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Desertification Report

Report highlighting the activities of the European Community in the context of the United Nations Convention to Combat Desertification (UN CCD)

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ABBREVIATIONS USED IN THIS REPORT

ACP	African, Caribbean and Pacific States of the Lomé Convention
ALA	Asian and Latin American States with EU Cooperation Agreements
CAP	Common Agricultural Policy
CCD	UN Convention to Combat Desertification
CEEC	Central and Eastern European Countries
CILSS	Comité Inter-Etats pour la Lutte contre la Sécheresse dans le Sahel
CSF	Community Support Frameworks re Structural Funds
DG	Directorate General
EAGGF	European Agricultural Guarantee and Guidance Funds
EC	European Community
Euro	European single currency
EDF	European Development Fund
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EMP	Euro-Mediterranean Partnership
ERDF	European Regional Development Fund
ESDP	European Spatial Development Perspective
EU	European Union
FAO	UN Food and Agriculture Organisation
GM	Global Mechanism
IFAD	International Fund for Agricultural Development
INCD	Intergovernmental Negotiating Committee for the elaboration of an international Convention to Combat Desertification
JRC	European Commission's Joint Research Centre
LIFE	Financial Instrument for the Environment
Lomé IV	Fourth ACP-EC Convention
METAP	Mediterranean Environmental Technical Assistance Programme
NGO	Non-Governmental Organisation
NAP	National Action Programme
NIP	National Indicative Programme
NIS	New Independent States
RIOD	International Network of NGOs on Desertification
RIP	Regional Indicative Programme
SCR	Joint Service for Management of Community Aid to Non member Countries
SMAP	Short and Medium-term Priority Environmental Action Programme

EXECUTIVE SUMMARY

This report provides a review of the policies, financial instruments and projects of the European Community which have contributed to the more sustainable management of dryland areas over the period 1990-99. Covering activities in both developing countries and Europe, the purpose is to inform development partners, donors and other parties to the United Nations Convention to Combat Desertification (CCD) about the experience gained by the European Community and the considerable commitment of resources it has made in this field

Convention to Combat Desertification The Community reaffirmed its commitment to addressing desertification in developing countries and within its own Member States through ratification of the CCD in March 1998. According to the CCD desertification is defined as **land degradation in arid, semi-arid and dry sub-humid areas resulting from climatic variations and human activities**. In summary, land degradation comprises a range of processes, such as erosion and declining soil fertility, leading to the reduced capacity of dryland areas to produce useful outputs or sustain wildlife and other organisms. It affects the livelihoods of millions of farmers, herders and their families, across the globe.

The processes of desertification were first recognised in the Sahelian region of West Africa. However dryland degradation is now accepted as a worldwide problem. All regions of Africa have been affected by drought conditions and pressures on land, as have parts of Asia, Latin America and the Mediterranean. The CCD also refers to the dryland region of the Northern Mediterranean, acknowledging that economically disadvantaged rural areas in these countries, including EU Member States, have experienced serious degradation of soils, vegetation and water resources.

International cooperation to address desertification The Community has built upon its long standing commitment to addressing desertification in developing countries, particularly in Africa. Over the period 1990-1999, a contribution of approximately € 1 billion has been committed to over 600 development projects in dryland areas of Africa, Asia and Latin America. This includes actions supported under the EDF, the funds for Asia and Latin America, the Mediterranean Partnership, TACIS, and thematic budget lines such as Environment in developing countries, Actions to promote tropical forestry, NGO cofinancing, Food aid and food security, and LIFE.

This report provides examples of interesting projects ranging from local to international scales from all regions in which the Community is active. These cover the promotion of forestry measures to prevent dune encroachment on the desert margins, environmental education initiatives, the development of smallholder agricultural production through support for irrigation and land reclamation, integrated rural livelihood and environmental development programmes, water resources management, decentralised cooperation for rural development and a range of measures to promote food security. Other projects supported by the Community are referred to in the annexes to this report.

Overall, by adopting an integrated approach, many of the projects focus strongly on addressing the socio-economic factors which can contribute to desertification by aiming at improved practices for agricultural land use and water management. Thus projects aim to stimulate the income generating capabilities of rural communities, reducing pressures to abandon land. The promotion of efficient (sustainable) resource use linked with appropriate training activities and awareness raising has also been instrumental in preventing over-exploitation of lands and diminishing vegetation cover.

In addition, various research programmes have supported just under 100 projects since 1991, with a total EC contribution of approximately €48m. These projects have included investigation of desertification processes, soil conservation and regeneration methods, water resource management techniques, genetic improvement of tropical dryland crops and the potential for their diversification, and use of remote sensing technologies to assess land degradation, amongst other topics. The new INCO-DEV research programme 1998-2002 is highlighted which seeks to support policy research for sustainable development strategies, systems research revealing the nature of complex interactions, and technical research to generate tools for sustainable development. The Community's remote sensing programmes have also made an important contribution to the monitoring of natural resource degradation in the tropics.

Within the EU Member States, the European Community has financed many programmes aimed at understanding and addressing the problems experienced in the dryland regions of the Northern Mediterranean. EC environmental policy contributes to action in this field by promoting legislation, and ensuring that an assessment of environmental impact is made prior to project development.

The Fifth Framework Research Programme and its predecessors have identified desertification in the Mediterranean as a priority area and over 90 multi-disciplinary research projects have been cofinanced from 1991-1998 with a financial support of over €75m. These projects have sought to contribute to a thorough understanding of the complex genesis and evolution of desertification in order to provide guidelines for rational management of desertification prone areas and protection or possible rehabilitation of threatened zones. Some of the major projects supported by the Community, such as MEDALUS and Archaeomedes, are highlighted in this report. The research priorities relating to the sustainable management of water resources and fire risks are also described. In addition, 7 relevant projects have been funded since 1997 under the ENRICH initiative on Global Change which supports projects both in EU member States and in developing countries alike. Work has also begun on the updating of the CORINE land cover database, a joint collaboration of the European Environment Agency and the Commission's Joint Research Centre.

The Community also fosters agricultural and rural development measures implemented by the national administrations and regional authorities through programmes for funding throughout the Member States. The Structural Funds, the agricultural policy measures under the EAGGF and the Cohesion Fund can all play a role in guiding land use in the rural areas of the southern European member states. The report looks into the relevant measures supported in recent years including the Agri-environment Programme, the Agro-forestry Programme, the activities within the Community Support Framework Programmes, and pilot projects as well as the forestation and erosion control measures supported under the environmental aims of the Cohesion Fund. Assessment of the total financial commitment to these actions is difficult due to the fact they are classified with various other activities within larger programmes dealing with water management, forestation etc.

INTRODUCTION

This report provides a review of the policies, financial instruments and projects of the European Community which have been harnessed to address desertification and mitigate its effects over the period 1990-99. Covering activities in both developing countries and Europe, the purpose is to inform development partners, donors and other parties to the United Nations Convention to Combat Desertification (CCD) about the experience gained by the European Community and the considerable commitments of resources it has made in this field.

WHAT IS DESERTIFICATION AND WHAT IS ITS IMPACT?

The term desertification has led, in the past, to a certain degree of confusion. A consensus view was established by the expert panel members of the Intergovernmental Negotiating Committee for the elaboration of an international Convention to Combat Desertification (INCD). Thus, desertification is defined in Art 1 of the Convention to Combat Desertification as "land degradation in arid, semi-arid and dry sub-humid areas resulting from climatic variations and human activities". This definition underlies the current understanding of desertification and related processes. Desertification is taken by the Convention as comprising a range of processes leading to the reduced capacity of dryland areas to produce useful outputs - crops, fodder, bush and tree cover, wildlife and other organisms. In this report, the terms "desertification" and "dryland degradation" will be used interchangeably.

Desertification has often been associated in people's minds with the idea of desert advance, rather than a more widespread process of degradation in areas that may be hundreds of kilometres distant from the desert margin. While dune mobility and encroachment by sand on fertile land, roads and settlements do constitute a problem in certain localities on the edge of desert areas, 'desertification' of dryland farming and pastoral areas represents a more substantial threat to the livelihoods of millions of farmers and herders across the globe.

The degradation of dryland areas involves processes such as the break down of soils through wind and water erosion, falling levels of soil fertility and damage to its structure, loss of vegetation cover and a change in its species composition, reduced availability and decline in the quality of water supplies, loss of wildlife and a fall in the biological diversity of plant and animal life. Such processes reduce the productivity of crop and livestock systems in dryland areas, and increase the vulnerability to food crisis of populations depending on these resources. This situation can result in an increase in migration especially to urban centres or higher rainfall regions, increasing the pressures on the resources in these areas.

While these processes provide the most evident signs of the problems that occur within dryland systems, the underlying factors which cause such adverse effects are many and various, and operate at different levels. At the field level, for example, particular patterns of soil tillage may accelerate rates of erosion, especially on sloping land. At national level, a lack of clarification regarding land tenure and processes for resolving conflicts over access to land may provide insufficient security for farmers to invest their time and effort in constructing soil conservation measures, such as terraces and bunds. At international levels, the price of commodities produced

by dryland peoples, such as cotton, groundnuts or beef, will affect the economic incentives faced by land users. Rising prices provide encouragement to farmers to produce more and, at the same time, raise revenues which can be invested in improving the productivity of their land.

EXTENT OF DESERTIFICATION AROUND THE WORLD

The transformation of soils and vegetation as a result of human use and climatic events is common to all ecosystems, for example, when soils are ploughed and pasture lands grazed. Dryland areas are considered particularly likely to suffer adverse impacts from human activity, because these areas also experience low and highly variable levels of rainfall. Thus, for example, soils are exposed to high risk of wind erosion during the long dry season, due to low levels of vegetation cover. Equally the violent storms at the start of the rainy season can provoke rapid floods and washing away of topsoil. Dryland soils are often thin with little organic matter, rendering them of low fertility and poor at holding moisture. Erratic and unpredictable rainfall also creates difficulties for human and animal populations dependent on these ecosystems since, in years of drought, reliance on other sources of food and income must be sought. As a result of their low productivity, dryland areas are often politically and economically marginal to most governments, and receive little attention.

At the same time, the drylands of the world have been of enormous importance to many major civilisation over past millennia, who were able to make a good living from combining irrigated farming with animal rearing and trade. Equally many of the most valued crops of today stem from dryland areas. Currently, an estimated 900 million people across the world live in areas considered 'drylands' which make up as much as 30% of the earth's land surface. These environments include the Sahelian and savannah plains of Africa, the plateau lands of southern India, arid parts of China and central Asia, much of the Mediterranean and Middle East region and the 'cerrados' or scrublands of South America. Although dryland areas in many developing nations contain many of the poorest people of the world, in countries like Australia and US, dryland areas provide the basis for extensive ranching activities, which bring good economic returns.

Data on the incidence and degree of desertification in the world's dryland areas stem from a variety of sources, all of which are subject to certain drawbacks. At a global level, certain surveys have been carried out over the last decade to assess the extent of soil degradation by region, such as the GLASOD survey (global assessment of soil degradation) commissioned by the FAO. This survey showed that 19.5 % of drylands worldwide were suffering from desertification.

A second survey carried out by the ICASALS group in Texas came up with a much higher figure of 69.5% of drylands worldwide suffering from desertification, due to their inclusion not only of areas affected by soil erosion, but also where a change in vegetation had occurred. Where perennial grasses had been replaced by annuals, the shift in species composition was considered to be negative, whether or not such changes were accompanied by soil erosion. The figures usually quoted by UNEP are based on the ICASALS data, and estimate 70% of the world's drylands areas as suffering from some degree of desertification with an estimated 900 million people worldwide at risk from problems of degradation.

Such large estimates have been disputed by other scientists who have argued that the nature of the data on which they are based is far too poor to arrive at an aggregate figure of any accuracy. Other surveys provide estimates of soil related degradation on a continent wide basis, such as those on soil nutrient losses in sub-Saharan Africa (Stoorvogel and Smaling, 1990) from which overall trends in soil quality can be gauged. While an improvement over the broader global surveys, these regional

assessments also suffer from the paucity of data and the problems associated with scaling up data derived at plot level to higher levels.

In contrast to these surveys estimating levels of degradation at continental or global scales, there is a growing body of research which presents a rather different picture of what is happening in dryland areas. This picture shows that in some places soils are being improved, conservation is being undertaken effectively, and farmers are intensifying their agricultural system in a seemingly sustainable manner (Tiffen et al., 1994; Reij et al, 1996).

Such studies provide some important clues regarding significant elements underlying sustainable farming practices which include: the need for farmers to gain economic benefits from improvements to their land, the great potential for adapting traditional techniques for managing soils and the importance of providing an overall policy framework within which farmers feel their rights to control access to land will be properly assured. These micro-level studies challenge the more gloomy predictions for African agriculture generated by global surveys, and show the importance of adopting a locally tailored approach to dryland development. Measures which are appropriate in one setting may not be relevant elsewhere.

Desertification in Europe

In Europe, dryland areas cover more than two thirds of Spain, the Algarve and Alentejo regions of southern Portugal, the Mezzogiorno regions of Italy, most of mainland and island Greece, as well as the island of Corsica and southern *départements* of France. In these regions, rural areas can suffer desertification on a significant scale as a result of changing patterns of land use combined with harsh climatic events.

Over the centuries, human communities whether hunters, herders or farmers have structured and re-structured the physical environment creating the current familiar images associated with the Mediterranean landscape - terraces and orchards, pasture and scrub on dry hillsides, etc. In recent years, however, several factors have combined to increase the risk of land degradation. Greatly intensified agricultural production has often involved unsustainable exploitation of limited sources of water, an increased risks of soil erosion from patterns of grazing and tillage. Conversely, abandonment of land can also lead to increased risk of damage caused by fires and loss of vegetation cover. Urban and tourist developments along the coastline have shifted population densities causing the exodus of people from rural areas. In addition, new urban centres have brought new pressures on patterns of land management and competition for limited water supplies.

These anthropogenic factors in combination with prevalent climatic conditions - fiercely dry periods followed by short intense rainfall events – can lead to serious problems of soil erosion. In Spain alone, data from 1993 suggest that almost one million hectares of land are already considered as desert lands and another 7 million have been identified as being at high risk of serious long term damage.

It can be seen that, in ‘developing’ and ‘developed’ countries alike, there is a clear need for the development of conservation measures for soils susceptible to damage which will help control or alleviate the worst excesses of land degradation. As land degradation is strongly influenced by economic factors, integrating environmental and economic policy at the macro level is of great importance.

THE UN CONVENTION TO COMBAT DESERTIFICATION (UN CCD)

The commitment to negotiate a Convention to Combat Desertification was taken at the 1992 Earth Summit at Rio. A series of five negotiating sessions led to the final text being agreed in Paris on 17 June 1994. Over one hundred and fifty governments and international organisations have now signed and ratified the Convention, including the European Community and all its Member States, confirming the worldwide commitment to addressing the problems associated with dryland degradation. The Convention entered into force in December 1996. Three Conferences of the Parties to the Convention have been held since November 1997.

Developed in the context of Agenda 21 and the Rio principles, the Convention constitutes a statement of international consensus on how best to support more effective and sustainable management of dryland areas, particularly in the poorest and most vulnerable region of the world. The text contains a total of 40 articles, covering definitions, general obligations of the different parties and the principles for drawing up action programmes and addressing the viability of scientific and technical cooperation. The CCD provides for institutions such as the Conference of the Parties (COP), the supreme authority of the Convention, and its subsidiary body, the Committee on Science and Technology (CST). It also provides for a Permanent Secretariat, and a Global Mechanism charged with responsibility for mobilising and channelling resources for implementation of the Convention in affected countries. The Permanent Secretariat is now located in Bonn alongside the Secretariat of the Framework Convention on Climate Change while the Global Mechanism is housed by the International Fund for Agricultural Development based in Rome. The Convention has four regional annexes which provide guidelines and arrangements for implementation in Africa, Asia, Latin America and the Caribbean, and the Northern Mediterranean respectively. A fifth Annex is being negotiated for Central and Eastern Europe. These annexes form an integral part of the Convention and respond to specific regional issues and priorities.

APPROACH OF THE CONVENTION TOWARDS ENABLING/ENFORCING ACTION

The Convention text represents the combined experience regarding how best to support more sustainable drylands development. Certain key principles underlie the recommendations and commitments outlined in the Convention which include:

Building on local knowledge and skills: the text recognises that local people have much relevant knowledge about their environment, from which interventions and technical improvements can be developed. Indigenous technologies of peoples around the world are often well suited to local conditions, although they may need adaptation as circumstances change. Agencies need to work more closely with local people to identify ways of improving the performance of existing technologies.

Promoting participation: The Convention argues strongly in favour of a participatory approach to dryland development, whether in the process of elaborating a National Action Programme, the design of local development plans, or the improvement of existing farming technologies. Participation of local populations is valued for several reasons: as a means to build on local knowledge and priorities, ensuring that programmes and interventions are well-designed for local circumstances and providing some chance of longer term interest and sustainability.

