CIHEAM
Centre International de Hautes Études Agronomiques Méditerranéennes

CIHEAM analytic note

N°15 – July 2006

Responsible and sustainable development in the Mediterranean

Bertrand Hervieu
Secretary General of CIHEAM

Roberto Capone
Principal Administrator of CIHEAM

Sébastien Abis
Project Manager CIHEAM

Responsible and Sustainable Development in the Mediterranean Region[1]

Bertrand Hervieu
Secretary General of CIHEAM

Roberto Capone
Principal Administrator of CIHEAM

Sébastien Abis
Project Manager at CIHEAM

Introduction

An ecoregion at the crossroads of three continents, the Mediterranean Basin has many different associations in the minds and experience of its populations, who rejoice in the wealth of its natural resources and the diversity of its scenery. Its natural assets no doubt explain why it is so often referred to in sentimental and emotional terms.

Unfortunately regional development over many years has been slowly eating into this natural and environmental capital. The development process, involving population growth, industrialisation, urbanisation and (often unplanned) land-use schemes, seems to be gathering pace and becoming more intensive. The region is already vulnerable and is being made more so by human activity, frequently pursued at the expense of the environment. The situation is so serious that further pressure on the region is likely to be unsustainable.

This note has a threefold objective. The first part of our analysis consists in assessing the present situation of natural resources and the future outlook. This assessment is followed by a very close examination of the water question, bearing in mind that water is essential for life and work in the Mediterranean Basin. Lastly we set out to show the extent to which the environment has become a major geopolitical issue in the region. As far as possible, challenges posed to the rural world by environment and development issues will also be addressed in the course of this analysis.

This review – necessarily incomplete – will finally lead us towards the new task that beckons and mobilises us: that of making the Mediterranean Region a world pioneer in sustainable development.

[1] This analytical note is taken from the 2006 report "*Panorama stratégique et prospectif de la situation agricole et agro-alimentaire en Méditerranée",* produced by CIHEAM's General Secretariat (under the direction of Bertrand Hervieu and the responsibility of Sébastien Abis) for the French Ministry of Agriculture and Fisheries as part of the annual work programme of the Council for European and International Food and Agriculture Forecasting (COPEIAA). The research accordingly received funding from the French Ministry of Agriculture and Fisheries (Direction des politiques économique et internationale - reference MAP.06.G6.02.01)

1. Situation and outlook for Mediterranean natural resources

1.1 Climate change

In 2001, an important study[2] confirmed that the greenhouse effect had substantially increased since the nineteenth century, producing a 0.8°C rise in the temperature of the planet. According to its projections the rate of warming was likely to increase and temperatures could rise by between 1.4 and 5.8°C by 2100. There is no question that the phenomenon poses a grave threat to the planet. Its impact is already being felt and will in all probability become more and more pronounced in the years to come. It is therefore highly likely that extreme weather conditions - severe summer drought, long heat waves, regular flooding and major change in rainfall patterns – will become increasingly widespread. These conditions are already common in the Mediterranean Region and are likely to become particularly severe there, given that the region is seriously affected by climate change. Moreover some scientists say that the hot dry climate of countries on the Mediterranean rim is likely to move further to the north of Europe[3].

Among the principal causes of climate disturbance are greenhouse gas (GHG) emissions, whose volume increased by 15% worldwide between 1990 and 2005. This increase is of particular concern to the Mediterranean Basin[4], where annual per capita GHG emissions are reckoned to be 5.4 tonnes, compared with a world average of just four tonnes. Nevertheless, an inhabitant of the Mediterranean Region produces just over half as much as a European and just over a quarter as much as an American. The northern Mediterranean countries account for 70% of total CO_2 emissions, which amount to 1,900 million tonnes annually (8% of global emissions). If the current trend continues, they could reach 3,300 million tonnes by 2025, with GHG emissions expected to soar in some countries, notably Malta (+300%), Turkey (+262%), Lebanon (+138%), Algeria and Tunisia (+135%). It should be noted here that all EU member states in the region and some countries on the southern shore (Algeria, Egypt, Israel, Jordan, Morocco and Tunisia) have ratified the Kyoto Protocol[5]. This is not the place for a detailed account of climate change, but it must be emphasised that atmospheric pollution is linked to industrial activity, transport and also to agriculture, although the latter absorbs some of the pollutant gas (carbon dioxide) through photosynthesis.

Changes in temperature are due in part to variations in the surface temperature of the sea. Studies of the Mediterranean carried out in Italy by ENEA (*Ente per le Nuove tecnologie, l'Energia e l'Ambiente*) using satellite techniques[6] identified variations in sea warming over the summer of 2003 together with their geographical and temporal distribution. Changes in the surface temperature of the sea are a good indicator of climate change and prolonged warming of the sea's surface to a significant degree would obviously influence climate in coastal regions. Some of the findings of the study should be highlighted:

- Between 1985 and 1991, annual variations in maximum temperature increased, whereas the minimum temperature remained constant at around 19.3°C.
- Between 1992 and 2002, leaving aside the relatively high values recorded between 1994 and 1995, the surface temperature of the sea rose steadily by around 1°C (0.1°C every year).

Moreover, with the expected increase in CO_2 emissions in the decades to come (due to the twofold impact of the population explosion and the increased use of energy resources), the temperature of the Mediterranean could rise by 5°C by 2070. The areas to be worst hit by this rise in temperature would be Northern Italy, Spain and all countries on the southern shore[7].

