



GREEK NATIONAL COMMITTEE FOR COMBATING DESERTIFICATION

**FIRST NATIONAL REPORT
ON THE IMPLEMENTATION
OF THE UNITED NATIONS CONVENTION
TO COMBAT DESERTIFICATION**

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1. SUMMARY

In the context of the fight against desertification, Greece signed the Desertification Convention on October 14th, 1994 and ratified it on March 6th, 1997.

Greece's geographical position and variations in climate and biotopes give a special character to the country's flora, fauna and habitats. Greek flora and fauna are among the richest in Europe. Since ancient times, human action has greatly transformed the natural environment in Greece. As a result of over-exploitation of soil, water and vegetation resources, large areas of the country are threatened by desertification.

During the last years, Greece has made a significant effort to protect its natural environment and adopt a sustainable development model. In this context, Greece has signed and ratified all major international conventions on the environment. The country's participation in the European Union as a full member since 1981, resulted in the integration and implementation in the national law of the legislation produced by the Union's competent services. The European Union's policies and strategies for sustainable development and environmental protection are therefore a part of the nation's development policy. Through the Community Support Frameworks and the Cohesion Fund, many actions and measures regarding sustainability and environmental protection have been funded.

National and Regional Planning will play a crucial role in the fight against desertification in the long term, following the recent passing of a new law on planning and sustainable development.

Regarding the institutional measures taken to implement the Desertification Convention, the following are mentioned:

- The ratification of the Convention.
- The establishment of the National Committee to Combat Desertification (NCCD), its tasks, composition and mode of operation.
- The Committee's activities, which include the preparation of the Greek National Plan for Combating Desertification, of a report on drought in Greece, the organization of two international conferences on desertification, and many actions aiming at the public awareness on desertification and its impacts.
- The financial aid provided by the Greek State to developing countries for the implementation of the Convention.
- The preparation of a national action plan to limit emissions of greenhouse gases.

An extensive participatory process took place during the preparation of the provisional national action plan. A large number of scientists were invited and participated in the relevant work groups; meetings, consultations and exchange of information were a part of the process. Communication with and representation of NGOs was also established.

Following its completion, the provisional GNAP is being presented in public and distributed to ALL stake-holders in order to function as grounds for an extensive dialogue between all parties involved and affected. The outcome of this dialogue will help GNCCD formulate the final edition of the GNAP and push the plan's implementation and incorporation through its official adoption by the government. Local authorities, NGOs and representatives of

stakeholders will be asked to participate in preparing Local Action Plans provided for in the GNAP and aiming at its proper implementation. A communication campaign aiming at information dissemination, public awareness and sensitization will be launched as part of the effort to implement the GNAP.

Significant measures have already been taken to help combat desertification, such as:

- The preparation of a National Cadastral Survey, currently under progress.
- Certain measures and actions taken in the sector of the forest resources management, the dealing with forest fires and the effort for reforestation.
- The effort for a rational management of freshwater resources.
- The significant agri-environmental measures under progress in many areas of the country.
- The national and regional plans under preparation.
- Various actions and measures regarding public awareness, capacity building and education, such as education offered on environmental protection and sustainable management of natural resources, advisory services offered to farmers in relation to erosion and environmental protection, and the significant role played by the environmental NGOs.
- The participation of Greece in international meetings of Annex IV signatories to the Convention.

Regarding measures taken or planned within the framework of the GNAP, the report extensively cites on the following:

- General measures to prevent and mitigate desertification, namely
 1. Determination of threatened areas.
 2. Information and awareness of groups involved.
 3. Implementation and monitoring of the measures to be taken.
 4. Spatial planning.
 5. Basic institutional and legislative measures.
 6. Allocation of financial resources required.
 7. Selection of pilot areas.
 8. Restoration of desertified areas.
 9. Research.
 10. International cooperation.
- Specific measures on certain sectors directly connected to the situation of desertification in Greece, namely
 1. Agricultural sector (soil erosion control, conservation of surface water and dealing with drought, implementation of measures).
 2. Forest sector (protection against illegal land use changes, forest fire control, proper forest management, implementation of measures, research).
 3. Cattle raising sector (legal, technical, political and educational measures).
 4. Freshwater resources sector (institutional and irrigation measures, measures regarding urban and industrial water use, measures for increasing water availability, research).
 5. Social and economic sector (financial, technological, development, demographic, social, legislative, institutional measures, measures on infrastructure and relevant research).

The successful implementation of the GNAP depends mainly on the securing of its funding, the exact amount of which will be assessed in a special study. Sources of finance of the

GNAP could be the state budget, E.U. funding, contributions of groups to be benefited by the measures to be taken and special contributions and donations.

INTRODUCTION

The term "desertification", as used in the text of the United Nations Convention to Combat Desertification (UNCCD), means land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities.

Desertification in Greece has been under progress for about three millennia, posing nowadays a serious impact to ecosystems, human economy and society.

In compliance to its obligations as a signatory to the Desertification Convention, Greece has prepared this National Report on the Implementation of the United Nations Convention to Combat Desertification. The main purpose of the national report is to inform the Parties to the Convention on the situation in Greece regarding desertification, in connection with measures taken for the implementation of the Convention. The information provided in the report will enable the Conference of the Parties to review the implementation of the Convention and the functioning of its institutional arrangements as well as to obtain an assessment of the progress towards achieving the objectives of the Convention. The national report reflects in a big extent the process of preparation and anticipated implementation of the Greek National Action Plan for Combating Desertification (GNAP).

2. DESERTIFICATION IN GREECE

2.1. Environment and Human Action in Greece

Greece's geographical position between Europe, Asia and Africa gives a special character to the country's flora and fauna; plants and animals are a rich mixture of European, Asian and African species together with a considerable number of endemic species. About 6.000 flora species or subspecies, 79 autochthonous primary freshwater fish species, 16 species of amphibians, 58 species of reptiles, 450 bird species and 116 mammal species have been already identified, not to mention numerous species of invertebrates (between 20.000-30.000). According to these figures Greek flora and fauna are among the richest in Europe. The country's climate and vast variety of biotopes are the primary reasons for that richness.

