



**GREEK NATIONAL COMMITTEE FOR COMBATING
DESERTIFICATION**

**GREEK NATIONAL ACTION PLAN FOR COMBATING
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(Extended Summary)



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UNCCD

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PREFACE

By
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Agriculture is the biggest consumer of water (83%) in our country. Consequently, the rational management of water resources would result in significant benefits for the agricultural production as well as for total water balance.

Desertification of large areas is one of the macro-factors, which effect the water balance, even though generations may not become aware of this fact. Desertification results in extreme losses in the productivity of soil resources and in the depletion and degradation of the quality of water resources. Consequently, this phenomenon leads to the minimization of the economical and environmental roles of flora and fauna. The inhabitants of the affected areas suffer serious decline in their livelihood. Additionally it adversely affects the quality of life in larger regions.

Today, this phenomenon has become a real threat to the welfare of people in many areas of our country. To counteract this threat, it is necessary that all responsible agents, governmental and non-governmental, contribute toward the implementation of a well-documented, integrated and effective National Action plan for combating desertification. The Ministry of Agriculture, complying with the mandate of the UNCCD, which has been ratified by the Parliament, delegated the Greek National Committee for Combating Desertification to prepare the respective National Action Plan. A provisional plan was initially widely distributed among the related state authorities, stakeholders, non-governmental organizations and it was presented to the media. Their suggestions, corrections, additions and changes have been incorporated in the present Action Plan. Its content is not static, but it will be continuously upgraded according to future changes, advancement of knowledge and experience gained.

In the strategy of the Greek Government for the primary sector of the economy and the rural development, the infrastructure and the water resources play an important role. The Government, being aware of the seriousness of the phenomenon of desertification, takes all the necessary measures for combating it at national and local levels, seeking always the consent and the co-operation of the involved agencies. The frames of our national international policies for combating desertification are defined in the Action Plan, which is presented today, with the acknowledgement that the problem is not only limited within our national borders, but it concerns a much larger area around us.

he Action Plan is a big step forward. It is the implementation of a prevention policy for tomorrow and the generations to come. We, who live in this broader historical region, preserve our memories and do not forget that our civilizations developed in the presence of water and were lost in deserts.

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INTRODUCTION

Desertification is a phenomenon, taking place throughout Greece, for about three millennia. Its primary results are the dramatic decline in land productivity and in available water reserves. Extreme degradation of these two important resources has already taken place in the "olive tree zone" covering more than 20% of its total area. About 30% of the Greek area is currently seriously threatened by desertification. In spite of the adverse physical conditions prevailing in this part of the world (the Mediterranean Europe), desertification proceeds only under irrational management of physical resources by man. Consequently, both in Greece and in the other countries of this region, desertification has been and still is in progress in the sensitive zones, because of the over-exploitation of soil, water and vegetation resources.

The phenomenon is developing slowly, and exhibits spatial and temporal discontinuity. Consequently, it is not directly and immediately perceived by human communities of each era, not until it has already affected them irreversibly. In many cases, desertification has already reached its terminal stages. It has been accelerated during the last years, mainly because of the industrialisation of agriculture and the over-consumption of water. Thus, national governments and international organisations are taking measures, for prevention, as well as for combating desertification.

The UN Convention for Combating Desertification includes a special annex for the Mediterranean countries (Annex IV). The Convention was ratified by the Greek Parliament on February 28, 1997 and is now a State Law. This law provides for the formulation of a Greek "National Action Plan for Combating Desertification".

The Greek National Plan (GNAP) as hereby described, is based on proposals made by working groups on Agriculture, Forests, Climate - Water Resources and Socio - Economic aspects. These working groups of experts were constituted by the National Committee for Combating Desertification.

The Action Plan describes the main guidelines and mechanisms to be followed, on the national level, in an effort to deal with the effects and dangers of desertification. The specific measures that have to be taken in each case are not described herein, because many of them require specific studies. Also, measures and actions that have to be taken on local level are not included, because they have to be adjusted to the relevant Prefectorial Action Programmes. These Programmes are to be developed by local committees, which are to be constituted. The contents of GNAP have been elaborated after a Provisional Plan had been distributed for discussion among the relevant governmental and non-governmental organisations. It was also presented to public and to mass media from the Minister of Agriculture, and their views have been taken into consideration. The present Action Plan is dynamic, flexible, and intended to be continuously adjusted and improved, according to the experience gained during its implementation. Also, attention will be given to possible changes of the related social, economic, technological and physical factors.

The main factor inducing desertification in Greece, as well as in the other countries of the European Mediterranean, is the irrational human activity. As a consequence, a major part of this Action Program, concerns - beyond various technical measures - political, legislative,

economic and social regulations and strategies. The text of the program is divided in to the following chapters:

- A. Definitions, Principles, Objectives**
- B. Desertification Factors in Greece**
- C. Desertification Processes in Greece**
- D. General Measures to Prevent and Mitigate Desertification**
- E. Measures concerning the Agricultural Sector**
- F. Measures related to the Forest Sector**
- G. Measures concerning Fauna**
- H. Measures concerning the Stock-Raising Sector**
- I. Measures concerning the Water Resources Sector**
- J. Measures concerning the Socio - Economic Sector**

The Greek text includes *annexes* on:

- assessment of desertification risk,
- criteria for land use planning,
- recycling of urban waste water and
- existing legal provisions concerning water.

