UNITED NATIONS E

ECONOMIC AND SOCIAL COUNCIL

Distr.
LIMITED
E/ESCWA/SDPD/2005/WG.3/4
18 July 2005
ORIGINAL: ENGLISH

Economic and Social Commission for Western Asia

Expert Group Meeting on Reversing Land Degradation:
Issues and Options
Beirut, 25-27 July 2005

LAND DEGRADATION IN THE NEAR EAST:

CASE STUDIES

By

Ghassan Hamdallah
Sr. Soils and Fertilizers Officer
FAO Regional Office for the Near East, Cairo

05-0447

TABLE OF CONTENTS

Land Degradation in the Near East:
Case Studies

A. BACKGROUND

1. *A Region with Limited Resource Base*

The Near East Region extends over a large land area, from the Atlantic on the West to the Central Asian States on the East. Although the 32 Member Countries sweep about 10% of the World's land area, and having some 10% of its population; these countries hardly enjoy 2.2% of the global Internal Renewable Water Resources (IRWR). Some 70% of the Region lands are arid or semi-arid.

In addition to the limited natural resource base in the Region (arable land per caput is 0.2 ha and the average fresh water share is 1500 M^3 per year); a wide disparity exists from one country to the other. For example the renewable water share ranges from over 10,000M^3 in some CIS States to lower than 120M^3 in other countries like Jordan. In addition, 60% of the good arable lands exist in only 4 countries of the Region: Iran, Pakistan, Sudan and Turkey.

2. *A Region Dominated by Dry Lands*

On the Global level, dry lands are home to nearly 2 billion people. In the Near East, these areas would include good portion of the urban parts, in addition to the usual dry land dwellers of livestock herders and small-scale farmers. Dry land areas are characterized according to the UNCCD by a ratio of annual precipitation/potential evapo-transpiration (P/PET) between 0.05 and 0.65 (Aridity Index).

3. *Main Causes of Land Degradation*

The generally-quoted causes for Land Degradation include chemical and physical parameters that could be man-made or of natural nature. Those causes would include: salinization of soil and ground water, sand encroachment, urbanization, drought impact, forest clearance and wood cutting, over-grazing and farming of marginal lands, etc. A simple review of these parameters in the Near East would reveal that almost all of these factors do exist in most countries, at a varying degree of severity.

Of the naturally-occurring phenomena, drought can stand alone as a single dominating one. The Drought wave that swept over majority of the Near East countries during 1999/2000 was heralded as *"the worst in 30 years in Jordan, Syria, Iraq and perhaps others"*. Needless to say that during drought, Land Degradation is un-evitable consequence. Due to its clear negative impacts on water, agriculture, as well as on socio-economic and environmental aspects; many countries opted, with the FAO assistance, to develop *Strategies and Action Plans for Drought Preparedness Planning and Mitigation Measures.*

The three terms: *desertification, land degradation, and soil deterioration* are all interconnected. Several processes and features of desertification are already defined, most prominent of which are: urbanization, salinization and alkalinization, loss of soil fertility, impeded drainage, water-logging, wind and water erosion, sand deposition (sand dune encroachment) and soil pollution.

4. *Extent of Land Degradation World-wide*

Land degradation has been recognized as a global problem associated with desertification in dry land regions. It has been a focus of much political and technical attention since and the United Nations Conference on Environment and Development (UNCED) in Rio in 1992. Following this Conference, the adoption of the Convention to Combat Desertification (UNCCD) occurred in 1994.

It is estimated that 2.6 billion people are affected by Land Degradation and desertification affecting more than a 100 countries, covering over 32% of the Earth's land surface. Around 73 % of rangelands in dry land areas are currently being degraded, together with 47 percent of marginal rainfed croplands and a *significant* percentage of irrigated croplands.

B. LAND DEGRADATION ASSESSMENT IN DRY LANDS (LADA)

1. *The LADA Programme*

The Programme principal objectives are to develop and implement strategies, tools and methods to assess and quantify the nature, extent, severity and impacts of Land Degradation on ecosystems, at a range of spatial and temporal scales. This can be done by:

i. Using Remote Sensing (RS) and (GIS) techniques;
ii. Producing a baseline map of dryland degradation at sub-regional scale;
iii. Enabling early warning of land degradation trends and the 'hot spots' together with their policy and institutional causes;
iv. Developing an information network leading to strengthened national capacity for undertaking land degradation assessment, interpret the results and provide information for land use;
v. Making land degradation assessment information readily available and user-friendly or land users and decision/policy-makers, and promoting the exchange of information on dryland degradation

2. *Need for LADA Programme*

The Programme was formulated in 2001 based on the identified need fro such global initiative, to try address some of the un-answered points stated below.

- Most assessments of global soil erosion have been based on unjustified extrapolation from measurements at plot scale, whilst early estimates of the area affected by desertification varied widely, from 1,615 to 3,475 million ha.
- The only case to date of a complete world assessment is the 1990 Global Assessment of Soil Degradation (GLASOD), results for which form the basis of the World Atlas of Desertification, (LADA, 2000). Some consider the picture drawn from this global assessment as "sketchy" and short of giving adequate details.
- Recent advances using economic-ecological zoning, RS& GIS techniques, databases, and strategic impact assessments and scientifically reliable and innovative assessment methodology for land degradation, including its biological and socio-economical components.
- *Previous and existing approaches* and capacities for assessing land degradation, and dissemination of information; showed general weakness of institutions in most of poor countries in the Drylands.

3. *Other International Initiatives with FAO Partnership*

FAO identified the availability of a number of databases and other sources of information of potential value to LADA activities, including the following.