Greece is a rugged mountainous country characterized by a great variation in altitude within short distance. Due to its predominantly steep terrain and certain climatic and bio-climatic conditions, the country is facing considerable soil erosion and desertification problems.

The climate of Greece is that of the Mediterranean type with quite large climatic variations within only short distances resulting in various distinguished climatic zones (pure Mediterranean, marine Mediterranean, central European, Alpine). The most characteristic feature of the climate is the long, hot and dry summer. For a period longer than 6 months, rain is almost absent from major parts of the country, resulting in a grave stress in natural and man-made environment. During this period, potential evapo-transpiration rate exceeds rainfall, creating a large water deficit for the growing plants from May to October. Climate conditions favor desertification in major parts of the country, such as eastern areas of Peloponnese, Sterea Hellas, Thessaly, central and southern areas of Macedonia, central and eastern Crete and the Aegean Sea, especially in the Cyclades islands.

Forestlands in Greece are extremely susceptible to degradation and finally to desertification due to the unfavorable natural and mainly human environment. Extensive deforestation and

intensive cultivation of the slopes since ancient times have led to soil erosion and degradation. Procedures directly connected to the vast damage of forest vegetation, are the following:

- Clearing of forests for agricultural and building purposes.
- Extensive forest fires.
- Continuous and intensive over-grazing by livestock animals.
- Mismanagement and over-exploitation of forest resources.

Agricultural practices have had a severe impact on cultivated areas through three processes of desertification:

- Soil erosion.
- Over-exploitation of available water resources resulting to their downgrading or even exhaustion.
- Secondary soil salinization.

The main water resources in Greece are surface waters (rivers, natural and man-made lakes) and ground waters. Compared to other Mediterranean countries, Greece is considered to be in a rather advantageous position, regarding the freshwater availability. Nonetheless, in their biggest part, water resources are intensively exploited, especially for irrigation purposes (80-84% of consumed freshwater in an annual basis) through a non-satisfactory infrastructure resulting in major water losses. In many locations, water over-pumping has resulted in a fall in the ground table of aquifers. Furthermore, the quality of water resources has degraded in many locations. Pollution is due to agricultural activities, urban effluents and industrial discharges. Quality problems have also occurred due to over-pumping, as in many coastal regions brackish water has been observed in aquifers.

Water shortage incidents are experienced in an increasing rate, resulting from the combination of increasing freshwater demand, climate change impact and diminishing rainfall.

As a result of the over-exploitation of soil, water and vegetation resources, an area of about 15.233 km² in the southern and central mainland, the Aegean islands and Crete is threatened by desertification (out of a total land surface of the country of 132.000 km²).

3. POLICIES AND STRATEGIES FOR SUSTAINABLE DEVELOPMENT

3.1. International Conventions on the Environment Signed and Ratified by the Hellenic Republic

The Hellenic Republic has signed and ratified all major international conventions on the environment, among which the following are mentioned:

- The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, 1971; it was ratified by virtue of the Legislative Decree 191/1974¹ and put into force on August 21st, 1975). The Amendments to the Convention have also been ratified and put into force.

¹ Official Gazette A 350.

- The International Convention on the Protection of the World Cultural and Natural Heritage (Paris, 1972; it was ratified and put into force by virtue of Law 1126/1981²).
- The International Convention on the International Trade of Endangered Species of Wild Flora and Fauna (Washington D.C., 1973; it was ratified by virtue of Law 2055/1992³ and put into force on January 6th, 1993).
- The International Convention on the Conservation of Migratory Species of Wild Fauna (Bonn, 1979; it was ratified by virtue of Law 2719/1999⁴ and put into force on October 1st, 1999).
- The International Convention on the Conservation of Wildlife and Natural Environment in Europe (Bern, 1979; it was ratified by virtue of Law 1335/1983⁵).
- The United Nations Framework Convention on Climate Change (New York, 1992; it was ratified by virtue of Law 2205/1994⁶ and put into force on November 2nd, 1994).
- The International Convention on Biological Diversity (Rio de Janeiro, 1992; it was ratified by virtue of Law 2204/1994⁷ and put into force November 2nd, 1994).

3.2. Strategies for Sustainable Development and Environmental Protection

When discussing about strategies and priorities established within the framework of sustainable development plans and policies, one should bear in mind that the Hellenic Republic has been a full member of the European Union (then European Communities) since 1981; the country is thus obliged to integrate and fully implement the legislation produced by the Union's competent services.

According to the foreword to the *Treaty on the Amendment of the European Union Treaty, the Treaties for the Establishment of the European Communities etc.*,⁸ leaders of the European Union member states have decided to push through the financial and social progress of their peoples, taking into consideration the principle of sustainable development... as well as environmental protection.⁹ The pursuit and achievement of a sustainable development is among the objects of the E.U.¹⁰ Furthermore, according to the amended Treaty on the European Community¹¹

- Requirements for environmental protection must be integrated in the designation and implementation of Community policies and actions, especially in order to achieve a sustainable development.¹²
- Environmental protection policy aims at a high level of protection.¹³
- Community environmental policy is due to contribute to the promotion, in international level, of actions and measures dealing with regional or world environmental problems.¹⁴

² Official Gazette A 32.

³ Official Gazette A 105.

⁴ Official Gazette A 106.

⁵ Official Gazette A 32.

⁶ Official Gazette A 60.

⁷ Official Gazette A 59.

⁸ "Amsterdam Treaty", signed on October 2nd, 1997, and ratified by Law 2691/1999.

⁹ Article 1 of the Amsterdam Treaty.

¹⁰ Art. B of the Treaty for the European Union ("Maastricht Treaty", February 7th, 1992), as amended.