A. DEFINITIONS - PRINCIPLES - OBJECTIVES

A1. DEFINITIONS

Definitions used in the text of this document are those described in Part I, Article 1 of the UNCCD.

A2. PRINCIPLES

According to the Article 10 of the Convention:

- The National Action Program must determine the factors that contribute to desertification of specific areas of the Country, as well as the practical measures required to face desertification and deal with consequences of draught.
- It must also specify the role of the Government, of the local societies and of the land users, as well as the required and available means.

A3. OBJECTIVES

The objectives of the Greek National Action Program are the following:

1. Determination of the threatened areas and their extend.
2. Estimation of the effectiveness of the applied policy and of the measures taken.
3. More effective application and use of the existing structures and institutions.
4. Elaboration of additional political, institutional, economical, social, and technical measures, and proposals on mechanisms required for their specification and implementation.
5. Formulation of a national strategy, to prevent and mitigate desertification, and to promote sustainable land and water use, and to secure biodiversity, while minimising social conflicts concerning land use
6. Promotion of public awareness and encouraging active participation of affected populations and of their local agencies to the formulation and implementation of local and specialised measures.
7. Selection and formulation of priorities and pilot - actions.
8. Demographic and socio-economic rehabilitation of areas facing desertification.
9. Establishment of a network for early diagnosis and warning.
10. Co-operation with respective National Programs from other countries and linking to corresponding international networks.

B. DESERTIFICATION FACTORS IN GREECE

The natural as well as the human factors and causes inducing desertification in Greece are given below.

- a. Climate**
- b. Physiography**
- c. Geology**
- d. Soil**
- e. Hydrology**
- f. Human effects**

B1. CLIMATE

The areas where climate conditions favour desertification in Greece are:

- 1. Mainland
 - a. Eastern areas of Peloponnese, Sterea Hellas, and Thessaly
 - b. Central and Southern areas of Macedonia.
- 2. Islands
 - a. Central and Eastern Crete
 - b. The Aegean Islands

B2. PHYSIOGRAPHY

Two physiographic factors contribute to desertification in Greece: **slope and exposure**. Steep slopes contribute to severe erosion while south and southeast exposures give rise to dry-thermal micro-climatic environments.

B3. GEOLOGY

Geology, contributes indirectly to desertification, by affecting soil erodibility and depth, as well as the hydrology. Limestone and tertiary marls are the main rocks contributing to the phenomenon in sensitive areas. Large areas of Mesozoic limestone exhibit intense desertification. Acid igneous and volcanic rocks, which form coarse textured soils in a slow pedogenetic rate, play a secondary role to desertification. Soil originated from such volcanic rocks presents severe desertification in the western part of Lesvos Island.

B4. SOIL

The main cause of desertification is the inability of soil to provide the necessary amount of water to plants and the necessary space to their roots. Soils sensitive to desertification are characterised by: shallow depth, high erodibility, tendency to form a surface crust and low water infiltration. Soils in the hilly and mountainous areas of South-eastern Greece are especially threatened.

Low alluvial soils are particularly vulnerable to desertification when enriched with water-soluble salts.

B5. HYDROLOGY

The hydrological balance determines whether an area is vulnerable or not to desertification. The main reasons of serious shortage in water availability in Greece are: their uneven spatial and temporal distribution, the particular geo-morphology, and the transboundary nature of rivers in Northern Greece. The very long coast line (15.000km) contributes to the problem, because of the intensive exploitation of coastal water resources, their salinization, as well as the presence of many islands that are anhydrous or low in available water resources

ANTHROPOGENIC FACTORS

The sensitive ecosystems of Greece are driven to desertification only if they are subject to irrational human interference. Man in Greece and in European Mediterranean was and still is a «catalyst» for desertification procedures, through three main activities:

- Over - exploitation of plant bio-mass on slopes
- Over - exploitation of water resources
- Irrational irrigation that may cause salinization of soils.

C. DESERTIFICATION PROCESSES IN GREECE

The processes driving sensitive Greek land to desertification, are classified in to three major categories:

- Procedures limiting the rootable soil layer.
- Procedures reducing water available to plants
- Procedures adversely affecting the chemical environment of the root-layer

C1. REDUCTION OF ROOTABLE DEPTH

1a. Erosion by Rainwater

Man accelerates erosion by:

- Excessive harvesting of plant biomass
- Cultivation practices on slopes leaving the surface uncovered during the period of rainfalls.
- Forest, pasture and cereal residue fires
- Technical works on slopes

1b. Soil erosion by the wind

The wind can blow off material from the soil surface, especially when it is dry, pulverised and uncovered from protective vegetation, thus causing erosion

1c. Other Root-layer limiting procedures

Sub-surface soil horizons or layers might undergo destruction of their structure, compaction and hardening. Therefore, creating an unfavourable environment for the growth of plant roots.

C2. REDUCTION OF AVAILABLE WATER

Reduction of water available for flora, fauna and human societies, takes place through the following procedures:

- Reduction of precipitation
- Exhaustion of underground water reserves
- Limitation of water – holding capacity of soils.

