. Thus, it has also positive indirect impact on land use, soil erosion and climate change mitigation. Due to the lack of data on forestry related indicators, the overall assessment on the policy effectiveness is difficult to draw.

10.5.1.3 Tunisia

For Tunisia, the main caveat of the analysis is that the impacts of the implemented policy programs are described at the highly aggregated level. Given that the analyzed programs are based on traditional market instruments, such as commodity price policies, input subsidies and other government intervention, the likelihood for significant trade-offs in terms of desired policy impact is likely to increase. Thus, the instrument level analysis would, especially in this case, be more appropriate compared to the aggregated analysis.

Agricultural and rural policies in Tunisia seem to emphasize structural development over other aspects. Policies have also contributed by increasing farmers' incomes and towards more intensive production in terms of animal units and the increases in the irrigated area. However, also the number of farms has been increasing. This may have controversial impacts on the increase in agricultural productivity. The indicator development indicates also increases in agricultural productivity. Number of tractors, stocking densities and fertilizer use has been increasing. By definition, these are indicators of the increased productivity.

10.5.1.4 Turkey

For Turkey, the coherence of the implemented policy programs is somewhat weaker compared to other countries. In addition, the identified policy impacts are in most cases restricted to a particular indicator. This implies that programs are compiled from targeted policy instruments. Targeting increases policy effectiveness, but may also be a source for a trade-off between indicator developments.

In aggregate, the desired indicator development in Turkey emphasizes structural development in agriculture, increasing productivity and more environmental friendly production practices. In addition, the role of agriculture in the overall economy is expected to decline. Employment in agriculture should decrease via a shift to non-agricultural activities in the rural areas, but not to urban areas. Policies should aim to increase the non-agricultural job activities in the rural areas in order to stop the migration.

10.5.2 Main Revealed Trade-Offs

In general, it can be concluded that although the policy coherence is relatively strong over MPCs and Turkey, there exist trade-offs between environmental, social and economic aspects. In order to tackle these trade-offs, agricultural and rural policies need to be extended to cover more effectively also the social aspects of sustainability. In addition, the analysis shows that policy programs include trade-offs with respect to indicator development. Different policy instrument may have opposing impact on the development of a particular indicator. Yet, the aggregate impact may still turn out to be positive.

The most controversial impacts in terms on undesired policy impact occur in social dimension of sustainability and especially in terms of employment. In example, in Turkey the overall objective is to reduce the role of agriculture in the rural employment and rural economy. However, the implemented policy programs have contributed by remaining the existing structures. Lacking structural development contributes negatively on the productivity growth in agricultural production.

COUNTRY: TUNISIA

								POLICY IMPACT ANALYSIS: NATIONAL POLICIES						
								POLICY PROGRAM: COMMODITY PRICE POLICIES			POLICY PROGRAM: INPUT SUBSIDIES		POLICY PROGRAM: CONSERVATION PROGRAMS	POLICY PROGRAM: IMPLEMENTED EU MPC POLICY, if any
MA: Ministry of Agriculture								Aggregated effect	Instrument effect	Instrument effect	Aggregated effect	Aggregated effect	Aggregated effect	Aggregated effect
Indicator	Unit of measurement	Data source	Year of first observation	Year of the most recent observation	First observation	The most recent observation	Desired direction	Price support programs	Price ceiling for producer prices	Consumer price subsidies	Input subsidies	Rural development program	Conservation programs	EU MPC POLICY
Environmental sustainability														
Utilized Agricultural Land	ha	Agricultural Farms structure Survey (MA)	1994	2005	5 295 000	5 300 000	++	+	o	o	o	+	o	o
Percentage of Arable Land of total land area	%	Monitoring Agricultural Crops Survey (MA)	1994	2005	29,1	29,8	+	o	o	o	o	o	o	+
Total agricultural water consumption	m3/ha/year	Monitoring Agricultural Crops Survey (MA)	2005	2010	2132	2141	+	-	o	0	++	+	o	o
Irrigated area	ha	Monitoring Agricultural Crops Survey (MA)	2005	2010	330600	400000	++	+	-	o	++	+	o	o
Organic Farming	% of UAA	General Directorate of Organic Farming (MA)	2007	2010	4,8	7,7	+	+	-	o	++	+	o	o
Generation of animal waste	tons of waste/ha UAA	Agency of Livestock and Pastures (MA)	1994	2005	0,03	0,166	+	+	+	o	+	+	o	o
Stocking density	AU/ha	Agency of Livestock and Pastures (MA)	1994	2005	1,72	2,04	+	+-	+	+	+	+	o	o
Animal units	1000 units	Agency of Livestock and Pastures (MA)	1994	2005	8080	9201	+	+-	+	+	+	+	o	o
Rate of forest area	%	General Directorate of Forests (MA)	1994	2010	33,8	38,2	+	-	-	-	--	o	+	o
Carbon Stock	Million tn	National Report of Forest Resources-Tunisia (FAO)	2000	2010	7,5	9,3	+	-	-	-	-	+	o	o
Tree biomass	Million tn	National Report of Forest Resources-Tunisia (FAO)	2000	2010	16	18,9	+	-	-	-	-	o	o	o
Number of Wildland Fires	%	National Report of Forest Resources-Tunisia (FAO)	2000	2010	1375	241	o	o	o	o	o	o	o	o
Permanent cropland	% of land area	Ministry of Agriculture (MA)	1995	2009	13,1	14,3	+	-	o	o	++	o	o	o
Fertilizer consumption	kg/ha	FAO	2002	2009	25,2	42,2	+	+	o	o	+	o	-	o
CO2 emissions	kt	National Agency of Environmental Protection	1995	2008	15735	25012	-	-	-	-	+	+	o	-
Organic producers	%	General Directorate of Organic Farming (MA)	2009	2010	1751	2487	+	++	-	o	o	+	o	o
Economic sustainability														
Farm income	MD	Economic Budget-2010 (MA)	2000	2010	2773	6380	+	+	-	-	+	+	o	o
Number of tractors	nobs	Agricultural Farms structure Survey (MA)	1994	2005	35090	39069	+	-	-	o	+	+	o	o
Public Budget RDP	%	Economic Budget-2010 (MA)	2000	2010	2,15	3,15	+	--	-	---	--	+	++	o
Share of Food on all consumption expenditures	%	National Intitute of Statitics	1994	2005	38	34,2	+	-	+	+++	o	o	o	o
Agriculture, value added	% of GDP	Economic Budget-2010 (MA)	1995	2011	13	8,3	++	-	-	-	+	o	o	o
GDP per capita	current TND	National Intitute of Statitics	1995	2011	2013	4297	++	o	o	-	0	o		o
Social sustainability														
Intensity agricultural labor index	AWU/100 ha	Monitoring Agricultural Crops Survey (MA)	2000	2010	12,1	13,1	+	-	-	-	o	o	o	o
Full time farmers	%	Agricultural Farms structure Survey (MA)	1994	2005	36	39	+	-	o	o	+	o	o	o
Number of farms	nobs	Agricultural Farms structure Survey (MA)	1994	2005	471000	516000	o	+-	-	o	o	+	o	o
Agricultural employment	% of total agriculture	Agricultural Farms structure Survey (MA)	1994	2005	17,3	16	+	+-	-	o	-	o	o	o

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Policy programs

1 Commodity price policies
2 Input subsidies
3 Rural developmen policy
4 Conservation programs

DATA SOURCES:
Yearbook of Farm Statistics. 1996, 2011. Information Centre of the Ministry of Agriculture and Forestry, Finland

COUNTRY: TURKEY

Indicator	Unit of measurement	Data source	Year of first observation	Year of the most recent observation	First observation	The most recent observation	Desired direction	POLICY IMPACT ANALYSIS: NATIONAL POLICY PROGRAM: INTERVENTION PROGRAM Aggregated effect	Intervention system	Instrument effect Commodity price support	Instrument effect Input subsidies	Instrument effect Production area restrictions	POLICY PROGRAM: THE AGRICULTURAL REFORM IMPLEMENTATION PROJECT Aggregated effect	ARIP	Instrument effect Direct income payments	Instrument effect Farmer transition program	Instrument effect Payments to change production	Instrument effect CATAK	POLICY PROGRAM: THE AGRICULTURAL REFORM IMPLEMENTATION PROJECT Aggregated effect	Rural development policy	POLICY IMPACT ANALYSIS: POLICY PROGRAM: IMPLEMENTED THE EU MPC POLICY Aggregated effect	IPARD
Environmental sustainability																						
GHG emissions, total	million tones CO_2 eq	OECD	1990	2009	187,03	369,65	-	+	++	++	-	+,-	+	-	0	-	0	0
GHGs from Agriculture, in Gg CO2 eq.	million tones CO_2 eq	OECD	1990	2010	29777	27172	-	+	++	++	-	+,-	+	-	0	-	0	0
Gene conservation forests	ha	Min. of Forestry and Hydrolic Works, Turkey	1989	2010	293,7	409	+	0	0	0	0	+	0	0	0	+	0	0
Nature protection area	ha	Min. of Forestry and Hydrolic Works, Turkey	1987	2010	4999	48067	+	+	0	0	+	+	0	0	0	+	0	0
Number of forest fires	nobs	Turkstat	1988	2010	1372	1871	-	+	+	+	-	-	0	-	0	-	0	0
Livestock Manure Production		OECD	1985	2004	70379	42852	-	+	++	++	-	+,-	+	-	0	-	+	+
Number of certified products	nobs	Min. of Food, Agriculture and Livestock, Turkey	2001	2011	4643775	64872244	+	+	++	0	0	+	+	0	+	0	0	0
Organic production	number of producers	Min. of Food, Agriculture and Livestock, Turkey	1996	2010	1947	42097	+	+	++	-	-	+	+	0	+	0	0	0
Agricultural groundwater withdrawals	million m^3	OECD	1991	2007	3800	2067	-	+	+	+	-	+,-	+	-	0	-	0	0
Water abstracted for agriculture 1998-2009	million m^3	Eurostat	2000	2009	32344	36607	-/+	+	+	+	-	+,-	+	-	0	-	0	0
Number of tractors	nobs	Turkstat	1988	2010	654636	1096683	-/+	+	+	+	-	+,-	+	-	0	-	0	0
Use of fungicides & bactericides	tn	FAOSTAT	1992	2010	4025	17545,58	-	+	+	++	-	+,-	+	-	0	-	0	0
Fertilizer consumption	total equivalent	Min. of Food, Agriculture and Livestock, Turkey	1981	2010	9735393	9592751	-	+	+	++	-	+,-	+	-	0	-	0	0
Utlized agricultural area	1000 ha	Turkstat	1988	2010	41940	39054	+	+	+	+	-	+,-	+	-	0	-	0	0
Economic sustainability																						
Household consumption expenditure, food	%	Turkstat	2002	2010	26,7	21,9	-	-	-	-	0	-	-	0	0	0	0	0
Total energy consumption by agriculture	Mtoe	OECD-IAE	1980	2006	0,93	3,53	-	+	++	++	-	+,-	+	-	0	-	+	+
Share of Agricultural Value Added (AVD) in GDP (with 1998 constant prices)	%	Turkstat	2000	2011	12,2	9,3	-	-	0	0	-	0	0	0	0	0	0	0
Share of agriculture on GDP	%	Turkstat	1990	2006	16,0	8,5	-	-	0	0	-	0	0	0	0	0	0	0
Social sustainability																						
Self-sufficiency in wheat	%	Turkstat	2001	2010	107	114,8	+	+	+	+	--	-	0	-	0	-	0	0
Total economically active population in agriculture	1000	FAOSTAT	1980-89	2006-10	9245	8295	-	+	+	+	-	+,-	+	-	0	0	+	+
Female economically active population in agriculture	1000	FAOSTAT	1980-89	2006-10	4050	4295	-	+	+	+	-	+,-	+	-	0	0	+	+
Employment in agriculture, per cent of total employment	%	OECD	1988	2009	47,4	22,9	-	+	+	+	-	+,-	+	-	0	0	+	+
Unemployment, total (per cent of total labor force)	%	OECD	1990	2009	8,0	14,0	-	-	-	-	+	-	-	0	0	0	-	-
Rural population	nobs	World Bank	1990	2010	22085149	22116707	-	+	+	+	-	+,-	+	-	0	0	+	+

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Policy programs

1 Intervention program
2 The Agricultural Reform Implementation Project ARIP
3 Rural development policies
4 Pre-Accession Assistance Rural Development IPARD
5

DATA SOURCES:
OECD National Accounts data

Other example relates to water use in agriculture. Increasing irrigation and the utilization of water resources is seen important to increase agricultural productivity and thus the area of utilized agricultural land. However, this may lead to unsustainable use of water resources and thus, have negative impacts on the environmental dimension on sustainability.

Similar logic appears also in the utilization of different production practices. Increasing the use of fertilizers and pesticides leads to increases in production and usually to increasing productivity in agriculture. However, the increased use of fertilizers may lead to environmentally harmful impact in terms of nutrient leaching, salinization and decreasing soil quality. Thus, appropriate monitoring e.g. in terms of nutrient balances is needed to neutralize the possible trade-off from the two possibly opposing objectives.

For climate change, agricultural and rural policies have not contributed towards the desired direction. This result indicates a clear trade-off between the objectives of increasing productivity and reduction of harmful environmental effects. The similar conclusion can be drawn from the impact of policies on total energy consumption. Although the desired direction for policies is to reduce energy consumption in agriculture, policies in aggregate have contributed towards opposite direction.

Turkey is a member candidate country of the EU. In order to comply with the EU's Common Agricultural Policy and Rural development programs, Turkey has implemented a pre-assistance rural development program, which is funded by the EU. According to our analysis, the contribution of this program in terms of the desired policy development has been weak. The policy impact can be determined only for indicators measuring the economic dimension of sustainability. However, it is shown that the policy impact has not worked towards the desired direction.

For the MPCs and Turkey, policy impacts on climate change can be approximated in terms of their impact on greenhouse gas and CO_2 emissions. Despite the lack of data from Egypt, it can be stated that the policy objective is to reduce greenhouse gas emissions from agriculture. However, based on the policy impact analysis the CO_2 and other emissions have mainly increased due to the implemented policy programs.

In addition to agriculture, forestry plays significant role in the sustainable development in the rural areas. Policy impact assessment on forestry is very challenging in all countries. This is both due to lack of forestry related indicators but also the fact, that policy programs are implemented as agricultural and rural policies with possible indirect impacts on forestry. Thus, the direct forestry enhancing policies are rare. However, at the individual country level, some conclusions can be drawn also on the role of policies in the sustainable development on forestry.

10.5.3 Benchmark Analysis

10.5.3.1 Policy Framework

To benchmark both the qualitative policy analysis framework and the ability of policy programs to enhance sustainability, we conduct the analysis also for Finland and Spain. For Finland and Spain, the actual policy framework is largely formed via the Common Agricultural Policy of the EU. The CAP is based on the market mechanisms, mainly single farm payments, under the First Pillar and structural and rural development mechanisms under the Second Pillar. In addition, both countries implement national agricultural policy programs. In order to make the analysis comparable, same indicators were selected for both countries.

Due to the nature of the CAP, the policy instruments under the First Pillar of the CAP are comparable and implemented under the same common principles both in Finland and Spain.[5] Moreover, the implementation of the policies under the Second Pillar of the CAP is based on the national Rural Development Programs (RDPs). While the framework and characteristics of the RDPs are common to all EU countries, the design and implementation of the programs is done at the national level. Thus, the initial objectives of the RDPs are common, but countries have their own sub-objectives via which they aim to fulfill the requirements set at the EU level.

Another major feature for Finland and Spain are forests. Compared to MPCs and Turkey, forestry has more significant role in both in policies and sustainable development in both countries. Especially for Finland, forestry is a key factor in sustainable development in the rural areas, mainly due large forest cover in Finland. Thus, Finland implements several comprehensive forest policy programs with different emphasis. Moreover, policies for agriculture and forestry are completely separated and the instruments do not overlap in any of the current policy programs.