¹¹ The "Rome Treaty", March 25th, 1957.

¹² Art. 3C.

¹³ Art. 130P par. 2.

¹⁴ Art. 130P par. 1, sec. e.

Beginning from the '70s, five Community action programmes for the environment have been implemented. Implementation of these programmes resulted in passing more than 200 Community statutes on various topics. Amongst them, many are connected to the fight against desertification, such as those regarding

- Nature conservation.
- Environmental Impact Assessment.
- Soil and freshwater pollution.

One should especially mention the 5th Community Action Programme styled "Towards Sustainability", which was adopted in 1993.

According to the above-mentioned, in order to fulfill the country's obligation for compliance with Community legislation, Greece conforms with its sustainable development and environmental protection plans and policies to those emanating from relevant Community legislation.

Many actions and measures in compliance with the 5th Community Action Programme for the Environment regarding sustainability and environmental protection have been funded through the *1st and 2nd Community Support Frameworks* and the *Cohesion Fund*. Especially, under the *Operational Programme for the Environment 1994-99*, funds were allocated for 7 sub-programmes, as follows:

- Infrastructure building for the operation of the European Environmental Agency, environmental monitoring and the observance of environmental clauses.
- Management of man-made environment and control of air pollution in Athens.
- Management and protection of natural environment.
- Regional and Urban Planning.
- National cadastral survey.
- Completion of actions taken under *Operational Programme for the Environment 1989-93*.
- Technical support.

In the context of the Community's *Common Agricultural Policy*, Council's Regulation 2078/92 should be noted, under which significant actions and measures regarding the fight against desertification are under progress (See Chapter 6.4).

3.3. National and Regional Planning

In October 1999, following a long consultative and participatory process, an important step in national legislation was taken, which could play a major role in combating desertification in the long term. Law 2742/1999 "On Planning and Sustainable Development"¹⁵ was passed. This law aims at establishing fundamental principles, agencies, procedures and means of regional planning for forwarding sustainable and balanced development, strengthening production and social cohesion, and securing environmental protection in the national area.

According to law, a Committee for the Coordination of National Policy on Planning and Sustainable Development as well as a National Council on Planning and Sustainable Development have been established. Planning in Greece will be realized through the:

¹⁵ Official Gazette A 207.

- General Framework Plan of Planning and Sustainable Development.
- Specific Framework Plans of Planning and Sustainable Development.
- Regional Framework Plans of Planning and Sustainable Development.

Following passing of the above-mentioned law, an integrated spatial planning should be applied in Greece. A more rationalistic spatial organization of land uses and their inter-connections should be established, in order to balance the demand for economic development and the need for environmental protection as well as achieve various social and financial ends. The principles of sustainable development should be integrated in spatial planning considering the need for protection and wise use of natural resources.

4. INSTITUTIONAL MEASURES TAKEN TO IMPLEMENT THE CONVENTION

4.1. Ratification of the UNCCD

The United Nations Convention to Combat Desertification was ratified by virtue of Law 2468 published on March 6th, 1997.¹⁶ Following this, UNCCD predominates over any and all contrary provisions of national laws.

4.2. Greek National Committee to Combat Desertification (GNCCD)

4.2.1. Tasks of the GNCCD

The GNCCD was established by virtue of the Decision of the Minister of Agriculture no. 96990/9361/11.12.1996. The tasks of the GNCCD are:

- Promotion of research on the protection of soil and water resources and support to the implementation of results and recommendations.
- Formulation of proposals for combating desertification.
- Coordination and monitoring of the implementation of the national, regional and local action plans.
- Promotion of the cooperation with E.U. and other international organizations on problems of desertification.
- Promotion of programmes for granting assistance to other affected countries.
- Coordination of public awareness programmes.

4.2.2. Composition and Mode of Operation of the GNCCD

All relevant Ministries, the competent departments of Universities, Research Institutes and competent Non Governmental Organizations are represented in the GNCCD at a high-level, through the Committee's fifteen members. GNCCD will have its own budget. The revenues will be derived from state and other national and international sources. Scientific disciplines represented in the GNCCD include:

- Soil science
- Forestry
- Agronomy
- Hydraulics science

¹⁶ Official Gazette A 32.

- Geography
- Economics
- Environment
- Political science and Diplomacy.

4.3. Activities of the GNCCD

4.3.1. A Report on the "Drought in Greece: Evaluation - Impacts - Mitigation"

Subjects elaborated in the report are:

- General characterization of drought and its historical course.
- The climate of Greece.
- Hydrology.
- Soils.
- Main land uses.
- Demand and management of water.
- Desertification.
- Recommended measures for increasing supply and management of water resources.

4.3.2. Greek National Action Plan For Combating Desertification (GNAP)

The GNAP as hereby described, is based on the proposals made by working groups on Agriculture, Forests, Climate, Water Resources and Socio-Economic aspects composed of expert scientists and constituted by the NCCD, which has already approved it.

The provisional GNAP describes the main guidelines and mechanisms to be followed, on the national level, in an effort to deal with the dangers and impacts of desertification. Specific measures that have to be taken in each case, many of them requiring special studies, are not described. Also, measures and actions required on local level are not included, because they must be adjusted to the relevant Prefectural Action Programs (PAPs) to be developed by local committees, as their constitution is proposed. The proposals are indicative and will serve as a base for discussion between the relevant governmental and non-governmental agencies as well as the media. The final GNAP, which will be formed, after the agencies have presented their positions, will be dynamic, flexible, and will be continuously adjusted and improved, according to the experience gained during its implementation. Also, attention will be given to possible changes of the social, economic, technological and physical parameters.