Recently, a tendency of rainfall reduction has been observed, which, in combination with high evapo – transpiration levels, may gradually reduce the available water reserves. This situation may get worse under the expected climate changes, mainly due to the green - house effect.

C3. SOIL CHEMICAL DEGRADATION

The main processes of soil chemical degradation are:

- Salinization - sodification
- Chemical pollution
- Acidification

3a. Salinization - Sodification

Salinization and sodification are the main chemical procedures causing desertification in sensitive alluvial plains. Salinization and high alkalinity threaten a relatively small area in Greece. Especially dangerous is secondary salinization, caused by irrational irrigation of agricultural land.

3b. Chemical Pollution

Chemical pollution is mainly due to toxic materials, which restrain flora and fauna growth. This problem, in contrast to other northern European countries, is of minor importance to Greece at present. However, it may become serious in the future.

3c. Acidification

Rapid soil acidification is due to acid rain coming from the use of fuels containing sulphur and other human actions.

D. GENERAL MEASURES TO PREVENT AND MITIGATE DESERTIFICATION

In order to prevent and mitigate desertification, certain general measures, will be taken. These measures, which involve the whole Greek population and are related to many sectors, are:

- Determination of threatened areas
- Information and awareness of groups involved
- Establishment of agencies responsible for application and monitoring
- Land-Use planning and its implementation
- Allocation of the necessary financial resources
- International co-operation
- Selection of pilot areas
- Restoration of the affected areas
- Research
- Legal and institutional measures

D1. DETERMINATION OF THE THREATENED AREAS

Determination and delineation of the threatened areas in Greece will be based on integrated analysis of the desertification factors and processes, mentioned above. Mapping will be based on national and international experience and will take place on both general and detailed level.

1a. General Mapping

General mapping of threatened areas will be based on the combination a) of the bio-climatic zones according to Bangoules - Gausson (Bio-climatic Map of Greece, Mavromatis, 1980) and b) of the Indexes of Potential Desertification of Lands (Yassoglou, 1995, Annex 1). Four sensitive bio-climatic zones will initially be used.

1b. Detailed Mapping

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 for greater specification of the measures to control the phenomenon. More specifically, detailed delineation will take place on regional, community or watershed level, wherever the necessary measures are costly and their socio-economic impacts are large. Scale could typically vary from 1:50.000 to 1:10.000.

Qualified local scientists and social agencies, assisted by the National Foundation of Agricultural Research and specialised university experts, will undertake the detailed land demarcation.

D2. INFORMATION AND AWARENESS

Prevention and control of desertification effects, pre-require complete information of the authorities and the population of the country. In this context, special emphasis should be given towards young people and farmers, on which consequences of desertification will be mostly evident.

D3. AGENCIES FOR THE IMPLEMENTATION AND MONITORING OF THE MEASURES.

The successful implementation of the National Action Program needs the clear partition of the responsibilities among the various agencies in charge. The organisation of the effort to combat desertification and to deal with its consequences should be based on the following principles:

- No new services will be created in the Public sector.
- The whole project will be decentralised and delegated between the state and the municipal services.
- Social and private agents will also undertake part of the work to be done.
- All interested social organisations and agencies should effectively participate in the formulation and implementation of the planned policy
- The National Committee will co-ordinate the whole effort and act as advisor to the state.

3a. National Committee to Combat Desertification

Work of the Committee

The Committee's assignment is monitoring, co-ordination and support of all activities for the implementation of the Action Program as well as the formulation of proposals on issues regarding desertification and their submission to the relevant authorities.

Composition of the Committee

The Committee consists of: high ranking representatives of all relevant Ministries, representative(s) of related University Departments, research Institutes and non-governmental organisations. The Committee shall have its own budget, financed by the state and by other national and international organisations.

3b. Decentralised Agencies

The basic work to combat the desertification will be undertaken at the local level by the responsible state and municipal authorities.

Prefectural Committees

A local committee for combating desertification should be established in each Prefecture, within the threatened zones.

Tasks of the Prefectural Committees

- Development of a specific Prefectural Action Programme
- Assignment and approval of studies, works and activities
- Spatial and temporal planning of the necessary actions and works
- The allocation of available funds
- Informing the local population
- The close collaboration with the National Committee and other Prefectural Committees
- Finding resources for the Prefectural Action Program
- The assignment of works and activities

Implementation and Monitoring of the Prefectural Program

The implementation of the particular phases of the Action Program will be assigned to responsible state agencies or non- governmental organisations.

D4. LAND USE PLANNING

The most effective measure to prevent and mitigate desertification is land-use planning and the implementation of its principles. This will also have significantly favourable effects on various developmental aspects: economy, demography, and environment. The existing land use status, except from the measures for forest protection and management, remains in most of its part confused and anarchic.

4a. Land Use Principles and criteria.

The main principle applied for determining land use will be: Permitted land uses and changes will be only those, which ensure sustainability and do not degrade biomass productivity and other land functions and processes. Following this principle, proper land uses for each region should be defined.

4B. Formulation and implementation of land use policy

All political parties should approve the formulation of the land use policy, if this is possible, and no basic points should be altered without general consensus.