- Digital Soil Map of the World.
- Forest Resources Assessment (FRA).
- Global Agro-Ecological Survey (GAEZ).
- Land and Water Resources Information Systems.
- AQUASTAT: database on water resources.
- TERRASTAT: database on world soil potential and constraints at country level.
- World Agricultural Information Centre (WAICENT).
- AFRICOVER: a project to map at 1: 250 000 land cover in Africa. The East African module, well advanced in its activities, involves 10 countries with a total area of 8.5 M km^2, at a cost of US$1.08 km^{-1}.
- Land Cover Classification System (LCCS): a standardized system, adopted by AFRICOVER and other international programmes.
- Food Insecurity and Vulnerability Mapping System (FIVIMS).
- ECOPORT: an Internet engine, which gives users access to data, allows them to contribute, but prohibits unauthorized changes to authored pages (www.ecoport.org).

In addition, the following projects were conducted under multiple sponsorship, with major contribution from ISRIC in the Netherlands.

- World Soils and Terrain Database (SOTER).
- Global Assessment of Soil Degradation (GLASOD).
- Asian Assessment of Soil Degradation (ASSOD).
- World Overview of Conservation Approaches and Technologies (WOCAT).

4. *Value of the Experience and Data Sources for LADA*

Current national efforts will form a highly valuable starting point for formulation of LADA national-level activities.

Where possible, LADA will make use of existing assessments and data, and will build up partnerships with ongoing programmes. The Project will carry out a major stocktaking exercise on the existing information and capacities that could support the project. This will include, for example, assembly and reconciliation of the digitized Soil Map of the World, the Soils and Terrain Database (SOTER), the mapping units employed in the Global Assessment of Soil Degradation (GLASOD), the FAO Global Agro-Ecological Zones framework (GAEZ) and FIVIMS programme; the data from the FAO Forest Resource Assessments; GIWA; observations of climate, as reported by organizations including WMO and FAO; environmental indicators and databases collected or reported, for example, by UNEP's Global Terrestrial Observing System (GTOS) and Global Resource Information Database (GRID), and the Reseau d'Observatiores de Surveillance Ecologique a Long Terme (ROSELT) of OSS; data on natural ecosystems as monitored by conservation organizations, e.g. the World Conservation and Monitoring Centre (WCMC) and UNESCO; the Millennium Ecosystem Assessment; the assessments of best practices of land management, as exemplified by WOCAT and UNEP's programme on Success Stories in Desertification Control; and the socioeconomic statistics and census data as available at international, national and in some cases sub-national levels. In addition, a major effort will be made to collect and homogenize all existing data related to desertification and drought as provided by countries and regions, in

particular within documents of National and Regional Action Programmes (NAPs and RAPs) of the UNCCD, and within information networks on resources and early warning systems related to food security.

Capitalizing on the existing data is a necessary but by no means sufficient condition to assess land degradation in order to meet LADA objectives, and it is recognized that a great deal of new data will be needed to be collected, produced and analysed, in particular on soils, vegetation (rangelands, crops, woodlands), water resources conditions, and on the main socioeconomic factors related to land degradation. A substantial effort will also be needed to integrate all these data within land units which are relatively homogeneous with respect to both natural and socioeconomic conditions, which can be characterized as agro-ecosystems or land resource domains. The preparation of an integrated information platform of this kind is essential in order that the large volume of diverse information can be analyzed in an holistic manner.

C. LAND DEGRADATION CONTROL: *National Efforts*

The data below on the Near East countries were based on Country Reports, as well as FAO and UNCCD data and websites:

ALGERIA

The large scale use of stone was initiated in Algeria and then became used all over the world. In Algeria, interventions were mainly based on a national project called the "Green Barrel" which covers the Saharan Atlas region on a surface estimated at 3 million ha. Desertification in Algeria continues to degrade ecosystems every year and land degradation is a consequence to this.

The main causes of desertification in the country are:

i. Expansion in cultivation, facilitated by the mechanized farming on sloping lands, is a prime cause.
ii. Overgrazing of range lands by the out-numbered livestock population.
iii. The eradication of woody species.
iv. The salinization of land due to expanded irrigation, as well as inappropriate use of water.

This ambitious National Programme took some priority steps aiming to: protect and improve the existing vegetation; reestablish tree populations; reforest appropriate lands; develop agricultural and pastoral lands; combat sand encroachment and dune fixation; mobilize underground and surface water resources; and finally to install necessary infrastructures such as tracks and roads. To this end, about 200,000 ha have recently been examined and assessed.

Reforestation has taken place on about 140,000 ha. Such reforestation for ecological protection purposes is generally undertaken on slopes which are subject to erosion; on dune areas; on banks of springs and ravines and on cattle routes. It also aims to set up wind breaks for small urban centers and economic infrastructures.

Actions to establish tree plantations in pastoral areas aim at improving land degraded from overgrazing, and at increasing fodder availability, by a rational use of resources. At the same time, such action helps to decrease the pressure of overgrazing on mountain forests. Tree plantations, now covering about 10,000 ha, are an important experiment with promising potential.

Projects of dune fixation covering an area of nearly 5,000 ha have been launched. The fixing of dunes is undertaken in two stages by fencing with dry palms and other materials and by planting adapted species.

Experience equally shows that, in all strategies for combating desertification, two fundamental elements have to be taken in account:

- First it is important to preserve ecosystems in threatened regions by extremely prudent management of available natural resources; and
- The second step is to gradually rehabilitate degraded and disadvantaged regions by developing their productive capacity and assessing the original value of their resources.