The objectives of the GNAP are the following:

- Determination of threatened areas and their extent.
- Estimation of the effectiveness of the followed policy and the measures taken.
- More effective application and use of the existing structures and institutions.
- Elaboration of corrective, supplementary and additional political, institutional, economic, social and technical measures, where applicable, and proposals on mechanisms required for their specification and implementation.
- Formulation of a national strategy, ensuring prevention and mitigation of desertification, promoting sustainable exploitation of land, freshwater, fauna and minimizing conflicts concerning land - use.

- Providing awareness and securing active participation of affected populations and their local agencies to the formulation and implementation of the local and specialized measures on prevention of and dealing with desertification.
- Selection and formulation of priorities and pilot - actions.
- Promotion of demographic and socio-economic restoration of areas facing desertification problems.
- Development of a network for timely diagnosis and warning.
- Cooperation with respective National Action Programs from other countries and linking to respective international networks.

4.3.3. Organization of Two International Conferences:

- The International Conference on Mediterranean Desertification, Crete 1996, in cooperation with the European Commission.
- The First Meeting of the Annex IV Focal Points.

4.3.4. Public Awareness

- Translation and dissemination of the UN publication “Down to Earth”.
- Widely publicized press conference of the Minister of Agriculture on desertification.
- Presentation of a summary of the Provisional Action Plan for Combating Desertification at the Celebration of the “International Forest Day”.
- Several newspaper articles and press interviews by members of the National Committee on the nature and consequences of desertification.
- Preparations for the public presentation and discussion of the Provisional Action Plan.
- Inclusion of desertification as a topic of the National Agricultural Policy to be discussed at prefectural levels.
- Contacts with Turkey and Iran for bilateral cooperation on problems of desertification.

4.4. Financial Aid provided by the Greek State

Apart from the country's contribution to the UNCCD's Permanent Secretariat, Greece has voluntarily contributed an amount of U.S. \$ 25.000 for funding the participation of experts from developing countries to various projects and activities for the implementation of the Desertification Convention.

4.5. National Action Plan to Limit Emissions of Greenhouse Gases

Greece has already prepared a National Action Plan to Limit Emissions of Greenhouse Gases. This Plan contains a list of actions along with relevant costs of implementation, anticipated results of each action, agencies in charge for the implementation of various actions and identification of potential administrative and legislative difficulties which could be encountered during the Plan's implementation.

6. PARTICIPATORY PROCESS IN SUPPORT OF THE PREPARATION AND IMPLEMENTATION OF THE GNAP

During the preparation of the provisional GNAP, a large number of scientists were invited and participated in the relevant work groups. Regular meetings, consultations and exchange of

information were a part of this process. Communication with and representation of NGOs was established through a member of the GNCCD specifically appointed to liaison with and represent NGOs.

Following its completion, the provisional GNAP is being presented in public and distributed to ALL stakeholders. It will function as grounds for an extensive dialogue between scientists and experts involved, academic institutions, central and regional State agencies, local government, organizations representing various social groups and non-governmental organizations. Reactions, opinions expressed and outcome of this dialogue will then help GNCCD formulate the final edition of the GNAP and push the plan's implementation and incorporation at all levels of the national economic, social and environmental planning, through its official adoption by the government. Local authorities, NGOs and representatives of stakeholders will be asked to participate in preparing Local Action Plans provided for in the GNAP and aiming at its proper implementation. The implementation of the national and local plans will start from pilot areas and demonstration cases.

An extensive, nation-wide communication campaign aiming at information dissemination, public awareness and sensitization will be launched as part of the effort to implement the GNAP. The role of the media is considered crucial to this end.

6. MEASURES TAKEN TO HELP COMBAT DESERTIFICATION

6.1. National Cadastral Survey

The lack of a national cadastral registry has been greatly affecting the land ownership regime thus exercising a grave negative impact on environmental protection and natural resources management, through practices like forest fires and land-grabbing, illegal building etc. In 1986, the National Organization for Mapping and Cadastral Survey was established, while in 1994 the National Cadastral Survey was included in the sub-programmes of the *Operational Programme for the Environment 1994-99*.

The National Cadastral Survey is a general, unified, systematic and up to date land inventory including a geometrical description and ownership regime of every piece of land, a multi-function tool, which will:

- Register public, private and municipal lands towards a more effective protection and management.
- Assist the policy for sustainable development and environmental protection.
- Conduce towards the protection, effective management and wise use of natural resources.
- Contribute in planning a more integrated agricultural strategy.
- Support regional and land use planning.
- Prevent land grabbing through illegal building, forest arsons etc.

The procedure for the preparation of the National Cadastral Survey is currently under progress in more than 450 municipalities and communities, covering about 1.1 million Ha. This programme covers agricultural, urban, scenic areas, wetlands and other areas with environmentally sensitive ecosystems.

6.2. Forest Resources Management - Forest Fires - Reforestation

Forestlands in Greece are extremely susceptible to degradation and finally to desertification due to the unfavorable natural and mainly human environment. Extensive deforestation and intensive cultivation of mountain slopes and hillsides since ancient times have led to soil erosion and degradation.

An effort has been made in Greece in the last decades to protect the natural environment, which has been facing serious threats from human activities such as deforestation, forest fires and overgrazing. Moreover, one should not fail to mention the impact of mostly unplanned tourism development and unplanned or illegal building industry.

The forestry sector is primarily controlled by the Secretariat General of Forests and Natural Environment of the Ministry of Agriculture. This agency is also in charge for the desertification policy as it is defined by the UNCCD. Among the targets of forestry services are included the following, connected to the fight against desertification:

- Reforestation on bald areas or forest ones, which have been burnt.
- Protection of forest resources from fires and illegal land grabbing.
- Construction of water and sediment retention structures in erosion-prone mountainous or hilly lands, with priority to burnt areas.
- Forest research and infrastructure studies.

