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.

M. Petit (✉)
Mediterranean Agronomic Institute of Montpellier (CIHEAM-IAM.M), Montpellier, France
e-mail: petit@iamm.fr

M. Petit et al. (eds.), *Sustainable Agricultural Development*,
Cooperative Management, DOI 10.1007/978-3-319-17813-4_1

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.

References

Abis, S. (2012a). Logistique et sécurité alimentaire en Méditerranée. *Food security in the Mediterranean* (pp. 110–129). Fondation de Malte: La Valette (Malte).

Abis, S. (2012b). *Pour le futur de la Méditerranée : l'agriculture* (150 p). Paris (France): L'Harmattan. (Bibliothèque de l'IREMMO).

Belghazi, S. (2013). *Scenarios for the agricultural sector in the Southern and Eastern Mediterranean* (37 p). MEDPRO Report No. 4, March 2013. http://www.ceps.eu/ceps/dld/7814/pdf.

Benoît, G. (dir.), Comeau, A. (dir.), Chabason, L. (2005). *Méditerranée : les perspectives du Plan Bleu sur l'environnement et le développement* (427 p). La Tour d'Aigues (France): Editions de l'Aube. (Monde en Cours).

Bessaoud, O. (2013). Aux origines paysannes et rurales des bouleversements politiques en Afrique du Nord : l'exception algérienne (No. 215, pp. 9–30). *Maghreb Machrek*. April 01 2013. http://www.cairn.info/resume.php?ID_ARTICLE=MACHR_215_0009.

Bessaoud, O., Montaigne, E. (2009). Quelles réponses au mal-développement agricole ? Analyse des politiques agricoles et rurales passées et présentes. In S. Abis, P. Blanc, F. Lerin, M. Mezouaghi (Coords.). *Perspectives des politiques agricoles en Afrique du Nord* (pp. 51–91). Paris (France): CIHEAM/AFD. (Options Méditerranéennes : Série B. Etudes et Recherches). http://om.ciheam.org/om/pdf/b64/00801109.pdf.

Blinda, M., Thivet, G. (2009). Ressources et demandes en eau en Méditerranée : situation et perspectives. In *Sécheresse* (Vol. 20, No. 1, pp. 9–16). January 01 2009. http://www.jle.com/e-docs/00/04/49/C6/telecharger.phtml?code_langue=fr&format=application/pdf&titre=Version%20PDF.

Bourgeois, L., Cheriet, F., Rastoin, J.-L., Boualam, F. (collab.). (2012). *Pour une politique agricole et agroalimentaire euro-méditerranéenne* (86 p). Paris (France): IPEMed. (Construire la Méditerranée).

CEPF. (2010). *Mediterranean basin biodiversity hotspot* (251 p). Arlington (Etats-Unis): Critical Ecosystem Partnership Fund. http://www.cepf.net/where_we_work/regions/europe_central_asia/mediterranean/EcosystemProfile/Pages/default.aspx.

Cheriet, F. (2013). Prospectives céréalières en Méditerranée : scénarios à l'horizon 2030. *Economie rurale* (No. 335, pp. 53–67). May 01 2013.

Cheriet, F., Rastoin, J.-L., Mohavedi, N. (2009). *Partenariats stratégiques pour la sécurité alimentaire en Méditerranée (PSAM)* (84 p., 57 p., 58 p.) Paris (France): IPEMed. (Construire la Méditerranée). http://www.ipemed.coop/fr/-r17/collection-construire-la-mediterranee-c49/partenariats-strategiques-pour-la-securite-alimentaire-en-mediterranee-psam-a1395.html.

CIHEAM. (2012). Actes de la 9ème réunion des ministres de l'agriculture, de l'alimentation et de la pêche des pays membres du CIHEAM. In *Proceeding of the 9th meeting of the ministers of agriculture, food and fisheries of CIHEAM's member countries* (154, p. 9). Paris (France): CIHEAM. Réunion des Ministres de l'Agriculture des Etats Membres du CIHEAM, La Valette (Malte). September 27 2012. http://www.ciheam.org/images/CIHEAM/PDFs/Cooperation/9rmc-actes.pdf.

