The Effects of Climate Change on Food Security in the Mediterranean Region

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Background

Issues We Can No Longer Ignore

For some years now, the issue of climate change, its consequences and the means of adapting to it have been the focus of international concern, not only on the political and scientific levels, but also and above all in public opinion. In addition, it would seem that the effects of climate change will probably make themselves felt earlier than believed, and with greater intensity in certain regions of the planet. The rise in average temperatures, the modification of rainfall regimes, the thawing of glaciers, the rise in sea level… these are but some of the issues we can no longer ignore.
The estimated acceleration of climate change over the next few years, combined with the growth of world population and revenues, threatens world food security, already particularly fragile. First of all because agriculture is highly vulnerable to climate change: high temperatures and carbon dioxide (CO_2) concentrations can cause changes in precipitation, affect agricultural and forestry systems, reduce crop yield and lead to the spread of weeds, infection and disease. Moreover, climate change also has an impact on animal husbandry because higher temperatures raise the risks of the spread of epizootics and emerging diseases. These changes will have more or less severe impacts on all components of food security (production, availability and quality of foods, animal health, stability of food supplies, access to food and consumption). Hence, the decrease in yield of certain produce and the decrease in production could lead to a rise in staple food prices while causing additional threats of malnutrition.
Whereas human responsibility in this climate imbalance has been emphasised, the impact of climate change will affect territories in a highly disparate and unequal manner. Indeed, though the countries of the Southern Hemisphere are not the main producers of greenhouse gas emissions (GGE), it seems that they are the ones that will be most affected through the decline of soil performance and higher frequency of extreme climatic events (floods and droughts). Consequently, many developing countries, in particular in Africa, could see their dependence on food imports rise. The problem becomes even more complex when we consider that agricultural production needs to increase by 70% by 2050 to feed the 9 billion people there will be in the world (2 billion more than today) and that 80% of the Earth's inhabitants will be city dwellers. For instance, according to the Food and Agriculture Organization (FAO), the annual cereal production should increase by nearly one billion tonnes and the production of meat by 200 million tonnes, 72% of which will be consumed in developing countries.

Age-Old Constraints

In the Mediterranean Basin, climate constraints, water stress and land tenure limitations have always been present. Mediterranean agricultural systems have often had to demonstrate ingenuity to overcome these numerous difficulties. Today, this capacity for relative resilience is being put to the test as never before because, due to its geographical location, the Mediterranean region is one of the world's most vulnerable to climate change. The fall in precipitation levels and the rise in temperatures could be greater than those estimated as a world average, with consequences for many socio-economic activities, in particular agriculture. According to a study by IDDRI-CIRED (2009),

the average temperature rise in the region is likely to reach between 2° and 6.5°C by the end of the century, with major infra-regional differences. Add to that a reduction of average regional precipitation, ranging from -4% in north-shore countries to -27% in southern ones, leading to a heightened risk of summer drought: analyses predict that by the 2080-2099 horizon, nearly one of every two years will be "dry."

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Evolution of temperatures, precipitation and sea level during the forthcoming century will probably result in a complex chain of physical impacts, both gradual and isolated: increased frequency of heat waves as well as wind storms, flooding, droughts, landslides, soil and aquifer salinisation, etc. This will have consequences on the resources available in the Mediterranean Region – ecosystems, water, soils and land – affecting some key sectors of the Mediterranean economy such as agriculture, tourism, industry and energy.
Hence, the issue of adaptation to climate change seems an essential factor if we wish to rise to the multiple agricultural, food and socio-economic challenges on the horizon.