Decision-making needs to be decentralised: It is now recognised that central governments have tried to do too much, and intervene in many fields where it is not appropriate. Instead, they need to devolve much power and responsibility to lower levels, to build on the initiatives of farmers and herders, and strengthen local organisations. For too long, governments have tried to plan how land should be managed and used, taking little account of how farmers, herders and other rural people were actually using land. There is a strong commitment towards subsidiarity within the Convention which advocates shifting power from central government to local land users.

The problems of dryland areas cannot be taken in isolation: While the main focus of the Convention is on management of resources in rural areas, this cannot be separated from opportunities to develop and diversify economic activities in other sectors. Hence, the text acknowledges the links between pressures on land and soils, and growth of employment and incomes elsewhere in the economy. For example, many farmers in developing countries rely on off-farm activities, while those in the urban sector often maintain strong links and interests in rural areas. Opportunities for farmers to earn cash by sale of animals or crops often depend on the operation of very distant markets and prices, while the sums available for farmers to invest in land improvement may stem from migrants' earnings gained thousands of miles away in European capitals. In southern Europe, current pressures on available resources are clearly very strongly linked to other sectors of the economy, particularly tourism.

Partnership and collaboration: All interested parties - NGOs, community based organisations, governments, donor agencies, and researchers - are urged to work together, to avoid competition and help build longer term programmes. Governments of affected countries are committed to set up a coordinating unit within the central administration to try and get the relevant ministries working together. Relevant donor institutions are encouraged to appoint a 'chef de file' who acts as catalyst and helps harmonise donor support for drylands work.

Avoiding the duplication of plans: Affected Country Parties to the Convention are committed to develop a National Action Programme (NAP) to Combat Desertification. However, rather than instituting a new plan, with new organisation, staff etc., parties to the Convention must take account of existing environmental initiatives, and build on these where feasible. Where a country is already half way through preparation of a National Environment Action Plan or a National Conservation Strategy, the NAP can be added to such a process to ensure that drylands issues are tackled within the existing framework.

More money alone is not the answer: The Convention text recognises that increasing the amount of money devoted to drylands development is less important than improving how it is used. Existing sources of funding could be used more effectively and a greater share allocated and used at grassroots level. While the funding of development projects remains an important element within the text of the Convention, of greater importance is the attention paid to getting the policy framework right at the national level. Within this framework, land users need to have a stronger incentive and capacity to invest in improvement of their land.

Legally binding commitments: In this Convention, affected country governments and donors accept the need for a legally binding text. In the past, each side has recognised the need for changes in practices but has not been willing to follow these through. The Convention provides a means to check whether the parties are taking their commitments seriously. The governments of affected countries and donor organisations must report on a regular basis on

progress made with meeting their promises. While no formal legal sanctions exist, such as to fine an errant party to the Convention, it is hoped that strong moral pressure will encourage governments to abide by the rules they have agreed.

Throughout the INCD negotiation sessions, particular attention was paid to Africa which is reflected in Art 7 of the Convention. The first regional Annex to the Convention, which concerns Africa, is also the longest and most detailed. A Resolution on Urgent Action for Africa was agreed in June 1994, encouraging governments of affected African countries to take forward pilot measures to implement the Convention during the interim period prior to the entry into force of the Convention. Most African countries submitted National Reports to the third Conference of the Parties describing the challenges encountered in the preparatory stages of the National Action Plans and progress with regard to action against desertification. Their eagerness to present these reports can be seen as an indication of the continued commitment of African nations to the Convention process.

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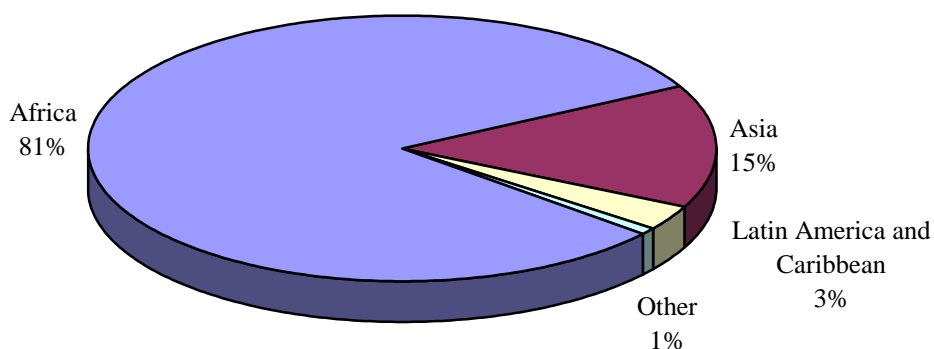
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1 THE EUROPEAN COMMUNITY AND THE CONVENTION

The Community is committed to the objectives of the Convention to Combat Desertification CCD, and has consistently promoted action to address desertification at the local, national, regional and international levels. It has been an active participant in the INCD negotiations and in all three Conferences of the Parties and has also provided financial support, through the CCD Secretariat, to facilitate the participation of developing country delegations at these meetings. The Community ratified the CCD in March 1998, joining all 15 EU Member States of the European Union which had already done so.

The Community has a strong record of support to programmes and projects which address the problems of dryland areas throughout the world. Over the period 1990-1999, a contribution of approximately 1.1 billion Euro has been committed to over 600 development projects in dryland areas of Africa, Asia and Latin America (see figure 1). The Northern Mediterranean region has also benefited substantially from Community funds (see chapter 3).

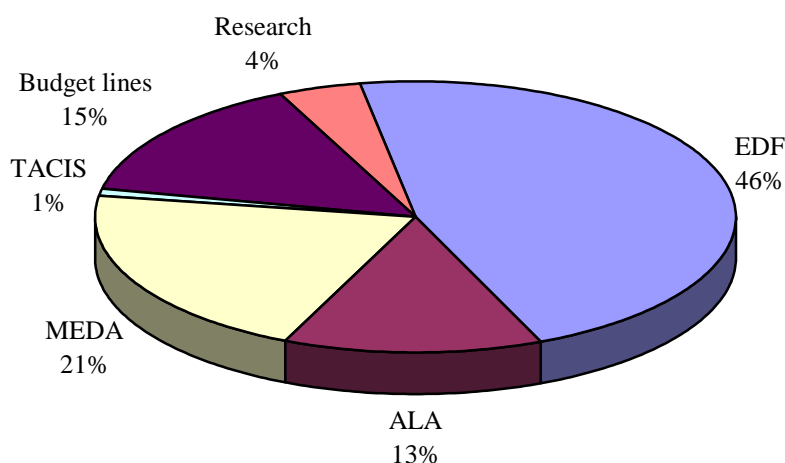
**Percentage of development funds committed to EC desertification projects by CCD regions
1990-1999**



The following chapter gives an overview of how desertification is addressed within development cooperation activities of the EC. Taking each geographical area in turn, the first section will look at the different programmes and funding instruments within the European Community's development cooperation policy and will provide a general summary of the types of intervention supported. Figure 2 below shows a breakdown of the contribution to desertification related projects of each of the main sources of funding described in this report.

Funds contributing to addressing desertification in developing countries 1990-99

Total amount: Euro 1.2 billion



Emphasis is given in chapter two to programmes and projects in Africa, since the CCD pays particular attention to this continent. The EC's development cooperation policies in sub-Saharan Africa have evolved over successive regional Conventions since 1963. Over the period 1990-99 the EDF and the budget lines which apply to Africa have made a substantial contribution to more sustainable management of dryland areas. The Mediterranean area has assumed increasing importance in the European Community's development and technical assistance cooperation programmes within the scope of the Euro-Mediterranean Partnership. Projects in Latin America, Southern and Central Asia of relevance to the CCD are also examined in this chapter. The report then sets out the different thematic funding instruments of the EC which apply to developing countries in different parts of the world. These typically promote smaller scale projects, except in the case of the Food Security budget line, but are nonetheless important financial instruments which can be harnessed by NGOs and other organisations to act against land degradation in dryland areas.

In addition to the implementation of development projects throughout the world, the European Community has supported various programmes for scientific and technological research in developing countries since 1982. These have promoted collaborative research into the potential for improved drought resistant plant species, sustainable production systems, restoration and conservation of the environment, livestock and rangeland management, and water resources development. These are also described in chapter two.

In chapter 3, the Report examines the many interlinked policy instruments which have supported action to combat desertification within dryland areas of the European Union Member States. With the ratification of the Maastricht Treaty, the EU has adopted a horizontal approach to the implementation of its environmental objectives. The chapter starts with a brief introduction to the Environmental Policy context and thereafter looks in turn at other relevant sectoral policies. The first section concerns the many important research programmes which have been supported by the European Community leading to detailed knowledge of the physical processes of land degradation as well as the multiple socio-economic factors which can cause desertification or exacerbate its effects. Following this, the report looks at the agricultural and forestry aid schemes that have

been set up within the scope of the 1992 reforms of the Common Agricultural Policy. Forestry measures to prevent fires and programmes to improve the knowledge of the effect of fire damage on Mediterranean ecosystems are also examined here, before turning to the regional development objectives of the Structural funds which target measures for improving the rural environment. Other regional policy measures which promote land use planning to address drought and desertification are also set out. The chapter closes with a description of the contribution of the environmental component of the Cohesion Fund.

A number of projects have been highlighted in boxes to provide illustrative examples of the type of programme financed. These represent a range of activities at regional, national and local scales in various countries each with different sectoral focuses. Where possible, a listing of relevant projects is provided in the annexes to this report.

1.1 MECHANISMS FOR THE COORDINATION OF AID

The Community aims to ensure that its programmes are developed in a spirit of partnership with the countries involved. The priority sectors set out in the National Indicative Programmes for the implementation of the Lomé Convention, for example, are negotiated and agreed with developing country governments, as explained further in chapter two. The Euro-Mediterranean Partnership also places emphasis on consultation and joint programming. The complementarity of EC development projects with the aid policies of the EU Member States is sought through monthly EC aid management committees. There are also a series of mechanisms for cooperation in place with other international organisations such as the OECD. For example, the Development Advisory Committee (DAC) of the OECD has agreed a series of development targets to be achieved over the next 10 to 15 years. Amongst other goals, it is planned to ensure that all developing countries have put in place a national strategy for sustainable development by 2002, with DAC members playing a supportive role in their formulation and implementation. The DAC Task Force to ensure co-ordination of this initiative is jointly led by the European Commission and the UK's Department for International Development (DFID). Coordination also takes place with the World Bank, FAO, UNDP and other UN Agencies in order to ensure complementarity and maximise the impact of development assistance in desertification control.

With respect to policies pursued within the European Union, the principle of subsidiarity applies to all Community programmes such that Member States play the central role in their implementation. As explained in chapter 3, in the case of the Structural Funds, the additional principle of partnership enshrines the participation of national administrations and regional authorities in the preparation and implementation of the development plans and operational programmes.

Within the Commission itself, measures have been taken to ensure that the officials concerned are aware of the importance of the CCD and the issues involved. Information packs on the Convention have been prepared for the Delegations of the European Community based in developing countries and a workshop has been held for officials in three of the relevant Directorates General. The Commission has also begun the task of mainstreaming the principles of the CCD into its development cooperation policies and programmes.

To encourage further discussion of policy and scientific issues surrounding desertification amongst key officials of the Commission and EU Member States governments, an Expert Group on Desertification was initiated by the European Commission in 1998. Scientific presentations are made at these meetings to stimulate an informed debate, while the focus of discussions is centred on ways and means of improving the integration of the CCD into development aid throughout the EU member states.

1.2 DISTRIBUTION OF ADMINISTRATIVE RESPONSIBILITIES

The European Commission is the administrative and executive arm of the European Community. It is responsible for managing Community aid programmes, and is the main proponent of new policies. The European Council, comprising heads of government of the Member States, holds overall decision making powers governing EU policies and legislation, in many cases along with the European Parliament. The latter is made up of directly elected representatives of the European populace, and has the main responsibility for the allocation of the annual budget of the Community.

Given the diverse contexts for addressing desertification, policies, programmes and instruments are managed by six different Directorates General at the European Commission: Development, External Relations, SCR, Environment, Research and Regional Policies. (See table 1).

DG Development 'is chef de file' in the Commission and the focal point for the administrative follow-up of the UN Convention to Combat Desertification.

DG	Title	Main Policy Instruments	Main Financial Instruments	Other official bodies of the Community
DEV	Development	Lomé Convention	EDF – European Development Fund Budget lines	SCR, Delegations
RELEX	External relations	ALA Agreements MEDA Programme SMAP	ALA Funds MEDA Funds Budget lines TACIS	
AGR	Agriculture	Common Agricultural Policy Rural Development	European Agricultural Guidance and Guarantee Fund Budget lines	
ENV	Environment	5 th Environmental Action Programme SMAP	LIFE Other Budget Lines	

RESEARCH	Research	5th Framework Research Programme	Environment and Climate Prog. INCO Prog.		
JRC	Joint Research Centre	5th Framework Research Prog.	Environment and Climate Prog. Actions in support of Commission	E E A	European Environment Agency
REGIONAL	Regional Policy	Regional Policy Cohesion Policy	European Regional Development Fund Cohesion Fund		

2 ADDRESSING DESERTIFICATION IN DEVELOPING COUNTRIES

The European Community's Development Cooperation is founded on Title XVII of the Treaty on European Union and is geared towards the twin goals of poverty alleviation and sustainable development. Three main policy frameworks, corresponding to different geographical regions govern the activities of the Community in this regard. Each of these frameworks supports the funding of relevant projects on a national or regional context, to address the problem of dryland degradation. In addition, other funding instruments are made available to provide funding for various thematic issues and research initiatives. This wide range of instruments reflects the EC's ability to respond to a variety of needs and circumstances.

This chapter will examine the main policy frameworks for cooperation with the different geographical regions with which the EC has development relations. We will also discuss the various financing instruments which are allocated by the European Parliament on an annual basis according to various thematic priorities. In addition, the various programmes for scientific and technological research in developing countries since 1982 and are described at the end of this chapter. Thirteen projects have been highlighted to illustrate the type of projects financed under the programmes described. These represent a range of activities at regional, national and local scales in various countries.

2.1 PARTNERSHIP AGREEMENTS

2.1.1 THE LOMÉ CONVENTION

The main policy instrument of the Community's development cooperation in Africa is the Lomé Convention. This Convention provides the legal and policy framework for a major programme of financial and technical assistance, as well as for many aspects of trade and cultural cooperation. It is currently in its fourth term and now benefits all sub-Saharan African nations and several countries of the Caribbean and the Pacific collectively known as the ACP states.

During the early seventies and again in the mid-eighties, a series of extreme droughts struck Africa forcing the world's attention onto problems of crop failure, livestock losses and the vulnerability of human populations throughout dryland Africa. Fears of widespread land degradation markedly influenced the elaboration of the Third Lomé Convention with the ACP states in 1985. A strong emphasis was placed on food security and food self sufficiency with Drought and Desertification Control specifically addressed in a separate chapter within the agricultural policy provisions of the Convention.

The European Action Plan to Combat Desertification in Africa (COM (86) 16 final) led to a very substantial allocation of funds to dryland areas in Africa. In 1989, it was estimated that over €1,000 million had been committed to activities to combat the degradation of natural resources under the scope of this Plan over four years. These programmes and projects involved direct action towards soil and water conservation and sustainable resource management as well as indirect approaches such as education and awareness raising activities at local and national level,

promotion of alternative energy and technologies, support in the elaboration of national conservation policies, and so on.

Since 1990, a more measured response to the environmental, social and economic problems of dryland areas in Africa has sought to place greater emphasis on the macro-economic structural nature of the problems faced, and greater attention to building up the capacity of national administrations and local stakeholder groups. The fourth Lomé Convention was brought into force in 1990 with the addition of new provisions concerning the environment. These articles confirmed that the protection of the environment and natural resources and halting the deterioration of land and forests were basic objectives of the ACP-EU partnership. A new forestry protocol agreed during the 1995 review of the Convention accorded special priority to actions which support and encourage the efforts of ACP states and their organisations to preserve, re-establish and use sustainably their forestry resources, including the fight against desertification.

One of the most interesting and relevant developments of the revised Convention was the introduction of new provision on decentralised cooperation aimed at making “available for the development of the ACP states the capabilities, innovative operating methods and resources of the agents of decentralised cooperation”, that is, “decentralised public authorities, rural and village groups, cooperatives, trade unions, teaching and research institutions, NGOs” and other associations.

On this basis, a new approach towards ‘decentralised cooperation’ has been given increasing emphasis within the Commission’s development cooperation programme. This approach seeks to place stakeholders at the centre of the development process and corresponds directly with the approach advocated by the CCD. The conceptual and operational elements of a long term strategy to transform the EU development procedures are currently being reviewed (based on Reg 1659/98). The proposed strategy relies on five principles which recognise the importance of: active participation by stakeholders, such that they can take charge of their own development; coordination and complementarity of action; decentralisation of management and financial responsibility to the level closest to the relevant actors; a process-oriented approach which allows time and flexibility for active participation and iterative programme development, building on lessons learnt during the lifetime of the programme; and last, but not least, giving priority to reinforcing local capacities and institutional development.

Several financial instruments exist to implement the aims of the Lomé Convention of which the most important is the European Development Fund (EDF). In the seventh EDF, covering 1990-1995, the total amount available for 68 ACP states was €10,800 m, and an additional €1,200 m was available as loan capital. The eighth EDF, which covers the period 1996-2000, provides €12,967 m in development aid and €1,658 m in loan capital.