EGYPT

Egypt played an active role in the formulation of the United Nations Convention to Combat Desertification (UNCCD) which was concluded in Paris in June 1994. The Convention has come into force in December 1996 since the required number of countries completed the ratification process. Parties to the Convention have to meet their commitments, foremost of which is the preparation of a National Action Programme (NAP) to combat desertification. The main objective of NAP is to identify factors contributing to desertification, and the appropriate measures to combat it.

The high population density has placed the lands resources under serious pressure. Most lands are overexploited, with short periods of fallow, and high doses of fertilizers are added. In some places where subsurface drainage facilities are absent or inefficient, water logging and the concomitant salinity and sodicity are degrading the lands.

The projects were selected to reflect the wide range of Egyptian efforts to combat desertification within the context of sustainable development. The examples given cover all types of land use: irrigated and rain-fed agriculture as well as rangelands. The examples also reflect work undertaken and/or planned to improve the physical environment and improve the institutional capacity of relevant stakeholders. Moreover, they represent both of work done and/or to be done on the local scale and work of regional and far reaching consequences.

Marsa Matruh Project: One of these areas is the northwest Coastal Zone along the Mediterranean Sea., near Marsa Matruh city was chosen in 1987 to implement a project under the name of the "Qasr Rural Development Project". *First,* an efficient water harvesting system would be established in the area, whereby water of the winter precipitation may be conserved for maximum utilization. *Second*, limited agricultural resources in the area would be utilized with due consideration to environmental consequences. *Third,* the native Bedouins population would be integrated into the ongoing development to guarantee their positive response to the extended opportunities.

Shrouk Project: The general objectives of integrated rural development include: development of local material resources; development of local human resources; and development of local institutional resources. The specific local objectives include: maintaining environmental natural resources; rural housing; transportation; energy; health services; motherhood and childhood care services; family planning; and people's participation.

Siwa Development Project: This Oasis is located on the northern edge of the great sand sea of the Western Desert of Egypt. It is rich in naturally-flowing springs and an extensive land area with a population of 10,000. Accumulated excess water causes rising water table, salinization, and thus land degradation. The Programme objectives are: to strengthen the Government capacities to plan and implement measures for the conservation and rehabilitation of natural and man-made environment. Strategies and ways to shelter and expand the available natural resource base, with the aim of leading to higher production, reduced migration, and improvement of the living condition in rural areas.

South Valley Development project: The Egyptian Government has embarked on a grand scheme of integrated design to develop the southern portion of the country. The underlying strategy is to redeploy present and future population over a wider spatial distribution such as to change demographic map of the country. It is estimated that the inhabited portion of the country would increase from 6% at present to 25% when the scheme is completed in the year of 2017. The scheme comprises plans and programmes that pertain to water engineering, agriculture, mining, industry, and tourism as well as human settlements, social, economic, and institutional activities. At present, work has begun in the Toshka Project which calls for the reclamation of 540,000 feddans (i.e acres) to the west and northwest of Abu-Simbel area, about 300 km south of Aswan city. The annual water budget of the Project is 5 billion cubic meters would be pumped from Lake Nasser through a canal that is named "El-Sheikh Zayed Canal" in appreciation of the friendly relations between Egypt and the United Arab Emirates.

Monitoring of Sand Dune Fixation: Most of the sand dune accumulations in Egypt occur in the Western Desert. Main relevant activities include:

- South Fayyoum-Wadi Rayyan dune belt that fringes the western side of the cultivated land of the Nile valley between Minya and Assiut.
- West Aswan and West Abu Simbel dune belts that cause siltation of the northern and northwestern parts of Lake Nasser.
- Ghard Abu Muharik that threatens the farms and settlements of Kharga Oasis and consequently the human activities related to the on-going Toshka national development project.
- The Farafra Depression dune field that threatens farmland and settlements of the Farafra and Dakhla Oases as well as the recent agricultural development project along Darb El-Arbain.
- Northwest Sinai Dune field where large land reclamation and cultivation projects are undergoing depending on EI-Salam Canal for irrigation.

The country needs a design of appropriate methodologies for combating the adverse effects of dune accumulations and movement for protection of its national desert development projects. This may be gained through better understanding of the geometry and dynamics of dunes, and the controls.

IRAQ

In Iraq, desertified areas or those subject to desertification are estimated to exceed 92% of total surface area. Causes of desertification can be classified into various categories according to its intensity and the extent of affected areas, as outlined below.

Type/desertification	Intensity	Areas affected (ha)
Wind erosion	light-medium very strong	1,431,000 635,000
Water erosion	light-medium strong-very strong	4,691,000
Soil salinization	light-medium strong-very strong	1,322,000 1,679,000
Soil hardening	calcified gypsum	16,771,000 8,600,000
Total area affected by desertification		40,129,000
Total Iraqi surface area		42,397,000

% of desertification area	92,5%

Source: http://www.unccd.int/knowledge/INCDinfoSeg/partv-1.php?noMenus=1#para6

This table reveals that about 92 % of the total Iraqi area is subject to one or two kinds of desertification, with varying degrees of intensity. Since 1981, the percentage has increased especially since military operations damaged both soil and plants and had other negative consequences detrimental to the environment.

Some 93% of Iraqi lands are affected by water and wind erosion. The following table indicates the areas affected by wind erosion.

Salinization of agricultural lands has become acute in Iraq due to an irrational use of water, as well as poor irrigation and drainage networks. It is estimated that about 10,000 ha/year suffer from salinization. More than half of the irrigated agricultural lands in Iraq are estimated to be affected either by salinization or water-logging.

Pastures have deteriorated in both desert areas particularly in the western desert, causing vegetative cover degradation and a worsening of the wind erosion problem.

