

The relationship between desertification and climate change in the Mediterranean¹

¹ This region is defined as those Mediterranean Partner countries of the EU-27 that are part of the Union for the Mediterranean (UfM). They include: Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Israel, Jordan, Lebanon, Mauritania, Monaco, Montenegro, Morocco, the Palestinian Authority, Syria, Tunisia and Turkey. Libya is included in this report as it is an observer state.

**The file note was written by the
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Catalogue number: QG-30-12-973-EN-N

ISBN: 978-92-895-0643-4

DOI: 10.2863/63777

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Introduction

The Mediterranean region is affected by land degradation and desertification to a greater degree than most other regions in the world. Unfortunately, the consequences of climate change are likely to exacerbate these tendencies even further. This report analyses the relationship between desertification and climate change in the Mediterranean, with special reference given to the role of local and regional authorities in responding to the challenges associated with them. To do this, the report outlines the problems associated with desertification; the causes and consequences of desertification; the different regional patterns of desertification across the Mediterranean; and how local and regional authorities are affected by climate change and desertification. The central aim of the report is to identify best practices in dealing with desertification and to make recommendations as to what the Union for the Mediterranean (UfM), the EU and other stake-holders can do to respond to the challenges presented by desertification and climate change in the future.

The report has four principal objectives. First, to provide a general overview of the relationship between climate change and desertification in the Mediterranean, the challenges that are associated with them, and the regional patterns of desertification across the Mediterranean. Second, to identify the different agencies and organisations that are currently dealing with desertification and climate change in the Mediterranean, providing an outline of their programmes and initiatives. Third, to assess how regions and localities are affected by desertification and the role of regional and local authorities in dealing with it, and to identify what actions are currently being undertaken. Fourth, to present key recommendations and proposals on how the effects of desertification and other associated phenomena (e.g., drought, land degradation, etc.) can be combated, highlighting where local and regional authorities might contribute.

1. Desertification and climate change in the Mediterranean

1.1 The relationship between desertification and climate change

Climate change

Any process that causes adjustments to a climate system – from a volcanic eruption to a cyclical change in solar activity – can be described as creating "climate change". Frequently, however, the phrase is most often viewed as a synonym of anthropogenic climate change, i.e., climate change caused by human activity. The principal way in which humans' activity is understood to be affecting climatic conditions is through the release of heat-trapping greenhouse gases into the air.

Climate change is often used interchangeably with another phrase – "global warming" – reflecting the strong warming trend that has been observed by some scientists over the past century. It should be noted, however, that climate change is a more accurate phrase than global warming, not least because rising temperatures can cause a host of other climatic impacts, such as changes in rainfall patterns.

If current trends in emissions of greenhouse gases persist, global temperatures are projected to rise faster over the next century than over any time during the last 10,000 years.² Although significant uncertainties surround predictions of regional climate change, it is likely that the Mediterranean region will warm significantly. The outlook for precipitation is much less certain, but most projections point to more precipitation in winter and less in summer over the region as a whole. A common feature of many projections is declining annual precipitation over much of the Mediterranean region. Even those areas that might in future receive more precipitation may get drier than today due to increased evaporation and changes in the seasonal distribution of rainfall and its intensity. Consequently, the frequency and severity of droughts are likely to increase across the region, with the long term prospect being one of hotter, drier conditions throughout the Mediterranean region as the relative influence of greenhouse gases increases over time.

² IPCC (Intergovernmental Panel on Climate Change) Fourth Assessment Report 2007, available from: http://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html.

Desertification

Climate change is one of a number of variables that are considered to contribute towards desertification. Desertification is land degradation in dry-lands, resulting from various factors, including both climatic variations and human activities. While in previous years, dry-lands recovered easily following long droughts and dry periods, more recently they have tended to lose their biological and economic productivity quickly unless they are sustainably managed. Consequently, dry-lands on every continent are now being degraded by over-cultivation, overgrazing, deforestation, and poor irrigation practices. Such overexploitation is generally caused by economic, environmental and social pressures.

Desertification reduces the productivity of land and contributes to poverty. This is because prime natural resources - fertile topsoil, vegetation cover, and healthy crops - are the first to disappear in the face of desertification. As a result, dry-lands across the world tend to have the lowest gross domestic product (GDP) per capita and the highest infant mortality rates. Soil degradation in dry-lands exacerbates the problem even more. The decline in the fertility of land reduces crop production and additional income sources. Land degradation can also trigger a vicious cycle of environmental degradation, impoverishment, migration and conflicts, often also putting the political stability of affected countries and regions at risk. Globally, it is estimated that over 250 million people are directly affected by desertification, and around a billion are on some level at risk of the effects of desertification.

The relationship between the two processes

It is essential to recognise that desertification is essentially a man-made phenomenon which is exacerbated by climate change. This is because an increase in weather extremes such as droughts and heavy rains as a result of climate change will lead to further land degradation. This in turn aggravates existing problems associated with poverty, forced migration and, in some areas, conflicts. While desertification is already responsible for significant forced migration, more than a billion people – one in seven of the current world population - could be forced from their homes between now and 2050 if climate change worsens. The Middle East and North Africa (MENA), in particular, is considered to be the region most at risk if such projections prove accurate.