10.5.4 Policy Impact Comparison

Although very different in agricultural and rural structures, the common policy framework guides policies towards common direction in both countries. The desired development for structural indicators is, in general, very similar in both countries. This favors the overall effectiveness of the policies.

Policy coherence is very good. In general, different policy programs impact towards desired direction for most indicators. Some controversies between policy programs exist, but the overall impact is neutral in terms of wanted outcome. In both countries, emphasis is put on the economic dimension of sustainability. The role of policies in securing farmers' incomes is very important. In addition, the

[5]For a discussion, see Kniivilä et al. (2012).

stronger impact is determined towards production indicators, such as self-sufficiency levels and utilized agricultural area. However, it can be stated that policy priorities are in constant change. Yet, profitable farming operations are seen as a key to achieve the other objectives set for agriculture and these social and environmental aspects are aimed to achieve via wider rural development policies.

The most controversial impacts of policies both in Finland and Spain are related to rural economy and structural development of agriculture. In general, the desired direction is towards larger average farm size, smaller number of farms and less utilized agricultural land in production. However, in both countries policy programs are, at least, slowing down or even restricting the structural development. Agricultural support keeps farms in the sector and land under active production. Without support a number of farms would leave the sector and a proportion of agricultural land would withdraw from active production.

Environmental impacts are largely guided with environmental support scheme under Rural Development Programs. In Finland the role of the agri-environmental support scheme has been even more important. Under the scheme, the use of fertilizers is restricted to a particular range. In addition, the scheme includes targeted instruments to reduce the greenhouse gas emissions from agriculture.

The development of use of fertilizers gives a clear example on the impact of environmental support scheme. In Spain, the desired policy direction is to reduce the total amount of fertilizers used in agriculture. However, all the policy programs analyzed are contributing towards increasing fertilizer use. In Finland, the reduction in fertilizer is due to the targeted instruments, such as precision farming, contracts on organic farming, among others.

COUNTRY: FINLAND

			POLICY IMPACT ANALYSIS: EU POLICIES					AGIRULTURE POLICY PROGRAM: CAP			POLICY PROGRAM: RDP				POLICY PROGRAM: NATIONAL	FORESTRY POLICY PROGRAM: METSO	POLICY PROGRAM: KEMERA	POLICY PROGRAM: NFO (KMO)	POLICY PROGRAM: NATURA
								Aggregated effect	Instrument effect CAP direct payments	Instrument effect	Aggregated effect	Instrument effect	Instrument effect	Instrument effect	Aggregated effect	Aggregated effect	Aggregated effect	Aggregated effect	Aggregated effect
Indicator	Unit of measurement	Data source	Year of first observation	Year of the most recent observation	First observation	The most recent observation	Desired direction	CAP	(-2005)	SPS	RDP	LFA	Basic measures	Special measures	National policies	METSO	KEMERA	KMO	NATURA
Environmental sustainability																			
Utilised agricultural area	1000 ha	Yearbook of Farm Statistics	1995	2010	2141	2272	+ -	+++	+++	+++	+++	+++	-	-	++				
Numbe of farms covered by organic farming inspection system	nobs	Yearbook of Farm Statistics 2011	1995	2010	2793	3939	+	o	o	o	+++	o	+++	+++	o				
Fertilizer use	kg/ha	Yearbook of Farm Statistics 2011	1995	2010	160,1	95,6	-	---	---	---	-	-	---	--	-				
Pestiside use (Herbicides in agriculture)	1000 kg	Yearbook of Farm Statistics 2011	2003	2010	1339,4	1515,2	-	--	--	--					+				
CO_2 emissions	metric tons per capita	World dataBank	1995	2008	10,245	10,636	-	-	-	-	--	-	--	---	+				
Agricultural nitrous oxide emissions (thousand metric tons of CO_2 equivalent)	thousand metric tons of CO_2 equivalent	World dataBank	1995	2005	3390,2	2969	-	-	-	-	--	-	--	---	+				
Self-sufficiency of wheat	per cent	Yearbook of Farm Statistics 2011	2000	2010	101	101	+-	+	--	-	-	+	--	-	++				
Self-sufficiency of milk	per cent	Yearbook of Farm Statistics 2011	2000	2010	112	97	+-	-	-	-	+				++				
Forest area	1000 ha	State of Europe's Forests 2011	2000	2010	22459	22084	+-	o								o	o	o	o
Carbon stock on forest (Biomass)	mill. metric tonnes	State of Europe's Forests 2011	2000	2010	802,4	832,4	+	o								+	+	+	+
Protective forests	1000 ha (nb. Protective forests for soil, water and other ecosystem functions)	State of Europe's Forests 2011	2000	2010	654	466	+	o								o	o	o	o
Conserved forest area	1000 ha (MCPFE Class 1.1)	State of Europe's Forests 2011	2000	2010	807	841	+	o								+++	+	++	+++
Economic sustainability																			
Growing stock	milj. m^3	State of Europe's Forests 2011	2000	2010	2085	2207	+	o								o	++	++	o
Forest fires	area under fire, ha, average: 2000= 1991-2000 and 2010: 2000-2010	Statistical Yearbook of Forestry 2011	2000	2010	681,7	641,5	-	o								o	o	o	o
Management plans	% of forest area	State of Europe's Forests 2011	2000	2010	65	68	+	o								o	+	+	o
Value of roundwood removals	million eur	State of Europe's Forests 2011	2000	2010	1839	1858	+	o								o	+	+	o
GVA	million eur	State of Europe's Forests 2011	2000	2010	2402	3562	+	o								o	+	+	o
Wheat yield/ha (kg)	kg	Yearbook of Farm Statistics	1995	2010	3710	3970	+	+	+	+	-	-	--	--	+				
Total Farm income	million euro	Finnish Agriculture and Rural Industries 2011	1995	2010	1141,81	704,4	+	+++	+++	+++	+++	+++	+	+-	+				
Total Costs	1000 euro	Finnish Agriculture and Rural Industries 2011	1995	2010	2283,6	3195,2	-	-+	x	x	x	x	x	x	x				
Total Returns	1000 euro	Finnish Agriculture and Rural Industries 2011	1995	2010	3425,4	3899,6	+	+	+	+	+	+	+	+-	+				
Value added in agriculture	million euro	World Bank	1995	2010	3746	4531	+	+	+	+	+	+	+	+	+				
Social sustainability																			
Numbers of farms	nobs	Yearbook of Farm Statistics	1995	2010	99964	62767	-	---	---	--	-	-	-	+	+				
Average farm size	ha	Yearbook of Farm Statistics	1995	2010	21,7	36,7	+	+++	+++	+++	+++	+	+	-	-				
Employment in agriculture	% of total employment	World Bank	1995	2010	8	4,4	-	-	-	-	+	+	+	+	+	o	o	o	o
Share of women employed in the nonagricultural sector	% of total nonagricultural employment	World Bank	1995	2009	51,1	51,5	+	x	o	o	o	o	o	o	o	o	o	o	o
Labor participation rate, female	% of female population ages 15+	World Bank	1995	2010	55	56,1	+	+	o	o	o	o	o	o	o	o	o	o	o
Rural population	% of total population	World Bank	1995	2010	38,6	36,1	+	+	+	+	+	+-	+	+	+	o	+	+	o
Employment in forestry	thousand FTE	State of Europe's Forests 2011	2000	2010	23	23	+	o								o	+	+	o

COUNTRY: FINLAND

+++ = strong positive policy impact	Policy programs
++ = intermediate positive policy impact	CAP (I. pillar)
+ = positive policy impact	RDP (II. Pillar)
o = no policy impact	National policy measures
- = negative policy impact	METSO
-- = intermediate negative policy impact	NATURA
--- = strong negative policy impact	KEMERA
x = no policy exists for the indicator/policy impact can not be determined	KMO

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COUNTRY: SPAIN

								AGRICULTURE							FORESTRY	BIODIVERSITY	PROTECTED AREAS		CLIMATE CHANGE
								POLICY PROGRAM: CAP			POLICY PROGRAM: RDP			POLICY PROGRAM: NATIONAL MEASURES	POLICY PROGRAM: SFS	POLICY PROGRAM: SBBS	POLICY PROGRAM 1: NATURA	POLICY PROGRAM 2: EUROPARC ESPAÑA	POLICY PROGRAM: SCCS
								Aggregated effect	Instrument effect	Instrument effect	Aggregated effect	Instrument effect	Instrument effect	Aggregated effect	Aggregated effect	Aggregated effect	Aggregated effect	Aggregated effect	Aggregated effect
Indicator	Unit of measurement	Data sources	Year of first observatio	Year of the most recent observation	First observation	The most recent observation	Desired direction	CAP	CAP direct payments (-2005)	SPS	RDP	LFA	Specific measures	National policies	SFS	SBBS	NATURA	EUROPARC ESPAÑA	SCCS
Environmental sustainability																			
Utilised agricultural area	1000 ha	Spain Agricultural Census 1999 and 2009 (National Institute of Statistics-NIS)	1999	2009	26316	23752	-	+++	+++	++	+++	+++	+++	+	o	o	+	+	o
Number of farms covered by organic farming inspection system	nobs	Spain Agricultural Census 1999 and 2009	1999	2009	16521	27627	+	o	o	o	+	o	+++	+	o	o	o	o	o
Fertilizer use	kg/ha	World DataBank 2012 (World Bank)	2002	2009	164,5	96,9	-	++	++	++	+++	+++	++	++	o	+	+	+	o
Pestiside use (Herbicides in agriculture)	1000 kg	World DataBank 2012 (World Bank)	1999	2009	4435	9732	-	--	--	--	-	-	++	++	o	+	+	+	o
CO_2 emissions	metric tons per capita	World DataBank 2012 (World Bank)	1995	2008	6,5	7,2	-	-	-	-	-	-	+	-	o	+	+	+	+++
Agricultural nitrous oxide emissions (thousand metric tons of CO_2 equivalent)	thousand metric tons of CO_2 equivalent	World DataBank 2012 (World Bank)	1995	2005	24528	26529	-	-	-	-	-	-	+	-	o	+	+	+	o
Forest area	1000 ha	World DataBank 2012 (World Bank)	2000	2010	16988	18173	+	o	o	o	o	+	o	o	+++	+++	+++	+++	++
Growing stock	million m^3	State of Europe's Forests 2011 (Forest Europe)	2000	2010	870	913	+	o	o	o	o	+	o	o	++	+	++	++	o
Carbon stock on forest (Biomass)	million metric tonnes	State of Europe's Forests 2011 (Forest Europe)	2000	2010	397	422	+	o	o	o	o	+	o	o	++	+	++	++	+++
Forest fires	area under fire, ha, average: 2000= 1991-2000 and 2010: 2000-2010	Database wildfires. Spanish Ministry of Agriculture	2000	2010	159674	113826	-	o	o	o	o	o	o	o	+	+	++	++	++
Protective forests	1000 ha (nb. Protective forests for soil, water and other ecosystem functions)	State of Europe's Forests 2011 (Forest Europe)	2000	2010	6510	6646	+	o	o	o	o	o	o	o	+++	+++	+++	+++	++
Conserved forest area	1000 ha (MCPFE Class 1.1)	State of Europe's Forests 2011 (Forest Europe)	2000	2010	n.a.	0	+	The figure '0' for 2010 indicates that in Spain there are no conserved forest areas without direct human intervention (see definition of MCPFE Class.1.1.).											
Economic sustainability																			
Wheat yield/ha	kg	World DataBank 2012 (World Bank)	1999	2009	2709	2957	+	+	++	+	o	+	+	++	o	o	o	o	o
Management plans	% of forest area	State of Europe's Forests 2011 (Forest Europe)	2000	2010	18,8	19,3	+	o		o		o	o	o	+	o	++	++	o
Value of roundwood removals	million euro	State of Europe's Forests 2011 (Forest Europe)	2000	2010	689	703	+	o	o	o	o	o	o	o	++	o	+	+	o
GVA	million eur	Spain Yearbook of Farm Statistics 2012 and State of Europe's Forests 2011	2000	2010	789	3247	+	o	o	o	o	o	o	o	++	+	+	+	+
Total Farm income	million euro	Spain Agricultural Census 1999 and 2009	1999	2009	34672	44109	+	+++	+++	+++	+++	+++	+++	+++	o	o	o	o	o
Total Costs	million euro	Spain Agricultural Census 1999 and 2009	1999	2009	14839	20924	-	-	-	-	x	x	-	-	o	o	o	o	o
Value added in agriculture	million euro	World DataBank 2012 (World Bank)	1995	2010	24478	33946	+	++	++	+	+	+	++	++	o	o	o	o	o

Social sustainability																		
Numbers of farms	nobs	Spain Agricultural Census 1999 and 2009	1999	2009	1790162	989796	-	+++	+++	++	++	+	++	+	o	o	o	o	o
Average farm size	ha	Spain Agricultural Census 1999 and Spanish Ministry of Agriculture (SMA) 2011	1999	2011	14,7	24,5	+	+++	+++	+	+	++	+	+	o	o	o	o	o
Self-sufficiency of wheat	per cent	Spain Yearbook of Farm Statistics 2003 (SMA) and World-Grain.com 2012	2000	2010	81,6	59,4	+	+	-	--	--	--	--	+	o	o	o	o	o
Self-sufficiency of milk	per cent	Spain Household Buedget Survey (NIS) 2012 and Yearbook of Farm Statistics 2003	1999	2010	93,0	99.7	+	-	+	+	+	+	-	+	o	o	o	o	o
Employment in agriculture	% of total employment	World DataBank 2012 (World Bank)	1995	2010	9	4	-	--	--	--	-	-	-	-	o	o	o	o	o
Share of women employed in the nonagricultural sector	% of total nonagricultural employment	World DataBank 2012 (World Bank)	1995	2009	36	47	+	o	o	o	o	o	o	+	o	o	o	o	o
Employees, agriculture, female	% of female employment	World DataBank 2012 (World Bank)	1995	2010	7	3	-	--	--	--	-	--	-	-	o	o	o	o	o
Rural population	% of total population	World DataBank 2012 (World Bank) and Municipal Population Census 2010 (NIS)	2000	2010	24,0	21,1	+	--	--	-	+	+	+	-	o	o	+	+	o
Employment in forestry	1000 FTE	State of Europe's Forests 2011 (Forest Europe)	2000	2010	34,9	37,6	+	o	o	o	o	o	o	o	+	+	+	+	+

+++ = strong positive policy impact
++ = intermediate positive policy impact
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- = negative policy impact
-- = intermediate negative policy impact
--- = strong negative policy impact
x = no policy exists for the indicator/policy impact can not be determined

Policy programs:
CAP (I. pillar)
RDP (II. Pillar)
National policies
SFS: Spanish Forest Strategy
SBBS. Spanish Biologic Biodiversity Strategy
NATURA
EUROPARC ESPAÑA
Spanish Climate Change Strategy

The different role of forest is clearly seen from the analysis. In Finland, forests are very significant part of rural economy, but also national economy with large-scale industrial use in all over the country. Yet, in Finland the role of forest as a source of ecosystem goods and services is widely recognized. Implemented policy programs are set to protect and maintain certain types of forests and forest amenities.

10.6 Conclusions and Policy Implications

In this study the main factors of sustainable agriculture and forestry were defined for MPCs and Turkey. These general factors do not apply only to these countries, but their nature is more universal. However, despite their importance, not all factors are given the same emphasis in practical decision-making.

In order to strengthen the policy analysis on sustainable development and its different dimensions, more data is needed. For sustainability assessments availability of times series data is essential. According to the data query of this study there are time series data available. However, still more would be needed on some specific issues. In some cases the value of an indicator in a single point of time may be enough for assessing how sustainable the current state is. This is possible if critical threshold value for the indicator is known. In many cases, and especially if the impacts of policies are evaluated, there is an obvious need to have data from different points of time. Data collected in the SustainMED project offers, however, an opportunity to widen the evaluation of sustainability of agriculture and forestry in the study countries.

Furthermore, regional data, which would be needed for more profound and elaborated analyses were available only in Turkey. Regions differ in their characteristics especially in large countries. There are also specific policies for regions. Lack of regional data complicates specification of suitable policies and decision-making.