The relevant law will determine: The scientific criteria for the determination of the proper land uses, the terms under which these criteria could be modified, the relevant agencies and institutions, the ways and procedures for the implementation of the regulations, as well as the incentives or possibly the counter-incentives for the realisation of the pursued policy. The implementation of the policy will be assigned to:

- The Supreme Council for Land Uses

- The Prefectural Councils
- The local, state and municipal agencies, responsible for desertification issues.

D5. FINANCIAL SOURCES

The main condition for the realisation of the Action Program is to be financed. The necessary funds amount to some hundreds of billion drachmas. A special study is needed by which the sources of the necessary funds will be specified. Among possible financing sources could be:

- | |
|--|
| <ul style="list-style-type: none"> • The state budget • EU funding • Contributions from social groups, benefited from the measures to be taken • Special contributions |
|--|

The particular tasks of the program shall be incorporated into the national and regional developmental programs.

D6. INTERNATIONAL CO-OPERATION

Greece will co-operate with other EU Mediterranean countries to get EU funding through INTEREG programme. The Greek National Program or part of it should become a part of a joint Mediterranean Action Program against desertification. Greece will co-operate and provide assistance to countries of Africa and of the Middle East.

D7. SELECTION OF PILOT AREAS

The National Action Program should be initially applied to some pilot areas. Such places are:

- | |
|--|
| <ul style="list-style-type: none"> • The hilly area of Central Thessaly • Eastern Crete (eastwards of Heraklion – Tymvakion) • Attica • The western part of Lesvos island • The Central Aegean islands • The Kilkis Plain in Central Macedonia |
|--|

D8. RESTORATION OF DESERTIFIED AREAS

Desertified areas fall into two categories: **reversibly** and **non-reversibly desertified**. Specific measures to be taken are described in chapters E, F, G, H, J. and I. Some general measures however, could be mentioned here:

8a. Measures to stop Degradation in Reversibly desertified Areas

- | |
|--|
| <ul style="list-style-type: none"> • Immediate banning of grazing in the burnt forests as well as artificial reforestation, in areas where the natural recovery is not possible |
|--|

- Limitation of the number of grazing animals within the carrying capacity of the degraded pasturelands
- Erosion control measures in sloping farm lands
- Control and restriction of the excessive pumping-up in the coastal aquifers
- Socio-economic incentives for sustainable development in the degraded areas

8b. Recovery Measures in Reversibly degraded areas

- Application of protective management in the degraded forests
- Proper land use
- Restoration of the terraces, wherever this is economically feasible
- Application of sustainable farming systems in agricultural lands
- Leaching of salinized soils
- Adoption of water saving irrigation practices and techniques
- Increase of the organic matter in farm lands

8c. Management of the Non-reversibly degraded Areas

Rehabilitation activities in such areas, resulting in restoring productivity and other ecological functions are usually impossible because of economical restraints.

The proper management practices for these areas are:

- Application of non-rural land uses, such as urban expansion, or tourist and industrial development. Many of these areas are located near large populated areas and / or exhibit aesthetic beauty of significant economic and social value.
- Conservation of wild life and establishment of recreational facilities
- Strictly controlled light grazing

D9. RESEARCH

Research dealing with desertification factors and processes, as well as restoration methods and technology will be supported. Specific research fields are described in every respective sector of the present document.

D10. LEGAL AND INSTITUTIONAL MEASURES

General measures to be taken are:

- Codification and simplification of existing laws.
- Clear definition of responsibilities of the involved agencies.
- Co-ordination of central and peripheral agencies.
- Updating of existing relative laws and institutions.
- Involvement of stakeholders.

E. MEASURES CONCERNING THE AGRICULTURAL SECTOR

Agriculture activities affect land through three desertification processes: a) soil erosion, b) depletion of water resources and c) secondary soil salinization

E1. CURRENT SITUATION

Agricultural practices in Greece do not always secure the sustainability of biomass productivity of the land and in certain cases promote desertification. Thus, there is need for the development and application of better farming systems and for the adoption of policies that protect land.

Measures being taken to protect the farmland against desertification are of technical, institutional and advisory type, but not sufficient.

1a. Technical measures

The technical measures concern mainly the development of irrigation networks, soil desalinisation, improvement of underground water quality and erosion control structures.

1b. Institutional measures

The institutional measures refer to application of set aside systems, through EU subsidies, in regions threatened by the erosion, to legal regulations against over-pumping and excessive drilling and to protection of surface waters.

1c. Advisory measures

The Ministry of Agriculture suggests measures and gives advice to farmers. It also trains them on subjects concerning controlling soil erosion, saving of irrigation water, irrigation effectiveness and water resources conservation.

E2. SOIL EROSION CONTROL

Effective control of soil erosion will be achieved by applying the principles of sustainable Land Use planning.

2a. Criteria for ascribing land to Agriculture

The criteria for ascribing land to agricultural use will be: slope, soil depth and degree of the soil's resistance against erosion.

2b. Criteria for the selection of proper Erosion Control Measures

Agricultural land on slope gradients greater than 6% will be subject to proper erosion control measures. These measures, should be selected on the basis of:

- their proven effectiveness
- their compatibility with the already applied sustainable crop systems,
- an acceptable cost-benefit relation,
- the farmer's acceptance

2c. Technical Measures

The main and most effective technical measure for the protection of the sloping land in the Mediterranean had been the construction of terraces, which are supported by dry stonewalls or nets made from tree or shrub branches.