Degradation of pastures, which constitute about 70-75% of Iraq's total area, resulting from: overgrazing; spontaneous grazing; woodcutting and uprooting of shrubs; as well as the cultivation of crops in pasture areas.

The protection of the public estuary project, in its first phase, stabilized sand movement for a distance exceeding 70 Km. Thus, drainage network of El-Gharraf El-Kabir has been protected against sand movement through the adoption of mechanical and biological methods over an area of 12,000 ha aimed at sand stabilization. This region, characterized by moving sand dunes, has been turned into agricultural and forest lands. An extensive programme was initiated to protect the Saddam river against moving sands, which can bury it altogether for a distance exceeding 100 Km on both banks stabilized by mechanical methods (mud covering). The Saddam river project covers the provinces of Wasit, Zi Qar and El-Qadeseya. Furthermore, 2,5 million seedlings of drought salt-resistant trees and shrubs of high forage value were planted after being irrigated. Thus, sand dune lands were turned into agricultural lands estimated at 25,000 ha.

Forest degradation resulting from excessive woodcutting, overgrazing and fires; which have all led to deteriorating plant cover in the forests of northern Iraq. Forests in Iraq used to cover all mountain areas in the north and the north-east. In 1970, forests covered 1.851 million ha but in 1978, they only covered 1.5 million ha. What can be seen now is only disparate forests of oak trees in the most remote areas.

The Impact of Military Activities in Iraq

i. Military activities in all forms, be they bombing, building trenches, or the use of heavy machinery have damaged the surface layer of soil in all parts of Iraq and especially in its desert areas. Severe, continuous sand storms, unknown in previous years, have caused wind erosion and the formation of moving sand dunes, which in turn speeded the process of desertification.
ii. The destruction of sites for electricity generation has halted stations which pump water from secondary drains to main drains. This has caused a rise in the level of groundwater and the rise of soil salinity.
iii. Due to fuel scarcity, citizens were forced to fell trees for household purposes. This has caused the uprooting of trees in many provinces in Iraq, which in turn had a negative impact on the environment.
iv. Diseases and insects have spread widely in the biota due to a lack of spraying planes.
v. Plant cover in the desert, which has grown over the years, was damaged. This plant cover cannot be restored without launching scientific programmes on a wide-scale.

THE ISLAMIC REPUBLIC OF IRAN

Deserts and desertified lands account for 34 million ha of Iran's total land area, out of which 12 million ha are sandy or covered by shifting sand dunes.

Land degradation and desertification in Iran have accelerated during recent decades due to the following factors (Population has doubled during the last 20 years):

i. The need for more agricultural and pastoral products has forced people to use land extensively or to convert forests and rangelands to cultivated land, without due consideration for the real potential and capacity of such land.
ii. Over-grazing and misuse of rangelands.
iii. Over use of wood and plants as fuel for household, as well as irregular exploitation of water resources.
iv. Refugees have degraded 1.2 million ha of natural resources to meet their needs.

The Government policies and programmes to rehabilitate and develop renewable natural resources, with special consideration for desertification control, are as follows:

- Increase public awareness about the importance of renewable natural resources and the dangers of desertification;
- Acceleration of socio-economic development in rural areas so as to prevent the migration to major cities and urban centers;
- Rehabilitation and reclamation of degraded lands;
- Sand dune stabilization to minimize negative effects on farm land, residential areas, strategic areas, roads and other valuable economic infrastructure.

Damage associated with sand dune encroachment increases annually. The first truly serious effort to control shifting sand dunes was initiated in 1965, initially involving only 100 ha of land. Today, such efforts have gown in scope and dimension so that sand-dune stabilization projects and anti- desertification programmes cover about 1 million ha annually.

Innovative measures of dune stabilization include biological, mechanical and chemical procedures and methods, including the planting of seedlings, seeding, the establishment of palisades and the application of petroleum mulch. More than 4 million ha of Iran's desertified and unproductive lands have been reclaimed until now. A highlight of the current phase of these efforts is a National Plan of Action which began in 1992 which envisages reclamation and sand-dune stabilization of 10 million ha of degraded lands.

Iran has actively co-operated with those countries and international agencies interested in mutual cooperation, and hosting regional meetings in cooperation with Economic and Social Committee for Asia and the Pacific (ESCAP), UNEP and FAO, as well as trilateral cooperation (Iran, UNHCR and IFAD) to rehabilitate desertified regions with Afghan refugee settlements. Plans also exist for the establishment of a Project Office for Desertification Control sponsored by ESCAP and UNEP in the country.

JORDAN

Land degradation in the country is driven by many factors among which are:

- The apparent dry climate with frequent *drought waves* in the country;

- *Misuse of land resources* (*overgrazing in the steppe and desert zones*, as well as in the forest land), is considered to be a primary cause of degradation of vegetative cover.
- *Overstocking of grazing animals* has led to either destruction or severe cutting of plant cover, with subsequent exposure of the soil to the erosion effects of rainfall and runoff, particularly in the steppe zone.
- The *expansion of arable farming* onto these lands is generally accompanied by very poor results and often crop failures.
- *Urbanization* is also steadily encroaching onto good quality agricultural land in the higher rainfall areas of the Jordanian highlands, reducing the traditional production areas of food crops such as wheat and barley.
- The *long term effects of chemical fertilizers* and pesticides on water quality, as well as the soil properties.
- *Certain irrigation practices* are continuing to experience fairly serious salinity and sodicity problems, due to a combination of unfavorable soil and drainage conditions.

To control Desertification below are some activities that were implemented in this regard.