The relationship between the two processes does not, however, move in only one direction. It is also possible that desertification may in turn affect climate change, due to the effects of land degradation reducing surface moisture. Because less water is available for the sun's energy to evaporate, more energy is left over for warming the ground and, consequently, the lower atmosphere. At the same time, wind erosion in dry-lands releases dust and other particles into the atmosphere. By absorbing the sun's rays or reflecting them back out into space, they may help to cool the Earth's surface. However, the energy they absorb can heat the lower atmosphere and in this way reduce temperature differences between the atmosphere's vertical layers; this can lead to fewer rain-showers and thus drier land. Finally, the periodic burning of arid and semi-arid grasslands, often associated with unsustainable slash-and-burn agriculture, emits greenhouse gases. The unsustainable use of fuel-wood and charcoal, a major cause of land degradation, also contributes to greenhouse gas emissions.³

³ On the other hand, reforestation is likely to have a cooling effect and is also, of course, an important way to combat land degradation.

1.2 Known causes of desertification

Along with climate change, there are a range of other factors that have been identified as major causes of desertification. The most commonly cited forms of unsustainable land use are over-cultivation, over-grazing, deforestation, and poor irrigation practices.

Seventy percent of the world's dry-lands (excluding hyper-arid deserts), or some 3,600 million hectares, are degraded. While drought is often associated with land degradation, it is a natural phenomenon that occurs when rainfall is significantly below normal recorded levels for a long time. Ordinarily, dry-lands respond quickly to climatic fluctuations. By definition, dry-lands have limited freshwater supplies. Precipitation can vary greatly during the year. In addition to this seasonal variability, wide fluctuations occur over years and decades, frequently leading to drought. Over the years, dry-land ecology has become familiar to this variability in moisture; plants and animals can respond to it rapidly. For example, satellite imagery has shown that the vegetation boundary south of the Sahara can move by up to 200 km when a wet year is followed by a dry one, and vice versa.

People must also adjust to these natural fluctuations. The biological and economic resources of dry-lands, notably soil quality, freshwater supplies, vegetation, and crops, are easily damaged. People have learned to protect these resources with traditional strategies such as shifting agriculture and nomadic herding. However, in recent decades these strategies have become less practical due to changing economic and political circumstances, population growth, and a trend towards more settled communities. When land managers cannot or do not respond flexibly to climate variations, desertification ensues.

The relatively low priority given to environmental protection often leads to poor land management decisions. The overuse of land may result from specific economic conditions or from inappropriate land laws or customs. In many cases, unregulated access to land resources may lead some individuals to maximize their own gains by overexploiting the land at the expense of the community as a whole. Poor people, particularly poor women, often lack access to the best land, depending instead on the most fragile areas and resources.⁴ Their poverty may give them little alternative but to extract what they can from the scarce resources available to them, even though this degrades the land.

International economic forces can also encourage people to overexploit their land. International trade patterns can lead to the short-term exploitation of local resources for export, leaving little profit at the community level for managing or restoring the land. Similarly, the development of an economy based on cash crops, or the imposition of taxes, can distort local markets and promote overexploitation of the land.

Ignorance, errors, and natural and man-made disasters can also contribute to land degradation. Ignorance of the natural environment played an important role in the US during the infamous Dust Bowl of the 1930s; among other errors, during a time of drought Midwestern farmers used ploughs better suited for the more temperate latitudes of Western Europe. In recent decades, similar mistakes in the choice of policies or technologies have led to land degradation in many countries, both developed and developing.

⁴ United Nations Convention to Combat Desertification (2011), "Gender and Desertification: Fact Sheet," available at: <http://www.unccd.int/knowledge/docs/Desertificationandgender.pdf>.

Disasters such as wars and national emergencies also destroy productive land by displacing its managers or causing heavy concentrations of migrants to overburden an area. Natural disasters such as floods and droughts can have a similar effect.

It is also possible to conclude that population expansion – a phenomenon that is characteristic of much of the Mediterranean region - is the ultimate driving force behind desertification. More people in an area inevitably exert a greater pressure on that area's resources; sometimes this pressure is indirect, as when growing urban populations place demands on food production in un-crowded rural areas. However, the causes of desertification are complex, and the relationship between two variables such as population and desertification is not always clear-cut. For instance, a decline in population can result in desertification since there may no longer be enough people to manage the land adequately.

1.3 Immediate consequences of desertification

There are several immediate consequences of desertification, both direct and indirect. They are: environmental degradation that reduces the land's resilience to climate variability; compromised potential for food production; an increase in the incidence of famine; indirect pressures on areas outside the immediately affected areas; and socio-economic instability. In turn, these factors have the potential to exacerbate other challenges facing the region.

Desertification reduces the *land's resilience to natural climate variability*. Soil, vegetation, freshwater supplies, and other dry-land resources tend to be resilient. They can eventually recover from climatic disturbances, such as drought, and even from human-induced impacts, such as overgrazing. When land is degraded, however, this resilience is greatly weakened, resulting in both physical and socio-economic consequences.

Soil becomes less productive when exposed and eroded topsoil is blown away by the wind or washed away by rainstorms. The soil's physical structure and biochemical composition can then deteriorate as vital nutrients are removed by wind or water. If the water table rises due to inadequate drainage and poor irrigation practices, the soil can become waterlogged, and salts may build up. When soil is trampled and compacted by cattle, it can lose its ability to support plant growth and to hold moisture, resulting in increased evaporation and surface run-off. The loss of vegetation cover is both a consequence and a cause of land degradation. Loose soil can sandblast plants, bury them, or leave their roots dangerously exposed. When pastures are overgrazed by too many animals, or by inappropriate types, edible plant species may be lost, allowing inedible species to invade.

