

**FEDERAL DEMOCRATIC REPUBLIC
OF ETHIOPIA**

**NATIONAL ACTION PROGRAMME TO COMBAT
DESERTIFICATION**

ENVIRONMENTAL PROTECTION AUTHORITY

ADDIS ABABA

NOVEMBER 1998

TABLE OF CONTENTS

VOLUME I: THE STATE OF NATURAL RESOURCES IN ARID, SEMI-ARID AND DRY SUB-HUMID AREAS	6
CHAPTER ONE: INTRODUCTION	8
1. THE GLOBAL SITUATION.....	8
2. INTERNATIONAL CONCERN AND PLANS TO COMBAT DESERTIFICATION IN AFRICA.....	9
CHAPTER TWO: DESCRIPTION OF THE STATE OF NATURAL RESOURCES 11	
1 GENERAL DESCRIPTION	11
1.1 Climate.....	11
1.2 Non-renewable Resources.....	11
1.3 Soil, Water and Vegetation Resources.....	11
1.4 Crop and Animal husbandry	12
1.5 Wildlife	13
2 ARID, SEMI-ARID AND DRY SUB-HUMID AREAS.....	13
2.1 Introduction.....	13
2.2 Soil Resources.....	15
2.3 Water Resources	16
2.4 Forest Resources	17
2	22
2.6 Crop Husbandry	24
2.7 Wildlife and Touristic Resources.....	24
2.8 Minerals and Other Resources	25
CHAPTER THREE: NATURAL RESOURCES AND SOCIO-ECONOMIC SITUATIONAL ANALYSIS IN THE ARID, SEMI-ARID DRY SUB-HUMID AREAS.	25
1. Natural Resources	25
1.1 Soil	27
1.2 Water.....	28
1.3 Forest.....	28
1.4 Livestock Resources	31
1.5 Crop Production	32
1.6 Wildlife and Touristic Resources.....	33
1.8 Mineral and Other Resources.....	36
2 Socio-economic Analysis.....	37
2.1 Sedentarization.....	37
2.2 Establishment of State Farms as a Policy Measure for Better Agricultural Development.....	38

2.3	Social and Economic Infrastructure	39
2.4	Natural Resource Tenure and Access Rights	40
2.5	Environmental Economics	40
2.6	Population Growth and Development.....	41
2.7	Community Participation in Natural Resource Management	42
VOLUME II: EVALUATION OF MEASURES TAKEN TO COMBAT		
DESERTIFICATION.....		45
ACRONYMS.....		46
CHAPTER ONE: POLICY AND STRATEGIC MEASURES		49
1.1	Major Policy Failures Prior to 1991.....	49
1.2	The New Policy Objective and the Role of the Government.....	50
1.3	General Macro-policy Environment	52
1.4	National Economic Development Policy.....	53
1.5	The Conservation Strategy of Ethiopia and the Regional Conservation Strategies	53
1.6.1	The disaster prevention and management policy	58
1.6.3	The population policy	59
1.6.4	Women's policy.....	60
1.6.5	Social policy.....	60
1.6.6	Rural land use and administration policy.....	61
1.6.7	Education and training policy	62
1.6.8	Science and technology policy.....	62
1.6.9	Forestry policy	62
1.6.10	National policy on biodiversity conservation research and development.....	63
1.6.11	Soil and water conservation policy	63
1.6.12 Water resources policy	64
1.6.13	National agricultural research policy and strategy	64
1.6.14	Wildlife policy	64
1.6.15	The industry sector strategy	65
1.6.16	The mining sector policy.....	65
CHAPTER TWO: LEGISLATIVE MEASURES.....		67
CHAPTER THREE: PROGRAMMES.....		69
3.1	Soil and Water Conservation Programme.....	69
3.2	Forestry	70
3.3	Livestock Resources Development Programme	71
3.4	Water Resources Development Programme	74
3.5	Wildlife Conservation and Development of Tourism.....	74
3.6	Minerals and Other Non-renewable Resources	75
CHAPTER FOUR: INSTITUTIONAL MEASURES.....		76

4.1	General	76
4.2	The Environmental Protection Authority	78
4.3	The Ministry of Agriculture (MoA)	79
4.4	Other Ministries	80
4.5	Community-based Organizations (CBOs), NGOs and Private Sector and International Organizations	81
4.6	Tertiary Education Institutions	82
CHAPTER FIVE: EVALUATION OF PAST AND CURRENT PROJECTS DESIGNED AND IMPLEMENTED TO COMBAT DESERTIFICATION AND MITIGATE THE EFFECTS OF DROUGHT.		84
5.1	Soil and Water Conservation	84
5.2	Forestry	87
5.3	Rangelands/Livestock Development Programmes	88
5.4	Wildlife and Touristic Resources Conservation	95
5.5	Mineral and other Resources	95
VOLUME III: GAP ANALYSIS AND PROPOSED APPROACHES TO COMBAT DESERTIFICATION		98
CHAPTER ONE: GAP ANALYSIS IN COMBATING DESERTIFICATION		100
1.1	Constraints and Gaps in Policy and Institutional Arrangements	100
1.1.1.	The Sector-specific Policies	100
1.1.2	Policy Constraints and Gaps Specific to the Arid, Semi-Arid and Dry	102
	Sub-humid Areas	102
1.2	Constraints and Gaps in Programmes	107
1.3	Constraints and Gaps in Legislation	111
CHAPTER TWO: PROPOSED APPROACHES TO COMBATING DESERTIFICATION		113
2.1	Introduction	113
2.2	Overall Goal, Guiding Principles and General Objectives	114
2.3	Policies	116
2.4	Action Programmes	129
2.4.1	Action Programme Areas for Managing Natural Resources Leading to Sustainable Development	130
2.4.3	Action Programme Areas for Improving the Socio-economic Environment	131
2.4.4	Action Programmes for Improving Basic Infrastructure	131
2.4.5	Action Programmes for Promoting Alternative Livelihoods	132
2.4.6	Action Programmes for Rural Credit Programmes, Including Establishment of a Fund to Combat Desertification and the Effects of Drought	133
2.4.7	Action Programmes for the Intensification and Diversification of Agriculture 134	
2.4.8	Action Programmes for Promoting Awareness and Participation	135

2.4.9	Action Programmes to Improve Institutional Organization and Capacity.....	136
2.4.10	Action Programme for Empowerment of Women.....	137
2.5.	Institutional Arrangements for Implementation.....	139

CHAPTER THREE: PRIORITIZED LIST OF PROGRAMMES AND BUDGET

ESTIMATE 144

1.1.	Participatory Development Planning and Programme Implementation.....	144
1.2.	Capacity Building and Institutional Support.....	144
2.	Improving Knowledge of Drought and Desertification.	145
2.1.	Research.....	145
2.2.	Capacity Building.	145
3.	Action Programme Areas for Managing Natural Resources Leading to Sustainable Development.	145
3.1.	Planting Material and Seed Production.....	146
3.2.	On-Farm Water Management.	146
3.3.	Research, Planning and other studies.....	147
3.4.	Small-scale Irrigation Schemes.....	147
3.5.	Species and Ecosystem Conservation.....	147
3.6.	Capacity Building and Institutional Support.....	148

**VOLUME I: THE STATE OF NATURAL
RESOURCES IN ARID, SEMI-ARID AND DRY
SUB-HUMID AREAS**

ACRONYMS

ADLI	-	Agriculture Development-led Industrialization
AMCEN	-	African Ministerial Conference on Environment
CILSS	-	Inter-state Committee on Drought Control in the Sahel
CSE	-	Conservation Strategy of Ethiopia
EIGS	-	Ethiopian Institute of Geological Surveys
EPA	-	Environmental Protection Authority
GDP	-	Gross Domestic Product
GTZ	-	German Agency for Technical Cooperation
NAP	-	National Action Programme
NGO	-	Non-government Organization
OAU	-	Organization of African Unity
TLU	-	Tropical Livestock Unit
UNCED	-	United Nations Conference on Environment and Development
UNEP	-	United Nations Environmental Programme
UNSO	-	United Nations Sudano-Saheliam Office
WHO	-	World Health Organization

CHAPTER ONE: INTRODUCTION

1. THE GLOBAL SITUATION

Desertification is "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variation and human activities".

Desertification is now a global concern. All the problems usually covered by this term involve ecological changes that sap land of its ability to sustain agriculture and human habitation. In the process, the most serious threat to human welfare is the degradation of patches of rangelands and cropland throughout the world's drylands (arid, semi-arid and dry sub-humid zones). Such deterioration occurs whenever land is abused regardless of the proximity of true, climatically created deserts. Where land abuse is severe and prolonged, and especially where extended drought intensifies its effects, grasslands and fields can be reduced to stony, eroded wastelands or even to heaps of drifting sand. More commonly, the quality of rangelands vegetation declines as the more palatable and productive plants are nudged out by less desirable species. On the croplands, yields may gradually fall as soil nutrients are dissipated and the topsoil is eroded by wind and water.

Land degradation and desertification diminish the ability of affected countries to produce food and consequently entail the reduction of regional and global food-producing potential with impacts on world food reserves and food trade. They also cause food deficits in menaced regions . Since desertification entails the destruction of vegetation and the diminution of many plant and animal populations, it is an effective cause of loss of biodiversity in arid, semi-arid and dry sub-humid areas, thereby limiting the opportunities of the benefits of diversity.

World-wide, drylands (arid, semi-arid and dry sub-humid areas) cover 6,150 million ha, or about 47 percent of the total land area in the world. Drylands comprise 62 percent of the total irrigated land area in the world, 36 percent of the total rainfed cropland, and 68 percent of the total rangelands. An assessment by UNEP of the global status of desertification shows that 30 percent of irrigated areas, 47 percent of rainfed cropland and 73 percent of rangelands within the drylands are at least moderately affected. About 43 million ha of irrigated land in the world's drylands are affected by various processes of degradation, mainly water logging, salinization and alkalization. It has been estimated that a total of 1.5 million ha of irrigated land are put out of production every year world-wide. On the others hand 1.0-1.3 million ha of rainfed cropland in the world's drylands are affected by water and wind erosion, depletion of nutrients and physical deterioration. About 7-8 million ha of rainfed croplands are currently put out of production every year throughout the world, of which 3.5-4.0 million ha are in drylands. About 3,333 million ha of rangelands in drylands are affected, mainly by degradation of vegetation. Erosion also affects some 757 million ha of this area. All in all, some 70 percent of all agriculturally used drylands is affected to various degrees by desertification/land degradation. The worst affected are Africa, North America, South America and Asia (Echholm and Brown, 1997).

People are the main agents of land degradation and desertification, they are also the victims. Throughout the Developing World, land degradation has been the main factor in the migration of subsistence farmers into the slums and shanty towns of major cities (looking for "better" opportunities), producing desperate populations vulnerable to disease and natural disasters and prone to participate in crime and civil strife. Such an exodus from rural to urban areas has exacerbated the already dire urban problems in many developing countries. At the same time, it has delayed efforts to rehabilitate and develop rural areas through lack of manpower and increased neglect of the land. The effects of land degradation and desertification are compounded by recurrent droughts. The mass exodus to urban centres that has been taking place in Africa since the late 1970s is a vivid illustration of the plight of people facing such intolerable environmental conditions. At the peak of the crisis, in 1984 and 1985, an estimated 30-35 million people in 21 African countries were seriously affected, of whom about 10 million were displaced and became known as "environmental refugees". Death, disease, chronic malnutrition and disability haunt these millions of refugees because of the continuing intolerable living conditions.

Desertification has different impacts on different social groups. Some social groups are resilient while others are vulnerable. Subordinate social groups with meagre resources and directly dependent on degraded drylands are among those social groups most negatively affected by desertification. The fact that desertification has divergent impacts on various social groups should be recognized and should be given greater attention by those bodies involved in combating desertification.

2. INTERNATIONAL CONCERN AND PLANS TO COMBAT DESERTIFICATION IN AFRICA

The Sudano-Sahelian part of the Continent has, over the last few years, been affected more by desertification than the rest of Africa and desertification is progressing steadily. The international community has not remained indifferent to this challenge.

The United Nations Desertification Control Action Plan which contained recommendations at national, sub-regional and international levels was adopted in Nairobi in 1977. The United Nations Environmental Program (UNEP) was charged with responsibility to monitor and ensure the implementation of the plan. Since then UNEP has established a desertification control unit.

The Assembly of Heads of State and Government of the Organization of African Unity (OAU) adopted in 1980 the Lagos Plan of Action which included drought and desertification as priority issues that needed urgent solutions.

In 1985, the African Ministerial Conference (AMCEN) adopted the Cairo Programme on African Cooperation, whose primary objective was to put an end to the degradation of the African environment and reverse the process with a view to meeting the food and energy requirements of the African populations.

These important initiatives and many others undertaken by the Heads of State and Government as well as international bodies all testify to the great efforts made to combat desertification at regional and sub-regional levels. These efforts have led to the realization at all levels of the need to pool the efforts of the international community to combat this scourge, and to the direct involvement of the cooperation partners, culminating in the preparation of several plans, strategies and programmes for the control of desertification in Africa.

Agencies such as the Inter-state Committee on Drought Control in the Sahel (CILSS) and the United Nations Sudano-Sahelian Office (UNSO) have invested considerable sums of money to contain desertification but in vain because of many constraints and problems inherent in the Continent.

Consequently, at the meeting preparatory to the United Nations Conference on Environment and Development (UNCED) held in Brazil in June 1992, African countries defined a common position which emphasized, among other things, the need to find ways and means of combating desertification more vigorously and the importance of having an International Convention on Desertification. At Rio this wish of the African States was granted and the "Desertification Convention" was negotiated, finalized and signed, and Ethiopia has signed and ratified the Convention.

Under the Convention, Affected Country Parties have undertaken the obligation to, among others, 'establish strategies and priorities within the framework of sustainable development plans and/or policies to combat desertification and mitigate the effects of drought'. Implicit in these obligations is that affected countries have a framework of sustainable development policies and plans which are, among others, suitable for combating desertification and mitigating the effects of drought. The National Action Programmes envisaged in the Convention may, therefore, be adequately linked to such a framework of sustainable development policies and plans, and, where such policies and plans are deficient in relation to combating desertification and mitigating the effects of drought, they need to be reviewed appropriately. An alternative option may be to ensure that the NAP incorporates any additional policies and strategies of a short-, medium-, and long-term nature required to supplement the existing sustainable development framework or to make them more focused on the arid, semi-arid and dry sub-humid areas. Ethiopia has a sustainable development framework in the form of the Conservation Strategy of Ethiopia. It should, therefore, be necessary to point out the appropriate approach for the preparation of Ethiopia's National Action Programme(NAP) to combat desertification. It is in line with this sustainable development framework that the National Action Programme to Combat desertification is formulated.

The subsequent volumes address the evaluation of measures taken to combat desertification in the arid, semi-arid, and dry sub-humid areas (Volume II), gap analysis and proposed approach to combating desertification (Volume III).

CHAPTER TWO: DESCRIPTION OF THE STATE OF NATURAL RESOURCES

1 GENERAL DESCRIPTION

1.1 Climate

The main physical feature of the country is the diversity in altitude and accompanying climate and ecological variation. The altitude ranges from 110 meters below to 4620 above sea level. The climate in the highlands (area more than 1800 masl) is mild and the annual precipitation ranges from 800 to 2200 mm. The lowlands are hot with annual rainfall varying from less than 200 to 800 mm; of the total area, 60 percent is reported suitable for agricultural purposes. The natural forest cover is about 2.4 percent of the total area.

Ethiopia has diverse physical features that cause a great variety of climatic conditions. The diverse latitudinal, climatic, soil and other conditions result in a multitude of agro-ecological zones. The traditional climatic zones and their physical characteristics include *Berha* (hot arid, rainfall below 200 mm), *Kola* (warm semi-arid, rainfall 200 - 800 mm), *Woina Dega* (cool sub-humid, rainfall 800 - 1200 mm), *Dega* (cool humid, rainfall 1200 - 2200 mm) and *Wurch* (cold and moist, rainfall above 2200 mm).

Based on temperature and moisture regimes, the country may be divided into 18 agro-ecological zones; and 62 sub-zones grouped into seven major categories, namely arid (about 42.3 million hectares, pastoral), semi-arid (2.9 million hectares, pastoral/cultivation), dry sub-humid (19 million hectares, annual crops), moist (24.5 million hectares, annual crops), semi-humid (16.7 million hectares, annual/perennial crops), and per-humid (0.7 million hectares, perennial crops/frost).

1.2 Non-renewable Resources

The main non-renewable resources are minerals of which gold, rare minerals, potash, platinum, marble, phosphate, high quality coal, oil shale and iron are important. Natural gas and hydrothermal potential are also substantial.

1.3 Soil, Water and Vegetation Resources

Of the total land area of Ethiopia (about 113 million hectares), only 14.8 percent is under cultivation, while 51 percent is permanent pasture; 11.7 percent comprises forests and shrubs and the unutilizable area covers about 18.7 percent.

Ethiopia has a large water resource potential which includes 11 major lakes with a total area of 7400 Km², twelve river basins with a total annual run-off of about 10 billion m³ and ground water with an estimated capacity of 2.56 billion m³. Most of the rivers are transboundary with more than 75 percent of the annual surface run-off draining to neighbouring countries. The water resources provide large potential for hydro-power generation, irrigation and fisheries. Mineral resources such as soda ash are also extracted from lake brine. Water quality in urban areas is poor due to pollution from domestic and industrial waste.

The large diversity of ecological conditions determined by topography ranging from 110 m below sea level at Kobar sink in the Afar depression to a peak of 4620 m above sea level (masl) at Ras Dejen, has created diverse and conducive environments for the development of a wide variety of fauna and flora.

The flora of Ethiopia is very heterogeneous and has a rich endemic element. It is estimated to contain between 6500 - 7000 species of higher plant, of which about 12 percent are endemic.

Ethiopia is also a very important centre of crop genetic diversity and for this reason it is one of the 12 Vavilov centres. It has a very high genetic diversity in four of the world's widely grown food crops (wheat, barley, sorghum, peas), in three of the world's most important industrial crops (linseed, castor bean, cotton), in the world's most important cash crop (coffee), and in food crops of regional and local importance (tef, finger millet, noug, sesame, enset).

The wide range of climate, topography, parent material and land use of Ethiopia has resulted in forming soils which are extremely variable, and in different parts different soil forming factors take precedence.

1.4 Crop and Animal husbandry

A variety of crops and animals have well adapted to the varied and variable environmental conditions of Ethiopia, including tolerance to drought, water logging, low soil fertility, and variable animal feed quality and quantity, and resistance and tolerance to diseases and pests. So have the tools and implements used in this systems appropriately developed. However, these husbandry systems are under intense pressure from the increasing size of human population which has necessitated expansion of cropland and reduction in grazing land. This has caused crowding of livestock and reduction of quality and quantity of feed and fodder.

Land degradation and the associated threats to the ecological support system underpinning agricultural production are the most serious environmental problems in Ethiopia. The introduction of crops with narrow genetic bases replacing the farmer's

varieties has increased risk of loss of crops. The use of obsolete technology which is not environmentally friendly and overgrazing by the fast growing livestock population have also exacerbated soil erosion.

1.5 Wildlife

As a resource wildlife contributes to the maintenance of the natural ecological process which human beings and the natural ecosystems depend upon, it represents a store of genetic material that contains unrealized potential for the future, and it has a potential to contribute to the national economy.

The direct benefits of wildlife to communities can be seen in the various forms of wildlife utilization. Examples include wildlife tourism, sport hunting, and intensive wildlife utilisation schemes, such as ranching crocodiles for their skins, civet for musk, among others.

The protected areas in the form of national parks or sanctuaries include Abijata-Shalla Lakes NP, Awash NP, Babilie Elephant Sanctuary, Gambella NP, Mago NP, Nechisar NP, Omo NP, Senkelle Swayne's Hartbeest Sanctuary, Yabello Sanctuary, Yangudi Rassa NP. Wildlife reserves include Alledeghi, Awash West, Chew Bahir, Gewane, Mille-Sardo, Shire, Tana; while controlled hunting areas include Afdem-Gewane, Akobo, Awash West, Borona, Dabus Valley, Erer Gota, Jikau, Lower Wabe Shebelle, Maze, Mizan Tefferi, Murle, Omo West, Segen and Tado.

2 ARID, SEMI-ARID AND DRY SUB-HUMID AREAS.

2.1 Introduction

The arid, semi-arid and dry sub-humid areas of Ethiopia account for about 70 percent of the total land mass and 46 percent of the total arable land. These areas are found in the northern, north eastern, north western, eastern, southern and south western parts of the country (Fig. 1).

The arid and semi-arid areas are generally characterized by a harsh and hot temperature with a low and an uneven distribution of rainfall and low altitudinal ranges usually below 1700 masl; however, there are areas with altitudes higher than 1800 masl, especially in Tigray and Wollo. Evapotranspiration in these areas is high because of high temperature which is normally over 25⁰C during the rainy season with occasional strong winds. Monthly potential evapotranspiration (PET) usually exceeds rainfall in most parts of these arid and semi-arid areas.

Figure 1.

Information regarding the state of natural resources and the socio-economic situation specific to the arid, semi-arid and dry sub-humid areas of Ethiopia is hard to come by. As a result, any analysis of the state of natural resources and the socio-economic situation will be rather limited. However, even such a limited analysis can serve as the basis for the preparation of an initial National Action Programme (NAP). As more and more studies are carried out and detailed information becomes available, subsequent reviews of the initial NAP will take account of the new information which may lead to modifications of all or some of its contents.

The International Convention to Combat Desertification states that desertification is a phenomena that occurs in arid, semi-arid and dry sub-humid areas, manifesting itself in terms of land degradation. It can result from various causes, including climatic variation and anthropogenic activities. Some of the major processes which bring about ultimate desertification are soil erosion (by wind or water), deterioration of the physical, chemical, biological and economic properties of the soil and long-term loss of biodiversity including loss of vegetation cover.

Arid, semi-arid and dry sub-humid areas are defined as areas in which the ratio of annual precipitation to potential evapotranspiration falls within the 0.05 - 0.65 range. Taking the desertification convention's definition of arid, semi-arid and dry sub-humid areas and applying it precisely to the context of Ethiopia is difficult due to the simple fact that there is no information accurately analyzed and compiled and supported by reliable maps. However, a recent study made by the Desertification Control and Study Team of EPA states that eight out of the nine regional states of the Federal Republic meet the conditions of the definition in all or in parts of their territories.

The arid zones of the country are characterized by mean annual rainfall of between 100 - 800 mm, mean annual temperature of 21-27.5⁰ C and mean annual potential evapotranspiration of between 1700 - 2600 mm. The zone encompasses about 40 percent of the Somali and some 30 percent of the Afar regions and a little bit of the north-eastern part of Wollo and some 5 percent of the Oromiya Region towards the southern tip which borders with the Somali Region.

The semi-arid zones of the country experience mean annual rainfall of between 300 - 800 mm, a mean annual evapotranspiration of 1600 - 2100 mm and a mean annual temperature of between 16-27⁰ C. Almost 90 percent of the Tigray Region, some 20 percent of the southern, eastern and north-eastern part of Oromiya, more than 60 percent of Benishangul, some parts of the Southern Nations and Nationalities and People's Regional State as well as the extreme north-eastern part of the Somalia Region (including Jijiga) fall under this zone. Given the situation that all fall under the same umbrella of semi-arid zone, there are distinct differences in characteristics within the semi-arid zone, between the semi-arid plains, the semi-arid lakes and Rift Valley and the semi-arid

mountains and plateaus.

The dry sub-humid zones of the country are characterized by a mean annual temperature of between 16-28⁰ C and a mean annual rainfall ranging between 700 - 1000 mm. The regions falling under this zone are mainly the Oromia, Amhara, Benishangul, Gambella and some parts of the Southern Nations, Nationalities and Peoples Regional State. The area coverage, as compared to the total land surface of each region, Oromia, Amhara, Benishangul and Gambella and Southern Nations, Nationalities and Peoples Regional State, is roughly estimated to be 10%, 10%, 10%, 15% and 5%, respectively. Areas of the Oromia Region falling in this zone include some parts of Bale, Arsi and Wollega.

2.2 Soil Resources

The general soil formation along with the dominant soil types of the arid, semi-arid and dry sub-humid areas of Ethiopia is briefly discussed below.

The soils of the north-eastern escarpment (eastern Shoa and central Wollo) have developed almost exclusively on Trap Series volcanoes (FAO, 1984). Soils on the latter land forms, which include wide parallel valleys, sideslopes and volcanic plateaux, are generally stony phase eutric and dystic Vertisols or vertic cambisols. Where intensively cultivated, even on minimum slopes, these highly erodible soils can become quite shallow. On the steeper land forms, entric cambisols predominate, with lithic phases and Leptosoles occurring on the steepest slopes.

The soils of southern Bale and Ogaden have developed on a range of parent materials. Limestone, sandstone and evaporite all occur in the same area. Colluvium of mixed origin cover large areas, and alluvium of equally mixed origin is found on the flood plains of Genale, the Wabi Shebele and the Fafem rivers. With rainfall rarely exceeding 400 mm, evapotranspiration of flat, parent material has the dominant effect on soil differentiation across the area. On the vast plains, Gypsisols, Cambic Arenosols occur: although the area has so much wind blown material that eutic and calcic Regosols probably predominate. On the flood plains of major rivers, saline phase eutic Vertisols occur where fine textured alluvium has concentrated.

The areas of southern Rift Valley include the zones from Lake Chew Bahir on the Kenya border to Lake Koka south of Addis Ababa. The geology is complex. Parent materials include tertiary pyroclastics and quaternary basalts. Much of the area around the numerous Rift Valley lakes is covered by lacustrine deposits of various origins. Evaporite occur around Lake Chew Bahir. Much colluvial slopes and fans occur in the Rift margins particularly in southern Sidamo and Gamo Gofa. Vitric and mollic andosols occur throughout, although the largest areas are concentrated to the north-east up to the area around Shashemene. Andosols have developed on ash and pumice both laid down as aerial deposit. And orthic solonchacks occur around Lake Shalla, where quaternary basalt

outcrop, leptosols and extensive areas of rock outcrop occur.

The north-eastern parts of Wello and Tigray respectively, are predominantly desert. Parent materials include tertiary and quaternary volcanics, collurium from the highland plateau, aeolian deposits as well as marine deposits.

Rainfall is also less than 200 mm and as a result soils are not well developed. However, unconsolidated deposits do occur as sand dunes, colluvial fans and beach sands, all more often than not saline. Playas, extensive lava flows and occasional occurrences of entric regosols and vertic andosols are also found. Rock outcrop predominates on sloping landforms.

In general, soil types in dry land areas vary according to location and altitude. Vertisols and Cambisols are predominant in southern, central Hararghe, and in the eastern parts of the lowlands of Shoa and Wello. Calcisols and gypsisols occur in the vast plains of Bale and the Ogaden region.

Eutric Cambisols is the most common soil type on the Tigray plateau. In most cases, the soils are medium to shallow in depth with many stones spread over the fields. These soils have low organic matter, and hence they have poor water holding capacity. They are also deficient in nitrogen. The length of the growing period in these areas is rather short, ranging from 30 to 120 days; as a result, poor harvest and complete crop failures are common phenomena.

The northern Rift Valley (i.e. starting from the footsteps of Northern Hararghe highlands towards extreme north of the country along the coastal areas of the lowlands inhabited by Afar people) is covered by shallow soils such as lithosols, regosols, solonchaks and fluvisols. The soils in the alluvial/colluvial plains are often affected by salinity where solon chalk soil types dominate.

2.3 Water Resources

Most parts of the country are endowed with an enormous potential for water resources development, both surface and ground water. The geology, topography and climate of the country determine the distribution, quantity and quality of surface water and ground water resources.

The arid, semi-arid and dry sub-humid areas have substantive amounts of water resource. The arid and semi-arid lowlands have varied water resources regimes and these are (a) where there is widespread surface water and/or ground water with moderate to large quantities (this includes the Rift Valley Lakes); (b) where localized and moderately large quantities of groundwater, especially along valleys are found and (c) where limited quantity of ground water with fair to poor chemical quality is

available.

According to the study made by the Ethiopian Institute of Geological Surveys (EIGS), the country is classified into five main water resource regions and of these three regions are found in the lowlands (dry land areas) as follows.

Lowland 1: These areas cover a widespread surface water and/or ground water with moderate to large quantities. There are seven major lakes located in these areas, namely, Ziway, Langan, Abijata, Shalla, Awassa, Abaya and Chamo. These lakes are used for commercial fisheries, irrigation, recreation and for industrial purposes at the present time. Most streams in these areas are perennial and the depth to ground water is 0-150 m.

Lowland 2: These areas cover most of the drier lowlands situated in the southern parts of Oromia (Moyale area), the eastern most part of Afar and some areas in the north-eastern part of Tigray. They are characterized by localized and moderately large quantities of ground water, especially along valleys; most of the streams in these areas are intermittent, and some are perennial. The ground water has a fair-to-poor chemical quality with TDS ranging between 1000 and 3000 ppm. Most streams are intermittent, with a few perennials; the depth to ground water is 0 to 270 m.

Lowland 3: These areas are mainly situated in the south-eastern part of the country (predominantly the Ogaden area). These areas are characterized by localized and limited quantity of ground water with a fair-to-poor chemical quality. The TDS range from 1000 to 3000 ppm. All the streams are intermittent. The depth to ground water has a range of 0 - 300 m.