In order to ensure the proper evaluation of policies, institutions need to be set to ensure the collection of time-series data for selected relevant indicators. In addition, this data needs to be directly comparable between countries and regions. The indicator selection and the procedures for data collection should be an essential part of the policy programs already at the planning stage of the policies.

Our study shows, that there exist significant trade-offs and controversies between the different dimensions of sustainability. In order to maximise the policy effectiveness, these trade-offs need to be accounted for in policy implementation. To tackle the trade-offs a sufficient number of different policy programs and instruments need to be implemented.

One of the main controversies relates to the importance of agriculture in rural employment. It alters policies on other significant trade-off in terms of different dimensions of sustainability. Increasing agricultural productivity and structural development reduces employment opportunities in agriculture. Agricultural and

rural policies may not, however, respond to social and economic dimension of sustainability in terms of creating employment opportunities outside agriculture. Thus, policies enhancing structural development in agriculture may increase the unemployment especially in the rural areas. Rural unemployment has direct impacts on migration, urbanization and rural population.

The role of the EU MPC policies should be more emphasised. According to our analysis, EU MPC policies play only a minor role in the sustainability development of the agricultural and rural areas. Moreover, the implemented pre-accession program in Turkey has not been able to contribute towards the desired direction. The actual effectiveness of these programs should be further analysed.

The qualitative policy impact analysis carried out in the project indicates that the desired direction for the development of comparable indicators is relatively similar in all countries. In general, the target is to reduce negative environmental impacts and enhance more sustainable use of resources, increase agricultural productivity and enhance structural development in agriculture, and reduce the relative economic importance of agriculture in the overall economy. However, agricultural and rural policies seem to lack the efficiency in contributing the alternative employment opportunities outside agriculture. This is a major challenge for social and economic sustainability as a whole, but especially in the rural areas.

Given the nature of sustainability and its different dimensions (economic, social, environmental), there exist some significant trade-offs between desired policy impacts of particular policies. These trade-offs occur and are also acknowledged in all MPCs and Turkey. One of the most important issues in this respect relates to water use in agriculture. Increasing irrigation and the utilization of water resources is seen important to increase agricultural productivity. However, this may lead to unsustainable use of water resources and thus, has negative impacts on the environmental dimension of sustainability.

The impacts of analysed policies on climate change are of great interest. For the MPCs and Turkey, policy impacts on climate change can be approximated in terms of their impact on greenhouse gas and CO_2 emissions. Despite the lack of data from Egypt, it can be stated that the policy objective is to reduce greenhouse gas emissions from agriculture. However, based on the policy impact analysis the CO_2 and other emissions have mainly increased due to the implemented policy programs.

In addition to agricultural, forestry plays significant role in the sustainable development in the rural areas. Policy impact assessment on forestry is very challenging in all countries. This is both due to lack of forestry related indicators, but also the fact that policy programs are implemented as agricultural and rural policies with possible indirect impacts on forestry. Direct forestry enhancing policies are rare.

In policy processes high priority should be given to the challenges related to different dimensions of sustainability. As the issues related to water use or agricultural productivity and food security may rise especially because of their urgency, other recognized challenges should not be neglected. It is also very important to acknowledge that the full impacts of climate change are yet to be experienced. In

addition, neglecting gender aspects will cause in a long run hindered economic growth and social problems.

In order to ensure the proper evaluation of policies, institutions need to be set to ensure the collection of time-series data for selected relevant indicators. In addition, this data needs to be directly comparable between countries and regions. The indicator selection and the procedures for data collection should be an essential part of the policy programs already at the planning stage of policies.

Our study shows that there exist significant trade-offs and controversies between the different dimensions of sustainability. In order to maximise the policy effectiveness, these trade-offs need to be accounted for in policy implementation. To tackle the trade-offs a sufficient number of different policy programs and instruments need to be implemented.

In this context, the role of the EU MPC policies should be more emphasised. According to our analysis, EU MPC policies play only a minor role in the sustainability development of the agricultural and rural areas. Moreover, the implemented pre-accession program in Turkey has not been able to contribute towards the desired direction. The actual effectiveness of these programs should be further analysed and enhanced.

Development of any society can be sustainable only if all dimensions of sustainability are taken into account in a balanced way both in policy processes and practical actions. The results obtained in this study shows that the emphasis in the MPCs is primarily on economic aspects, which is understandable when the development stage of the countries is considered. However, in the long-run neglecting other dimensions is a source of future instability.

Consequences of poor social sustainability have been strikingly demonstrated in several MPCs during the last few years. Poverty reduction, women's empowerment and the increase of local people's involvement are at the core of social sustainability. Without local acceptance the likelihood to gain long-lasting success is minor. More research is needed on the local peoples' perceptions on the major problems related to current policies and institutions aiming especially at poverty reduction, decrease of environmental degradation and increasing agricultural productivity, and on their consideration of the best possible policy actions. This applies both to institutional and social structures, and includes issues related to land ownership and legal frameworks.

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Chapter 11
Food Security in MPC's

Fabian Capitanio

11.1 Introduction

This chapter is concerned with the issue of food security, placing special emphasis on the current situation of South Mediterranean countries.

The events of 2007/2008 and those of 2010/2011, has been unfortunately more than an alarm-bell. The most recent spike in food prices alone has shifted almost 45 million people below the poverty line, synonymous with leading an existence on less than 1.25 USD a day, which is already experienced by more than 1.2 billion people around the world. The tensions between supply and demand suggest this is a structural imbalance that will grow in the years to come. The failure to meet the first of the millennium development goals, a reduction in hunger in the world, ought to restore a sense of urgency and determination in order to conceive and design renewed policies at the international level, to build a new overview of global food security. Given the scale of the problem, this need cannot be relegated solely to its traditional place on the agenda on just how to support agricultural development and food self-sufficiency in late-developing areas, but should be tackled with decisions that necessarily involve agriculture world-wide. It is a problem that affects us all and not just a question of how to help "others".

After decades in the wilderness it is no coincidence that the issue of food security is once again part of the lexicon of American and European policy makers, just at the moment when the USA and EU are preparing to reform their own agricultural policies, the longest established and also the most criticized.

By a brief introduction of the main conceptual aspects of food security, this work point out the shift from a former focus on food energy availability to a more comprehensive appraisal of this phenomenon in recent times. The most likely causes of recent rises in food prices are also described. Food security issues are

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analyzed in connection with rural poverty issues and with the failure to achieve successful agricultural development in some developing countries, which sometimes have to overcome strong restrictions concerning the availability of land and water resources for food production.

11.2 World Food Trend

The issue of access to, and availability of, food on a global basis, known as food security, has been making headway on the political and media agenda since the start of the twenty-first century. What now gives cause for concern is the increase in food prices levels and volatility. Since the mid 1990s we are observing sharp peaks in farm commodity prices (e.g. 2007/2008 and 2010/2011). The most recent forecasts indicate a sizeable rise in prices for the coming years. Despite the debate on the role played by the various factors involved, most academics agree that the long era of abundant food, available at low prices, is over, and has given way to an era of new scarcity. The phenomenon is usually linked to projections on demographic growth, according to which, in 2050, there will be more than nine billion inhabitants on the planet.

In tackling the issue of security in the food supply the analysis of population dynamics has given way to examination of distribution dynamics. The problem, as posed in recent years, is not scarcity, but the inequitable distribution of food resources, which has ended up penalizing vast populous areas in the world (De Castro et al. 2012). Such a problem has recently been aggravated, leading the number of poor, undernourished, people worldwide to exceed one billion. Though inter-related with the broader issue of natural resource depletion, food scarcity assumes connotations of greater or equal urgency compared with numerous delicate problems, such as market instability and price volatility, conveyed more loudly by public opinion.

Economic theory tells us that the rise in prices is due to a change in market equilibrium, caused by the increasing gap between the demand and supply of a certain product. In the case of agricultural markets, there are concerns regarding the increase in food demand, which in recent years has advanced at sustained rates, especially in emerging areas, such as the Mediterranean Partner Countries.

In such a complex, evolving, and risky context, the analysis of food security and poverty need to be conducted deepening the understanding of structure of current risk management strategies.

To emphasize the question of inequitable food distribution, recall that we have experienced a period of great agricultural capacity almost on a global scale, called “the Green Revolution”. This is a term used to refer to the remarkable increase in world agricultural production between the early 1960s and the end of the 1980s. The technological progress experienced in the more developed economies and its transfer to other regions, especially Asia and Latin America, led at that moment to

the doubling of yields for some cereal crops which are basic for the human diet, like rice, wheat and maize, besides the productivity of other plant species and livestock.

This real production boom has been able to meet rising food demand in the past 30 years and has also ensured a certain stability to food prices. A historical phase in which giant steps taken in developing pesticides and fertilizers, combined with an improvement in production techniques and plant breeding, allowed a rapid growth in farmland yields. Certainly, not everywhere: in Asia, yield increases were obtained practically without increases in cultivated areas, while in Africa yields were stationary despite the bringing into cultivation of new lands.

However, we are talking of a quarter-century of sustained yield increases, coinciding with a marked rise in public investment in agricultural research, both in more developed and in developing countries. The result was a mean annual global increase in cereal production of 2 %, with the highest rises in Asia (+2.5 %). The Green Revolution seemed universally to be the death knell of the Malthusian theory of growth.

What has changed? How can we account for an alarming situation that today goes well beyond the ever-neglected issue of hunger in the world's poor areas? What has compromised the reaching of internationally-agreed goals regarding the war against malnutrition?

The international markets for agricultural commodities are the stage on which the new scarcity is shown in all its clarity. The roller-coaster ride of commodity prices fully expresses the tensions between demand and supply which are responsible for price rises.

It would be clear now that, referring at market instability, one of the main drivers is the headlong growth in food consumption, associated with population growth, but especially with the higher purchasing power among increasingly broad ranges of the population in emerging countries. As early as the mid 1990s, major increases were being witnessed in the demand for some strategic agricultural commodities, such as wheat, whose prices had long been in constant decline. Demand began to rise at an average rate of 2 % per annum, especially thanks to China, India and Brazil, able on their own to account for at least one-third of increases in world requirements at that time.

11.2.1 The Return of Scarcity

From the early fifties there was a long period of stagnating and declining prices on agricultural markets, interrupted only by some spurt in concomitance with extraordinary events (like the "oil shock" in the 1970s). The scenario changes in the mid 1990s where an inverse trend begins, with sharp peaks in farm commodity prices in 2007/2008 and 2010/2011. The most recent forecasts indicate a sizeable rise in prices for the coming years.

Several causes are driving the increase in agricultural commodity prices. One of the main is the headlong growth in food consumption, associated with population growth, but especially with the higher purchasing power among increasingly broad ranges of the population in emerging countries. According to FAO, world population will exceed nine billion in 2050. This represents an increase of about one third against the current population of 6.9 billion, which will be lower than in the past. In fact, the population increase of over 30 % predicted by the FAO for the next 40 years is well below the relative growth in the past four decades, during which the population more than doubled.

The largest increases will take place in developing countries, while the population in high-income economies will remain almost stable and in some areas, especially in some regions of Europe, there may even be population declines. By contrast, in Africa the population is expected to double, growing from one to two million by 2050. In emerging areas growth will continue to be sustained especially in India, while China's growth should slow down; absolute increases will remain appreciable. In these two countries, which now make up over one-third of the world's population, the number of inhabitants is expected to rise from the current 2.5 billion to 3.2 by the year 2050.

The global effects of population increases will be strictly linked to migration intensity between countryside and town. Around 50 % of the world's population is now distributed in urban areas, the other half in rural areas. In 1950 only 28 % of the population lived in large urban agglomerations; in 2050 this percentage is destined to reach 70 %. Compared with today, there will be 19 more cities with over ten million inhabitants and five of these will be in Asia where the trend toward metropolitan concentration will be particularly marked. FAO estimates the population reduction active in agriculture in the next 40 years at around 30 %.

The most important contribution to the global convergence of diets will be made by the expansion of the middle classes in emerging areas. Individual income in countries like India, Brazil and China rose at sustained rates in recent years, only to slow down, but not stop, during this long phase of world economic recession. The cases that stand out most are those of China and India which have recorded annual growth rates close to the double figures in the years immediately prior to the recession and which are forecast, according to the International Monetary Fund, to continue their trend at least for the next 20 years. This means on one hand that expenditure on food consumption grow fast, on the other that food habits change radically (the so-called "substitution effect" explained by Engel's Law).

As populations gradually become richer, in their diets the unprocessed starch products (like rice and flour), are replaced by products with a higher protein content (such as meat, milk and other dairy products) and by processed products with greater value added, promoting a process of dietary convergence worldwide along the models of richer populations. This trend is involving several billion people in emerging countries and the demand of livestock product is forecast to increase very

fast in the coming years with the consequence of a multiplying effect on the demand for some agricultural raw materials, like soya and wheat, which are at the basis of animal feed.[1]

Critical situations concerning water consumption may arise from overexploitation, climatic stress and pollution, in the case in which water courses receive more waste than they can assimilate. In the course of time, some such situations have been alleviated in many parts of the world thanks to technological progress, which has allowed an increase of about 700 % in the storage capacity of fluvial systems in the past 50 years, promoting economic development, especially agriculture.

By contrast, problems have become more serious in other areas, for example where economic and urban expansion have required large quantities of water, exchanged for ever greater doses of pollution. There are also cases where erosion has led to a reduction in water availability in many large areas of Africa, including some SEMC. This is a clear constraint to possible expansion in the agriculture sector, which becomes even more serious if we view the growing negative implications accompanying the relationship between water and agriculture starting with the Green Revolution: agriculture is indirectly responsible for about 40 % of pollution of surface water, stemming from the increase in use of chemicals, as fertilizers and pesticides, whose use seems to intensify when areas are devoted to biofuel production.

In past years the adjustment of supply to demand was guaranteed by technical progress. The technological progress experienced in the more developed economies and its transfer to other regions, especially led to the doubling of yields for some cereal crops which are basic for the human diet, like rice, wheat and maize, besides the productivity of other plant species and livestock. The sustained yield increases was lead by a marked rise in public investment in agricultural research, both in more developed and in developing countries.

Now we are faced with two types of limits: on the one hand the need for more sustainable agriculture, hence based on less use of chemical inputs, one of the main protagonists of the Green Revolution; on the other, the concern at having reached a technological barrier such as to be able to achieve only marginal short-term increases.

The OECD and FAO recently estimated that for the coming years the annual growth in production will continue to be slower than in the past, falling from an annual average of 2.4 % for the previous decade to 1.7 % for the coming years. According to many analysts, these data indicate unequivocally the end of the season of the Green Revolution and the reaching of a level of efficiency that will be hard to beat in the short-medium term.

Also those of a contingent nature have far more impact than in the past, since the greater integration of the economy favors a more rapid transfer of signals (and shocks) from one market to another (De Castro et al. 2012). Such integration is also partly responsible for another aspect of the current scenario: market volatility.

[1]To globally satisfy a diet which will be increasingly enriched in calories and change in its composition, annual cereals production will have to reach around three billion tons, about one third higher than today, that of soya will have to increase by 140 % and that of meat will have to reach 470 million tons, 200 million more than current production (FAO 2010a, b).

This term is used when the frequency and range of price variations recorded in a given time span are greater than the historical average. Between 2007 and 2008 the farm price index used by the International Monetary Fund (IMF) rose by 50 %, to then drop sharply (without return to its pre-boom levels) and rise to even higher levels at the beginning of 2011, representing a rise of 130 % against 2002 levels.

This phenomenon, depending on several causes, exacerbates the natural instability of agricultural markets linked to the seasonal cycles. One cause arise from the small-scale market, characterized by low volumes and a restricted number of exporters. Only 12 % of maize and 18 % of wheat are traded on international markets; the remaining part stays within producer countries.

This means that also in the case of modest shocks, repercussions on prices may be significant and the return to equilibrium may take a long time. This is what has happened with increasing frequency of extreme meteorological events linked to the broader phenomenon of climate change.