2d. Cultivation related measures

Effective erosion control measures related to cultivation are those, which ensure constant and extensive vegetation cover of the agricultural land. Some of these measures are:

- Strip crop rotation along the contour lines. Annual crops should alternate with legumes Simultaneous cultivation of different crops on the same land unit.
- Use of winter crops.
- Maintenance of under story vegetation in vineyards, olive groves and orchards located on strongly sloping areas.
- Minimum ploughing.
- Ploughing along the contour lines.
- Avoiding continuously cultivated and or irrigated crops on sloping land.
- Burning of residues on sloppy areas presenting a gradient greater than 6% should be avoided.
- Replacement of annual crops with perennial ones combined with under storey vegetation.
- Application of subsidised set-aside systems with priority to areas with steep slopes.
- All areas, presenting a slope greater that 39% should be ascribed to stock raising or turned into forestland.
- Every other measure considered as a necessary one by the local scientists and authorities.

E3. FACING DROUGHT CONSERVATION OF SOIL WATER

Measures to reduce water losses and to increase water stored in the soil.

Saving of irrigation water. **Irrigation should be spatially, temporally and quantitatively controlled so that water usage does not exceed maximum crop requirements. Applied water should also cover the needs for leaching of soluble salts.**

Irrigation water usage should be subjected to the principles of maximum effectiveness. These refer to the infiltration depth of irrigation water, the water quantity and the irrigation method.

Evaporation reduction of the stored soil water. Cultivation related measures could reduce the water losses and increase stored soil water.

Soil treatment. Experiments in Greek soils indicated that, compared to surface ploughing, non-ploughing is more effective in reducing evaporation losses and in retaining soil water.

Soil surface coverage. Dry plant residues will not be burned or removed if this does not interfere seriously with the farming practices. Small stones or coarse gravel should not be removed from soil surface.

E4. FACING SECONDARY SALINIZATION OF IRRIGATED SOILS

These measures aim at preventing the enrichment of irrigated soils with water-soluble salts. These salts constitute a very serious desertification threat. The most important measures are:

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

E5. IMPLEMENTATION OF THE MEASURES

Activities necessary for the realisation of the measures prescribed for the sector of agriculture are summarised as follows:

- Information of all interested parties.
- Conduct of local studies on the selection of the specific measures to be taken and the areas to be treated.
- Ensuring all necessary funds for the application of the measures.
- Application of the prescribed measures to the pilot and demonstration areas
- Formulation of proposals on sustainable development policy and macro-economic incentives and counterincentives.
- The Greek government will provide for the application of all the above measures.
- The Greek government will also undertake initiatives, along with governments of other Mediterranean countries, for specific amendments in the E.U. Common Agricultural Policy.

E6. RESEARCH

Many of the proposed measures need further research and experimental verification. Therefore, research related to agriculture should be supported. In addition, there should be established a monitoring and early warning network.

F. MEASURES RELATED TO THE FOREST SECTOR

The unfavourable natural and human environment renders forestlands in Greece particularly susceptible to degradation, and ultimately to desertification.

F1. CURRENT SITUATION

In Greece, the main degradation factor affecting forested areas is man. . Processes leading to degradation of natural vegetation are:

1a. Clearing of forestlands for agricultural expansion

Irrational and uncontrolled land clearings are the main reason for severe degradation and sometimes complete destruction of soil and vegetation resources, as well as, heavy disturbance of the water balance in most of the country.

1b. Forest fires

Forest fires have always played a significant role to environmental degradation leading to desertification of extensive areas. During the last 40 years the forest fires were rapidly increased. Approximately 90% of the areas burned every year concern the Mediterranean type ecosystems, i.e. areas largely susceptible to desertification.

1c. Over-grazing

Continuous and intensive grazing, is taking place for millennia, and is considered as the main desertification factor for most parts of the Mediterranean type ecosystems. The severe degradation of many forests, woodlands and grasslands is basically a result of over-grazing.

1d. Over- exploitation of forests

Over-exploitation of forests, during which the most productive tree individuals are removed, as well as, the uncontrolled activities aiming at the construction and maintenance of forest roads, result in biodiversity decline, and simplification of the forest ecosystem.

F2. OBJECTIVES OF THE MEASURES PROPOSED FOR FOREST PROTECTION

The respective measures aim at protecting the existing natural ecosystems and specifically at:

- The quickest possible recovery of vegetation in the disturbed ecosystems.
- The restraint of soil erosion and the restoration of their productivity.
- The re-establishment of normal hydrologic conditions.
- The overall protection, development and maintenance of land productivity.

F3. PROTECTION AGAINST ILLEGAL CHANGE IN LAND USES

Generally, land use changes in forests should be allowed only after a precise assessment of the environmental impacts taking into consideration the particular social needs. To this effect, the necessary legislation will be completed.