During the year 1998 more than 2,400 Ha of burnt, bald and watershed areas were reforested. Another 1,800 Ha of agricultural areas were forested along with another 400 Ha of degraded forest areas, which were rehabilitated through reforestation, in compliance with EC Regulation 2080/92. In 1999, about 2,000 Ha of burnt, bald and watershed areas were reforested, while various agricultural areas were afforested. Through Community-funded Interreg II programme and the Coherence Fund, various actions were also taken aiming at the management and protection of forests and protection of forest soils.

Actions were also taken for Forest Research as well as Forest Inventory, Mapping, and Cadastre.

Especially regarding the major and many-sided problem of forest fires, which causes huge ravages in the country's forests each summer, it should be noted that in 1998 by virtue of Law 2612/1998¹⁷ the Fire Brigade was assigned with the responsibility and operational planning (that is the organization, management and co-ordination of all available means) for the suppression of forest fires. Forest services are still responsible for forest fire prevention and all actions for the protection of burnt forest areas. The Brigade is employing scientific and technical personnel specialized in forestry.

Nonetheless, it is a major problem that fires have always and are still destroying forest areas much faster than the rate of reforestation conducted by the Ministry of Agriculture,¹⁸ while grazing in areas under either natural or artificial reforestation greatly reduces the possibilities for a restoration of burnt forest areas.

¹⁷ Official Gazette A 112.

¹⁸ See Annex.

6.3. Freshwater Resources Management

Some technical measures have been taken during the last years. These concern mainly the repair and improvement of efficiency of existing irrigation networks in some plain areas along with the improvement of irrigation methods -with both measures aiming at water saving-, the desalinization of soils, the improvement of underground water quality, the construction of small water reservoirs in many islands which suffer from water shortage, and the construction of erosion control works.

The institutional measures taken refer to the regulatory provisions aiming at limiting the over-consumption, drilling and over-pumping of underground water and the protection of surface waters. Nonetheless, the operation of thousands of illegal and uncontrolled water drillings in all plain areas of the country remains a major problem, which has not been faced up to now.

The Ministry of Development has developed computer software for the codification of licenses granted for water use. This Ministry has conducted two studies for the integrated management of water resources of the Region of Epirus and the area of the rivers Louros and Arachthos, in the same region. The will exists to conduct such studies for all areas, on a level either of water district or catchment basin.

The administrative organisation of freshwater resources' management presents serious problems. The relevant legislative framework consists of a great variety of laws and in many cases there is contradiction in their terms and they lack updating. The delay in the completion and implementation of the institutional framework is a serious problem. The Ministry of Development is responsible for the management of water resources from a quantitative point of view, while the Ministry of Environment, Planning and Public Works is concerned with matters of quality.

A new E.U. Framework Directive, regarding the formulation of a European policy on the protection of freshwater resources, has been proposed and is in the final stage of its preparation. This Directive will contain regulations aiming at:

- Preserving or restoring a satisfying condition of surface and underground water.
- Approaching freshwater resources management on the level of catchment basin.
- Introducing the obligation for preparation of Management Plans.
- Establishing Catchment Basin Management Bodies.
- Coordinating all measures needed to be taken concerning various sectors of freshwater resources uses.
- Ensuring a realistic pricing of all services related to freshwater resources use.
- Informing and sensitizing the public on the need to achieve its objects.
- Completing and integrating the existing Community legislation on freshwater resources.

Following passing and then integration of the Framework Directive in the national law, this could prove of much help to the management of freshwater resources and the fight against desertification in Greece, in the long term.

6.4. Agri-Environmental Measures

Following the new lines of the EU's Common Agricultural Policy and in compliance with Regulation 2078/92, specific measures and actions are being taken, especially in the big plain areas of Greece. These measures and actions include:

- Subsidized set-aside systems.
- Strip rotation cultivation.
- Anti-erosion measures.
- Irrigation water saving measures.
- Measures aiming at the improvement of the quality of irrigation water, such as a programme applied in certain areas of the Thessaly plain, aiming at the control and reduction of groundwater pollution due to nitrogen overuse.
- Reforestation.
- Rehabilitation of degraded areas.
- Protection of ecosystems, biodiversity and local species, races and varieties.
- Recovery of terraces.
- Various structural measures such as cultivation restructuring.

6.5. National and Regional Planning

So far Greece has been lacking a large-scale national spatial planning and regional planning.¹⁹ Following the understanding by relevant state agencies of the pressing need for such a planning, National and Regional Plans have been under preparation during the last three years. This kind of integrated planning is expected to greatly assist in the fight against desertification, in the long term.

6.6. Public Awareness, Capacity Building and Education

Various actions and measures have been taken up to now, regarding public awareness, capacity building and education in the effort to combat desertification.

Generally speaking, education on environmental protection is mainly offered at the University level. Regarding the sustainable management of natural resources and their protection against degradation, education offered has significantly improved in the last few years. Though, the complexity of the process involving "natural resources - production - environment" often requires a multidisciplinary approach. Until a deep understanding of the whole system exists, present misunderstandings and mismanagement of the natural environment will persist.

Advisory services are offered in issues related to erosion and environmental protection. For example, relevant agencies offer advice to farmers regarding irrigation water saving and techniques for reducing soil erosion. Among other things, one could mention the opportunities offered by the Joint Ministerial Decision no. 16190/1335/1997,²⁰ regarding measures and actions on the protection of water resources from nitrogen pollution due to agricultural practices. According to this, "Codes for a Wise Agricultural Practice" can be prepared under the supervision of the Ministry of Agriculture along with programmes for the promotion and implementation of such Codes, aiming at the awareness and training of farmers.

¹⁹ Contrary to Law 360/1976 on Regional Planning and Environment.

²⁰ Official Gazette B 519.

Implementation of such Codes by the farmers can only be voluntary. Of course, a lot of things remain to be done in this crucial sector of agriculture, in the context of the fight against desertification.