- Rangelands Improving Project, where about 27 Range Reservations have been established with total area of 75,000 ha.
- High Land Project, by establishing soil conservatives measures like *stone walls, terraces ... etc. The Project started* in 1964 in cooperation with the *World Food Programme.*
- Zarqa River Basin Project *which* Started in 1980 with three stages and ended in 1995, covering some 82,500 ha of the private owned agriculture lands. The Project focused on improving the range and forest lands and protecting the Zarqa River sides, through providing extension for implementing conservative measures and planting the proper plants.
- Hamad Project , focusing on improving the rangelands for a good livestock production and improving the water sources and improving the population social and economical status in the north east part of the Kingdom. The Project managed to build several small dams and digging big holes in the area to collect water, including two artesian wells.
- Afforestation and Forest Management projects, dealing with managing and protecting the natural forests and increasing the planted forest areas through a yearly plan, as well as involving the private sector in improving their lands (community participation).
- Al Azraq Project started in 1994 to study the optimum use of available soil and water resources in Azraq Oasis in an integrated sustainable way and rehabilitation of the area.
- National Soil Map and Land Use Project started in 1989, with the main objectives to identify, describe and geographically locate areas of arable lands and obtain all information about soils necessary for agricultural and urban project planning to classify arable land areas according to suitability for irrigated and non-irrigated agriculture.

LEBANON

The different ecosystems in the country are mainly threatened by deforestation, over-grazing, urban development, road development, bad agricultural techniques, excessive use of chemical products, over-hunting and industrial development.

As soon as the countries affected by drought and desertification were called for the signature and ratification of the Convention to Combat Desertification, the Government of Lebanon, through the Ministry of Agriculture, answered the call. The CCD was signed in September 1995 and ratified in December 1995.

An Umbrella Project document was prepared with the assistance of UNDP and FAO. It led to the preparation of a project document with the assistance of UNDP aiming at the preparation and implementation of the NAP and its activities. It was pending till now because of the lack of funding from the Government. Another project will

be providing a support to the preparation of the NAP. It will be implemented with the German development agency, the GTZ, the Arab Centre for Scientific and Agricultural Development, ACSAD, the National Centre for Remote Sensing and the Ministry of Agriculture, Rural Development and Natural Resources Directorate. It is financed by the German Government with an in-kind contribution from Lebanon.

Land degradation and deforestation are not problems of the last decades only; they started more than a century ago and kept going on. Regions severely affected by desertification are of areas in el-Hermel, Baalbeck, Zahle. Regions partially affected by desertification are Akkar, Tripol, Zgharta, Koura, Kesrouan, Beirut, Saida, Nabatieh, Mary Ayoun, Sour, Bint Jbeil, Rachaya and West-Bekaa areas.

Both the Ministry of Agriculture and the Ministry of Environment are launching initiatives to save the natural patrimony and promote protection and proper management of natural resources. Laws prohibiting wood cutting and protecting forests from fires, grazing and mismanagement are issued. Bird hunting is forbidden awaiting for the improvement of the law on hunting. The production capacity of the forest nurseries of the Ministry of Agriculture is increased; reforestation activities are being undertaken.

This European Union financed plan calls for the sustainable management of forests in Lebanon through the establishment of 3 separate pilot projects in Bekaa, Northern Lebanon and Mount Lebanon. Executed by the French National Office for Forestry, the project provides demonstration at different levels including the production of seedlings, afforestation, grazing management, forest pruning and different managing tools as well as capacity building and training for engineers at the Ministry of Agriculture.

Forest Fires Prevention Programme is co-financed by the French and Lebanese Governments. It is being executed by the French Forest Office and the Ministry of Agriculture. It aims at providing equipment for forest fire control and primary interventions as well as capacity building on the levels of both engineers, forest guards, through training in France and Lebanon. This has included training programmes for personnel at the Ministry of Agriculture in France and investing in forest fire prevention equipment, and the construction of water reservoirs in areas exposed to fire incidence.

Conservation and Sustainable Use of Dry land Agro-Biodiversity of the Near East project being executed by the Lebanese Agricultural Research Institute emphasizes the prevention and control of land degradation through the development of sustainable use methods for biodiversity conservation as well as the demonstration and application of techniques, tools and methods to conserve traditional crops, and forests

MOROCCO

Out of the 20 million ha of watersheds located upstream of existing or future dams, approximately 5 million ha face significant risks of water erosion. With an average soil loss over 2000 tons/km2/year in the Reef region.

Forest decline is estimated at approximately 31,000 ha each year, the breakdown of which is as follows: 22,000 ha corresponding to fuel wood cutting, 4,500 ha resulting from land clearance, 3,000 ha lost to fire, and 1,000 ha to urbanization and other domestic uses.

Approximately 8.3 million ha of rangelands are heavily degraded. They are located mainly in the eastern regions of Morocco (the Oriental), the Souss, the Pre-Sahara and the Sahara. Furthermore, land clearing affects more than 65,000 ha taken from the best grazing lands of the country.

According to Ministry of Agriculture report 1995, some 5.5 million ha of sloping area studied suffer from water erosion.

Approximately 500,000 ha located mainly in the command areas are threatened by salinity, which occurs in most Moroccan irrigated schemes;

The oasis is also threatened by salinity and sand blowing. A study, conducted in 1982 on 21,000 ha, revealed that 35% of the Tafilalet palm grove soils were salty (4 to 6 g/l), and 18% very salty (> 16 g/l). In addition, sand movement continuously threatens houses, agricultural lands, irrigation canals and roads. Affected areas are estimated at 30,000 ha in the Ouarzazate province and 250,000 ha in the Errachidia province.