F4. FOREST FIRE CONTROL

The following measures will be taken for forest fire control:

- 1. Promoting public awareness**
- 2. Measures to prevent forest fires and discourage prospective arsonists. These measures could comprise:**
 - Clarification of the land ownership status in forests and woodlands according to the current cadastral plan.
 - Restoration of the pre-fire land use in all burned forest lands
 - Development of an effective system for arresting and punishing the arsonists.
 - Application of special forest management practices and techniques minimising fires.
 - Establishment of less flammable forest communities.
 - Forest thinning and maintenance of appropriate forest structure.
 - Clearing, pruning, controlled brushwood burning and removal of wood residues.
 - Measures for quick fire detection and control and for keeping damages low.

More specifically:

 - Development and implementation of quick fire detection and warning system by the agencies in charge.
 - Development and implementation of an emergency Action Scheme
 - Organisation and effective use of necessary gear and personnel for immediate fire control.
 - Development of mechanisms for the implementation of the above-mentioned measures.
- 3. Measures for restraining fire consequences, such as:**
 - Effective protection of burned land from grazing
 - Effective implementation of the prohibitions.
 - Avoidance of soil disturbance and support of natural regeneration.
 - Sowing and planting of the appropriate forest trees, bushes or grasses at the vulnerable sites.

Having taken into consideration the above-mentioned aspects, it is recommended that one single agency should be responsible for the co-ordination of all these measures. This agency should be in close co-operation with the Forest Service and the Fire Department. The foresters should have a prime role.

Awareness of local agencies will be a priority so that the recommended measures for forest protection would be successfully implemented.

F5. PROTECTION FROM DAMAGING GRAZING

The first and most effective measure to be taken is the preparation of a Programme for Use and Management of the grazing land in each region (see chapter H).

F6. FOREST MANAGEMENT

Forests should be properly managed so that sustainable forest yield can be achieved.

More specifically:

- The Forest Service will supervise woodcutting and transportation of wood products to forest roads.
- Forest products will be put on the market either by the Forest Service or by Forest Co-operatives.
- Seedlings for reforestation will be produced by the Forest Service itself or by private seedbeds under the supervision of the Forest Service.
- Land use will be properly planned while changes regarding these uses should be strictly controlled.
- Measures will be taken for the protection and restoration of hydrologic conditions of the watersheds.
- Regarding degraded areas, the program mainly aims at maintaining and recovering the protective vegetation, which shall enrich the soil with organic matter while eventually create forest cover.
- Bio climatic zones and regions needing immediate protection will be determined. These regions should be subjected to special restoration projects.
- Information mechanisms will be established and responsible persons will be appointed to prepare the local action programmes.
- Measures provided for in the National Action Programme will be harmonised with current or projected developmental projects at local and national level.

F7. IMPLEMENTATION OF THE PROPOSED MEASURES

Due to the extensive damages (both direct and indirect) caused by desertification processes in the Greek forests, the state will immediately undertake effective measures, such as:

- Organisation and upgrading of the Forest Service
- Adoption of the proposals set out in the respective section of the Agricultural Sector applicable in the forest Sector as well.
- Realisation of Projects for Combating Desertification in mountainous regions. These projects, conforming to the agro-environment E.U. Council Regulation 2078/92, should primarily aim at minimising the erosion risk and improving degraded soils.
- Due to the specific ecological, socio-economic, historical and cultural conditions encountered in the various regions it is recommended that initially, there should be conducted 2-3 pilot projects, in respective regions

F8. RESEARCH

The above measures will be supported by relevant scientific research.

G. MEASURES CONCERNING FAUNA

G1. CURRENT SITUATION

Greek fauna is particularly interesting at European level, due to Greek's geographical location as well as its physical and climatic diversity. Greek fauna consists of 429 species of birds, 116 species of mammals, 58 species of reptiles, 18 species of amphibians, 79 native freshwater fishes, and 447 species of seawater fishes. The inventory of some groups, such as mammals, birds, reptiles and fishes is almost complete. Population declines have been observed for several animal species mainly as a result of habitat destruction and degradation. Various human activities are the cause of this, through removal of natural vegetation and subsequent increase of soil erosion.

G2. MEASURES FOR FAUNA RESTORATION AND PROTECTION

The following measures will be taken so that the current problems of the Greek fauna can be tackled:

- Systematic and continuous inventories of species and populations.
- Selection and protection of ecologically important biotopes.
- Control of over grazing.
- Provision of incentives to farmers so that they construct hedgerows around their fields.
- Enactment of controlled hunting in special regions.
- Design of an efficient network of game refuges.
- Harmonisation of the annual hunting regulations according to available population data on game species.
- Provision of incentives to the hunting clubs or other agencies to carry out projects for the reclamation of biotops (sowing, planting, interception of spring waters, e.t.c.).
- The “hunting” problem will be addressed in accordance to ecological principles about sustainable use of game resources.
- Information and awareness.

H. MEASURES CONCERNING THE LIFE STOCK-RAISING SECTOR

H1. CURRENT SITUATION

Most of the Greek territory, has nowadays dry warm climate, while land is covered by degraded forestland, grazed by farm animals, especially sheep and goats. Usually, degradation of natural ecosystems results from over-grazing. In the arid and semi-arid regions of the country, this phenomenon is particularly intense. Desertification results not only from over grazing **but also, under certain conditions**, from under-grazing as well, or from no grazing at all. In this case, ceasing of livestock activity results in dangerous accumulation of combustible materials, which can cause extensive and disastrous fires.