Environmental NGOs have played a significant role in the effort towards the establishment of a sustainable development model in Greece, stressing on the urgent need for protection of the environment and wise use of natural resources. Environmental campaigns of great weight have emphasized on topics directly connected to the fight against desertification, such as forest and wetlands protection, conservation of species and their habitats, rational management of water resources and restructuring of the agricultural sector.

6.7. International Cooperation

Greece participated in the Ministerial Meeting of the Annex IV signatories to the UNCCD, which was held in Rome, on February 17-19th, 2000. During this Meeting, bilateral contacts were made with the Turkish delegation and it was decided to set forth a close cooperation between the two countries on the fight against desertification. A similar decision has been taken following relevant contacts with Iran.

The GNCCD has participated in the formulation of the terms of reference for the Regional Action Plan for the Annex IV countries

Greek scientists have coordinated and participated in international research projects workshops and training schools on desertification.

Greece looks forward to undertake the role of the coordinator of UNCCD Annex IV Member States on December 2000.

6.8. Efforts to Correct Mistakes of the Past:

6.8.1. The Karla Lake Partial Rehabilitation Project

Up to 1962, a big lake existed at the southeast part of the Thessaly plain it was Lake Karla (the Voivis Lake of ancient Greeks), with a maximum size of 20,000 Ha. The lake gave a fish production of about 1,000 tons annually thus sustaining 1,200 jobs and financially supporting equal in number families in the surrounding villages, where three fish-wharfs operated. It was also a very important wetland on a European level with more than 1,000,000 waterfowl hibernating in the lake's greater area.

In 1962 Lake Karla was drained through an ambitious reclamation project, mainly for agricultural purposes. Following its drainage, a part of the old lake-bed was cultivated with only mediocre results while fish production vanished, climate changed for the worse, the greater area's hydrological regime was severely disturbed with ground waters remarkably lowering, big cracks occurred at the soil and chemical degradation of the soil was detected. Waterfowl almost disappeared. The desertification process can be currently noticed. Quite shortly after the completion of the land reclamation project, it became evident that it was a failure, which created bigger problems than the ones it was supposed to solve.

Currently a project for the partial restoration of the Karla Lake is under progress. According to the scheme, a water reservoir with a size of 3,800 Ha will be created in the lowest part of

the old lakebed. Dikes for flood prevention will be built and three artificial islets will be constructed for attracting waterfowl. Environmental impact assessments have finished and the project will be completed in three years.

The Karla Lake Partial Rehabilitation Project is an example project in the context of an effort to repair damages occurred due to the application of an unsustainable development model. A small number of similar restoration projects are currently under consideration.

6.8.2. Enrichment of Salt Affected Ground Water Aquifers with Fresh Water.

Coastal aquifers intruded by seawater due to their over-pumping have been recharged with fresh water that has raised the water table levels. An example of such an extensive operation is conducted in the Argolis plane in Eastern Peroloponnese.

7. MEASURES TAKEN OR PLANNED WITHIN THE FRAMEWORK OF THE GNAP

7. 1. General Measures to Prevent and Mitigate Desertification

In order to prevent and mitigate desertification, certain measures of general application, concerning the total population of the country and engaging many activity sectors, will be taken. These measures are:

1. Determination of threatened areas.
2. Information and awareness of groups involved.
3. Implementation and monitoring of the measures taken.
4. Spatial planning.
5. Basic institutional and legislative measures.
6. Allocation of financial resources required.
7. Selection of pilot areas.
8. Restoration of desertified areas.
9. Research.
10. International cooperation.

7.1.1. Determination of Areas Threatened by Desertification in Greece

Determination of threatened areas will be based on the analysis of the factors and procedures of desertification. Mapping will be based on relevant experience in Greece and other countries and will take place on two levels:

- General Mapping, which will be based on the combination of the bio-climate zones and the Indexes of Potential Desertification of Lands.
- Detailed delineation and risk assessment of desertification will take place wherever the general mapping indicates the need for more precise determination of measures and priorities and greater specification of the measures to control the phenomenon, on regional, community or watershed level.

7.1.2. Information and Awareness

Prevention and control of the impact of desertification pre-require complete information, awareness and sensitization of the country's authorities and population. In this effort, special emphasis should be given towards young people and farmers.

7.1.3. Implementation and Monitoring of the Measures to be taken

The implementation of the GNAP and the achievement of its targets need the clear allocation of the activities to the competent agencies. The organization of the efforts to combat desertification and mitigate its impact will be based on the following principles:

- No new services in the Public sector should be created.
- The whole work will be decentralized and allocated in the State and municipal services, such as Prefectural Committees.
- Certain work phases will be undertaken by social and private agencies.
- In the formulation of the policy and the implementation of the measures and actions, interested social agencies should be effectively participating.
- The NCCD will coordinate the whole effort and act as advisor of the State.

7.1.4. Land Use Planning

Land use planning and the implementation of its rules could be the most effective measures to prevent and mitigate desertification, in the long term, as they will have a significant favourable impact on the economic, demographic, physical planning and environmental development of the country. The existing land use regime needs further improvement.

According to the basic principle governing land use designation, permitted uses or changes of use are only those which ensure sustainability and do not degrade productivity as well as other useful land operations. The proper land uses in each region will be defined with relevant criteria.

7.1.5. Selection of Pilot Areas

The implementation of the GNAP should be firstly applied in suitable pilot areas, such as:

- The hilly area of Central Thessaly.
- The area of Crete eastwards of the line of Heraklion - Tymvakion.
- Attika.
- Western Lesvos.
- The islands of Central Aegean Sea.