Wind erosion conditions are meted in the south regions which are characterized by low and variable precipitation and frequent droughts, and where high winds and high temperatures are manifested (principally in Errachidia, Ouarzazt, Tiznit, Figuig and Essaouira), the damage can be either looked in irrigated areas like Agadir where the Wind erosion alter some component of irrigated infrastructure.

In order to reduce the damage causing by weeds in agricultural fields, the ministry of agriculture in Morocco had conducted a famous program to reduce this kind of weeds in different areas of Morocco: 300 ha of lands had been reclaimed from Doum weeds (Tangier), and 1230 ha had been reclaimed from jujube weeds (Al Hoceima, Nador, Oujda, Sefrou, Settat, Khouribga).
Med coastland is a thematic network project funded by the European Union within the 5th framework program for the International Cooperation with Mediterranean Countries (INCO-MED), aiming at the Mediterranean coordination and dissemination of land conservation management to combat land degradation for the sustainable use of natural resources in the Mediterranean coastal zones. The overall objective of MED-COASTLAND is to contribute to sustainable development, planning and management of natural resources in Mediterranean coastal areas, with particular regard to Land and Soil Degradation and Conservation Management.

The National Action Programme to Combat Desertification: The adoption of the UN Convention on Desertification Control (UNCDC) in June 1994 represents an important landmark in the process initiated by the international community to attempt facing up to the challenges posed by desertification and drought control. In this regard, concerned parties are urged to design national action plans to combat desertification.

The NAP fits within a broader scope integrating all activities and initiatives aiming to achieve the goal of sustainable development. It is conceived as a conceptual framework for the operational implementation of Strategy 2020 for rural development.

The first vocation of the NAP is to pave the way for success conditions of desertification control programme, through:

- Mitigation of the erosion process: village-based forestry and windbreaker curtains.
- Development of forest and pre-forest pilot zones.
- Promotion of rainwater harvesting, such as in the Anti Atlas and Reef regions.
- Implementation of projects to harvest water resources will prioritize indigenous approaches and will contribute to decrease the harmful effects of drought.
- Consolidation of agricultural, forestry and rangeland sustainable development.

SAUDI ARABIA

Range and Forest Lands considered to be susceptible to degradation were protected through the following:

- Several Large Enclosures were fenced for *grazing control.*
- About 29 locations were fenced for *forest protection* in seven land units.
- Some 21 *Range Areas* were also protected from grazing by fencing.

- About 51 Sites in forest areas were *planted with trees*.
- Some extensive *dune fixation areas* were planted with trees and shrubs.
- The Ministry of Agriculture established *29 Forest Nurseries* in different regions of the Kingdom
- Approximately 6.8 million trees were planted between 1978 and 1992.
- Nearly 60 Sites in Rangelands in 14 districts spread throughout the country were re-seeded by perennial native species. Approximately 725 projects of this type were executed.
- The Kingdom started large scale sand dune stabilization (4500 ha) in Al Hassa, whereby more then 10 million seedlings of trees and shrubs were planted to be as a National Park area.
- Similar project are now underway in Wadi Dawasir to stop sand encroachment in Al Khumesien city and its surrounding farms.

Three Range Research Stations with an area of 8,000 a equipped with complete weather recording equipment, were established in the northern rangelands. Extensive studies cover vegetation changes with different management inputs, land productivity, range use suitability, range animal performance, range carrying capacities and the influence of climatic factors on range productivity. Range improvement trials are also carried out.

A seed propagation station for native perennial range plants was established in the northern rangelands. Currently 24 perennial plants with an approximate production of 3.5 tons of seeds per year are found in the station. The purpose of this project was both conservation of native genetic resource from extinction and use of the seeds in rehabilitation of degraded rangelands using adapted species.

In 1978 the Council of Ministers adopted the Forestry and Range Regulation No. 392 and passed it as a law in accordance with Royal Decree M/22 of 3.5.1398H. The Ministry of Agriculture formulated the bylaws. The objectives of the Forestry and Range Law and its bylaws were to control and stop some of the activities that lead to desertification. Regulations were passed on the following:

i. Forests in fragile habitats susceptible to deterioration can not be exploited.
ii. Forest areas in valley bottoms cannot be exploited for farming.
iii. Areas with more than 40% slope cannot be cropped or cleared.
iv. Areas used as control of sand encroachment cannot be exploited.
v. Tree cutting and uprooting of plants in their native habitats for fuel were regulated. Only people with special permits form the Ministry of Agriculture and Water are allowed to cut.
vi. Burning was completely forbidden in forest and range lands

Royal Decree M/34 of 1980 established the basis for water conservation, water pollution control, water resource utilization, and distribution and drilling of wells.

SYRIA

The phenomena of desertification and land degradation appear in different forms in the country such as: wind erosion in Al-Badia and water erosion in the areas of high rainfall averages as a result of the collapse of the plant cover, and the soil salinization. The area of degraded lands in Syria reaches 18% of the country total area.

To stop land degradation, Syria ratified the UNCCD in 1997 and is living to its obligations.

The programmes of combating desertification were included in the Plans for Economic and Social Development for the periods 1991-1995, 1996-2000 and 2001–2005. They focused on changing the traditional view of irrigation through adopting a full programme for developing Al-Badia, management of pastures and forestry resources for sustainable policies leading to the overall environmental protection.

One of the most important projects is the Al-Badia Development Project, which includes several activities, among which are:

- Performing environmental surveys of natural resources;
- Biodiversity conservation;
- Reclamation of lands affected by salinity;
- Establishing of a Network for Meteorology Stations;
- Establishing permanent Environmental Meteorology Stations in the different Syrian regions.
- Construction of the Pasture Nurseries
- Establishing some protected zones
- Sand dune fixation activities
- Planting forestry trees.