Cuttelod, A., García, N., Abdul Malak, D., Temple, H., Katariya, V. (2008). *The Mediterranean: A biodiversity hotspot under threat* (14 p). Gland (Suisse): IUCN. http://cmsdata.iucn.org/downloads/the_mediterranean_a_biodiversity_hotspot_under_threat.pdf.

De Franchis, L., Ibanez, F. (carto.), Benoit, G. (dir.). (2003). *Les menaces sur les sols dans les pays méditerranéens : étude bibliographique* (70 p). Sophia Antipolis (France): Plan Bleu. (Les Cahiers du Plan Bleu; n. 2). http://planbleu.org/sites/default/files/publications/cahiers2_sols_fr.pdf.

Gradus, Y., Lipshitz, G. (Eds). (1996). *The mosaic of Israeli geography* (516 p). Beer-Sheva (Israël): Ben-Gurion University of the Negev Press.

Hervieu, B. (dir.), Abis, S. (coord.), Blanc, P. (coord.), de Jouvenel, H. (collab.), CIHEAM. (2008). *Mediterra 2008: The future of agriculture and food in mediterranean countries* (356 p). Paris (France): Presses de Sciences Po. (Mediterra). http://www.ciheam.org/index.php/fr/publications/mediterra-le-rapport-officiel-du-ciheam/mediterra-2008.

Keys, A. B., Keys, M. (1975). *How to eat well and stay well the Mediterranean way* (488 p). Garden city N.Y. (Etats-Unis): Doubleday.

Lerin, F., Lemeilleur, S., Petit, M. (2009). Volatilité des prix internationaux agricoles et alimentaires et libéralisation en Afrique du Nord. In P. Blanc, F. Lerin, S. Abis, M. Mezouaghi (coords.). *Perspectives des politiques agricoles en Afrique du Nord* (pp. 9–49). Paris: CIHEAM/AFD. (Options Méditerranéennes : Série B. Etudes et Recherches; n. 64). http://om.ciheam.org/om/pdf/b64/00801108.pdf.

Malorgio, G., Solaroli, L. (2012). Policies and regulations in the mediterranean: Complementarity and coherence. In F. Mombiela (dir.), S. Abis (dir.), CIHEAM. *Mediterra 2012: The mediterranean diet for sustainable regional development* (pp. 443–464). Paris (France): Presses de Sciences Po. Chapter 21, Part 8: Public policies and measures. http://www.ciheam.org/images/CIHEAM/PDFs/Publications/Mediterra/2012/vo/en/Mediterra_2012_CHAP_21_WEB_EN.pdf.

Médail, F., Quézel, P. (1997). Hot-spots analysis for conservation of plant biodiversity in the Mediterranean Basin. In *Annals of the Missouri Botanical Garden* (Vol. 84, no. 1, pp. 112–127). http://www.jstor.org/stable/2399957.

Mombiela, F. (dir.), Abis, S. (dir.), CIHEAM. (2012). *Mediterra 2012: The Mediterranean diet for sustainable regional development* (500 p). Paris (France): Presses de Sciences Po. (Mediterra). http://www.ciheam.org/index.php/en/publications/mediterra-2012.

Paillard, S., Treyer, S., Dorin, B. (2010). *Agrimonde : scénarios et défis pour nourrir le monde en 2050* (295 p). Versailles (France): Editions Quae. (Matière à décider).

Palma, G., Padilla, M. (2012). The "mediterraneisation" of food fashions in the world. In F. Mombiela (dir.), S. Abis (dir.), CIHEAM. *Mediterra 2012: The Mediterranean diet for sustainable regional development* (pp. 133–151). Paris (France): Presses de Sciences Po. (Mediterra). Chapter 6, Part 2: Food and sociocultural dynamics. http://www.ciheam.org/images/CIHEAM/PDFs/Publications/Mediterra/2012/vo/en/Mediterra_2012_CHAP_6_WEB_EN.pdf.

Roose, E., De Noni, G., Lamachère, J.-M. (1998). *Spécial érosion* (41 p). Montpellier (France): ORSTOM. (ORSTOM Actualités; n. 56). http://horizon.documentation.ird.fr/exl-doc/pleins_textes/pleins_textes_7/b_fdi_51-52/010015610.pdf.

UNDP. (2010). *Human Development Report 2010* (229 p). New York (Etats-Unis): United Nations Development Programme. http://hdr.undp.org/en/content/human-development-report-2010.