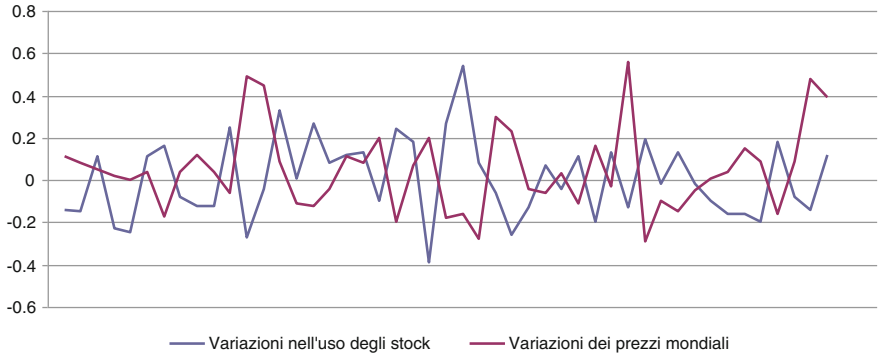
Often reactions to these events have led to restrictions of trade. In 2010 we experienced a new cycle of measures that were completely uncoordinated at the international level. In summer 2010, following huge wildfires that hit Russia and caused damage to crops, Moscow banned grain exports, triggering price increases. The Russian example was followed by Ukraine, while in parallel many governments began to subsidize imports or reduce their taxation. The announcement of the ban, was enough for many concerned importers to begin to negotiate higher volumes than in the past, fearing subsequent price rises. According to the FAO, world wheat prices increased by between 60 and 80 % between July and September 2010 after the export ban decided by Russia.

Government reactions to price booms have aimed to stabilize domestic supply as rapidly as possible by adopting protective measures (such as bans on exports or incentives for imports), to alleviate the impact of increases upon its citizens. Yet these initiatives have had the sole result of exporting instability (and inflation), taking it from national to international markets (Tangermann 2011), amplifying price oscillations and triggering a vicious circle which made the markets even more precarious.

The scenario is further complicated by the state of reserves of strategic agricultural products (Fig. 11.1). Today, the level of food reserves is much lower than in the past. In 2007 cereal reserves reached their historical minimum. This actually made the agricultural supply even more inelastic than it is naturally, further restricting the capacity to respond to price increases.

Also the role played by the financial markets during the price rises is more hotly debated. Some governments, but also several analysts and representatives of international institutions have pointed the finger at financial speculation, it being identified as one of the main drivers behind recent booms in farm prices.

In its broader, more authoritative strands the economics literature is rather skeptical regarding the nexus of direct causality which is thought by many to connect speculation and price rises. The trend in futures quotations is theoretically tied to expectations on demand-supply relations and thus tends to converge on the real market value of the traded commodity as the contract expiry date approaches.



Source: Our elaboration from USDA data

Fig. 11.1 Wheat stocks are negatively correlated with wheat prices

By contrast, financial operations conducted outside commodity exchange circuits are different, such as in the so-called "over the counter" (OTC) market, where it is large institutional intermediaries which trade commodities through non-standardized contracts and without solvency guarantees made available by stock exchanges. This generates large risks, like those that became reality during the financial bubble in 2007, in which the contractual reneging of many players who had taken on excessive risks led to real market failure.

The development in analyzing the field of food security, reflect the shift from a former focus on food energy availability to a more comprehensive appraisal of this phenomenon developed in recent years.

11.2.2 Food Security in South Mediterranean Countries: Towards a More Comprehensive Approach

In September 2000 189 nations approved the "United Nations Millennium Declaration "(UNMD), calls for halving by the year 2015, the number of people who live on less than one dollar a day. The Millennium Development Goals pointed out by the UNMD include eight priorities: Eradicate extreme poverty and hunger, Achieve universal primary education, Promote gender equality and empower women, Reduce child mortality, Improve maternal health, Combat HIV/AIDS, malaria and other diseases, Ensure environmental sustainability and Develop a global partnership for development. The level of this goals, are measured each year using more than 60 indicators.[2]

[2]The official list is available on http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm.

What emerge applying the upgraded $1.25-a-day poverty line, which is used to measure progress toward the first Millennium Development Goal (MDG), is that official poverty rates in most south Mediterranean countries are lower than in many other low- and middle-income countries (LMICs). Extreme poverty affects less than 3 % of the population. But going depth in the analysis of non-income MDG indicators the situation change and the difference between south Mediterranean countries (and in general all Arab countries) and other LMICs appears less pronounced (IFPRI 2012a, b).

On this field, is interesting the results come out from a study conducted by International Food Policy Institute (IFPRI) in 2012,[3] pointing out how poverty and income inequality in the SEMC context are likely higher than official numbers have long suggested. In this study a new indicator of food insecurity risk is developed, merging a macro-level and a micro-level measure of food insecurity. The first one is defined as the share of food imports divided by total exports plus net remittance inflows,[4] while the prevalence of child under nutrition is used for representing the micro micro-level measure of food insecurity. The result is a classification of SEMC countries into five risk groups, based on this composed indicator. In IFPRI 2011, it can be seen that the situation is more deficit recorded for Mauritania, Sudan and Yemen. The situation is relatively better than these indices in Libya, Egypt, Morocco, Tunisia, Turkey and Syria.

11.2.3 Mediterranean Countries and Food Security Indicators

This approach goes beyond the traditional micro aspects put at the basis of the Global Hunger Index (GHI),[5] calculated each year by the International Food Policy Research Institute (IFPRI). The GHI provide a multidimensional overview of the hunger, combining three equally weighted indicators:

The proportion of undernourished as a percentage of the population, which reflects the share of the population with insufficient dietary energy intake.

The prevalence of underweight children under the age of five, which indicates the proportion of children suffering from low weight with regards to the adequate weight for their age.

The mortality rate of children under the age of five, reflect the interaction between an inadequate energy intake and an unhealthy environment.

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[3] *Beyond the SEMC Awakening: Policies and Investments for Poverty Reduction and Food Security* (IFPRI 2012a, b).

[4] Food imports/[total exports + net remittance inflows].

[5] The GHI ranks countries on a 100-point scale. Values less than 5.0 reflect low levels of hunger, values between 5.0 and 9.9 reflect moderate hunger, values between 10.0 and 19.9 indicates the presence of a serious problem of hunger, values between 20.0 and 29.9 are alarming, and values of 30.0 or higher are considered as extremely alarming.

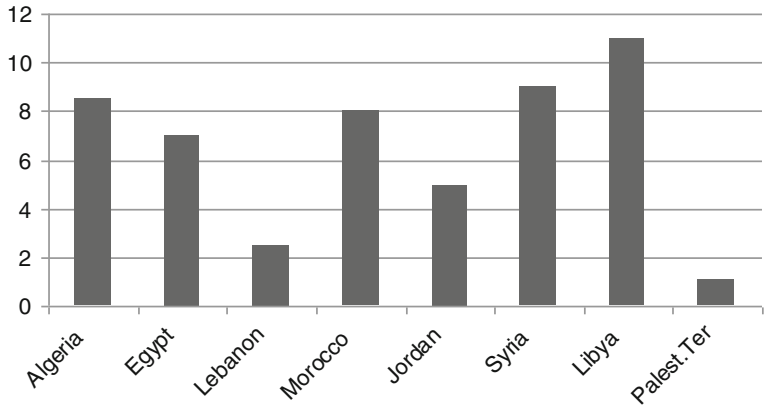
The scores for some selected North Africa and Middle East countries, in comparison with the six countries at the bottom of the world list in 2010, show that the situation of South Mediterranean countries is relatively good and widely differs from the situation of those African countries that suffer the most from food insecurity. All the selected countries are classed, in 2010, in the category of countries with low hunger levels, with the exception of Morocco and Syria, which appear with moderate hunger levels. The best scores among the SEMC correspond to Tunisia, and the worst to Morocco, where the prevalence of underweight children under five years of age has increased between the average of 1988–1992 and the average of 2003–2008, to 9.9 %.

A factor becomes more and more crucial in measuring the multiple dimension of the concept of food security is the exposure to food import. The South Mediterranean Region has as one of the most food import-dependent area in the world, with net food imports accounting for 25–50 % of national consumption. This result is a consequence of a very rapidly demographic growth in the last few decades combined with the change in consumption patterns linked to the increasing average income. A direct consequence of this development has been the rising external food trade deficits, that if in general it should not mean self-sufficiency deficit,[6] in the cases of some South Mediterranean countries the figure gives rise some concerns, related to the high ratio of food imports over total exports. In particular in those countries characterized for an high dependence of export earnings from oil, the exposure to food security risks is directly related with the oil price fluctuations. The quota of total exports used to pay for imports is in the SMC higher than the world average. The food dependence is more pronounced for Palestinian Territories, Lebanon, Jordan and Egypt than in the other countries included in the region (Fig. 11.2).

Combining the number of times that total exports cover food imports with the food production per capita, the GHI, and Gross National Income per capita, on the basic distinction grounded on the mineral resources endowment of each country, Breisinger and other authors have proposed a food security countries classification in which all the South Mediterranean countries considered are included in the category countries facing a food security challenge (Breisinger et al. 2010).

A most recent multidimensional food security indicator is the Global Food Security Index (GFSI) developed by *The Economist Intelligence Unit*, that consider the core issues of affordability, availability, quality and safety across a set of 105 countries (Table 11.1). The index is a dynamic quantitative and qualitative benchmarking model, constructed from 25 unique indicators, that measures these drivers of food security across both developing and developed countries, providing a rank of countries in function of their food vulnerability. The 2012 GFSI for the South Mediterranean countries covered by the survey provide the following result.

[6]Food trade deficits may be an acceptable way of guaranteeing the availability of food supplies, but only under the condition that deficit-prone countries are able to generate enough foreign currency to pay for their imports.



Source: Breisinger et al. (2010)

Fig. 11.2 Total exports/Food imports in SEMC (2010)

Table 11.1 Global food security index in some SEMC (2012)

	Overall score	Affordability	Availability	Quality and safety	GFS rank
Algeria	40.1	38.2	39.1	47.6	72
Egypt	50.4	38.1	59.8	55.3	52
Morocco	49.1	49.5	47.5	52.6	57
Tunisia	52.2	52	48.6	66	49
Turkey	62.2	55.6	66.6	66.2	33
Jordan	49.8	51.8	49	47.1	49
Syria	40.9	33.6	44.9	47.9	70

Source "The Economist" intelligence unit

11.2.4 Structural Factors Affecting Food Security in South Eastern Mediterranean Countries

The population growth rate of SEMC countries has averaged 2.1 % in the last seven years compared to a world rate of 1.2 %. In the southern and eastern Mediterranean countries, high population growth rates have been recorded over the past three decades with natural growth peaks of 3 % and more. Profiles vary widely, however. Population growth in the Maghreb countries is controlled as the result of a steep decline in fertility rate: this is the case in Tunisia, whose population has grown from 5 million in 1970 to 10 million at the present time but should not exceed 15 million by 2050. Population growth is still buoyant in most of the countries in the Near East. In Syria, Jordan, Egypt and the Palestinian Territories the annual growth rate is still around 2 %. Egypt, for example, which had a population of 35 million in

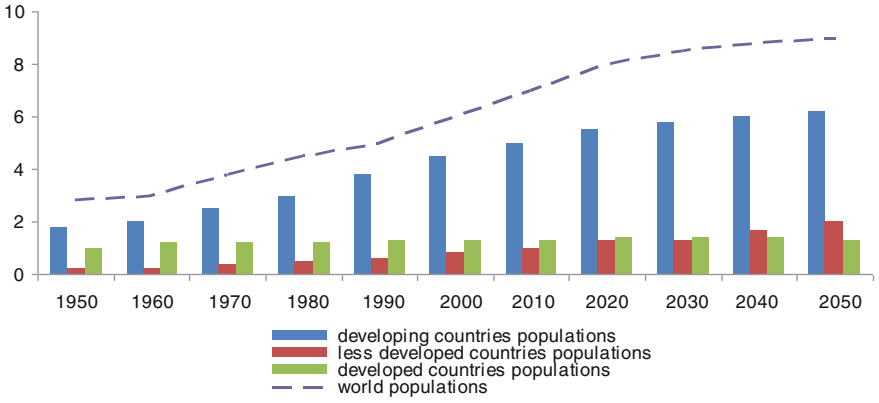
1970, now has some 75 million inhabitants, and the figure could rise to almost 120 million by 2050. In the Near East, population trends are very correlated to socio-economic disparities: the demographic and socio-economic profile of Lebanon, for instance, is far removed from that of Syria (Fig. 11.3).

This trend has been accompanied by a rapid urban growth in the SEMC, where the number of city dwellers will have doubled by 2020 compared to the figure for 1990. Yet rural areas, on the whole, are not becoming depopulated. There has been a steep decline in the rural population in most SEMC in general terms, but the relative share of the rural population is decreasing in absolute terms as a necessary corollary of galloping urbanization, rural areas have never been so populated, particularly in the countries of the Near East and in Egypt, where the rural population is still larger than the urban population and farming still remain the primary activity in large part of this region.

At the same time the average income growth rate has been roughly 3.0 % in the last decade, compared to the world average of 1.1 %, redrawing, hand in hand with the increasing urbanization, the consumption patterns of the entire region and leading, as previously recalled, toward a progressive exposure in terms of food trade deficits.

The competition in covering soil has seen an increasing role of the urban area, often at the expense of fertile areas. Since this region is characterized by a limited resources of arable land and water, this means limiting option available for contributing to cover the increasing food demand. In Algeria, Jordan, Libya and Egypt, for example, the acreage of arable land accounts for less than 5 % of the total area of the country. In many of the SEMC the arable land per capita is below the global average and its decline has been rapid.

In order to get around water scarcity, the people of the SEMC developed efficient systems of water engineering, which they used mainly for watering their crops. In Egypt, where crops cannot grow without irrigation, numerous techniques have



Source: FAO

Fig. 11.3 Total population growth and projections

been used for thousands of years to exploit Nile spates. But it was in the 20th century that irrigation was developed most, at least in terms of areas covered.

Irrigation is no doubt reaching its limit after years of rapid development, particularly in SEMCs, which are amongst the least endowed in the world in terms of available water resources: half of the world's "water-poor" (less than 1000 cubic meters per capita) live in the region. The natural resources exploitation index (the ratio between the volumes abstracted and the renewable water resources available) gives a worrying indication of the pressure that now weighs on water resources. Most of the SEMCs have an exploitation index of over 50 %, for instance, but it is the situation in the east of the basin that is reason for the greatest concern. With the exception of Lebanon and Turkey, both of which have water resources, the indexes are already very high (over 75 %) and, to judge by trend scenarios, are liable to rise further. These quantitative limits are compounded by signs of deterioration in water quality. The increase in the volume of water abstracted from groundwater aquifers, for example, makes these aquifers more sensitive to marine intrusion.

11.2.5 Food Dependency and Price Pass-Through

As seen previously, SMC are particularly concerned about food security because they are highly dependent on international commodity markets. The level of exposure is directly related both to the ratio of food imports to total exports and the fiscal balances.

SEMC countries are the largest net importers of cereal calories in the world, importing roughly 56 % of the cereal calories they consume. This dependence on foreign market concerns all countries of the south Mediterranean region, which are the world largest net importers of cereal calories buying on the international market more than 50 % of the cereal consumed calories. Wheat represents a significant part of the SMC diet, reaching in the case of Tunisia roughly 50 % of the total consumed calories.

The exposure of SEMC countries to world food price volatility is firstly linked to their high dependence on the external market. The World Bank (2012) has calculated the ratios of net imports to domestic consumption, as indicative of the dependency on foreign imports to satisfy domestic food demand.[7] The results show that dependence on food imports in general is high across SEMC countries (Table 11.2).