---

[2] Report by the Intergovernmental Panel on Climate Change (IPCC), « *Climate change 2001* », 3rd Assessment Report, published in 2001.
[3] See Sonia Seneviratne, "*Land: atmosphere coupling and climate change in Europe*", in Nature, volume 443, no 7108, pp. 205-209, 14 September 2006.
[4] Figures given here are taken from the Blue Plan report "A sustainable future for the Mediterranean*, the Blue Plan's Environment and Development outlook*", Earthscan, October 2005, with data provided by the Observatoire Méditerranéen de l'Energie (OME).
[5] The Kyoto Protocol is the most important arm in the fight against climate change. It represents a commitment by most industrialised countries to reduce emissions of certain greenhouse gases, which are responsible for global warming, by an average of 5%. The Kyoto Protocol entered into force in November 2005, when it was ratified by 156 states.
[6] Drawing notably on the work of the Med-Clivar programme (Mediterranean Climate Variability and Predictability).
[7] Work by the International Panel on Climate Change (IPCC), "Special Report of IPCC Working Group III. Emissions Scenarios", Geneva, 2000.

1.2 Biodiversity

The specific geographical features of the Mediterranean Basin (climates, soils, landscapes, coastlines, etc.) help make it one of the world's richest and most extraordinary regions in terms of biodiversity. Ten per cent of all plant species are to be found there in a habitat covering just 1.6% of the world's land mass. There is also great animal and marine diversity: the Mediterranean is an important corridor for migration and has more than 500 bird species (mostly found in Egypt and Turkey).

But Mediterranean biodiversity is also among the most vulnerable on the planet. For example, the monk seal, an iconic regional species, is classified "critically endangered", and is one of the 10 most endangered species in the world. The concreting over of the coast is one of the more obvious manifestations of environmental degradation and could affect 50% of the Mediterranean shoreline by 2025[8]. The drive towards urbanisation, sometimes excessive or uncontrolled, often takes no account of ecological risks; indeed, it is estimated that industrial emissions, municipal waste and urban waste water are responsible for 80% of pollution of the Mediterranean Sea.

The last few years have nevertheless seen a great increase in legal measures designed to protect biodiversity in the Mediterranean countries. The number of protected areas, for example, continues to increase (in Egypt and Tunisia the number has risen from one to 24 over the past four decades). These efforts to protect the environment are worth highlighting, even though they still have to prove their worth in the long term. Unfortunately, it would be no exaggeration to say that the wealth of Mediterranean biodiversity is matched only by the scale of the threat to it.

1.3 Soils

The Mediterranean zone certainly lends itself to the development of recreational as well as commercial activities, with its sunshine, gentle slopes and natural accessibility. These features also explain the diversity of agricultural production systems. However, current farming methods are often threatened by soil erosion, desertification or salinisation. It must be emphasised that Mediterranean soils needs are becoming increasingly vulnerable.

The Mediterranean Basin is home to 7% of the world's population and represents 6.3% of its land mass. It has 242.4 million hectares (ha) of agricultural land (4.9% of world resources), of which 97.4 million are arable land (6.95% of all arable land on the planet and 40% of all Mediterranean farmland)[9]. But while the North and South of the region have comparable areas of arable land (45.1 and 52.3 million ha respectively), the South has twice as much agricultural land as the North (154 million ha compared with 89.3 million). Broadly speaking this means that arable farming accounts for half the agricultural land in the North of the Basin and only a third in the South.

The top five Mediterranean countries in terms of agricultural land resources are, in descending order, Algeria (39.9 million ha), Turkey (39.2m ha), Morocco (30.4m ha), Spain (30.2m ha) and France (29.7m ha). As to arable land, two countries stand apart: Turkey with 23.4m ha and France with 18.4 million. Trailing a long way behind are Spain (13.7m ha), Morocco (8.5m ha), Italy (7.9m ha) and Algeria (7.5m ha).

These figures must however be viewed in relation to the total surface area of the Mediterranean countries. Indeed there are stark contrasts between countries in this respect. In terms of overall land use, agriculture accounts for just 3% in Egypt, 9% in Libya, 15% in Cyprus and 17% in Algeria, but 50% in Italy and Turkey, 54% in France, 60% in Spain and Tunisia, 64% in Greece, and 68% in Morocco. The world average is around 37%.

[8] Blue Plan's figure, 2005 report, *op.cit.*, p. 300.
[9] Our own calculations based on FAO figures for 2003, collected in *MedAgri 2006*, a directory of agricultural and food economies of Mediterranean and Arab countries - CIHEAM-MAI Montpellier, under the direction of Mahmoud Allaya, July 2006.

The case of Egypt is especially problematic in that it alone has 22% of the region's agricultural workforce and 15% of its rural population but only 1.4% of its agricultural land.[10] And yet enormous efforts are being made to increase the amount of agricultural land (the Tochka project for example), which has grown by 33% over the past fifteen years. On the plus side it must be borne in mind that nearly 85% of Egypt's agricultural land is arable and 100% of that land is irrigated. Given the situation in other countries to the South of the Mediterranean, this point deserves to be highlighted (irrigated land accounts for only 7.5% of agricultural land in Algeria, 14% in Tunisia and 17% in Morocco, which shows just how worrying the water situation in the Maghreb actually is).