H2. PROTECTION FROM OVER GRAZING

A number of measures will be taken so that the adverse environmental effects of over-grazing are eliminated. The most important measures to be take are:

1. Legal measures

- Demarcation of the grazing forest land at Municipality level
- Abolition of the public use status that characterises the grazing lands. This status will become of controlled use.

2. Technical measures

- Preparation and application of special studies concerning management and rehabilitation actions for every Municipality or community.
- Development of alternative foodstuffs.

3. Political measures

- Enacting of a single common policy.
- Modification of the existing subsidising status.
- Financing for amelioration of grazing land

4. Educational measures

- Training of the scientists concerned
- Information and awareness of the livestock breeders

I. MEASURES CONCERNING THE WATER RESOURCES SECTOR

II. CURRENT SITUATION

1a. General quantitative assessment of Water Resources

Significant surface and sub-surface water resources exist all over Greece. Various factors, such as the uneven spatial distribution of supply and demand complicate their use, resulting in significant reduction in water availability.

International agreements are going to regulate the usage of transboundary waters, according to U.N.O.'s principles.

1b. Overall qualitative assessment of Water Resources.

The quality of water resources has shown recently, in some locations, signs of deterioration. Agricultural activities, urban effluents and industrial discharges act as sources of pollution.

1c. Institutional Framework of the Water Resources Management.

The administrative organization of water resources presents some problems. The legislative framework covering water management needs better codification and more efficient enactment. There is some delay in the completion and implementation of the institutional framework.

1d. Irrigation

In Greece, more than 80% of the water resources are used for irrigation. There is need for more efficient infrastructure (dams, reservoirs, land reclamation projects), while maintenance of the existing irrigation networks needs improvement. There are significant water losses from the irrigation networks

1e. Drilling

In many locations, water over-pumping has resulted in lowering the ground table of aquifers. In many coastal regions, brackish water has been observed in aquifers.

1f. Sufficiency of Irrigation Water

For the time being, there are possibilities for saving irrigation water. Demand though, for irrigation water, is highly increasing. Greenhouse effect will alter the water balance, through decreasing water stocks and increasing demands.

II. INSTITUTIONAL MEASURES

Because of the significant difference between water supply and demand, regional policies concerning water (per water district or group of water districts) should be established. The relevant legislation will be applied following points and priorities:

- Immediate planning of water resources development at all levels.
- Completion and functioning of regional water management services.
- Issuing regulations to protect water resources for each water basin, by the Prefectures.
- Effective checking for any law infringement and infliction of the respective penalties.
- Issue and implementation of all envisaged legislative regulations.

13. MEASURES FOR IRRIGATION

The measures to be taken are:

- Repairing the irrigation networks
- Renewal of the various components of the networks and use of new technologies
- Integrated management of irrigation water
- Water recycling and re-usage

It is estimated that by applying the above-mentioned measures, water saving will range from 10 - 50%.

14. MEASURES FOR URBAN AND INDUSTRIAL WATER USE

- Adjustment of prices during summer and prolonged periods of drought.
- Changes in hydraulic installations to decrease water consumption
- Reduction of the water leakage
- Incentives for constructing private tanks and rain-water reservoirs
- Restrictions on use of water-demanding plants in gardens and flower beds
- Public information on water saving needs and methods

15. MEASURES FOR INCREASING AVAILABLE WATER

- Studies on water insufficiency in vulnerable regions
- Evaluation and improvement of management applied on the reservoirs
- Retention and storage of running and surface water
- Financing of projects dealing with water recycling and water re-usage
- Enrichment of underground water
- Ensuring the readily available ground water
- Transport of surface water to regions threatened by desertification. A well-documented feasibility study is needed for the implementation of this measure.
- Water supply increasing management of forest lands.

16. RESEARCH

Regarding accurate knowledge of water availability, a research program on water resources will be prepared aiming at completing and processing hydrologic information about water quality.

J. MEASURES CONCERNING THE SOCIO-ECONOMIC SECTOR

This chapter refers to socio-economic measures and to their implementation. Some of these measures have been mentioned already in the respective chapters. An integrated analysis is presented here.

J1. SOCIO-ECONOMIC MEASURES AGAINST DESERTIFICATION

These measures can be classified into two general categories: the **corrective** measures and the **preventive** ones. The first category applies on the irreversibly degraded areas while the second category applies on areas, under degradation process. For each category, the respective measures are proposed. These measures are classified in **short-term** measures and **long-term** ones according to the expected results and the easiness of their implementation. The proposed measures are general proposals at a national level.

Various desertified areas present significant flora diversity. These areas will be subjected to specific management plans for biodiversity conservation. Traditional land management practices should be applied to this end.

The measures are presented separately. However, a lot of measures, classified in various categories should be integrated and harmonised with each other.

The measures to be applied are:

- **Financial measures:** subsidies, price support to traditional practices.
- **Technological measures:** environmental friendly technologies, transfer of technology
- **Developmental measures:** supplementary activities, modification 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 E.U. regulations, co-ordination and completion of the legislation for soil, water and nature protection and management, as well as for prevention of land profiteering (speculation)
- **Institutional measures:** co-ordination of services and activities of the responsible agencies, establishment of a "Fund to Combat Desertification", and of agencies for monitoring and implementing policy against desertification.
- **Infrastructure:** improving access of Services related to Health, Information, Education and Distribution of goods.
- **Research:** on socio-economic factors inducing desertification and on methods and techniques intercepting the phenomenon.