2.4 Forest Resources

The vegetation of the country is very heterogenous and has a rich endemic element. Estimates put the size of Ethiopia's flora at about 7000 species with endemism estimated to be in the order of 12 percent; approximately 800 species. Endemism is particularly high in the sub-desert Ogaden in the south-east and the forests of the south-west.

Perhaps one in four Ethiopian species is found only in the arid species-rich south-east of the country, which is characterized by its diversity of Acacia and Commiphora species. The latter are particularly important since about half of the 150 to 200 species of the genus are endemic to the small area of south-east Ethiopia, north-east Kenya, and Somalia.

The Arid Zone

In as far as the status of vegetation in the arid zones is concerned, there is not much information; and the available information indicates that the vegetation consists of grassland, bushland and woodland.

The arid zones have three distinctly known features(a) the arid plains,(b) the arid valleys and escarpments and (c) the arid mountains.

In the arid plains, the naturally occurring tree species include such species as *Tamarix aphylla*, *Calotropis procera*, *Balantine aegypticus*, *Dodoneea viscosa*, *Acacias*, etc. Among the introduced species such as *Parkinsonia aculeata*, *Prosopis juliflora*, *Azadirachta indica* do well in the area.

The arid valley and escarpments are those parts of the arid zone which are mainly found in the Afar Region. They have similar characteristics as the arid plain in that there is no growing period based on rainfall. Some of the characteristic tree species here include *Balanites aegypticus*, *Salix subserata*, *Flueggia virosa*, *Casissa edulis*, *Rumex nervosus*, *Tamatindus indica*, *Ulcea schimperi* and *Acaccia* spp.

The arid mountains are found in the eastern part of Dire Dawa up to Aysha-Dewelle. They are mountainous and receive relatively high rainfall reaching between 300 - 800 mm annually. These are the portions of the arid zones which have at least 45 days of growing period annually.

There are a number of initiatives to enhance irrigated agriculture in the arid zones; and agricultural expansion claims more and more wooded grassland and bushland for cultivation and dam sites and that, if not properly managed, could be environmentally unfriendly.

Parts of the arid zones are rich in gum and incense tree species e.g. the areas south of Jijiga around Imi and K elafu.

Semi Arid Zone

The semi-arid plains consist of those areas lying towards the Humera area (Western Tigray). These areas are known to experience about 60 days of growing period in a year. In this part of the semi-arid zone, the hilly areas are under wooded grasslands and bushes, whereas the flat terrain is under mechanized rainfed crop cultivation, crops such as sesame, teff and sorghum are grown. Natural tree species found in this part of the zone include *Boswellia papyrifera*, *Acacia segal*, *Acacia senegal*, *Acacia nilotica*, *Zyzyphus* spp, *Diospyros mesqiliforms*, *Exytenanthera abyssinica*, *Balantines aegyptica*.

The lakes and rift valley portions of the semi-arid zones including Alem Tena have a growing period of between 46-60 days.

The semi-arid mountains and plateaus are large and include places such as the Hamerbako area of the Southern Nations and Nationalities and Peoples Regional State. The area is vast but sparsely populated. A semi-nomadic life style is practised.

The plateaus of Axum, Adigrat and Mekele show typical semi-arid characteristics (TNRS, 1993). At the mountains and plateaux mean annual rainfall reaches 980 mm and at the lowlands the rainfall goes down to 450 mm. It is reported that the maximum temperature sometimes reaches 40⁰ C. The minimum temperature experienced is 5⁰ C. Previously, up to 50 percent of the land used to be covered with vegetation. Due to human interference for agriculture production, fuelwood, charcoal, and house construction as well as because of overgrazing, all the natural forest cover has gone, except for some patches in the valleys of Tekeze, Hirmi and Woree. Few patches of forest are also seen in the inaccessible higher and lower altitudes, church-yards and other holy places.

In the higher altitudes (above 1800 masl), the tree species found include evergreen montane forest and the deciduous woodlands i.e. *Acacias*, *Ficus* spp., *Euphorbia* Spp., *Cordia abyssinica*, *Croton macrostochys*, *Olea africana*, etc. In altitudes < 1800 mts *Acacias*, *Albizia* spp., *Combretum* spp., *Terminalia* spp., *Camiphora* spp., *Boswellia* spp., *Zyzyphus* , etc. exist.

The other classical semi-arid zone is the Borena zone and its surroundings. In this zone, there is an estimated total of 292,802 ha of natural forest in Medaga, Yabelo, Mankubsa, Bore, Zenbaba Woha and Anferara-wadera. The Mankubsa and Megada forests are strictly under the semi-arid zone of the country and are sensitive forests as they experience insufficient rains and high temperatures. Most of the Borena zone is classified as having more than 70 percent of its land in the 'kola' zone. The natural forest in the priority areas is composed of species such as *Aningeria adoldfi-frederichi*, *Podocarpus gracillioir*, *Cordia africana*, *Syzigium guinese*, *Pguim afrucabna*, *Polyscias* spp.

The nomadic life of the Borena people is closely related to the existence of forests and other vegetation. Shade for domestic animals and fresh grass under the canopy of forests are very important requirements of the Borena people. Among the animals reared by the Borena people, camel and goat are browsers and these animals negatively affect the woodlands of the Borena.

The Borena people do not normally cut forests but have the culture of setting fire to dry grass mainly to eradicate ticks, to make clearing as well as to improve pasture. Such fires are very dangerous and are known in the past to have devastated sizeable parts of the Mankubsa forest every year.

Dire Dawa and its surroundings are areas categorized as semi-arid zones of the country, and no dense forest exists here. However, 1.2 percent of the total land area is covered by bush and shrubland and most of the land is unproductive and unutilizable.

About 50 percent of the Metekel area falls in the semi-arid category. A vast area between Mega and Moyale is also known to fall under the semi-arid zone of the country. The area has large variation in altitude, and the mean annual rainfall ranges between 250 - 1500 mm. Even though it is known for being suitable for growing drought resistant crops, the mainstay of the economy is livestock production. The crops cultivated here are maize and sorghum.

Lowland species growing in the area include *Acacia* spp. *Euphorbia* spp. and *Balantines* spp. The area experiences repetitive wild fire occurrences and because of this some fire climax species (fire resistant species) are observed in some places. Termites are a big problem discouraging development efforts in the area. Still the available woodland forest is being used as a source of firewood and timber for construction purposes.

The semi-arid parts of the country lying in the Arsi zone of Oromiya are the area where state farms are found. The areas are highly cultivated and as a result do not have much vegetation cover (e.g. Gofer). They are, thus vulnerable to erosion and land degradation.

The Dry Sub-humid Zone

Wollega, especially the Nekemt area, is identified to fall in the dry sub-humid parts of the country. Not too far from Nekemt is where the forest priority area, Chato-Sengi-Dengeb, is found. It is a highly disturbed remnant natural forest covering some 5000 ha. Some effort is being made to cover the area with man-made forest. It is reported that by 1993 some 60 ha had been planted.

From the eastern and southern parts of Oromia, the Nazareth, Wadera and part of the Agere Mariam areas fall in the dry sub-humid zone. There is practically no forest around Nazareth; however, the Nazareth fuelwood plantation project is found in this area. It was reported that more than 5200 ha were planted with eucalyptus for fuelwood purposes. Much of this plantation was destroyed during the change of government in 1991. The destruction of the forest was due to the fact that the Derg regime had taken the land for the establishment of plantation without the prior consent and full agreement of the surrounding communities. The other issue which has aggravated the situation is the undefined boundary between Regions 3 and 4, while regionalizing the forest itself. With the anticipation that the plantation forest might serve as a buffer zone bordering the two regions and that the forest resources could be given to any one of the two regions, a lot of pressure was exerted on this resource by the surrounding communities.

Further south in Oromia, the Wadera and Agere Mariam areas fall in the dry sub-humid parts of the country. In the Wadera area, there is the Anferara Wedera forest priority area. It is a heavily degraded 13,000 ha of forest. This forest has been exploited for wood-based industries since the time of the Italian occupation. Such practice continued up to

1983 after which time harvesting for industries has been stopped.

Out of the available important forest resources of Oromia-the Adaba Dodola forest-is in this zone. According to the Ethiopian Forestry Action Plan most parts of this forest, covering about 10,000 ha, are classified as heavily disturbed. It is at present one of the forests which has been given due attention by the Regional Government. The GTZ, the German Agency for Technical Cooperation, has provided support towards the conservation of this forest.

The Southern Nations, Nationalities and Peoples Regional State also has some portion of its land in the semi-arid Zone. This part of the region has been estimated to cover more than 5 percent of the total area. In the North Omo zone of the region, Arba Minch and Merab Abaya are identified as classical dry sub-humid zones.

The Arba Minch forest is found near the town of Arba Minch. This forest is being threatened by fuelwood collection, illegal cutting of trees for timber as well as for charcoal production. One of the better known National Parks of the country, the Nechisar Wildlife National Park, which has a high touristic value, is also found near the town of Arba Minch. The Merab Abaya part of North Omo is the area which has generated interest among investors. It is an area identified as a zone of potential crop production.

The dry sub-humid zone of the country includes the Kembata, Alaba and Timbaro areas. The Kembata, Alaba, and Timbaro zone has a dispersed remnant natural forest which, together with plantation forests, covers about 19,329 ha (SNNPRS, 1994). The zone has a lengthy growing period reaching 240 days a year. The area has great potential for the production of Enset and perennial fruit trees. It is being highly threatened by shifting cultivation. The area is known for its high population density reaching up to 310/km².

The Benishangul Gumuz National Regional State has some 10 percent of its total land falling in the dry sub-humid zone. There is no study to indicate the extent of forest cover in the area. All the same, the existing forest is being highly threatened (BGNSRS, 1995). There is no significant effort to reafforest the area either. Gambella has quite a significant part of its land cover in the dry sub-humid zone. It is estimated that some 15 percent of the land cover falls in this zone. The land under vegetation cover is estimated to be 422,000 ha of which 162,000 ha was high forest. The Gambella vegetation is being threatened by ongoing development projects. The Alwero irrigation project alone has claimed about 140,000 ha of land covered by vegetation (GNRS, 1994).

Quite a sizable area of the Amhara Region is also known to fall in the dry sub-humid zone. It is estimated that it covers some 10 percent of the overall land area of the Region. It goes around the moist boundary of the Amhara Region like a belt and acts as a buffer between the moist and semi-arid zones of the Region. Gondar area and the Bir Valley are some of the localities which directly fall in this moisture zone (ANRS, 1993).

Bir Valley is found in West Gojjam, and it is an extensive area comprising woodland, shrubland and riparian vegetation. There is no estimate of the extent of forest cover of the area.

2.5 Livestock Resources

Rangelands are lands in which the native vegetation is predominantly grass, grass-like plants, forbs or shrubs suitable for grazing or browsing. It includes lands revegetated naturally or artificially to provide forage cover that is managed like natural vegetation. Rangelands include natural grasslands, savannah, shrublands and moist deserts.

Rangelands are categorized into highland and lowland rangelands and cover 62 percent of the total land area of the country. They support about 62 million heads of livestock of which cattle are 33.08 million (53.7%), sheep 13.46 million (21.86%) and goats 10.41 million (61.9%). The remaining 4.6 million (7.53%) are draught animals. Asses have a considerable share amounting to 3.1 million heads. Land use and grazing systems between the major rangelands types are integrated and interdependent as well.

Arid zone rangelands are mainly distributed in the northern Rift Valley lowland, in Somali Region of eastern lowland, mainly in the Eastern Ogaden lowland, and also in the southern lowland South of Borana and Sidamo region. It covers 64 percent of the lowland climatic zone.

Continuous interaction between the highland farmers and the lowland pastoralists has been a common practice. The highland farms provide grain, as well as grazing during the dry season and drought periods, while the lowlands pastoralists supply animal products and by-products, draught animals, fuelwood and charcoal.

Lowland Rangelands

The rangelands, as lowlands, occur within the arid, semi-arid and dry sub-humid zones below 1500 m elevation and comprise 61 percent (or 78.1 million ha.) of the total land area (Coppock, 1994). The lowland rangelands include the Rift Valley lowlands (population density ranging from 13.5 to 131.7 Km²); and the eastern, southern, south Western, western, north and north-western lowlands (population density 6.9 to 19.1 person/km²). Climate zones in the lowlands include arid lands (64%), semi-arid (21%) and dry sub humid (15%).

Land use is dominated by pastoralism and to a lesser extent by agro-pastoralism, namely shifting cultivation with different kinds of cereals. Although the lowlands have a lower abundance of animals than the highlands, they still play a crucial role in the national livestock economy. In the mid 80s livestock production comprised 33 percent of the gross value of annual agricultural output and 15 percent of GDP. Lowland breeds of cattle and

small ruminants comprised 12 percent of the gross annual export revenue overall in the mid-80s. As many as 450,000 heads of lowland livestock may be traded on the international black market each year and official statistics do not reflect this volume. Internally, lowland cattle may also provide about 20 percent of the draught animals for the highland, and smaller numbers are supplied for finishing by farmers on crop residues and to beef fattening government ranches and private feedlots, especially from the southern and south-eastern lowlands. The exercise helps relieve livestock pressure on the rangelands. Rapid population growth, expansion of crop cultivation, overgrazing and drought has contributed towards land degradation in the lowlands.

Rangelands Resources and Uses

Rangelands are important in providing forage for livestock and wildlife. Pastoralists subsist on livestock products and by-products. However, the use of rangelands is not limited only to livestock grazing. Range ecosystems supply minerals, soil, plant water, wildlife, wind, radiant energy, fish, gums, resins and aesthetics. It should be noted that oil and gas are found on the rangelands. The water sources in the form of rivers (i.e. Awash, Wabi-Shebele, Genale, Dawa, Baro, Omo...etc.) and lakes in the Rift Valley (Awassa, Shalla, Abijata, Chamo...etc.) as well as ground water have potential for domestic consumption, irrigation and as sources for energy. The lowlands are also rich sources of solar and wind energy, as well as geothermal and fossil fuels such as gas. Many mineral deposits are also found (i.e. limestone, marble stones, salt, potash, sulphur, gold...etc.) there.

Multiple use system on range is practised and the livestock is composed of cattle, sheep, goats and camels. Goat and camels are more dominant and browse on woody vegetation.

It is distributed around the periphery of the highland massifs. It covers 21 percent of the total land area. Semi-arid environment is found in the north and north-western lowlands, southern and eastern lowland Zones.

Semi-arid rangelands in the north and north-western lowlands include Tigray, Oromia Region (part of Welega) and Amhara Region (Western Gojjam and Gondar) and the Benishangul area.

Rangelands in the southern lowland parts of the country comprise Oromia (South Sidamo and Bale), towards the Kenya border, Gujji and Borena territories reaching Chew Bahir to the west.

Rangelands in the eastern lowland lie in the Oromia and Somalia regions, southern Bale and southern and south-eastern parts of Hararghe (Ogaden lowlands). Part of the central Rift Valley also belong to the semi-arid rangelands category.

In the Savannah vegetation type, vast areas of grassland exist, with exception where thorn brush invasion has taken place as a result of overgrazing. When the brush invasion reaches a high proportion stage, it is mainly used for browsing by camel and goats; the dominant thorn bush species are *Acacia senegal* and *A. mellifera*.

The semi-arid zone is estimated to produce 1 to 3 tons of dry matter per hectare and the carrying capacity is 14 to 28 TLU/Km². The inhabitants are semi-nomadic. The households are sedentary in most years but the livestock are mobile as necessary. Agro-pastoralism is practised and where water harvesting is possible, maize is planted.

The zone covers 15 percent of the lowlands and occurs at an altitude range of about 1500 masl with mean annual rainfall ranging from 800 to 1300 mm and mean annual temperature ranging from 20o C to 27.5o C. It has 180 to 270 growing days per year.

Dry matter forage production is estimated up to 6 tons/ha and with an average carrying capacity of 66 TLY/Km². Livestock is less important in the zone, since the zone is infested with diseases specially trypanosomiasis. Cattle, sheep and goats are commonly found. The inhabitants are sedentary and they practice crop and livestock farming. The zone has unexploited rangelands development potential.

2.6 Crop Husbandry

The wide range of ecological conditions in Ethiopia have made possible the growth of a variety of crops. The main crops grown in the arid, semi-arid and dry sub-humid areas are sorghum, maize, teff, finger millet and haricot beans.

In addition to subsistence crops grown, using the practice of shifting cultivation, cash crops such as cotton and tobacco are grown in many parts of the semi-arid and dry sub-humid areas. Cotton is produced by small holders and by larger commercial growers both rain-fed and under irrigation.

2.7 Wildlife and Touristic Resources

Another major resource in the lowland rangelands is wildlife which is considered the basis of an expanded eco-tourism. Big game in all lowlands and bird fauna in the Rift Valley are abundant. At present, there are more national parks and wildlife sanctuaries in the lowlands than in the highlands, of which the Awash and Omo National Parks are important.

The lowlands are also important in endemic plant species. The flora of the Ogaden is

one of the richest in the world.

2.8 Minerals and Other Resources

The traditional artisanal production of salt, placer gold, building stones, clays and iron and the use of thermal waters and natural steam for curative and recreational purposes have a long history. Of these, gold and salt occupy places of importance in trade and mineral use. Gold for artisanal mining is found in Benishangul, Akobo River area, Adola, Moyale (Borena) and Shire (Tigray). The level of production is not known but it is believed to be significant. Both production and trade have been illegal in the last two decades or so.

Salt quarrying at As'Ale in northern Danakil has long history and provides salt in bars for both human and livestock consumption. Salt has also been quarried alongside many brine bodies especially in the Afar, Borena and Western Ogaden. Such places are also cattle salt lick sites.

CHAPTER THREE: NATURAL RESOURCES AND SOCIO-ECONOMIC SITUATIONAL ANALYSIS IN THE ARID, SEMI-ARID DRY SUB-HUMID AREAS.

1. Natural Resources

In Ethiopia, agriculture is the main economic activity, accounting for 45 percent of the GDP. The main products are teff, sorghum, barley, field peas, chick peas, nigger seed, linseed, enset, cotton and coffee. Small-holder farming is predominant, accounting for

more than 90 percent of the agricultural production and 95 percent of the total area under crop.

The livelihood of 85 percent of the Ethiopian population is dependent on natural resources (particularly renewable natural resources). Depletion and deterioration of these resources have resulted in reduced agricultural productivity and subsequently in reduced quality of life of the people. In addition, the occurrence of droughts has become more frequent. Drought, which has claimed the lives of millions of people and caused loss of millions of livestock, is another important environmental issue affecting 53 percent of the land area. Most of the highlands are highly degraded and, even in times of good rains, people living there have not been food self-sufficient.

Ninety five percent of the cultivated land is under small-holder peasant agriculture (average 1.5 ha). It is the cumulative impact of the actions of these land users that has eventually led to the degradation and depletion of these resources. As a result, forests, woodlands and, generally, biomass cover is shrinking rapidly so much so that out of the now remaining 2.4 percent of high forests, 45 percent is facing pressure from the ever expanding agriculture.

Since the rural population's livelihood is based on farming and livestock raising, their dependence on the land and related natural resources is absolute. Agricultural land holdings are small, so much so that more than one third of rural households cultivate less than 0.5 ha. Farm lands of such small size are inadequate even for subsistence food crop production under rain-fed conditions. Changes in climatic patterns, such as rainfall, affect rural populations seriously and make them vulnerable to natural disasters particularly drought. These factors contribute largely to the fact that 52 percent of the Ethiopian population is food insecure and consequently below the poverty line. Chronic food insecurity is primarily caused by low productivity, lack of appropriate storage facilities and lack of or low levels of income. While chronic food insecurity is a major factor, there is also transitory food insecurity caused by the impacts of drought, displacement and fluctuations in food prices. Poor natural endowment, inaccessibility and general inadequacy of social and economic infrastructure are even more pronounced in arid, semi-arid and dry sub-humid areas since they extend largely to remote border areas.

The major environmental and natural resources management issues that Ethiopia is faced with are well documented in the Conservation Strategy of Ethiopia (FDRE, 1997a, 1997b, 1997c, 1997d). Therefore, it will suffice to indicate here that the country-wide problems related to soil erosion and degradation, deforestation, loss of biodiversity and energy related problems also apply to the arid, semi-arid and dry sub-humid zones of Ethiopia. In general, the threats to the arid zones include, among others, wind and water erosion, expansion of large-scale farming and salinization in the irrigated farms because of topography and high potential evapotranspiration and cutting of forests for fuel. There is apparently poor success in man-made forest development without irrigation. The situation is aggravated as a result of low rainfall, high temperature and poor infrastructure

in the area.

The issues which are more specific to arid, semi-arid and dry sub-humid zones, such as over grazing, dryland farming, incursion of irrigated agriculture, among others, are discussed below.

1.1 Soil

The natural endowment of the arid and semi-arid and dry sub-humid zones is not generous. Generally the soils in the arid and semi-arid zones consist of weakly developed xerosols, undifferentiated sand (in arid zone) and scattered soils of volcanic origin. The arid areas have diverse vegetation ranging from wooded grassland to semi-desert scrub. Where the degree of aridity is extreme, grass cover tends to become annual rather than perennial and, in fact, large areas of this zone are simply barren with no vegetation cover. The vegetation of the semi-arid zone consists of perennial grass, wooded grassland and bushland.

Soil thickness and fertility is low with implications of limited productivity. Rainfall is not only low but also variable and unpredictable, making these areas vulnerable to frequent droughts. Obviously, when inappropriate human activities are carried out with such poor starting conditions, the negative impact on the fragile ecosystem can be more immediate and, perhaps more lasting than in other areas.

Soils in the dry lands have serious problems of management and, consequently hamper sustained productivity. Most of the dryland soils are degraded or are in the process of degradation. They are also less productive because of soil erosion which makes them thinner, and over the years impoverishes them in nutrient content as well as reduces their moisture-storage capacity. Water erosion to the north-west and south-west parts of the region is intense because of proximity to the adjoining highlands. Soil erosion by wind in the months of June to September every year is a common phenomenon. This phenomenon results in blowing away loose soil and has been observed to diminish the sparse vegetation cover of the region. The nature of the topography exacerbates the situation. The desert and semi-desert scrubland is vulnerable to wind and water erosion; overgrazing and salinity is a potential problem. Soil erosion is commonplace in the Acacia-Comiphora Woodland and the Dry Evergreen Montane Forest and Montane Grassland; in the latter, the problem is induced by cultivation. In the Afroalpine and sub-Afroalpine area, the natural vegetation is threatened by grazing, cultivation and fire.

Crop production constraints are related to moisture and nutrient stress, to salinization and to soil surface crusting. The adoption and diffusion of dry land technology is impaired by the poor resource base of dry land farmers. Inputs and credit are not available at reasonable rates. Small and fragmented holdings are clear disincentives to land improvement. Poor infrastructural, marketing and price support stand in the way of

extending better value crops to these areas.

1.2 Water

There are 12 river basins with a total annual surface run-off of about 110 billion m³, and they flow through the north-western, western and southern lowlands of the country; and some pass through vast irrigable lands. In the Awash Valley, the traditional grazing lands of the Afar have been put under irrigated agriculture. Management of the irrigation schemes has resulted in salinization and the spread of water-related diseases, such as schistosomiasis and malaria.

Seven of the eight major lakes of Ethiopia are found in the Rift Valley, namely Zeway, Langano, Abaya, Chamo, Awasa, Shalla and Abijata. Lakes Shalla and Abijata have high concentrations of chemicals; soda ash is produced from the latter. Some of the lakes support commercial fishing.

In the Rift Valley, the valley floor is highly faulted and the fault fracture openings act as groundwater storage and transmission conduits. The lacustrine deposits and the unconsolidated volcanic rocks such as scoria and pumice have good prospects for groundwater resource development for irrigation, domestic and industrial use where the quality permits. However the volcanic rock aquifers of the central Rift Valley have high concentrations of fluoride.

Due to saline deposits, the groundwater in central, western and some parts of the eastern Ogaden is charged with salts and even water in some shallow- dug wells has high salt content.

Deforestation and poor land husbandry practices have resulted in accelerated run-off, reduction in the recharge of groundwater reserves, increased sediment load of rivers and siltation of reservoirs and increased incidence in the degree of flooding.

1.3 Forest

Deforestation is a major issue in Ethiopia, since it is one of the main causes of the prevailing land degradation. Tree cutting is a common occurrence which has been taking place for centuries. A long time back in history some parts of Northern Ethiopia, which are today suffering from conditions caused by land degradation, were covered with forests.

In present day Ethiopia, however, forests are being destroyed at an alarming rate and the area covered by forests at present is only 2.4 percent compared to the estimated 40 percent initial coverage. The primary causes of natural forest destruction are agricultural expansion, both through shifting cultivation and the spread of sedentary agriculture; the demand for increasing amounts of construction material, fuelwood and charcoal. Charcoal production is commonplace in the arid, semi-arid and dry sub-

humid parts of the country. Using fire to fumigate bees and to facilitate hunting is also very common.

The major source of household energy is biomass. A 1984 estimate indicated that 94.8 percent of the total energy consumption in Ethiopia was made up of biomass fuels consisting of fuelwood, animal dung and crop residue (EFAP, 1993). Fuel wood use makes up 81.8 percent of these traditional sources, while animal dung and crop residue make up 9.4 and 8.4 percent, respectively. Traditional fuels make up 99.9 percent of the rural energy consumption and the rural population consumes 86.7 percent of the total net energy (EFAP, 1993).

In addition to the deforestation caused by understandable needs, negligent as well as wanton destruction (such as by fire), do contribute to deforestation. These types of deforestation have become increasingly frequent in the last 20 years or so. This has been a period in which security of land tenure and access to natural resources were undermined by unpopular policy measures such as frequent redistribution of land and restrictions in cutting and utilizing trees, even in one's own backyard. Serious destruction of forests has occurred between the fall of the previous government and the stabilization of the present one.

Forest and generally biomass degradation, as well as consequent land degradation, lead to the destruction and erosion of biodiversity of both plants and animals. In the past, the focus of biodiversity conservation in Ethiopia was only in crop genetic resources. Thus, animal diversity was completely neglected, while plant diversity was only of interest in as far as it related to crop genetic resource diversity. More specifically, the destruction of habitats, the introduction of a narrow spectrum of crop varieties, recurring droughts, as well as wars and conflicts could be mentioned as the most common causes for the erosion of biodiversity in Ethiopia. In view of the presently growing conflicts between biodiversity conservation and agricultural needs, there is a potential danger that conservation of biodiversity may lose. Ethiopia's largely poor rural population, driven by poverty, attempt to satisfy their survival needs through the clearing of more forest land for agricultural purposes.

Unlike the resources in domesticated plants, the genetic resource of their wild relatives (naturally occurring plants) and also wild animals has not been given sufficient attention and as a result there is continuous loss of biodiversity.

In the dry lands, the existing Acacia woodlands are being depleted for fuelwood at an alarming rate, especially in the area lying towards the lower Awash Valley. Labourers of the Amibara State Farm alone are using an estimated 60,000 m³ of wood for fuel. This is a very serious pressure on the existing woodland of the Region annually. Besides, there is also a tradition of producing charcoal on the main highway from Assab to Addis

Ababa, depleting the vegetation on the left and right sides of the highways up to 5 km in depth.

In regions such as the Afar, the high number of domestic animals and the insufficient availability of grass during the dry season exacerbate the situation. Traditionally, whenever shortage of grass on grazing land occurs, the leaves and small branches of *Acacia* spp. are cut and fed to domestic animals.

Large-scale agricultural expansion has also a great influence on vegetation cover. In the middle and lower Awash Valley alone (a part of the Afar region), 45931 hectares of land have been utilized for irrigated crop production. There is also a big threat to the vegetation as wood is required for construction purposes.

The factors causing desertification in the dry lands are considered to be (a) human action, and (b) natural phenomenon. Human action is directly related to population increases. The need for basic facilities such as land, shelter, house furniture and farm implements, firewood, extraction of traditional medicine have aggravated the situation. Agricultural expansion and fire meant for clearing the forest areas have devastated the forests and bushes. Overgrazing in the forest areas, because of increases in animal populations, has also adversely contributed to excessive land degradation.

Some of the natural factors contributing to desertification are changing climatic conditions. The days are hotter and the nights are becoming colder. There is a remarkable decrease in total rainfall and distribution. Extended drought has become commonplace and surface water (springs, rivers, natural ponds, etc.) are disappearing; eg. in Tigrai.

As a result of loss of natural vegetation and absence of alternative energy supply, there is, at the moment, a serious energy crisis. The situation has led people to use cow dung and crop residues as main sources of domestic energy. For example, in Mekele (Tigrai Region), people are using roots of trees as sources of domestic energy (for cooking food) and in Adigrat, another town in Tigrai, the situation is even more serious. In the latter, the price of 50 kg of firewood is almost equivalent to the price of 50 kgs of grain.

In the Benshangul and Gumuz areas (Region 6), many human activities result in the destruction of forests. The people in the area make an unlimited use of the natural resources. Though the people cut the forest for fuelwood purposes, much more is being lost because of traditional hunting practices. Hunters set fire to the forest to force wild animals to flock together and move in the desired direction, where they will be ambushed. Another activity that causes fire in the forest is honey collection. Traditional bee hiving is a common way of life in the area. People set fire when harvesting honey to fumigate the bees and decrease the extent of their attack, and the fire often goes out of hand and destroys the surrounding vegetation. Lightening also causes fire and results in forest destruction.