This situation shall produce, in case of price shock, dramatic consequences in terms of food inflation. The SEMC region is the largest wheat importer in the world, and wheat prices increased by 70 % in the second half of the 2000s. The incidence

[7]Dependency ratio is calculated as: $D_i = \frac{M_i}{C_i}$ where M_i is net imports of food product I, C_i is the domestic consumption with I corresponding to grains, edible oils, meat, and sugar.

Table 11.2 Food dependency ratios, import, and consumption share for 2010

Country/Food item	Net imports as a share of consumptions	Commodity import shares	Commodity consumptions shares	Country/Food item	Net imports as a share of consumptions	Commodity import shares	Commodity consumptions shares
Algeria				*Lebanon*			
Grains (%)	68	52	52	Grains (%)	87	39	32
Oils (%)	88	22	18	Oils (%)	38	7	8
Meat (%)	33	7	15	Meat (%)	56	38	49
Sugar (%)	89	19	15	Sugar (%)	100	10	11
Food (%)	69	100	100	Food (%)	70	100	100
Bahrain				*Morocco*			
Grains (%)	100	28	25	Grains (%)	51	57	61
Oils	n/a	n/a	n/a	Oils (%)	50	24	21
Meat (%)	88	62	65	Meat	n/a	n/a	n/a
Sugar (%)	100	10	9	Sugar (%)	57	19	18
Food (%)	92	100	100	Food (%)	89	100	100
Egypt				*Syria*			
Grains (%)	39	54	62	Grains (%)	51	53	62
Oils (%)	78	27	14	Oils (%)	6	7	19
Meat (%)	37	10	13	Meat	n/a	n/a	n/a
Sugar (%)	37	9	11	Sugar (%)	104	27	16
Food (%)	33	100	100	Food (%)	43	100	100
Jordan				*Tunisia*			
Grains (%)	97	42	35	Grains (%)	68	58	63
Oils (%)	68	17	20	Oils (%)	−73	15	22
Meat (%)	25	27	34	Meat	n/a	n/a	n/a
Sugar (%)	98	14	11	Sugar (%)	104	27	10
Food (%)	67	100	100	Food (%)	43	100	100

Source Calculations using USDA data collected by Cristina Savescu

of food consumption in the basket household expenditures in SEMC countries is, in fact, still account between 30 and 50 % and consequently food inflation often represent the most important component of the overall inflation.

It is well known, that the effects on the field of food security are strictly correlated with the income distribution among the population. The question of the high concentration of household living near the poverty line that characterized the SEMC area, would represent in case of prolonged price shock a threat in increasing the severity of poverty levels (IFPRI 2012a, b). About half of the populations of the SEMC countries live in rural areas, and within this category agricultural sector plays a key role in, Syria, Egypt, Tunisia, Morocco and Jordan. Therefore, we need to emphasize that rural poverty is at the core of food security problems in the region, and recent rises in food prices have contributed to an increase in the incidence, depth and severity of poverty. Some preliminary analysis carried out during last years have stressed the link between increase in food price and increase in poverty in these countries; these results suggested that about a 30 % increase in food prices in Egypt would result in a 12 % point increase in poverty, and a 14 % increase in food prices in Morocco would result in a 4 % point increase in poverty.

Furthermore, the tight of supply available on the food commodity market for certain strategic products, like cereals, increase the risk of disruptions in procurement and shortfalls in food availability in countries with high food dependency ratios. A further point which should be emphasized is the similarity often misleading of the concept of food security compared at self-sufficiency; indeed, food trade deficits may be an acceptable way of guaranteeing the availability of food supplies, but only under the condition that deficit-prone countries are able to generate enough foreign currency to pay for their imports. In practice it means being able to keep a relatively low ratio of food imports over total exports. In this context, SEMC countries are currently using 11.5 % of their total exports to pay for their food imports. As underlined by the joint World Bank/IFAD/FAO report on improving food security in SEMC countries (World Bank 2009), food security in the region is determined by resource endowments which affect the level of food import requirements and also by fiscal balance which influences a country's ability to afford food imports.

This means that vulnerability to food price shock is basically influenced by the import dependence, but also by the fiscal position of the considered country. High import dependence associated with a sound fiscal position is not of concern, excepted in case of quantity shock such as export bans (African Development Bank 2012).

Global price movements in some strategic agricultural products markets is one important source in conditioning domestic price levels, accompanied by others linked to country-specific factors, including public policy measures. Governments of SEMC countries use many policy instruments in order to mitigate the effects on consumers rising from fluctuations in global agriculture commodity price. Those measures has helped SEMC countries in isolating households from price volatility and food inflation. As observed by Ortiz et al. (2011) different policy interventions

(especially an extensive use of price subsides, but also measures aimed at managing and regulating food consumption, production and trade) are used by SEMC countries in this field.

11.3 Policy Recommendations

The exposure of MPC's to world food price volatility is firstly linked to their high dependence on the external market (see Fig. 11.2). The World Bank (2012) has calculated the ratios of net imports to domestic consumption, as indicative of the dependency on foreign imports to satisfy domestic food demand. The results show that dependence on food imports in general is high across MPC's.

This situation shall produce, in case of price shock, dramatic consequences in terms of food inflation. The MPC region is the largest wheat importer in the world, and wheat prices increased by 70 % in the second half of the 2000s. The incidence of food consumption in the basket household expenditures in MPC's is, in fact, still account between 30 and 50 % and consequently food inflation often represent the most important component of the overall inflation.

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11.3.1 Tools Utilized by MPC's Governments

Governments of MPC's use many policy instruments in order to mitigate the effects on consumers rising from fluctuations in global agriculture commodity price. Those measures helped MPC's in isolating households from price volatility and food inflation. As observed by Ortiz et al. (2011) different policy interventions (especially an extensive use of price subsides, but also measures aimed at managing and regulating food consumption, production and trade) are used by MPC's in this field.

The latest peaks in international price has consequently complicated the macroeconomic scenario, leading toward an extensive use of resource devoted to **price subsides** measures and others instruments, including **production subsidies**, **import protection cuts**, and build-up of **food reserves**, taking away fiscal resources that can be used to finance growth-enhancing investments (World Bank 2012). The effects of food price transmission are linked to both the level and the typology of policy instrument used to mitigate the transmission into the domestic market. In case of prolonged period of increasing food price fiscal, the amount of resources for covering the cost of those measures increase, generating a heavy fiscal drain on government budget and compromising the sustainability of these kind of response.

Inevitably fiscal and inflationary pressure has grown in many MPC's that are experimenting a fast growing domestic food demand and spending a relevant share of their GDP on food subsides. Some MPC's with high food import dependence and large fiscal deficit, such as Libya, Jordan, Lebanon, Egypt, Algeria, and Tunisia, appears most vulnerable to a sustained food price shock (IFPRI 2012a, b; World Bank 2009).

In countries with limited fiscal budget and high import food dependency the space for price subsides in order to keep domestic prices stable decrease hand in hand with the increase in food price. In the last years public policy expenditures in some countries, like Egypt, Tunisia and Morocco, has seen an increase arising from extending food and fuel subsidies. In parallel the fiscal deficit has grown.

11.3.2 Subsidies

Albers and Peeters (2011) analyzing the fiscal implications of increased expenditure on subsidies argue that the impact on public finances of the commodity price increases has been large by comparison with other. For Egypt, Algeria and Tunisia food subsidies as a percentage of GDP increased during 2007 and 2008 food price peak. The weight of the combination of food and fuel subsidies on total government expenditure increased dramatically in Egypt where they reached 30.9 % of current government expenditure in 2008, but also in Morocco and Tunisia where they reached 19.9 % and 17.7 % in 2008.

Food subsidies are popular, but have substantial drawbacks. Many countries in the region rely heavily on food subsidies as the primary safety net, including Egypt, Syria, and Morocco, among others. In-kind food subsidies are particularly popular and many countries have expanded these subsidies in response to the recent price shock, food subsidies absorb up to 2 % of GDP in some cases.

Subsidies have several disadvantages. First, they divert significant resources from alternative, more productive uses. Second, when they are not targeted, they are unnecessarily expensive, because most benefits are captured by the non poor. And third, in-kind food distribution systems entail heavy administrative overhead and substantial wastes due to storage losses, and they encourage corruption, waste, and leakage of food to non-human uses.

11.3.3 Logistic

Given that much of the food imported into North Africa consists of bulky cereals, a large part of the final cost is due to international and domestic transport, warehousing and storage costs. Economic and Social Commission for Western Asia argues that countries in the area, (which includes Egypt as the only North African country) tend to perform worse than other Middle Income Countries in terms of trade development indicators such as the World Bank's Logistics Performance Index. This is partly due to lack of integration of border services and inspections, lack of simplified procedures for transit freight, the poor state of railways and roads, inefficient and lengthy border clearance procedures, and lack of ability to trace and track consignments.

The Logistics Performance Index (LPI) for the North African countries included in the World Bank's sample. As evident in the report,[8] there is considerable scope for all four countries to improve their trade logistics. This is particularly true for Algeria and Libya who rank 130th and 132nd out of 155 countries and have a LPI below the average for the MPC region as a whole as well as below the average for Lower Middle Income countries (when they are Upper Middle Income) and below

[8]Trade Logistic in the Global Economy, World Bank (2012).

the East Asia Pacific region. There is a positive relationship between the LPI and food security with the latter measured by the Global Hunger Index. Hence, reforms to improve trade logistics in North Africa may well have a beneficial impact in terms of food security. Furthermore countries need to tailor their stockpiling strategies to their specific needs. Food stocks serve multiple purposes: as rapid emergency food aid in times of crisis, as working stocks for regular distribution, and as buffer stocks to stabilize domestic prices.

11.3.4 Storage

Key factors in making this assessment are national consumption, variability of domestic production (increasing with climate change), storage costs, size of the country relative to the international market, risks of production shortfalls and high prices to the poor, and thinness of international markets.

Although wheat reserve offers no protection against structural long-term price increases, they effectively serve as an insurance policy with costs and benefits that must be carefully considered. In fact, many MPC's are considering expanding their strategic reserves to be able to hold six months' to one year's worth of wheat stocks.

Despite being the largest wheat-importing region, in 2010 MPC's held only 10 % of the world's wheat stocks. Egypt is the only MPC among the top-ten wheat stock holding countries. The majority of global wheat stocks are held in wheat producing countries such as China, the United States, and India, which may indicate that it is more cost effective to hold stocks close to production. As food security concerns have grown, many MPC's governments have revisited the idea of strategic reserves and are planning to increase their level of wheat stocks. Overall storage capacity in the region is on average six months of consumption, and estimated ending stocks are four and one-half months.

The relative size of the subsidy in MPC's can be estimated by comparing their storage costs with the cost of storage in the Netherlands, South Korea, and the United States. In all three benchmark countries, the private sector manages the WISC in markets characterized by high competition.

Assuming the long-term marginal cost of storage is approximately US$2 per metric ton per month, in 2009, four MPC's fell below this international rate, suggesting either lower land, labor or capital costs or the presence of direct or indirect subsidies.

11.3.5 Fiscal Measures

On the other hand MPC's governments are responding to the recent price shock with a combination of trade policies, wage increases, and safety-net programs that will be difficult to scale back. Trade—and tax—policy changes have been a

common initial response, aimed at increasing food security and controlling consumer prices. Public-sector wages have been increased in several countries, including Jordan, Egypt, Syria, although these increases are largely intended as compensation for both higher energy and food prices. Some countries have used cash transfers to increase the purchasing power of the poor.

11.3.6 Food Security and Policy Implications in 21st Century

Programs need to be targeted to the poor because they are most affected by price shocks, spending proportionately more on staple foods. Most cash-transfer programs in the region are small, amounting to less than 1 % of GDP in most cases. Most programs use categorical targeting approaches. Households and individuals are entitled to benefits if they fall into eligible categories, such as single mother, widow, unemployed, elderly, or disabled. These categories are not limited to the poor, and do not necessarily cover the poorest sectors of the population.

Strategic wheat reserves require sound management in order to mitigate import supply and price risks effectively.

Mismanagement of strategic reserves may outweigh the benefits of maintaining wheat stocks, ultimately weakening a country's food security (Murphy 2009). To ensure a well managed reserve, each country must establish a set of guiding principles regarding when to draw down stocks and when to replenish, assuming the first-in-first-out (FIFO) principle. These guidelines must be clear and must be designed with the objective of mitigating supply and price risks, and the purchasing and selling of the wheat reserves must be done in a competitive and transparent market. In addition, to ensure that wheat is accessible when needed it is important to make sure that all stakeholders are well informed about the guidelines and that staff located both at the site of the reserves and in back offices are properly trained. Lastly, the management of wheat reserves must be adequately financed (Murphy 2009).

Three factors must be considered in establishing the guidelines for the reserves: the threshold domestic price that will trigger the drawdown of wheat reserves, the target reserve level, and the rate of reserves replenishment. A recent analysis argues (Larson et al. 2011) that selecting a higher threshold domestic price turns the reserve into more of a safety net to be used in emergency situations rather than as a tool for price stabilization; with a high threshold price, strategic reserves may not have much of an impact on domestic price volatility as long as prices remain below the threshold. The larger the targeted size of the reserve, the more costly it will be to maintain, but the more food-security coverage the reserve will provide. Lastly, a more aggressive rate of building up and replenishing the reserves is more likely to smooth domestic price volatility, as there is less chance of there being insufficient reserves. However, replenishing reserves increases demand from international markets, which may aggravate international price volatility.

The appropriate management structure of the reserve is specific to each country and should be designed to minimize costs, ensure food safety, and reduce distortive

impacts of stock policies on grain markets (Rashid and Lemma 2011). Once the strategic reserve policy is established, there may be opportunities to create public-private-partnerships (PPPs) for management.

The government could pay private operators to manage logistics and storage operations for strategic stocks or could play a more limited role, getting involved only during severe price and supply shocks.

Improve the design of safety nets to dampen the effects of food-price shocks and prevent them from doing permanent harm.

Strengthen program coordination and enhance payment mechanisms to improve resource efficiency. At the policy level, program coordination needs to be improved to reduce overlapping beneficiaries and mandates that waste resources. Implement safety nets that are flexible enough to be scaled up when shocks strike and scaled down when they recede.

This is important because scalability enables relief for the vulnerable when prices are high and a reduction in the fiscal burden when prices are low. If possible, existing targeted cash-transfer programs should be the prime candidates to be scaled up. These include poverty-focused social assistance, as well as social pensions, unemployment assistance, and disability pensions. Where public workfare is already part of the safety net, it may be useful to expand program reach. The next most desirable candidate would be food stamps or other near-cash assistance that could be targeted and scaled up or down. Direct subsidies and food distribution would be the least desirable option, only advisable when food markets are functioning poorly or when subsidies are the only available safety net.

Agricultural markets in MPC's appear nowadays still organizationally and structurally weak: the role of the policy maker is therefore one of a great responsibility.

International coordination of measures is required to prevent unilateral actions (such as export bans) aimed at promoting food security within particular areas that end up destabilizing the global food supply and increasing the size of those populations at risk from hunger and malnutrition. As recently pointed by leading scholars in agricultural economics, trade policy initiatives aimed at reducing the impacts of price increases have been a major stimulus to the increases that immediately followed. In particular, the adoption of restrictive measures exacerbated the price increase trend.

A further important topic to be taken into account is the management of risks. The large exposure of agricultural sector to risks related to natural events and the instability of the market still require a significant public intervention. As pointed by our field research, so that Poverty, Food Security and Risk Management, in MPC's lack of a solid structure to help farmers in managing risks. This in turn exposes MPC's to risks of disasters, reduction in productive potential, vulnerability and food insecurity.

An appropriate intervention strategy would be to ensure a fair functioning of markets. The incentives must drive the adoption of practices and technologies to increase yields and have less impact, as well as compensating farmers for the environmental benefits they produce. In other words, support policies should be

directed towards the stabilization of incomes rather than the market, using intelligent, flexible measures. Among them a special role needs to be played by the tools of risk management. Access to the opportunities offered by traditional devices for risk transfer to third parties, such as insurance, should also play their part.

The presentation in the previous pages has stressed the questions of how to assess the impact of economic shocks, of which price volatility may be a symptom, on food security.