The EDF is implemented according to five-year indicative plans setting out the development priorities of each country. These plans are drawn up and proposed to the Commission by each ACP State. After a series of negotiations they are adopted with an indicative five year budget. The extent to which any sector is addressed within these National Indicative Programmes (NIPs) will depend largely on the priorities identified by the governments of the ACP states themselves and on the overall financial envelope decided by the Commission for each country. On this basis, detailed projects are later proposed for financing. ACP states also contribute to the

formulation of a Regional Indicative Programme (RIP) which is aimed at supporting cross-border cooperation and regional integration and development.

The interventions promoted by the EC throughout Africa cover the very diverse range of measures promoted in the CCD. Activities involving soil and water resource conservation are included within many different types of development projects. The majority of those identified aim specifically at improving agricultural methods and pastoral practices or at reforestation to improve vegetative cover or replenish woodlands which have been over-exploited for fuel. However, soil conservation efforts are commonly included in a number of projects primarily aimed at managing resources in wildlife and natural parks which otherwise become vulnerable to environmental degradation. In many affected countries these extensive parks act as barriers to the encroachment of desert lands. Other projects have had an important indirect impact towards addressing desertification such as those which promote the development of alternative energies and raising awareness amongst local populations and officials.

**BOX 1: PROGRAMME TO ADDRESS DUNE ENCROACHMENT AND DEVELOP FOREST RESOURCES
IN THE NORTHERN REGIONS OF MALI**

EC contribution: €6,810,000
Source of Funds: EDF National Funds
Date of signature: January 1994
Duration: 4 years

The diverse pressures exerted on the fragile natural environment in the north of Mali threaten an acceleration of degradation of the natural cover and dune advance. The global objective of this project, therefore, is to combat desertification by protecting natural areas from the movement of sands and improving living conditions in these regions, where the population tends still to concentrate around the banks of Niger River.

An earlier phase of this project financed under the 6th EDF was successfully implemented in the areas surrounding Timbuktu through the know-how acquired by the local forestry services and the active participation of local populations. The second phase has built on this experience and that of other agencies working in desertified areas. The specific aim was to halt the encroachment of sand in the towns, agricultural lands and communication routes and waterways in the regions of Timbuktu and Gao. The build up of silt in the rivers makes navigation very difficult.

The implementation of the project included assistance to groups and individuals for the development of tree nurseries and market gardening, and paid particular attention to the participation of local populations and groups. Some of the dune stabilisation tree planting operations were entrusted to active community groups.

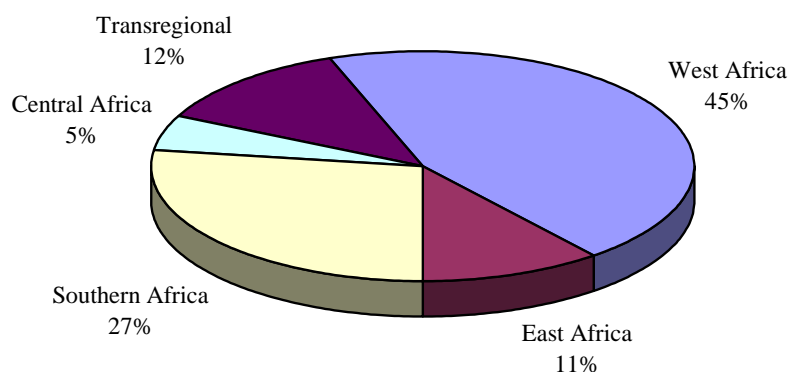
Actions included dune stabilisation (to protect 2,750 ha. by planting fast growing trees such as Tamaris on the dunes, Prosopis for hedges and wind breaks, and Eucalyptus for firewood etc.) and the development of forest resources (the rehabilitation of 3,520 ha. of forests etc.).

Importantly, technical aspects of the project are continually adapted to take account of the different ecosystems. In the light of results obtained so far in the dune fixation activities, a new project has recently been submitted to extend the project to the circle of Bourem, given the serious problems equally present in this area.

During the period 1990-1999, over 170 projects have been supported in 27 sub-Saharan African countries. A brief description of each of the projects financed during 1990-1999 can be found in annex IA.1 while an example is presented in Box 1. Figure 3 below shows the geographical breakdown of funding commitments by region.

Percentage of funds committed to EC desertification projects in sub-Saharan Africa by region 1990-1999

Total: 686 million Euro



Several regional programmes have also been financed which directly or indirectly address desertification. The European Community has supported regional institutions such as the Inter-State Committee on Combating Drought in the Sahel (CILSS), the Intergovernmental Authority on Development (IGAD) and the Southern African Development Community (SADC) all of which have made commitments to improved management of environmental resources particularly in the context of the CCD. For example in West Africa, the European Community is the main provider of funds to the CILSS, with important contributions to the diagnostic food security programme (DIAPER III), the regional solar energy programme, the PFIE (see Box 2), the regional reforestation and soil and water conservation programme (PRECONS) and the Sahel 21 reflection on the future of the Sahel. This latter programme has sought to enable Sahelians to identify their priorities for the next twenty years as regards socio-economic, cultural, political, social, monetary, environmental policy issues, as well as priorities for health and education and private sector development.

2.1.1.1 Microprojects

A substantial number of 'microprojects' are also financed under the EDF within the framework of the National Indicative Programmes described earlier. These cover a range of smaller scale programmes, up to an individual limit of €300,000. Many of these concern management of natural resources in rural dryland areas, amongst various other social and economic development projects. For example, under the Senegal 7th EDF Micro-projects programme alone, 600 projects of a diverse nature have been funded. The microprojects budget under the Lomé Convention has risen from €19.5 m in 1975 to €200 m under Lomé IV. These are based on three principles. The first is that the benefits of the microproject should be shared amongst the target group. The second relates to the contribution of the partners, such that at least 25% of the budget, is contributed by the local community concerned either in cash or in kind. Thirdly, projects should encourage "ownership" by the beneficiary groups, thus activities should spring from their own initiatives and be under their management. In addition, several local level projects are financed under the Commission's annual development cooperation budget disbursed along thematic lines described below. These provide funding for environmental and tropical forest management, NGO cofinancing, food security and rehabilitation in Southern Africa amongst other issues.

2.1.1.2 CTA: Technical Centre for Agricultural and Rural Cooperation

The Technical Centre for Agricultural and Rural Cooperation (CTA), based in the Netherlands, also operates within the framework of the Lomé Convention. It seeks to help ACP countries to meet two major challenges: to improve their access to information on rural and agricultural development and to strengthen their capacity to produce, acquire, exchange and utilise information in these areas. This type of information exchange mechanism is encouraged under the CCD, particularly in the African Annex.

To this end, CTA develops information and communication management strategies and partnerships designed to help formulate and implement policies. It encourages contacts and exchange of experiences, provides information to ACP partners on demand, and strengthens their information and communication capacities. In its various activities, CTA gives priority to several key themes: intensifying and optimising production, strengthening national agricultural systems, mobilising civil society, protecting the environment and managing natural resources, and promoting market-oriented development. CTA's bi-monthly bulletin *Spore* is published in English, French and in Portuguese (*Esporo*). See annex II for a list of publications available and annex III for useful addresses.

BOX 2: REGIONAL PROGRAMME FOR EDUCATION AND INFORMATION ON THE ENVIRONMENT (PFIE)

PHASES I AND II

Total EC contribution: I: €10,600,000 II: €16,000,000
Source of funds: I and II: EDF Regional Funds
Project duration: I: 5 years II: 5 years
Dates of signature: I: December 89 II: December 95
Participating countries: I and II: Burkina Faso, Cape Verde, Chad, Gambia, Mali, Mauritania, Niger and Senegal (in phase I Guinea-Bissau also participated)

This project aims to contribute to changing attitudes and practices of school-age children in relation to their environment and through a multiplier effect to raise awareness more widely of the issues concerning desertification. It was proposed by a conference of Education Ministries of the nine Member States of the CILSS (the Inter-State Committee on Combating Drought in the Sahel) in 1988. Based in Bamako, it is managed by a Regional Coordination Cell at the Institute of the Sahel (INSAH) which is also in charge of similar programme funded by UNSO concentrating on secondary school education.

In a break from the traditional teaching methods in Sahelian primary schools, the methodology adopted in the first phase of this Programme involved outings away from classrooms. These enabled the pupils to observe and reflect with their teachers on the causes and effects of environmental problems. Teaching materials were only distributed at a later stage once the children had had the chance to think about the issues themselves. Drawings and jotters kept by the pupils during the course of these trips were used subsequently to inspire the development of teaching materials for the remainder of the courses. Training of teachers and links with technical support

services involving carrying out demonstration projects on activities to combat desertification etc. were other important aspects of the programme.

Over 78,000 children in the fourth and fifth years of primary school and 1800 teachers in 900 community schools were included in the first phase. An external evaluation of the project in 1994 recommended continuation of the project to an operational phase to consolidate the achievements and in particular to develop further interactive teaching methods.

The objective of the second phase was to contribute to the improvement of the quality of basic teaching and to reinforce local capacities for managing natural resources in the Sahel. Environmental Education will be introduced into the curricula of 3,000 schools, representing 23% of the schools in the countries concerned and reaching around 670,000 pupils. Strategies adopted in this phase included the promotion of national policies on decentralisation to involve grassroots organisations in interventions in this field.

2.1.2 THE EURO-MEDITERRANEAN PARTNERSHIP

The countries bordering the southern and eastern coast of the Mediterranean are severely affected by dryland degradation where large areas suffer serious soil erosion. Though the average rainfall of most of the region is below 650 mm per year, one single rainfall event can reach devastating strengths leading to serious damage to arable lands and hillslopes.

Formerly, funding for the Southern and Eastern Mediterranean region was programmed on the basis of bilateral agreements financed under the consecutive five-yearly Financial Protocols. These agreements were progressively replaced by Association Agreements within the framework of the Euro-Mediterranean Partnership (EMP), which was adopted in July 1996. Mediterranean partner countries are Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, Palestinian Authority, Syria, Tunisia, and Turkey. A work programme has been adopted which sets out the priorities and actions to be implemented through regional and global dialogue and cooperation. These relate to political economic and cultural fields. The result of this dialogue to date has been the achievement of the agreements and common principles related to industry and small and medium size enterprises (SMEs), energy, water management, information, tourism, fisheries, and maritime transport.

The main financial instrument for the implementation of the EMP is known as MEDA which is intended to support financial and technical measures to accompany the reform of economic and social structures. Over the period 1991-1995, more than €4,000 m was allocated to the Southern and Eastern Mediterranean in addition to over 3,000 of EIB loans. For the period 1995-99, financial aid of €4,816 m in budget funding has been allocated by the Commission matched by a similar amount in EIB loans. Funds may be channelled at the bilateral level through Association Agreements or at a regional level.

Significantly, the enhanced relations under the EMP gave the impetus for the preparation of a Short and Medium term priority environmental Action Programme (SMAP) which was launched in November 1997. This is a framework programme for the protection of the Mediterranean environment. Combating desertification in the region is one of the five priority areas for funding

under the SMAP. The urgent actions which are referred to within this priority area aim at promoting or maintaining sustainable agricultural practices, mitigating the effects of drought, increasing water availability where possible by using appropriate harvesting techniques and preventing salinisation of soils, preventing and combating forest fires, while protecting the existing forest ecosystems and encouraging appropriate reforestation and combating erosion and dune encroachment. Incentives are also available under this Programme for local populations in order to avoid abandoning of the agricultural land. One project has been supported thus far in Egypt, Tunisia and Turkey to promote sustainable use of agricultural land through the introduction of organic farming methods. The SMAP is expected to become the common basis for environmental purposes in relation to policy orientation and funding in the Mediterranean region.

Thirty two projects focusing on the management of water resources and remote sensing of natural resources have been funded in the Mediterranean region from 1990-1999. An example is presented in Box 3. The total financial commitment to relevant projects in the Mediterranean amounts to approximately €130 m in this period. This figure includes eight projects under the MED-Campus programme 1994-95, which supported University networks between several Mediterranean countries in order to undertake research studies or training in environmentally sensible arid zone management. A regional desertification programme covering Egypt, Israel, Jordan, the West Bank and Gaza Strip and Tunisia has also been supported by MEDA. Projects are listed in annex IA.2.

The European Union's main financial instrument for supporting its internal environmental policy (LIFE) has been extended to apply to countries bordering Mediterranean as well as Eastern European states. Over the period 1996-1999, nine projects were funded which related to desertification in this region with a total contribution of €2.5 m. Programmes are aimed at the establishment of the necessary administrative structures in the field of the environment, the conservation or restoration of important habitats hosting endangered flora and fauna and pilot actions to promote sustainable development. It is addressed primarily at national administrations to foster exchange of experience and transfer of know how, with the ultimate goal of better management of their environment and establishing strategies for sustainable development.

BOX 3: BUSTAN AGRICULTURAL DEVELOPMENT PROJECT, EGYPT

EC contribution: €15,000,000
Source of Funds: Financial protocols,
Date of signature: 1996
Project duration: 5 years

Water is the most critical resource enabling Egypt to survive and develop. As all of the known natural water resources available to Egypt have already been tapped, the future of Egypt depends on better use and management of its existing water resources. After water, the availability of agricultural land is the next most important constraint for agricultural growth in Egypt. The loss of agricultural land as a result of urbanisation and population pressure has led the government to invest in a major land reclamation programme for the settlement of landless farmers and graduates. Most of the land reclaimed so far (about 400,000 ha) is desert land with sandy soils for which the common production techniques of the Nile Valley and Delta are not suitable.

This project aims to increase agricultural production and farm incomes and support the government's effort to establish an economically viable and environmentally sustainable farming system for small holders on reclaimed desert land (New Land) in the West Delta in Bustan. This shall be achieved through more efficient irrigation systems to reduce waterlogging and waste of resources, the improvement of extension services, training of small farmers and the wider availability of credit for essential on-farm investments.

The project will reactivate the existing Land Reclamation Training Centre at Mariut and establish two new 40 ha demonstration farms in the Bustan area. A total of 7,000 smallholders and 800 extension workers will receive targeted training over the course of the project. The centre would continue to train an estimated 35,000 small farmers in the eastern New Lands once current development plans have been implemented.

2.1.3 THE ALA AGREEMENTS

Thirty countries in **Asia and Latin America** have signed Cooperation Agreements with the European Union, some at the bilateral level and others at regional level. Funds are made available under these Treaties and are renewed every four years. During the period 1991-1995, €4,000 m were available, of which €750 m were in the form of loans from the European Investment Bank (EIB). Implementation of these Agreements is made on the basis of financial and technical assistance projects, proposed by or through governments of the beneficiary states. Whether a particular sector is supported for financing under these Funds depends mainly on the projects proposed and the extent to which they correspond to the priorities identified by the Commission.

In 1992, a Council Decision adopted in direct response to the Rio Earth Summit required that 10% of ALA funds be committed to projects concerning the protection of the environment and natural resources over the period 1991-1995. An external evaluation in 1996 of environmental

performance of EC programmes in developing countries concluded that this target has been reached.

2.1.3.1 Latin America

Two relevant projects have been funded under the main ALA Funds in Latin America for a total financing cost of €17 m. The first is an integrated rural development programme in the two northernmost regions of Chile at the edges of the Atacama desert and the second is a project aiming at the improvement of rural smallholder agricultural production in the dry northern region of Nicaragua. Eight projects concerning desertification in Latin America have been financed under the Environment and Tropical Forest budget lines over 1990-1999 with a total financing cost of just under €6 m. An example of a project supported under the Environment budget line in Latin America is presented in Box 4.

BOX 4: ACTIVITIES TO COMBAT DESERTIFICATION IN REGION IV, CHILE, PHASES I AND II

EC contribution: I: €168,075 II: €330,000
Source of Funds: Environment Budget Line
Project duration: I: 2 yrs II: 3 yrs
Date of signature: I: 1991 II: 1994

The first phase of this project involved a study which estimated that 40.9% of the region's total land surface is in the process of desertification. The study identified the principal cause of desertification to be the unsustainable agro-pastoral production systems. An inadequate focus on the threat of desertification within the education system and excessive pressures on biomass fuel were also highlighted. Over exploitation of wood for fuel is a major problem throughout the region as this represents 95% of household fuel consumption.

The second phase began in 1994 with awareness raising activities (seminars and workshops) targeted at local and regional authorities, professionals, students, grassroots organisations and other sectors of the community. The regions' goat farmers were offered training in more sustainable productive systems. Taking a long term view of the viability of local agricultural practices, however, the project also sought to improve the goats' reproductive health and enhance their income potential.

The project carried out environmental education campaigns amongst the local population and the regional authorities to raise awareness of desertification control practices. Alternative technologies have also been promoted to reduce the pressure on scarce firewood resources by substituting traditional woodstoves with solar powered ovens. Mist-trapping systems were developed in the coastal Caleta Hornos community to increase the potential for exploitation of the region's scarce water resources. The project has also promoted the implementation of existing environmental laws within the framework of Chile's Action Plan against Desertification and participated in the processes of developing an effective land law. This project has been awarded UNEP's Saving the Drylands Award as a model for initiating the sustainable management of dryland areas.