Shortage of grazing land is also a very serious problem in this zone. Lack of alternative grazing constrains forces the people to put pressure on the existing vegetation cover. There is practically very limited effort for conservation and because of this, erosion is a very serious problem. This problem coupled with land shortage is aggravating the process of land degradation.

In Gambella one major threat to vegetation cover is the shifting cultivation practice of the Menjengir. The Menjengir partly depend on hunting for their livelihood, and they set fire to vegetation to facilitate hunting. They also use fire in the collection of forest honey, and the fire often goes out of control and destroys the forest.

In the north-west, the Gondar area was covered with dense forests some 40 to 50 years ago. These forests have dwindled because of man's action such as by land clearing for cultivation and to prevent wild beast from destroying field crops. Cutting of forests for construction and fuel purposes is still a common practice. At present Gondar is not only devoid of forests but also of trees.

1.4 Livestock Resources

Arid rangelands have low, sporadic and variable rainfall. At times, rainfall intensity is high, resulting in devastating floods. The level of incidental radiation and temperature are high, atmospheric humidity is low, and strong wind with dust and dust storms occur. Water is the most important limiting factor for plant growth. Overgrazing contributes to land degradation too, exposing the soil to wind and water erosion.

The condition of the arid zone rangelands is poor and the carrying capacity ranges from 4 to 16 TLU/Km². Dry matter production is less than 1 ton/ha. Vegetation types are described as short shrub grassland, shrub grassland, and dry thorn brush. Lack of alternative energy resources, other than biomass energy, has led to deforestation, thus exposing the soil to wind and water erosion, finally manifesting itself in reduction of crop yields.

The inhabitants are nomadic pastoralists. Household and animals often move in search of water and feed and food. Social system tend to be decentralized in terms of leadership (Donaldson, 1982). Cultivation is very risky, limited to drought tolerant crops such as sorghum and millet planted in depressions or flood plains. Soil salinity is also a serious problem.

Overgrazing in this zone has lowered the water table, increased run-off, caused soil erosion and degradation of Savannah vegetation and finally resulting in thorn brush invasion. Ground vegetation cover is reduced and so is moisture retention of soil because

of overgrazing. Overgrazing has become severe as pastoralists are limited to small areas and they do not practice their traditional communal alternate-dry-and-wet season continuous grazing system.

It can be seen that drought accompanied by bad distribution of rainfall is a significant factor in rangelands deterioration, followed by overgrazing. Brush invasion, due to lack of prescribed burning, in association with severe overgrazing and increased dryland farming, directly reduces grazing resources and this is particularly true in the southern rangelands.

It is important to note that rangelands degradation not only decreases biological productivity, but has also a far reaching ill-effect on the overall environment. A decline of fresh water resources and increase in sand and dust storms are consequences of degradation. Declining returns from range/livestock result in increasing poverty and migration to urban areas and also encourages farming of marginal areas which in turn increase further degradation.

Increases in cultivated land and continuous overgrazing have shifted climax vegetation towards increased shrubland invasion and bareland. Forest land is reduced from 33.9 percent to 4.5 percent and has been replaced by induced grassland. Regular and controlled use of fire will arrest brush invasion and hence improve range condition.

Overgrazing in some parts of the arid and semi-arid areas is becoming a major problem. There is currently an on-going debate as to whether overgrazing is caused by a tendency to overstock on the part of pastoralists, or whether the overgrazing is caused because traditional nomadic grazing lands have been taken over by increase in irrigated agriculture and the designation of parks pushing out the pastoralists to marginal areas. It is indicated in the CSE, for example, that the Afar and the Kereyu together have lost 57,000 ha of their best dry season grazing areas to irrigation. Another major factor which has been cited as a cause to the loss of traditional grazing areas is the designation of parks (19,767 Km²), wildlife reserves (28,100 Km²) and sanctuaries (9,536 Km²) in these areas. Whatever the cause, the fact is that there is overgrazing which is leading to the elimination of grass and the invasion of weedy plants as well as to soil erosion by wind and water. The overgrazing is also exacerbated by inappropriate development of watering points for the livestock which has disrupted the rhythm of movement between wet and dry season grazing areas and leading to long periods of concentration of livestock around the watering points.

1.5 Crop Production

Besides livestock production, farming has become an increasingly important activity in

these areas. Early pastoralist communities in the dry sub-humid zones have become, for a long time now, agro-pastoralists, practicing both livestock production and crop cultivation. Pastoralists in some of the semi-arid areas are also becoming increasingly engaged in crop production since food crops are being used to meet their food requirements. Cultivation in these areas includes shifting cultivation, which frequently leads to slashing and burning of vegetative cover, as the cultivators abandon farmlands which become less productive after use and move to new lands. While such farming may have been viable when population levels were low and there was plenty of land, it has now become increasingly difficult to find new land, resulting in more and more impoverishment of the same repeatedly used land.

Insufficient distribution of precipitation is the main distinct trait for crop production in arid, semi-arid and dry sub-humid areas. Moisture stress is also a major problem that results in low, unstable and unremunerative crop yield. High evapo-transpiration makes crop production a highly risky proposition in such areas. In addition to moisture stress, crop production is constrained by poor soil fertility, high weed and pest infestation, lack of appropriate cropping system, lack of drought-resistant cultivars, soil erosion and lack of small farm implements.

Precipitation is low and erratic in most of the rain-fed areas. There is a high coefficient of variation with regard to amount, on set and cessation of rainfall. Unpredictable dry spell occurring at the vegetative and grain formation stages of crop growth has a significant negative impact on crop production.

In the semi-arid regions of Ethiopia, drought and crop failure are becoming common problems because of the failure of rain-fed agriculture to provide the minimum food requirements of the rapidly growing population.

Crop production is also affected by nutrient stress, salinization, soil surface crusting and other related problems.

1.6 Wildlife and Touristic Resources

Ethiopia has a rich and diverse wildlife but its potential as a component of the tourism industry is not yet tapped. The following factors are responsible for the underutilization of these resources.

(a) Lack of awareness: At many levels of the Ethiopian society, there is a lack of awareness that natural resources such as wildlife are precious and should be protected and developed for the continued benefit of all.

(b) The law and its enforcement: Of the parks in the arid, semi-arid and dry

sub-humid parts of Ethiopia, only the Awash National Park is gazetted. All other conservation areas (Abijata - Shalla Lakes National Park, Gambella National Park, Mago National Park, Nechisar National Park, Omo National Park, Yabello Sanctuary, Yangudi-Rassa National Park) attempt to function without proper legal recognition. Such laws as do are inadequate or are openly disregarded by the people living around the national parks and other conservation areas. The exclusion of human activity from the Protected Areas is imperfect and often very poor. Since the flora and fauna co-evolved with humans, complete exclusion of humans is not desirable. Nevertheless, much destruction has taken place in these protected areas, especially in the last decade. The protected areas have been encroached by the local people attracted by the well preserved wildlife habitats. The existing laws have had no effect in controlling the human interference in these designated wildlife conservation areas.

(c) Lack of integration with the people around the conservation areas: In the past, when the Awash National Park was legally established, the involvement of the community was disregarded and their goodwill was not ensured. To date, this issue has remained problematic. As a result of such neglect, communities in and around national parks display, not surprisingly, negative attitudes to such protected areas. This negativity has often been expressed in violent destructive actions on the protected areas, particularly during transitions between governments.

SITUATION ANALYSIS OF PROTECTED AREAS

Abijata-Shalla Lakes National Park

The charcoal industry has become the main source of livelihood, albeit not sustainable, to many communities residing in or adjacent to the park. The problem is exacerbated by the presence of a soda-ash extraction plant in the Park. The area is also heavily settled and cereal cultivation in the Park is commonplace. The high rate of deforestation, overgrazing by livestock, cultivation of the fragile soil have all exposed the land to severe wind erosion.

All the rivers flowing into these lakes are intensively used for agricultural purposes, thus reducing the total amount of water reaching the lakes to very low levels, with heavy silt loads.

Awash National Park

Human and livestock populations in the park are increasing and tree felling for construction and domestic fuel, including charcoal production, has now become very

common.

Gambella National Park

Human settlement is the major threat to this park; necessitating the use of force, and incursions are occurring.

Omo and Mago National Parks

Omo and Mago National Parks are the site of periodic serious conflicts with local people, exacerbated by the Sudanese internal conflict and the demand for wildlife meat, complicated by armed inter-tribal conflict.

Lately, many people have settled in the Mago National Park and grazing livestock is commonplace in both parks. In addition, new agricultural developments are making demands on these land areas.

Nechisar National Park

People have settled in the eastern part of the Park and in areas adjacent to it, and poaching is very common. A lot of firewood is collected and the Park is also a major source of timber for construction.

Yabello Sanctuary

There is a lot of deforestation taking place, and illegal hunting of the spotted cats and ostrich is common. Some ex-servicemen have also settled in the sanctuary.

Yangudi-Rassa National Park

There is much environmental abuse, including illegal tree felling for fuelwood and charcoal production.

As the hospitality industry, tourism has built-in capacity to create a positive image and enhance international goodwill for Ethiopia. World trends show that tourism will continue to be the fastest growing industry and a major employer in the world economy by the year 2000. It is also confirmed that travel preferences are increasingly shifting in favor of destinations in non-industrialized and lesser-known countries with surviving ancient cultures and less disturbed ecologies. Ethiopia offers these products and has the potential to become a unique and internationally competitive tourist destination.

Considerable potential for wildlife based tourism exists in Ethiopia, using both

conventional (East-African) type systems of exploitation, as well as other methods. The possibilities in Ethiopia are enhanced by the large number of endemic species, many of them large and significant; by the spectacular scenery; and by the structures and traditions of the very rich cultural history, especially in the highland areas. Further, wildlife based tourism in East Africa, especially in Kenya, are saturated, and suitable new and additional areas are much sought after.

The arid, semi-arid and dry sub-humid parts of Ethiopia provide a significant part of the area with high potential as tourist destination in Ethiopia.

The key constraints to the growth and development of this sector include:

- lack of coherent tourism policy that adequately considers international situations;
- lack of an effective international marketing strategy and action in the market place;
- an inefficient and unreceptive tourism sector with inadequate services and facilities;
- poor distribution of infrastructure over the tourist attraction sites; and
- lack of requisite hotel rooms, services and tourist facilities outside Addis Ababa.

1.8 Mineral and Other Resources

The mineral development programme of the country aims at attainment integration and mutual support with sectors of the economy that are end-users of mineral raw materials in order to contribute to the progressive self-reliance of the economy.

The economic development strategy that Ethiopia is to follow over the next two decades aims at effecting a transformation of the structure of the economy such that output from the industrial and services sectors will grow relatively to that of agriculture.

The central aspect of the strategy is an "Agricultural Development-led Industrialization (ADLI)" and this is to be attained mainly through the improvement of productivity of small holder agriculture and industrial development based on indigenous raw materials and labour intensive technology.

In this strategy, the potential role of minerals in the expansion of export trade is recognised and mineral production is to be encouraged. Mining also has the potential for contributing to the objectives of agricultural and industrial development through the provision of primary and intermediate inputs.

At present, conditions are being created that are favourable for mineral resource development with the active participation of both indigenous and foreign private investors. While the policy and the legislative climate is thus improved, a number of factors constrain the development of mining. The constraints include inadequacy of available information on the country's mineral resources; insufficiency of the government institutions and their resources for carrying out exploration and development support tasks that are pre-requisites for mineral development; the small size of indigenous mineral end-user industries; inadequacy of the capacity and capability of the indigenous private sector for a satisfactory level of involvement in mineral development, and the deterioration of the already fragile ecosystem.

However, to date, the output of the mining sector does not figure high in the national economy and adequate geological maps are still unavailable for much of the arid, semi-arid and dry sub-humid areas. Apparently, in the dry lands there are many areas with favourable conditions for the exploitation of minerals, including metallic mineral deposits in Precambrian rocks, and oil and gas in sedimentary rocks. Participation of rural communities in mining has long been known and accounts for a significant share of both mineral discoveries and output. The important minerals produced are gold, pottery clay and salt. Although they make important and often irreplaceable contributions in the satisfaction of household needs and in mineral trade, the activities have never benefitted from improvements in the technologies of extraction and use. Neither the extent of employment in nor output from these industries is known.

2 Socio-economic Analysis

2.1 Sedentarization

Many governments, bilateral and international agencies and NGOs the world over have launched programmes and projects intended to control desertification and promote development in dryland regions. Faulty assumptions about the nature of land use systems and poverty in dryland areas have led to inappropriate responses to land degradation problems and rural poverty, such as sedentarization of pastoralists in arid areas. Nomadic pastoralists move their herds over wide areas to make maximal use of seasonal and cyclical availability of pasture and water resources. Opportunistic grazing strategies

enables pastoralists to use low-yielding dry rangelands more economically and sustainably than do modern ranching methods.

It is often stated in the Ethiopian public media that sedenterization is a preferred way of life compared with pastoralism.

Several projects funded by bilateral and multilateral donor organizations in many dry regions tried to limit pastoral movements by establishing new water points (the construction of boreholes), veterinary services and managed grazing techniques. However, such interventions have often been highly environmentally damaging as a result of the negative impacts of sedentarization. The construction of boreholes makes water more available for pastoralists' animals in dry areas but water points often lead to accelerated land degradation by creating a permanent concentration of animals and humans around them. Veterinary services, such as effective vaccinations against rinderpest, have heightened the need for more sound land management by increasing pressure on grazing resources. New forms of range management organizations such as pastoral cooperatives have also been largely ineffective due to financial inviability and dependence on external fund as well as skilled manpower. Similarly, government ranches, that take over large tracts of land traditionally used by pastoralists, have been less productive in their herd management and breeding than traditional herders.

2.2 Establishment of State Farms as a Policy Measure for Better Agricultural Development

State farms were initially formed by nationalizing large scale commercial farms which were owned by individuals prior to the land reform act of 1975.

Within the then socialist framework, objectives of the state farms were:

- . to augment the domestic food supply;
- . to produce surplus for export and also for import substitution, and
- . to promote technology transfer in agriculture through the introduction of better farming technologies.

The total size of state farms in Ethiopia was 71,000 ha for almost ten years between 1975-1984/85. This constituted 0.5 percent of the annual cropped land and 1.8 percent of the total grain production .

State farms were given special attention in the development campaign which started in 1984/85. During the first three campaign years, the size of state farms expanded threefold reaching a total of 229,600 ha. Land for expansion was obtained by evicting both peasants from their holdings and pastoralist from their traditional grazing areas. During the establishment of the state farms, an estimated 90,683 local farmers were displaced from their holdings (i.e., about 176,708 ha). The expansion of irrigation schemes has also led to the spread of vector-borne diseases.

Despite the Government's preference for state farms in terms of investment capital, credit services and prices, they proved to be failures

After the change of government, the displaced people returned to their former homesteads at an alarming rate, and there were frequent clashes over resource acquisition. In response to this, and as an issue of current government policy, the local administrations managed to claim part of these farms and allocated them to peasant associations. Despite the governments' preference to state farms in terms of investment capital, credit services and prices, they proved to be failures.

2.3 Social and Economic Infrastructure

Generally, the rural areas of Ethiopia suffer from inadequate social and economic investment. Education levels are very low, and health facilities are inadequate. Eighty five percent of the rural people are illiterate. Only 10 percent of the rural population has access to potable water, while human waste disposal facilities in the rural areas are non-existent. Low levels of nutrition affect the productivity of the rural populations. For example, the caloric intake of the population is 16 percent lower than the 2,1000 K Cal that has been set by WHO as the minimal acceptable weighted average calorie needs. Besides malnutrition, lack of safe drinking water and poor environmental sanitation are major causes of health problems in Ethiopia, much so in the arid, semi-arid and dry sub-humid parts. Health services are also limited and reach only 46 percent of the population. As a result, infant mortality and overall death rate are high, while average life expectancy at birth is 47 years.

There is a limited access to post and telecommunications facilities, while electricity is a luxury not accessible to rural populations. Ethiopia is one of the countries in Africa which has the lowest road density; most of the existing roads need extensive maintenance. Inaccessibility and the undeveloped nature of market facilities is one of the major factors which discourage the growth and expansion of private investment in these areas. Only about one third of the rural households had access to fertilizers in 1995. The average use of fertilizers is only about 15 kg/ha which is very low compared to 48 kg/ha in Kenya, for example. In many of the rural areas, markets for inputs and outputs are underdeveloped.

Despite some progress, lack of adequate rural credit facilities is one of the major constraints for marketing, particularly in the purchase and use of inputs required for agriculture and livestock production.

Means of Livelihood

The excessive dependence of the Ethiopian rural population on natural resources, particularly land, as a means of livelihood is a major cause for land and other natural resources degradation. Because of the very limited opportunities for rural people to employ themselves in non-farm activities, the pressure on the natural resources will continue to increase with the growth in population. Unless macro-level policies, which can support programmes that take into account the creation of appropriate alternative livelihoods are designed and implemented, the end result will be the total destruction of the productive potential as well as the regenerating capacity of the natural resource base.

2.4 Natural Resource Tenure and Access Rights

The frequent reallocations of land by peasant association all over Ethiopia including the arid, semi-arid and dry sub-humid parts during the past regime created a strong feeling of tenure insecurity among land users. Even when re-distribution was stopped, large areas of communal land were brought under cultivation by individuals who were either landless or by those who took advantage of the situation and moved to acquire more land.

The old practice of considering woody plants open property resources for the taking by anyone has deterred peasants from planting trees. This has reduced security of tree tenure and exacerbated the deforestation of the country.

2.5 Environmental Economics

The normally quoted measure as a country's output, the Gross Domestic Product (GDP), does not take into account the depletion of the national assets and the country's natural capital such as soil, forests, water and minerals. In the economic appraisal of the development projects, the costs of environmental and natural resource benefits forgone as a result of the projects' activities are rarely included in the calculations. For example, the opportunities lost with the loss of biodiversity at Abijata, where soda extraction takes place, and the livestock production forgone as a result of irrigation in the Awash Valley, are not considered in Ethiopia's developmental activities.

2.6 Population Growth and Development

Generalizations about the cause and effect relationships between population dynamics and environmental degradation at national or local levels are varied and always full of a multitude of exceptions .

Though facile generalizations treating population growth and poverty as the principal causes of desertification are misleading, it is true that population growth increases pressure on natural resources in dryland regions.

Ethiopia's population is presently growing at an annual rate of 3.1 percent. If this rapid rate of demographic growth continues unchecked during the next century, the pressure on the already stressed natural environment would be even greater, thus adversely affecting its sustainability.

The high population has caused the unsustainable use of soil, water and forest resources. The ever- growing energy demand for domestic fuel has resulted in extensive use of crop residues and cow dung for fuel. This practice breaches the nutrient cycle. Forest resources are also being depleted fast because of high demand for fuel wood and timber. More and more land is being deprived of its plant cover due to the ever-increasing demand for crop land. The depletion of top soil has meant reduced water retention capacity of land, erosion of plant genetic resources and loss of habitat. At the current rate of population growth and resource utilization, it is estimated that by 2010 three quarters of the old awrajas will be unable to meet their subsistence food needs. Deforestation has accelerated in recent years, especially in the last three decades, in response to a rapidly growing human population.

A number of studies have shown that various factors encourage large family size or high fertility in developing countries. A desire for large numbers of children is based on economic considerations (children are regarded as sources of additional family labour and as old-age security for their parents), health considerations (high fertility as a response to high infant and child mortality) and the subordinate status of women (the absence of alternatives to women's roles as wives and mothers or the disadvantaged condition of women with regard to their opportunities for education, training and employment).

Reducing population growth rates requires real social development far more than family planning services. It requires, among other things, improved food security, improved education and health services, better security for the aged, improvement of women's status through better education and employment or generally improved social and economic conditions for vulnerable social groups. Such real social development, the only acceptable way to reduce population growth, would greatly facilitate the control of both population growth and desertification.

Ethiopia has adopted a national population policy which aims at the harmonization of the rate of population growth and the rate of economic and social development. The National Population Policy of Ethiopia sets laudable goals, objectives and strategies. Concerted efforts should be exerted towards its implementation

In 1996, the population was estimated at 58 million and was increasing at 3.1 percent per annum; this rate is expected to increase to 3.6 percent by the second decade of the next century. Most of the population (88%) live in the highlands (above 1500 masl) which constitute only 43 percent of the country's land area. The land is approaching its carrying capacity limits.

Besides the human population, the livestock population also has an impact on the resource base. The highland areas of the country are where the largest number of livestock are found. They are also the areas which are heavily cultivated for crops. The expansion of cultivated land leaves limited pasture land; and as a result, there is an increased reliance on crop residues as animal fodder. According to one forecast, all pasture land in these areas will be fully utilized by the year 2005. Problems in the highlands push farmers to the marginal lands at lower altitudes. Here they try to practice their highland farming systems, resulting in enhanced environmental degradation.

2.7 Community Participation in Natural Resource Management

The limitations of a top-down technical approach, which places low priority on socio-economic factors in environmental projects, and the need for participatory bottom-up approaches that support local knowledge and management systems is now widely accepted. The participation of the beneficiaries in the design, implementation and evaluation of a given project is a prerequisite for sustainability: First, it is now recognized that indigenous knowledge can provide a useful basis on which to build interventions; Second, failures of previous projects is attributable to lack of response to local priorities and needs, and third, establishing local rights and responsibilities constructs a pattern of long-term interests and incentives to create a sense of "ownership" of project activities.

The absence of popular participation in resource management during the Derg regime has resulted in the rejection of government policies formulated and implemented from the centre, i.e. policies such as collectivization, villagization, resettlement, campaigns for re-forestation and soil conservation as well as prohibition of tree cutting.

In addition, the state sector land developments have been taken with little, if any, consideration for the traditional users of the land. Examples include: delineation of national parks in areas traditionally used by pastoralists and/or agro-pastoralists;

development of large fuelwood plantations in areas of mixed small-holder agriculture; large irrigation schemes in dry season grazing areas of pastoral people's livestock and development of state farms in areas of small-holder agriculture.

Today, the issues of community empowerment and local participation in rural development and natural resource management projects in Ethiopia are receiving increasing attention from researchers and development organizations. The Government has also adopted this concept in principle in its policies and the concept is reflected in its new policies.

REFERENCES

- Amhara National Regional State. 1993. "Regional Conservation Strategy of ANRS".
- Benshangul Gumuz National Regional State. 1995. "Regional Conservation Strategy".
- Coppock, L.D. 1994. "The Borena Plateau of Southern Ethiopia". Synthesis of Pastoral Research, Development and Change 1980-91. ILCA Systems Study No. 5.
- Eckholm, E. and L.R. Brown. 1997. *Spreading Deserts: The Hands of Man*. Worldwatch Paper 13.
- "Ethiopian Forestry Action Program. 1993". Draft Final Report, Volume 2 - The Challenge for Development. MoNRDEP. Addis Ababa.
- FOA. 1984, *Assistance to Land Use Planning*. Livestock Production and Feed Resources. FAO, Rome.
- FDRE. 1997a. "The Conservation Strategy of Ethiopia. Vol.I". *The Resources Base, Its Utilization and Planning for Sustainability*.
- FDRE. 1997b. "The Conservation Strategy of Ethiopia. Vol.II". *Federal Policy and the Environment*.
- FDRE. 1997c. "The Conservation Strategy of Ethiopia. Vol. III". *Institutional Framework and Operational Arrangements*.
- FDRE. 1997d. "The Conservation Strategy of Ethiopia. Vol. IV". *Action Plan for the Federal Policy on the Environment*.
- Gambella National Regional State. 1994. "Regional Conservation Strategy".
- Southern Nations, Nationalities and People's Regional State. 1994. "Regional Conservation Strategy".
- Tigray National Regional State. 1993. "Regional Conservation Strategy of Tigray".

**VOLUME II: EVALUATION OF MEASURES
TAKEN TO COMBAT DESERTIFICATION**

ACRONYMS

ADLI	-	Agricultural Development-led Industrialization
ARDU	-	Arsi Rural Development Unit
CADU	-	Chilalo Agricultural Development Unit
CBO	-	Community-Based Organization
CRDA	-	Christian Relief and Development Association
CSE	-	Conservation Strategy of Ethiopia
DPPC	-	Disaster Prevention and Preparedness Commission
EARO	-	Ethiopian Agricultural Research Organization
EC	-	European Commission
EFAP	-	Ethiopian Forestry Action Programme
EPA	-	Environmental Protection Authority
EPC	-	Environmental Protection Council
EU	-	European Union
EWCO	-	Ethiopian Wildlife Conservation Organization
EWNHS	-	Ethiopian Wildlife and Natural History Society
FAO	-	Food and Agriculture Organization
FaWCRA	-	Forestry and Wildlife Conservation and Development
FLDP	-	Fourth Livestock Development Project
GHAI	-	Greater Horn of Africa Initiative
GTZ	-	German Agency for Technical Cooperation
IAR	-	Institute of Agricultural Research

IBRD	-	International Bank for Reconstruction and Development
ICRAF	-	International Centre for Research in Agroforestry
IGAD	-	Inter-governmental Authority for Development
ILCA	-	International Livestock Centre for Africa
ILRI	-	International Livestock Research Institute
IUCN	-	International Union for the Conservation of Nature
JIRDU	-	Jijiga Rangelands Development Unit
LMB	-	Livestock and Meat Board
MEDaC	-	Ministry of Economic Development and Cooperation
MPP	-	Minimum Package Programme
MoA	-	Ministry of Agriculture
MoE	-	Ministry of Education
MoIC	-	Ministry of Information and Culture
MoME	-	Ministry of Mines and Energy
MoWR	-	Ministry of Water Resources
NAP	-	National Action Programme
NERDU	-	North-eastern Rangelands Development Unit
OAU	-	Organization of African Unity
PA	-	Peasant Association
PARC	-	Pan-African Rinderpest Control
PENHA	-	Pastoral Environment Network in the Horn of Africa
PGRCE	-	Plant Genetic Resources Centre, Ethiopia

RECC	-	Regional Environment Coordinating Committees
RRC	-	Relief and Rehabilitation Commission
SCRP	-	Soil Conservation Research Project
SERP	-	South-eastern Rangeland Project
SIDA	-	Swedish International Development Authority
SLDP	-	Second Livestock Development Project
SNNPS	-	Southern Nations, Nationalities and Peoples Regional State
SORDU	-	Southern Rangelands Development Unit
SWC	-	Soil and Water Conservation
SWCD	-	Soil and Water Conservation Department
TGE	-	Transitional Government of Ethiopia
TLDP	-	Third Livestock Development Project
UNDP	-	United Nations Development Programme
UNESCO	-	United Nations Educational and Cultural Organization
UNHCR	-	United Nations High Commission for Refugees
UNICEF	-	United Nations Children's Fund
UNSO	-	United Nations Sahelian Organization
USAID	-	United States Agency for International Development
WADU	-	Wolayta Agricultural Development Unit
WFP	-	World Food Programme
WWF	-	Worldwide Fund for Nature

EVALUATION OF MEASURES TAKEN TO COMBAT DESERTIFICATION

CHAPTER ONE: POLICY AND STRATEGIC MEASURES

1.1 Major Policy Failures Prior to 1991

In 1975, an economically "laissez faire" feudalist government was replaced by a "command economy" centralist/socialist government. During this post- 1975 government, the country's economy declined. Natural resources and the environment, including the rangelands continued to be degraded despite the massive programme of soil conservation measures on croplands, afforestation of denuded areas and the closure of hill sides for regeneration between 1976 and 1985. These government failures and their negative environmental impact can be grouped into three sets of "policy failures".

- Policy and regulatory interventions which had direct and indirect negative environmental impacts.
- The failure to implement policies and regulations which would otherwise have had direct or indirect positive impacts.
- The lack of policies or regulations, the default producing negative environmental impacts.

The most negative environmental impact came from policy and regulatory interventions that increasingly and cumulatively eroded the rights of individuals and communities to use and manage their own resources. Although peasant and, to a lesser extent, pastoral/range associations, were created in 1976 with the responsibility to control their own resources, from 1977 onwards the central government increasingly assumed control of resource use. Management policies and regulations were formulated and implemented from the centre. The policies of collectivization, villagization, resettlement, state central grain marketing and quotas, centrally planned and organized campaigns for re-afforestation and soil conservation, as well as prohibition on tree cutting and movement of charcoal are major examples. All of these collectively resulted in the usurpation of local control from communities and individual farmers and pastoralists over the use and management of their resources.

Farm lands were frequently reallocated, usually to politically correct individuals, and this led increasingly to a perception by rural people of a complete alienation from their crop, grazing lands and their produce, including any trees planted on them. As a sequel, soil conservation structures were not constructed and those that were constructed by coercion were not maintained. Indeed, with the announcement of the 'mixed economy' policy in

1990, many of the government projects, including wood lots and hillside afforestation, were quickly removed. Protected areas and National Parks in the dry lands suffered greatly as trees were cut and vast areas were set on fire. People perceived that they had no secure land and tree tenure and the State was not able to enforce its own regulations of forest protection and environmental conservation.

The coming of the Transitional Government (TGE) in 1991 allowed people more freedom of settlement and returned some government farms to pastoralists such as in the Awash Valley. The new government did not, however, reverse the land tenure and land remained under state control.

In retrospect, a major characteristic of the rural programs and campaigns, which were implemented between 1977 and 1990, is their lack of sustainability; invariably all major programs and projects collapsed. In a short interim period between the fall of the Military Government and the consolidation of power by the Transitional Government, the pentup feeling of resentment of the people was released, resulting in much forest and wildlife destruction.