1.4 Energy

The daily news shows the extent to which energy is a central factor in political, economic and social problems and tensions. If the energy problem is viewed in relation to environmental issues, it is easy to see why it is a major factor in sustainable development policy. Energy is essential to human activity and exploitation of energy sources directly effects both the environment and the climate, most of all by producing greenhouse gases.

Energy consumption in the Mediterranean countries, which are highly dependent on fossil fuel (oil and gas), has more than doubled since the seventies. At the same time renewable energies are not being adequately promoted. Some states seem more committed to it than others (Italy for example is devoting an increasingly large share of its research budget to it) but renewable energies (water, geothermal, wind, solar and biomass) nevertheless provide for no more than 6.6% of the region's current energy requirements. Of course, the countries in the basin include two major oil and gas exporters (Algeria and Libya) and two more with significant resources of their own (Egypt and Syria). But the others are becoming more dependent on imported energy. The countries on the northern shore, which account for 75% of total energy consumption in the region, are seeking to diversify sources and looking at ways of reducing the environmental impact of their consumption. The average Northern Mediterranean consumes 3,100 kep (kg equivalent petrol) per year, which is only half as much as an American but still three times as much as a Southern Mediterranean.

According to projections by the Observatoire Méditerranéen de l'Energie (OME), we are likely to see a widespread increase in energy demand, driven both by population growth and by economic development in the region. In 2000 total demand for energy in the Mediterranean Region was 820 Mtep (million tons equivalent petrol) and by 2025 it could increase by 65% to 1,365 Mtep.

Moreover, the OME predicts that the southern countries share in energy demand will increase significantly, from 10% in 1970 to 40% in 2025 (by which time Turkey will have become the second biggest consumer in the basin). At the present time energy requirements in the South are growing four times more rapidly than in the North.

At this point we should mention the rural Mediterranean world, which often has difficulty accessing energy sources. Some countries are lagging far behind in the electrification process. In Morocco for example only 26% of the rural population had access to electricity in 2000, compared with 91% of city dwellers. This lack of collective infrastructure places the countryside at a disadvantage and forces rural populations to migrate to the city. Not having access to the benefits of electricity (lighting, communications facilities, refrigeration, etc.), inhabitants of rural areas are often caught in a poverty trap. Lastly it should be emphasised that the development of photovoltaic solar energy seems to offer interesting possibilities in countries where electricity networks cover only part of the territory. Thanks to the climate of the Basin, where sunshine is a regular feature, Mediterranean countries might be well advised to look to the considerable potential of solar energy, despite the high installation costs. The establishment of the MEDENER Association[11], which promotes the development of thermal solar energy, is an encouraging sign in this respect.

[10] The population of the Mediterranean Basin is currently 454 million inhabitants. On the basis of figures provided by the FAO, it is reckoned that the Mediterranean region now has an agricultural workforce of 38.5 million, 86% of which is in the South. By way of comparison with the situation in Egypt, outlined above, Morocco has 11% of the region's agricultural workforce, 8% of its rural population and a full 13% of its agricultural land.

[11] MEDENER is the Mediterranean Association of National Agencies for Energy Conservation. At present it comprises 12 organisations, including France's Agence de l'Environnement and Agence de la Maîtrise de l'Energie (ADEME).

2. Water: symbol of the challenge of sustainable development in the Mediterranean Region

2.1 Water, the planet's "blue gold"

Water is a rare, fragile resource, and one that is unevenly distributed across the world. It is a central to the interaction between environment and development projects, societies and economies. It is allocated to three distinct user groups: agriculture, industry and households. Will it be possible, given prevailing global demographic trends (6.1 billion inhabitants in 2000, 7.2 billion by 2015, 8.3 billion by 2030 and 9.3 billion by 2050 according to United Nations projections[12]), to meet the growing fresh-water needs of households, industries and the environment, while providing sufficient water to produce food for the world population?

Although industry and private individuals use much less water than agriculture, the amount they consume is increasing rapidly. Access to safe, hygienic, potable water is crucial to good health, particularly children's. Moreover, humankind is only just beginning to appreciate the importance of water conservation for the conservation of the environment (in the course of the twentieth century, the Earth lost more than half of its wetlands). At the present time aquifers are running dry, aquatic ecosystems are polluted and development of new water sources is still very costly.

In the coming decades, shortage of water could be the principal factor in limiting food production and will therefore be a cause of serious geopolitical tension. This dynamic, which is already at work in some parts of the Earth, will be very strong and will take a particularly complex form in areas where poverty is rife and water resources are dwindling. Studies[13] have already shown that by 2025, per capita water resources worldwide will be a third of what they were in 1950. At present 25% of the world's resources are in South America, which is home to just 6% of the world population. Every day 34,000 people die for want of clean water. Nearly 1.5 billion of the Earth's inhabitants still lack access to potable water and if nothing is done, the figure is likely to be 3 billion by 2025.

According to one trend scenario, water demand for all uses other than irrigation will increase by 62% between 1995 and 2025[14]. Water consumption by industry will increase much more rapidly in developing countries than in developed countries. Domestic water demand will rise rapidly, particularly in developing countries, as a result of urbanisation (with the new megapoles in the South posing a strategic supply problem), population growth and higher incomes. In 2025 farmers will be using just 4% more water for irrigation than in 1995, largely because no more will be available. But at the same time, the rich countries will have to learn to save water (in America current per capita water consumption is 600 litres a day, in Europe it is about 150 litres a day). Lastly, we may see a slight increase in food production and a significant shift in the location of the world's main farming areas.