2.1.3.2 Asia

Land resources in densely populated dryland areas throughout Asia are put under severe pressure as a result of drought conditions and other natural factors compounded by intensive exploitation. Since the late 1980s, most of the rural development projects in Asia have incorporated environmental components, particularly reforestation, in order to protect against erosion resulting from unsound land management practices.

Ten projects have been cofinanced from 1990-1999 with respective Governments relating to the protection of forest resources and severely degraded pastoral and agricultural land in dryland areas of Asia covered by the ALA Treaties. The majority of these projects are in Northern and Eastern India, and several have adopted a successful participatory approach and in particular focusing on empowering the role of women in community decision making. See Box 5 for an example of an interesting project and the annexes for details of all projects identified. Total ALA funds committed to relevant projects in dryland Asia amount to approximately €140 m.

BOX 5: REHABILITATION OF THE COMMON LANDS IN THE ARAVALLI HILLS, HARYANA, INDIA

EC contribution:	€23,200,000
Source:	ALA funds
Date of signature:	1990
Project duration:	9 years

Community lands comprise over 100,000 ha. of the Aravalli hills area, which have been degraded into desertified wastelands as a result of demographic pressure and the absence of rational resource management over several decades. These programmes have sought to protect village owned common lands by restoring vegetation over 38,000 and 17,000 ha of semi-arid lands respectively, conserving soil fertility and water resources as well as re-establishing natural hydrological balance and reducing soil erosion. In doing so, the projects aim to enable the villagers to meet their needs in fuelwood, fodder and timber from the hills in an ecologically sustainable manner.

In order to address more comprehensively the ecological problems, the Rehabilitation of the Common Lands project sought to establish a change in the system of free access

to the common lands towards a regulated and sustainable system controlled by the user community. This involved building up community controlled village level institutions and introducing formal safeguards for equity and the interests of the most deprived groups. A major challenge throughout the development of the project has been to train and actively involve women in the management and protection of the rehabilitated lands. This is crucial for the sustainability of the project, as women are the primary collectors of fodder firewood and other produce from these lands. An extensive women in development (WID) programme was carried out involving eleven different elements. The success of the WID programme had the result that over one third of the local labour force paid to work in the project areas were women.

Fuelwood, fodder and timber species and fruit trees, have been planted along with grasses and leguminous herbs. Other project activities include the treatment of surviving rootstock, contour trenching for soil protection and stonewall fencing. Since capacity building was a key component, workshops and training courses for community decision makers, resource managers, technicians and extension workers were also supported. Training in sustainable pasture management was given to women's groups to change practices of harvesting grasses. In addition, women were given cash incentives not to cut the grasses until they have seeded and the new practices were given a chance to yield benefits. As a complementary activity, fuel-efficient stoves were introduced using waste biomass like dry leaves, twigs and agricultural waste. A cheaper clay version of the project model was produced on the initiative of the women themselves who now manage this activity themselves. Other activities include setting up Village Forest Committees, encouraging the empowerment of women and their inclusion in technical training on nursery planting and transplanting techniques as well as silage and haymaking etc.

A recent study conducted with the help of satellite imageries revealed that the overall vegetation cover has increased by 34% in the project area. This has a direct impact for the people because of the increased availability of adequate fodder and fuel and the greater potential recharge of ground water levels.

Following the success of this project, the Haryana Community Forestry project was launched, building on the experiences of working with village level institutions in the development of community based forestry and sustainable management of natural resources. A greater involvement and empowerment of women, scheduled castes, landless and other disadvantaged groups in village decision making is being pursued through Village Resource Committees. It focuses particularly on degraded wastelands, village common land, farm boundaries and so on, and although the emphasis is on tree growing and management, the project deals in a holistic way with land, water, trees, crops and livestock.

2.1.4 ECONOMIES IN TRANSITION IN EASTERN EUROPE AND CENTRAL ASIA

The EC has a technical assistance programme for the economies in transition of Central Asia, called TACIS. The Programme aims to support countries in Eastern Europe and Central Asia in their transition to democracy and a market economy. Tacis has since its launch in 1991

supported projects aimed at combating coastal desertification, environmental degradation and loss of agricultural productivity caused by excessive exploitation of water in the Aral Sea (see Box 6) and the Caspian Sea in central Asia.

The Tacis projects seek to provide for international and national water resources management with allocation between economic sectors and users based on criteria which are economically sound, equitable and ecologically sustainable, giving proper regard to the preservation of quality and downstream use. They include transmitting know-how to make more effective use of existing operating systems and institutional infrastructures, while introducing economic concepts (value of water) and environmental accounting to create awareness of the real benefits of adopting new policies and dangers of pursuing existing ones. The projects also aim to assist the development of new technologies and practices of water resources management in agriculture..

**BOX 6: WATER RESOURCES MANAGEMENT AND AGRICULTURAL PRODUCTION IN THE
CENTRAL ASIAN REPUBLICS**

EU contribution: €8,000,000
Source of funds : TACIS programme Regional Funds
Date of commencement: February 1995
Project Duration: 5½ years

The Aral Sea is a land locked body of water surrounded on all sides by deserts and semi-arid grasslands. Its only recharge has been from the waters of the two rivers, the Amu Darya and the Syr Darya which used to provide a combined annual inflow of more than 56 cubic kilometres per year.

The rapid expansion of cotton production and irrigation schemes in the 40s and 50s reached its height in 1969 with the exploitation of 4.5 million hectares of land in the surrounding areas leading to an annual water consumption was running at 50-55 cubic kilometres. The resulting plight of the Aral Sea is well known: by 1990, the sea level had fallen 14 metres from its 1960 level and the area of sea had shrunk by more than 40%, an area greater than the size of Belgium. The effects on the adjacent lands are multiple: salt is deposited through the dust whipped up from the exposed sea bed and the rainfall cycle is diminished. The temperature has changed sufficiently to endanger the production of cotton and the high summer temperatures increase the evapotranspiration rates of plant stands which are already stressed by the salinisation of soils. The Amu Darya used to spread out into a wide delta creating 15,000 sq kms of seasonally flooded grassland and groundwater forests which supported almost 400 species of birds and mammals - the delta has since dried up, killing vegetation, destroying biodiversity and with it, the traditional livelihood of the local peoples.

To address the dramatic problems which the whole basin was facing, the overall objective of the WARMAP programme was to provide technical assistance to improve Inter-republic water apportionment and the development of principles and institutions.

2.2 THEMATIC FUNDING SOURCES

In addition to the three main funding sources described above, a diverse collection of thematic budget lines has been introduced at the instigation of the European Parliament from the annual budget of the European Community. These characteristically have lower budgets and tend to promote pilot projects, small-scale NGO projects or research studies. They are generally focused on particular sectors rather than geographical areas and are managed by DG Development. A description of those budget lines which have financed action in the field of desertification is presented below.

2.2.1 ENVIRONMENT

The budget line has existed since the beginning of 1980s and was relaunched with increased budget in 1988. It applies to all developing countries and consists of a total annual budget of € 15 m. One of the five priority topics concerns improving practices for the conservation of soils and farmland, management and protection of forests and the fight against desertification.

Other priority areas include the preservation of biological diversity through the conservation of ecosystems, the improvement of the urban environment and policies of land use management and the use of environmentally sensible technologies in the field of energy. The budget line may finance EU policy analyses and environmental impact assessments as well as pilot environmental projects. Some examples of projects supported under this source of funds are included in Boxes 4 and 7.

2.2.2 ACTIONS TO PROMOTE TROPICAL FORESTS

This budget line was initiated in 1992 in the framework of commitments to Agenda 21 taken at the Rio Earth Summit and is aimed at supporting the efforts of developing countries to conserve and sustainably manage their tropical and subtropical forests in both dry and humid areas. Special consideration is given to forest conservation operations which are considered to play an important role locally in the prevention of soil erosion and the restoration of degraded areas and globally in relation to climate change and loss of biological diversity. A total of €50 m has been available annually for forestry actions in all developing countries up to 1999. A much lower allocation is foreseen for the years ahead.

2.2.3 COFINANCING OF NGOS

A special budget line is set aside for support towards a whole range of projects concerning developing countries carried out by NGOs. It has the overall aim of addressing directly the fundamental needs of the most disadvantaged people in developing countries. Actions are implemented through partnerships between European and local NGOs and mainly concern local rural and urban development, human resource development and institutional support to local partners. Actions of raising awareness of the European public towards development issues are

also supported by the budget line to the extent of 10% of the total annual amount. NGOs who can demonstrate successful EC project experience for three years are entitled to apply for a block grant which allows flexibility to the NGOs to support local partners with mini-projects of between €5,000 and €40,000. In addition, up to €300,000 can be made available for NGO projects aimed at strengthening of activities of grassroots organisations in developing countries. Projects aimed at addressing desertification under this budget line have involved improving agricultural techniques in dryland areas, local reforestation actions, and support to local community groups in the implementation of agro-ecological activities. The total annual budget in 1998 was €200 m.

BOX 7: CONSERVATION OF BORANA RANGELAND ECO-SYSTEMS, ETHIOPIA

EC contribution: €33,000
Source of funds: Environment Budget Line
Project duration: 3 years
Date of signature: September 1994

The primary problem facing the Borana pastoralists is food insecurity brought about by shortages of water and forage, inadequate animal health services, insufficient access to grain and inadequate economic opportunities. The Borana lead a subsistence life style and traditionally make no provision for food shortages beyond increasing their livestock herds as much as possible and selling some cattle when it was necessary to buy other commodities. With an increasing population, decreasing rangelands and an unstable economy, this strategy is no longer adequate to meet their food needs.

Sources of the current problems are both natural and man-made. Erratic and inadequate rainfall lead to poor agricultural land, however inappropriate land use practices have compounded the problem. Traditionally, the Borana had complete control over their grazing lands and managed a sophisticated system to reduce over grazing and ensure a steady forage supply, however lands are now becoming encroached by brush cover.

This project promoted a set of appropriate land use practices to reduce over grazing and interventions and to increase economic opportunities. These included forage development, (eg training in haymaking, management of hay stocks and the storage and collection of *Acacia tortilis* pods for dry season feeding), water development (well improvement, construction of community water cisterns, water tanks, boreholes, cattle troughs etc., training for community masons), improving and diversifying the food supply in order to reduce dependency on dairy products in the area and increase general food security, a veterinary programme to improve animal health and management of medicines and to establish a Community Vet Committee, and a women in development programme to encourage their active participation in the programme. Eighteen women's groups were organised which now operate community shops, sell maize locally, raise smallstock and purchase oxen and donkeys.

The most important aspect of the project was the promotion of community based development, whereby with intensive efforts to train extension staff, the communities took responsibility for their own development. Year by year, the communities were able to take a greater share of the responsibility, so that at the end of the project they had the organisational and managerial means to address problems with a minimum of outside assistance.

2.2.4 DECENTRALISED COOPERATION

This budget line is aimed at providing direct and flexible support to a variety of pilot development initiatives, projects and programmes stemming from non-government bodies in developing countries. It is intended to act as an incentive for promoting information and awareness about decentralised cooperation among all the parties potentially concerned, mobilising and strengthening the development capabilities of these parties, paving the way for larger scale operations. Funded projects include the promotion of local Agenda 21 programmes Namibia, an Africa wide programme to support the training of farmers representatives in markets and agricultural policy the development of a participatory approach in local government in Eastern and Southern Africa, and the implementation of decentralised cooperation in 3 pilot programmes in Senegal, to cite but a few examples. The total annual budget in 1999 was 4 m Euro.

**BOX 8: IMPLEMENTATION OF THE DECENTRALISED COOPERATION APPROACH IN 3 PILOT
DEPARTEMENTS, SENEGAL**

EC contribution: €469,086
Source of Funds: Decentralised Cooperation Budget Line
Date of signature: 1997
Project duration: 3 years

Senegal has engaged in numerous reforms towards devolution and decentralisation of powers and responsibilities relating to economic and social development. These reforms correspond to a major challenge: giving a new opportunity for development on the basis of a redefined society based around strong democratic values and principles. From the principles and practices which follow new forms of trust and new synergies can emerge.

This project aims at the implementation of an integrated approach towards decentralised cooperation as part of an important change in thinking in three pilot areas of Senegal (Podor, Foundiougne and Kolda). Thus, it will define and set up appropriate consultation methodologies and tools to guide participatory decision making. Another important activity is the establishment of a development fund under a shared local responsibility according to priorities developed with the participation of all relevant stakeholders. In order to do this, the project will concentrate on building the capacities and management skills of local project managers through training activities at regional and local level. Technical and financial guidelines will be developed to assist project managers in drawing up short and long term plans for the main types of project investment (schools, health centres, hydro-agricultural systems, etc).

These experiences in the pilot areas will be used to reorient EC's Microprojects programme under the 8th EDF. Thus, more than responding to direct needs, future microprojects will be aimed at helping actors to exercise responsibility and build up skills through promoting active participation by the whole range of actors and stakeholders.

2.2.5 FOOD AID AND FOOD SECURITY

This budget line is different in character to the other budget lines and is allocated a much higher annual budget in the order of €500 m. It applies to all developing countries though interventions are targeted to priority countries. Community operations in support of food security consist of either supplying food products, or financing development projects relating to structural food security. (Emergency food distribution is financed and managed through the European Community's Humanitarian Office, ECHO). In addition, various types of food early warning system have been financed by the EC. These include systems aimed at detecting food shortages early enough for food aid to be able to fulfil its emergency function and advanced early warning systems based on cross-referencing indicators of various kinds (crop monitoring, income, migration, nutritional state, health) to generate socio-economic and nutritional data. Market information systems, which enable information on market trends to be disseminated to economic operators, have also been set up with EU funding. In addition to support of many national systems, the EC has provided financial support to the FAO towards the development of the Global Information and Early Warning System (see also section 2.3.2).

Since the 1996 Regulation (1292/96) covering both food aid and operations to support food security, an increasing emphasis has been placed on actions which promote long term food security. The three major priorities of the new policy involve stronger partnerships with beneficiary countries, appropriate responses to food security (for example, focussing on supporting interventions before crises occur rather than attempting to contain the effects) and more effective integration of strategies into broader development cooperation. A European Food Security Network (RESAL) has also been set up covering 20 of the low income countries with high food insecurity. The majority of these are in dryland regions. Each zone is covered by a joint team of European and local experts which work to develop inter-sectoral approaches and debates on food security policies and strategies. Information produced by RESAL is available from the EC at <http://www.resal.org>

Projects relevant to the aims of the CCD include soil conservation actions and forestry measures as well as the improvement of food stocking and distribution systems and other measures to mitigate the effects of drought. Some examples are provided in Box 9.

BOX 9: BUDGETARY AND PROJECT SUPPORT FOR FOOD SECURITY IN MOZAMBIQUE

Land degradation is being increasingly reported in Mozambique. In some areas, this is due to increased population pressure, combined with inappropriate land use practices. The lack of inputs and the move towards demanding cash crops, such as cotton, is already beginning to result in extensive bush clearing, reduced flow periods and declining crop yields. Vegetation cover is also suffering due to uncontrolled bush fires and an increase in the exploitation of the forest resources, both for timber and for charcoal. Species diversity is thus affected and the risk of soil erosion is on the increase.

The Community is engaged at several levels to address these problems. At the national level, it is one amongst a number of donors which sponsor the current five year national programme for agricultural development (Proagri) in collaboration with the Ministry of Agriculture and Fisheries (MAP). The development of this programme has been recognised as a very interesting and successful experience of donor coordination in Africa. Proagri is a key element in the government's strategy to reduce food insecurity and poverty in the country and is basically a process of institutional reform through which the Ministry can be transformed to undertake its newly defined core functions. It will provide for the establishment of an environmental planning capacity at national and provincial level and the appointment of an environmental monitoring committee chaired by MAP with inputs from related Ministries, donors and independent environmental organisations. More detailed EIAs for irrigation and livestock development, use of agro-chemicals and exploitation of forest and wildlife resources will be required. An environmental management implementation and monitoring plan will be published and several workshops will be held to increase the awareness of environmental issues, including short term courses for key staff in the principles of sound environmental management.

At a more local level, a total of 17 other food security and environment projects carried out by NGOs have been funded by the EC in the semi-arid regions with a strong environmental component. Two major projects under the Food Security budget line aim to increase productivity and minimise the risk of crop failure by reintroducing drought resistant crops such as sorghum and millet, improving the availability of traditional seed varieties adapted to local conditions, encouraging crop diversification and other forms of income generation and facilitating commercialisation through producer associations. In one case, this is achieved through a micro finance institution that provides credit to small traders. It is anticipated that the EC will fund projects promoting cashew production, as this can be grown in marginal areas, with benefits for the stabilisation of soils, and is a potentially profitable crop.

2.3 RESEARCH PROGRAMMES

In response to the call by the United Nations Conference on Science and Technology for Development in 1980, the European Community set up its first multi-annual programme for research in developing countries. The Science and Technology for Developing Countries (STD) programmes, which ran from 1982-1994, supported scientific research into the agricultural, environmental and health problems of developing countries, through partnerships between North and South. Preference was given to proposals which brought together participants from at least two developing countries. Research priorities for the agricultural section of the STD programme had the overall aim of reducing the food deficit and the development of produce with high economic value. The response to the calls for proposals during the three STD programmes clearly demonstrated the potential of research capacities in the field of tropical and subtropical agriculture in developing countries and EU member states alike. Selected projects concerned the

improvement of agricultural production systems - including improvement of crop varieties and livestock feeds etc., the restoration and conservation of the environment, forest improvement, as well as post-harvest technologies. Two projects are presented in Boxes 10 and 11 to illustrate the types of research funded under this programme.