1.2 The New Policy Objective and the Role of the Government

The role and economic objectives of the present government, as contained in the various macro-policy and strategy documents, are to transform the previous centrally planned and state controlled economy to a market economy through the following interventions:

(a) An increased enabling role for the government to ensure that fundamental conditions exist for markets to function by (i) rectifying previous policy failures which resulted in a lack of sustainable management of resources and caused environmental damage and economic stagnation and declines; (ii) exercising prudent macro-economic management and ensuring that other macro-policies do not have negative environment impacts; (iii) making available market information, where this is lacking, such as internal and external (export) market for livestock, and (iv) reforming and/or establishing legal framework and democratic institutional structures which provide clearly defined and secure natural resource access and tenure rights and a framework for constructive partnership, dialogue and negotiation between the government on one hand and resource users and developers on the other.

Besides the new enabling role of the government, the policy regarding the development of agriculture and rangelands confirms a re-orientation of government support away from state farms to peasant agriculture and a pastoral system of production through construction of rural infrastructure (roads, water), expanded distribution of inputs and provision of extension services to all parts of the country

including previously neglected areas such as the dry lands (rangelands).

(b) A reduced interventionist role in direct economic and production activities in all except key strategic resources (i.e. large hydro- electric generation, large- scale mining, etc.) and confining other interventions to (i) investments in the provision of "public goods" such as infrastructure, education, research and extension, etc., and (ii) enhancement of the enabling environment through the use of public policy instruments such as tax incentives and charging full user costs for previously "unpriced" resources (e.g. water, forests, wildlife).

(c) A regulatory role through the adoption of a relatively minimal and cost-effective monitoring, regulatory, and where all else fails, coercive role in order to minimize the perpetration of environmental damage and thus act as the country's "environmental guardian". Thus, whilst the primary economic role of the government is to provide an enabling environment for the market economy, a rationale for government intervention could exist when markets fail in the allocation, efficient and sustainable use of natural resources and in the care for the environment. For instance, tree clearing, felling and burning of large lowland plains for rain-fed commercial farming occurred in the NE and NW dry land areas in the past (without regard to the pastoral production system) and this resulted in ethnic conflicts requiring government intervention to resolve the conflict.

The policy area of Natural Resources Management and Environment Protection has also received additional review resulting in the formulation of a framework environmental policy and the establishment of the Environment Protection Authority. In the early 90's, forestry policies were reviewed as part of the preparation of the Ethiopian Forestry Action Plan which included the arid, semi-arid and dry sub-humid areas. Similarly, the area of conservation of bio-diversity received emphasis and as a result the Ethiopian Plant Genetic Resources Centre was upgraded and renamed the Bio-diversity Institute.

Although to date there is no policy specifically intended to combat desertification, there are policy provisions contained in the CSE and some of the other macro- and sectoral policies which are, directly or indirectly, useful to combat land degradation in general.

In the following review and analysis of policies and strategies which are deemed relevant to combating desertification and mitigating the effects of drought, an attempt will be made to ascertain the extent to which existing policies and strategies incorporate policy and strategic statements appropriate for combating desertification and mitigating the effects of drought as well as to indicate the weakness and/or gaps in such policies and strategies, particularly in relation to the major issues that the Convention requires to be included in a NAP.

1.3 General Macro-policy Environment

The general macro-policy environment in Ethiopia is reflected in some of the major legal documents and other documents reflecting economic policy issued by the government both during and after the transitional period. These legal documents include provisions regarding decentralization and the devolution of power to lower organs of government and community structures. They emphasize the principles of regionalization, participation with a concomitant reduction of the role of the state in economic development.

With respect to decentralization and devolution, the most important measures are the steps taken to restructure Ethiopia from a unitary highly centralized state into a federal one. The regions which form the Federal Republic of Ethiopia have extensive powers with exclusive powers in all matters except on matters concerning defense, foreign affairs, economic policy, the conferring of citizenship, the declaration of a state of emergency, the deployment of the armed forces where situations beyond the capacity of the regions arise, the printing of currency, the establishment and administration of major development undertakings, building and administering major communications networks and the like. Thus, the regional states have now the power to raise their own revenues and plan and execute their own development activities following the policies of the federal government. The decentralization and devolution do not stop at the regional level. The woreda level is the lowest decentralized and devolved level of formal state structure within the regions. Below that are peasant associations, kebeles, tabias and villages with local councils which have mandates to develop and enforce, among others, by-laws governing the management of natural resources.

The economic aspects of these policies stress the liberalization of the economy to become market-oriented. The previous centralized economic planning and decision-making, which gave total authority on the economy to the state, has been abolished. Forced collectivization of rural peasant Ethiopia and price controls over agricultural produce are no more in existence. Although land remains still under government control, the importance of creating a sense of tenure security in the land users is recognized and, as a result, land redistribution is discouraged unless absolutely necessary for equity purposes and the peasant now has every security in land, short of disposing it by sale. Government has taken steps to stabilize the local currency through devaluation measures and the deregulation of the foreign exchange market. The effort of the government to reduce government spending and to control the supply of money has paid off by bringing down inflation to under 5 percent. While efforts to broaden the tax base have been made, reforms to reduce tax rates have also not been neglected. Export taxes have become totally eliminated except on coffee. Price controls and restrictions on trade and the labour market have practically disappeared.

1.4 National Economic Development Policy

The national economic policy is known as the Agricultural Development-led Industrialization (ADLI). The policy aims at transforming the national economic planning from that of command economy to a market-oriented one. To facilitate the transition to a market-oriented economy, an enabling environment which will encourage participation through the devolution of power to the regional states and reinstating their rights to manage their resources on their own will be created. The policy is designed to enhance the productivity of the peasant agricultural sector by improving the crop husbandry and farm technologies by developing irrigation and the provision of inputs such as fertilizers, other agrochemicals, as well as increasing farm sizes and making them suitable for mechanization. More and more rural people are absorbed by a growing industrial sector. Increased industrialization is expected to come about through the use of labour intensive systems and local raw materials in the production of goods and services required particularly by the large rural population. Support for the peasant agriculture is the centre-piece of this policy. This sector will be assisted through the rendering of advice on improved cultural practices, the promotion of small-scale irrigation schemes and the provision of fertilizers and pesticides. Reorientation of the extension message, the delivery of information, the communications channels and development of training modules, which encourage peasant development agents and extension agents at the grassroots level, is also an important aspect of the policy provisions focusing on increasing productivity in the agricultural sector. Generally, through the implementation of this rural-centred economic policy, the country is expected to enjoy continuous and unhampered development which will bring about growth based on equity and social justice and promote self-reliance by getting rid of structural dependencies of the economy on external inputs.

1.5 The Conservation Strategy of Ethiopia and the Regional Conservation Strategies

At the Federal level, there is, already in place, an approved Environmental Policy. This policy, which was approved in April 1997, is the result of the still continuing process of the Conservation Strategy of Ethiopia. While this document consists of overall as well as of sectoral and cross-sectoral umbrella policy guidelines for the management of Ethiopia's natural, human-made and cultural resources, the detailed strategies and action plans as well as the institutional arrangements required for the implementation are to be found in what are known as the CSE documents, particularly Volumes II, III, and IV. Most of the states of the federation have also elaborated regional specific conservation strategies while the remaining are expected to do so soon. The principles, guidelines and strategies set out in these documents are expected to provide Ethiopia with an adequate umbrella strategic framework for the effective management of the environment, following which all sector and cross-sector specific

policies need to be reviewed or newly developed.

The CSE deals with eleven sectoral and eleven cross-sectoral issues. The sectoral issues are:

Improved soil, Crop and Animal Husbandry for Sustainable Agricultural Development;

Rangelands Management and Pastoral Development;

Forest, Woodland and Tree Resource Management;

Genetic, Species and Ecosystems Biodiversity Conservation and Management;

Water Resources Development for Irrigation, Hydroelectricity and Water Supplies;

Energy Resources Development and Management;

Mineral Resources Development and the Management of Mining Operations;

Human Settlements, Urban Environment and Environmental Health Control and Management of Pollution from Industrial Waste and of Hazardous Materials;

Control of Atmospheric Pollution and Climatic Change, and

Conservation of Cultural and Natural Heritage.

Cross-Sectoral Issues

The cross-sectoral issues are:

Population Growth and Distribution and its Impact on Natural Resources;

People's Participation in the Sustainable Development and Management of Natural, Human-made and Cultural Resources and the Environment;

Rural Land and Natural Resource Tenure and Access Rights;

A National Land Resource Use Policy and Strategic Physical Land Use Planning;

Integration of Social, Cultural and Gender Issues in Sustainable Resource and

Environmental Management;

Environmental Economics, Macro-economic Policy and Economic Development;

Environmental Information Systems;

Environmental Research for Sustainable Development;

Science and Technology for Sustainable Development;

Environmental Impact Assessment of Policies, Programmes and Projects, and

Environmental Education and Awareness and Human Resource development.

Although the CSE does not deal with the desertification phenomena per se, it is obvious from its contents that it gives attention to a number of sectoral and cross-sectoral issues that have direct bearing for combating desertification and mitigating the effects of drought. Six of the sectoral and all of the cross-sectoral issues are relevant, some of them more so than others, to desertification and drought. Thus, in terms of policy coverage at the umbrella CSE level, there is not much to worry about. What is lacking is only a clear picture of the extent of the arid, semi-arid and dry sub-humid areas in the country and the extent of actually desertified and semi-desertified portions. Had this been done, it would have indicated an appreciation of the problem and strengthened the holistic perception that is required.

The priorities, as contained in the CSE documents, are based on consideration of Ethiopia's dependence on its natural resources and environment for socio-economic development. The sectoral umbrella policy guidelines and strategies lay a good ground for the development of more detailed strategies and policies in the respective sectors. The following is a brief summary of the relevant sectoral and cross-sectoral CSE policies and strategies.

Sectoral Umbrella Strategies in the CSE

Land, both agricultural and pastoral, and biomass resources, including forests and biological diversity are dealt with adequacy. Proper land management and soil husbandry is one important area of focus in any effort to combat desertification. The CSE contains a number of policies and strategies for soil husbandry, rangelands management and pastoral development. These policies and strategies emphasize measures designed to prevent soil erosion and loss of fertility, including the promotion of physical and biological soil conservation measures appropriate to specific locations, use of both organic and chemical fertilizers, agro-forestry and soil and water conservation measures.

What is more important is that the need to foster a feeling of assured, uninterrupted and

continuing access to the same land and other natural resources for farmers is stated. Obviously, such a feeling of security needs to exist if farmers, pastoralists and other resource users in the arid, semi-arid and dry sub-humid areas are to retain their willingness to invest in the land in order to keep it in a productive condition.

The policies and strategies for forest, woodland and tree resources management are designed to ensure the integration of forestry with the management of land, water and energy resources as well as the management of ecosystems, genetic resources and crop and livestock production. Forestry development is largely left to individuals and communities except in cases where these groups are unable to do so. The efforts of individuals and communities are to be encouraged through research and extension, the provision of infrastructure and appropriate pricing policies and, what is more important, increased sense of security to land and tree resources as well as benefit sharing. Capacity building in terms of training within the formal and informal systems as well as institutional building is also emphasized.

In the area of genetic, species and ecosystem biodiversity conservation and management, policies and strategies which are designed to preserve, develop, manage and sustainably use the diversity of gene pools of species of wild and domesticated flora and fauna and their natural and human managed ecosystems for social and economic development as well as to maintain the integrity of the biosphere are in place. Conservation of biodiversity is to be carried out through measures of conservation using systems of management appropriate for both protected and non-protected areas as well as undertaking an integrated system of *in-situ* and *ex-situ* systems of conservation. The need to ensure that a major part of the economic benefits resulting from park, forest and wildlife conservation and management programmes which conserve biological diversity to be channelled to local communities affected by such programmes is stressed.

Water resources management, which is very important in combating desertification and mitigating the effects of drought, is also given the attention it deserves both as part of soil husbandry and separately as a sector by itself.

The issue of energy is also dealt with in a manner designed to ensure the sustainable production and utilization of fuelwood as well as to promote, for the longer term, the use of alternative sources of energy such as solar, wind and biogas. Obviously, the sustainable production and use of fuelwood along with measures to diversify into other forms of renewable energy sources will help to decrease the pressure on natural forests and other biomass resources, as well as, make available animal dung and crop residue for soil fertilization and, thus abate desertification.

Cross-sectoral Umbrella Strategies in the CSE

The policies and strategies for managing population growth and migration aim at maintaining and, where possible, improving the human carrying capacity of the

environment by managing population growth (and migration) in such a way as to match people and resources. This will be done in a manner which is environmentally sound, economically sustainable, economically and biologically productive as well as socially and culturally acceptable. In addition to ensuring increased access to family planning programmes to lower population growth to a level compatible with economic growth and the availability of social services, measures for tackling the issue of poverty, health, education and empowerment are considered important. It is recognized that more effective results can be gained by integrating population programmes with strategies for sustainable development of natural resources for increased agricultural production (i.e. relevant sectoral policies). The issue of migration and resettlement is also dealt with. It is recognized that settlement can be an important means of reducing population pressure and relieving shortage of land in highly populated areas. Thus, voluntary migration and settlement, where it does not create conflicts with local population, is envisaged.

Rural land and natural resources tenure and access rights are important factors which determine the success of efforts for the sustainable management of environmental resources. The need for a secure and uninterrupted access to land and the renewable natural resources on it, including protection of customary rights of access to land and other natural resources, as long as they are constitutionally acceptable and socially equitable, are recognized. Equally, socially equitable traditional community institutions for resource management will be legally empowered to regulate the use and management of natural resources as long as they are preferred by the communities and do not come into conflict with the constitution. The urgent need to undertake studies, consultations and discussions into existing and potential mechanisms for providing security of access to and tenure of natural resources is emphasized.

In addition, achievement of coordinated, integrated and participatory local land use plans and land use decisions to achieve ecologically, socially and economically sustainable state and private sector land utilization are an important element in the CSE. These consist of Federal, Regional and Community strategic land use plans which can be translated into detailed land use and management plans at the level of communities or individuals.

The CSE also contains umbrella policies and strategies regarding the integration of social and cultural gender issues in sustainable environment management, environmental information systems, research, science and technology and environmental education and awareness and human development. These are cross-sectoral issues which have over-reaching application to all sectors of environmental management and, therefore, are equally important elements of measures to combat desertification and mitigate the effects of drought.

Finally, the CSE has umbrella policies and strategies which promote the integration of environmental costs and benefits into economic planning and accounting at all levels of government so that the actual costs or benefits of development and of using and

misusing the environment and natural resources are fully reflected in economic assessment as well as by taking measures to correct market failures and avoid policy failures.

1.6 Sectoral and Cross-sectoral Specific Policies

As far as sectoral and cross-sectoral specific policies are concerned, several of them have come into existence in the last few years. Again none of these sector and cross-sector specific policies discuss desertification. The disaster prevention and management policy, the energy policy, the agriculture policy, the population policy, the social policy, women's policy, the biodiversity policy, education and training policy, science and technology policy are policies which are officially approved and operational. On the other hand, there are a number of policy areas which have very important implications in any effort to combat desertification and mitigate the effect of drought, still in the draft stage. Major among these are the rural land use and administration policy, forestry policy, wildlife policy, as well as soil and water conservation policy.

1.6.1 The disaster prevention and management policy

The policy defines disaster as "an event in which society or a community undergoes acute deprivation of food and other basic necessities due to natural and man-made calamities to such an extent that the normal functioning of the society or the community is disrupted and that it cannot subsist without outside intervention". Relief includes measures which reduce vulnerability to disaster through programmes which generate employment, environmental rehabilitation and other drought-proofing activities. Prevention pertains to measures designed to eliminate the root causes that makes people vulnerable to disaster.

Some of the relevant objectives of this policy are to ensure that relief efforts reinforce the capabilities of the affected areas and populations, promote self-reliance and contribute to sustainable economic growth and development. Relief programmes should be geared to eliminating the root causes of vulnerability to disaster, and the best use of natural resources endowment of the affected areas is to be promoted. Further, it is the objective of the policy to ensure that all spheres of development give due emphasis to disaster prevention programmes.

The major policy direction in this areas is to ensure that communities play a leading role in planning, programming, implementing and evaluating relief programmes and related measures.

Although the title of this policy may lead one, at first glance, to consider it as a policy which does not go any further than the prevention, and when it occurs, the management of disaster, it is clear from the objectives that it goes further into the

promotion of sustainable development based on the best use of the natural resources in affected areas. When considered from the point of view of combating desertification and mitigating the effects of drought, this policy is one of the most relevant, particularly in relation to those desertification issues which are of cross-sectoral nature (e.g. poverty alleviation and eradication, alternative livelihoods).

1.6.2 The energy policy

The energy policy gives priority to the planning and expansion of the energy supply required for economic development, particularly the implementation of the ADLI, while at the same time, taking measures to transform energy consumption in the country from traditional to modern sources. This will be carried out in an integrated manner through proper coordination with development planning and implementation and the strengthening of the linkages of the energy sector with other sectors of the economy. The policy also emphasizes the need to take energy utilization, efficiency increasing measures as well as the promotion, whenever feasible, of indigenous energy sources which are cost-effective and reliable.

The goals and objectives of this policy are to be attained through strategies which give priority to the development of hydro-power for modern energy development while afforestation will be expanded to meet traditional energy requirements. As energy use shifts to modern sources, the present heavy dependence of traditional sources of energy will be phased out. On the other hand, energy conservation and energy efficiency will be enhanced through the application of energy saving technologies at the supply and end-use levels.

The policy emphasized the coordination of rural energy development with the development of agriculture, environmental management and overall rural transformation. The policy also intends to reduce the impact of using crop residue and dung to meet household energy requirements on agricultural productivity. In localities where the resource endowments allow, such alternative sources of energy as geothermal, coal, solar and wind, will be encouraged. In addition, the policy promotes the exploration of oil and gas to eliminate the need to import this items and promote self-sufficiency in energy.

1.6.3 The population policy

Some of the specific objectives of this policy which are relevant to combating desertification are:

- ensuring a spatially balanced population distribution pattern with a view of maintaining environmental security;

- improving productivity of agriculture and introducing off-farm non-agricultural activities, and
- information and education programmes addressing issues pertaining to small family size and its relationship with human welfare and environmental security.

The population policy contains detailed policy and strategy provisions which will enable the attainment of the objectives set out above. The fact that it does not focus only on population growth reduction activities but rather integrates issues of agricultural productivity, off-farm alternative livelihoods and the need to bring about a rational distribution of population commensurate with the carrying capacity, makes the population policy quite relevant for combating desertification and mitigating the effects of drought.

1.6.4 Women's policy

The National Policy on Women contains basic principles regarding the scale and scope of women's rights to equality with their male counterparts in every area. The policy sanctions involvement of women in the development process at all levels. Such participation of women in the implementation of actions to combat desertification and mitigate the effects of drought will make women actively interested stakeholders. This policy is particularly important to ensure that women in the arid, semi-arid and dry sub-humid areas are empowered through equal entitlements to land and other natural resources as well as receiving other benefits such as credit.

1.6.5 Social policy

This policy identifies, as one of the major problems, poverty as manifested in starvation, lack of clothing, disease, illiteracy and unemployment.

Among the root causes for the extreme poverty in the country that the policy identifies are wars and frequent drought and other natural or man-made disasters, displacement and migration, inequitable distribution of wealth, lack of participation in economic and social development programmes, inadequate capacity. The strategies devised to solve these problems include expansion of social services in the areas of health, education, creation of employment opportunities and establishing and strengthening a social security scheme. The strategies also give due emphasis to the well-being of the poor, women, children, the elderly and the infirm.

1.6.6 Rural land use and administration policy

There is no rural land use and administration policy in effect in Ethiopia right now . There is, however, an unofficial draft policy. This is encouraging because when the policy is approved, it will fill a major gap in an area which is of utmost importance for combating desertification and mitigating the effects of drought.

In accordance with the unofficial draft the objectives of such a policy will include:

- the sustainable utilization of land which accords with its productive capacity;
- the elimination of the negative impacts of land redistribution;
- ensuring that there shall be no insecurity and inequity in land tenure;
- minimization of the negative impacts of farming on non-agricultural lands;
- ensuring appropriate land utilization and administration.

The policy provisions designed to facilitate the attainment of the objectives set out above include the taking of measures that will enhance and facilitate the effectiveness of soil and water conservation activities to be carried out by the population, particularly the peasant farmers. These provisions include:

- the right to transfer land, it lease out and give as inheritance;
- the provision of official documents as evidence of tenure to a specific land in order to give land users a feeling of security;
- encouraging contiguity of farm lands for reasonable uninterrupted soil conservation measures;
- fixing the minimum and maximum sizes of land allowed for peasant farmers;
- promotion of land use plans so that land will be used according to such plans;
- provision of incentives which will promote land conservation.

This document contains a number of useful policy guidelines and strategies which are obviously of importance in combating desertification and mitigating the effects of drought.

1.6.7 Education and training policy

The specific objective of this policy which is of relevance to the creation of awareness regarding environmental issues, including the issue of desertification and drought relates to the provision of education that can produce citizens who possess national and international outlook on the environment and protect the natural resource of the country.

1.6.8 Science and technology policy

This policy gives priority to research and to the introduction of technology for agriculture, natural resources development and environmental protection, water resources and energy. It sets out to apply science and technology for awareness and control of environmental conditions and the conservation and rational utilization of the natural resources of the country.

It aims at building capacity and devising methodologies to identify the scientific content of traditional technologies; improve those that are useful for wider dissemination and diffusion.

1.6.9 Forestry policy

The forestry policy is also at a draft stage. The draft sets out the following specific objectives:

- satisfying the demand for forest products;
- protecting and conserving natural systems (including genetic resources in general and wildlife resources in particular);
- reducing foreign exchange expenditures on imported forest products, and
- reducing soil erosion and protecting soil fertility thereby increasing agricultural production.

The policy provisions contained in this draft are designed, among others, to encourage the development of forests by individuals, organizations and government and the designation of protected forests and productive forests to be administered in accordance with laws to be enacted for each. The draft stresses the need to give security of ownership of forest products to the developer and the importance of protecting every kind of forest from natural and man-made destruction.

Further, the draft policy emphasizes the importance of managing and utilizing the country's forests scientifically and sustainably in accordance with management plans as well as the expansion of training in forestry. Forestry research is to be

expanded focusing on growing native tree species and their utilization as well as identifying useful exotic species and growing seedlings of such trees for wide dissemination. Community forestry development and protection shall be carried out through participation.

1.6.10 National policy on biodiversity conservation research and development

This document, which has been approved recently, is very brief. It contains policy directives with regard to the need to explore, collect, characterize, evaluate, conserve and utilize biodiversity. The need to regulate access to genetic resources through various measures, including legislation and building appropriate institutional structures and mechanisms is also mentioned. Strengthening capacity for information collection and documentation, encouraging networking and generally integration of biodiversity conservation, research and development elements in education and general awareness programmes are considered important. The policy directives emphasize the importance of community participation in the conservation and sustainable utilization of biodiversity resources together with the need to provide for access and benefit sharing for communities to and from biodiversity resources. Capacity building and provision of adequate funds is also provided for.

1.6.11 Soil and water conservation policy

The objectives in this draft soil and water conservation policy are highly relevant for the effort to combat desertification. They include: ensuring that land users are aware of their obligations and rights and that they pass over properly conserved land to future generations; finding legal solutions to activities which induce and exacerbate soil erosion; ensuring that a feeling of ownership is created in society so that voluntary initiatives will be undertaken to protect and conserve natural resources; providing, stage by stage, a solution to soil erosion emanating from excessive livestock populations and their movement; and creating methods and technologies suitable to various agro-ecological conditions and the state of productivity.

These objectives are expected to be attained through policies and strategies to enhance security of tenure to land as well as by measures which will put the land users under obligations to protect the land and soil by abstaining from engaging themselves in activities which induce or exacerbate soil erosion such as, for example, agricultural activities on land which has a slope of more than 55 percent; isolating from human and animal contact land which has lost its productivity by communities around it. Soil and water conservation is to be promoted through the expansion of scientific livestock production which eliminates uncontrolled expansion of livestock population and movement; emphasizing research in soil and water conservation and the creation and

introduction of appropriate technology; identification of inputs required for soil and water conservation suitable for the various agro-ecological zones and undertaking of awareness creation programmes.

1.6.12 Water resources policy

The Ministry of Water Resources Development is currently in the process of drafting a water resources policy and strategy. It is hoped that this policy will give emphasis to measures which facilitate the development of water resources to meet the domestic and agricultural needs of the farmers and pastoralists as well as their needs for water in other off-farm activities and the development of agro-industries. Such measures must be complemented with measures designed to raise the technical know-how of peasants and farmers to construct as well as maintain water supply schemes.

1.6.13 National agricultural research policy and strategy

This policy and strategy document has a number of objectives, including the development and selection of agricultural technologies which bring about increased productivity which will in turn bring about self sufficiency in food. Agricultural research shall direct itself to solving the major issues and problems in agriculture, focusing on environmental protection and development and designed to get sustainable agricultural productivity in terms of quantity, quality and variety in the peasant agricultural sector. Research to develop appropriate technology by building upon traditional technologies shall be encouraged based on the proper understanding of the farming systems and experiences.

1.6.14 Wildlife policy

The overall goal of this draft policy is stated as the preservation, development, management and sustainable utilization of Ethiopia's wildlife resources for social and economic development and for the integrity of the biosphere. The attainment of this overall goal is expected to be realized through eight basic policies with strategies deemed appropriate stated under each policy item. The eight areas cover legislation, organization, conservation, administration and management of protected area, conservation outside the protected areas, distribution or sharing of revenue and utilization of wildlife and tourism. The policy gives authority to the regions to manage all protected areas except areas bordering neighbouring countries sharing animal populations, areas which fall between two or more regions or which contain endemic species with restricted distribution or which harbour endangered species or which are or may become world heritage sites. Such areas are to become the responsibility of EWCO. The policy encourages the

joint management arrangements with local authorities as well as the sharing of the larger part of collected revenues with them so that populations around a protected area will benefit from its existence. The policy also intends to encourage touristic activities around protected areas. Such activities can include involving populations in these areas in the production and sale of handicrafts and other products which can be of interest to tourists and which can generate off-farm or alternative livelihoods, thus decreasing the need to encroach on protected areas.

1.6.15 The industry sector strategy

This strategy has a number of objectives which are related to combating desertification and mitigating the effects of drought. An important objective is to have a regionally balanced industrial development. This is an important objective and can have a considerable impact in alleviating poverty and reducing pressure on natural resources in the arid, semi-arid and dry sub-humid areas provided that a deliberate strategy to promote, through various incentives, including building infrastructure such as roads, electric power, etc. is in place. The fact that this kind of infrastructure is severely limited in these areas is a serious drawback to industrialization in remote areas. Another important objective is the development of domestic technological capability for the production of intermediate inputs, spare parts and capital goods. The industry sector strategy recognizes that industrial establishments in Ethiopia have not been able to use the strong potential backward linkage, instead depending on imports of such inputs. The development of this linkage with the potential inputs in the arid, semi-arid and dry sub-humid areas can provide opportunities for, among others, off-farm employment in these areas. This objective can also be linked to another important objective which is the promotion of labour intensive technology and local resources use.

1.6.16 The mining sector policy

The one major hindrance to mineral development had been the restrictive policies imposed on the activities of the private sector. The policy thus provides for the state to create enabling legislative and administrative conditions that will encourage private capital investment. The major strategies for the development of mineral resources and encouraging mining activities are:

- increasing awareness regarding opportunities in mining through public education;
- promoting sustainable mineral development by ensuring internal integration within mining and external linkages with other economic

sectors;

- gaining the cooperation of traditional gold miners by enabling improved production of income;
- categorizing other micro-scale operations by rural communities in the mining of low-value minerals (e.g. salt and pottery clays) as 'Artisanal Mining' operations and support and encourage these and other related activities, and
- encouraging jewelry making and other handicrafts that use mineral raw materials.

CHAPTER TWO: LEGISLATIVE MEASURES

The present constitution of Ethiopia is environmentally sensitive and contains provisions which recognize the importance of the environment and the need for its proper management. These provisions can serve well as points of departure for developing legislation, not only for natural resources management but also to influence the contents of other macro-legislation in the political, social and economic fields in such a way as to make them environmental friendly. Based on the earlier Transitional Charter of Ethiopia and the present constitution, such issues as democratic governance, devolution of power to lower levels, particularly grassroots, participation and the sharing of revenues among the different levels of government have been adequately tackled in macro- legislation. As a result, there is now a favourable atmosphere for empowering grassroots communities and for assisting them to take initiatives in the areas of environmental management, including combating desertification. However, there is no specific legislation in the area of combating desertification, nor is there any specific mention of desertification in any of the natural resources management legislation in existence.

Unlike the policy area, there is no umbrella or framework legislation in effect at present, although one is in the process of being drafted. However, there are in effect at present recently updated legislations in the areas of forestry, water resources utilization and mining. Legislation in the wildlife area has been presented to the Council of Ministers, with a draft wildlife conservation management and utilization proclamation and regulations to go along with it.

Proclamation No. 94/94 is a law issued to provide for the conservation, development and utilization of forest resources. A number of proclamations have been enacted in the past 50 years or so, which have provided for the better management of Ethiopia's forests. Proclamation No. 94/1994 is special as it addresses the central problems of forest development and gives provision for the ownership and utilization of private forests. Three types of forest ownerships are identified under this proclamation, and these are State Forests, Forest of Regional States and Private Forests.