The link between desertification and *food production* is also strong. A nutritionally adequate diet for the world's growing population implies tripling food production over the next 50 years. This will be difficult to achieve even under favourable circumstances. Given the high rates of population growth in recent decades across the southern and eastern Mediterranean, adequate levels of food production are essential to ensure that there is sufficient production to maintain export levels and to feed local populations. However, if the extent of desertification is not reversed in the coming years, food yields in many affected areas are likely to decline.

Malnutrition, starvation, and ultimately *famine* may result, although famine typically occurs in areas that also suffer from poverty, civil unrest, or war. Drought and land degradation often help to trigger a crisis, which is then made worse by poor food distribution and the inability to buy what is available. The relationship between soil degradation and crop yields, however, is

seldom straightforward. Productivity is affected by many different factors, such as the weather, disease and pests, farming methods, and external markets and other economic forces.

Some of the consequences of desertification are also borne by *people living outside the immediately affected area*. For example, degraded land may cause downstream flooding, reduced water quality, sedimentation in rivers and lakes, and siltation of reservoirs and navigation channels. It can also cause dust storms and air pollution, resulting in damaged machinery, reduced visibility, unwanted sediment deposits, and mental stress. Wind-blown dust can also worsen health problems, including eye infections, respiratory illnesses, and allergies. Dramatic increases in the frequency of dust storms were recorded during the Dust Bowl years in the US, in the Virgin Lands scheme area in the former USSR in the 1950s, and in the Sahel-Sahara region of Africa in the 1970s and 1980s.

There are also immense *social costs* that are caused by the incidence of desertification, mass migration, and conflicts. In Africa, many people have become internally displaced or forced to migrate to other countries due to war, drought, and dry-land degradation. The environmental resources in and around the cities and camps where these people settle come under severe pressure. Difficult living conditions and the loss of cultural identity might further undermine social stability.

There is little detailed data on the *economic costs* resulting from desertification, although an unpublished World Bank study suggested that the depletion of natural resources in one Sahelian country was equivalent to 20 per cent of its annual GDP.⁵ Other indirect economic and social costs suffered outside the affected areas, including the influx of “environmental refugees” and losses to national food production, could possibly be even greater.

1.4 Longer term risks of desertification

There are a number of significant longer-term risks associated with the prospect of continued desertification in the Mediterranean. They are: increased frequency of water shortages and a decline in water quality; compromised food security; public health risks; permanent ecosystem damage; losses to national economies. These risks might in turn threaten to cause or exacerbate political instability in the region.

1.4.1 Increased frequency of water shortages and decline in water quality

It is likely that the first impacts of climate change will be felt in the Mediterranean water resource system. Reductions in water availability would hit southern Mediterranean countries the hardest. In Egypt, Libya, Tunisia, Algeria, Morocco, Syria, and Lebanon, water availability already falls below, or approaches 1,000 m³ per person per year - the common benchmark for water scarcity. In addition, some water supplies could become unusable due to the penetration of salt water into rivers and coastal aquifers as sea level rises. Water pollution - already a major health hazard in the region - would become still worse as pollutants become more concentrated with reductions in river flow.

⁵ Darkoh, M.B. (1996), “The Human Dimension of Desertification in the Drylands of Africa,” *Journal of Social Development in Africa*, Vol.11, No.2, pp. 89-106.

1.4.2 Food security threatened by falls in production and world price rises

Livestock production would suffer due to a deterioration in the quality of rangeland associated with higher concentrations of atmospheric carbon dioxide and to changes in areas of rangeland as climate boundaries move northwards. In the European Mediterranean, the area of unproductive shrub land is expected to expand, while in the MENA region, most of the steppe rangeland could give way to desert by 2050 or earlier.

Yields of grains and other crops could decrease substantially across the Mediterranean region due to increased frequency of drought. While losses may be partially offset by beneficial effects from carbon dioxide, crop production would be further threatened by increases in competition for water and the prevalence of pests and diseases and land losses through desertification and sea level rise.

In the MENA region, changes in average climate associated with a doubling of carbon dioxide could cause yield losses of over 20 per cent for wheat, corn and other coarse grains - even before allowance is made for losses through other causes. In coastal areas, large areas of productive land may be lost through flooding, saline intrusion and water-logging. In Egypt, for example, agricultural production may cease altogether over an area extending 20 km inland.

World prices for many key commodities such as wheat, maize, soybean meal and poultry could rise significantly as a result of global climate changes.⁶ Not only might Mediterranean countries lose substantially in economic terms, but the combination of higher prices and crop losses would lead to a deterioration in levels of food security, especially in the poorer southern rim countries.

1.4.3 New, widespread risks to public health

Reductions in food security could increase the risks of malnutrition and hunger for millions in the southern and eastern rim countries. The combination of heat and pollution could lead to an upsurge in respiratory illness among urban populations, while extreme weather events could increase death and injury rates. Water shortages and damaged infrastructure could increase the risk of cholera and dysentery. Higher temperatures might then increase the incidence and extent of infectious diseases, such as malaria, dengue fever, schistosomiasis and yellow fever.