1a. Involved and affected population groups

Population groups either involved in or affected by these policy measures include mainly the following groups:

- Decision-makers
- People responsible for implementing the policy measures
- People directly affected by the measures.

Table 1: Corrective measures to combat desertification (desertified and/or severely degraded areas)

	Economic Development Technological	Demographic Social Educational	Legal Institutional	Infrastructure
Short-term	Income support of desertification affected groups with parallel support of traditional land use practices (Environmentally friendly) Technology support Price supports for selected products Tax incentives	Technology/ Information transfer/support services to interested parties (e.g. farmers, livestock producers) – linked to proper administrative structures	Short-term/interim limits on use of critical resources (e.g. water, pastures) Desertification standard/limit Control (or, ban) of harmful activities Imposition of standards on production and use of selected products	Specialised studies for restoration of arid lands Development of technical capacity in the Ministry of Agriculture in co-operation to universities and research centres
Medium-term	Implementation of the EU Agro-Environmental Regulations. Subsidies for terraces restoration Fiscal and financial incentives for conservation strategies/practices Application of Environmentally friendly technology Price support for selected products Special tax incentives	Public information campaigns Services for technological support to interested parties (e.g. farmers, livestock raisers)	Special legislation (special EIAs) General environmental legislation (Strategic Impact Assessment) Resource conservation regulations (mainly for water resources) Co-ordination of legislation Co-ordination of the responsible agencies Co-ordinated implementation	Provision of social infrastructure Studies on Watersheds: Carrying capacity, spatial planning and management Development of technical capacity in the Ministry of Agriculture with the co-operation of universities and research centres
Long-term	Planning for environmentally-sensitive areas Establishment of the "Desertification Fund" Subsidies for environmentally friendly land uses	Public information campaigns Services for technological support	Integrated spatial planning and regulations Special legislation (special EIAs) General environmental legislation (Strategic Impact Assessment) Regulations for resource conservation Control for land speculation Co-ordination of legislation Co-ordination of the responsible agencies Co-ordinated implementation	Provision of social infrastructure

Table 2: Preventive measures to combat desertification

	Economic Developmental Technological	Demographic Social Educational	Legal Institutional	Infrastructure	Research and Development
Short-term	Change of the local economy – Encouragement of complementary economic activities Selected tax incentives Promotion of environmental-friendly technology and practices	Training and education Public information campaigns Services for technological support	Harmonisation of the national legislation with the EU Agro-Environmental and Water Policies Partial co-ordination of legislation Partial co-ordination of the responsible agencies	Improvement in access. Improvement of existing social and health services	Specialised studies of sensitive areas Carrying capacity studies
Medium-term	Incentives for new jobs Change of the local economy – Encouragement of complementary economic activities Capital subsidies for environmentally friendly land uses	Incentives for population decentralisation Educational programmes General and environmental educational/information campaigns Services for technological support	Special legislation (special EIAs) General environmental legislation (Strategic Impact Assessment) Control for land speculation Co-ordination of legislation Co-ordination of the responsible agencies Co-ordinated implementation	Infrastructure for better access and various other services Establishment of social and health services in remote areas (islands included) Provision of social infrastructure	New technology for agriculture, transportation, and communications) Carrying capacity studies
Long-term	Incentives for new jobs Change of the local economy— Encouragement of complementary economic activities Planning (spatial, water resources, etc.) Capital subsidies for environmentally friendly land uses	Measures for keeping population Educational programmes	Integrated spatial planning and regulations Strategic Impact Assessment Control for land speculation Co-ordination of legislation Co-ordination of the responsible agencies Co-ordinated implementation	Infrastructure for better access and various other services Provision of social infrastructure	Application of new technology

K. GENERAL INSTRUCTIONS FOR THE IMPLEMENTATION OF THE ACTION PLAN

K1. INTEGRATED APPROACH

The measures described in the various chapters of this document will be implemented in the framework of integrated projects by considering all the relative parameters in each of the threatened areas and by involving all stakeholders and necessary disciplines.

K2. TEMPORAL AND SPATIAL PROGRAMMING OF MEASURES AND ACTIONS

The measures and actions are to be taken in the following sequence:

- Development of a general policy and strategy for combating desertification.
- Development of the necessary legal and institutional framework.
- Securing the necessary funds.
- Promotion of public awareness.
- Adoption of incentives for the stakeholders
- Exact demarcation of the affected zones.
- Initial implementation of the Action Plan in the pilot areas designated in the present document.
- Design and application of detailed local projects.
- Evaluation of results and updating of both the local projects and the National Action Plan.
- Implementation of the National Action Plan throughout the affected zone, all around Greece.

K3. SYNERGIES WITH THE UN CONVENTIONS ON CLIMATE AND BIODIVERSITY

Results obtained and recommendations developed in the framework of the UN conventions on climate and biodiversity as well as other relative international initiatives will be considered for the implementation of this Action Plan and the formulation of detailed actions on local scales.