A serious deterioration in the underlying situation cannot be ruled out. Failure to implement water management and food production policies would significantly increase the risk of a world water crisis in the twenty-first century. Hence the urgent need to encourage sustainable development of water resources, so that we can provide for a significant increase in the amount of water assigned to environmental needs, connection of all urban households to a mains water supply network, and an increase in per capita domestic water consumption, while maintaining food production at rational levels.

[12] *World Population Prospects, the 2004 Revisions.* New York: United Nations Organization. 2004.
[13] See Gaëlle Dupont, "*2025: l'humanité est contrainte à partager l'eau"*, in Le Monde, 21 January 2006.
[14] See the Note by the International Food Policy Research Institute (IFPRI): "*Water and food to 2025: policy responses to the threat of scarcity"*, Washington, IFPRI, 2004.

2.2 Water in the Mediterranean Region: a vulnerable resource, which is growing scarcer[15]

Under this global scenario, in which "water stress" will become increasingly severe, the Mediterranean Region will face a particularly grave threat, water being an important factor in regional crises. Indeed, the region will contain half of all the people in the world facing water scarcity[16]. Nearly 30 million inhabitants of the region will not have access to a potable water source (around 7% of the total population of the basin). Rural populations, who tend to be poor, are often the first to confront this immense difficulty.

Another problem is the unequal distribution of water in the region: 75% of resources are located on the northern shore (Mediterranean Europe and the Balkans), 13% are in the Middle East (10% in Turkey alone) and just 10% are in the Arab countries to the South of the Mediterranean.

Work by Blue Plan has shown that studies of water-related issues in the Mediterranean Basin must focus on a precisely defined geographical area: the Mediterranean catchment. If we include only those countries with a Mediterranean coastline, this catchment covers 1,753,850 km². It is defined as the area comprising the catchments of all rivers (within the territorial boundaries of the Mediterranean countries) that flow into the Mediterranean Sea.

Generally speaking, urbanisation and concentration of the population in coastal areas aggravate local pressure on water resources, both in the North and the South of the basin. However the water situation in the Mediterranean Region is very diverse, with rainfall levels varying considerably from one geographic area or time period to another. Total annual rainfall volume in the Mediterranean catchment is 1,100 km^3 but two thirds of this volume is concentrated over 20% of its surface. France, Italy and Turkey alone receive nearly 50% of all rainfall, while the states in the South of the basin share about 13%.

Total renewable fresh water resources (ground and surface water) in the Mediterranean catchment amount to 600 km^3 in an average year. This figure represents the maximum potential amount supplied naturally in an average year. But 85% of this potential amount is in countries to the North of the Mediterranean (including Turkey). With current demographic trends (stabilisation in the North, growth in the South), the gap between the Northern states and the Southern and Eastern states in terms of per capita natural water supply will steadily widen[17].

The data provided by Blue Plan also shows that the number of people experiencing water scarcity in the South and East of the Mediterranean catchment, ie those with less than 1000 m^3/inhabant/year, was 108 million in 2000, 45 million of whom were in a situation of "absolute scarcity" (less than 500 m^3/inhabant/year). By 2025 it is expected that 165 million will be experiencing scarcity (one person in three) and 63 million will be experiencing absolute scarcity (one person in eight).

Rainfall distribution across the Mediterranean Region is therefore very uneven. Levels also differ markedly from one season to another: there is concentration of rainfall over a short period (an average of 50-100 days per year) followed by a summer drought coinciding with periods of high water demand (for irrigation and tourism). Moreover, rainfall levels in the region vary significantly from one year to the next, which represents a further disadvantage.

Not only is water unevenly distributed across the region, it also tends to be of poor quality in some areas. Very often fresh water resources in their natural state are of limited usefulness owing to their high salinity. All these constraints are likely to become more pronounced with the effects of climate change in the Mediterranean Basin (in the South and East droughts will be more severe and more frequent and rainfall levels will fall).

---

[15] Figures given in this chapter are taken from the Blue Plan report *"A sustainable future for the Mediterranean, the Blue Plan's Environment and Development outlook"* Earthscan, October 2005, under the direction of Guillaume Benoit and Aline Comeau (pp. 250-253). The Mediterranean Region is understood to comprise all countries on the Mediterranean rim, excluding the non-Mediterranean parts of France.

[16] According to United Nations Organization definitions, an area has satisfactory access to water when supplies are above 1,700 m^3/person/year, it is experiencing water stress when annual water supplies drop below 1,700 m^3/person/year, and is in a situation of scarcity when supplies fall below 1,000 m^3/person/year.

[17] In 1950 average per capita supply of renewable natural water resources in the South and East of the Mediterranean Region was 2.5 times less than in the North. Today it is six times less and it will probably be eight times less by 2025.

Overall water demand in the region doubled over the second half of the twentieth century, rising most of all in Turkey, Syria and France. Since 1990, some countries have nevertheless succeeded in stabilising demand (Israel) or even reducing it. Galloping urbanisation in the region has significantly increased pressure on resources.

The main drivers of water demand in the Mediterranean are irrigation (needed to make up for the lack of rain and provide for countries' growing food requirements), domestic uses (which are increasing with the urbanisation of the region) and tourism (the Mediterranean is the world's foremost tourist destination, with 364 million holidaymakers from home and abroad in 2000 - nearly 35% of the global aggregate - and 637 million expected in 2025).