In 1992, as greater emphasis was placed on the Mediterranean area within the Community's development cooperation policies, a separate research initiative was set up as a pilot programme. The AVICENNE initiative was designed to support research into problems common to the whole Mediterranean basin and aimed at intensifying scientific links and networks within the region. In its first year, the programme was oriented towards the management of natural water resources and 14 relevant projects were financed. From 1995, the policy and funding framework for research in all developing countries was consolidated within the International Cooperation (INCO) programme described below.

BOX 10: LAND USE, HOUSEHOLD VIABILITY AND MIGRATION IN THE SAHEL**EC contribution: €399,734****Source of funding: STD III****Date of signature: 1994****Project duration: 3 years**

Sahelian herders and farmers are widely perceived as being at the mercy of a harsh and unpredictable environment, and caught in a vicious spiral of climatic downturn, impoverishment and environmental degradation. They are seen as responding to these pressures by shifting from transhumant herding to cultivation and by migration, strategies that could put natural resources at risk of further degradation. For Sahelian nations to deal with the complexities generated by these strategies, it is necessary to understand the determinants of household decisions, underlying shifts of livelihood and location.

This project set out to investigate the relative importance of different economic and environment factors in driving decisions by households to settle or move, to farm or herd, to sell or store. It was found that for most Sahelian households, livestock sales are driven by economic necessity and response to market conditions is limited by lack of animals. In times of relatively favourable production conditions and terms of trade, Sahelian patterns of shifting livelihoods and locations are by no means driven by impoverishment or degradation. Migration by individuals or households may represent any one of a great variety of types of movement with different underlying reasons. While qualitative economic factors, such as type of production system, are clear determinants of decisions to move, quantitative differences in wealth or crop yields appear less important in this respect.

The effect of cultural, ethnic and local demographic factors must be appreciated before the relative importance of environment and economy can be established. Culture correlates strongly with the production system, which in turn correlates with demographic patterns. Production systems, environmental factors and ethnicity are all significant influences on decisions over seasonal labour migration and transhumance. In a time of environmental or economic crisis, the relative importance of different influences would shift, but cultural pressures and demographic constraints remain driving forces.

BOX 11: DYNAMICS OF SOIL FERTILITY MANAGEMENT IN SAVANNAH FARMING SYSTEMS IN AFRICA

EC Contribution:	€478,000
Source of Funds:	STD III
Date of signature:	1994
Project Duration:	3 years

The issue of sustainable development of agriculture is high on the policy agenda of African countries particularly those in dryland savannahs where resource pressures are acute. Within agricultural development strategies, soil fertility management is critically important. Two contrasting options are often proposed for the intensification of African farming systems. The high-input option depends on the substitution of traditional soil management practices, such as fallowing, with new practices, such as planting high yielding crop varieties, that depend on the application of large amounts of fertiliser and pesticides. The second low-input option focuses on adaptation within traditional systems, working to improve the efficiency of nutrient cycling, by reducing losses and enhancing uptake through effective timing, focussed application and spatial selectivity.

This collaborative research project aimed at contributing to this debate by providing a comparative analysis of soil fertility management practices in contrasting small holder farming systems at sites in Ethiopia, Mali, and Zimbabwe. The appropriateness of the different options was explored, and the possibility of combining the two approaches through tailored integrated soil fertility management strategies was considered. The project also aimed to increase the understanding of the ways in which macro-policy influences the decisions made at farm level. Across all settings investigated, farmers considered the issue of managing and improving soil fertility as of paramount importance. Farmers identify and appraise different kinds of soils, however, their capacity to invest in better soil fertility management depends on a range of factors, which operate at different levels. Clear differences were found between farmers with respect to their ability to invest in larger scale use of organic and inorganic sources of nutrients. Inputs are not spread universally across all fields and crops. Nutrients tend to be focused on nearby, smaller plots of land, where higher value crops are grown. In each site, there were fields with net nutrient gains although if account is taken of the whole rotation cycle, a net outflow of nutrients cannot be excluded. Where lower value crops are grown, and less inputs used, net nutrient losses are found. However, even here, farmers often make highly effective use of the very limited quantities of nutrients available through careful planning and timing of inputs in relation to rainfall and crop development. Such diversity of soils, cropping patterns and management practices within a single farm suggests that interventions should be highly localised in approach. Improved management methods developed within the project include resource flow diagrams identifying biomass movements and nutrient flows and farmer-led trials to test the impact of various soil fertility treatments. The great importance of policy issues has been underlined. Overall, macro-economic policy changes have led to the rising cost and reduced availability of mineral fertiliser, reduced access to extension advice, and in some cases, shifts in land tenure systems.

The project has demonstrated the value of improving dialogue, joint experimentation and analysis between farmers, researchers and extension workers, the need for tailored approaches, which recognise diversity between and within sites, and the importance of policy design to provide stronger incentives to farmers to engage in soil fertility maintenance and management. Such an approach calls for interventions at both macro- and micro-levels.

2.3.1 INCO

The review of policy inspired by the UN Conference on Environment and Development in Rio in 1992 was taken into account in the development of the Fourth Framework Programme for Research, adopted in 1994. This included the EC's programme incorporating international scientific cooperation with all non EU countries (INCO). The 1994-98 sub-programme for developing countries, INCO-DC, targeted three sectors of general importance. The first concerned sustainable management of renewable natural resources whose principal objectives were to promote the conservation and sustainable use of natural resources in a way which is compatible with long term economic growth, and the enhancement of productive capacity that is both equitable and environmentally sound. The Programme also highlights research into soils, water and biotic resources and how they are used within the economy, recognising that the potential for enhancing productivity in the use of dryland ecosystems through diversification and sound management may be substantial. Some examples of research supported under this sector include an investigation of the risks of desertification within dryland ecosystems, the interactions between biophysical, socio-economic and cultural factors as a means to promote sustainable management systems and the policy and how sectoral policies interact with the sustainable use and management of natural resources. Projects funded under the second sector, sustainable improvement of agricultural production, included the development of new crop varieties better adapted to dryland conditions and the study of how agricultural production systems can be improved within economic, social and environmental constraints.

With the adoption of the Fifth Framework Research Programme (1998-2002), the Community has sought to build on the earlier work to strengthen and add value to ongoing research in European and developing country research centres and provide training opportunities. The new INCO-DEV sub-programme seeks to tackle challenges linked directly to the particular conditions of developing countries and to the emergence of a series of far-reaching, interrelated and accelerated changes, like the rapid pace of technological advance, globalisation of knowledge and information, political and economic integration of countries into regional blocks, growing populations increasingly concentrated in urban centres, competition for natural resources and environmental deterioration. For developing countries to keep up with these challenges, research is vital. The problems to be tackled have been defined through appropriate dialogue with developing countries and their sub-regional organisations. Lessons learned through earlier research programmes have stimulated greater emphasis on the policy relevance of research findings. A novelty of the INCO-DEV programme is its approach based on three levels of research. Firstly, policy research to determine the conditions for sustainable development. Secondly, systems research on complex issues involving many interacting components and thirdly research on specific scientific and technical problems to generate tools for sustainable development which can be used in particular systems or policy contexts. Opportunities for

research into desertification clearly exist under the policy research theme “natural resource use and economic production: adaptation to globalisation and ensuring harmony with the environment”. The programme also supports systems research aiming at strategies for ecosystem management for sustainability and technology research for sustainable plant and animal production.

Two other sub-programmes of INCO should be noted. The first is aimed at supporting research partnerships with the Mediterranean countries of the broader MEDA cooperation programme. This identifies the management of scarce water resources as an important research priority, and is particularly concerned with integrated planning of transboundary water resources and efficiency in agricultural and urban/industrial water use. In relation to the newly independent states of Central Asia, one of the new research priorities of another INCO sub-programme, known as Copernicus, is specifically concerned with human-induced desertification. This aims to support research into management systems and technologies aimed at forecasting, combating and mitigating the effects of dryland degradation.

BOX 12: IMPACT OF CLIMATE VARIABILITY ON AGRO-ECOSYSTEMS AND WATER RESOURCES IN DRYLANDS (CLIWARDA)

EC contribution: €465,000
Source of funding: INCO-DC
Date of signature: 1996
Project duration: 3 years

During the last 150 years, there has been a dramatic increase in the areas under irrigation. To a large extent this growth was concentrated in the drylands of the developing world, particularly in those regions with a relatively scarce, but renewable water supply. The study was carried out in five countries (Argentina, China, Egypt, India and Niger) and covered two broad physiographic regions (continental deserts and arid zones in the vicinity of high mountain ranges depending on melt water and zones where water supply originates in areas of higher rainfall which is transported by rivers over large distances).

Due to the variability of precipitation in these areas, reservoirs have only a short term mitigating effect. To some extent, irrigated agriculture has developed a significant resilience to this variability, but increasing competition for water resources and continuously increasing agricultural water use has contributed to higher vulnerability of dryland agricultural production systems.

The above issues have been addressed by the scientific community at various levels of detail. This research project has endeavoured to analyse the mechanisms deployed by different societies to adapt to this variability. How did hydrological conditions vary in the recent past, and what impact did this have on agricultural production? How do societies react to water scarcity, and can local findings be applied more effectively in a wider context?

Besides its calls for research proposals INCO also launches calls for accompanying measures meant for promoting its research programme. In this context INCO-DEV supports EIARD-Infosys which is a meta-information system of the European Initiative for Agriculture Research for Development (EIARD). This internet based system links decentralised on-line information sources on agricultural research for development and is a tool for facilitating research partnerships between participants in Europe and developing countries. Its web-site may be explored at <http://www.dainet.de/eiard/infosys/index.htm>.

A European Network for Research into Global Change (ENRICH) has also been set up by the European Community, through the INCO and Environment and Climate (see Chapter 3 below) Programmes, to encourage information sharing in the field of global change amongst researchers in Europe and developing countries alike. Through this initiative, workshops have been supported to disseminate the latest research concerning freshwater resources at the regional scale, examining land use and climate interactions in particular. Another activity seeks to develop greater understanding about how institutions (decision making procedures that define social practices) shape the content of human/environment relations whether as driving force for anthropogenic change or in devising appropriate responses.

BOX 13: IMPACTS OF LAND USE POLICY ON ENVIRONMENT, WILDLIFE, DEMOGRAPHY AND SOCIO-ECONOMIC INDICATORS IN EAST AFRICAN SAVANNAS

EC contribution: €400,000
Source of funds: INCO-DC
Date of signature: 1995
Project duration : 4 years

This project seeks to analyse the long term outcomes of different land use policies on environment, wildlife, demography and socio-economic indicators in the Serengeti Ecological Unit, which provides a natural experiment with an ecologically and ethnically continuous ecosystem divided into zones of comparable and contrasting policy lying either side of a national border representing major economic and political contrasts.

Methods are being developed from broad-scale to micro-level to interrelate the SEU's land use and economic policies with the environmental context. These concern long term vegetation and habitat change in different blocks, changes in human, livestock and wildlife populations with different policies, agro-pastoralist responses to land use policy and their implications. Statistical and quantitative analyses will be used to help identify proximate causes and driving forces shaping these interrelations and to develop explanatory models. International seminars and publications are also planned.

The project will present archival and literature reviews on the development of savanna land use policies. Various types of data will be obtained including remote sensing land cover mapping, collation of aerial census data on wildlife, livestock and people. PRA surveys will also be undertaken to determine the significance of

different types of land use for biodiversity and pastoral management, land/livestock holdings, land use trends, yields and food security.

This research will deliver useful empirical information and a basic structure for analysing, predicting and evaluating land use policy outcomes, as a tool of development and government. It sets up a coherent framework for analysis of economic and ecological implications of policy change, and identifies hard outcome measures as reliable indicators of impacts of different policies in terms of economic and ecological change. Interrelationships between policy changes and economic / environmental trends will also be examined providing a test of competing hypotheses over current debates on intensification and degradation; on dryland system dynamics; and on common property resources.

Projects funded under the STD, AVICENNE and INCO programmes and the ENRICH measure are listed in annex IB. Catalogues outlining the objectives and activities of each project under the latest programmes and a summary final report of many of the completed projects are available from the European Commission. These documents may also be retrieved from the Internet through the EIARD Information system (see above). Many publications are also available through the CTA (see section 2.1.1.2).

2.3.2 REMOTE SENSING RESEARCH PROGRAMME

In addition to the funding of coordinated research projects, the Commission directly carries out research activities through its Joint Research Centre (JRC). The Space Applications Institute of the JRC carries out various research and development projects focussed on the use of satellite imagery for environmental monitoring and management and many of these are directly relevant to desertification issues.

The Global Vegetation Monitoring Unit (GVM) has developed remote sensing activities outside Europe over the last 20 years, originally in cooperation with the CILSS. A broad range of activities is now being carried out within that unit and that are relevant to desertification monitoring and early warning systems. The FIRE project has developed the “World Fire Web” based on a network of local satellite data receiving stations, that pool together their observations to provide a unique view of patterns of fire activity at the global level, with an emphasis on the savannah - forest transition zone of the tropical belt.

The VEGETATION programme jointly carried out with France, Belgium, Sweden, Italy and the European Commission aims to build and operate a low resolution imaging system to observe vegetation status on a daily basis over the whole globe. GVM is also looking at improving access to data by end users. Complementary agreements have also been established with local partners (national meteorological offices, national and regional early warning units) to test methodologies in real conditions.

The Global Environment Information System project is also interesting. It is focussed on the contribution of remote sensing techniques to the implementation of international environmental conventions. This project also deals with land cover mapping and monitoring at national to continental scales and assesses the impact of short term climate variation, such as El Niño

events, and long term trends, such as population increases. In another activity, the project seeks to monitor fire as it relates to land degradation and environmental management practices.

3 ADDRESSING DESERTIFICATION IN THE EUROPEAN UNION

Dryland degradation has become a major problem in certain areas of the northern Mediterranean as a result of bad management of land and water resources and progressive drought under changing climatic conditions. Areas of land considered as semi-arid or dry sub-humid as defined under the Convention include more than two thirds of Spain, the Algarve and Alentejo regions of southern Portugal, the Mezzogiorno regions of Italy, most of mainland and island Greece, as well as the island of Corsica. This chapter will look at the way in which the European Community's policies can address desertification and contribute to the better management of natural resources within the European Union territory.

There are many interlinked policy instruments which have supported action to combat desertification within dryland areas of the European Union Member States. With the ratification of the Maastricht and the Amsterdam Treaties, the EU has adopted a horizontal approach to the implementation of its environmental objectives. The following chapter starts with a brief introduction to the environmental policy context, highlighting the European Action Programme for the Environment, and thereafter looks in turn at other relevant sectoral policies. Section 3.2 concerns the many important research programmes which have been supported by the European Community. These have contributed to a more detailed knowledge of the physical processes of land degradation as well as the multiple socio-economic factors which can cause desertification or exacerbate its effects. Following this, the report looks at the agricultural and forestry aid schemes that have been set up within the scope of the 1992 reforms of the Common Agricultural Policy. Forestry measures to prevent fires and programmes to improve the knowledge of the effect of fire damage on Mediterranean ecosystems are also examined here. Section 3.4 turns to the regional development objectives of the Structural funds which target measures for improving the rural environment. Other regional policy measures which promote land use planning to address drought and desertification are also described. The chapter closes with a description of the environmental component of the Cohesion Fund. Where possible, examples are given of the type of activity supported and financial contributions provided, however, a quantitative assessment of the contribution made by these Funds is often not possible, as relevant projects fall within larger programmes dealing with other issues, such as water management, forestation, etc.

3.1 EUROPEAN ACTION PROGRAMME FOR THE ENVIRONMENT

Developed as part of the EC's response to Agenda 21 agreed at the Earth Summit at Rio in 1992, the Community's (fifth) environmental action programme (EAP), defines the objectives for a Community strategy towards sustainable development. The fifth EAP entitled "Towards Sustainability" has formed an important element in the policy background upon which other developments described in this chapter have been set such as the Reform of the Common Agricultural Policy (CAP), review of the Structural Funds, the creation of the Cohesion Fund, and the definition of the Fourth Framework Programme for Research. Each of these have a role to play in understanding, preventing or mitigating the effects of desertification.

The Programme proposes a fundamental shift in the approach of policy makers towards environmental issues. It argues that the integration of environmental considerations in the definition

and implementation of economic policies in sectors such as agriculture and forestry is fundamental in order to adapt the current economic model towards a more sustainable one. This objective entails both a carefully defined sharing of responsibility amongst administrations as well as dialogue and awareness raising.

To further its aim of integrating the environment into sectoral policies, the Programme has emphasised the importance of policy instruments such as the promotion of spatial planning and strengthening the monitoring and knowledge of the state of the environment and the importance of assessing the environmental impact of programmes and projects applied by national, regional and local authorities. Developments in these fields are described in the relevant sections below.