The National Action Programme (NAP) was prepared in 1995 through a mutual effort between the State Ministry for Environmental Affairs and the Arab Organization for Agricultural Development (AOAD) and in cooperation with the Ministry of Agriculture and Agrarian Reform, in co-operation with all departments concerned with combating desertification. The objectives of the programme included the application of what was agreed upon in the UNCCD. The programme included 33 urgent, medium and long-term projects.

Several ministries and institutions work directly or indirectly in combating desertification and in drought mitigation, and these are their duties:

State Ministry for Environmental Affairs:

- To co-ordinate efforts on combating desertification;
- To put in place an integrated policy of combating desertification and drought mitigation;
- To raise awareness about combating desertification.

Ministry of Agriculture and Agrarian Reform:

- Play as the main Government department which executes several projects relating to combating desertification and conservation of natural resources, such as conservation of soil, plant cover, establishment of protected areas, pasture plantation and providing water for the inhabitants of Al-Badia and their cattle.

Ministry of Irrigation:

- Monitoring and Management of water resources, following up their levels, developing them, protecting them and prohibiting their pollution;
- In charge of Land Reclamation.

Ministry of Housing:
It prepared a legislative text to amend the law no. 44 of 1960 concerning the prevention of creeping random building expansion into the agricultural lands.

The primary concern of all of these was combating desertification, such as the application of legislation (Forestry Law, Law of Prohibition of Cultivation in Marginal Lands, Law of Prohibition of Wild Hunting).

Syria is considered to be an active member in the Steering Committee of the Combating Desertification Programme. increasing the area of green zone and the environmental support of Al-Badia relating to the Arab League. It cooperates with the Arab organizations concerned with the problems of desertification, soil degradation and agricultural development such as the Arabic Centre for the Studies in Arid Zones and Dry Lands (ACSAD) and the Arabic Organization for Agricultural Development.

TUNISIA

Tunisia has a leading experience in the fields of water and soil conservation, improvement of pastures and combating advancing sands.

The frequency of storms, along with the irregularity of rainfall, both inter-annual and inter-seasonal, has strongly contributed to the acceleration of water erosion. A map compiled in 1967, covering 12 million of Tunisia's 16.4 million ha, shows 7 million ha were threatened directly or indirectly by such erosion. Another 4 million ha suffering wind erosion also suffer some water erosion. In the center and south of the country, persistent desertification threatens 5.6 million ha. In arable lands about 25% are suffering strong degradation and 40% are subject to medium degradation.

The Government began in 1985 a series of *National Strategies to Combat Desertification*; the latest was for the period 1991-2000, focusing on water erosion, overgrazing and deforestation. They aim to promote agricultural activity in the six provinces of southern Tunisia while allowing better management of rural areas by conserving productive land and exploitable natural resources and protecting them against the processes of sand encroachment, wind erosion, gullying, scouring and salinization. In the course of the decade 1991-2000, desertification control programs are projected to fix 24,000 ha of sand dunes, to create 24,000 kilometers of protective green belts, and to improve 600,000 ha of rangeland.

At the regional level, each province has a Division of Agricultural Development, a decentralized structure to coordinate regional interventions. To improve social and economic conditions in regions of southern Tunisian threatened by desertification, the Government also created in 1983 the Office of Southern Development, which promotes integrated development strategies by providing assistance for the creation and support through small projects of small and medium-sized enterprises in the cottage industry and handicraft sectors.

On the institutional side, in order to efficiently combat desertification, the Tunisian Government has put in place a number of structures. Aside from the Forest Department which has operated since the 19th century with a bureau responsible for anti-desertification projects.

In terms of infrastructure, areas totaling a million ha of sloping land have been improved through techniques of soil conservation, water harvesting, creation of approximately 87 hillside lakes and manure spreading. Action to control sand dune encroachment in recent years has encompassed the protection of 100 oases and 70 000 hectares of agricultural land, involving projects such as fixing 40,000 ha of artificial dunes and reforestation of 28,000 ha of cleared land.

This philosophy guides government activities throughout the country, which, among other things, envisage through the year 2000, the realization of a variety of projects in an integrated watershed management such as:

i. Erosion control on 600,000 ha of land;
ii. Improvement of 400,000 ha of grain-producing land;
iii. Creation of 1,000 hillside lakes;
iv. Construction of 4,000 works to recharge aquifers and fertilize lands with flood plain waters; and
v. Conservation and maintenance activities on one million hectares already rehabilitated.

YEMEN

According to UNEP and other UN desertification assessment criteria and related maps, desertification in the Yemeni is caused mainly by harsh climate conditions, misuse of vegetation cover, exhaustion of water resources, and non-compliance with proper agricultural practices.

There are two major areas in Yemen that suffer from severe desertification. *The first* is the coastal plains known for their moving sands which pose a threat to agricultural land, towns and roads and which expose the areas to salinization problems. *The second* are the mountains which extend all over the country and are exposed to soil erosion and degradation. Some 97 % of the country is affected by desertification, in a varying degree.

The implementation of the Desertification Control Plan worked out in collaboration with the UNDP and ESCWA. Intensification of national efforts and collaboration at the regional and international levels will be needed for the implementation of Plan projects and the execution of short-term priority programmes as well as the long-term desertification control strategy.