7.1.6. Mitigation of Desertified Areas

Desertified areas are separated into the reversible and non-reversible ones. The general measures are as follows:

a. Measures preventing further degradation in reversible areas

- Banning of grazing in burnt forests and artificial reforestation in areas where the natural reforestation is not possible.
- Limiting the number at grazing animals to the level of the carrying capacity in degraded grazelands.
- Implementing the anti-erosion measures in sloping farmlands.
- Controlling and restricting the pumping-up in coastal aquifers.
- Adopting economic and social incentives for sustainable development in degraded areas.

b. Rehabilitation measures in reversible areas

- Implementation of protective management methods in degraded forests.
- Implementation of the proper land use.
- Recovery of terraces where economically possible.
- Implementation of the sustainable systems of farm land exploitation.
- Leaching of soil salinization.
- Implementation of rational irrigation systems.
- Increase of the organic mater of farmlands.
- Employing traditional practices

c. Management of non-reversible areas

In these areas, the rehabilitation of biomass productivity and ecological upgrading are usually economically unprofitable. The proper management practices of these areas are as follows:

- Non-rural land uses such as urban expansion, tourist and industrial development. Many such areas are cited next to populated centers and / or have the aesthetic values to provide economic and social benefits.
- Preservation of wildlife through fauna and flora conservation and development of recreational facilities.
- Strictly controlled light grazing.

7.2. Agricultural Sector: Specific Measures

7.2.1. Soil Erosion Control

Effective soil erosion will be achieved through the implementation of principles of sustainability in land use planning.

The measures concerning agricultural lands will be selected on the basis of their proven effectiveness, the maintenance of sustainable crop systems currently under use, the acceptable cost benefit ratio and ensuring of farmers' consent.

The effective cultivation measures against erosion are those, which ensure the plant cover of the agricultural lands. Among these measures will be included:

- The strip rotation to the contour lines with the legume cultivation alternating with other annual crops.
- A combination of various cultivated plants in the same land.
- Use of winter crops.

- The maintenance of understory vegetation in vineyards and orchards on steep slopes.
- Minimum ploughing and ploughing along contour lines.
- Avoiding the continual use of plowed and / or irrigated crops in sloping soil.
- Avoiding the burning of residues in soils with a slope over 6%.
- Replacing the annual crops with perennial crops in combination with sub-vegetation.
- Implementation of the subsidized set-aside system with a priority to steep slopes.
- Return to the stock raising or reforestation of the land with a slope over 35%.
- Other measures that local scientists and agencies concern indispensable.
- Employing traditional practices.

Restoration and maintenance of terraces should also be sought, where economically viable.

7.2.2. Conserving Surface Water and Facing Drought

a. Measures for the Reduction of Losses and Increase of the Surface Water Storage.

Irrigation will be controlled on a spatial, temporal and quantitative basis in order to avoid the waste of irrigation water. During the use of irrigation water, the principles of maximum effectiveness should be followed.

Measures will be taken referring to the prevention of the enrichment of irrigated soils with water-soluble salts, which constitute a very serious danger of desertification, such as:

- Regular control of the quality of the irrigation water.
- Regular control of the water-soluble salts and soil alkalinity.
- Ensuring proper drainage and leaching away salts from irrigated soils.

7.2.3. Implementation of Measures

Above-mentioned measures should be implemented through the following activities:

- Informing all interested parties.
- Preparing studies on a local level for the selection of areas and measures to be taken.
- Securing the funds required for the implementation of the measures.
- Operating pilot and demonstration projects in areas within threatened zones.
- Formulating proposals for sustainable policy and the necessary institutional incentives and counter-incentives.
- Implementing above-mentioned measures through Official State policy.
- Intervention of the State, in cooperation with other Mediterranean States, for the adoption of respective changes in the EU's Common Agricultural Policy.

Research is needed before some of the above-mentioned measures be implemented. Therefore, the relevant agricultural sector research must be reinforced. Monitoring and early warning network will be established.

7.3. Forest Sector: Specific Measures

The respective measures aim at protecting existing natural ecosystems through:

- The most rapid possible recovery of plant vegetation in disturbed ecosystems.
- Limitation of soil erosion as well as rehabilitation, protection and improvement of its productivity.
- Re-establishment of the normal hydrologic conditions.

7.3.1. Protection against Illegal Land Use Changes

Land use change in forest areas should be allowed only as a result of a precise evaluation of its environmental impact and existing social needs. To this end, the necessary legislation should be completed.

7.3.2. Forest Fire Control

Regarding forest fires, the following measures will be taken:

1. Sensitization and public awareness.
2. Awareness of relevant regional and local agencies.
3. Provision of guidelines for fire control.
4. Measures preventing forest fires such as:
 - Clarification of the land ownership regime in forests and forest areas in compliance with the national cadastral plan under development.
 - Preservation of the land use, which existed before a forest fire.
 - Proper management of forest ecosystems.
 - Improvement of and strengthening institutional mechanisms for rapid-fire detection and extinguishing.
5. Measures for the minimization of the negative impact of forest fires.

It is proposed that only one agency should be responsible for the coordination of the above-mentioned measures and cooperate closely with the Forest Service and the Fire Department. In this agency, foresters should have a dominant role.

7.3.3. Proper Forest Management

Forests should be properly exploited so that sustainable forest production will be achieved through specific planning and appropriate measures.

7.3.4. Implementation of Measures

Due to the extensive devastation caused by desertification in forestlands, the State will take proper measures, such as:

- Better organization of the Forest Service and upgrading of its role.
- Preparation and implementation of programmes to combat desertification of the mountainous regions, aiming at minimizing erosion risks and improving degraded soils. Relevant programmes are provided for in the agri-environment E.U. Council Regulation 2078/92.
- Due to the specific ecological, socio-economic, historical and cultural conditions of some regions, 2 to 3 regions should be used as pilot areas at the first stage.

7.3.5. Research

Measures to be taken against desertification of forestland should be supported by respective research.

7.4. Animal Husbandry Sector: Specific Measures

A number of measures will be taken, so that the unfavourable impact of over-grazing on the environment can be eliminated, such as:

a. Legal measures

- Demarcation of the grazing land.
- Removal of the regime of free use of grazing lands; to be replaced by the regime of controlled use.

b. Technical measures

- Preparation and implementation of management and development studies per Municipality or Community.
- Development of alternative sources of fodder.

c. Political measures

- Establishment of a single policy regarding the use and management of grazing land.
- Improvement of the relevant subsidy regime.
- Funding of grazing land development schemes.

d. Educational measures

- Training of the scientists concerned.
- Awareness campaign regarding cattle-raisers.