Despite these advances, the Community has recognised that there is scope for improving the environmental sensitivity of certain EC policies and programmes, through coordination and integration of environmental priorities. The Common Agricultural Policy, for example, has encouraged intensive grazing and unsuitable crops in certain areas, while the Structural Funds and the Cohesion Fund, by financing major irrigation projects which may lead to overuse of local water resources. These issues are being addressed, however, within the recently approved Agenda 2000 programme. This programme is the result of a considerable effort on the part of the Commission to reflect upon ways in which many of the Community's central social and economic development policies can be reformed, including ways of building in greater integration of environmental concerns (see Box 14).

BOX 14: AGENDA 2000 AND THE ENVIRONMENT

In March 1999, the Council of the European Union concluded an agreement on the Agenda 2000 programme whose main objectives are to strengthen Community policies and to give the European Union a new financial framework for the period 2000-06 with a view to enlargement of the Union. Among the priority areas of this programme are the continued reform of the Common Agricultural Policy (CAP), increasing the effectiveness of the Structural Funds and the Cohesion Fund and the integration of environmental perspectives into the EU's main social and economic development policies.

In its decision, the Council agreed the establishment of a strong new rural development pillar to the CAP with respect for the environment at its centre. Comprehensive national or regional programmes must take account of the interrelationship between agriculture and sound management of the rural environment. Member States are required to take appropriate environmental measures with respect to the use of agricultural land and the sustainability of production. Among these measures are support for environmental training of farmers, enhanced support in less favoured areas and schemes to promote forest species of high ecological value. A regional environmental assessment should be made before the adoption of Community programmes for the implementation of the Structural Funds. The Commission is preparing an assessment methodology for this purpose.

The new regulations also aim to strengthen the role of partners, such as environmental authorities, in the management of the structural funds. This is part of the new agreement on the sharing of responsibilities which allows Member States greater flexibility and focuses the Commission's role on follow up. "Environmental authority networks" have been set up in Spain, Italy and Portugal in order to coordinate the presence of environmental authorities in the Structural Funds decision-making process. These networks will be expanded under the Agenda 2000 strategy.

The Commission's assessment of the fifth EAP has been published on the web and is undergoing a process of public consultation. The document sets out a number of areas in which improved targets and priorities must be set, including the necessity of integrating UN CCD objectives into the range of EU policies relating to land use in the southern European Member States. The Community's sixth environmental action programme is currently in preparation.

3.1.1 ENVIRONMENTAL IMPACT ASSESSMENTS

The Commission has been active in promoting legislation concerning environmental impact assessments (EIAs) since the 1970s. In 1985 legislation was adopted requiring that an EIA be carried out before projects are developed for support by governmental authorities in the Member States - this applies whether or not it is funded by the Community - and the Directive was revised in

March 1997. In accordance with the precautionary principle endorsed in the Maastricht Treaty, a new Strategic Environmental Assessment Directive has been proposed which would expand these requirements making EIAs compulsory for certain plans and programmes. The Community does not interfere in how the Member States should use their lands, and the provisions of proposed Directive extend only as far as requiring that environmental impacts are identified and assessed and that any such concerns be taken into consideration in the planning process. Under the proposals, the public is encouraged to give its opinion, which should be taken into account during the decision making procedure. Any subsequent decisions taken should be publicly notified, in a spirit of transparency. Political agreement on this Directive has now been achieved, and its adoption is foreseen by the end of the year 2000.

3.1.2 LIFE PROGRAMME

LIFE, the EC's main financial instrument for the environment was created in 1992 to support the objectives of Community environment policy. Its main efforts are focused on the implementation of innovative and replicable actions which seek to integrate environmental issues in different fields related socio-economic development. Within this overall objective, priorities are set each year and a call for proposals is issued. In 1995, in particular, the LIFE programme included priority towards actions aimed at protecting soils threatened or damaged by fire, desertification or the disappearance of the dune belt. Details of the variety of actions funded are included in annex I.D.1 and an example is provided in Box 15.

As environmental problems do not tend to respect national boundaries, the EU has a particular interest in promoting the adoption of environmental and sustainable development policies in neighbouring states. Five percent of LIFE funds are reserved for actions in 16 countries bordering the Baltic and Mediterranean Seas, in addition to the various development cooperation instruments described in the previous section. Interventions are focused on technical assistance in the establishment of administrative structures of concerned countries in the environmental field and for the drafting of environmental action plans in these countries. The LIFE-Third countries programme also contributes to strengthening and further development of relations with international organisations in the environmental field.

From 1996, the Programme was divided into LIFE Environment and LIFE Nature with a combined budget of €450 m over 1996-1999. The areas of activity outlined in the LIFE Environment Programme include support for local authorities measures in sectoral and integrated aspects of land use, and the integration of environmental considerations in the coordination and evaluation of local policies is also highlighted. The LIFE Nature programme is intended to support the EC Directives on Natural Habitats and Endangered Species. Many important wildlife species habitats are found in the dryland regions of the European Union, particularly in areas where traditional farming practices and animal husbandry are still practised. Where these farming systems are transformed into high input intensively exploited farms or, conversely, where they are abandoned, such habitats may be at risk of disturbance, pollution or erosion. Many of the LIFE Nature projects aim to work with local institutions to restore sustainable management practices through reintroducing traditional grazing patterns, planting local varieties of shrub and sowing native grasses to stabilise the subsoil, and restoring tracks in National Parks as firebreaks in high risk wildfire zones. In many of the targeted areas, the agricultural economy is in stagnation, and the main source of income is often tourism, which makes such environmental protection measures particularly appropriate. While making a

substantial contribution to promoting biodiversity, therefore, these projects also contribute to the efforts towards combating desertification and sustainable development in general.

BOX 15: PROTECTION AGAINST DESERTIFICATION AND HILLSLOPE SOIL EROSION THROUGH RESTORATION AND DEVELOPMENT OF AGRICULTURAL TERRACES, GREECE.

EU Contribution: €496,053
Source of funds: LIFE environment
Date of Signature: 1995
Project Duration: 3 years

The project is located in the islands of the Cyclades (Tinos) and the Epirus (Zagori Ioannina). Soil erosion through run off has been one of the main factors involving degradation in these areas since antiquity. Agricultural production to support rural populations through history has led to the development of techniques for the maximum exploitation of available land resources along with the development of measures for protecting against degradation. However, terraces, which were the principle tool serving both these purposes, were largely abandoned with the mechanisation of agriculture and many of these hillslopes have been since been converted to pasture, encouraged by the Common Agricultural Policy. These factors are seriously threatening the traditional systems of land preservation.

Within this context, the project aimed to protect soils against erosion, to conserve cultural heritage, to maintain rural populations within the focus areas, researching their methods and expectations for agricultural development.

The project is supporting different aspects of rural development on the principles of sustainable development promoted within the EC's Fifth Action Programme. It must produce and multiply results at the local level which will be important as a demonstration and which could further the economic interests of the local areas. It is using innovative means and methods to disseminate results such as university field workshops, creation of audio-visual material, computer imaging of the landscape and its evolution through time and other teaching tools. The project will also establish trans-regional cooperation through links between the Cyclades, Epirus and Provence.

3.2 RESEARCH PROGRAMMES

The complex physical and socio-economic factors causing desertification, the processes involved and the rate of degradation in the northern Mediterranean region are not yet adequately known. Although desertification phenomena have been studied for years, until recently research has mostly been undertaken outside Europe. Research is therefore needed to better understand and quantify the processes involved and to provide the scientific basis for addressing problems of dryland degradation in the European Mediterranean region. Furthermore new research initiatives focusing on aspects of mitigation, restoration and prevention of desertification should now receive equal attention.

This section will look at the different research programmes which are active in supporting scientific investigation into desertification and describe the Community's programmes for the collection and coordination of environmental data. Research is also carried out directly by the Commission's Joint Research Centre, whose programmes of relevance to European land resources are also described in this section.

3.2.1 ENVIRONMENT RESEARCH PROGRAMMES

Community research into desertification in southern Europe was initiated under the European Programme on Climatology and Natural Hazards (EPOCH) in 1989. A few important projects were launched under this Programme such as the MEDALUS (Mediterranean Desertification and Land Use) project which is described in Box 16 below and the EFEDA (Echival Field Experiment in a Desertification threatened Area) project. The latter undertook pilot studies of the interactions between climate vegetation and water resources within the processes of erosion and desertification. Another contemporary programme - Science and Technology for Environmental Protection (STEP) - supported environmental research into the risks from agricultural technologies and land use practices for soil, surface and ground water quality. Both EPOCH and STEP were incorporated into a single Environment Programme from 1991 to 1994.

This was succeeded within the EC's Fourth Framework Programme for Research by the Environment and Climate Programme which covered the period 1994 to 1998. Under the theme of natural environment, environmental quality and global change, projects were sought which provided an integrated approach to understanding the complexity of processes and interdependent factors which lead to land degradation and desertification in Europe. Thus, the programme aimed to further the "development of the scientific foundations for rational and sustainable management of land resources in specific parts of Europe which are threatened or affected by desertification and to support the implementation of the fourth regional annex of the UN Convention to Combat Desertification (CCD) concerning the Northern Mediterranean". Two illustrative examples of the type of work financed under this priority area are highlighted in Boxes 16 and 17.

BOX 16: MEDALUS - MEDITERRANEAN DESERTIFICATION AND LAND USE

MEDALUS I January 1991 - December 1992 - €3,000,000 - 17 partners
MEDALUS II January 1993 - September 1995 -€9,055,700 - 44 partners
MEDALUS III October 1995 - June 1999 €8,000,000 - 30 partners

The MEDALUS project has combined European expertise to research Mediterranean climate change, water supply, semi-arid landscape processes, vegetation growth, socio-economic changes, and methods of linking all these factors by mathematical modelling. As the project has evolved it has focused increasingly on integrating the various strands of research to assess the sensitivity of specific locations or regions to the causes (such as changing climate and changing land use) of desertification, and on developing tools to help in the mitigation and management planning of desertified areas.

At field sites in Portugal, Spain, Italy and Greece a programme was set up to monitor rainfall, soil moisture, vegetation growth and soil erosion (among other parameters and processes), contributing to basic research into the effects of land abandonment, the adaptation of vegetation species to drought, long term soil loss and changing agricultural practices. The same field programme has also fed data into two mathematical models simulating all the processes operating firstly on a semi-arid hillslope and secondly on complete river basins. The distribution and availability of water is of paramount importance in desertification studies, and so research on the role of ephemeral channels, gullies and rivers was also included.

Research into climate change has taken historical trends into account as well as the output from large scale general circulation models, and provides forecasts of rainfall and temperatures through the next century. MEDALUS has also investigated changes in weather types expected to occur with increasing levels of greenhouse gases.

The problem of how to scale up work on monitoring processes which operate at a hillslope scale in order to model those at a river basin or even regional level has been addressed in MEDALUS III. The aim was to match the scale of the research to the scale at which management decisions are made. At regional, national and European scales remote sensing and regional data have been integrated to produce objective indicators for climate, vegetation cover and the assessment of erosion risk, with its accompanying socio-economic implications. From another angle, the project also addresses how sections of the landscape would respond to different desertification processes. This idea has been developed from the concept of desertification response units in MEDALUS I and II to the production of maps of environmentally sensitive areas in MEDALUS III. These maps result from target area based studies in the Guadalentin basin (Spain), the Agri basin (Italy), the Alentejo (Portugal) and the island of Lesbos (Greece) and are included in a Manual on key indicators of desertification and mapping environmentally sensitive areas to desertification published in 1999 by the European Commission.

Some policy relevant results: Research has confirmed that the climate has become more variable since 1940 and that water resources are at crisis point. The main environmental problems in rural areas are related to land abandonment and this confirms the need for spatial planning. Existing policies for land use should be adapted to long term needs. A range of mitigation actions will be required to respond to the enormous diversity of land use patterns and their histories. Plans are best developed working upwards from local authorities to central government.

A book on Mediterranean Desertification and Land Use was published in 1996, an Atlas of Mediterranean Environments in Europe was published in 1998 and two volumes under the title Mediterranean Desertification: a mosaic of processes and responses are due to be published in 2000. Further details of the MEDALUS Projects can be found on the web site: <http://www.medalus.leeds.ac.uk>

BOX 17: ARCHAEOMEDES

EU contribution to two phases:	€1,500,000	€2,000,000
Starting Date:	1 July 92	1 March 96
Duration:	27 months	36 months

The Archaeomedes Project aims at a better understanding of the complex dynamics of land degradation in the vulnerable circum-Mediterranean environments. It focuses notably on the long term relationship between the natural processes involved and the socio-economic dynamics underlying human interaction with the environment. The project makes a conscious effort to elicit local knowledge to feed into the debate on potential scenarios and consequences of policy action.

In Archaeomedes I, case studies were initially undertaken to examine temporal rhythms of land degradation in four sites. These covered the Epirus (30,000 BC to 8,000 BC and 1940 to present) and the Argolid (1960 to present) in Greece. In Spain, the Vera Basin (3,000 BC to present) was chosen as a case study while in France, investigations were made in the lower and middle Rhone valley (5,000 BC to 1550 and 1800 to present). In a related project (Environmental Perception and Policy making), research was undertaken in Epirus, the Argolid and the Veneto (Italy) on the role of present day human perceptions of the natural and cultural environment in making decisions about the landscape. In particular, decisions to undertake infrastructural works were examined. In Archaeomedes II, the accent shifted to the role of the interaction of rural and urban socio-natural dynamics in land abandonment under a range of natural and socio-economic circumstances. Indicators of socio-natural resilience were also sought in order to improve direct mitigation measures, and the integrative modelling of desertification, land degradation and land abandonment. Other sites were investigated in France (at different nested levels, from the Causse Méjan up to the Midi-Pyrénées and Languedoc-Roussillon), Spain (Marina Baixa and Empordà), and Portugal (Baixo Mondego).

The first phase demonstrated the need to establish long term data sets on the interaction between climate, soil, vegetation and society and to understand the dichotomy and interaction between nature and culture in western tradition. The term 'resilience' was recommended as a shift in thinking away from 'sustainability'. This recognises that degradation of natural resources is in many cases inevitable and focuses on the ability to cope with natural change rather than prolongation of present circumstances. The first phase also pointed to the conclusion that policies concerning degradation should not be confrontational. 'Technofixes' only aggravate the problem and reinforce a belief in power over nature rather than a need for adaptation to changing circumstances.

Archaeomedes II led to the following additional conclusions:

- The interaction between temporal dynamics and spatial structuring of the landscape, and between land-use competition and conflict play dominant roles in structuring landscapes and triggering land degradation and abandonment.

- **In such competition, differing perceptions, resource identifications, valuations and decisions among stakeholders are crucial. The ways in which decisions are made need closer examination and, may well need to be reorganised if desertification, degradation and abandonment are to be prevented, mitigated or otherwise counteracted.**
- **The dynamics concerned heavily involve those of the urban settlement system in a multiplicity of ways, and the problems cannot be successfully tackled without taking these into account**
- **Doing so will enable subsidies to be directed more effectively towards balanced and integrated development of both the rural and the urban environment, as well as improving efficient use of other resources (water, land, energy, etc.).**

The Fifth Framework Programme (1998-2002) continues to develop these initiatives within the new Environment and Sustainable Development sub-programme, which focuses more explicitly on the contribution of research to policy making. One of the key actions under this programme concerns Global Change, Climate and Biodiversity. The research topic which aims to foster a better understanding of complex terrestrial ecosystems, gives priority to the investigation of dryland ecosystem vulnerability, particularly in the context of the CCD and other international environmental obligations. In this context, the 1999/2000 call for proposals includes support for studies of driving processes and interactions involved in land degradation. In addition, and in line with the new policy oriented focus of the programme, these should be complemented with proposals that aim to develop global and regional scenarios and strategies for the prevention, mitigation of and adaptation to global change. With reference to desertification, the topic seeks to provide options for sustainable development of sensitive and threatened areas. The feasibility of such strategies and actions from the economic, technical, institutional and policy points of view, will be emphasised strongly, as will their socio-cultural acceptability.

The demand for European water resources has risen in the past decades leading to increasing conflict between direct human needs and indirect needs to sustain freshwater ecosystems, particularly during periods of drought. The Community has supported several research projects into the modelling, analysis and sustainable management of water resources in Europe. These have aimed to improve the understanding of processes which lead to widespread European drought and to develop strategies to address over-exploitation of water resources as well as the degradation of catchment basins. An example of one such project is presented in Box 18. Under the new Fifth Framework Programme, the key action “Sustainable management of and quality of water” supports, amongst other topics, the development of cost effective and environmentally friendly methodologies techniques and management tools to address the water resources issues in arid and semi-arid regions.

Box 18: GROUNDWATER AND RIVER RESOURCES ACTION PROGRAMME ON A EUROPEAN SCALE (GRAPES)

EU contribution:	€1,000,000
Date of signature:	1995
Date of commencement:	March 1996
Project duration:	36 months

The over-exploitation of groundwater resources due to the increasing demand for agricultural, industrial and public water supply has emerged as pan-European problem. In response to that problem, the GRAPES programme was established to develop a framework for the assessment, remediation and sustainable management of intensively developed groundwater-fed catchments in Europe. GRAPES focused on water resource issues and not water quality problems, though clearly any water quality issues must be addressed to achieve sustainability. Major issues in the management of groundwater-fed catchments in Europe were investigated, which provided the basis for the development of new guidelines for their sustainable management.