Two main conclusions can be drawn at this point. The first is that data availability, in terms of both quality and coverage, is still an important limitation for our collective ability to conduct meaningful and timely analysis of relevant socio-economic phenomena such as food security. If not properly recognized, mistaken inference can be drawn. The question is that, the role of theory as a guiding principle is of fundamental importance. By making extended reference to the debate on the practice of food insecurity assessment, we hope to have demonstrated how the risk of slipping away from proper inference is always around the corner.

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Chapter 12
Market Forces and Public Regulation Influencing the Management of Safety Risk in the Fresh Produce Sector: Contrasting Morocco and Turkey

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12.1 Introduction

Compliance with pesticide maximal residue limits is the main food safety objective of fresh produce industries, at least when marketing products in Europe. Acute poisoning through the consumption of fresh fruits and vegetables may be considered a minor risk for consumer health, compared to the major risk generated by microbiological contamination in animal or fresh cut vegetable marketing chains. However, for the private sector, non-compliance with residue limits exposes businesses to legal liabilities and commercial risk, including loss of sales opportunities and potential harm to the company's reputation. These issues are particularly important for fruit and vegetable traders and modern food retailers.

Given the low public health concern, there is no rationale for a prescriptive approach in managing the risk associated with the contamination of fresh fruit and vegetables by pesticides. Switching responsibilities to private actors under governmental supervision is more acceptable than in seafood and meat industries, for instance, and is popular among rich countries. Moreover, in countries where

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consumer suspicion regarding pesticide residues is critical, which is the case in most of northern Europe, retailers tend to be proactive in managing pesticide risks and impose stringent requirements on their suppliers, such as requiring maximal residue limits which are stricter than those of governmental regulations, or imposing preventive farming practices in order to reduce the probability of contamination.

All the players in the value chain are thus involved in managing pesticide risk, beginning with the farmers who spread chemicals on crops. While cooperation is desirable in managing the risk along the entire chain, competition remains very active given the conflicting interests of the players involved at the different levels. The bottom line in these market forces is a high level of interaction (or "private regulation") among private players under the more or less active supervision of public authorities. However, this interaction may vary greatly between countries according to the level of farmers' dependence on buyers, the degree of vertical integration in the chain, the level of governmental support and the existence of public-private co-regulation.

The aim of this chapter is to draw and expand on our hypothesis of the higher role of the private sector when the commercial risk far exceeds sanitary risks. To that purpose, we analyze and compare public and private involvement in the management of pesticide risk in Morocco and Turkey. In these two Mediterranean countries, food safety control has turned into a key issue for the development of fresh produce export markets and to a lesser extent local markets (Martinez and Poole 2004). Morocco and Turkey were chosen since they offer two contrasting configurations of markets and national safety risk management systems. The tomato supply chain will serve as the case study.

We will begin by presenting the risk of contamination by pesticides in fresh produce and the different farm practices that help to mitigate risk, from the observance of the pre-harvest interval to the introduction of integrated crop management. We will then present a conceptual framework to analyze pesticide risk management at the country level. To characterize tomato production practices, we have collected first-hand data from vegetable producers and packing stations, through face-to-face surveys in Turkey (region of Antalya) and Morocco (region of Souss-Massa). In the last section, we compare the two countries, the dissemination of good agricultural practices in tomato greenhouses and their micro- and macro-determinants, highlighting the respective role of market forces, private regulation and governmental intervention.

12.2 Managing Pesticide Risk in the Fresh Produce Sector

12.2.1 Contrasting Public Health and Marketing Risks

There are different sources of health risks linked with the misuse of pesticides in agriculture. The exposure of humans to pesticides could be oral, respiratory or dermal. Occupational exposure, with the risk of acute poisoning, concerns in

particular the workers involved in the manufacturing and trading of pesticides, and the operators of application equipment. For farmers and farm workers, the risk includes the exposure to pesticide residues on crops, when picking and handling the produce. Apart from acute poisoning, another concern is the long-term exposure with non-specific chronic effects (e.g. cancer, adverse reproductive outcome), especially for farm workers that are considered as particularly vulnerable (WHO 1990).

The general population may also suffer from exposure to residues in food. The causes of food contamination include the use of pesticides not approved for target crops, incorrect mixing and higher than recommended rates of application, a harvest interval that is not respected, equipment that is faulty or not calibrated, pesticide residues in soil from previous use, and the dumping or accidental spillage of pesticides into soil or water sources (Allara et al. 2013). As the concentration of pesticides in crops tends to decrease with time, the hazard is all the greater if the crop is harvested just after spraying. For consumers, high exposure may therefore occur if contaminated food is consumed soon after harvest (WHO 1990).

Conversely, a detectable level of pesticide residues in fresh produce does not necessarily translate into a hazard to consumers. As with any food safety issue, a distinction must be made between food contamination and hazard. Moreover, governmental standards and the *Codex Alimentarius* Commission's guidelines on maximal residue limits (MRLs) include substantial margins of safety to protect consumers.

However, for food companies, the marketing risk may be critical. In certain countries such as the Netherlands, where consumers' associations undertake residue analyses and publish the results according to trade name, militant action directly threatens retailers' individual reputations (Bignebat and Codron 2006). This is more generally a concern in European countries, where consumer suspicion regarding pesticide residues has increased in recent years, following awareness campaigns from consumer interest groups and an ongoing public debate on the uncertainties surrounding the long-term effects of exposure to pesticides.

12.2.2 Farm Practices to Mitigate the Risk of Contamination

To reduce the level of hazardous residues in food, the most basic good agricultural practices are to ban the use of highly toxic pesticides, to not exceed recommended rates of application, and to observe a pre-harvest interval between application and picking. The rational use of pesticides also includes scouting for pests and diseases in order to treat only when necessary, and the recording of treatments to keep track of pesticides and improve their management over the years. Another step is the use of non-chemical products and the implementation of selected alternative preventive practices, which may be integrated into systemic approaches: integrated pest management, integrated crop management, and organic agriculture.

The integration of crop protection tactics to control all classes of pests, insects, pathogens, weeds and vertebrates on a farm is called Integrated Pest Management or IPM (Ehler 2006). According to the FAO, Integrated Pest Management is "the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment" (FAO 2009). IPM has been actively advocated by the FAO, the European Union, the USDA and the CGIAR centers. Integrated Crop Management (ICM) takes the principles of IPM further and extends it to the whole production process, looking at synergies between different cultural practices, especially when dealing with soil fertility and water management (Little and Nicholas 2009).

Because of a warm and wet microclimate, with no wind, protected vegetable production provides a favorable environment for pests and pathogens (Hanafi 2013). It is therefore traditionally strongly dependent on chemical methods. However, various alternative methods are increasingly used in greenhouses: resistant varieties, bio-disinfection, solarization, organic amendments, mulching, mechanical weeding, grafting, drainage, insect nets, microclimate management, fertirrigation and the use of natural enemies (Brismontier et al. 2009). Regarding biocontrol, an important feature in tomato production is the release of the parasitoids *Eretmocerus mundus* and *Encarsiaformosa* and the polyphagous predators *Macrolophuscaliginosus* and *Nesidiocoristenui* (Arnó et al. 2009). Today, IPM can be considered the general crop protection policy in Northern Europe. In Middle East and North African countries (MENA), it has significantly increased since the late 1990s, including Morocco (Hanafi 2013) and Turkey (Yucel et al. 2013).

The implementation of good practices by fresh vegetable producers is increasingly recognized in food chains through certifications. Private standards of good agricultural practices (GAP) include different sets of requirements related to food safety, environmental management, and social accountability. They follow the principles of quality assurance and third-party certification by external certifying bodies.

One of the most prominent of those standards is GLOBAL G.A.P. Previously referred to as Eurep GAP, the scheme covers the certification of the whole agricultural production process of the product, from farm inputs (e.g. feed or seedlings) and all farming activities until the product leaves the farm. It includes procedures for risk assessment, record keeping, product traceability, workers' health, safety and welfare, waste management, and environmental protection. The standard has been developed by the Europ-Retailers Produce Working Group, a consortium of major Northern Europe retailers (Bignebat and Codron 2006). In 2012, there were more than 100,000 certified producers worldwide, of which 74 % were in Europe. In MENA countries, Turkey comes first with 2442 farms, mostly in fresh fruits and vegetables, followed by Israel, Egypt and Morocco (Food PLUS 2012). For integrated pest management, the pre-farm gate GLOBAL G.A.P standard provides an

IPM toolbox and requires growers to implement activities related to prevention and scouting for pests and diseases.

Other relevant certifications include Assured Produce Scheme, Nurture (Tesco), Field to Fork (Marks and Spencer), and *Engagement Qualité* (Carrefour). In the processing and packing of fresh produce, they are completed by certifications for traders and manufacturers, such as BRC Global Standard, International Food Standard, Dutch HACCP, and SQF 2000.

12.3 Public and Private Regulation of Pesticide Risk

12.3.1 Public Regulation of Safety Risk

To elaborate further on the role of governments in pesticide risk management, it is first necessary to characterize the whole set of sanitary and phytosanitary risks in the fresh produce industry. A starting point is the profound differences in the issues raised by the risk of excess residues on the product, from the risk of quarantine pests detected at the border of the importing country. As developed above, the former may be considered as a minor threat to consumer health that may be fairly easily managed through performance-based regulation and good industry practices. The latter represents a major collective risk for the countries which are free of quarantine pests, with often severe sanctions imposed on all exporters in the case of detection, regardless of fault.

When the risk is low, the need for direct governmental inspection is limited and the resulting leeway for control by private actors is quite significant. With high risks and market externalities, as in the case with quarantine pests, given the prohibitive costs of excluding free-riders, there is a clear rationale for public control, both in exporting and importing countries.

In the case of pesticides, the target of European public authorities is to lower control costs, although continuing to make on their own a minimum of control without giving up their task of the definition of the standards (Bignebat and Codron 2006). In MENA countries, although public intervention may be weak in controlling the level of pesticide residues directly, the role of the State remains fundamental when defining safety rules such as the development of national MRLs. It may also be strong in other fields related to the management of food safety risks. For instance, in Turkey, the intervention of the State has been crucial in developing the infrastructures for safety control, in fostering farmers' knowledge and capacity to implement good agricultural practices and in creating the conditions for implementing traceability in supply chains. However, not all governments are as proactive as Turkey. The extent of intervention depends on the resources of government, and the economic and institutional peculiarities of the country, such as the pressure in favor of harmonization with EU food law in the case of Turkey.

12.3.2 Private Regulation of Pesticide Use

Private sector involvement in the management of pesticide risk not only depends on the leeway left by the State, but also on the motivations and constraints of the actors in the food chains. All the players are likely to play a role in managing this type of risk and influencing the dissemination of practices within vegetable farms.

Retailers who may suffer from consumer suspicion regarding pesticides often define more stringent rules than the legislation in place, while also ensuring that their suppliers respect these rules (Levidow and Bijman 2002; Fulponi 2005; Bignebat and Codron 2006). Following the Food Safety Act (1990), British retailers have implemented "Assured Food Standards" to better control farmers' practices with regard to safety concerns (Bignebat and Codron 2006). As mentioned above, GLOBAL G.A.P. has expanded in the 2000s as a response to Northern European retailers concerning safety issues. Shippers who have direct contact with farmers may be led to increase controls and sometimes to decide on behalf of producers (Hu and Hendrikse 2009; Codron et al. 2013) as soon as they deal with safety-demanding buyers (Aubert et al. 2013a). They also have to manage the diversity of food safety rules imposed by retailers.

The vertical and horizontal organization of food chains is an important macro-driver in managing pesticide risk, which is nevertheless seldom investigated in the literature. A closer coordination of farmers' and shippers' practices is obtained through backward and forward integration or, most often, by contracting. Vertical integration develops as a complement to GAP standards, which are not considered sufficient by a large number of final customers. Integration is all the higher as consumers are safety-demanding (Aubert et al. 2013a).

Horizontal coordination is a common practice at the farm level, as soon as collective marketing or sourcing is necessary to offset the small or medium size of a farm and to reduce marketing or sourcing dependence on buyers or pesticide sellers (Bijman 2007). Demand for safety does not lead to collective action, but it does contribute to significantly strengthening its mechanisms.

For intermediaries, coordination may result in collective rules and mechanisms for showing compliance. Collective conventions governing residue control have also been developed among French importers. Such conventions, which are supervised by the government and are sometimes referred to as co-regulation, allow for more flexible and less costly control (Codron et al. 2007).

There are several drivers for the management of pesticide risk, which will eventually lead to the dissemination of integrated pest management and other good agricultural practices in the fresh produce sector (Table 12.1). The choices of farmers are framed by public regulations, market opportunities and extra requirements imposed by customers to access high-value markets. Public and private regulation therefore contributes to the structure of incentives and constraints.

Furthermore, farmers are choosing production practices based on their costs and benefits, which are associated to farm-specific characteristics. The literature on the adoption of sustainable farming practices emphasizes the role of structures and

Table 12.1 Main drivers of the dissemination of good agricultural practices at the farm scale

Drivers		Potentially positive impact
Macro-drivers (country-specific)	Public regulation and policies	Implementation of compulsory rules (MRLs, traceability), support to infrastructure (e.g. laboratories), research and extension services
	Market forces	Export markets: Shippers trading with safety-demanding countries (e.g. Western Europe) Domestic markets: Modern outlets (retail chains), growing consumer income and concerns with food safety, market rewards for quality produce
	Private regulation	Private standards, vertical integration of supply chains, contract farming, collective action (e.g. marketing cooperatives, trader associations)
Micro-drivers (farm-specific)	Farm structures	Farm size, farmer education, land ownership, access to credit, technical assistance and consultants, farm environment (e.g. soil productivity, pest and disease pressure)

farmer characteristics. For example, most North American studies on integrated pest management show a positive correlation between farm size and the adoption of IPM practices (Caswell et al. 2001; Fernandez-Cornejo et al. 1998; Fuglie and Kascak 2001; Lambert et al. 2007). Other potentially positive micro-drivers include farmer education, land ownership, access to credit, technical assistance and consultants, and the bio-physical environment. These variables are proxies for the utility associated with choices for individual producers; for example a negative effect of farmer age may be interpreted as reflecting the fact that older growers have fewer incentives to invest and may eventually also be more risk-adverse.

In broad terms, all farmers in the fresh produce sector are exposed to the same macro-drivers, whereas the micro-drivers explain the heterogeneity within a country. Therefore, the mean values of farm characteristics (for example average crop specialization) are also important to understand differences between countries. We acknowledge that the divide between macro- and micro-drivers is a simplification for analytical purposes and there may be a correlation between variables, for example between (larger) farm size and vertical integration, both associated with "corporate" type farming (Aubert et al. 2013a). We nevertheless believe that this conceptual framework is fruitful to analyze pesticide risk management at the country level.

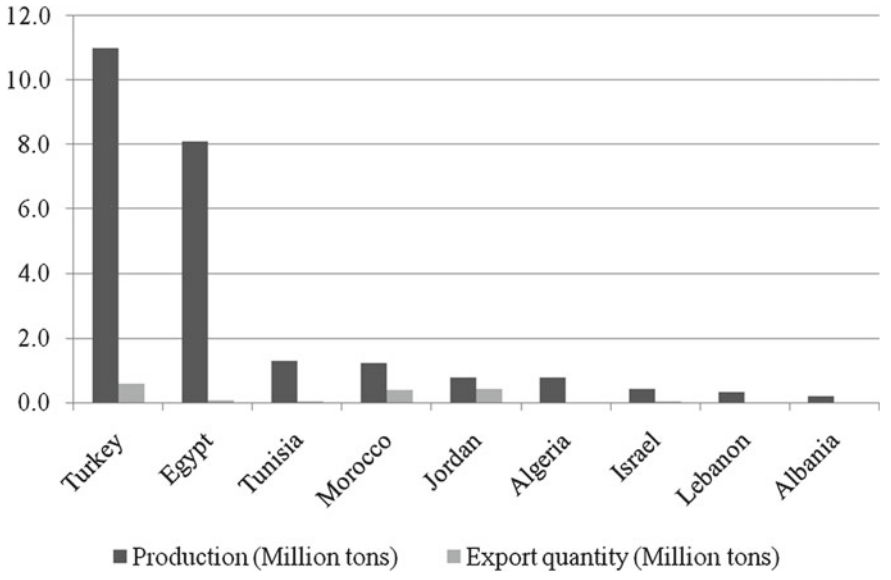
12.4 Pesticide Risk Management in Morocco and Turkey: The Case of Tomato

Turkey and Morocco are among the leading tomato production and exportation countries in the world. With regard to production, Turkey has been among the top ten growing countries worldwide since the beginning of the 1960s. During the last

decade, it climbed three places in the world ranking from 6th to 3rd place, while Morocco moved from 24th to 16th place. Within Middle East and North African countries, Turkey's production comes first in 2011, with a total of about 11 million tons (including tomatoes for processing), while Morocco's production is 3rd, after Egypt and equivalent to Tunisia with 1.2 million tons (Fig. 12.1).