A very important new legislation is the new Federal Rural Land Administration Proclamation. This Proclamation contains the basic principles and guidelines which the Regional States should follow when enacting regional laws for the administration of land. It also provides that farmers and pastoralists, both men and women, should have the right to get land sufficient for their subsistence freely and that they should not be evicted or displaced from such lands for any reason other than for total or partial redistribution of holdings which are effected by the decision of the Regional State Councils. In case of loss of tenure, due to full or partial redistribution of land, the new owner pays to the old owner for improvements made on the land through labour and/or capital. Whenever possible, a person who has made improvements to the land he/she holds through his/her labour or capital should be allowed to retain portions of such land. Women's equal rights with respect of the use, control, management, transfer and the bequeathing of their tenure should be confirmed. Women, orphans who have not attained majority and the physically infirm should be allowed to use hired labour or other arrangements on their land. The

proclamation emphasizes also the participatory implementation of such activities as redistribution of land to individuals following such criteria as family responsibility and marital status. The participation process should be transparent, fair and particularly give due regard to the adequate representation of women. Designation of land for residences, grazing, forest development, social services and other communal uses is also to be carried out with the participation of the communities concerned. Finally, there should be a procedure to hear grievances on matters pertaining to tenure and redistribution.

CHAPTER THREE: PROGRAMMES

3.1 Soil and Water Conservation Programme

During the last two decades Prior to the devolution of power and the setting in of the decentralization process, soil and water conservation activity programmes were developed and prepared at the central level. The socialist system during the Derg Era, operating on the basis of command economy, had been following a rigid "top-down" approach.

In 1980 and 1981, the government established the Soil and Water Conservation Department (SWCD) and the Forest and Water Conservation Department (FAWCD), respectively, in the Ministry of Agriculture, to carry out soil and water protection activities in the country. At the same time, the government's 10-year development plan gave priority to soil and water conservation activities. The plan provided for the implementation of catchment rehabilitation activities in the badly eroded areas of Wollo, Tigray and North Shoa regions which had been affected by frequent droughts and famines. The most important and extensive soil erosion, runoff and conservation research in Ethiopia was undertaken by the Soil Conservation Research Project (SCRIP).

Besides the regular rehabilitation programme of the degraded lands, soil conservation research was recognized as an important programme in its own right. The need for applied research to provide continuing and comprehensive support for soil and water conservation programmes of the country was apparent. The problem was addressed through the refinement of already existing conservation techniques.

Presently, soil and water conservation research in Ethiopia is being undertaken by:

- . the Institute of Agricultural Research,
- . the University of Alemaya,
- . the University College of Mekele, and
- . the Soil Conservation Research Project (SCRIP).

IAR in 1984/85 established runoff plots and carried out a preliminary wind erosion study at its research station in Nazareth; however, this study was not continued. Environmental research by IAR was limited to alkalinity and salinity problems in irrigated lands.

Limited soil erosion and soil and water conservation research works were also carried out at the Alemaya University of Agriculture; the research focused on the effects of bunding on various crop yields in Hararghe region. The University had tried to expand SWC research to other regions (Wello and Shoa), with the following objectives.

- . to quantify productivity increases in agriculture, forest and grasslands, resulting from the conservation programme;
- . to study cost effective techniques of conservation for increased agricultural production, and
- . to train graduate students of the Alemaya University of Agriculture in conservation impact analysis.

This programme was designed with FAO project assistance and could not be sustained.

The most important and extensive soil erosion, runoff and conservation research in Ethiopia was undertaken by the Soil Conservation Research Project. The implementation of soil and water conservation technologies in the dry land areas is a great challenge in terms of human as well as financial resources. Transfer of technologies is not at all an easy task, since it is faced with many constraints including cultural constraints.

All too often in the past, conservation projects failed because the problems targeted were not those perceived by the intended beneficiaries as being immediate priorities. This approach did not take socio-economic realities into account. Development staff at field level never consulted farmers or beneficiaries on issues relevant to their needs and choices during the planning and/or implementation phases.

However, the efforts of the last 20 years or so to combat the problem of land degradation and desertification by government and non-government organizations cannot be dismissed. It has been estimated that between 1971 and 1993 physical conservation measures (soil and stone bund) were put in place on some 700,000 ha of cultivated land, almost 289, 504 ha of land was covered by hillside terraces, 955.98 million tree seedlings were planted and 1,105, 939 ha were closed off for the recovery of the natural vegetation.

3.2 Forestry

The Priority Forest Areas Programme

A major programme in the forestry area was the Priority Forest Areas Programme. Priority forest areas are those forest areas which are, in one way or another, important areas from a forest development and conservation point of view. The status of priority forest areas did vary; some areas were covered with natural forest; others were degraded lands and/or inhabited by people. The main objective was to facilitate the rehabilitation of areas so that previous conditions would be recovered.

The Priority Forest Areas Programme evolved mainly for the following reasons:

- to be able to regulate utilization of scarce resources to bring about visible and tangible results with a coordinated effort to develop selected priority forest areas by mobilizing resources;
- to facilitate preparation of forest management plans for priority forest areas and implement the plans in a reasonably short period, and
- to ensure the protection and development of such forest areas and restore their previous forest conditions and utilize them, in a sustainable manner, where possible.

There were more than 20 so-called forest projects before this programme evolved. It was these projects which were collectively renamed as 'Priority Forest Areas'. In 1985-86, an overall assessment was made and about 58 priority forest areas were identified in the country.

The concept of 'Priority Forest Areas' was more effective in forest management than the previous fragmented project concept.

The Ethiopian Forestry Action Programme (EFAP)

The preparation of EFAP was initiated by the previous Government of Ethiopia and was coordinated by a National EFAP Secretariat. The UNDP, EC, GTZ, FAO, and SIDA all provided financial support for the study. The process produced an impressive documentation as an output covering a wide range of subjects.

The objective of EFAP was to promote sustainable management and conservation of existing forest resources and to expand the forest base by providing incentives for people to plant trees. The overall study assessed a wide array of forest problems, identified gaps and gave recommendations which were finally formulated into packages of actions. Some of the projects proposed in the EFAP study are now being implemented (e.g. Sustainable Participatory Woodland Management Project supported by GTZ).

3.3 Livestock Resources Development Programme

In the period before the advent of the 1974 revolution, the country had had a feudal system of government. Few landlords controlled the agricultural lands in the highlands, but the rangelands were largely controlled by pastoral clans until the 60's.

Irrigated and rain-fed agriculture (crop farming) was initiated in the arid and semi-arid areas, especially in the Awash Valley and the western lowlands of Setit and Humera

areas. Cotton farming, and to a lesser extent, the expansion of sugar and horticultural developments in the Awash Valley (both upper and lower Awash) were significant, resulting in land use conflicts between the agriculture system and the pastoral system based on free grazing. The expansion of sedentary farming in the Ogaden and the northeast rangelands, especially in the semi-arid and sub-humid escarpments and villages, was also significant.

The absence of land use planning often resulted in uncoordinated land development, with conflicts among various government agencies. Living examples are the extraction of soda from Lake Abijata (protected area) and the development of state coffee farm in Bebeke (priority state forest area). The absence of land use planning became the root cause of conflict between the government and peasants and/or pastoral people who traditionally depended on the land prior to 'developmental interventions'.

The expansion of both commercial and traditional agriculture into the traditional pastoral regions was largely opportunistic and was made in response to improved global and, to some extent and in the case of cotton growing, domestic market demands. The global market for oil and pulse crops in the 60s and early 70s was indeed good. In 1966/67, Ethiopia was able, for instance, to export more than it imported (largely due to agricultural exports). It is true that the agricultural expansion was supported by the national 5-year development plans, which all gave emphasis to agriculture. These 5-year plans, however, were not based on popular, broad participation and were not, for the most part, public knowledge, nor were they strictly followed even by the government. Nonetheless, they served as guidelines and facilitated external aid and negotiation of loans from IBRD and donor countries.

In the middle and early 70 s, political pressure for land reform was intensified, spear-headed by students. Government response to these calls was inadequate and this contributed to the fall of the feudalistic government and was replaced by the 'Derg' in 1974 with totally new policies as regards rural land, settlement and means of production. Natural resources and the environment suffered greatly as a result, especially in the rangelands.

The period up to 1991 was characterized by a socialist order and a command economy based on socialism. It nationalized all rural lands and imposed a collective system of land use. However, the rangelands and the pastoral system of production and resource use were less affected. But

villagization was vigorously pushed and this led to the establishment of settlements even in the traditional range areas. The commercial farms that had existed before 1975 were nationalized and became state farms. These farms were poorly managed and as a result were not profitable. More land was annually cleared for state farm expansion, continuously reducing grazing lands and this impacted negatively on pastoralists.

While the full impact of nationalization of rural land was less felt by the pastoralist, the new land policy did not halt the expansion of crop farming into the traditional rangelands. Pastoralists demanded a favourable policy that might have abated this encroachment, but the government did not respond favourably.

This period saw the continued decline and weakening of the regional rangelands programs as government resources went to other "priority" areas: the civil war, villagization and other socialist modes of development, such as the massive tree planting and soil conservation structures in the agricultural areas. The rangelands were largely ignored by the government during this period as pastoral associations were not formed effectively.

The International Livestock Centre for Africa (ILCA), now International Livestock Research Institute (ILRI), joined efforts with the World Bank and the Livestock and Meat Board (LMB) to improve rangelands resources and much information was generated by these collaborative efforts. Non-government organizations such as CARE/Ethiopia became active in the dry lands and pastoral areas, largely in response to the effects of recurrent drought and desertification.

The Relief and Rehabilitation Commission (RRC) was also active in severely affected areas of the north-east and served as an umbrella organization for the major NGOs such as CARE, World Vision International, Action Aid, OXFAM, Agri-Service, Christian Relief and Development Association (CRDA), among others. RRC has now been replaced by a new commission, the Drought Prevention and Preparedness Commission (DPPC).

The Institute of Agricultural Research (IAR) assumed national leadership on research on rangelands and natural resources management in the dry lands during this period. At present, it organizes annual national workshops on livestock improvement and natural resources conservation to facilitate exchange of experiences among ministries, universities and colleges, NGO's and the private sector. IAR has now additional mandates and has been renamed as the Ethiopian Agricultural Research Organization (EARO). Under the new organizational structure, a drylands unit has been established. In addition, a new faculty for dry lands has also been established in the Mekele University College with a dry lands research centre.

In terms of programmes, the most significant was the programme focusing on regional rangelands development, initiated by LMB with the financial assistance of the World Bank, under the 3rd and 4th Livestock Programmes. Under those programmes, the following projects were established (a) the Jijiga Rangelands Development Unit (JIRDU), (b) the Southern Rangelands Development Unit (SORDU), (c) the North Eastern Rangelands Development Unit (NERDU), (d) the South-eastern Rangeland Project (SERP), and also the South-western and Western Lowlands Project.

The objectives of the programme were:

- to improve grazing management practice and increase forage availability;
- to increase rangelands productivity;
- to undertake forage adaptability trial and generate research results for adoption;
- to establish monitoring system, and
- to generate data.

Full-fledged projects for the regions on which the programme focused were formulated based on findings from pilot projects. The operational structure had four distinct units; namely (a) Range planning and management,(b) Range monitoring,(c) Trials and studies, and (d) Training and extension.

The programmes and/or activities comprised (a) survey of the resource base and market analysis, (b) infrastructure development, including roads and water resource development, (c) preparation of range management plans, and (d) provision of services such as veterinary and vaccination services.

3.4 Water Resources Development Programme

The Ethiopian Government is taking an integrated approach to water resources planning. This will be achieved through an appropriate balance between the use of surface water and ground-water resources to ensure the sustainability of use. To date, a complex of policy, institutional and financial problems have hindered water related developments, including irrigation based agriculture and hydro-power development.

In the past, the centralised socialist policy of the previous government hindered the development of irrigated agriculture. Although efforts were made and ambitious targets were set the absence of a clear policy and strategy made international banks and financial institutions unwilling to lend money for the development of irrigated agriculture. In addition, large irrigation schemes require considerable foreign exchange for consulting services and the purchase of equipment. The same is true for hydro-power development. This in turn entails a rather long gestation period before such schemes become operational. As alternatives small-scale irrigation and mini-hydro development are encouraged at the present time.

3.5 Wildlife Conservation and Development of Tourism

The difficulties that are facing the management of Ethiopia's Protected Areas have been highlighted in recent years and support has been provided by international bodies such as the United Nations Development Programme (UNDP), World Wide Fund for Nature

(WWF) and the European Union (EU), in addition to the regular budget provided by the Ethiopian Government.

The UNDP programme has three components:

- emergency rehabilitation and restoration of priority areas;
- strengthening and restoring effective management for priority Protected Areas, and
- development of long-term financial support strategies for Wildlife and Protected Areas through the creation of a Trust Fund.

The EU programme focuses on rehabilitation of the protected areas in the South (Omo, Mago and Nechisar National Parks).

The Austrian government has shown interest in the development of tourism in Siemen National Park.

WWF has a rehabilitation programme at Bale Mountains National Park.

None of these measures can be considered very successful, since apparently the constraints and development of these protected areas are minimal.

3.6 Minerals and Other Non-renewable Resources

Ethiopia has a wide range of useful minerals of grades and extent comparable to deposits that are under exploitation in other countries. The potential for gold production is essentially good. Due to the underdevelopment of the country's economy, mineral use and indigenous production are both limited. Mining for many years in the past could not develop based on mineral exports due to its isolation from the world market for capital, technology and mineral commodities, especially during the more favourable periods of the 1970s and 1980s.

In the context of the economic reform measures that are being undertaken by the current government, conditions are being created that are favourable for mineral resources development with the active participation of both indigenous and foreign private investors.

CHAPTER FOUR: INSTITUTIONAL MEASURES

4.1 General

The decentralization and devolution process that Ethiopia has undergone in the last few years has resulted in new political and administrative institutions. The introduction of a federal system has changed the balance of power in favour of the newly created regional states which have legislative, executive and judicial powers within their jurisdictions.

Currently (1998) Ethiopia has 9 Regional States making up the federation. There are also two urban administrations i.e. Addis Ababa and Dire Dawa, under the Central Federal Government. The Federal Constitution and Proclamation 7 of 1992 as amended, provide for overall political power regarding the internal affairs of the regions to reside in their respective elected regional councils. Proclamation 41 of 1993, as amended, also defined the powers and duties of the central and of the regional executive organs of the Transitional Government.

The goals of decentralization include: increased administrative efficiency, local participation in development planning and management and the allocation of resources so that they reflect more closely the development priorities of local populations. This form of structure essentially decentralizes the government but in practice the opportunity is largely lost for some of the regional states as they are technically weak and the central government still controls the financial and other resources, including trained manpower. The hardest hit of these are the Regional Governments that are largely pastoral such as Region 5 (Somali), Region 2 (Afar Territory) and Region 6 (Benishangul).

Within the regional states themselves governance is structured in such a way that basic units of administration (i.e. the Woredas) with their own democratically elected

representatives have come into existence. These institutions have brought about a situation where peoples and communities participate and take decisions regarding their political, social, economic and environmental concerns, as well as, take the necessary measures to implement such decisions.

The more specific measures taken or intended to be taken to bring about effective natural resources management are also positive. At the federal level, the EPA has been established in 1995. The objective for which this authority is established is specified in its enabling proclamation; it is to ensure that all matters pertaining to the country's social and economic development activities are carried out in a manner that will protect the welfare of human beings as well as sustainably protect, develop and utilize the resource bases on which they depend for survival.

The Environmental Protection Authority (EPA) consists of the Environmental Protection Council (EPC) chaired by the Minister of Agriculture, and a General Manager with the necessary staff. The EPA is accountable to the Federal Council of Ministers. The office of the General Manager acts as the Secretariat to the EPC. The Environmental Protection Council coordinates the implementation of the various development and management aspects and also the review and revision of the Federal Policy on the Environment.

The Ministry of Economic Development and Cooperation (MEDAC) coordinates the planning, programming and consolidating of the overall investment programmes and annual capital budgets in accordance with the Federal Policy on the Environment, with action programmes forming an environmental subset of the overall development programme of the country. Regional planning bureaus exercise identical functions with respect to regional action plans and investment programmes.

The Regional Environmental Coordinating Committees (RECC) recently established by the regions, although not legally mandated, yet coordinate the implementation, review and revision of their respective Regional Policies on Natural Resources and the Environment. The membership of these committees varies from region to region. Generally, the regions are making efforts to include representative non-governmental stakeholders in addition to Regional Executive bodies and other governmental entities.

Individual programme and project monitoring is the responsibility of the appropriate federal and/or regional implementing and/or mandated agencies. Monitoring of the overall impacts of the implementation of the Federal Environment Policy as well as the regional conservation strategies on the country's renewable natural resources and environmental support systems and compilation of recommendations for any modification that is required, will be carried out within the framework of the institutional arrangements discussed above in a manner which is responsible to popular opinion.

Annual meetings will be held and evaluation reports prepared by communities at the village level with their Community Environmental Coordinating Committees (or Science

and Technology Associations), then successively from the Wereda and the Regional Environmental Coordination Committees to the Environmental Protection Council to evaluate these reviews and make their recommendations. Presentations and submissions on environmental matters affecting communities, woredas and regions will be received by the EPA from the Environmental Coordinating Committees at the various levels as part of, and as an adjunct to, the formal monitoring process. EPA, after evaluating the reports, prepares a synthesized and consolidated report with recommendations for submission to the Prime Minister's Office which will in turn submit the report to parliament. The Environmental Protection Authority has the responsibility to prompt all the monitoring, reporting and evaluation activities described above.

Lower level environmental coordinating committees have not yet been established at the zonal, woreda and community levels. When these committees are established, the coordinating mechanism for environmental management, including the combating of desertification, through the implementation of the CSE and RCSs will be completed.

Line ministries, commissions and authorities, at the federal level and counterpart line bureaus at the regional level will implement those components of the overall CSE and RCS policies, strategies and action plans for which they are already responsible under the existing law.

The major federal level institutions of particular importance for combating desertification are the following.

4.2 The Environmental Protection Authority

At the Federal level the EPA has been established recently. This Authority is the Federal organ for coordinating and regulating activities in the environmental management field. This Authority has broad mandates over the environmental affairs of the country. It is expected to coordinate environmental policy, strategy, action plans and legislation making, including EIA guidelines and procedures which Ethiopia does not have so far. It is also mandated to establish systems necessary for evaluating the impact of social and economic development projects on the biological systems they support as well as to make recommendations on the application of diverse incentives and regulatory measures as well as directives required to enhance awareness of the need for environmental protection. In addition, the coordination of CSE implementation at the Federal level is the function of the Environmental Protection Authority (EPA). Of particular importance regarding the combating of desertification, however, is that the Authority is mandated to carry out studies to combat desertification and, in cooperation with the concerned organs, create favourable conditions for their implementation. To carry out this mandate, the Authority has established a "Desertification Team". Since the EPA, and hence, the EPC, has, under the Desertification Convention ratification instrument, the power to undertake all acts necessary for the implementation of the Convention, it has established a National

Steering Committee for the formulation of the NAPCD as well as a National Task Force for 'Desertification Fund.'

EPA has a council which consists of various Federal line ministries and other relevant Federal organizations and which will be the main decision-making body on policy and related issues regarding the management of the country's environment. The currently existing macro-policies, almost without exception, stress decentralization and devolution of development activities, including environmental management. Thus, the states making up the federation and their sub-units are expected to enable implementation of environmental management projects at grassroots level by the concerned communities themselves.

4.3 The Ministry of Agriculture (MoA)

The Department of Wildlife and Forestry, the Ethiopian Wildlife Conservation Organization and the Institute of Biodiversity are the major institutions under the Ministry of Agriculture which have mandates pertaining to environmental management. Areas of mandate for this ministry include: land tenure, crop and animal husbandry, rangelands and pastoral development, land and water resources management, land use policy and genetic resources. It coordinates its activities with EPA, MoWR and MoE. The following are the major specialized organs under this Ministry.

The Bio-diversity Institute

Plant Genetic Resource Centre, Ethiopia (PGRCE), presently renamed the Bio-diversity Institute, is established to promote collection, evaluation and utilization of plant germplasm. It covers a wide range of ecological zones, including the arid, semi-arid and dry sub-humid climatic zones. It manages germplasm rescue operations and also conducts germplasm screening to assess tolerance to adverse environment.

The Ethiopian Seed Corporation

This produces basic and certified seeds and has distributed landraces of sorghum and maize to drought-prone regions and also for emergency relief and rehabilitation; no attention is given to grass, legumes and browse range plants.

Land Use Planning

The objective of this program is to promote sustainable land use by integrating crop and livestock production for the benefit of the nation. The Department was assisted by FAO and conducted socio-economic survey in the arid and semi-arid areas including crop environment assessment.

The Forestry and Wildlife Development Conservation Department: Forestry Research

Experimental sites are located in four major ecological zones of the arid lowland and semi-arid lowlands. The objective of the centre is seed collection, testing, storage and distribution and also to conduct agro-forestry trials.

The Ethiopian Wildlife Conservation Organization

Ethiopia's natural resources, including protected areas and wildlife, are managed by both the Central and Regional Governments. The Central Government's responsibility lies largely with the ministry of Agriculture. Within this ministry, the principal responsibility for Wildlife and Protected Areas management is held by the Ethiopian Wildlife Conservation Organization (EWCO). EWCO has responsibility for all national parks and sanctuaries in the country. In addition, it oversees controlled hunting areas and wildlife reserves in the absence of other responsible agencies and where it is able to provide resources.

The Ministry of Agriculture: Department of Agricultural Development and Crop Protection

The department conducts adaptive research on a wide range of ecological zones. Presently, trials on moisture conservation method and inter-cropping system is being conducted in different semi-arid zones.

4.4 Other Ministries

The Ministry of Water Resources (MoWR)

This ministry is responsible for water resources policy and standards formulation as well as for water resources development. Through the National Meteorological Services Agency, this Ministry is also responsible for meteorological and other activities connected with the atmosphere and climate. Its activities are expected to be coordinated with EPA and MoA. The National Meteorological Services Agency is under this Ministry. This Agency has established a number of agro-meteorological stations at different ecological zones where rainfall probability, temperature, growing days, climatic water balance and soil water balance data are recorded, with the objective of forecasting future weather impact and to create awareness.

The Ministry of Mines and Energy (MoME)

Mineral resources and energy policy and development are the responsibilities of this ministry. Coordination is carried out with EPA, MoWR, MoLSA and MoA.

The Ministry of Information and Culture (MoIC)

With appropriate coordination with MoE, EPA, MoA, and ESTC, this ministry is expected to carry out environmental awareness activities mainly through public media such as radio, TV and newspapers.

The Ministry of Education (MoE)

This ministry is responsible for environmental education. It is expected to coordinate its activities with EPA, MoA and MoIC.

The Ministry of Economic Development and Cooperation (MEDAC)

The mandates of this ministry include: monitoring the overall implementation of development policies as well as reviewing programmes and projects, land use policy and strategic land use planning (through the Ethiopian Mapping Agency which is under its umbrella), environmental economics, macro-economic policy and national economic development. The general mandate is carried out in cooperation with all line ministries but coordination pertaining to land use policy formulation and strategic land use planning is done with EPA, MoA, MoME, MoWUPD and MoI.

4.5 Community-based Organizations (CBOs), NGOs and Private Sector and International Organizations

Community-based Organizations

Ethiopia has a number of community-based organizations, the most famous form of which is the "Idir". However, these community institutions are not involved in the management of the environment since their purpose is to serve a social need, that of supporting their members financially and morally in cases of death in the family. But other forms of CBOs are being established such as the water users associations in Tigray. Other institutions, such as farmers associations, women's associations and youth associations, which can be used by their members to further the cause of improved environmental management exist and more, are being established.

Non-governmental Organizations

The present decentralized and devolved system of governance has facilitated the emergence of indigenous NGOs. The Christian Relief Development Agency (CRDA) is

the largest organization representing an alliance of both international and local NGOs. Indigenous NGOs also have their own separate overall organizations. Among the local NGOs, LEM Ethiopia and the Ethiopian Wildlife and Natural History Society (EWNHS) stand out for their work in environmental management field, particularly awareness and advocacy activities.

International and Regional Organizations

There are also a number of international regional and sub-regional organizations relevant for combating desertification in Ethiopia. The International Livestock Centre for Africa (ILCA) now known as the International Livestock Research Institute (ILRI) is one of them. The major objective of its Ethiopian program is to increase the sustained yield and output of livestock products and subsequently to improve the quality of life of the people. It conducts research in southern pastoral areas. Major research activities include aerial survey, crop/livestock research activities, pastoral settlement, rangelands monitoring, water use, animal husbandry, milk processing and exotic forage species introduction and testing.

The role of other international organizations (such as ICRAF, IUCN, WWF) and UN agencies (such as UNEP/Habitat, UNICEF, UNESCO, UNHCR) as well as multi- and bilateral donor agencies is on the increase in support of sustainable land use. Regional organization are also being set up to coordinate developments and information sharing.

Some of the major institutions established and operating in the dryland environment vis a vis drought and desertification include:

- Greater Horn of Africa Initiative (GHAI);
- Pan Africa Rinderpest Control under OAU (PARC);
- Inter-governmental Authority for Development (IGAD);
- Pastoral Environment Network in the Horn of Africa (PENHA).

Ethiopia stands to benefit by actively working with these institutions and organizations.

4.6 Tertiary Education Institutions

The universities of Alemaya and Addis Ababa have a long tradition of engagement in development related activities. The Institute of Development Research (IDR) at the Addis Ababa University is well known in such endeavours. The research in Alemaya is closely related to the work of the Institute of Agricultural Research (IAR), the latter has been involved in research for the last three decades.

The Awassa College of Agriculture conducts trials in the semi-arid areas, especially in investigation of the collection and identification of early maturing drought resistant crops and also in the selection of fast growing multipurpose trees and shrubs. The Mekele University College is engaged in dryland management research.

CHAPTER FIVE: EVALUATION OF PAST AND CURRENT PROJECTS DESIGNED AND IMPLEMENTED TO COMBAT DESERTIFICATION AND MITIGATE THE EFFECTS OF DROUGHT.

5.1 Soil and Water Conservation

There were a number of projects being implemented as means of rehabilitation and development of soil and water conservation activities in the drought stricken and marginal areas of different parts of the country. Such projects which were taken as regional programmes include the following.

Agricultural and/or Soil and Water Conservation Projects.

- The Chilalo Agricultural Development Unit (CADU) in Arsi region which was superseded by the Arsi Rural Development Unit (ARDU) and was supported by SIDA.
- The Wolayta Agricultural Development Unit (WADU) in Wolayta which was supported by the World Bank.
- The Minimum Package Programme (MPP) which was supported by the World Bank.
- SIDA support for soil and water conservation in the Borkana catchment, Wollo region.
- Kobo and Jijiga Ethio-Italy Integrated Development Project funded by the Italian Government.
- Sirinka Catchment Rehabilitation Pilot Project financed by the World Bank.
- Golina-Homrat Catchment Reclamation Project sponsored by the Dutch Government.

World Food Programme Projects

The World Food Programme (WFP) has been providing assistance for the implementation of SWC projects in critically degraded areas of Tigray, Wollo, Shoa and Hararghe since 1975. The present programme, known as project 2488, started in 1980 and has been extended until the present. The programme has gone through three phases. The objectives of WFP support are:

- to provide an incentive to farmers, primarily through PAs, to perform agreed

activities and observe practices conducive to SWC and thus introduce better methods of land use and hence of land productivity;

- to provide a base for future agricultural productivity on degraded land, currently used for food crops, grazing or reforestation by applying suitable soil and water retention techniques in vegetative and structural conservation;
- to improve the inadequate diet of the farmers and their dependents in areas where drought/famine conditions are endemic and food is readily accepted in lieu of cash wages.

Food aid through WFP is at present the prime incentive to SWC activities. The provision of food is based on a family ration of 3 kg wheat and 120 g oil per person day. The overall impact of the programme so far has been positive. A wide range of degraded land has been rehabilitated, water sources for human and livestock in the arid and semi-arid areas have been developed. The provision of food for work has opened employment for the rural poor during the slack season for agricultural activities (January to June).

A drawback of the FFW programme is related to the quality of the soil and water conservation works undertaken. The payment for SWC work is based on what is achieved and accomplished, there is a built-in danger in emphasizing the quantitative rather than the qualitative aspects of the work performed. For many farmers food is the most important concern; the nature of the work is secondary. They also feel that they are paid to build bunds not to maintain them. In some instances, it has been noted that farmers have knocked down the bunds, hoping to be paid more food for rebuilding them the following years. The trend of FFW has created dependency and undermined the technical quality of the work and none of the structures built would be maintained once the project or the programme is completed. Although the controversy about quality is still not settled, the overall performance has been satisfactory.

Assistance to Soil and Water Conservation Projects

The Food and Agricultural Organization (FAO) had provided technical assistance to SWCDs from 1979-1994 funded by UNDP. The objective of the project was to strengthen the capacity of SWCD for implementing an expanded programme of soil and water conservation by organizing inservice training for the staff, advising in the selection of project sites and in the preparation of action plans within the selected catchments. This is in addition to assisting in the implementation of WFP project and ensuring that the activities are implemented according to sound technical standards.

The Soil Conservation Research Project (SCRP)

The Soil Conservation Research Project (SCRP) started in 1981 under the umbrella of the Soil and Water Conservation Department, in association with the University of Berne, Switzerland. The project has had experimental activities in different agro-climatic zones. These included Andit Tid (North Shoa), Anjene (Gojjam), Dizi (Illubabor), Hundelafto (Hararghe), Gununo (Sidamo) and Maybar (South Wollo). With the exception of Hundelafto, which is located in the dry sub-humid zone, the rest are found in areas with no moisture constraint.