1.4.4 Many valuable ecosystems would be lost

Many valuable ecosystems could be lost as species fail to keep up with the shift in climate boundaries and/or find their migration paths blocked by human activities. Wetland sites will face the dual threats of drying out and sea level rise. Up to 85 per cent of wetland sites in southern Europe could disappear with a 3 to 4 degrees centigrade rise in temperatures. In Tunisia, for example, rising temperatures could contribute to the loss of all food plants and breeding waterfowl and the disappearance of nationally important fisheries.

⁶ Food and Agricultural Organization (2010), "Food Outlook: Global Market Analysis," November 2010, available at: <http://www.fao.org/docrep/013/a1969e/a1969e00.pdf>.

1.4.5 Losses to national economies

Serious social disruption as the livelihood of millions is threatened and international tensions over resources mounts. Serious social disruption could occur as millions are forced from their homelands as a result of desertification, poor harvests and any rise in sea levels associated with climate change, while international disputes over shared water resources could turn into conflict in the face of declines in water availability and increased demand.

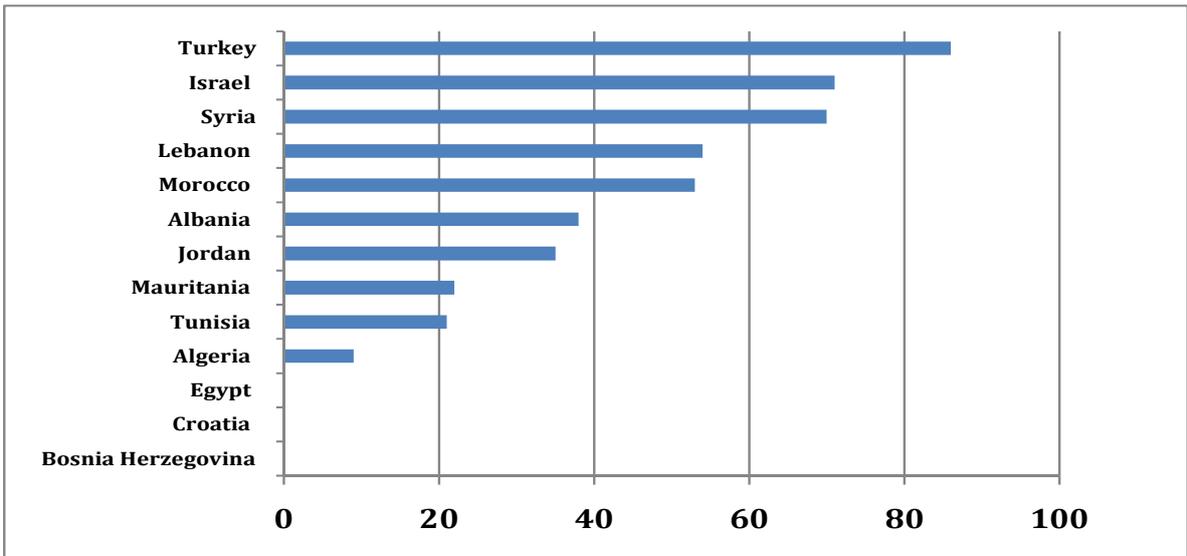
National economies would also be adversely affected not only by the direct impacts of climate change and desertification, but also through the cost of adaptive measures and the knock-on implications of changes elsewhere. Quantitative estimates of financial costs are unreliable but in general, developing countries are expected to suffer larger relative economic damages than developed countries.

1.5 Regional patterns of desertification in the Mediterranean

All three sub-regions of the Mediterranean – the northern, eastern, and southern – are experiencing desertification to some degree, and are likely to continue to experience it to a greater degree in the future. However, the amounts of desertified land, or land threatened by desertification, vary considerably from one country to another across the three sub-regions. As Table 1 illustrates, the most desertified land area of the Mediterranean is in the MENA region. The situation is approaching critical levels in Morocco, Lebanon, Syria, Israel and Turkey. While it is evident that the northern rim of the Mediterranean is at a lower risk of desertification than the eastern and southern rims, it is a source of concern that Albania – a country on the northern rim – is also under threat of desertification across much of the country. It should be noted that the data presented here are aggregated national data; the distribution of dry-lands then varies within countries. For example, while only 9 per cent of Algeria's total land area is under threat of desertification, much of this occurs in and around heavily populated areas.

Figure 1: Dry-lands, per cent of total land area.⁷

⁷ The concept of dry-lands continues to be debated. In the data used here, dry-lands are taken as areas with a potential hazard of desertification. The hyper-arid zone is not subject to desertification and is therefore excluded. Hence dry-lands are defined as the arid, semi-arid and dry sub-humid zones, or areas with lengths of growing periods of 1-179 days. Data are unavailable for Gaza and West Bank, Libya, Monaco and Montenegro.



Source: United Nations, Global Environmental Outlook database (2011)

2. Key players that deal with desertification in the Mediterranean

As a result of the important social, economic, political and environmental consequences of desertification and climate change that are likely to shape the development of the Mediterranean, there are already a large number of organisations operating in the region with the aim of combating desertification.