Turkey is also the first tomato exporter within MENA countries, with 0.6 million tons, while Morocco comes second, equivalent to Jordan with 0.4 million tons (Source: FAOSTAT). Morocco boasts the longest experience with exports, while Turkey became a major exporter in the 1980s, reaching the same level as Morocco. Tomato is the major exported vegetable in both countries, with 64 % of tonnage exported in Morocco and 56 % in Turkey.

The two countries differ in the structure of tomato production. In Turkey, farms are typically small and family-owned, with a high degree of land fragmentation (OECD 2011). About half (48 %) the producers specialized in vegetables and flowers farm less than 2 ha, and 68 % less than 4 ha (2006 Agricultural Holding Structure Survey). Growers are producing 0.7 ha of tomato on average. Morocco has also weak farm structures and the production of open-field seasonal vegetables concerns mainly smallholders. However, there is an important early season vegetable sector, accounting for about 38 % of tomato area. In this modernized, export-oriented sector surrounding the town of Agadir, farm structures are much larger. According to a previous study conducted in the mid-2000s, the mean area of tomato



Source: FAO (2013).

Fig. 12.1 Tomato production and exports in Middle East-North Africa (2011). *Source* FAO (2013)

under protected cultivation was estimated to be around 10 ha (Chemnitz and Grethe 2005). Our own survey shows even higher figures, with 54 ha of tomato on average.

To understand the differences between Turkey and Morocco regarding the management of pesticide risk, we have conducted a series of surveys in 2011, on samples of 186 farmers in the region of Antalya, 86 farmers and 30 packing stations in the region of Souss-Massa, around the town of Agadir. The information on market characteristics and regulations comes from official databases, literature reviews, and meetings with experts and fresh produce chain stakeholders (Codron et al. 2012).

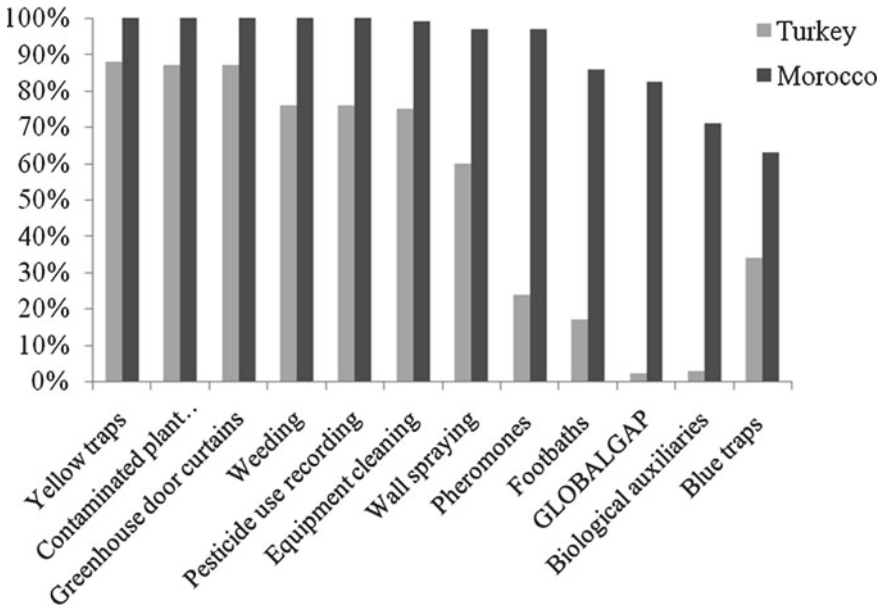
According to our conceptual framework, the main drivers of the dissemination of good agricultural practices are both country-specific (macro-drivers) and farm-specific (micro-drivers). The latter are developed in other papers (Aubert et al. 2013a, b). Hereafter, we focus on the economic and institutional factors explaining pesticide risk management in Turkey and Morocco, contrasting the two countries.

We first compare the differences in the average use of IPM and GAP certification, identified in the grower surveys. We then consider the drivers influencing the dissemination of greenhouse practices, first the market forces and private regulation—with a differentiation between foreign and domestics markets—and then the governmental regulations and policies.

12.4.1 Dissemination of Good Agricultural Practices: Results from Farm Surveys

Different types of farm practices to manage pesticide risk are considered in the surveys: (i) the monitoring of crop depredators and the recording of pesticide treatments as a rational chemical protection, (ii) IPM and related alternatives to chemical control, and (iii) integrated crop management practices, with side-effects on safety management. The list of practices has been constructed through a consultation of agronomists from Moroccan and Turkish Universities. In addition, the compliance with third-party certifications is a relevant proxy (even though somewhat biased) for the implementation of good practices related to pesticide management.

As expected, given the earlier and greater exposure of Morocco to high safety-demanding consumers, Moroccan growers in the Souss-Massa are much more advanced in pesticide risk management than growers based in the Antalya province (Fig. 12.2). The most basic IPM practices, frequent scouting for pests and diseases, compliance with pre-harvest interval, treatment recording, the use of resistant varieties, yellow traps and insect curtains for doors and openings, the elimination of contaminated plants, equipment cleaning and wall washing, have been adopted by a vast majority of growers in both countries. However, only a minority of Turkish growers are familiar with practices that are already well-established in the Souss-Massa, such as the use of pheromones, biological auxiliaries and footbaths at each



Source: Surveys in Souss-Massa and Antalya, 2011 (N=272 farmers).

Fig. 12.2 Dissemination of good agricultural practices in tomato greenhouses. *Source* Surveys in Souss-Massa and Antalya, 2011 (N = 272 farmers)

entrance of the greenhouse. Likewise, GLOBAL G.A.P. and other certifications, which are widespread in Souss-Massa, still concern only a few large-scale growers in Antalya.

In short, the management of pesticide risk is broadly disseminated in both countries, although differences remain at the level of practice adoption and the sophistication of techniques, Moroccan growers being more advanced than Turkish growers. However, although Souss-Massa producers have generally succeeded in reaching the level of their European competitors, notably in France and Spain, a potential still exists for upgrading practices, in particular with regard to the use of biological auxiliaries (29 % of farmers still do not use these), the voluntary implementation of pesticide residue control plans and the use of computers for recording treatments (Aubert et al. 2013b).

12.4.2 Market Forces and the Role of Private Regulation

The comparison of the two surveys shows that farm characteristics (size, crop specialization, family labor, manager education), the organization of supply chain (forward integration into packing) and the customers' requirements for food safety

Table 12.2 Characteristics of tomato greenhouses in the two countries

Farm characteristics		Morocco	Turkey
Sample size	N	86	186
Greenhouse size in ha	Mean	54 ha	0.7 ha
Tomato specialization (% tomato in crops)	Mean	57 %	88 %
Farms with family labor	Frequency	47 %	98 %
Farm head with university education	Frequency	37 %	15 %
Manager with university education	Frequency	76 %	2 %
Own packing plant	Frequency	34 %	2 %
Audit or certificate required by customer	Frequency	83 %	17 %
Residue control plan required by customer	Frequency	98 %	9 %
Yield of classic tomatoes (kg/m^2)	Mean	19 kg/m^2	11 kg/m^2

Source Survey in Souss-Massa and Antalya, 2011 (N = 272 farmers)

(GAP certificate, residue control plan) differ considerably between Morocco and Turkey (see Table 12.2). The average farm in Souss-Massa is of the "corporate" type, while the average farm in Antalya is of the "family" type. The greenhouse size of the former is almost one hundred times larger than that of the latter (0.7 ha).

In Souss-Massa, less than half the farms employ a member of shareholders' families in the labor force. Farm owners have a higher education and hire managers with university diplomas, which is very rare in Antalya. As a result of the large greenhouse size, many Souss-Massa farmers have diversified their greenhouse production and have integrated forward into vegetable packing. This is not the case for Antalya tomato growers, who sell on spot markets and are highly specialized in greenhouse tomato production. Finally, the performance in terms of tomato yield is significantly higher in Morocco.

The larger size and the wider resources of Moroccan producers are certainly a strength in mastering advanced IPM practices such as the release of biological auxiliaries *Eretmocerus mundus* and *Nesidiocoristenui*, or the use of pheromones to trap insects.

Moreover, Moroccan tomato growers, whose main customers are France and other EU countries, must achieve higher quality and safety standards than Turkish growers, which initially traded with countries in the Middle East and Eastern European, with less stringent standards. It is however worth noticing that, due to a change in its customer portfolio and a rise in safety requirements implemented by its main customers (Russia and new EU member states), Turkey has recently significantly upgraded the safety level of its exports.

In addition, Turkey is one of the more developed and richer countries among the MENA (Compés López et al. 2013). With a much higher GDP per capita, representing almost three times the value of Morocco, Turkey has a stronger potential for high-value domestic chains. However, although supermarkets—supported by public liberalization policies—have grown very quickly over the last decade, their share in the produce market is still low (about 20 % in Turkey, less than 10 % in Morocco).

The price difference between domestic markets adds to the price difference between foreign customers to make the Moroccan price gap (between the domestic price and the export price) wider than that observed in Turkey. Consequently, the majority of Moroccan exporters most often ignore the domestic market, while Turkish shippers increasingly tend to target both the export market and the domestic market. While Moroccan supermarkets complain about the lack of motivation of large-scale export-oriented growers to supply them, Turkish supermarkets complain about the small scale of the tomato growers and the lack of efficient marketing cooperatives. One of the major constraints for small-scale farmers is the volume marketed, as supermarkets are reluctant to negotiate small vegetable lots with a multitude of farmers. While dedicated wholesalers have developed at the initiative of some supermarket chains, the Turkish government is encouraging the development of marketing cooperatives (Lemeilleur and Codron 2011), but their market share is still very low.

Traditional retailing, which still enjoys a market share of 80 % in Turkey and more than 90 % in Morocco, is primarily supplied by intermediaries through wholesale markets and major public initiatives have been launched with a view to modernizing these wholesale markets. In Turkey, the wholesale market system aims to ensure improved price transparency and greater bargaining power for small-scale farmers while continuing to be highly regulated. However, it is often considered too rigid and inappropriate to foster technological innovation at the production level (Lemeilleur and Codron 2011). More generally, the insufficient integration and cooperation between agriculture and its customers is considered as a major threat for the Turkish food sector (Çağatay 2012).

12.4.3 Contrasting Governmental Intervention in Morocco and Turkey

Although local consumers are not yet very demanding as regards pesticide-related safety and the domestic market structure is not yet favorable to the development of good agricultural practices, the Turkish government made an early attempt to teach and disseminate basic IPM practices in the mid-90s before a decisive development was observed in public safety regulation for the domestic market during the last decade (Table 12.3). More recently, since March 2011, growers that implement Turkish GAP are eligible to a governmental subsidy of 200 TL/ha for greenhouses and 20 TL/ha for open field (Mencet et al. 2012).

Public safety regulations were initially intended to strengthen exports by upgrading safety control infrastructures and export-oriented farmers' safety capabilities. They now also decisively target the domestic market. Ambitious policy measures to improve the safety and traceability of fresh produce are implemented at all levels of the chain. Farmers are concerned, irrespective of the scale of their activity and whether or not they are export-oriented. The government plays a

Table 12.3 Drivers of good agricultural practices in the fresh produce sector

Drivers	Morocco		Turkey	
Public regulation and policies	↘	Low state intervention until recent years 2007: Food Safety Act 2011: Traceability and record-keeping rules	↗	Ongoing harmonization with EU standards
				Consistent state intervention
				1990s: Support to IPM/GAP research and dissemination
				2004: Turkish GAP regulation
				2010: New Food Law
				2011: Producer subsidy for GAP implementation
Export markets	↗	Significant share of export (33 % for tomatoes, 11 % for all vegetables)	↘	Low share of exports (5 % for tomatoes, 4 % for all vegetables)
		Western European consumers highly sensitive to pesticide residues		Less sensitive foreign consumers (e.g. Middle-East, Balkans), but some increasingly sensitive
Domestic markets	↘	Low income domestic market	↘	Medium income domestic markets
		Low sensitive consumers		Low sensitive consumers
		Predominant traditional retailing		Predominant traditional outlets, but increasing share of supermarkets
Private regulation	↗	Vertically integrated export supply chain	↘	"Hands-off" supply chain
				Ineffective wholesale market system
		GAP certification and farm pesticide control plan required by foreign customers		Lack of small farmer organization
Characteristics of vegetable farm	↗	Large holdings, modern greenhouses, educated farm managers	↘	Small-scale production, mix of traditional and modern greenhouse systems

Legend ↗ Strength for the dissemination of good agricultural practices, ↘ Weakness
Source Authors

decisive role in upgrading the safety capabilities of the entire production and distribution system. Motivations are diverse. The Turkish government has a tradition of public intervention in agriculture, with a level of domestic support, measured as a share of gross farm receipts, now exceeding the OECD average. Along with improving self-sufficiency levels and raising farmers' incomes, ensuring food safety is one of the objectives of agricultural policy in Turkey (OECD 2011). The Turkish government faces consumers with a higher standard of living than Morocco. In addition, issues of rural migration towards big cities are more acute than in Morocco.

In Morocco, whereas market mechanisms have been the key drivers behind the compliance of exports with the safety requirements of foreign customers, national regulations (in particular the 2007 Food Safety Law and the creation of ONSSA in 2009) are emerging in the wake of such external constraints, and gradually trying to adapt non-export-oriented production to international safety standards.

12.5 Conclusion

The results of country surveys show that Morocco and Turkey have contrasting economic and institutional features, framing the choices of vegetable growers in their management of pesticide-related risk. The findings confirm our initial assumption of a major role played by the private sector in managing risk, as soon as there are high economic stakes, as in export chains oriented to rich countries.

The most noteworthy finding is that when consumer markets provide powerful incentives for safety, private regulation becomes the main driver of growers' practices, whatever the initial level of public regulation. From this viewpoint, Morocco only has a very recent history of governmental intervention in pesticide regulation and can therefore be considered as a reference of *laissez-faire*. However, for all the good agricultural practices surveyed, the rate of adoption is higher in the Souss-Massa (Morocco) than in the region of Antalya (Turkey), and Moroccan greenhouse producers have more advanced practices than their Turkish counterparts.

The case of Turkey raises complementary questions. Although the scope of public and private involvement in food safety management seems highly country-specific, it may also be commodity-specific and dependent on the stage of development of the sub-sector. In that respect, the lower dissemination of good practices in Turkey may be explained by the early stage of development of the high-value produce chain in this country, fruit and vegetable farmers having not yet benefited from the momentum of the private sector, like that provided by export players in Morocco.

To go further into the analysis of public and private regulations, it will be fruitful to study other commodity chains, and as far as possible, to select Middle East and North African countries with similar features in terms of market orientation and farm structures. Another specific objective will be to better capture the effects of vertical and horizontal chain organization. It may also be interesting to consider countries characterized by an early involvement of governments in the management of pesticide risk, such as EU countries.