The major objective of SCRCP was "to provide the Ethiopian Soil Conservation Department's efforts with necessary basic data and information for the proper planning and/or implementation of soil and water conservation measures, to test the applied methods and to plan adapted SWC measures, and to train local as well as international personnel in this field of study".

The activities included studies on runoff plots, sediment loss, land use, and crop production studies vis a vis alternative SWC measures. SCRCP played an important role in the preparation of SWC guidelines for development agents.

Outputs of SCRCP have been published in the form of progress reports and research reports. Generally, SCRCP has already valuably contributed to a scientific understanding of the process of erosion in Ethiopia and has provided useful information towards improvement of conservation practices in the programme areas. Data were collected for 13 years for a wide range of ecological conditions and cropping systems, and these data are very much valuable for future planning aimed at providing solution to conservation problems in the field. At present these data have been compiled and are under edition prior to distribution to various users.

Institutionally, the research activities have been decentralized to three regions (Amhara, Oromia and Southern Nations, Nationalities and People's Regional State [SNNPS]). The decentralisation of the research activities is relevant in terms of strengthening the regions' capacity in carrying out research based on local needs as well as linking research and extension. However the decentralization process should have taken into consideration the readiness of the regions to guarantee continuity of research activities. At the same time, mechanisms of networking at regional and federal levels should have been established to facilitate exchange of relevant information and experience.

However, SCRCP's achievements fell short of expectations because of the following drawbacks.

. SCRCP was not formally institutionalized within a

government structure.

- . Research topics were more biased towards physical conservation measures.
- . The potentials of indigenous soil and water conservation practices were not given due attention and exploited.
- . The link between research output and extension was weak, resulting in poor feedback.
- . Lack of adequately trained researchers in areas of soil and water conservation.

Absence of land use policy and land use plans at different levels (national, regional and grassroots) has also been one of the main hindrances to soil and water conservation practices at grassroots level.

5.2 Forestry

The recurrent on-going programme of forest development was at its highest during Forestry and Wildlife Conservation and Development (FaWCDA's) time, and was at its lowest during the transition period in 1992-93. The main reason for this is the organizational instability of the forestry sector. In 1981, the concept of establishing peri-urban fuelwood plantation projects came to the forefront and it was decided that the projects should start at least in three areas, namely Addis-Bah and Addis Ababa, supported by the World Bank, Nazareth, supported by Finnida /UNSO, and Debre Berhan, supported by Finnida/UNSO. Another fuelwood plantation project was also started at Gondar, which was being coordinated from Addis Ababa under the Fuelwood Coordination Office together with Nazareth and Debre Berhan based projects. Addis-Bah was a big project, it was founded on existing eucalyptus plantations around Addis Ababa which were nationalized by the 'Derg'. All the other fuelwood plantation projects started from scratch but Addis-Bah started by rehabilitation of old plantations together with the establishment of new plantations. Dessie fuelwood plantation project was included at a later stage.

All the plantation projects functioned well and were able to reach the following planting targets.

- . Addis-Bah fuelwood plantations project 16703 ha
- . Addis Ababa fuelwood plantations project 12815 ha
- . Nazareth fuelwood plantations project 5181 ha
- . Debre Berhan fuelwood plantations project 3113 ha
- . Gondar fuelwood plantations project 783 ha
- . Dessie fuelwood plantations project 3059 ha

Shortcomings of the Plantation Projects

The fuelwood plantation projects, though established to offset the problems of fuelwood crisis in major towns and cities in Ethiopia, had planning problems from the outset. During site selection process none of the projects had allowed communities to participate in the process.

It was true that some members of the community working during peak planting seasons and in the forestry nurseries. The people did not have any rights of claim from the developed plantation forests. This gradually gave rise to a serious conflict in resource use and the outrage of the people was demonstrated by destroying the plantation forests within the few days of unrest in the immediate aftermath of the fall of the Derg Regime.

All the same, the fuelwood plantation forests have increased availability of fuelwood tremendously and these resources are still being used at present. Most of these fuelwood plantations projects have been phased out from the centre and are being handed over to respective regions. In some regions, trees from such plantations are being auctioned for sale from time to time.

The fuelwood projects did effectively address fuelwood scarcity in urban centres and this would have in turn effectively reduced the pressure on the arid, semi-arid and dry sub-humid areas resulting from charcoal production and collection of fuelwood. However, by not consulting communities who were the traditional users of the land on which the plantations were established, they became sources of conflict between the government and communities, and hence could not be effectively managed.

5.3 Rangelands/Livestock Development Programmes

Government Supported Regional Programmes.

Baseline surveys undertaken in connection with these regional programmes indicated that the traditional pastoral systems were indeed breaking down and that there has been a large increase in sedentary agriculture, both as a result of spillover from the highland agriculture and from the pastoralists attempt to farm in order to stop highland farmers from moving into their traditional rangelands. The pastoralist did not know farming nor were they being trained. Charcoal and fuelwood removal from the arid and semi-arid lowlands is associated with sedentary agriculture and improvement of roads.

Despite government efforts and donor assistance to better manage the rangelands and improve productivity, drought continued to recur, and desertification continued unabated, resulting in the destabilization of the fragile ecosystem in the arid and semi-arid rangelands.

For development purposes rangelands are grouped into a number of regions. National attempts to develop and manage the resources of the lowlands, especially the range and livestock resources, started about 40 year ago. The major programmes and projects are briefly reviewed.

Southern Rangelands

The Southern Rangelands covered some 95,000 to 100,000 km², covering the Sidamo/Borena region. The first livestock development efforts were initiated in the early 1960's when the Ministry of Agriculture, with the financial support from USAID, initiated the first rangelands development programme on 240,000 hectare of rangelands near Yabello. The objective of the project was to introduce appropriate range management practices by introducing water development programmes into local grazing resources. The objective was not, however, realized. Instead of showing productivity and improvement, the selected sites were exposed to overgrazing.

In 1973, the Second Livestock Development Project (SLDP) was initiated in these rangelands with the a loan from the World Bank. Its objectives were (a) to develop and integrate livestock market and stock route system (b) to establish slaughter facilities in towns and cities, and (c) to provide administrative assistance.

Using the experience gained from the USAID/MoA and the SLDP, with World Bank and ADF funding, in 1976 the Third Livestock Development Project (TLDP) was formulated with both short-term and long-term objectives. The short-term objectives were to improve productivity in the livestock sector by restructuring the traditional extensive stock production. This was planned to be achieved by (a) provision of veterinary and livestock extension services, (b) construction of watering facilities, (c) establishing stock trade routes, (d) establishing fattening ranches, and (e) training of pastoralist and strengthening government institutions responsible for the livestock sector.

The long-term objective was the eventual launching of a comprehensive system of range use control under which livestock herder and owners would voluntarily adjust overall stock numbers to meet the carrying capacity of the rangelands. This was planned to be achieved through (a) institutionalizing land planning and range management programmes in conjunction with a programme for the gradual control of livestock numbers and (b) research and study programmes regarding improved range use and grazing control practices.

The TLDP, as a 5-year project, operated in the Southern Rangelands (SORDU), the Jijiga Rangelands (JIRDU) and the North-east Rangelands (NERDU) covering 95,000; 33,000 and 75,000 km², respectively.

The main development components of SORDU as well as of the other two regions were (a) land use planning and range management, (b) trials and studies on range use and grazing control practices, (c) road construction, (d) water supply development, (e) animal

health service (f), livestock breed improvement (g) stock feeder programme and (h) training programmes for project staff and pastoralists.

In 1989, the Ministry of Agriculture (Animal and Fishery Resources Department) launched the Fourth Livestock Development Project (FLDP) with World Bank financing.

This 5-year project, which had a pilot project in SORDU, was aimed at alleviating the problem of unsustainability of technological interventions realized in the TLDP. The FLDP designed and revised the approach so that the pastoralists would participate in the identification, planning and implementation of rangeland development programmes.

The main objectives of this pilot project covering the pastoral areas between Sagan and Dawa rivers of SORDU project were: (a) to improve the food and feed security of the pastoralist and their livestock, and (b) to increase their income and livestock off-take through ecologically sound development approach using their energies, resources and traditional social organization.

To determine achievements of this project objective, a system of monitoring and evaluation was designed using basic indicators. Based on these indicators, the project has achieved the following: (a) the formation of five service cooperatives, (b) the transfer of fattening ranches to service cooperative managements, (c) the construction of roads and maintenance of wells, (d) the training of animal health care and development of a range monitoring system, and (e) changing the attitudes of both project staff and pastoralists in understanding participatory development and its implications.

Since 1985, the partners working in SORDU also included ILCA, CARE-Ethiopia, IAR and DPPC.

South-eastern (JIRDU/SERP Ogaden) Rangelands

Initially, a rangelands development project for the south-eastern region was initiated over a 33,000 km² area that extended from the foothills of the Hararghe highlands to the arid plains of the lower Ogaden, covering dry sub-humid, semi-arid and arid zones. ILCA participated in carrying out the baseline survey as part of project planning and implementation. Range potentials and status were assessed, so were land use conflicts between pastoralism and sedentary farming.

The project activities were similar to those described above in the TLDP for the Southern Rangelands and the FLDP in 1990. JIRDU was expanded to cover 100,000 km² and renamed SERP. The success rate in JIRDU/SERP were similar to those of SORDU.

North-eastern Rangelands (NERDU)

The project covered an area of about 75,000 km² of which 85 percent was arid and 15 percent semi-arid. The main development objectives of NERDU were similar to those

of SORDU and JIRDU/SERP except for greater emphasis on rehabilitation of drought-stricken pastoralist of the 1973-74 drought. This rehabilitation was to include establishment of irrigation schemes and water harvesting systems as an alternative life-style for those who had lost access to dry season grazing because of the increased cultivation of cash crops along the Awash River.

The South-west and Western Lowland Rangelands

These lowlands are typically more humid compared to the three regional rangelands described above. But the prevalence of tsetse menace has limited cattle raising and human settlement schemes. Some programmes of tsetse fly control along with breeding trypanosomiasis-tolerant breeds have been attempted led by ILCA. Reportedly, there has been tsetse control achieved in selected sites in the Ghibe and Didessa Valleys.

These lowlands are also far from the main domestic and international livestock markets. Should there be more success in tsetse fly control, it is more likely that the area would be put under cultivation rather than for the production of livestock.

The rangelands are generally seen as the only resources for livestock production based on traditional free grazing with hardly any external inputs to increase productivity. But the rangelands have other natural resources other than grass and browse. Indeed, many rivers traverse the rangelands, for example Awash, Mile in the NE rangelands, Fafan, Dakata, Wabi-Shebele in the Ogaden rangelands and many lakes and swamps are also found there. Some of these rivers and lakes have attracted commercial agriculture and ecotourism. But none of these activities included the pastoralists themselves, this often resulted in conflict of interest and animosity. The pastoralists were not economically and politically empowered to lead and participate in these new initiatives. Even the few commercial ranches and beef fattening activities were carried out by investors from outside the area.

Government supported programmes of livestock development were not successful for the following reasons.

- (a) The programmes failed to recognize and incorporate traditional range management such as the use of 'adas' or customary laws traditionally used to settle watering and grazing disputes. It also failed to appreciate controlled burning traditionally used to prevent brush invasion, which in turn reduces carrying capacity.
- (b) Contrary to traditional rangelands improvement practice, brush burning was banned in SORDU since 1970. The effect was rapid brush invasion in most of the area, resulting in pest build up, reduced grassland coverage, hence less grazing resource to livestock.

Evaluation made on the range management projects, especially on SORDU and JIRDU/SERP, clearly showed that the project objective were not achieved and instead, new problems were added. The project's successes were limited to water development, road and building construction and veterinary services. These major benefits were confined to the short-term objectives of raising productivity. TLDP's programme design and implementation was from the top, with little or no participation from the pastoralists. Thus, the pastoralists were not able to adapt/adopt most of the technological intervention. Most of the ponds, roads and other infrastructure were not maintained after the project was completed. What is more, gullies formed during road construction have contributed to severe erosion in these areas.

The government ban on brush burning since 1970 through project recommendation has led to brush encroachment resulting in 20 percent decline of grazing resources. This is contrary to the traditional method of range management where annual brush burning by pastoralists was used to control brush invasion, animal pest and disease. Brush control by prescribed burning is essential to improve the rangeland condition and its grazing capacity.

Livestock improvement and health service

Parallel to the range improvement efforts there were also efforts in livestock improvement and the provision of primary health services (i.e. veterinary service). This involved selection and cross-breeding programmes. This was initially spear-headed by the Alemaya College of Agriculture in the 60's and these efforts later were joined by IAR at selected dryland stations. The regional projects, such as SORDU, JIRDU/SERP and NERDU, also participated, especially in the primary health services.

The results of the efforts to improve the livestock breed to make them more ecologically adaptable and increase yield (e.g. meat, milk, butter) were no better than the breed improvements the pastoralists had been making by careful observation and selection based on field performance of individuals or herds. The difference was that the process that the pastoralists used was essentially slower.

The lack of progress or effective success by the institutions mentioned above, in addition to the Livestock and Fisheries Main Department of the Ministry of Agriculture and that of LMB (through the 2nd, 3rd and 4th Livestock Development Projects), is mainly caused by lack of continuity due to frequent changes in staff placement and institutional arrangements as well as the overall paucity of funding.

Research in Feeds and Feeding

There have been several research activities and trials on feed resources vis a vis breed improvement. But the results have not been widely utilized because of weak training, weak extension and research linkage as well as poor services. Fodder trials have been carried out in several locations of the three rangelands projects such as at Jijiga, Milkawere, Adami Tulu and other IAR stations, based on rainfed and irrigated plots. Commonly experimented woody/succulent species include: *Atreplex* spp, *Opuntia* spp *Leucaena leucocephala*, *Prosopis* spp as well as crop residues and agro-industrial by-products. ILCA, through multi-location trials in Southern Ethiopia, has carried out trials on many local and introduced species and maintains a germplasm collection at its Headquarters in Addis Ababa.

Small-holder Fattening and Ranching

Ranching was attempted in a few locations in SORDU with the intent of managing them jointly by SORDU and the local peasant associations (not grazing associations). But these schemes were not profit-making because of management and marketing problems. The ranch concept was thus abandoned and the land was returned to pastoralist management.

A small-holder fattening program was also attempted. Young animals (bulls) from the pastoralists (rangelands) were distributed to highland farmers on credit so that farmers

would in turn finish them on grazing as well as feeding them crop residues. The farmers were ultimately expected to sell them for slaughtering or use them as draught animals. The pastoralists could buy grain with the cash from the farmers. Here too the principal beneficiaries were not the pastoralists. Transporting the animals into the highlands and distributing them was a major problem and consumed a lot of the potential benefits of the pastoralists.

Training and Extension

Through rangelands projects and the funding mechanism provided, many Ethiopians have been trained both at home and abroad. The project also conducted training for pastoralists in support of animal health.

Range management courses offered by the Alemaya University of Agriculture, the Awassa College and the new Mekele University College are not sufficiently comprehensive and are poorly supported by field facilities and transport. Training of agro-forestry for the dry lands is not formally available. Teaching and training resource materials are grossly inadequate.

Attention to extension services in the training and research institutions is weak. Despite governments declaration about the availability of packages, such packages are certainly not available at the grassroots/local level. Similarly, government extension services for pastoral areas are hardly available.

Development of Infrastructure (Water and Roads)

The development of water points and roads show mixed results at best. Roads generally tended to promote offtakes of cattle and exchange of products as well as facilitate the delivery of inputs and animals health services. However, deforestation for charcoal and firewood also increased due to road improvements. On the other hand, water development tended to encourage localized overgrazing and permanent settlements as well as crop farming. Capital expenditures for these two programmes have been high.

Early Warning and Drought Monitoring

There have been concerted efforts to collect and study climatic data over the years with UNDP/FAO and ILCA assistance. ILCA has made attempts to establish rangelands monitoring tools vis a vis the 3rd and 4th Livestock Development Projects of LMB. These, however, have been little used on the ground.

The establishment of the DPPC is part of the effort to prevent drought and have the skill and means to quickly deal with drought when it does occur. The frequency of major droughts since the early 70's has increased. Each drought period is getting more severe

than the one before it. As a result, coping mechanisms have been made weak and time for natural rangelands recovery is being shortened.

5.4 Wildlife and Touristic Resources Conservation

Wildlife and environmental conservation efforts have been very limited even though several management plans for some of the parks have been formulated. Enforcing conservation measures was not successful because of the land tenure in place which did not give local inhabitants any incentive. Wildlife conservation through the establishment of game parks and reserves is seen by the people living in and around such areas as encroachment on their rangelands as there is no revenue sharing from tourism. Game wardens and forest guards are not well trained, nor are they well equipped to manage conflicts.

Planning on a national basis for wildlife conservation has been carried out periodically in the form of two five-year plans. These mainly dealt with planning of material resource requirements. While considerable effort was expended in the writing of these plans, no extra resources were made available and little of what was planned could ever be achieved.

The recent decentralization of government allowed local inhabitants to destroy game and woodlands to get supplementary income from sales of items such as charcoal and the skins of wild animals.

5.5 Mineral and other Resources

Various mineral resources are available in the arid, semi-arid and dry sub-humid parts of the country. Most prominent are the Calub natural gas resources of the Ogaden, the geothermal resources of the Rift Valley, the potash deposits in Afar and Tigrai, alluvial gold in Tigrai, Gambella, Wollega, among others, the salt deposits in Tigrai, Afar, and the Ogaden, and soda ash in Lakes Abijata and Shalla.

The soda ash project at Lake Abijata in the Rift Valley is capable of producing 20,000 tons per annum, which will be used for the manufacturing of caustic soda, textiles, tyres, detergents and soaps. The likely impact of the process of removal of this soda ash on the very rich fish and birdlife of the lake has not been properly assessed; and this is a major environmental concern.

The basic constraint on successful mineral development in Ethiopia is associated with the nature of the country's economy. The level of industrial development in the country being low and the nature of its agriculture being dominated by subsistence level peasant farming, indigenous mineral use is small. This has deprived mining of an indigenous

market.

The world market for minerals is well supplied and competitive. The absence of experience in Ethiopia in hard rock mining and international mineral trade as well as the underdeveloped state of the country's infrastructure severely limit its ability to successfully compete in the production and marketing of most minerals.

Modern and systematic mineral exploitation has a history of only a quarter of a century in Ethiopia. The programme is developed in isolation and too slowly to succeed in accumulating the desired volume of mineral data of the desired quality. This insufficiency of information hinders the extent to which the resource and its development potential can be illustrated and investment in its development promoted.

Shortage of investment possibilities is one of the important constraints. Although some capital that mining requires may be raised indigenously, it is not sufficient as the level of domestic capital formation is too low, and is not enough to satisfy all the investment needs.

Mining is not competitive to attract capital. The industry is characteristically associated with high investment needs, high level of risk, slow payback and heavy financial imposition.

The development of the mining industry is highly dependent on the availability of low cost, high standard and extensive transport and communications infrastructure. The development of mineral deposits other than those of the very high value and low bulk minerals such as gold and platinum, will be constrained by the low level of development of the infrastructure in the country.

There is a very high resource wastage during mining. Even the small extent of mining by artisans and small-scale operations has been inefficient in mineral extraction and has caused extensive destruction of the environment.

**VOLUME III:GAP ANALYSIS AND
PROPOSED APPROACHES TO COMBAT
DESERTIFICATION**

ACRONYMS

AAU	-	Addis Ababa University
BI	-	Biodiversity Institute
BoA	-	Bureaus of Agriculture
BoE	-	Bureaus of Education
BoWA	-	Bureaus of Women Affairs
CRDA	-	Christian Relief and Development Organization
CSE	-	Conservation Strategy of Ethiopia
DPPC	-	Disaster Prevention and Preparedness Commission
EARO	-	Ethiopian Agricultural Research Organization
EGS	-	Employment Generating Schemes
EIA	-	Environmental Impact Assessment
EIS	-	Environment Information System
EPA	-	Environmental Protection Authority
ESRDF	-	Ethiopian Social Rehabilitation and Development Fund
ESTC	-	Ethiopian Science and Technology Commission
EWCO-	-	Ethiopian Wildlife Conservation Organization
GIS	-	Geographical Information System
IAR	-	Institute of Agricultural Research
ILCA	-	International Livestock Centre for Africa
MoA	-	Ministry of Agriculture
MoE	-	Ministry of Education
MoIC	-	Ministry of Information and Culture
NAP	-	National Action Programme
NGOs	-	Non-government Organizations
NMSA	-	National Meteorological Services Agency of Ethiopia
PA	-	Peasant Association
SWC	-	Soil and Water Conservation
UNCED	-	United Nations Convention for Environment and Development
WFP	-	World Food Programme

GAP ANALYSIS AND PROPOSED APPROACHES TO COMBAT DESERTIFICATION

CHAPTER ONE: GAP ANALYSIS IN COMBATING DESERTIFICATION

In Volume One, desertification was introduced. The state of the natural resources, with emphasis on resources available in the arid, semi-arid and dry sub-humid parts of the country, was also described. In Volume Two, evaluation of developmental measures taken in arid, semi-arid and dry sub-humid parts of the country was presented. In this volume, gaps in policy, legislation, programme and institutional arrangements are analysed and an action programme to combat desertification is presented.

1.1 Constraints and Gaps in Policy and Institutional Arrangements

1.1.1. The Sector-specific Policies

The Draft Rural Land Use and Administration Policy has some difficulties in its effort of assuring security of tenure while, at the same time, trying to ensure equity through land redistribution. It also does not seem to provide for a participatory approach to land administration. Finally it does not, unlike the Conservation Strategy of Ethiopia (CSE), speak much about the possibility of encouraging traditional tenure systems which may be of particular relevance in pastoralist areas where community rights to grazing and water rights are important factors. Since this document is still at the draft stage, it should be re-examined with the view of adding to it or modifying it to take care of the aforementioned important issues.

Although the Draft National Policy on Biodiversity Conservation, Research and Development speaks about the importance of integrating the national policy on biodiversity conservation, research and development, there is not much to integrate in view of the fact that the policy directives in this document are so broad that it is difficult to understand why we need to conserve and develop biodiversity in the first place, let alone to find out how, for example, such conservation and development will contribute to eco-system and, particularly, human well-being. It is important that this policy be more concretized and that detailed strategies for its implementation be formulated.

While the Soil and Water Conservation Draft Policy recognizes the need for participation in the development of a demand-driven research policy and strategy, both technological as well as socio-economic, it appears to be too prescriptive as far as the policies and strategies in the other parts of the document are concerned. It also relies too much on legal measures to deter land users from undertaking activities which damage land and soil resources. It may be possible to discourage persons involved in such large-scale construction activities such as road building through regulatory means. It is, however,

doubtful whether such an approach, with regard to the subsistence activities of farmers and pastoralists, will be effective.

The National Agricultural Research Policy and Strategy does not seem to give attention to research on social and economic issues in agriculture. It is too much biased towards solving only technological problems. Another aspect which does not seem to be covered by this document is policy and strategic provisions which state that farmers (including women farmers), industrialists, marketers of agricultural products, etc., may, as necessary, participate in the formulation of agricultural research programmes and dissemination of results.

In the Draft Wildlife Policy, the need to involve local populations in the selection, designation and management plan preparation (i.e. the participatory approach) has not come out clearly.

The lack of operational sector-specific detailed policies and strategies in such important areas as forest resources, land and soil resources, wildlife resources and water resources creates a serious gap in policy for the management of the environment generally and for combating desertification and mitigating the effects of drought specifically. These gaps need to be filled in as soon as possible. At the same time, policy makers should recognize the opportunity that this situation presents for reviewing the existing draft policies to incorporate/integrate policies and strategies designed to combat desertification and mitigate the effects of drought, as necessary. The same should apply for new policies that are going to be formulated in the future.

In the meantime, and taking into account the policy deficiencies and gaps that have been identified, the National Action Programme to Combat Desertification may need to elaborate policies and strategies which can serve as a basis for its formulation. Since Article ten of the Convention and Article eight of the Implementation Annex for Africa clearly delineate the areas on which a national action programme should focus, it will be convenient to specify policies and strategies accordingly.

The overall government policies and strategies were briefly reviewed above, including those affecting the dry lands. One can, however, discover that the policy objectives are less clear for the dry lands and livestock development compared to the development objectives of the peasant agriculture. In fact the policies view the dry lands and the range lands in particular, as new frontiers for the expansion of agriculture, especially commercial farming. These policies do not see the range lands as equally important as the agricultural and forestry sectors in the highlands. This can be seen from the following analysis of the gaps, which are specific to the dry lands.

1.1.2 Policy Constraints and Gaps Specific to the Arid, Semi-Arid and Dry Sub-humid Areas

KNOWLEDGE ON DROUGHT AND DESERTIFICATION

Not much effort is being made to improve the knowledge on drought and desertification in Ethiopia. Such knowledge is pertinent in combating drought and desertification. Research, information gathering and disseminating in this regard need to be more emphasized. Raising public awareness about the environmental problems in the dry lands through very rigorous awareness creation campaigns will help bring about the required knowledge and attitudinal changes at all levels.

The actions required to achieve the assessment and monitoring of the effects of drought also include the establishment of a reliable information system for early warning. This follows from developing appropriate drought indicators and parameters mainly for the arid, semi-arid and dry sub-humid parts of the country because of their susceptibility to degradation.

To date, research in and application of soil and water conservation measures have given emphasis only to physical structures and neglected agronomic measures which can make a major impact in reducing soil and water losses. The frequent lack of vegetative material for planting on bunds is a reflection of such bias. Past anti-desertification efforts and projects also tried to address desertification problems through technology based solutions to the natural/physical aspects of environmental degradation rather than to the social dimensions and consequences. All these are results of a policy bias towards physical conservation structures, which needs to be corrected.

This does not mean, however, that physical soil and water conservation (SWC) measures are not useful for the dry lands. Although physical soil and water conservation measures incur higher labour cost and time as compared to the benefits accruing as a result of such measures in crop production, structural SWC measures on cropland in the dry lands can be expected to result in increased yields.

Neglect of the importance of indigenous environmental knowledge and management practices has been another problem. There has also been an obvious failure to exploit existing indigenous knowledge in soil and water conservation. Past projects failed to incorporate these knowledge systems and environmental conservation mechanisms. Indigenous environmental knowledge and management practices provide a useful basis for sound dry land management and drought mitigation strategies and, thus, programmes and projects should incorporate and build on these knowledge systems.

Lack of attention to local variations and uniform solutions have been applied to the complex problems of land degradation, which vary greatly depending on local situations. As a result, the development of site-specific technologies has been difficult. To be

effective projects should give due attention to the needs and priority livelihood concerns of the local peoples in the dry lands. Recognizing that desertification problems vary from place to place, attention should be given to specific local situations in attempts to tackle its problems.

Because of social, political and economic factors, there is lack of strong research-extension linkages that make extension agents aware of new technologies.

LAND POLICY AND SECURITY

Absence of clear land tenure systems sets back the implementation of long-term soil and water conservation practices, which require confidence by the farmers. Insecure and inequitable land tenure systems are among the principal factors in land degradation and, thus, any sustainable development strategy must deal with land tenure issues in the dryland regions. Therefore, providing equitable and secure access to land is essential for the land users to make labour and other scarce investments that conserve or improve it because the benefits from such investments usually take longer years to be realized.

In Ethiopia, land is publicly owned and the individual is given rights of access to use the land. The present land tenure system gives assurances of ownership rights to the fruits of the land, to soil and water conservation structures as well as trees.

However, pastoral societies such as the Afar and Somali practice communal land ownership. Pastoral groups using communal land ownership systems have enjoyed traditional collective grazing and water rights. This traditional systems of resource use ensures a balance between grazing and the natural environment and prevent overgrazing and depletion of water resources. Therefore, the government should legislate to recognize customary land rights. This will help pastoralists from losing land through encroachments, alienation and being confined to drier and marginal areas that lead to overstocking, overgrazing and land degradation.

There are also some constraints of a policy implementation nature which may affect pastoralists as well as farmers in the drylands. One such constraint is the reallocation of land which occurs from time to time. It is a serious disincentive which discourages long-term improvements in a particular piece of land. Although redistribution may sometimes be necessary, care must be taken to balance both the equity and security concerns.

Again more effort is required to make farmers and pastoralists in the drylands aware regarding the rights they have to land and the utilization of closed and forested hillsides. Lack of awareness about the existence of such rights may have discouraged individuals from undertaking SWC measures. When physical conservation measures such as terracing are carried out by mass mobilization regardless of whether or not the individual land user wants the land treated in that particular way, the discouragement becomes exacerbated.

PROMOTION OF ALTERNATIVE LIVELIHOODS

Another policy problem related to land degradation is the rise in rural unemployment accompanied with serious population pressure. This situation has led to severe degradation of land resources.

RURAL CREDIT PROGRAMMES

Poverty is a general problem in Ethiopia and the populations of the drylands are no exception. They lack the human, technical and financial resources to undertake the management and development of water and soil resources as well as to involve themselves in off-farm activities which will reduce their dependence on natural resources. Provision of credit in rural areas to poor farmers is gaining momentum. It is important that existing policies or policies yet to come should give more emphasis to the establishment of rural credit institutions in the drylands which are often neglected because of their inaccessibility.