The Imperatives for Agriculture in the Mediterranean Basin

Main Challenges

Water is the most threatened resource in this region, which is the most arid part of the world. According to World Bank forecasts (2009), availability of water per inhabitant will decrease by half by 2050, even without taking climate variability into account. Population growth, industrial development, urbanisation and the emergence of new economic sectors have contributed to heightening the water problem in the Mediterranean Basin. The intensification of water stress constitutes a major challenge because water in the Mediterranean serves for the most part to produce food and therefore to feed the population. The combined effects of aggravated water shortage and heightened climate variability are a real threat for the agricultural sector, which consumes 85% of water resources in the region. In addition, there is a strategic association in the region between rain and harvests, production and global economic growth. For instance, record cereal harvests during the last season in the Maghreb (2008-09) were essentially due to abundant precipitation and allowed a reduction of the country's food dependence. Hence, we can reconsider the mobilisation of water for agricultural purposes but we cannot drastically diminish the amounts allotted.
At the same time, land tenure pressure is being felt with the increased recurrence of drought, progressive desertification, heightened risk of fires, the shrinking of areas of arable land and so forth. Erosion and soil pollution is on the rise while salinisation is spreading. Deterioration of land and fragmentation and impoverishment of habitats are taking place everywhere under the pressure of urbanization. These phenomena can lead to the progressive loss of soil productivity or even the disappearance of plant cover, threatening biodiversity in the region. More responsible soil management thus constitutes one of the primary factors for ensuring the continued existence of agricultural productive systems.
A great number of uncertainties remain concerning the effects of climate change on agriculture. But we know that, in a climate change scenario, by 2050, the combination of these elements in the region could cause a sharp decline in yields of staple crops such as wheat, maize and rice, among others, as well as shifting optimal production zones for certain crops. The calorie availability should also decrease in the region, affecting efforts to prevent or alleviate child malnutrition. Indeed, IFPRI (2009) estimates that there will be 2 million children suffering from malnutrition in the North Africa–Middle East Region by 2050, which is 1 million less than today, but still 1 million more than in a scenario without climate change. By the same token, the security and quality of foodstuffs are threatened by hygiene risks, effects on animal health and the propagation of disease. New imperatives with regard to logistics will also emerge: packaging and storage of products, the cold chain and forms of distribution are some of

REPORT OF THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE ON CLIMATE CHANGE AND THE MEDITERRANEAN REGION: ENVIRONMENTAL AND ENERGY CHALLENGES

On 17 January 2008, the Bureau of the European Economic and Social Committee (EESC) requested the Section for External Relations to draw up an informative report on the topic of climate change and the Mediterranean Basin.

On 15 September 2009, the working group – composed of the Economic and Social Councils of Spain, Greece, Algeria, Tunisia, Lebanon and Palestine, the National Economy and Labour Council of Italy, the Delegations of Civil Society Representatives of Egypt and Jordan, respectively, as well as the Turkish Delegation of the EU-Turkey Joint Consultative Committee – submitted a report on the effects of climate change in the Mediterranean Region. This report does not provide grounds for optimism. Indeed, it describes a fragile ecosystem under environmental threats of human and natural origins: constant increase in CO_2 emissions, rise in sea level, drought and desertification. Agriculture is particularly vulnerable, because its production fluctuates according to meteorological and climatic phenomena whose intensity is expected to increase, entailing a dramatic drop in yields. It is therefore indispensable to protect agriculture throughout the Mediterranean Basin in order to ensure food security. Forest ecosystems are also in danger, and their loss would represent losing the benefits of their role as absorbers of CO_2 and their role in preventing soil erosion.

Climate change could affect numerous sectors. In the first place, tourism is likely to suffer a change of destinations to areas with cooler weather. The sphere of health is likewise to be affected, with a rise in infectious disease and death rates due to thermal stress. And finally, biodiversity in the Mediterranean Sea, which is already relatively poor, will be even more endangered.

The representatives of the Economic and Social Councils thus insisted on the need to include the struggle against climate change in numerous spheres of public policy (environmental policies, agriculture, health, tourism) and to respect the principle of "shared but differentiated responsibilities."

It is therefore indispensable, in order to avoid these dramatic events, to develop European resources in renewable energy. The Mediterranean Region, due to its geographic characteristics, has an enormous development potential that cannot be ignored, though this will require significant investment at times. Wind energy, solar photovoltaic energy (solar radiation) and solar thermodynamic energy (heat) should be fostered in particular. These types of renewable energy present significant challenges: though wind energy is the leading source of renewable energy in Europe, photovoltaic energy is still too dependant on tariffs and subsidies, whereas thermodynamic energy requires considerable amounts of water for its development, which poses a problem in the Mediterranean Region where water is scarce.

The role of civil society in climate change matters should be fostered. The current priority is to alert civil society of the consequences that climate change could have if appropriate policies are not applied as soon as possible. The Economic and Social Committee calls upon the Member States of the Union for the Mediterranean to adopt common objectives and engagements inciting change in current development models.