A major part of these guidelines explains how to quantify the current hydrological situation within a groundwater-fed catchment and how to predict the future. Data requirements, monitoring systems and databases are defined, as well as methods for assessing the historical development of the catchment. Particular emphasis is placed on how to develop and use hydrological and hydro-ecological modelling and the need to take account of uncertainties in modelling. GRAPES assessed the utility of several *conceptual* models and *physically-based* models. The characteristics of the various models (such as data and levels of expertise needed) are presented in the guidelines to aid selection of the most appropriate model in a given circumstance. An explanation of how to select and run various scenarios such as different abstraction rates and best estimates of climate change is also provided.

The guidelines describe how to develop and implement solutions and restoration strategies, including the assessment of environmental impacts and selection of an appropriate decision-making framework. They also cover legislation and economic incentives, ecosystem conservation and water management, alternative technologies and water sources, education and awareness building, monitoring, evaluation and adaptive management. There are many potential solutions to water resource problems. Some are supply-led measures, optimising surface and groundwater systems or artificial recharge of aquifers. Others involve demand management, including the use of efficient irrigation technology, time-limited licences and pricing of water. However, the implementation of licences and pricing is hampered in many countries by current perceptions of water as a free limitless good and by existing laws that protect historical abstraction rights. A range of supply and demand management options must be considered.

The Space Applications Institute of the Commission's Joint Research Centre has also been developing methods to use operational Earth Observation satellites for mapping and regular monitoring of vegetation and soil characteristics in the region. This is carried out in the framework of several European research projects, such as MEDALUS and DeMon managed by DG Research and which are providing, through a range of pilot studies, important inputs to an overall conceptual framework for long term change monitoring with Earth observation systems in Mediterranean ecosystems.

Fire management is another area in which the Commission has been actively engaged in supporting research. Fire is an important element in land degradation, and its occurrence is more or less frequent depending on a series of interrelated factors associated with environmental management practices and climate. Several projects have been financed by the EC to support the development of management techniques for the prevention of wild fires and minimising the effects of fire damage. The JRC also carries out pilot projects on the use of remote sensing techniques for the management of natural hazards, such as forest fires and drought.

Since 1991, 59 projects have been launched under the different environmental research programmes aimed at deepening knowledge of the evolution of desertification within the European context and to provide the scientific basis for developing mitigation strategies. The financial contribution of the Community to these projects amounts approximately 50 m Euro over 1991-1999. A full listing of projects supported by the EC is provided in annex I.C.1. Further details, research summaries and final research results reports are available from DG Research.

3.2.2 COORDINATION AND DISSEMINATION OF RESULTS

Research can only be fully justified if it can be taken forward for practical application in resolving the problems investigated. In order to derive maximum benefit from the efforts of the various scientific undertakings within the EU and in associated third countries, coordination and information exchange initiatives are supported. Apart from financing joint research projects, the Environment and Climate Programme and its predecessors have supported Concerted Actions which are aimed at coordinating research and other projects already funded by public authorities at national or European level. A Concerted Action on "Desertification and its relevance to contemporary environmental problems in the Mediterranean" was initiated in 1996 which reviewed, stimulated and strengthened the cooperation of research in the field of land degradation in the Mediterranean. Publications supported by this Action are listed in annex II. A new Concerted Action on Environmental Communication was launched in 1998. It aims to analyse some of the structural difficulties involved in combating land degradation and desertification from different sectoral and hierarchical positions on the basis of two case studies in Greece and Spain (see Box 19).

BOX 19: CONCERTED ACTION ON ENVIRONMENTAL COMMUNICATION

To express the most difficult matters clearly and intelligently is not an easy task. Different stakeholders often have distinct perspectives on environmental problems and their solutions. This often leads to difficulties in understanding and communicating which can delay or block urgent remedies, and even lead to the adoption of inappropriate measures. It is important to improve our awareness of the deficiencies in this communication process by investigating cross-sectoral differences in understanding environmental problems and their solutions. This exercise in communication aims to make accessible knowledge acquired by a number of environmental programmes. Specifically this involves:

- **understanding of the difficulties that agents and stakeholders face in communicating and negotiating their environmental problems;**
- **sharing the understanding among the different partners participating in the project and debating with them the ways in which barriers and failures can be overcome or mutually accepted; and**
- **disseminating what has been learned in order to reduce misunderstanding and conflict.**

A conference was organised in November 1996 to raise the profile of EU research into desertification, to alert both public and policy makers to the extent, nature and urgency of the problem and to translate the results of scientific research into policy development and actions. A summary report of this conference with outcomes of the working groups discussions as well as the proceedings are available from DG Research. In October 1999, an International workshop “Desertification Convention: Data and Information Requirements for Interdisciplinary Research” was also held with the aim of identifying existing core data sets, future needs and ways in which data and information should be organised.

Each of the research programmes under the Fourth and Fifth Framework Programme can also apply for funds to hold workshops, seminars, set up networks and so on to disseminate the results of European funded research. The ENRICH initiative has been launched to enable better collaboration in European research on Global Change - which refers to the changes in the earth's climate, land productivity, water resources, land use, ecological balance and natural resources. It also seeks to enlarge the scope of such research in a wider international context. Relevant projects are listed in annex IB.2.

3.2.3 AGRICULTURAL RESEARCH

Three other programmes have supported research into the problem of desertification arising - in the context of agricultural production. The Competitiveness of Agriculture and Management of Agricultural Resources (CAMAR) Programme and the Agro-Industries, Forestry and Rural Development (AIR) Programme and its successor, known as FAIR. The latter aimed to develop themes such as the reform of the Common Agricultural Policy, the multi-functional management of forests and rural development. Thirty-three relevant projects were financed under these programmes which received a total EU contribution of just over €23 m. Details are listed in annex IC.2. Within the new fifth Framework Programme, launched in early 1999, issues of desertification are considered agricultural research priorities under the theme “Quality of life and management of living resources”.

3.2.4 EUROPEAN ENVIRONMENT AGENCY-RELATED ACTIVITIES

In 1985, the CORINE pilot programme was established for the purpose of gathering, coordinating and ensuring the consistency of information on the state of the environment and natural resources in the Community. A prototype geographical information system (GIS) was developed for this purpose and linked to a consistent database. Soil erosion risk, important land resources and land cover were included amongst the first priority areas for application of this system in southern areas of the Community. The data provided forms a basis to support Community policy development. Several research projects dealing with desertification in the Mediterranean area have worked on data retrieved from the CORINE network. Data is freely available for non-commercial use.

The project has produced a wide range of outputs - a pool of expertise, a series of data sets on land resources as well as methods of assessing soil erosion risk and land quality in southern areas of the Community in a form appropriate for policy applications. Thirteen countries of the EC's PHARE programme in the Central and Eastern European Countries are also now covered by the database.

The European Environment Agency (EEA) in Copenhagen took over the further development of priority areas of the CORINE programme since 1993. Certain tasks are taken up by the European Topic Centres (ETCs) to develop the work programme and to deliver the agreed data, information, reports and other services in collaboration with Member States.

The EEA and JRC have recently begun a three year project to collaborate on updating the land cover database beginning early 2000 based on methodological guidelines developed by the JRC. The project involves participation of all member states and will be based on interpretation of satellite images of Europe for the year 2000. The main outputs of this project will be information on land cover changes in Europe over the past 10 years, a seamless land cover map at scale 1:100 000 and a satellite image mosaic with 25 m ground resolution.

3.3 AGRICULTURAL MEASURES

The EC's Common Agricultural Policy (CAP) was devised as one of the mainstays of the European Economic Communities. The majority of funds available under the CAP, financed via the European Agricultural Guarantee and Guidance Fund - Guarantee Section, are dedicated to measures concerning the common regulation of agricultural sector markets (CMOs). Some measures are also included which aim to improve agricultural structures. Although environmental considerations have not yet been fully incorporated into the regulations governing the CMOs, the provisions of the Single European Act, the Fifth Environmental Action Programme and the Maastricht and Amsterdam Treaties have all stimulated the integration of environmental sustainability into agricultural and rural development policy.

Actions under the CAP of relevance to the problem of desertification concern reforestation and soil conservation programmes, measures to reduce the impact of agricultural production methods on the environment, actions to monitor and prevent forest fires as well as research programmes. As with Regional Policy described later in this section, the Commission's role is in the identification of Community priorities and the approval and scrutiny of development programmes. These programmes are proposed and implemented by the Member States and individual projects are

managed directly by national administrations. Therefore, as detailed project information is unavailable, this chapter will concentrate on the enabling framework of sectoral policies, legal instruments and financing structures which provide guidance and financing for projects contributing to the fight against desertification.

3.3.1 REFORM OF THE COMMON AGRICULTURAL POLICY

In 1992, the European Community's Common Agricultural Policy (CAP) was reformed to improve the equilibrium of markets for agricultural produce and the competitiveness of European agriculture given the surpluses and over exploitation of resources experienced during the 1980s. At the same time, recognition of the potentially damaging effects of increasingly intensified farming led to increased policy dialogue and emphasis on environmental impacts of agriculture. Consequently, in the context of the major overhaul of the CAP, two Programmes were set up providing incentive schemes for better environmental practices by farmers throughout Europe. In the context of these reforms, the farmer is no longer viewed within the CAP as a food producer alone but is now taken into account as a caretaker of the environment, countryside and landscape.

3.3.1.1 Agri-environment programmes

These Programmes aim to support the Community's agriculture and environmental policies to accompany the reform of the Common Agricultural Policy and to contribute to supporting farmers incomes. The measures approved under the Programmes encourage farmers to undertake farming methods compatible with protection and maintenance of the environment and can therefore have a significant contribution to addressing desertification in the southern European Member States. Premiums are payable under the aid scheme described below to compensate farmers for loss of income or additional costs incurred. Programmes are developed by the national or regional authorities according to local need. Measures directly relevant to combating desertification are identified in Box 20.

BOX 20: PURPOSES OF THE AID SCHEME OF THE AGRI-ENVIRONMENT REGULATION

MEASURES RELEVANT TO COMBATING DESERTIFICATION:

- a. Low input and organic farming: to reduce substantially the use of fertilisers and plant protection products, to keep to the reduction already made, to introduce organic farming or to continue with organic farming;**
- b. Extensive crop and forage production: to change to more extensive forms of crop production; including forage production - by means other than those referred to under (a) above - to maintain extensive production methods introduced in the past or to convert arable land into grassland;**
- c. Extensification of livestock production: to reduce the proportion of sheep and cattle per forage area;**
- d. Other environmental farming practices: to use other practices compatible with the protection of the environment and natural resources, as well as maintenance of the countryside and the landscape, or to rear animals of local breeds in danger of extinction;**
- e. Upkeep of abandoned land: to maintain abandoned farmland and woodland in good condition;**
- f. Long-term set aside: to set aside farmland for at least 20 years with a view to its use for purposes connected with the environment, in particular for the establishment of biotope reserves or natural parks or for the protection of hydrological systems;**

Training and demonstration projects: Measures may be included in the Programmes to train farmers with regard to farming or forestry practices beneficial to the environment. Additional measures may be introduced specifically to provide for traineeships and demonstration projects. These are to be designed to promote practices compatible with protection of the environment and natural resources, maintenance of the countryside and the landscape and to promote codes of good farming practice.

To ensure the achievement of its environmental goals in an efficient way, the programmes introduced under this Regulation clearly need to be monitored and evaluated. An obligation to do this was introduced in 1996 (Reg. 746/96). Examples of programmes containing measures designed to protect dryland areas exist or are planned in all Mediterranean regions. Local measures may be targeted at a single valley or mountain area and in the Mediterranean regions several measures exist to prevent the spread of fires or to protect fragile grazing systems, with the specific aim of combating tendencies to desertification. The programme on the mainland of Portugal comprises a series of measures designed to protect the environment, to upkeep abandoned forest land and to protect it from the risk of fire. Farmers are required to clear the forest of brushwood periodically (twice in a five year period) and cut and remove diseased or dead trees and observe other good woodland management practices. A separate measure is aimed at the protection of vulnerable areas through the maintenance of the natural environment. Significant measures have also been implemented throughout Italy, Spain and France. In the case of Greece, programmes are in the early stages of implementation, but anti-erosion and other measures are planned to address desertification issues. The EAGGF contribution to all measures

in the agri-environment programmes in each of the Mediterranean Member States is given in the table below, clearly not all measures will be relevant to the CCD objectives.

Agri-Environment Programmes		EAGGF contribution to measures (in m Euro)				
Member State	1993	1994	1995	1996	1997	Total
Greece	0.0	0.0	0.0	1.5	8.5	10
Spain	8.3	13.8	15.7	32.8	39.4	110
France	67.1	73.1	106.2	118.9	147.9	513.2
Italy	0.0	0.0	54.4	41.5	368.5	464.4
Portugal	0.0	12.0	38.6	40.0	49.1	139.7
Total	75.4	98.9	214.9	234.7	613.4	1,237.3

BOX 21: AGRICULTURE PROGRAMME
ADDRESSING DESERTIFICATION IN PORTUGAL

Portugal's agri-environment programme takes up the challenge of sustainable management of natural resources and maintaining the countryside. Two priority measures are being carried out in those mainland areas affected or threatened by desertification. Firstly, formerly abandoned forest areas are being rehabilitated in order to avoid the increased risk of fires associated with the accumulation of brushwood. Thus, woods are cleared of brush at least twice every five years, and diseased or dead trees are cut down and removed. Natural regeneration is promoted wherever possible, and in some areas, improved species are also planted which have qualities such as higher levels of drought tolerance and disease resistance. Particular attention is given to maintaining trees along water channels, which are susceptible to severe erosion during high water flows, or heavy storms.

A second set of measures aims to support traditional agricultural systems in areas that are designated as environmentally sensitive (ESAs). These activities involve the promotion of traditional irrigation systems and organic fertilisers. Financial incentives are given to farmers for keeping less than two livestock units per hectare.

3.3.1.2 Agro-Forestry Programme

The second of the accompanying measures to the reform of the Common Agricultural Policy is the Agro-forestry programme. The structural objectives of this reform were to accompany the changes foreseen in the context of balancing agricultural markets by encouraging an alternative use for agricultural lands and development of forestry activities in agriculture. This Regulation aimed to contribute towards an overall improvement in forest resources and towards forms of countryside management more compatible with environmental balance as well as to combat the greenhouse effect through absorption of carbon dioxide. As with the Agri-environmental programme, an aid scheme was established in order to bring about the requisite change in practices. The scheme provides grants for forestation of agricultural lands and investment aid for the improvement of woodlands and planting shelter belts. In case of fast-growing species cultivated in the short term, aid is eligible only for farmers practising farming as a main occupation and provided that planting is adapted to local conditions and is compatible with broader environmental concerns. The four Member States most affected by dryland degradation have been allocated 69% of funds budgeted for this Programme. 24% of the total has been directed to Italy alone where this Programme constitutes one of the main instruments for addressing desertification.

Forestation Actions 1993-1997	Greece	Italy	Portugal 1	Spain	Total four Member States
Total estimated EAGGF contribution (m Euro)	43.5	300	96	430	869.5
Target wooded surface area (ha)	15,000	80,00 0	94,000	305,75 0	494,750
Total area implemented (ha)	16,000	60,00 0	110,00 0	390,00 0	576,000
% of target reached	107 %	75 %	117 %	128 %	69 %

In addition to the measures funded under the EAGGF, desertification can also be addressed within a budget line created to provide agricultural credits to support additional forestry measures such as those described below.

3.3.1.3 Programme for Protection Against Forest Fires

Approximately 1.2% of Europe's residual forests have been destroyed through fire in the decade to 1992, mainly in the southern regions of the Community. Damage caused by forest fires is one of the leading immediate causes of land degradation in Mediterranean Europe and, when combined with periods of drought, the situation is greatly worsened. In recent periods, forestation has often aggravated the impact of fires on ecosystems as timber fuel is now accumulating in extensive abandoned pastoral and agricultural areas. In addition, by reducing landscape diversity, some ecosystems have become more at risk of fires. The European Community has supported action against forest fires under its agricultural policy since 1979. The current Programme (Reg 2158/92), established in 1992, aims to increase the consistency of Member States' forestry measures in general, and measures to protect forests against fire in particular. This imposes an obligation on the Member States to investigate their own fire risk areas, and to present their general forest fire protection plans to the Commission. During the period 1992-1999, 760 projects were supported for a sum of 90 m

Euro specifically to prevent fires. In addition, a Community Forest Fire Information System has been set up which constitutes an important evaluation tool for the analysis and prevention of the causes of forest fires.

Another Community programme concerns the protection of forests against atmospheric pollution also supports pilot projects to improve the understanding of the effects of air pollution on forests and to develop methods of maintaining and restoring damaged forests.