INTENSIFICATION AND DIVERSIFICATION OF AGRICULTURE

Available literature strongly suggests that local farming systems have often been superior to modern ones depending on new technologies and many externally purchased inputs. Indigenous systems were often less risky, more equitable and used available human and natural resources fully and productively. Though modern science and technology can make a big contribution, it is very difficult to introduce modern technologies without their accompanying negative social and environmental impacts. High external input farming systems tend to be disadvantageous especially in poor countries such as Ethiopia because external inputs such as agrochemicals and farm machinery have to be imported from abroad. This situation increases national dependence on external aid, exports and loans and often leads to the exploitation of local people by intermediaries. High external input systems also tend to be disadvantageous because they make intensive use of fossil fuel energy while making lesser use of the most abundant resource in poor communities and countries-human labour.

Though sustainable farming systems should ideally be based on indigenous knowledge and the use of local resources in each locality, growing integration into national and global economies inevitably implies the use of purchased inputs and technologies.

In the face of this, sustainable farming systems that use available labour productively and fully and use low external input tend to be advantageous

because they are less disruptive of traditional social systems and minimize dependence of local people on undependable and adverse national and international terms of trade. Such farming systems could also contribute to improving the food security of vulnerable groups and at the same time protect resources from degradation.

AWARENESS BUILDING AND ACCESS TO INFORMATION

Farmers and local government officials may be aware of the degradation problems but not of the root causes of the problems. Although this fact is well recognized by officials at national and regional levels, the efforts being made to make farmers and pastoralists alike aware about the technologies developed to combat desertification and mitigate land degradation through the prevention of the slow depletion of the soil and water resources are minimal.

This may be partly due to the limited capacity of the extension service in the country to reach large numbers of farmers and transfer technology through other means such as farmers' days as well as the limited use of the mass media, including published materials, radio and television programmes designed to enhance the awareness of farmers about newly developed technologies.

MEASURES TO ENHANCE INSTITUTIONAL ORGANIZATION AND CAPACITY

More emphasis is required with respect to measures which will strengthen local (whether traditional or newly developed) institutions. At present, existing institutions developed by the populations of the drylands do not seem to get the attention they deserve. There is particularly a lack of adequate numbers of strong rural development institution such as farm cooperatives in the drylands.

Although rural community institutional strengthening is very important, institutional problems at higher levels should also be looked into. An example is the poor institutional arrangement in the forestry sector which has been mentioned elsewhere in this document as one of the major institutional gaps. Actions to resolve such institutional problems is also important.

Shortage of properly trained extension agents who are aware of and familiar with the dryland agricultural problems and the technologies developed to abate the problems pastoralists and farmers are facing in these areas is another serious shortcoming which requires attention.

Another important and, indeed, indispensable requirement for the success of rural development in general and sustainable conservation and utilization of natural

resources, which is closely related to strengthening democratic local level institutions, is participation. The concept of participation, essentially, has three dimensions: a process of involving people in the development decision-making, eliciting people's contribution to development programmes, and the process of sharing the development benefits among the people.

There have been a number of rural development and natural resource management projects in different parts of the country, including the dryland areas. These include: agricultural development, forestry, soil and water conservation, rangelands/livestock development and wildlife conservation projects supported by various bilateral and international agencies and NGOs.

However, past efforts at development, including the control of desertification and mitigating the effects of drought in Ethiopia, were not based on participatory approaches.

Although people might have participated in water and soil conservation projects in the sense of making labour and other contributions, they were not involved in the decision-making process and were not the full beneficiaries of the projects. There are recent observable changes in the approach that both government and non-governmental organisations are using in assisting communities to undertake development activities, including natural resources management. Various participatory mechanisms are being used in an effort to involve communities in the inception, planning, implementation and monitoring and evaluation of conservation programmes and projects. It is important that these new approaches become widely practised as a matter of principle not as an experiment only. Future programmes and projects should be based on the participation of the intended beneficiaries in the design, implementation and evaluation of projects. Community empowerment, that is, local control of resources and decision-making, is an important pre-requisite for achieving sustainable use of natural resources, and local people must be assumed that they have genuine control over their natural resources.

Several recent studies reveal that indigenous knowledge systems form the most viable basis for sustainable approaches to development of workable dryland management and drought mitigation strategies. The 1992 UNCED in its programme of action makes provisions for people's participation in strategies to combat desertification as well as for the respect of indigenous knowledge, organization and technology and a bottom-up approach.

Though indigenous knowledge systems are valuable resources, these knowledge systems have been undermined. Undermining indigenous knowledge leads to increasing dependence of local people on outside expertise. Therefore, indigenous knowledge pertaining to local resource management and traditional soil and water conservation mechanisms should be incorporated into sustainable

dryland management programmes and projects.

1.2 Constraints and Gaps in Programmes

The arid, semi-arid and dry-sub-humid parts of the country are highly vulnerable because of low rainfall and high temperature. The combination of low rainfall and high temperature makes man-made efforts to undertake natural resources conservation an arduous task. Indeed the responses and measures taken in the drylands to minimize land use conflicts and reduce and/or prevent resource degradation (which finally express themselves in drought and desertification) were limited.

Degradation of land results essentially from its use by man beyond its capacity. Physical characteristics (slope, soil types, rainfall erosivity) are not the sole causes for land degradation/desertification. Socio-economic conditions in dryland areas have contributed to land degradation and desertification processes through inappropriate land use.

Because the policy constraints and gaps identified earlier in this document contribute to the formulation of unsatisfactory natural resources conservation and utilization programmes, a situation where the programmes do not wholly achieve their objectives is created.

Programmes do not seem to take into account (or take into account only partially) the following issues:

PARTICIPATORY NATURAL RESOURCES MANAGEMENT

Managing natural resources in a participatory manner, including, among others, joint or co-management, is known to create a vested interest and a sense of ownership in the communities living near or inside the resource base. This sense of ownership or vested interest can create a situation where the communities enthusiastically involve themselves in guarding the resources from any degradation.

If one takes forest resources as an example, there are no forests in Ethiopia which are free from human encroachment, including the forests in the vicinities of semi-arid and dry sub-humid zones such as the Wadera and Megada. Unless participatory resource management systems are put in place, including joint and co-management of resources, no forest resource will be free from encroachment and destruction. There is, therefore, a need for a participatory forest management through involvement of people living within or near forests. No action should be taken without the consent of the stakeholders.

ENCOURAGING PRIVATE SECTOR INVOLVEMENT IN FOREST

DEVELOPMENT

The policies of the present government are more conducive for the development of the private sector. Proclamation number 94/1994 has allowed private forest ownership but, there is still suspicion as to whether the land lease system would encourage investing on long-term forest development. Many realize that forest development is a worthwhile business and is a saving to the future. However, owing to a sense of insecurity created by the lease system, not many are investing in forestry. There is a need to encourage the private sector to involve itself in forestry development. If forests are developed, the pressure on the existing natural forests will obviously be reduced.

BENEFIT SHARING WITH COMMUNITIES LIVING IN OR AROUND NATURAL RESOURCES SUCH AS FORESTS, WILDLIFE AND TOURISTIC ATTRACTIONS/ INCENTIVES

The farming communities found within or at the periphery of forests and national parks used to have no rights concerning use of such resources. Forest development and other protected areas were established without the consent of the community and, as a result, the community members faced critical shortage of grazing lands. There were no clear objectives when patches of man-made forests were planted on any available land in a community. No one was clear as to what to do with them once they were established. Consequently regulations governing management of such forests were not respected by the communities living around them. Often tree cutting for timber or for fuel wood was commonplace..

The right to harvest fruits and grass from forests, the right to graze animals in forests and sometimes even in other types of protected areas, access to water, the right to walk through, the right to collect firewood and construction material are some of the necessities a farming community looks for. Incentives may include sharing of income generated from the use of such resources with communities e.g.- incomes from national park visitors. What may happen in the absence of this kind of benefit sharing and incentives has been demonstrated during the few days of unrest which prevailed following the downfall of the Derg's Regime. The people's outrage was shown in their acts of destruction against state- owned forests and national parks. They have even destroyed forests which were planted by themselves on community lands. The policy that made all rural land to become government land left no incentive to rural dwellers (both farmers and pastoralists) to properly utilize natural resource and to protect the environment. Wildlife and tree cover and other related resources were thus destroyed and exploited beyond the rate of natural regeneration.

Since then the government has made a strong effort to curb deforestation by prohibiting transport of charcoal and fuelwood. But both pastoralists and ex-military personnel continue to depend on the harvest and sale of wood and grass. This pressure is not confined to the commons but included National Parks and Biological Reserves as well.

INFRASTRUCTURAL DEVELOPMENT

Basic infrastructure such as roads, guard houses, among others, are lacking in most of the major forests and other protected areas such as the national parks of the country. For example, a forest or a natural park where there are no technicians or guard houses could not be considered as a properly managed forest, since the actual forest managers do not live in the proximity of the forest area.

The infrastructure developed earlier were destroyed at the time of the change of government. Building access roads in protected areas (forest and parks) has long been stopped. As a consequence, patrolling the protected areas to control theft and fire is becoming more and more difficult. Literature reveals that in the case of forests, 20 mts of access road for each hectare of forest is the proper access road density.

Because natural resources conservation and utilization programmes in the drylands failed to incorporate the issues discussed above, numerous problems, some of them very serious, still prevail. The following are the major ones:

CLEARING OF FORESTS FOR AGRICULTURAL EXPANSION

This process has been mentioned as a central problem contributing to forest destruction in all the arid, semi-arid and dry sub-humid parts of the country. Hundreds and thousands hectares of forest land are claimed from time to time for agricultural purposes. The Middle Awash irrigated agriculture and the newly expanding irrigation projects in the Somali Region are some of the examples from the arid zones. This same problem has also been mentioned as serious in Tigray and Southern Peoples Nations and Nationalities Region (e.g. Mirab Abaya).

In the dry sub-humid parts of the country agricultural expansion has been identified as a central problem. It has been mentioned as a serious problem in Gambella, where the Alwero irrigation project has taken more than 140,000 ha of forested land. A similar problem has also been identified in Benishangul.

CUTTING OF TREES FOR FUEL AND CONSTRUCTION

In Ethiopia, the majority of the rural as well as the urban population is dependent on wood. Wood is the main source of energy in Ethiopia. With high population growth, driving the rising energy demand and with non sustainable fuel wood production, the country is experiencing a widening wood fuel deficit.

The woodlands in the arid and semi-arid parts of the country are being exploited for fuel wood and charcoal making purposes (Afar and Somali). With the exception of major

towns, where well-to-do families live, most of the houses in Ethiopia are made from wood and mud. The plantation forests developed to date are negligible and cannot satisfy these demands. The annual incremental yield from the forests of Ethiopia does not exceed 14.5 million cubic meters, whereas the demand on fuel wood alone is more than 45 million cubic meters annually. The difference for the demand is satisfied through the exploitation of resources of the commons, thus putting more pressure on the natural forests.

The arid, semi-arid and dry-sub-humid parts of the country are highly vulnerable because of low rainfall and high temperature. The combination of low rainfall and high temperature makes man-made efforts to develop forest resource unlikely.

Shortage of wood is a common problem in the arid, semi-arid and dry sub-humid parts of the country. In Afar, the Middle Awash state farm alone has an average fuel wood consumption of 5 m³ per family per annum. This brings a requirement of 35,000 m³ of wood annually. In the Somali Region, the fuel wood crisis has forced communities to cut the gum and incense trees for household use. In Tigrai, which is a typical semi-arid area, the fuel wood crisis is at its apex; a similar situation exists in Dire Dawa, and the same can be said for Borena and Moyale, among others.

OVERGRAZING

Grazing land shortage is a major problem of the arid, semi-arid and dry sub-humid parts of the country. For instance, in Afar, the Acacia woodlands are lopped and chopped to feed the livestock during the dry season. This inflicts change on the status of the Acacia woodland in the area.

Overgrazing is an acute problem in Tigrai. The Borena people have special regard for the woodlands in their area. They believe that their animals get shelter under the forest. It is also noted that new grass is always found under the forest. They do not usually mismanage the forest resources; however, the area is overgrazed in its totality.

The Kembata, Alaba and Timbaro area which is a dry sub-humid zone suffers from problems associated with grazing. Any available common land is grazed and often overgrazed. Overgrazing is a problem in Gondar as well and it has been recorded that overgrazing is a serious problem in the Bir Valley in Gojam.

ENCROACHMENT OF PROTECTED AREAS

Protected areas are encroached. Such encroachment is manifested in overgrazing, tree cutting, killing of wildlife, charcoal production and even human settlement and cultivation.

UNCONTROLLED FIRE

Uncontrolled fire is a serious problem everywhere. There are various reasons for starting fire in protected areas. One of the most frequent practices in most, if not all parts of the country, is starting deliberate fire to remove tick from a given surrounding, and at the same time facilitating the growth of palatable grass for livestock. This practice, coupled with the aim of clearing weeds and grasses for cultivation, is very common in most parts of the country, but is much more pronounced in the south, including the Rift Valley area. Other reasons for starting fire is to fumigate bees during honey collection. Any burning material left in the area unextinguished may expand and destroy the surrounding vegetation. Campers are also mentioned as having caused fires. The Benishangul experience revealed that fire is being initiated by the traditional hunters to help them close the corridor through which important wildlife move.

POLICY IMPLEMENTATION

The government policy encourages the development, utilization and conservation of forests. This has been enacted in Proclamation No. 94/94 which has clearly put that there will be check-points established to control the movement of forest products.

There are several reasons for making such a move. There are forest species which have been given protection by the proclamation. Because of the abolition of the check-points, lumber of all species is nowadays available in the market. It is, therefore, important to device means of ensuring the consistency of one policy to the other. Mechanism for the follow-up of policy implementation is essential.

1.3 Constraints and Gaps in Legislation

WILDLIFE LEGISLATION

The draft wildlife legislation focuses too much on restrictions and prohibitions. It hardly contains provisions reflecting recent trends in the conservation and sustainable utilization of wildlife such as allowing reasonable access to wildlife resources, participation in the designation and management of protected areas as well as benefit sharing. It is also interesting to note that the draft defines wildlife only as "any wild animal indigenous to Ethiopia including migratory species passing over or temporarily residing in Ethiopia", thus effectively excluding wild plants

FOREST LEGISLATION

About six years have elapsed since the Forestry Proclamation No. 94/94 was issued. How much of it is being implemented is an issue which needs further investigation. One thing is clear; under article 13/1 of this proclamation, it is stated that utilizing or harvesting threatened forest species such as *Hagenia abyssinica*, *Cordia africana*, *Podocarpus*

gracillior and *Juniperus procera* is prohibited. Under article 14 of the same Proclamation, it is stated that forest guards and inspectors have the power to check and control the movement of forests. The practical situation indicates that these two important articles are not being implemented for the only reason that forest "check-points" established at the main gates of towns and cities have been abolished. It is, therefore, very essential to assess the implementation of the Proclamation and to revise the Proclamation itself to amend its shortcomings. The forestry legislation is not accompanied with implementation regulations. It will not be of much use without such implementational regulations.

WATER UTILIZATION LEGISLATION

The water utilization legislation is faced with the same situation as the forestry legislation. In addition, the latter legislation focuses more on procedural matters for granting water use rights and hardly contains provisions to eliminate or minimize the adverse effects on water resources by other activities.

MISCELLANEOUS LEGISLATION

There are also areas of natural resources management that are not covered at all or not sufficiently covered by legislation. The major ones of relevance for combating desertification are land utilization and administration and soil conservation. Legislation on Environmental Impact Assessment (EIA) is also not in existence at present although EPA is preparing draft procedures and guidelines. Once the framework legislation presently being drafted by EPA is enacted, the next logical step would be to start a systematic approach of reviewing sectoral legislation. EPA should take the initiative in this regard and coordinate the sectoral review. During such review attention can be given to integrating provisions for combating desertification as found necessary.

CHAPTER TWO: PROPOSED APPROACHES TO COMBATING DESERTIFICATION

2.1 Introduction

Under the Convention, Affected Country Parties have undertaken the obligation to "establish strategies and priorities, within the framework of sustainable development plans and /or policies, to combat desertification and mitigate the effects of drought" among others. Implicit in this obligation is that affected countries have framework sustainable development policies and plans which are, among others, suitable for combating desertification and the effects of drought. The National Action Programme envisaged in the Convention, may therefore, be adequately linked to such framework sustainable development policies and plans, and , where such policies and plans are deficient in relation to combating desertification and mitigation of the effects of drought, they need to be reviewed appropriately. However, an alternative option may be to ensure that the NAP incorporates any additional policies and strategies of a short- , medium- and long-term nature required to supplement the existing sustainable development framework or to make them more focused on the arid, semi-arid and dry sub-humid areas.

Article 10 of the Convention and Article 8 of the Regional Implementation Annex for Africa specify the important issues that need to be dealt with by a NAP. These issues are:

- development of a participatory mechanism which ensures active involvement of local populations and communities. Participation implies also decentralised and democratic governance structures including empowering local populations and communities to manage natural resources;
 - identification of factors which lead to desertification and/ or drought, including measures required to enhance knowledge about desertification, as well as the existing resources which are available for use and any additional requirements thereof;
 - development of appropriate policies and institutional mechanisms required;
 - measures designed to combat poverty through improvement in the economic situation of affected populations and communities;
 - measures which will improve the conservation and sustainable utilization of natural resources; and
 - measures required to monitor and asses the effects of desertification and drought.
- The CSE sectoral and cross-sectoral umbrella policies and strategies do not give

prominence to desertification although issues leading to land degradation and, consequently to desertification in arid, semi-arid and dry sub-humid areas are taken into account. This is an oversight which requires correcting, particularly in view of the fact that close to 61 percent of the country's area falls within the definition of such desertification prone zones. Although the existing operational sector-specific policies contain numerous policies and strategies designed to promote the sustainable use of land and the natural resources thereon, such policies and strategies are also, in some respects, of such a general nature that there is a need to restate and amplify them in the NAP. These issues include: improving knowledge on desertification and drought, improving the socio-economic environment, provision of basic infrastructure, promotion of alternative livelihoods, rural credit facilities and desertification fund, diversification of agriculture, promoting awareness and access to information regarding desertification and drought, institutional and organizational capacity building. Review of these policies and strategies as well as review of the existing sector-specific relevant policies when undertaken by EPA and other cooperating federal organ, should seek to take into account the issues of desertification and drought and ensure that such issues are integrated within the overall policies and strategies of the relevant sector. The situation is the same in the area of the cross-sectoral strategies. They contain policies and strategies with scattered references pertaining to poverty, alternative livelihoods and measures which are likely to improve the socio-economic conditions of the affected communities. These also need to be reshaped, added to and amplified in the same manner as suggested for the sector specific policies and strategies.

2.2 Overall Goal, Guiding Principles and General Objectives

OVERALL GOAL

To increase human well-being in the arid, semi-arid and dry sub-humid areas of the country through the conservation and sustainable utilization of land and other natural resources.

GUIDING PRINCIPLES

- Enhance regional economic development.
- Protect the environment and manage natural resources through sustainable production systems designed to stop/control desertification and mitigate the impacts of drought.
- Develop human resource through enhanced participation of local communities in planning, implementation and monitoring development projects and programmes as well increased formal and non-formal training. It should be appreciated that

sustainable soil and water resources conservation can only be maintained through the involvement of the whole population, including local communities, in planning, implementation of programmes to combat desertification and mitigate the effects of drought. This should be facilitated at federal, regional and community levels.

- Increase knowledge and inculcate a sense of community responsibility and ownership of natural resources.
- Give full consideration to the rehabilitation of degraded lands as well as the conservation of and sustainable management of water and soil resources in the drylands at federal, regional, community and individual levels.
- All citizens of the country in general, and people residing in arid, semi-arid and dry sub-humid areas in particular, should strive to develop a better understanding of the nature and value of land resources, the expansion of desertification and land degradation and create partnership and cooperation towards sustainable use.
- Clearly defined rules and regulations for the access, management and equitable sharing of benefits are prerequisites for the sustainable use of common property resources.
- Local communities have informal associations of people who share common interests and/or who cooperate on various tasks. There are also voluntary associations such as producer and marketing groups. These institutions can be used as the basis for promoting development at the community level.
- Effective desertification control projects and programmes should place a high priority on the needs and aspirations of the intended beneficiaries (vulnerable social groups) and should actively involve these groups in project design, implementation and evaluation.
- Public policies and market forces have to become supportive of sustainable development. Both public policies and market forces will have to be directed towards promoting poverty alleviation, social solidarity and ecologically sustainable development as primary goals.

National strategies should, among other things, attempt to provide real opportunities and incentives for vulnerable groups as well as for the well-off groups in dryland regions to manage their natural resources sustainably. At the same time, they have to improve livelihoods. Price, trade, credit, investment, social, fiscal and other policies, all have to be designed to contribute towards meeting the priority objectives of sustainable development.

OBJECTIVES

- Enhancement of policies and strategies for the conservation and sustainable utilization of the natural endowments of the arid, semi-arid and dry sub-humid areas.
- Ensuring that tenure and access rights to land and other natural resources in these areas are conducive for conservation and sustainable management.
- Strengthening institutions and organizations for the conservation and sustainable utilization of natural resources, particularly at the local level and promoting local coping strategies through better understanding.
- Maintaining and, where possible, enhancing the state of the resource base in these areas.
- Increasing income diversification opportunities within these areas and strengthening linkages of their economies with non-agricultural sectors of the economy.
- Promoting an improved productivity of land through rehabilitation of degraded areas, conservation and sustainable management of soil and water resources leading to improved conditions for the dryland communities.

2.3 Policies

The policies and strategies required for agricultural and pastoral land, vegetation cover, wildlife, forests, water resources, biological diversity are well developed in the CSE, the existing and operational sector-specific policies and strategies as well as in those policies yet in draft form. Their implementation, where necessary after being reviewed, in the arid, semi-arid and dry sub-humid areas will adequately take care of natural resources management concerns in the dryland zones. The following additional policies and strategies are being proposed to fill the observed gaps.

IMPROVING KNOWLEDGE ON DROUGHT AND DESERTIFICATION

Policy No. 1: Research and Development

A research and development system which shall be demand driven shall be put in place.

Strategies

- Prepare an inventory of all research undertaken in the past with regard to issues and problems of sustainable development in the ASALs as well as assess the extent of adoption of research results including, if any, reasons which have led to unacceptability.
- Ensure that on-going research regarding sustainable development, particularly the sustainable management of natural resources, gives adequate attention to issues and problems faced by farmers and pastoralists in the arid, semi-arid and dry sub-humid areas.
- Take measures which will encourage farmers and pastoralists to identify and define their research and technology needs and to ensure that research and technology development activities will be driven by demand from the concerned communities.
- Develop a system whereby farmers and pastoralists carry out collaborative research as well as apply research results.
- Channel adequate resources towards research which tackles the issues and problems in the ASALs and, particularly study and implement ways and means which will enable community organizations to access funds which they can use for commissioned research on specific localized issues and problems.
- Encourage research designed to identify appropriate local knowledge and technologies as well as to integrate such knowledge as technology with other appropriate science-based knowledge and technologies.
- Continue and intensify range and animal resource improvement efforts, including the modernization of the livestock production systems along with the improvement of the traditional livestock management systems in the rangelands.
- Improve dryland farming through the growing of drought and pest/disease tolerant varieties and crops, introduce water harvesting techniques and agro-forestry practices for increased food and feed resources.
- Establish policy which gives priority to research needs and areas in water management, control of wind erosion and moisture conservation techniques.
- Find compatible and efficient alternative energy sources, acceptable to the society, and disseminate the technology to willing citizens. (Solar cookers in the lowland receiving enough diurnal sun energy and bio-gas in places where water, biomass and animal dung are available).

- Strengthen the capacity to undertake and carry out research required in these areas, particularly on such critical issues as the link between productivity and technologies for conservation of land and other natural resources, the impact of technology introductions, yield gap analysis, various incentives, integration of crop and livestock systems, drought resistant and short growing period food and cash crop varieties and more productive and locally adapted livestock breeds.
- Strengthen the capacity of the existing soil and water conservation research and establish research programmes in arid, semi-arid and dry sub-humid areas.
- Design a research programme which focuses on energy saving technologies such as stove design, and socio-economic factors conditioning the acceptance of new technologies.
- Ensure that research findings on ASALs and other relevant knowledge of wide application are widely disseminated and popularized particularly among farmers and pastoralists for adoption and adaptation where possible using on the ground demonstrations.
- Strengthen the capacity of relevant government institutions at federal and regional levels to collect, analyze and disseminate information and knowledge on desertification and drought.
- Strengthen and encourage the use of traditional knowledge and information transmission methods to broader understanding of the desertification phenomena as well as the means of controlling them.

IMPROVING THE SOCIO-ECONOMIC ENVIRONMENT

Policy No. 1: Policy Environment

Policy provisions for the conservation and sustainable utilization of land and other natural resources in the arid, semi-arid and dry sub-humid areas shall be adequately integrated with other sustainable development policies.

Strategies

- Develop policies which are designed to alleviate poverty, promote growth and encourage the sustainable use of natural resources.
- Make every effort to involve all stakeholders, particularly farmers and pastoralists in the formulation of such policies.
- Ensure that the mechanisms and institutions for policy implementation are

well defined.

- Ensure that policy formulation, coordination and implementation mandates and responsibilities at federal, regional state and local levels are well defined.
- Ensure that the formulation and review of sectoral and cross-sectoral sustainable development policies takes into account the policy provisions contained in the National Action Programme for adequate integration.
- Undertake awareness and capacity building programmes that will sensitize policy makers, professional, NGOs as well as farmers and pastoralists about this National Action Programme.

Policy No. 2: Security of Tenure and Access to Resources

Natural

The Government shall ensure that land and other natural resources administration measures adhere to the requirements of provisions in the federal and regional state constitutions as well as legislation and regulations designed to guarantee security of tenure to land and access to natural resources.

Strategies

- Ensure that land and natural resources administration regulations and rules developed and applied by the regional states and their local governments are in line with the federal and regional constitution as well as federal land and natural resources administration laws.
- Ensure that such regional and local regulations and rules are applied correctly through the participation of the communities concerned.
- Ensure that communities are provided with genuine proprietary rights to use and fully benefit, determine the mode of usage and the rules of access, and determine the distribution of benefits from common property resources.
- Ensure that further development of common natural resource management are supported by changes in state regulations in respect to tenure on common property and/or cooperative organization. Unless such changes are made, conflicts and power struggles are inevitable and the collective management system may fail.
- Undertake programmes of awareness at community levels to enable

farmers and pastoralist to understand the extent of their rights to land tenure security and access to natural resources under the federal constitution and other laws of the country.

- Take measures that will accelerate the implementation of constitutional and legal provisions that give women the right to own land as well as generally empowering them.
- Facilitate voluntary resettlement and migration of populations from densely populated areas through the identification of such areas, granting lands, providing credit and construction of physical infrastructure.
- Create mechanisms for the actual application of concepts of benefit sharing and reinforcement of the rights to access natural resources.
- Continuously monitor, assess and review the policies, laws , rules and regulations with the aim of finding out their impact and changing or modifying them as necessary with the participation of the communities.

Policy No. 3: Creation and Development of Markets

Government shall make increased effort to facilitate the development of markets which will enable farmers and pastoralists to sell their products as well as to buy necessities, particularly inputs required for production.

Strategies

- Promote the establishment of marketing cooperatives and build up their capacity to sell and buy products.
- Facilitate the establishment of schemes which can provide credits to cooperatives and individual traders.
- Facilitate the development of a system for the collection and dissemination of market information including prices of commodities and inputs.
- Improve livestock off takes animal by-products through improved livestock markets and marketing.
- Temporarily subsidize the transport cost of providing inputs to remote and isolated areas which are food deficit and phase out such subsidies as infrastructure and private markets develop.
- Study the possibility of creating a seed certification system which will

facilitate the development of an informal seed supply market.

IMPROVING BASIC INFRASTRUCTURE

Policy No. 1: Social and Infrastructural Investment

All efforts shall be made to provide basic infrastructure (e.g. rural roads, clinics, water supply, schools, etc.) in order to improve the health and living conditions of the farmers and pastoralists as well as to stimulate economic growth.

Strategies

- Undertake a programme of road maintenance through the full or partial participation of the concerned communities whenever possible.
- Construct new roads particularly focusing on linking farms and livestock producing localities to markets.
- Encourage rural road building through the participatory effort of the communities in these areas.
- Render technical assistance to communities involved in rural road building, including giving basic training to persons elected by the communities.
- Increase the availability of water supply for domestic, livestock as well as, whenever possible, for agricultural purposes as well as sanitation facilities.
- Assist farmers and pastoralists to build and manage schools and health facilities in their localities.
- Promote the expansion of telephone, postal and electric services.
- Promote labour intensive methods of building infrastructure.

PROGRAMMES WHICH PROMOTE ALTERNATIVE LIVELIHOODS

Policy No. 1: Alternative Livelihoods/Source of Income

A conducive environment for the creation of diversified forms of alternative livelihood and income generating activities for farmers and pastoralists shall be promoted inside as well as outside the arid, semi-arid and dry sub-humid areas in

order to alleviate poverty, increase income and reduce pressure on land and natural resources.