Key organisations include:

2.1 The European Union

The EU has been involved in action to reduce and manage climate change since at least 1992, although since 2010 it has established a specific Directorate-General, DG CLIMA, headed by Commissioner Connie Hedegaard to lead its work in this area. At the macro level, the EU strategy works both to reduce greenhouse gas emissions and prevent damage to the ozone layer, and, to mitigate the unavoidable adverse effects of climate change. More information on the EU's extensive programme of activities in this area can be found on its website.⁸

2.2 The Union for the Mediterranean

Desertification, climate change and their effects on agricultural production were at the heart of the Joint Declaration at the Paris Summit of the Union for the Mediterranean of 13 July 2008.⁹ Climate change and desertification were further highlighted as high priorities for the UfM at the Marseille Summit of 3–4 November 2008, including its effects on tourism. Ministers also welcomed the progress made to-date on de-pollution of the Mediterranean.¹⁰ The UfM Secretariat's Water Agenda focuses on four main priorities: water governance, water and climate change adaptation, water demand management and water financing. By 2012 an Action Plan will set out the concrete milestones and programme of work in this area.¹¹

⁸ http://ec.europa.eu/dgs/clima/mission/index_en.htm.

⁹ http://www.ufmsecretariat.org/wp-content/uploads/2010/11/ufm_paris_declaration1.pdf.

¹⁰ http://www.ufm-water.net/UfM/Final_Statement_Marseille_04_Nov_2008_EN.pdf.

¹¹ <http://www.ufmsecretariat.org/en/environment-and-water/>.

2.3 United Nations: the Interim Secretariat to Combat Desertification

The international community has long recognized that desertification is a major economic, social and environmental problem of concern to many countries in all regions of the world. In 1977, the United Nations Conference on Desertification (UNCOD) adopted a Plan of Action to Combat Desertification (PACD). Unfortunately, despite this and other efforts, the United Nations Environment Programme (UNEP) concluded in 1991 that the problem of land degradation in arid, semi-arid and dry sub-humid areas had intensified, although there were "local examples of success".

To help combat desertification, the Convention (UNCCD) was adopted in Paris on 17 June 1994 and opened for signature there on 14-15 October 1994. It entered into force on 26 December 1996, 90 days after the fiftieth ratification was received. 193 countries were Parties as at August 2009. The Conference of the Parties (COP), which is the Convention's supreme governing body, held its first session in October 1997 in Rome, Italy. The ninth, and most recent, session of the conference of the Parties was held in Buenos Aires, Argentina from 21 September to 2 October 2009.

The Interim Secretariat of the UNCCD provides affected countries with information and expertise. Countries affected by desertification are bound to implement the Convention by developing and carrying out national, sub-regional, and regional action programmes. Criteria for preparing these programmes are detailed in the treaty's five "regional implementation annexes": Africa (considered a priority because that is where desertification is most severe), Asia, Latin America and the Caribbean, the Northern Mediterranean, and Central and Eastern Europe.

The Secretariat is currently co-ordinating the UN Decade for Deserts and the Fight against Desertification, which will run from January 2010 to December 2020 to promote action that will protect the dry-lands. The Decade is viewed as an opportunity to make critical changes to secure the long-term ability of dry-lands to provide value for humanity's well being. To this end, the Secretariat is charged with:

- (1) raising awareness of (a) the causes of and (b) solutions to ongoing land degradation and desertification in the framework of a ten-year strategic plan and framework to enhance implementation of the Convention (the 2008-2018 The Strategy);
- (2) mobilizing financial and technical support to support special initiatives in observance of the Decade as well as other observance events and activities worldwide; and
- (3) monitoring and reporting on progress in preparation of the Secretary General's Report to the General Assembly at its 69th Session on the status of implementation of the resolution.

2.4 Community of Sahel-Saharan States (CEN-SAD)/ Sahara and Sahel Observatory (OSS)

After the ratification of the UNCCD, the Community of Sahel-Saharan States (CEN-SAD) was created to reinvigorate an effective fight against desertification in the region. It is intended that it will develop a shared vision and a common programme based on South-South

partnership and cooperation, in particular with the Arab Maghreb Union (AMU). The Sahara and Sahel Observatory (OSS) whose experience in, and support for, implementation of the Convention span more than ten years of serving the region, its sub-regions and their states - has offered to develop a regional community programme to fight desertification, with the intention of reinforcing cooperation and sustainable development. The AMU for North Africa was appointed to implement the Convention on the sub-regional level, specifically in the Maghreb countries. These organisations have drawn up and begun to implement sub-regional action programmes (SRAPs) to fight desertification.

2.5 United Nations: Food and Agricultural Organisation (FAO)

Evaluation and monitoring of desertification and drought processes is the primary way in which FAO helps deal with desertification. One of FAO's basic functions is to collect and interpret global information on all aspects of the food, agriculture, forestry and fishery sectors. In zones affected by desertification, these activities are particularly concerned with the natural resources used by the various sectors, their potential and vulnerability and their state of degradation or conservation. Also covered are the social and economic conditions, especially nutrition, linked to the use of these natural resources by the various sectors.

FAO has prepared a number of unique and comprehensive world maps of desertification and has, together with the United Nations Environment Programme (UNEP), developed a methodology for evaluating and mapping desertification, thus enabling the creation of a world map of desertification risk. In collaboration with UNEP and Unesco, FAO also developed a methodology for mapping land degradation. Regional maps were prepared for sub-Saharan Africa and for the Middle East East region. In cooperation with UNEP, FAO has distributed monitoring and evaluation reports on the evolution of pastoral ecosystems and has implemented several ecological monitoring projects in various parts of the Mediterranean.

At the local level, FAO has conducted numerous studies on agricultural systems, pasture and rangeland management, subsistence production, shifting cultivation and irrigated agriculture, taking into account the social, economic, legislative and institutional conditions of each country.