In 2000, total water demand in the Mediterranean catchment was 190 km^3, nearly a third of renewable resources. According to one trend scenario (projections), demand will be 210 km^3 in 2025, which will mean an increase of 0.4% every year. But demand will mainly increase in the South (+0.7% per year) and East (+1.5% per year), notably in Turkey, Syria and Egypt.

In most countries, most water is used by farmers for irrigation (except in France and the Balkans). Demand for agricultural water (green water) accounts for nearly 65% of total water demand in the region. The percentage varies from one shore to another: 48% in the North and 82% in the South. Water is thus primarily used for agricultural purposes in the South of the region. In spite of agricultural development policies designed to increase the amount of irrigated land, this trend should stabilise over the next few years, assuming that irrigation water can be used more efficiently. This means that demand for agricultural water in the South could fall from 82% to 74% of total water demand.

Potable water is the second largest draw on regional water resources, accounting for 15% of the total. Under the combined effect of the growing population and the rising standard of living, potable water demand is likely to increase significantly in the South and East of the region (from 8% of demand in 2000 to 10% in 2025). This increase will be compounded by a growth in tourism, which should continue to develop on the southern shores of the basin. The tourism sector in the South and the islands will continue to demand a steady supply of water and the rise in demand will be most marked in countries already experiencing water shortage. Potable water could account for more than a third of total demand in some countries (34% in Cyprus, 45% in Israel and Algeria) and more than half in others (58% in the Palestinian Territories, 87% in Malta).

The energy and industrial sectors are third on the list of water consumers and tend to cause the most pollution. In the North the percentage of overall demand from this quarter should gradually fall (from 35% in 2000 to 30% in 2025) but in the South it is expected to grow steadily (from 10% in 2000 to 16% in 2025). Future demand is therefore likely to be particularly high in the countries to the South and East of the basin, which are already suffering from shortage of water. In the North demand seems to be stabilising and states are now directing their efforts towards reducing regional disparities and ensuring that supplies are sufficient and of sound quality.

2.3 Pressure on resources is increasing

The ratio "natural renewable water resources used/total natural renewable water resources available" is an indicator of the extent to which resources are being exploited: the higher the ratio, the greater the pressure on natural renewable water resources.

Mapping of this index across the region reveals widely differing situations:

- Countries with a ratio of about 75% or more: Egypt, Israel and Libya at the present time, the Palestinian Territories and southern Spain by 2025. If these countries were to rely on natural sources they would be in a situation of severe stress and will therefore be increasingly dependent on unconventional sources between now and 2025.
- Countries whose ratio is high (between 50 and 70%) but is not likely to change by 2025: Malta, Syria and Tunisia;
- Countries whose ratio is low enough to create local tensions or impact adversely on the economic climate (between 25 and 50%): Lebanon, Cyprus and Morocco at present, to be joined by Turkey and Algeria by 2025.
- Countries whose ratio is below 25% and whose overall demand is falling: Greece, France, Italy, and countries to the East of the Adriatic.

Tensions over resources are increasing, given that not all renewable natural resources can necessarily be exploited by man. In the Mediterranean catchment as a whole only 60% of renewable natural resources, ie 360 km^3 per year, are exploitable at the present time. Moreover, 75% of supply from these resources is highly irregular, which means that structures need to be built for storing water over the year so that it can be used in summer or during dry periods. On the other hand, many man-made reservoirs tend to become silted up, which limits their lifespan, and more importantly, it is generally acknowledged that the Mediterranean Region has entered a post-dam era now that available new sites have all been used up. As to groundwater, reserves are often overexploited and levels are gradually falling.

These worrying observations should alert us to our obligation to develop other resources for future generations, particularly those living to the South and East of the basin. Three techniques need to be explored: recycling of waste water, use of agricultural water recovery systems and industrial production of fresh water through desalination of sea water (although the economic cost is very high) and brackish water. At present use of these techniques in the Mediterranean Basin as a whole yields 1.1 km^3, 12.6 km^3 (mainly in Egypt) and 0.4 km^3 respectively.

Problems are compounded by human activities that modify the water regime or the quality of the water: increased abstraction of groundwater, disturbance caused by hydraulic developments, bad irrigation practice, which may sometimes increase water salinity, and changes in land use. All of this affects the quality of water resources, which are already vulnerable, and limits their usefulness. Mediterranean ecosystems are affected by the rise in pollutant emissions and water quality is threatened by the numerous pollutants introduced into fresh water (through sporadic tipping of domestic and industrial waste and more widespread application of fertilisers and pesticides). In countries to the South and East of the Mediterranean, the amount of waste water discharged into the environment will certainly increase with urbanisation, higher living standards and increasing development of tourism (a significant factor: the Mediterranean Region now accounts for about a third of all international tourist flows with nearly 250 million arrivals every year[18]). Aggregate waste water discharge in the whole of the Mediterranean catchment is likely to rise by 30% from 37 km^3 to 47 km^3 by 2025.

These trends indicate that water will be increasingly difficult to obtain in the Mediterranean. Tension over resources and increased pollution will go hand in hand with severe damage to the environment and a steady rise in the cost of water supply systems (which will also be increasingly vulnerable). It may be that the “polluter pays principle” will be applied more broadly. Furthermore, we cannot dismiss water-related crisis or conflict scenarios. Pressures on water resources may well lead to conflict: first of all between those with modern equipment and those using more traditional techniques, then between broad categories of user (households, farmers, manufacturers), with the agricultural sector rarely coming off best, and finally between regions or countries, especially in the Middle East. In the twenty-first century there is no doubt that water will be a major geopolitical and strategic factor in the Mediterranean Region.