From a policy viewpoint, two relevant issues could be considered in further research. In Turkey, there is a need to assess the potential impact of the challenging and promising 2010 new Food Law, and to see to what extent it may influence the adoption of good agricultural practices by smallholders. In Morocco, although advanced greenhouse practices have already been adopted by most export-oriented producers, the potential for better compliance with public and private safety

standards still exists. Progress may be obtained on the side of supply chain organization, in particular by reinforcing the grower-shipper vertical coordination and developing grower marketing groups.

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Chapter 13
Conclusion

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How can societies and governments of Southern and Eastern Mediterranean countries (SEMCs) face the challenges they are confronted with in their fight against rural poverty, the promotion of rural development and the management of natural resources? How can outside actors, notably the European Union, help them in doing so? These are the two questions we want to come back to in the conclusion of this book. First, we will essentially confirm, sometimes further specify, the worrisome diagnosis presented in the introduction. We will then assess the lessons learnt regarding how public policies can respond to the challenges. And finally, we will draw implications for the neighbourhood policy of the European Union.

13.1 Diagnosis

Poverty, particularly rural poverty, remains a major problem in many countries in the region. This is particularly true for Egypt and Morocco; even in Tunisia, rural poverty has re-emerged as a major concern. Rural poverty is also an issue in Turkey. As discussed in this book, the rural poverty situations in each one of these

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four countries are very diverse. As a result, the policy dilemmas faced by public authorities are also diverse. But everywhere they are serious and difficult. In the four countries, however, a significant reduction in poverty has been achieved thanks to forceful public policies.

We pointed out that the main instrument used to alleviate poverty in many countries has been the set of food and nutrition policies. This strategic choice is justified by the fact that the budget share of food is very high among the poor, who therefore derive great benefits from consumption subsidies. At the same time, many farmers are also poor and their welfare is positively affected by high producer prices. The difference between producer and consumer prices has mainly been born by the public budget. The resulting costs have been rising, even though they have been restricted to a limited number of products, wheat in particular. These costs will continue to do so if the policy is not changed, and they are becoming unsustainable.

Yet, several signs point to a recent growing awareness of the social and political risks of neglecting rural poverty for too long, as illustrated for instance by the 'Plan Maroc Vert', adopted in Morocco in 2008, and the National Rural Development Strategy (NRDS) adopted in Turkey in 2006. It is premature to predict what the rural poverty alleviation policies of the new regimes in Egypt and Tunisia will be. Nevertheless, as discussed above, in both countries, rural poverty issues are important, albeit in two quite different contexts, and it would be very surprising if public authorities do not place high priority to solve those issues. Past efforts have admittedly been significant. Yet, they have not been sufficient to achieve satisfactory success. And, as discussed extensively in this book, they have been associated with fast growing imports of cereals, while natural resources continued to deteriorate, leading to a situation of great urgency: existing policies, although significant, fail to stem the deterioration of water, soil and biodiversity resources.

Thus, the time may have come to re-examine the intellectual foundations of past and current policies. In particular, should not public authorities consider more targeting of beneficiaries than has been attempted in the past? Admittedly, targeting only poor consumers is politically difficult under any circumstances; but the economic costs of not doing it are likely to become less and less sustainable. On the producers' side, targeting the poor would probably mean substituting direct income payments for price support and targeting those payments. Turkey has already moved in that direction with the introduction of its direct income support (DIS) program together with deficiency payments. This directly leads us to a discussion of other potential policy responses.

13.2 Needs for New, or at Least Renewed, Policy Responses

Sustainability issues are rightly a source of major concern in the region. It is well recognized that water scarcity is already acute in most countries and that the situation will worsen rapidly in the forthcoming years and decades. Other natural resources (soils and biodiversity, in particular) are also under great stress. As discussed in

Chap. 10, a specific methodology was developed to explore the question of how effective past and current policies have been in promoting sustainable agriculture, forestry and rural development in these countries, and what the recommendations for improvements would be. Factors of sustainability were first analyzed; then, relevant indicators of sustainability were identified for the four studied countries, on the basis of international experience and of a benchmarking exercise conducted in the cases of Finland and Spain. It turned out that many quantitative data for these indicators were not available. So, a policy impact analysis was finally carried out, relying mainly on qualitative data and national experts' judgements.

Two main conclusions emerge from this analysis: sustainability policies are insufficient and data limitations are so serious that, by themselves, they would prevent the design and implementation of appropriate policies.

1. Existing policies lack global coherence and proper balance. Practically all the factors to be taken into account by public policies are mentioned in policy documents and debates, but they are not given the same attention. In general, the need to maintain and enhance the existence of resources and their productive and socio-economic functions is well recognized in the studied countries. But biodiversity and cultural values are less emphasized or even neglected, their impacts being less direct and not so easily measurable. Furthermore, the consequences of poor social sustainability have been strikingly demonstrated in several SEMCs during the last few years. Poverty reduction, women's empowerment and the increase of local people's involvement are at the core of social sustainability. Without local acceptance, the likelihood to gain long-lasting success is minor. More attention, including by researchers, is needed on the local peoples' perceptions of the major problems related to current policies and institutions aiming especially at poverty reduction, a decrease in environmental degradation and increasing agricultural productivity, as well as in their consideration of the best possible policy actions. More attention must also be given to both institutional and social structures, including issues related to land ownership and legal frameworks, which have been recognized as critical for decades but for which policy action is now very urgent. In addition, the qualitative policy impact analysis carried out in the project indicates that there exist significant trade-offs and controversies between the different dimensions of sustainability. Given the multiple objectives which these trade-offs reflect, a sufficient number of different policy programs and instruments need to be initiated and implemented, which means that sustainability policies must be quite sophisticated. Finally, it is also very important to acknowledge that the full impacts of climate change are yet to be experienced and taken on board by sustainability policies.

2. Data limitations are very serious, not only for the purpose of analysis but also for policy making. Data on all major factors and challenges of sustainability are needed for comprehensive sustainability assessments. Although abundant data were found on natural resources and their productive functions, not enough

detailed data were available on biodiversity and on the quality of other resources, on land degradation, on agricultural productivity and even on poverty. More generally, times series data are not always available. In some cases the value of an indicator at a single point in time may be enough for assessing how sustainable the current state is. This is possible if a critical threshold value for the indicator is known. In many cases however, and especially if the impacts of policies are evaluated, there is an obvious need to have data from different points of time. Furthermore, regional data, which would be needed for more profound and elaborated analyses were available only in Turkey. Yet, regions differ in their characteristics, especially in large countries. The design of appropriate policies needs to take into account regional specificities. Thus, the lack of adequate regional data complicates the specification of suitable policies and decision-making. As a result, existing institutions need to be upgraded or new ones created, to ensure the collection of time-series data for relevant indicators. In addition, these data need to be directly comparable between countries and regions. The indicator selection and the procedures for data collection should be an essential part of the policy programs as early as the planning stage of policies.

International Competitiveness of agricultural value chains is also a necessity for SEMCs. Private actors have the main responsibility to enhance this competitiveness; but governments can also contribute and public policies are also critical in this domain. The role of the private sector in economic growth, competitiveness and the promotion of rural development, through employment creation, has mainly been studied through an original approach, called 'Global Value Chain Analysis' (GVCA). The focus on value chains is justified because understanding where value lies in the eyes of consumers and identifying where 'bottlenecks' exist in the chain, could spur a new line of debate over how SEMCs can tackle the question of competitiveness in their agri-food sectors, the bottlenecks often being the result of unproductive interactions among various actors, both private and public, in other words a lack of appropriate governance. This is particularly true for export sectors and it is consistent with two key premises: competition is moving away from 'between firms' to 'between value chains' and value chains cut across borders.

The specific GVCA approach used in our research, drawing heavily on the management science literature, is based on a key assumption: the value of a finished product is decided by the final consumer; thus, the value chain is defined as the activities that add value to a product from basic raw materials to the final consumer. Effective chain practices, based on inter-firm trust and a high degree of quantity and quality in information sharing between firms, create a competitive advantage that, in turn, improves organizational performance. The full approach was used to analyze the fresh orange export sector in the four studied countries although other value chains (tomatoes, dairy, sheep meat, and olives) were studied in various countries. One should note that the fresh orange export sector is quite interesting per se. Most SEMCs are concerned, the volumes traded—notably with the EU—are significant and the policy issues are often controversial.

Important policy lessons regarding this sector were learnt: Since the price of an orange is not as important to European consumers as certain quality attributes, agricultural policies that seek to drive down production costs, with little concern for what the impact on *consumer value* could be, might be doing some harm to the competitiveness of the value chain. Modernization plans in SEMCs should be put within the context of maximizing value. Driving down production costs and increasing export quantity should not be the only, perhaps even not the main, indicator of competitiveness, as is typically associated with traditional approaches. More specific and detailed recommendations are spelled out in Chap. 8.

In addition, convinced that the dynamic of technological innovation adoption by both farmers and by suppliers of inputs has become a key factor of competitiveness, special attention was given to the analysis of key technological constraints and risks associated with a specific agricultural product, in this case the citrus production sector in Tunisia. Specifically, we analyzed how the various actors in the value chain cope with clonal selection of some varieties of citrus fruits, viral sanitation and the improvement of citrus fruit varieties and rootstock, as well as with phytophagous citrus fruit mites. We investigated the introduction of methodologies to combat them. Another topic of investigation was the study of the diagnosis for citrus fruit "mal secco", including chemical measures and varietal resistance. Finally, the study of the 'tristeza' disease found in citrus fruits, and their vectors, was undertaken. The main result is that citrus fruit farmers are very willing to, and do, adopt technical progress. But sometimes the obstacles they face are hard to overcome. Thus for instance, we identified an interesting group of highly educated and highly innovative farmers, who appear highly individualistic in their behaviour. They are not involved in the collective actions necessary to fight these pests and diseases effectively. Apparently, their land holdings are too small and fragmented for them to participate in these desirable collective actions. Furthermore, the means required to fund the research and implementation of collective action aimed at providing phyto-sanitary protection would appear limited. Thus public action is called for.

Another factor of international competitiveness is the ability to respect public and private norms and standards of food safety. In this respect we specifically studied how fresh fruit and vegetable chains are organized to comply with such safety standards in the cases of tomato growers in Morocco and Turkey. The most noteworthy finding is that when consumer markets provide powerful incentives for safety, private regulation becomes the main driver of growers' practices, whatever the initial level of public regulation. From this viewpoint, Morocco has only a very recent history of governmental intervention in pesticide regulation and can therefore be considered as a reference of "laissez faire". However, for all the good agricultural practices surveyed, the rate of adoption is higher in the Souss-Massa (Morocco) than in the region of Antalya (Turkey), and Moroccan greenhouse producers have more advanced practices than their Turkish counterparts. This probably results from various causes, notably that tomato farms are much smaller in Turkey than in the Souss region of Morocco, which has a longer history of developing a high-value produce chain, with a significant role played by foreign

investors. All of this probably explains why, in the Turkish case, the public sector plays a more critical role in pesticide residue rules than in Morocco.

Trade liberalization policies are quite controversial in the Mediterranean region. The debates on this topic have even too often been counterproductive, as they distracted attention from more fundamental issues, such as those discussed above. In our research and in this book, we built on results from past research,[1] indicating that the economic stakes in Europe of liberalized imports of olive oil and fruits and vegetables coming from the SEMCs would not be huge; they should be manageable and they are not commensurate with the long standing political opposition to Euro-Med agricultural trade liberalization, manifested again for instance recently in the European Parliament at the time of the ratification of the last trade agreement with Morocco.

As discussed in Chap. 7, we focussed our main attention on two issues: an assessment of this last agreement with Morocco and an in-depth review of Non-Tariff Measures (NTMs).

In general terms, the results on the impact of the trade agreement between Morocco and the EU show that trade liberalization, including the removal of entry prices for Morocco, would substantially boost its exports of tomatoes and cucumbers, the two vegetables we studied most closely. These are the cases where the effect of the minimum entry price seems most protective. Yet the impact on the domestic European market would be very modest. For other products, eliminating the entry price for Morocco would not affect domestic prices in the EU to a significant extent. Moreover, our results indicate that trade liberalization in EU markets would not result in dramatic price and sale changes for EU producers, in spite of the result that extra-EU import flows could rise significantly. Thus we confirm in this case that the marginal impact of trade liberalization does not provoke substantial trade impact, which is consistent with past research mentioned earlier. This does not mean the absence of problems in the value chain for exporters and farmers. Pressures on prices at the producer level are in many cases related to the lack of transparency, lack of organization and asymmetric information among the different agents in the value chain. Very often, market pressures are attributed to foreign competition when the source of problems may perfectly be related with weak functioning of the value chains, including lack of coordination and collaboration among actors, and fragmentation of producers' organisations.

As already indicated, a comprehensive study of the extent to which NTMs affect the agri-food sector in SEMCs has been carried out. In addition to an inventory of NTMs, an assessment of their impact, with a focus on the extent to which the alert system in the EU is motivated by disguised protectionism, was done. The analysis confirmed that, in general, the sanitary and phytosanitary rules applied by the EU are not used as unfair barriers to the access of these goods. Besides, we even tested

[1]See in particular two research projects (EUMED AGPOL and MEDFROL) supported by the EU within the 6th Framework Program (FP6), and in which a number of authors of this book were involved.

the hypothesis that there might be a "reputation effect" in the implementation of NTMs by European countries, i.e. that rejections of shipments are positively correlated to the past history of rejections, presumably reflecting the perception that there are real chronic phytosanitary problems in some countries. We did indeed find evidence of such a correlation. Yet, econometric tests suggest that the fruit and vegetable exports to the EU and shipments from the Mediterranean region are not particularly discriminated. Notifications are not specially activated by an import surge, which indicates weak links between the functioning of the alert system and import volumes. So, implementation of NTMs by the EU does not discriminate along the level of economic development, which suggests that it rather depends on the integration of agri-exporting firms in the global value chains.

13.3 Implications for the EU Neighbourhood Policy

The implications of these results for the European Neighbourhood policy in the Mediterranean region are important. Given the magnitude of the poverty challenge discussed above and drawing on the results discussed above, it is clear that trade liberalization alone will not be sufficient to alleviate the urgent need for new jobs for rural youth in SEMCs, which in general lack infrastructure, education, sanitation, human rights and peace. Yet since the first Barcelona conference in 1995 at least, trade liberalization has been the backbone of the European Mediterranean policy. The main objective then was the establishment of a Mediterranean free trade area, to be achieved in 2010. Today, we are far away from that lofty objective, which is widely seen as having been utopian. Yet, trade liberalization continues to be at the heart of what is now called the 'Neighbourhood Policy', since the so-called 'Deep and Comprehensive Free Trade Agreements' are the main instrument of association with, and reward to, partner countries well engaged in the process of "economic integration and democratic reforms". The results of our research as presented in this book challenge this primacy given to trade liberalization.

Trade liberalization in, and with, SEMCs will take a long time and may never be complete. The EU Neighbourhood Policy in the Mediterranean region must shift its main focus to increased development aid and partnership, enhanced sustainability of agricultural and rural systems, support to civil society, and an immigration policy with a medium-term perspective. Accordingly, in the field of agriculture and rural development, the ENPARD initiative is welcome, given the meager real attention given to the rural sector in past cooperation programs. But the promotion of rural development is very difficult everywhere in the world. The Terms of Reference of our research did not include the study of the mechanisms involved and conditions for success of such efforts. But several remarks can be made at this stage: the monitoring and evaluation of ENPARD projects will be very important in order to draw effectively the lessons, both positive and negative, from these experiences. Similarly, important lessons can be learnt from LEADER projects in Europe. Current efforts to support cooperation among civil society organizations, notably

farmer organizations, seem encouraging. Here again lessons identifying best practices need to be learnt. In addition, there is a huge scope for closer collaboration in the field of agricultural research and education, with some known good practices, notably in CIHEAM or in many programs, such as Tempus for instance.

Finally, much more could be done by the private sector, particularly in terms of Foreign Direct Investments (FDI), and adaptation to public and private norms to be respected for accessing the European market. Here, there are enough successful experiences to be optimistic, since the conditions for success are known.

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