2.6 Global Mechanism (GM)/International Fund For Agricultural Development (IFAD)

The Global Mechanism (GM) of the United Nations Convention to Combat Desertification (UNCCD), was established by the First Conference of the Parties (COP1) held in Rome, in September 1997. It is a subsidiary body of the Convention, mandated to "increase the effectiveness and efficiency of existing financial mechanisms...[and]...to promote actions leading to the mobilization and channelling of substantial financial resources to affected developing country Parties" (Article 21).

The GM works with country Parties in mobilizing financial resources, using the emerging practices within the international community of harmonization and alignment with national development priorities, in the context of national budgeting processes, as called for by the

Paris Declaration on Aid Effectiveness. IFAD's mission is to enable the rural poor to overcome poverty. Its mandate is thus inextricably linked to tackling land degradation.

Because of IFAD's commitment to combating the causes of desertification, a large proportion of its investment is channelled towards programmes, grants and policy initiatives related to desertification. Indeed, over the past 25 years, IFAD has committed over USD 3.5 billion to supporting dry-land development and combating land degradation worldwide, with a large share of this devoted to the MENA region in particular.

2.7 World Bank Partnership on Combating Desertification (WBPCD)

The WBPCD is financed by the World bank to create enabling environments to implement the Convention to Combat Desertification (CCD) in developing countries affected by desertification. The partnership supports the Secretariat of the United Nations Convention to Combat Desertification, Global Mechanism, International Fund for Agricultural Development (IFAD), United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), Food and Agriculture Organization (FAO) of the United Nations, sub-regional organizations, and countries in their activities to combat desertification.

Specific partnership activities include: development and undertaking of awareness and advocacy actions in the context of the CCD; the establishment, operation, and maintenance of the Financial Information Engine on Land Degradation (FIELD) system for searching, collecting, and disseminating financial information related to land degradation; resource mobilization from bilateral donors, the UN system, multilateral financial institutions, regional and sub-regional financial mechanisms, and non-governmental organizations, foundations and other private sector entities; and making these available to affected countries; contributing to National Action Programmes (NAPs) in affected countries by financing actions designed to combat desertification and/or mitigate the effects of drought; and support of community based activities that will lead to effective measures aimed at combating land degradation.

3. The role of regional and local authorities in dealing with desertification

3.1 How regional and local authorities are affected

Desertification in the Mediterranean, as elsewhere, reduces the productivity of land and deprives people of biological resources that are important for human sustenance. These impacts, in turn, reduce the incomes (and subsistence levels) of millions of already poor, dry-land peasants, herdsmen and urbanities who form part of the same economy. Prolonged periods of drought under these circumstances often lead to hunger, malnutrition and starvation, high infant mortality and accelerated rural migration. Loss of biodiversity in cultivated plants and domesticated animals, and in wild foods which are so important when agriculture fails at times of drought, is a direct threat to food security. Desertification is therefore a major scourge, the effects of which are often felt most intensely at the local and regional levels.

The effects of desertification that produce steep drops in agricultural production can cause irreversible damage to local and regional production structures, particularly in areas that are heavily reliant on agricultural activity. In such instances, local authorities are forced to deal with the negative socio-economic effects associated with rising unemployment, declining incomes, hunger and social dislocation. However, because the negative economic effects of desertification can reduce revenue generation for local and regional authorities, their capacity to deal with the social effects is often compromised.

The effects of drought and land degradation – both closely associated with desertification – often cause high levels of migration, usually to urban areas, placing an enormous amount of stress on the local infrastructure and municipal administrations in areas that prove to be destinations for migratory movements. Indeed, such pressures can, in turn, put excessive pressure on destinations that are yet to experience desertification. Because the favoured destination of migrants is often urban concentrations, the already rapid pace of urbanisation in the Mediterranean region – especially in the eastern and southern rims – is further compounded. For example, if drought accelerates the migration of farmers from the countryside to cities, additional pressure is placed on city services such as water and sanitation, causing problems for already water-scarce users (e.g., water-dependent factories, hospitals, etc).

3.2 How local and regional authorities can deal with desertification

Although regional and local authorities often bear the brunt of the effects of desertification, they also happen to be best placed to deal with the man-made causes of desertification, as well as managing its effects, although their capacity for action is often contingent on enabling national and international conditions. There is now a clear prevailing consensus that meeting the challenges of desertification in an effective manner requires both top-down solutions from governments and bottom-up approaches from regional and local authorities and their communities.

Managing the dry-lands of the Mediterranean in a manner that can increase overall food security while maintaining the sustainable livelihoods of the people is vital. During the past few decades, numerous approaches to this problem have been made. These efforts include reforestation, establishment of shelter or green belts, sand dune stabilization, protection of existing forest reserves, the introduction of agro-forestry practices, establishment of communal woodlots and soil and water conservation measures. Many of the national and regional action programmes, however, have been hampered by lack of political will or poor financial resources.

This recognition of the importance of local and regional authorities coincided with the realisation on the part of the UNCCD that traditional responses to the effects of desertification have too often been excessively “top-down” in their approach. Traditionally, outside experts from concerned international organisations initiated the planning process for implementation of national and regional action programmes by defining objectives, activities, and expected outputs. This was then followed by a visit to the area to consult local authorities, inform them of the plan, and invite the community to help in executing projects. However, the UNCCD now proposes to turn this approach upside down, with greater emphasis on an ethos of participatory development. Currently, action programmes to combat desertification are encouraged to originate from the local level and to be based on genuine local participation. This is because shared ownership of planned initiatives is viewed as a key condition for their sustainability.