In the circumstances, we should consider ways of promoting “good water governance”, ie more efficient management of water to meet social, economic and environmental ends. Improved management of resources involves active measures to combat pollution and better techniques for collecting and purifying waste water (in the South and East of the Mediterranean Region only one person in two is connected to a treatment plant). Improved demand management calls for more rational use of water to ensure that needs are properly catered for, while encouraging more efficient allocation of water for different uses.

Attitudes and practices will no doubt have to change radically if these vital objectives are to be met. It will be necessary to stop treating water as an inexhaustible resource and tailor consumption to genuine requirements if Mediterranean citizens are to exercise responsible stewardship over their water assets. We must rethink the way we fund water management and redefine the roles of the different players (states, communities, users, enterprises, banks, etc.). At the same time we must reform charging practice and introduce charging systems that are designed to meet social as well as environmental objectives. Lastly it is quite clear that the urgency of the situation demands close cooperation between countries on the Mediterranean rim. Only then will it be possible to provide long-term support for the work that must be done (often at local level) to ensure that water assets are shared and not coveted and fought over.

[18] Our own calculations, based on data provided by the World Tourism Organisation for the year 2004.

Significant strides have been made over the past few years but they are not sufficient to meet the challenges facing the Mediterranean world at the start of the twenty-first century. Today the water issue is central to sustainable development work throughout the world and most particularly in the Mediterranean Region, as we can see from the figures given above. If nothing is done, future sustainability will be severely compromised and water will become a recurrent cause of social, territorial and economic conflict.

3. When the environment becomes a major geopolitical issue in the Mediterranean Region

3.1 Environment and sustainable development in the Mediterranean Region: time for action

The threat to the environment and the steady degradation of resources in the Mediterranean Basin is taken increasingly seriously by players and decision makers in the region; current development trends appear to be unsustainable in spite of the progress achieved in some areas. As a percentage of national GDP, the World Bank reckons the annual cost of environmental degradation to be 3% in Tunisia, 4% in Lebanon, 4.5% in Morocco, 5% in Syria and Algeria and 5.5% in Egypt[19]. Environmental degradation holds back the countries' economic and social development and weighs most heavily on the poorest sections of the populations.

There can be no doubt that environmental awareness has significantly increased over the past few years. In 1975, following the First World Conference on the Environment in Stockholm in 1972, where the United Nations environment programme (UNEP) was established, the Mediterranean rim countries and the European Community launched a Mediterranean Action Plan (MAP). This was accompanied by an important legal instrument, the Barcelona Convention, designed to guarantee the protection of the Mediterranean. This in turn led to the establishment of Blue Plan, a think tank and forward studies centre specialising in the Mediterranean environment, which has been based in the South of France since 1979. This was the decade in which the environment became an international policy issue[20].

Later, the 1992 Rio Conference, the first Earth summit on Environment and Development, drew attention to the unsustainability of current developments worldwide and undertook to launch an appropriate response (Agenda 21). The concept of sustainable development - satisfying the needs of present generations without compromising the capacity of future generations to satisfy theirs - was a simple one and quickly caught on. In 1995 the launch of the Euro-Mediterranean Partnership (EMP) created the conditions for the establishment of a Mediterranean Commission on Sustainable Development (MCSD), operating in conjunction with UNEP/MAP. Since then several European countries have established their own national observatories dedicated to the environment and sustainable development. In 2002, the second Earth summit on sustainable development emphasised the need to alter consumption and production patterns while ensuring that natural resources were protected and sustainably managed. It built upon the Millennium Development Goals (MDGs), to which the international community committed in 2000. Governments seemed to have moved beyond the discussion stage and were determined to act. Indeed, some of the major industrialised countries recognised their own responsibility with the French President admitting that "if the whole of humanity were to behave like the Northern countries, it would take two more planets to satisfy our needs"[21]. Governments accordingly decided to draw up a strategy for sustainable development in the Mediterranean Region and their decision was approved by the second Euro-Mediterranean Ministerial Conference on the Environment in July 2002 (following on from the one held in Helsinki in November 1997).

[19] World Bank, "*Assessing the costs of environmental degradation in the MENA region*", Environment Strategy Note No 09, Washington, April 2004.
[20] See François Lerin and Laurence Tubiana, "*Questions autour de l'agenda environnemental international*", in la Revue internationale et stratégique, No 60, Winter 2005-2006, IRIS, Paris, pp. 75-84.
[21] Speech by President Jacques Chirac to the Plenary Session of the World Summit on Sustainable Development in Johannesburg, 2 September 2006.

The UNEP/MAP Mediterranean Strategy for Sustainable Development (MSSD) was officially adopted in June 2005 in Athens. The sub-title of the document is worthy of mention: *"a framework for environmental sustainability and shared prosperity"*. From the outset, therefore, the object was to promote dynamic, coordinated cooperation between Mediterranean rim countries[22]. Designed to foster sustainable economic, social and environmental progress, the MSSD has four main objectives:

- to contribute to economic development by enhancing Mediterranean assets;
- to reduce social disparities by implementing the millennium development goals and strengthen cultural identities;
- to change unsustainable production and consumption patterns;
- to improve governance at local, national and regional level.