One of the major reasons for desertification of rangeland areas in Yemen are:

- Cultivation in natural rangelands, particularly in rain-scarce areas. Ploughing leading to removal of vegetation makes land more vulnerable to wind erosion. As rangelands recede in this way, animal carrying loads increase on the remaining parts; this contributes to their further degradation. This is a familiar pattern in most of the country's rangelands.
- Over-cutting of forest trees, which initially provide wood for use in construction and as a substitute for fuel. More recently, over-felling has extended to vast areas of woodlands which have been denuded of their green cover and left vulnerable to water and wind erosion, particularly in high and very high areas.
- Cutting of trees for cultivation purposes in order to meet the increasing demand for food crops and agricultural products.
- Overgrazing which has been a major factor in rangelands and forest degradation.
- Ploughing of terraces in the direction of the slope has been a major cause of soil deterioration, particularly where deep furrows are made.
- The non-rotation of crops is another reason for desertification as a result of ensuing imbalance of nutrients in the soil, which leads to its exhaustion, segmentation, and exposure to erosion.

The UN Plan of Action stresses the need to link national desertification plan to overall development plans. The Government has, moreover, given top priority to development of the agricultural sector and has included desertification control, also, meanwhile giving considerable attention to water resources. It has also enacted legislations aimed at rationalizing and organizing the use of natural resources as well as at developing and protecting these resources. Such legislation includes the Environment Protection Act and the Forests Act.

Several voluntary and non-governmental organizations already play a very important role in this regard; they include the Yemen Environment Protection Society, the Yemen Women Association, the Boy Scouts and Girl Guides, and Student Unions. Also playing a major role are the local councils for collective development, professional associations, and people's organizations concerned with a forestation and with desertification control. The latter have contributed considerably to the enhancement of popular awareness of the importance of forestation as an instrument of desertification control.

The main objective of the strategy is to end desertification by the year 2010. The following goals fall within this main objective:

i. To ensure a definite end to desertification;
ii. To effect a change in people's attitude towards the problem of desertification.
iii. To reaffirm that desertification control is a fundamental precondition for any increase in agricultural and animal production, for environmental improvement, and for the provision of better living conditions; and
iv. To ensure that desertification control becomes a major cornerstone in the development process.

CONCLUDING REMARKS

1. *Expected Outputs*

The expected outcome from LADA Programme activities could be summarized as follows:

i. Standardized methods and guidelines for Dry Land Degradation Assessment and Monitoring.
ii. A baseline map of Dryland Degradation at a sub-regional scale.
iii. Global Assessment of actual Dryland Degradation and degradation hazards.
iv. Detailed assessment of land degradation at national level, focusing on areas at greatest risk *(hot spots)* and areas where degradation has been successfully reversed *(bright spots)*.
v. Analysis of the effects of land degradation areas at risk.
vi. Best practices for the control and prevention of land degradation in dry lands.
vii. Communication and exchange of land degradation information, and promotion of its use in decision making.

2. *Recommended Actions by Countries*

There are a number of issues that Member Countries ought to address, in their endeavor to combat or reverse Land Degradation:

i. Each country to prepare an "issues paper" and to invite wide discussions for development of a national partnership initiative at different levels (local, country level, regional networks, research partners);
ii. Ensuring the full involvement of all concerned national bodies, including Finance, Policy and Planning; as well as sectoral bodies (land, agriculture, environment, water, forestry, etc.), and securing proper integration and co-ordination of resources;
iii. To identify a committee including a multi-disciplinary group of experienced persons to guide the process using innovative mechanisms for combating Land Degradation, with a focus on sustainable human livelihoods perspective and locally driven approaches, etc;
iv. Review and utilize all conducted surveys and progress reports on all aspects of preventing degradation and rehabilitating degraded lands, such as: water harvesting; conservation agriculture, livestock and environment, agro-forestry, etc.

3. *Recommended Actions by International and Regional Organizations*

i. Continue providing technical support to Member Countries for promoting Land Degradation Control Programmes and to assist in their implementation, in co-operation with concerned parties like FAO, ESCWA, UNEP, UNCCD and others;
ii. Ensure liaison with existing technical advisory bodies and expert groups under the CCD, National Action Programmes, liaison group on biodiversity; as well as with technical groups of FAO and other national, regional and international partners;
iii. Provide technical assistance to Member Countries for developing National Strategies and Action Plans for Land Degradation control;
iv. Encourage establishing Information Networking to ensure exchange of data and experiences among countries at the regional and sub-regional levels.

SELECTED REFERENCES

FAO, 1995. Planning for sustainable use of land resources. Towards a new approach. Land and Water Bulletin 2. FAO, Rome.

FAO, 1996. Agro-ecological Zoning Guidelines. FAO Soils Bulletin No. 73, 78 pp. Rome: Food and Agriculture Organization of the UN;

FAO, 1998. Terminology for Integrated Resources Planning and Management.

FAO, 2000. Land Degradation Assessment in Dry Lands (LADA). Report of an International Workshop, Rome, 5-7 December 2000.

FAO, 2003. Land Degradation Assessment in Dry Lands (LADA): Guidelines for a Methodological Approach.

GEF, 2001: Options for Enhancing GEF Support for the Implementation of the UN Convention to Combat Desertification. GEF/C.17/5 document.

Hamdallah, G. and Tahoun, S. (2002). Review of Drought Mitigation in the Near East Region: Action Taken and Future Perspective. Regional Workshop on Capacity Building on Drought Mitigation in the Near East Rabat, Morocco, 1-5 November 2002.

Kassas, M. 1998. The Concept of Ecosystem Fragility. In: Proceedings of the FAO Workshop on Agro-Silvo Pastoral, Safita, Syria, 1998.

UNEP/MAP/PAP, 2000. Guidelines for Erosion and Desertification Control Management with Particular Reference to the Mediterranean Coastal Areas. 107 pp. Priority Actions Programme, Mediterranean Action Plan.

http://www.unccd.int/knowledge/INCDinfoSeg/partv-1.php?noMenus=1#para6