The increased focus on local participation in project planning is considered to be so important because previous attempts to combat desertification - usually co-ordinated by international organisations – failed to take into account the views, perceptions and capacities of local people. Consequently, they were usually ineffective. Indeed, despite their considerable expertise, outside agencies cannot necessarily identify local needs and priorities, or develop effective responses to them once identified. Local communities, on the other hand, have valuable experience and a special appreciation of their own environment. When the responsibility for natural resource management is taken away from them, their use of land and other natural resources can become highly inefficient. The result is often land degradation. Thus, participatory development recognizes the rights of local communities over their resources, granting them a greater stake than anyone else in improving agricultural productivity while ensuring the long-term ecological balance of their fragile lands. In addition, local participation in planning and decision-making is essential for building local capacity. Several clear best practices that define who should participate and in what way are now apparent.

First, those most directly involved in the management, use and benefits of a particular resource must be active participants. In the case of desertification, small farmers, pastoralists, nomads and other local land users are vital to the process, as they have the most intimate contact with the land. Local leaders — village elders, traditional chiefs, representatives of community groups — as well as local authorities (regional, district and municipal officials) are also essential for mobilizing action. Technical experts, researchers, non-governmental organizations (NGOs) and voluntary associations are called on to bring skills and expertise in response to locally perceived challenges.

Second, at the inception of a development initiative, the objectives and planned activities should be identified through a participatory process which includes the local level. Once a programme has started, the participants should conduct regular reviews of progress made and obstacles encountered. When each phase is completed, a consultative mechanism should help them all to be involved in evaluating its outcome and deciding on the next steps. NGOs, community based organizations (CBOs) and women's and youth organizations are essential actors here. It may also be necessary for the central government to delegate more decision-making authority and to share key aspects of the sustainable governance of natural resources with decentralized authorities closer to the local grass-roots level.

Third, because the participatory process is time-consuming and labour-intensive, affected areas need a stronger civil society presence. Awareness campaigns are needed to educate the public about national action programmes. Agricultural extension services and NGOs can help to build up the community's capacity for "participatory programming". Local decision-making procedures may have to be adapted and strengthened. The community has to go through a long learning and confidence-building process in order to take full advantage of the new resources it might receive and manage directly. Due attention should also be paid to gender issues and the involvement of the more marginalized social groups.

Fourth, while at the local level, discussions are likely to take place in informal groups as well as in organized meetings, the results need to be carried forward to the provincial and regional levels to ensure inter-village cooperation and coordinated management of the regional environment. At the national level, all of this input should be translated into a national action programme. In addition, the national government needs to respond to local aspirations by providing an "enabling environment", including a legislative and macro policy framework conducive to dry-lands development, public infrastructure and technical assistance. It should also serve as the central point for contact with foreign aid providers. Ideally, through the iterative NAP process, information and ideas flow back and forth continuously among the various levels.

Thus, the prevailing best practice is firmly oriented towards encouraging a bottom-up approach to combating desertification that integrates local people, national authorities and the international community. However, because desertification reflects fundamental ills, such as poverty, underdevelopment and lack of food security, solving the problem of desertification will not be possible without simultaneously attacking the causes of poverty and addressing the basic needs of rural people. Stopping desertification would necessitate reversing the processes of land degradation and protecting soil, water and biological resources. At the level of government policy, this would require the promotion of sustainable socio-economic development in order to eradicate poverty and ensure food and energy security, as well as the improvement of living conditions and the wider natural environment.

4. Proposals on how the UfM can help combat desertification

The previous section outlined the need for international, regional, national and local-level government co-operation to halt the process of desertification. As was made clear, there is much that can and must be done at both the regional, local and individual level. In line with the best practices outlined above, several key proposals are outlined in this section. It should be noted that there is great potential for synergies with the Secretariat of the UNCCD in all the areas highlighted here. As such, any effective UfM programme should be co-ordinated with the Secretariat to ensure that resources are not replicated, but are instead leveraged to achieve maximum impact.

4.1 Active encouragement of community organisations

Community organizations and international NGOs have a vital role to play in combating desertification. This is because community organizations are well placed to help governments put appropriate projects into place. To help communities cope with the effects of drought and the impacts of desertification, there is a need for both short and long-term solutions. If the entire community is motivated and mobilized to deal with desertification, true sustainable solutions can be found. The UfM has the potential to co-ordinate a common approach to the creation of local-central government partnerships, and ensure effective knowledge transfer of best practices across the region.

4.2 Accelerated promotion of sustainable agriculture

The development and dissemination of sustainable agricultural methods is essential to reducing causes of desertification, including soil erosion, over-exploitation of fragile lands, overgrazing on rangelands, and in some areas, overuse of chemical inputs that can reduce long-term productivity. Overall, it is important to reduce pressure on marginal lands, to counter land degradation and to rehabilitate degraded lands through the use of appropriate land management techniques, to reforest deforested areas and to develop the use of alternative energy sources. The promotion of sustainable agriculture is part of the wider drive to achieve socio-economic modernization across the region. Consequently, any activities oriented towards sustainable agricultural development should also be linked to the efforts of other international agencies present in the region with an interest in promoting economic development (e.g., the World Bank, OECD, EBRD UN, etc). There is thus a clear role for the UfM in co-ordinating the activities of these organisations.