3.4 STRUCTURAL POLICIES - RURAL DEVELOPMENT

3.4.1 EU STRUCTURAL FUNDS

The Structural Funds are the main financial instruments of the European Community for the achievement of the goals of economic and social cohesion. They consist of four Funds of which two can support measures relevant to addressing desertification: the **European Regional Development Fund (ERDF)** and the **Guidance Section of the European Agricultural Guidance and Guarantee Fund (EAGGF-G)**.

The ERDF was set up in 1975 to provide assistance to the most disadvantaged regions of the Community. Its overall orientation has remained towards investment in production, businesses, infrastructure and human resource development, though since the adoption of the Community's Fifth Environmental Action Plan in 1992 substantially more resources have been directed towards the protection and improvement of the environment.

The Guidance section of the EAGGF supports the adjustment of agricultural structures and the development of rural areas. By cofinancing measures in areas eligible under the regional Objectives of Structural Funds policy (see below) it can fund measures for sustainable development and the rural environment including developing and strengthening agricultural and forestry structures and for maintaining, enhancing and restoring the landscape. The Guidance section of the Fund is implemented on the basis of different Regulations of which the main one includes a provision for structural measures to combat certain climatic hazards e.g. reparation of lands, land or pasture management, restoring agricultural and forestry production after natural disasters (Reg 2085/93). Another relevant Regulation concerns the development of forests in rural zones (Reg 1610/89) which has promoted forestation and reforestation in areas threatened by erosion, as a result particularly of severe storms and wildfires. In addition, measures to rationalise forestry have been supported, such as the construction of forest tracks for the prevention of fires, setting up forestry associations, development and rationalisation of marketing and application of forestry products. A Regulation to promote specific measures to encourage agricultural development in certain regions of Spain (Reg 1118/88) has also supported relevant measures.

In 1993, the Structural Funds were reformed and the new regulations have contributed to increase consideration of environmental aspects at all levels of programming and implementation of Cohesion Policy. Thus, it is now compulsory that regional development plans submitted by the Member States contain a description of the prevailing environmental conditions as well as an assessment of the environmental impact of the measures proposed for the subsequent period. The proposed plans must also set out the actions taken to associate the national environmental authorities in preparation and implementation of such measures.

3.4.1.1 Regional Development Objectives

The Structural Funds are allocated on the basis of seven priority objectives. The first of these, Objective 1, encompasses many of the most disadvantaged rural areas in the EU, where per capita GDP is less than 75% of the Community average. These areas correspond closely to those most affected by desertification and drought in the South of Europe. Other areas such as Catalonia and southern mainland France are also affected by dry conditions and soil erosion. These are eligible for structural funding under Objective 5b, which is aimed at vulnerable rural areas with a low level of socio-economic development. Measures are intended to promote economic diversification and the emphasis is on investment in infrastructure to create jobs outside agriculture and protecting the environment.

The structural funds are implemented according to development programmes known as Community Support Frameworks (CSFs). These pluri-annual programmes are proposed and implemented by authorities within the Member States, in accordance with the principle of subsidiarity, that is, locating decision making powers at the best possible political level consistent with effectiveness. Partnership between the Commission and national and regional partners is also an important element with respect to the implementation of the Structural Funds. These principles are in line with the recommendations of the CCD, which call for decentralisation of decision taking and cooperation in efforts to combat desertification.

The first of the objectives set out in the environment sub-programme of Spain's CSF is to address the degradation of the country's extensive dry areas. The development programme envisages actions within a Reforestation Plan, a Plan for Forests and Water, a Plan for Combating Erosion and a Plan for Combating Forest Fires. Forestry measures to be financed under the EAGGF-Guidance Section in 1994-1999 include the forestation of 161,012 hectares, the establishment of forest routes extending for 11,345 kms, forest improvement over 182,115 hectares to prevent soil erosion, and protection measures against forest fires and diseases over an area of 371,763 hectares. Actions under the heading environmental protection and conservation will cost approximately €71m.

In the other countries affected by desertification, the ERDF and EAGGF also provide substantial support for the management of water resources, the conservation and improvement of the natural environment as well as instrumental support actions and research into the environment.

3.4.2 SPATIAL PLANNING AND THE PREVENTION OF DROUGHT AND DESERTIFICATION

The geomorphological and climatic factors which lead to the physical degradation of land are often compounded by the impact of planning decisions which fail to take into account the particular vulnerability of affected areas. Europe's regional policies can contribute at a broader level to addressing desertification through measures to improve spatial distribution of human activities in order to reduce pressures on scarce resources.

The Mediterranean regions have for a number of years seen an increase in drought conditions. Beyond climatic trends, the worsening impact of drought is generally attributed in part to a series of

inappropriate spatial planning practices and poor management of water resources. In 1991, the Commission developed a policy document setting an European agenda on sustainable and balanced spatial development. The theme was developed further, and presented in 1994 in a publication entitled Europe 2000+: cooperation for European territorial development. The primary goal of this strategy document was the achievement of a viable use of territory through sustainable development and made a number of recommendations regarding in particular, cross-border and trans-national cooperation in the field of spatial planning. These strategy documents were instrumental to the development of the European Spatial Development Perspective (ESDP), the INTERREG IIC initiative and the TERRA programme.

The European Spatial Development Perspective (ESPD) is a policy-oriented document agreed at the Informal Council of Ministers responsible for Spatial Planning in Potsdam, May '99. It is aimed at a substantial contribution to effective implementation of a new spatial development strategy encompassing economic, social and environmental dimensions. It identifies the wise management and development of the natural and cultural heritage as one of the three spheres of activity along with a more balanced and polycentric urban system and more equal access to infrastructure and knowledge. One of the operational objectives identified in the document is the establishment of a European network of open spaces for the preservation of natural resources, including protected areas.

3.4.2.1 INTERREG COMMUNITY INITIATIVE (1994-99)

As a corollary to the ESDP and the result of several ministerial meetings, strong support from the European Parliament, and the Committee of the Regions, the INTERREG IIC instrument was introduced. This is a financial instrument to fund programmes for trans-national spatial planning, including actions specifically aimed at drought-mitigation in the four affected Member States. These may contribute to sustainable land management, avoiding excessive consumption of water and favouring the rational and equitable distribution of water resources. They may promote cooperation amongst Member States, local authorities and communities, in exchanging knowledge and experience.

BOX 22: SPATIAL PLANNING AND COMBATING DROUGHT IN THE MEZZOGIORNO, ITALY

EC contribution: €15, 238,000
Source of Funds: INTERREG IIC
Date of approval: July 97

The southern regions of Italy, and Sicily and Sardinia in particular, have a low annual rainfall and strong local heterogeneity with respect to their soil coverage, orography and exposure to sunlight. The instability of the climate combined with the shortage of adequate infrastructure enables the long-term programming of water resources is seriously obstructing the expansion of agriculture, tourism and industrial activity.

This programme has carried out an in-depth analysis of the water cycle in the affected basins in order to identify the most vulnerable areas. Monitoring networks will be strengthened through the installation of a series of measurement stations. Wherever water resources are insufficient, the analysis of the precipitation cycle will lead to an improved water management system in the various sectors (public, industry, agriculture and tourism).

Two innovative pilot projects were set up in Sicily and Sardinia to redevelop the region and the water resource management system. Wastewater will be used for irrigation or even recycled for drinking water. The programme also incorporates measures to promote and disseminate information, notably a conference to encourage the exchange of experiences between Member States benefiting from the INTERREG II drought programme and Mediterranean countries which are not EU members.

The budget for these measures in the four Member States is €144 m over the period 1997-1999. Since 1997, three operational programmes have been financed under the INTERREG IIC initiative, in Portugal, Spain and Italy for an approximate financial commitment of 129 m Euro. The Italian programme is highlighted in Box 22. A similar programme is expected soon for Greece.

3.4.2.2 TERRA

The TERRA Programme is one of the Innovative Programmes launched under Article 10 of the ERDF to fund networks of regional and local authorities in vulnerable areas of the EU that are experiencing difficulties in developing an integrated spatial planning strategy. TERRA is aimed at finding new approaches and solutions for facing up to such vulnerability which could serve as examples for other similar areas within Europe or open up new opportunities for experimental research. The programme was launched in 1997 and one network has been financed in areas where soil erosion and desertification are a threat in Greece and Italy. The purpose of this project is to promote integrative planning through pilot activities, and particularly by establishing local planning observatories, to draw conclusions at local level which could feed into the formulation of guidelines at higher administrative or policy levels.

3.4.3 THE COHESION FUND

The Cohesion Fund was set up under the Maastricht Treaty, to stand alongside the Structural Funds. Targeted at the less prosperous Member States, it has the overall objective of boosting EU economic and social cohesion in preparation for economic convergence. Interventions are concentrated on environmental improvement and transport infrastructure, as it is in these sectors that the commitments of poorer countries are especially onerous. Eligible countries are Spain, Portugal, Greece and Ireland. The Fund amounted to approximately €16,000 m over the period 1993-1999 of which equal shares were apportioned to transport and the environment. Unlike the Structural Funds, projects are submitted directly to the Commission for approval and should, in principle, involve over €10 m.

Principally, the Cohesion Fund is intended to implement EC Regulations on water supply, urban waste water and urban waste. However, a significant number of projects outside these three fields of intervention have also been assisted, especially in the case of Spain, such as erosion control measures and reforestation, reflecting the special needs of the country. In particular, the Fund supports the improved management of scarce water resources that contribute significantly to the mitigation of desertification, through reduced exploitation of ground water resources and by stabilising rural communities in dry land areas. Of greatest relevance to desertification are the measures aimed at forestation, combating erosion and the regeneration of ecosystems damaged by fire, which include river basin assessments and management plans and monitoring projects. Approximately €90 m has been committed to supporting such measures, 80% of which has been allocated to Spain. A description of the forestation projects in Spain is presented in Box 23. Activities have also been supported in both Portugal and Greece.

BOX 23: THE COHESION FUND: FORESTATION AND COMPLEMENTARY ACTIONS TO COMBAT EROSION

These projects are promoted within Spain's reforestation plan 1995-1999. They seek different operations to realise under the responsibility of nature conservation directorate of the Spanish Ministry of Environment, on the one part and the autonomous regions on the other. The following are the main activities.

- Replanting of fragile areas with appropriate species of trees and bushes**
- Treatment of existing wooded areas aimed at improving the vegetation there and maintaining a balance between the protection of the soils and the forest cover.**
- Light infrastructure works aimed at stabilising the edges of water courses to prevent against torrent erosion**
- Reforestation and treatment of areas which have suffered damage from forest fires or are under threat of such damage**

All projects are focused on controlling soil erosion and desertification in the vulnerable areas of the country. As well as on the protection and regeneration of forests ravaged by fires. They are distributed amongst the main river basins of Spain (Ebro, Guadiana, Duero, Jucar-Levante, Segura, Tajo and the Norte as well as the river basins of the Balearic Islands and the Canaries). They constitute a coordinated response to the serious problems linked to erosion which are experienced over a massive area: estimated at 40% of the national territory.

An integrated model has been used which is aimed at protecting natural resources from the processes of desertification. Environmental impact assessments are undertaken ensuring that forest species are introduced to lands either where there is no risk of negatively transforming the local ecology or where similar species have been present for at least the last fifty years.

I - PROJECTS SUPPORTED BY THE EUROPEAN COMMUNITY**METHODOLOGY ADOPTED FOR SURVEY OF PROJECTS**

A INTERNATIONAL DEVELOPMENT PROJECTS	1990 - 1999
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1. ACP COUNTRIES
2. MEDITERRANEAN
3. ASIA
4. LATIN AMERICA
5. PROJECTS FINANCED UNDER NGO COFINANCING BUDGET LINE

B RESEARCH PROJECTS IN DEVELOPING COUNTRIES	1991 - 1999
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1. STD - AVICENNE - INCO-DC PROGRAMMES
2. ENRICH INITIATIVE

C RESEARCH PROJECTS IN EU MEMBER STATES	1991 - 1999
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1. ENVIRONMENT PROGRAMME - ENVIRONMENT AND CLIMATE PROGRAMME
2. AGRICULTURAL RESEARCH PROGRAMMES

D PROJECTS IN EU MEMBER STATES	1993 - 1999
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1. LIFE - FINANCIAL INSTRUMENT FOR THE ENVIRONMENT

2. INTERREG IIC - TERRA PROGRAMMES
3. COHESION FUND - ENVIRONMENT SECTION

II - PUBLICATIONS**III - USEFUL ADDRESSES**

ANNEX I : PROJECTS SUPPORTED BY THE EUROPEAN COMMUNITY

methodology adopted for carrying out the survey

ACP states. Projects were identified by cross referencing information from two sources. The first source was an inventory produced in May 1996 and a second inventory produced in October 99 during the course of evaluations of EU environmental programmes. In its categorisation of projects this report took a restrictive view of what may be considered activities related to addressing desertification. It was therefore necessary to look at the Annual Reports of the Delegations in each relevant ACP state which give brief descriptions of all ongoing projects. Where information was unclear and time permitting, follow up discussions were held with desk officers. Additional data was obtained from the EDF project database.

For the **ALA-MED countries**, annual reports were unavailable and the 1996 Inventory mentioned above was the primary source of preliminary project identification. Projects identified on this basis were subsequently discussed with desk officers to obtain further information. The 1999 inventory has not been available and a simple listing of projects has been obtained from the services of DG External Relations.

In both cases, we have selected for inclusion those projects in dryland areas which concern land use, the management of natural resources, anti-erosion measures, natural resource saving alternative energies, environmental education, improvement of agricultural practices, long term food security measures in the field, and smallholder irrigation. It was felt extremely important to include projects relating to sustainable agriculture and improving long term food security and thus to avoid perpetuating an unhelpful or inappropriate distinction between natural resource management projects and those addressing agriculture. It was decided that large scale irrigation works would not be included in the analysis, in line with the latest debates on the nature of the concept of desertification which hold that desertification is mainly concerned with rainfed production. Irrigation systems involve other specific issues such as the salinisation of soils and groundwater reserves which are not necessarily related to dryland degradation.

European Member States. Projects from the LIFE programme were selected either from official lists grouped by policy priorities or identified from project databases giving a basic project description. Research projects were identified on the basis of catalogues of contracts and on advice from officials. Information on funding programmes under the Agricultural and Regional Policies were identified and transmitted by officials of these DGs. Unfortunately, projects cannot be listed in the same way as for the projects in developing countries. This is due, firstly, to the fact that desertification actions are included among many more general measures in the field of water management, forestation etc. and are in most cases not individually identified. Secondly, the operational partnership between the Community and the Member States in the management of most agricultural and regional policy programmes means that individual project details are not available at the Commission. The exception to this rule is the Cohesion Fund, and TERRA programme that are directly managed by the Commission. In all cases, it should be made clear that the sums of money attributed in the project listings represent the financial commitment agreed by the EC not disbursements subsequently made. Due to the complexity of identification of projects from such varied sources, it is possible that some relevant projects may have been omitted from the project listings which follow.

ANNEX II - PUBLICATIONS

EC PUBLICATIONS

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EC RESEARCH - SUMMARY REPORTS

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Second Programme Science and Technology for Development. Sub-Programme: Tropical and sub-tropical agriculture. Research Projects 1987-1991: summaries of the final reports

Catalogues of projects under STD 3, Avicenne, Environment, and AIR programmes, listing objectives, methods, expected results and details of research institutes are available from the European Commission, DG Research.

Archaeomedes: Understanding the natural and anthropogenic causes of land degradation and desertification in the Mediterranean basin. Research results, Bruxelles: European Commission – DG Research (EUR 18181)

Medalus: Mediterranean Desertification and Land Use: Manual on key indicators of desertification and mapping environmentally sensitive areas to desertification (EUR 18882)

Actions Taken by National Governmental and Non-Governmental Organisations to Mitigate Desertification in the Mediterranean, Concerted Action Report 1 (EUR 18490)

International Conference on Mediterranean Desertification: Research Results and Policy Implications Summary of working group discussions (EUR 19303). Main results (EUR 17782)

EUR 19303. Mediterranean Desertification –Research results and Policy implications

Volume 1 (Key note speakers) and Volume 2 (Summary of projects results) Video: “The Sorcerer’s Apprentice: Deserts in Europe” a video of various projects in southern Europe including interviews with project coordinators

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- Wood, P.J., Burley, J. Les arbres à usages multiples: introduction et évaluation pour l'agroforesterie, Wageningen: CTA, ICRAF, 1993, 144pp (ISBN 92 9081 1129, CTA No. 560, 10 unités de crédit CTA)

Several books on this subject produced by other publishers are also available from the CTA. For a full listing of books available please see the CTA Publications Catalogue, 1999. Copies may be purchased from CTA's bookseller, Triops (see address below) or, in the case of co-publications, from other international distributors, from retailers or from the main publisher. Subscribers in ACP countries who have registered with the CTA's Publications Distribution Service (PDS) may also obtain these publications using their credit points and their CTA publications order forms. TRIOPS, Hindenburgstrasse 33, D-64295 Darmstadt, Germany Tel: ++49.61.51.33665/11551 Fax: ++49.61.51.314048 Email: triops@triops.de Website: <http://www.triops.de>

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DG Research, 8, Square de Meeûs, B - 1040 Brussels
DG Agriculture, 17, 37, 99 rue Joseph II, B - 1040 Brussels

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