For further information:
EESC Report:
www.eesc.europa.eu/sections/rex/euromed/events/2009-10-18-Alexandrie/rapport%20CESE/REX%20254%20A_CES682-2009_FIN_RI_en.doc

the parameters that will have to be studied with a view to adapting them to climate change.

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The accentuation of such pressure, in particular in South Mediterranean Countries, will make living conditions in rural areas even harder for already vulnerable populations. Apart from this social dimension, the impacts will also be of an economic order, since increasing environmental degradation weighs upon the GDP of Mediterranean countries. Agricultural production and food security are the essential domains through which climate change can also stop human development or cause a reverse trend, thus detracting from the quality of life for populations.

In sum, there is no doubt that agriculture will be one of the activity sectors most severely affected by the ensemble of climate change effects in the region. Limitation of available land, reduction of water availability, deterioration of ecosystems and displacement of populations constitute determining variables for the complex future taking shape in the Mediterranean Region, where risks associated with food insecurity are likely to increase, according to the different forecasts effected. The difference between resources and demographic demand could quickly become explosive in the forthcoming years.

Adapting Agriculture to Reduce the Risks of Food Insecurity

To meet the need to feed a growing population in a context of climate change, the main challenge of

the agricultural sector will be to significantly increase agricultural productivity while improving use of land and water resources (improving quality, availability and efficiency). It will also have to make efforts to protect ecosystems and thus render this increased agricultural productivity ecologically sustainable. In this regard, strategies for adapting agriculture would include deployment of known but little-used practices (such as, for instance, sowing by injection of seeds into the soil); the use of crops capable of withstanding climate shocks; the diversification of means of subsistence among rural populations; or improved management of forests and fisheries.

Seeking food quality should also be a priority in political responses to climate change. With the increase in saturated lipid and sugar levels in food intake, obesity problems are spreading everywhere throughout the region and the Mediterranean Diet is in retreat. Apart from the health and policy problems it increasingly entails, this dynamic questions the forms of responsible consumption to be encouraged. Consuming locally, consuming Mediterranean produce, consuming with an awareness of the environmental dimension of one's diet such that everyone participates on a daily level in the adaptation to growing climate constraints can make all the difference. For these are no small gestures if there are several million of us making them. Hence, the first step towards adapting to climate pressure could well be to modify one's own diet in order to return to the basics of the Mediterranean Diet….

All of this will require strong public investment for the implementation of research and development policies and programmes. Other steps would be to improve awareness-raising efforts, encourage data collection shared among countries and build knowledge transfer networks in different fields. In many Mediterranean countries adapting agriculture to climate change has become a priority and the Authorities have already begun to consider national and regional policies for such adaptation. In Spain and Italy, as well as in Morocco and Egypt, climate change adaptation plans have been included among national agricultural strategies. In Europe, the European Commission published a White Paper on Adapting to Climate Change in April of 2009. Three months later, the Directorate General for Agriculture (DG Agriculture) also proposed a working paper on the role of agriculture in attenuating climate change through the reduction of greenhouse gas emissions.

Within the framework of CIHEAM, the agriculture ministers of thirteen of its member States met in Istanbul, at the Turkish Authorities' invitation, on 8 March 2010, to deal with the effects of climate change on food security in the Mediterranean and the adaptation measures to be taken in this regard.

The Need for Multilateral Cooperation

The present issues and emerging challenges are so great and so complex that it would be illusory to believe that only coastal States can take them up and respond effectively. Regional Mediterranean cooperation is required to ensure the human security of populations in particular insofar as adaptation to rising climate stress. With climate change affecting the everyday lives of each individual and agriculture still representing the main profession of a third of the inhabitants of North Africa and the Middle East, adaptation to climate change constitutes the strategic basis for all regional stability and development projects and can bring together the Mediterranean countries.

This need can prove costly, but it is certainly vital for simultaneously attenuating food instability in the region, contributing to the preservation of ecosystems and biodiversity in the Mediterranean and participating in the economic and social development of regional territories that are still rural and agricultural, although these inland areas are at times hidden behind a globalised urban coast where adaptation to climate change must also be undertaken.

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