In order to meet these objectives, the MSSD recommends action in seven priority areas which are increasingly interlinked:

- improved management of water resources and demand;
- improved rational use of energy, increased renewable energy use and mitigation of and adaptation to climate change;
- sustainable mobility through appropriate transport management;
- sustainable tourism as a leading economic sector;
- sustainable agriculture and rural development;
- sustainable urban development; and
- sustainable management of the sea, coastal areas and marine resources.

Not only are these areas most threatened by unsustainable trends, they are also crucially important economically and socially. In the meantime the MSSD has been recognised as a frame of reference for all governments and players in the Mediterranean Region. While the burden of the "environmental debt" falls chiefly on the countries in the North, it is necessary to place sustainable development at the heart of the Mediterranean agenda, not only to preserve the future of the region but also to highlight the importance of closer Euro-Mediterranean cooperation.

3.2 Making the Euro-Mediterranean zone a laboratory for sustainable development

Although we have been aware of environmental issues ever since the seventies, there can be no doubt that the political framework provided by the Euro-Mediterranean Partnership (EMP) has been of help in fostering practical initiatives in this field. Under the MEDA Programme, an EU financial instrument to support implementation of the EMP, the European Union has funded numerous environmental projects. In 1997 in Helsinki, Euro-Mediterranean environment ministers adopted a declaration establishing the Short and Medium-Term Priority Environmental Action Programme (SMAP), of which there were to be three generations of projects by 2005 (SMAP 1 from 1998 to 1999, SMAP 2 in 2000 and SMAP 3 in 2005). One example of SMAP's success was the development of sustainable agricultural land use through the introduction of organic cropping methods in Egypt (at the Mohsen Eissa pilot farm near the SEKEM farm).

[22] United Nations Environment Programme, Mediterranean Action Plan, "*Mediterranean Strategy for Sustainable Development: a framework for environmental sustainability and shared prosperity* » Tenth Meeting of the Mediterranean Commission on Sustainable Development in Athens, 20-22 June 2005, adopted by the UNO on 27 June 2005.

Further support was given by the European Environment Agency under the EU's LIFE-third countries programme. At the same time, the European Investment Bank (EIB) made several loans to finance environmental infrastructure in the Mediterranean Region. The EU also cooperated with the World Bank, whose work in the South of the Mediterranean Region included an environmental component, as illustrated by the METAP project (*Mediterranean Environmental Technical Assistance Program*)[23].

The new European Neighbourhood Policy (ENP) treats the environment as one of the most important areas for Euro-Mediterranean cooperation, as is clearly indicated in the European Commission strategy paper drawn up in May 2004[24]. Moreover, the ENP is based on a commitment by the EU and neighbouring countries to a set of common principles, including those relating to sustainable development. The challenge posed by the threat to the environment was highlighted once again at the celebrations to mark the 10th anniversary of the EMP in Barcelona on 28 November. The work programme drawn up at the time by the 35 members of the process sets out practical measures[25], including a plan to depollute the Mediterranean Sea by 2020. This objective gained official status on 5 September 2006 with the publication of a paper by the Commission proposing the gradual decontamination of the Mediterranean Sea: "Horizon 2020" [26]. The Commission is in the process of setting up a coalition of partners to implement the initiative, whose first phase will cover the period 2007-2013, corresponding to the EU's next budget cycle during which the new financial instrument to support the ENP (ENPI) will also be in force. All the Horizon 2020 initiative procedures and players will be finally approved at the 3rd meeting of the Euro-Mediterranean environment ministers due to be held in Cairo on 20 November 2006.

Lastly it is worth pointing out that a Euro-Mediterranean road map for the gradual liberalisation of agricultural trade has been in place since 2006. There has been considerable concern in the region over the social and economic impact of trade and the Euro-Mediterranean Parliamentary Assembly (EMPA) has accordingly recommended that the process be flanked by special measures to safeguard the economic, social and environmental cohesion of the Mediterranean territories and ensure the promotion of quality agriculture[27].

3.3 The Mediterranean Region and the future: moving towards sustainable rural development

The development of rural areas occupies a particularly prominent place within the vast range of issues associated with the Mediterranean environment. Not only do these southern Mediterranean areas suffer from a number of severe structural handicaps, they are also experiencing serious environmental degradation, which cannot be ignored.

[23] Founded in 1990, the Mediterranean Environmental Technical Assistance Program (METAP) is a partnership between countries of the Mediterranean region and multilateral donors intended to help beneficiary countries prepare projects and build capacity in regional management of the environment. The initial partnership comprising the European Investment Bank (EIB) and the World Bank (WB) has expanded to take in the European Commission (EC), Department for International Development Cooperation at the Finnish Ministry of Foreign Affairs (FINNIDA), The Swiss Agency for Development and Cooperation (DDC), and the United Nations Development Programme (UNDP), which make up the main donors. Its mission is to enhance regional capacity to develop and enact sound policies for the environment, focusing in particular on: policy and legislation tools, water quality, wastewater and coastal zone management, and municipal and hazardous waste management. Today, METAP operates in the following Southern and Eastern Mediterranean countries: Albania, Algeria, Bosnia-Herzegovina, Croatia, Egypt, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia, Turkey, and the Palestinian territories.