7.5. Water Resources Sector: Specific Measures

7.5.1. Institutional Measures

In Greece, due to the significant lack of balance between the existing water supply and demand, regional water policies should be established. The relevant legislation should be applied, specifically on the following points:

- Direct implementation of the planning procedure for the sustainable use of water resources.
- Establishment and operation of regional water management bodies.
- Issue of prefectural normative decisions aiming at the protection of water resources through the concept of water basin.
- Effective law enforcement; infliction of the respective penalties.

7.5.2. Irrigation Measures

The measures to be taken are:

- Implementation of water recycling and re-use.

- Rehabilitation of the structure of irrigation networks, their components, and introduction of new technology.
- Implementation of integrated management procedures of irrigation water.

It is estimated that implementation of the above-mentioned measures will result to water saving ranging from 10 to 50%.

7.5.3. Measures Regarding Urban and Industrial Water Use

- Rational pricing of water.
- Proper maintenance and reduction of losses of water distribution networks.
- Use of sound technology for the reduction of water consumption by various water users.
- Provision of incentives for encouraging the application of certain water saving methods.
- Restrictions imposed on certain wasteful water uses.
- Public awareness and sensitization campaign.

7.4.4. Measures for Increasing Water Availability

- Financing of programmes on water recycling and re-use.
- Preparation of studies on water sufficiency in regions at risk.
- Improvement of management of reservoirs.
- Implementation of aquifer enrichment methods.
- Availability of groundwater ready to be pumped.

While construction of big dams for water storage in reservoirs can be of help in some areas threatened by desertification, the negative impact of relevant construction projects must be always taken into consideration. This applies even more in major water diversion schemes. Prior to the construction of such major projects aiming at the intensive exploitation of natural resources, well-documented feasibility studies and environmental impact assessments must always be prepared containing the extensive examination and evaluation of all available alternative solutions.

7.5.5. Research

Regarding the accurate knowledge of water availability, an extensive research programme of water resources should be prepared aiming at completing and processing hydrologic information about water quality.

7.6. Socio-Economic Sector: Specific Measures

This Chapter refers to socio-economic measures and their implementation. Some of the measures have been mentioned already in respective chapters. An integrated analysis is presented here. Relevant measures are distinguished into two categories:

- Reactive measures, which should be applied at degraded areas at a late stage of land's degradation.
- Proactive measures, to be applied at degraded areas at various stages of land's degradation.

Respective measures are proposed for one or more problematic areas and are distinguished in short-term measures and long-term ones, according to their expected results and the difficulties anticipated for their implementation.

Some significant points regarding these measures should be mentioned. There are desertified areas with significant flora diversity and important biotopes of endangered or threatened flora and fauna species. These regions should be managed so that their biodiversity can be conserved. Traditional land management practices should be applied to this end and major technical works, such as dam and road building, must be avoided. The measures, to be implemented, are presented separately. However, this does not mean that one single measure can be effective by itself. The implementation of many measures classified in various categories should be integrated and well coordinated.

The measures to be applied are as follows:

- **Financial** measures: subsidies, price support and traditional practices.
- **Technological** measures: application of environment-friendly technologies, transfer of technology.
- **Development** measures: promotion of supplementary activities, differentiation of local economies.
- **Demographic** measures: encouragement of population's decentralisation, population's restraint from emigration.
- **Social** measures: education, information, provision of social services.
- **Legislative** measures: implementation of the respective EU legislation, improvement and coordinated enforcement of the legislation for the protection and management of soils, water resources and natural ecosystems, action against land speculation.
- **Institutional** measures: co-ordination of activities of the responsible agencies, establishment of a National Fund to Combat Desertification, statutory establishment of agencies for monitoring and implementing policy against desertification.
- **Infrastructure**: improvement of access to Health Services, Information, Education and distribution of goods.
- **Research**: on factors resulting to desertification and activities aiming at prevention and reduction of land degradation, rehabilitation of partly degraded land and reclamation of desertified land.

8. FINANCIAL RESOURCES FOR THE IMPLEMENTATION OF THE CONVENTION

A main prerequisite for the successful implementation of the GNAP is the securing of its financing. The expenditure needed will amount to some hundred billion drachmas. It will be assessed in a special study in which the sources of the required funds should be specified. Such sources of finance could be the following:

- The state budget.
- The EU funding.
- A contribution of groups, which will be benefited by the measures to be taken.
- Special contributions and donations.

Large funds have been allocated for the implementation of the measures described in previous sections. The exact amounts can not be given in this report because the collected information needs further elaboration. Apart from these funds the GNCCD has been granted with approximately \$ 120,000. This amount is expected to increase significantly for the year 2000

9. INDICATORS AND BENCHMARKS

Suitable indicators to be used for the evaluation of the progress made in combating desertification are:

- The ratification of the UNCCD by the Greek Parliament
- The creation of the GNCCD
- The preparation of the provisional action plan (GNAP)
- The institutional and legal measures taken by the Greek State
- The quite satisfactory publicity given by the media in presenting the threat of desertification and its consequences.
- The fair level of public awareness achieved.
- The enthusiastic support given to provisional GNAP by the Minister of Agriculture.
- The satisfactory level of reforestation and erosion control conducted by the Forest Service in burned forestlands.
- The delay in preparing and implementing codes for erosion control in agricultural lands.
- The satisfactory institutional measures taken by the State for land and water sustainability.
- The successful campaigning and measures taken by the water authorities to arrest over consumption of water.
- The satisfactory level of cooperation achieved with other Annex IV countries.
- The low level of cooperation with African countries.