4.3 Promotion of education on desertification and land degradation

More research is needed on how and why land users degrade their land. This research should also focus on land tenure systems, which constitute a major impediment to communities living in fragile ecosystems. While the research itself is already being undertaken in some instances by other organisations with an interest in the subject, the UfM has a potential role to play in co-ordinating the transfer of knowledge among European and Mediterranean universities and research institutes which are carrying out research in the area. Moreover,

because public environmental education is necessary to ensure long-term sustainability of all measures that combat desertification, the UfM has an important role to play in disseminating the results of research in the area.

4.4 Promotion of public information

Programmes to educate citizens about the value of preserving woodland and about alternatives to current practices are necessary, along with citizen participation in developing the best methods of implementing the goals. Local communities can do much to spread awareness of the reality of desertification through media campaigns and public speaking. The UfM has the potential to co-ordinate the provision of a regional campaign to promote awareness of the causes and consequences of desertification across the region.

4.5 Local and central government partnerships

A supportive political environment together with the necessary infrastructure plays an important role in the success of projects aimed at combating desertification. Local organizations can persuade their governments through letter-writing campaigns, the use of media and other methods to get them to take notice of the problem of desertification. Governments seeking to protect the fundamental, long-term interests of their people in dry-land areas should seek to arrest desertification and reverse its effects whenever possible. This involves not only the direct responsibility of each government to sustain lands under its legal authority, but also a responsibility for all governments to cooperate and to assist in this task as part of a global effort. The UfM has the potential to co-ordinate a common approach to the creation of local-central government partnerships, and to transfer knowledge and best practices across cases.

4.6 Improved access to finance for local initiatives

Previous attempts to combat desertification have failed because of the absence of sustainable access to finance for organisations charged with implementation of action programmes. Thus, ensuring that local and regional authorities are able to secure long-term financing arrangements to support initiatives will be essential to the success of efforts to fight desertification across the region. The role for the UfM might be to co-ordinate the activities of regional financial organisations rather than provide the financial resources directly.

4.7 Openness to popular participation and use of local knowledge

Finally, many indigenous people have lived for thousands of years on their land without causing desertification. The survival skills and knowledge of the Earth's processes held within traditional groups of people living in dry-lands could offer many solutions to these problems. Any policy taken to combat desertification should take into account the ways of life of indigenous peoples in the areas affected, and try to incorporate their knowledge into an overall action plan.

1. ARLEM's role is to act as a network bringing together the expertise, power and will for collective action of all 43 UfM countries. In doing so, it should fulfil three functions: (1) to inform (and to warn) ARLEM members about the serious challenges that climate change presents; (2) to encourage the formation of international and inter-regional partnerships between states on both sides of the Mediterranean so that they can embark on projects that mitigate the effects of climate change; and (3) to make members fully aware of what sources of EU and UfM funds that will allow them to meet these objectives.

2. The challenge for ARLEM members when they return to their regions and localities is to act as champions and exemplars in the fight against climate change at the local and regional level. At the heart of this must be a widespread 'greening' of all areas of public action, so that climate change policy is not a separate policy domain, but rather something that is deeply embedded across the full range of public policies, from housing to transport to the encouragement of enterprise.

Summary

This report has analysed the relationship between desertification and climate change in the Mediterranean, with special reference given to the role of local and regional authorities in responding to the challenges associated with them. It was argued that climate change is one of a number of variables that are considered to contribute towards desertification. Desertification - land degradation in dry-lands - results from various factors, including both climatic variations and human activities. While desertification is primarily caused by human activities, climate change is likely to exacerbate its spread and effects. Moreover, desertification also has the potential to amplify the onset of climate change.

The Mediterranean – especially around the southern and eastern rims - is one of the regions worst affected by desertification, because of climatic, environmental and socio-economic factors. This is unfortunate because desertification has a number of alarming consequences, including: environmental degradation that reduces the land's resilience to climate variability; compromised potential for food production; an increase in the incidence of famine; indirect pressures on areas outside the immediately affected areas; and socio-economic instability. In turn, these factors have the potential to exacerbate other challenges facing the region.

The consequences of desertification – including environmental degradation, economic underdevelopment, unemployment, poverty, health problems, social instability, etc. - are often felt most intensely at the local and regional levels. However, although regional and local authorities often bear the brunt of the effects of desertification, they also happen to be best placed to deal with the man-made causes of desertification, as well as managing its effects.

Fortunately, because of the important social, economic, political and environmental consequences of desertification and climate change that are likely to shape the development of the Mediterranean, there are already a large number of organisations operating in the region with the aim of combating desertification. Of perhaps most significance is the Secretariat of the UNCCD. The Secretariat has worked across both Mediterranean region and beyond for a number of decades and has identified a number of best practices for dealing with desertification. Very often, these best practices are focussed at the local and regional levels, with the UNCCD encouraging a 'bottom-up', participatory approach to combating desertification.

With these best practices in mind, a number of key recommendations and proposals for the UfM to help local and regional authorities combat desertification were presented. They included: the active encouragement of community organisations; accelerated promotion of sustainable agriculture; promotion of education on desertification and land degradation; promotion of public information; the formation of local and central government partnerships; help to improved access to finance for local initiatives; and an openness to popular participation and use of local knowledge. Any initiatives should be co-ordinated with agencies already working on the issue in the region, especially the Secretariat of the UNCCD.