[24] COM (2004) 373 final, European Commission"*European Neighbourhood Policy - Strategy paper",* Brussels, 12 May 2004, p. 20. includes the following passage: *"Environmental pollution does not respect borders and can therefore be best addressed through a mix of international, regional and national action (…) Action Plans will promote good environmental governance in partner countries to prevent environmental degradation and pollution, protect human health, and achieve a more rational use of natural resources. Priorities will be identified in key areas such as water quality, waste management, air pollution and the fight against desertification. Regional co-operation between the partner countries needs to be further enhanced and ratification and implementation of international agreements promoted".*

[25] European Commission: "*Conclusions of the Euro-Mediterranean Barcelona Summit, 27-28 November 2005: Five year work programme"*, paragraph 2.2.i on environmental issues.

[26] See press release "*Commission proposes environmental strategy to protect the Mediterranean Sea"*, IP/06/2005, Brussels, 6 September 2005.

[27] Resolution by EMPA on promotion of quality of life, trade between civil societies and culture, adopted in Rabat (Morocco), 21 November 2005, p.3.

Nobody would deny that agriculture has a considerable impact on the environment, positive as well as negative. There is much debate over the (all-too often unsustainable) way in which it uses and exploits natural resources such as water and soil. The economic and social instability of Mediterranean rural areas are often cited among the main causes of the (sometimes irreversible) degradation of natural resources, and this in turn holds back the economic and social development of rural populations.

At once perpetrators and victims of serious and sometimes irreversible degradation of natural resources, Mediterranean farmers have no option but to move gradually towards sustainable methods. Hence the introduction over the past few years of a legislative and institutional framework (comprising environmental protection agencies), whose object is to optimise resource management and improve ecological awareness. Although results have been encouraging, the effort has been limited in scope owing to insufficient funding and lack of technical expertise. It is important to remember that the negative effects of the Common Agricultural Policy (CAP) on the environment were not fully recognised until the eighties, after which the CAP was reformed to include measures to protect the environment (agri-environmental measures and ecoconditionality as of 1992)

In light of these numerous observations, all we can do is promote the development of sustainable agricultural and rural policies. We are faced with a twofold task since the ecological dimension must be incorporated in both the planning and the development stages. It presents a difficult but stimulating challenge, given that the field of action thus defined is of the utmost importance to the future of Mediterranean societies.

As environmental constraints worsen and the range of challenges increases (as we have seen the first priority is to rationalise and increase the effectiveness of water resource management), we need to pay particular attention to the future of Mediterranean agriculture, a sector of crucial economic and social importance. Moreover, given the density of the population in the rural areas to the South of the Mediterranean (they are home to 41% of the population: 110 million people), implementation of effective sustainable rural development strategies is essential. Many states in the region have already embarked on the task in hand and it is important that they persevere and that their efforts be placed on a multilateral footing, for sustainable development is now a matter of vital importance to all countries in the region.

For many years now CIHEAM has been busy alerting government authorities and international bodies to the need to coordinate agricultural and rural policies in the Mediterranean countries to the fullest possible extent. With this in mind we firmly expect the European Commission to use the forthcoming European Neighbourhood and Partnership Instrument (ENPI) to establish a rural development programme and we hope it will be able to use the MSSD as a means of ensuring cooperation and mobilisation in the region. The big Mediterranean EU states will then have an important role to play in this process.

It is already clear that the promotion of sustainable rural development is bound to require action in particular areas. Water is of course a matter of central importance and technical and commercial adjustments will be needed to ensure that use of water in Mediterranean agriculture is scrupulously regulated, bearing in mind that water is key to food production. Participatory management of natural resources would also be welcome. It will be necessary to consider introducing agri-environmental measures specific to the Mediterranean region if the future trend is towards cooperation in agriculture.

Lastly we cannot overlook the infraregional dimension of these policies, since it is now obvious that action on agriculture must be adapted to circumstances and must be taken at local level. In this respect, enhanced governance by local communities and players seems essential, as does *inter alia* the greater involvement of women in the negotiating and decision-making process.

Conclusion

The diversity and fragility of the Mediterranean environment are such that we must apply the principles and pursue the objectives of sustainable development throughout the region. The need for action has never been more urgent.

If we are determined to make the Mediterranean Basin a world pioneer in sustainable development, we must persuade partners to observe and act upon the principles of the MSSD, while setting up the instruments and mechanisms needed for the implementation of sustainable agricultural and rural development policies.

Why such determination? Every day the economic situation shows us that globalisation is leading to the formation of major regional blocs, the benefits of which are lost on a wide section of public opinion. For while its overall effects may benefit a state, globalisation does not necessarily improve the quality of life of its populations to any significant degree. Societies are increasingly divided into beneficiaries and victims of the globalisation process. In the Mediterranean Basin this trend is not only perpetuating the gap between North and South, it is also causing divisions within countries to the South (notably between rural and the urban areas) to develop at a spectacular rate. The sense of injustice over the way the benefits of globalisation are perceived to be shared out is therefore increasing on two levels. On the one hand, the countries in the South feel they are losing out to those in the North; on the other, the populations of isolated areas in the South (the rural populations) feel disadvantaged compared with those connected to the external world (the urban populations).

In the medium and long term, the success of the Euro-Mediterranean project is likely to be measured by its capacity to make globalisation socially acceptable by protecting the most disadvantaged and safeguarding the region's human and natural capital. As a means of cushioning globalisation and instigator of a new North-South social pact, the Euro-Mediterranean project could serve as a genuine laboratory for the sustainable development process. To assume such a role amid the prevailing circumstances and trends would demonstrate not just boldness but a great sense of responsibility.