Strategies

- Promote an overall industrialization programme designed to particularly absorb excess population from the ASALs.
- Promote the development of small-scale agro-industry using farm and livestock products for further processing.
- Encourage private sector investment through, among others, the provision of incentives, to invest in employment generating activities.
- Undertake a programme of training individual farmers and pastoralists with particular focus on women, in various skills and trades which can service the needs of their communities.
- Promote diversification in agriculture, including growing cash crops such as vegetables and fruits and promote the development of markets for such agricultural products.
- Encourage the establishment of information regarding feasible alternative livelihood options and the demand for the services, products and employment opportunities resulting therefrom.
- Facilitate the development of rural credit institutions to provide alternative livelihood and income generating activities start-up funds with particular focus on poor farmers and pastoralists as well as women.
- Minimize or eliminate land use conflicts through economic integration between the highlands and the lowlands, that is between pastoralism and agriculture and forest development.
- Enhance diversified economic activities in the drylands such as the production of charcoal/fuel wood production, exploitation of gums and resins, wildlife handicraft/cottage industries and direct and indirect benefit from the high bio-diversity.
- Develop and exploit other natural resources such as mineral resources and energy resources.
- Improve livestock and range resources through better rangeland management, animal health, breed improvement and feed resource.

- Strengthen capacity of farmers and pastoralists to undertake various alternative livelihood initiatives through skills development and vocational training.

RURAL CREDIT PROGRAMMES, INCLUDING ESTABLISHMENT OF A FUND TO COMBAT DESERTIFICATION AND THE EFFECTS OF DROUGHT

Policy No. 1: Rural Credit Institutions

Rural credit institutions shall be facilitated and actively promoted, particularly in those areas where poverty is prevalent and the pressure on land and natural resources is high;

Strategies

- Facilitate the establishment of rural credit institutions both formal and non-formal (e.g. savings and loans associations and 'Equbs') at local levels by providing a conducive policy and legal environment. The government, NGOs, the private sector as well as communities should play a role in the establishment of such institutions.
- Encourage the flow of funding to those credit institutions which are established in remote areas.
- Promote the use of non-traditional forms of collateral such as group responsibility for loans or social sanctions. Employ a group approach. Dealing with groups rather than with individuals minimizes costs associated with loan administration of rural credit institutions. Farmer and pastoralist groups should be entitled to loans relying on group pressure for repayment and they should not be required to put up property as collateral for the loans. The group approach is also important because farmers and pastoralists often adopt new practices as a group rather than individually.
- design and implement a mechanism for establishing and operating a stakeholder managed, independent fund which can be accessed by or for communities to implement community level projects for combating desertification and mitigating the impacts of drought.
- Legalize the mobilization of savings by non-formal saving institutions.
- Build the capacity and skills of farmers and/or pastoralists to establish and

run credit institutions through training.

- Ensure that rural credit institutions adhere to good financial management practices.
- Encourage flexibility in fixing interest rates, loan ceiling and repayment schedules depending on the outcome of the projects and credit beneficiaries.
- Ensure that formal financial institutions develop the capacity to serve farmers and pastoralists with small-scale credit needs.
- Carry out research on non-formal rural credit practices and promote use of positive research findings.
- Undertake awareness programmes and provide information to farmers and pastoralists regarding rural credit institutions.

PROGRAMMES FOR THE INTENSIFICATION AND DIVERSIFICATION OF AGRICULTURE

Policy No. 1: Agricultural Intensification and Diversification

A strong and vigorous diversification program both as a complement and alternative to the traditional pastoral system of production and land use need be put in place. Farming communities, including agro-pastoralists, shall be encouraged and assisted to diversify their agricultural products.

Strategies

- Carry out studies and research to identify possibilities for the diversification and intensification of agriculture in the arid, semi-arid and dry sub-humid areas for increased agricultural production.
- Develop and provide extension packages focusing on diversifying intensifying agriculture.
- Train development (extension) agents from the relevant communities, including farmer and agro-pastoralist agents, to promote the diversification packages.

- Make a provision for incentives and awards for project authorities to implement farmer-evaluated, cost-effective dryland management programmes. Incentives and awards should also be provided for farmers and pastoralists to encourage experiments and innovation.
- Promote high value cash crops such as fruits and vegetables having due regard to the availability of markets both inside and outside the country.
- Promote and assist farmers to plan and implement small-scale irrigation projects in order to ensure that they have water available for supporting their diversification efforts.
- Improve and expand programmes and projects for intensifying livestock breeding and providing veterinary services.
- Encourage the processing or semi-processing of ASAL agricultural and pastoral products for exports.

AWARENESS BUILDING AND ACCESS TO INFORMATION

Policy No. 1: Awareness and Information

Awareness programmes tailored to the needs of farmers and pastoralists in the arid, semi-arid and dry sub-humid areas as well as to the needs of policy and decision makers at all levels shall be promoted; appropriate desertification and drought information systems shall be established at community, woreda, regional and federal levels.

Strategies

- Ensure that desertification and drought issues are adequately incorporated while integrating environment into the educational curricula at all levels.
- Encourage the development of desertification and drought awareness circles in both the rural and urban areas of the arid, semi-arid and dry sub-humid zones of the country.
- Ensure that awareness programmes take into account cultural as well as

linguistic conditions of target populations, and that awareness materials for farmers and pastoralists are simple, clear and understandable

- Promote the involvement of NGOs and other civil society entities in the provision of such programmes of awareness.
- Ensure that awareness activities are coordinated to avoid duplication of effort and gain maximum impacts.
- Establish and/or assist the establishment of information systems on desertification and drought as well as other essential information required for the sustainable development of the arid, semi-arid and dry sub-humid areas.
- Disseminate basic knowledge and skills in environment management by giving environmental education a high priority in the general education policy.
- Raise the capacities of educational systems through training and dissemination of technical information and the provision of adequate resources.
- Promote community-based actions by means of formal and non-formal education, including participative environmental awareness campaigns, using regional languages, and the full range of media delivery.
- Utilize all the possible media outlets. Strengthen the efforts by either state, NGOs and individuals and enrich the package that development workers take to grassroots through training, action, research and continuous follow-up.
- Monitor and evaluate awareness creating programmes to measure their effectiveness.

MEASURES TO ENHANCE INSTITUTIONAL ORGANIZATION AND CAPACITY

Policy No. 1: Institutional and Organizational Capacity

The institutions and organizations that are required for the better conservation and sustainable utilization of the land and natural resources in these areas, particularly the institutions and organizations at the local level, shall be strengthened and,

where lacking, their free and voluntary development nurtured.

Strategies

- Ensure that government structures are adequately decentralized to community and village levels so as to empower the farming and pastoralist communities in the ASALs to manage their affairs including the planning, implementation and monitoring and assessment of natural resources management programmes and projects.
- Strengthen traditional institutional mechanisms which have developed indigenously to manage the social and economic affairs of farming and pastoralist communities, particularly those institutional mechanisms developed to cope with distress situations such as natural and man-made disasters.
- Strengthen existing local informal institutions, no matter how imperfect they may be. Traditional leadership can use social pressure for compliance to rules and can provide mechanisms for dispute minimization and resolution.
- Promote the establishment of farmer and pastoralist level organizations such as service cooperatives and strengthen their capacity to negotiate on equal footing with local government officials, development agents, NGOs or any other entity which is external to them by undertaking continuous human resource development programmes.
- Train farmers and pastoralists in various technologies required to enhance farm and livestock productivity.
- Ensure that local governments (woreda level) work closely with farmers and pastoralists through participatory processes within a framework of cooperation and partnership and not from a position of superiority; enhance the transparency and accountability of local governments to the communities in their jurisdiction.
- Strengthen regional and federal organizational capacity to integrate desertification and drought concerns into development programmes to coordinate the implementation of such programmes as well as the capacity of the relevant regional and federal organizations in providing information and early warning about desertification and drought.
- Strengthen institutions such as the Disaster Prevention and Preparedness Commission (DPPC) and the National Meteorological Services Agency

of Ethiopia (NMSA) at both the Federal and Regional States levels. The operational presence of the DPPC in the arid, semi-arid and dry sub-humid zones of the country is essential. Increased applied and adaptive research and trials as well as early warning systems need to be developed further.

- Establish an objective and result-oriented staff development planning process, including in-service training.
- Ensure collaboration and coordination between different government and non-government organizations. The organizations may include: EPA, MoA, MoE, IAR and universities and colleges, on one hand and non-government organizations, on the other.
- Encourage the formation of linkages between community-based organizations to broaden the possibilities for large collective action.

PROGRAMME FOR EMPOWERMENT OF WOMEN

Policy No. 1: Women's Empowerment

Every effort should be made to ensure the participation of women in all activities designed to combat desertification and mitigate the effects of drought.

Strategies

- Undertake research programmes towards the development and adoption/adaption of techniques which are gender sensitive;
- Take measures of reviewing, amending or repealing, as necessary, laws and regulations in the country which fully or partially deny women access to and control over land and other natural resources;
- Make an effort to make available to women adequate time to participate in activities for combating desertification and mitigate the effects of drought through the facilitation of access to water supplies, household energy sources as well as labour-saving technologies such as grinding mills;
- Develop employment generating schemes and means of alternative livelihood especially suited for women in the arid, semi-arid and dry sub-humid areas;
- Make available family planning services through the provision, among

others, of training programmes, birth control means as well as basic child and mother care;

- Ensure that women get fair representation in decision-making processes and institutions as well as facilitate and promote women's organizations at all levels, but particularly at the grassroots level;
- Promote the training of women development agents to work in the arid, semi-arid and dry sub-humid areas; and
- Undertake an extensive awareness programme designed to change traditional negative attitudes and encourage acceptance of women's basic human rights to be treated as equals to men in social, economic and political affairs.

2.4 Action Programmes

The previous sections discussed the impact, both positive and negative, of past policies, strategies, programmes and projects. As a result of past policy failures, there was no stakeholder participation in the planning and evaluation of development and investment activities. The policies hardly contributed to the prevention of desertification and/or controlling drought. The quality of life and the health of the environment continued to suffer over the years and each successive drought took its toll on people, livestock and wildlife in the rangelands. Development efforts in the past were confined to farm and range and livestock expansion/improvement only and have left little evidence of success. The need to put people first in development planning by empowering them and providing the needed services was also highlighted. A number of areas which required attention in terms of policies and strategies have been identified to effectively halt desertification and mitigate the effects of drought.

In order to translate both policies and strategies into action as well as to monitor and evaluate the results, the Regional States, with the assistance of the Federal Government need to consider taking the appropriate actions.

Volume IV of the Conservation Strategy of Ethiopia contains prioritized action programmes for each of the 11 sectoral and 11 cross-sectoral issues identified and dealt with in Volume III, including the six sectoral and all of the cross-sectoral issues identified earlier as directly relevant to combating desertification and mitigating the effects of drought. These CSE action programmes are categorized into immediate and medium-term priorities. The detailed action-oriented measures under each component of each issue are, no doubt, of general importance to the conservation and sustainable use of environmental and natural

resources. However, additional components and actions should be included to complement those already available in the CSE based on the strategic areas identified in this document.

It is proposed, therefore, that the action-oriented section of the NAP be organized broadly, following the priorities indicated in Article 10 of the Convention and reiterated in Article 8 of the Implementational Annex for Africa. Such prioritization can be summarized in the following major categories:

2.4.1 Action Programme Areas for Managing Natural Resources Leading to Sustainable Development

- * Agricultural and pastoral land
- * Vegetation cover
- * Wildlife
- * Forests
- * Water resources
- * Biological diversity

The action programmes indicated in the CSE Vol IV for the six areas mentioned above can be adopted.

2.4.2 Action Programme Areas for Improving Knowledge on Drought and Desertification

Undertaking research and studies and disseminating the results and findings, e.g. programmes of research related to the extent and root causes of desertification and drought, indigenous technologies, knowledge and adaptive strategies coping mechanisms which can be used to combat desertification and mitigate the effects of drought. Actions in this area should include:

- Agro-ecological mapping.
- Recording indigenous dryland and semi-dryland management practices.
- Identifying research-based management technologies.
- Facilitating farmer experimentation.
- Disseminating farmer-evaluated land management technologies.
- Documentation of adaptive strategies and processes that have led or may

lead to sustainable livelihoods and preparing a model package of recommendations which can be used to reinforce adaptive strategies.

- Inventorying and documenting indigenous knowledge required to combat land degradation and desertification in general, and soil and water resources problems in particular.
- Developing and establishing programmes and support to schools through introduction of curricula on the concept and process and of drought and desertification and the action required to combat them.
- Providing training and conducting workshops on assessment and monitoring of drought effects consequences and measures to be taken, etc.
- Establishing a countrywide network of environmental information which includes data and information on desertification and drought.

2.4.3 Action Programme Areas for Improving the Socio-economic Environment.

- Development of improved socio-economic environment through poverty alleviation/relief and rehabilitation programs and improvement of infrastructures (water, road, markets, etc.).
- Encouraging private sector involvement in natural resources development.
- Promoting benefit sharing with people living inside and at the peripheries of natural resources requiring special management (e.g. protected forests and national parks) and introducing incentive schemes.
- Improving the welfare of rural communities, especially women.
- undertaking socio-economic studies and need assessment of the grassroots community in the drylands.
- Designing Employment Generating Schemes (EGS) for the community-based on needs assessment.

2.4.4 Action Programmes for Improving Basic Infrastructure

- Improvement and development of basic infrastructure to reach the rural communities e.g.- roads.

- Improvement of basic health (particularly family planning programmes) and educational infrastructural facilities.
- Improvement of appropriate water supply for human and domestic animal consumption.

2.4.5 Action Programmes for Promoting Alternative Livelihoods

- Domesticating, managing and exploiting sustainably gums, resins and medicinal plants their domestication and management.
- Establishment of more state, private, community and joint state and country-owned and managed Game Parks and expansion of eco-tourism.
- Introduction of game cropping, on a pilot basis, along with the development of tourist lodges and camps.
- Enhancement of a modern honey and bees wax production (bee keeping).
- Encouragement of individual wood lot production and nurseries.
- Production of charcoal and fuel wood through bush control and sustainable harvesting.
- Development of handicrafts and local cottage industries based on local under utilized resources such is lowland bamboo, (*Oxyamthera abyssinica*), reeds (*Phragmites communis*, *Papyrus* sp.) dyes and tanins (*Lasonia enermis*), castor (*Recinus communis*)
- Development and exploitation of other natural resources including: (a) energy resources (geothermal, solar, wind, fossil fuels, etc., where appropriate) (b) limestone and marble, (c) precious and semi-precious gemstones, (d) salt sulphur and potash deposits.
- Piloting ostrich farming.
- Fishing and fishing equipment production e.g. boat-building.
- Facilitating increases in the production of forestry products on a sustainable basis, including saw timber, fuel wood, poles, fodder and minor forest products;
- Assisting farmers, pastoralists and other rural resources users, particularly

the poor and women to organize themselves for collective action in initiating alternative livelihoods

2.4.6 Action Programmes for Rural Credit Programmes, Including Establishment of a Fund to Combat Desertification and the Effects of Drought

Actions in this area should include the following:

- Developing clear guidelines on who, how, for what purpose can establish rural credit institutions in the ASALs and disseminating them widely.
- Undertaking research and study in the ASALs to identify indigenous institutions which can develop into effective institutions which can provide credit to farmers and pastoralists, particularly the very poor and women.
- Promoting and, where necessary, assisting the development of non-formal credit institutions at local levels run by the farmers and Pastoralists themselves through the provision of training and seed money.
- Abolishing any legal constraints against the operation of non-formal credit institutions.
- Preparing and providing both non-formal and formal credit institutions with minimum rules and regulations of operation to which they must adhere.
- Sensitizing farmers and pastoralists about the availability and the possible uses and benefits of credit.
- Preparing a proposal for the establishment of a desertification fund.
- Organizing workshops to discuss the proposal with the participation of stakeholder groups.
- Approaching donors, both domestic and international, to contribute to the fund.
- Organizing events for raising funds, i.e. bazaars.
- Designating government revenue sources as income for the desertification fund e.g. fines collected from persons contravening environmental laws and regulations.

- Sensitizing communities in the ASALs about the fund and how they can access it.

2.4.7 Action Programmes for the Intensification and Diversification of Agriculture

- Domesticating and exploiting sustainably wild fruits, nuts and leafy vegetables as well as introducing ecologically suitable species of nuts and fruits (i.e. *Xnunia americana*, *Dobera glabra*, *Yehib nut*, *Phoenix* spp, *Dovyalis abyssinica*, *Moringa* spp dum palm, *Opuntia valgaris* (spineless var.)
- Introducing irrigated food and fodder production where appropriate.
- Increasing agricultural production through reduced land degradation and increased soil fertility.
- Expanding dryland irrigated agricultural schemes.
- Developing and maintaining, on a priority basis, more productive and sustainable farming systems at the local level.
- Basing, to the extent possible, sustainable farming systems on indigenous knowledge and the use of local resources in each locality (natural resources and human labour).
- Making selective use of external inputs and technologies.
- Ensuring that appropriate policies including land tenure policies that could facilitate the emergence of more sustainable farming systems in dryland regions are designed, implemented, evaluated and reviewed.
- Providing increased support for site-specific research aimed at integrating indigenous knowledge and practices with modern science into ecologically and socially sustainable farming systems.
- Promoting site-specific socio-economic and technical research before incorporating innovations into local farming systems to understand the impacts of introducing innovations on local livelihood systems and the natural environment.
- Ensuring that local farming systems are developed with the participation of the local groups who will use them.

2.4.8 Action Programmes for Promoting Awareness and Participation

- Undertaking awareness programmes for all sectors of government and civil society regarding desertification and drought in the context of Ethiopia, including through the establishment of an information system.
- Promoting the participation of communities in the planning, decision-making, implementation and monitoring and evaluation of activities designed to combat desertification and mitigate the effects of drought, e.g.- decisions on the conservation and development of natural resources as well as land use plan preparation and implementation Participation may also include contribution of resources (knowledge, labour, finance, technical support, incentives, etc.) from community, government and non-government organizations.
- Facilitating and encouraging the establishment of voluntary associations, youth, women groups' clubs to contribute and play an important role to public awareness.
- Developing and exchanging educational and public awareness materials (leaflets, newsletters, flyers, etc.) in various local languages.
- Arranging for the general public a natural resources day, once a year, to enhance awareness through:
 - * meetings, workshops and seminars with affected people;
 - * mass communication, primarily newspapers, radio and television;
 - * environmental training for media specialists to assist them in disseminating information.
- Integrating environmental education at all levels of training, that is, primary, secondary and tertiary levels.
- Integrating the fragmented efforts by different groups through media outlets, the NGO efforts , by directly contacting grassroots and producing promotional materials. The informal sector participation, out of mere concern, should be integrated and coordinated.
- Establishing and supporting existing research capacity in monitoring and assessing drought and desertification process and combating actions as well as soil and water conservation measures in arid areas.

- Improving on the social aspects of land use; confirming implementation of land use principles.
- Building the capacity of community (local leaders, women groups, youth groups) through provision of training and materials to mobilize on community and individual basis, using existing local resources.

2.4.9 Action Programmes to Improve Institutional Organization and Capacity

Building capacity, particularly at community levels, to make possible the planning and implementation of local level projects for combating desertification and mitigating the effects of drought as well as the assessing and monitoring of impact. These include training farmers and pastoralists on how to plan, implement and assess and monitor their own local level projects. Capacity building of regional and federal institutions will also be required (e.g. early warning systems). Actions in this area should include:

- Strengthening and making functional existing environmental and natural resources and others related institutional mechanisms for NAP implementation as well as empowering local level institutions. Defining with the communities their tasks with regard to the sustainable management of soil and water resources and promoting the development of local level community rules and regulations that deter misuse of soil and water resources.
- Formulating guidelines indicating the roles of public and private sectors in the production, utilization and marketing of natural resources, including forest products.
- Building of capacity for local decision-making. This can be done through:
 - * the holding of workshops or community discussion sessions in which ideas about democratic processes of public formation are addressed;
 - * training of various kinds (e.g. in how to form committees, draw up constitutions and run meetings);
 - * problem-solving exercises, case studies and role-play about situations in which communities find themselves. These kinds of strategies can be very effective among women's groups and among farmers associations.

- Appointing local people as 'change agents' or 'community extension workers'.
- Ceasing the involvement of DAs in activities which undermine the trust that farmers and pastoralists have towards them, e.g. tax collection.
- Using local authorities such as community/traditional village and political leaders.
- Providing educational and training and/or promotion of literacy and numeracy among local people.
- Local control of resources and decision-making, that is, ensuring that local people have control over their own land and natural resources.
- Establish and strengthen extension services from regional to grassroots level to disseminate relevant technical methods and techniques more effectively.
- Strengthening public awareness, participation and education on drought and desertification, their cause and effects.
- Providing training for field staff and PA and rural community members giving more consideration to participatory approach for sustainable conservation and use natural resources in general and soil and water resources in particular.
- Monitoring and assessing (evaluating) of the effects of drought on people, animals and range resources.
- Establishing databases for EIA, EIS, GIS, etc..
- Increasing training and extension services to pastoralists and local leaders.
- Establishing early warning system at various levels (regional, zonal and grassroots levels).
- Equipping implementational institutions with appropriate trained personnel and facilities.
- Establishing a feed back (reporting) system .

2.4.10 Action Programme for Empowerment of Women

Actions in this area should include the following:

- Training women extension agents for the ASAL zones (preferably the trainees should come from the ASAL zones themselves).
- Training male extension agents in the ASALs on identification and incorporation of gender issues in the ASALs.
- Organizing consultative workshops with women's organizations in the ASALs to identify the relevant gender issues and devise ways and means for integrating required measures in programme and project planning in the ASALs.
- Developing and promoting the implementation of guidelines for enhancing the participation of women in decision-making regarding the formulation, implementation and monitoring of development plans in the ASALs.
- Promoting and, whenever possible, assisting the formation of women only associations which advance the empowerment of women and particularly strengthening the capacity of women's groups to negotiate with male-dominated institutions.
- Training women in the skills required in organizing themselves as well as in running their organizations.
- Reviewing and updating the Ethiopian Civil Code and other laws and regulations which have gender bias and ensuring that they are in conformity with the provisions on women in the FDRE Constitution.
- Identifying ASAL women's needs for technology and developing or adapting such technologies for use.
- Building grinding mills.
- Establishing day-care centres.
- Intensifying the construction of domestic water supply facilities.
- Promoting and, whenever possible, assisting, the development of homestead and other appropriate types of tree plantations to meet the domestic fuel wood requirements of women.

- Popularizing the use of energy-saving and smoke-minimizing stoves.
- Undertaking studies to identify possible activities that can provide alternative livelihoods or supplementary income for women in the ASALs and using various means to disseminate the information among them.
- Using existing clinics/health facilities or establishing family planning facilities where non exist, to provide:
 - awareness about family planning;
 - training about measures of health care that women in the ASALs need to take with regard to themselves and their children;
 - birth control means.
- Using various media and fora (e.g.-radio, market places, village social organizations such as Idirs, etc., to advocate and create dialogue about ways and means of changing negative cultural beliefs, attitudes and practices towards women.
- Developing measures which enhance the literacy of women and attendance of girls in schools.

2.5. Institutional Arrangements for Implementation

The new administrative policy allows each Regional State to plan and implement development and investment in accordance with the laws and regulations set by the central government. Indeed, the Regional States, including the Regional states whose economy is based on pastoralism, are preparing action plans but are still weak institutionally to effectively plan and implement developmental projects. To effectively combat desertification and mitigate the effects of drought, appropriate institutional arrangement is essential.

The action programmes and projects detailed in this document need to have the institutional homes as contained in Proclamation 26 of 1993 which details the mandates, powers and responsibilities of the 11 Regional Bureaus.

All these repeated reorganization processes have impacted negatively on the fiscal plans of the sector. The impact on research and continuity of a given policy has been even worse. Manpower displacement, resource misappropriation is common occurrence. The instability has in general affected proper short-, medium- and long- term planning. The

implementation of an ongoing project was either stopped or slowed down with changes in organizational structure.

Absence of a proper and stable institution leads to discontinuity of policy, misappropriation of resources and insecurity of staff employed in the sector.

Proper policy action to stabilize the resource management sector organizational set-up is necessary. The organizational set-up has to take into account the need for autonomy as regards the organization to be formed, so that resource development and conservation efforts will be well coordinated and implemented, as well as properly monitored. The organization to be formed should have the capacity to raise its voice and be listened to whenever a subject of importance in resource management is raised.

Institutional Measures

The Divisions that cater for the drylands in general at present are the Dryland Agriculture and Agro-forestry Division of Ethiopian Agricultural Research Organization (EARO). The overall thrust of research in Dryland Farming and Rangelands Development is at present weak; extension services are also poor.

The training and human resources development of the drylands is now being spear-headed by the Drylands Agriculture Faculty and Centre of the Mekele University College, and a pastoral Research Institution has been proposed under the umbrella of the Alemaya Agriculture University (proposed to be renamed Harrar University with several new faculties added).

The institutional instability that the forestry sector has undergone for the last 40 to 50 years has been given due consideration in this study.

With unstable organizational structure, the following problems were identified:

- . Lack of long-term planning of forestry activities and discontinuity of plans under implementation.
- . Misappropriation and mismanagement of resources in the transition from one organizational structure to the other.
- . Lack of responsible body for the natural resource management during the transition period which was characterized by enhanced destruction of forests.
- . Instability in staff assignment and, under many instances, followed by even mental instability of the staff.

The current policy of the government has decentralized authority to federal government offices. In line with this, an autonomous forestry authority can also be established which will have representation in the regions for actual implementation of the programmes. This is necessary mainly for the following reasons. (a) It has been realized that the present structure of the Ministry of Agriculture is not suitable for forest development, (b) In the Ministry of Agriculture, departments are formed either as regulatory or extension departments. This structure has also been replicated in the regions. The nature of forest development seems to require a different set-up to facilitate development, conservation and management of forests. At present, development does not appear in any of the levels in the whole organogram which apparently indicates that there is no forest development to be undertaken in any of the forests being managed by the state. In a situation where, for different reasons, land tenure insecurity is at its highest and the level of awareness in the community still undeveloped, it will be presumptuous to imagine that the communities will either develop and/or conserve and protect forests. It is, therefore, important that a different structure which allows full autonomy to handle affairs of forestry with packages of important activities such as forest conservation, forest development and forest utilization, wildlife conservation, forest extension and awareness creation, among others, as its main activities, be developed.

The lowlands of the country were not areas of attention from forest development points of view. There were trials here and there but owing to erratic rainfall and problems caused by termites, the efforts were not successful. The structure to be made should, therefore, take an account of lowland forest rehabilitation as an activity that needs focus.

The clue for any development in any sector is knowledge of the status of a given resource. The biggest problem in the forestry sector is the very low capacity to demarcate and inventorize the existing forest resource. Out of 58 forest priority areas, not even 20 are demarcated so far. But, the forest inventory division has been working on it for about 20 years before it was totally dissolved in the current downsizing policy of the existing government. When the activities relevant to the forest resources inventory aspects are considered, only an insignificant portion of the country's forest resource has been inventorized and nothing has been done in the last 7-8 years along these lines since the responsible team for this activity has been disbanded.

The kind of institution required for forestry development should, therefore, be autonomous in order to be able to accomplish such programmes which apparently cannot be handled by either the community or even the regional states at this stage. However, with strengthened awareness creation efforts and with required capacity built in the regional states, the power can gradually be transferred to the community.

The monitoring and evaluation arrangements for the forestry sector should be based on a very strong relationship between a federal autonomous office and that of the regions. The federal office has to assist and provide backstop support for the regional government

and should also give advises on all matters concerning forest development. The federal office will not take part in the actual monitoring and evaluation of the regional forestry bureaus, but should be able to make studies, conduct research and trials whenever the need arises.

The regional bureaux should give special emphasis to issues of concern in the arid, semi-arid and dry sub-humid regions of the country. These bureaux include:

- The Bureau of National Resources Development and Environment Protection.
- The Bureau of Agriculture (including Forestry).
- The Bureau of Mines and Energy.
- The Bureau of Public Works and Urban Development.
- The Bureau of Industry and Handicrafts.
- The Bureau of Culture and Sports.
- The Bureau of Health.
- The Bureau of Education.
- The Bureau of Information.
- The Bureau of Labour and Social Affairs.
- The Bureau of Planning and Economic Development.

The above 11 Bureaus cover most of the programmes and projects detailed in the previous section and projects listed in the following section. The above are largely structures created by the policy mirroring the ministries at the Federal State (Central Government) level. If one is to take Somali or Afar National State which are exclusively based on pastoral economy, the above institutions hardly exist.

Based on the institutions listed above, even if they were developed, one can see obvious gaps as regards the rangelands, dry land agriculture and rangeland management. For instance, although the new EARO has divisions of Drylands and Livestock and that the new Mekele University College has a strong dryland training and research Centre, the deployment of qualified staff and operation of adaptive research/trials and surveys as well as local training remains to be weak at the Regional States level. The education stated to be carried out by the Education Bureau is also only formal training, while what is required, at least initially, is informal or non-formal training and education as it has to be skill-based training. The information base and material developed and available for use

in these areas, both for training and planning, is grossly inadequate or does not exist. At present, nearly all of the Regional Bureaus are highly dependent on consultancy services paid, for the most part, by donors and the World Bank. International NGOs are also key in filling some of the gap at present. But these efforts remain short-term measures and often work against capacity building.

The Drought Prevention and Preparedness Commission (DPPC), which is a key institution for states with pastoral economy, is not well institutionalized, except via some of the NGOs operating under its auspices, such as CARE-Ethiopia, World Vision International, Agri-Service, World Food Programme (WFP), Christian Relief and Development Association (CRDA). These NGOs and others, with few exception, are traditionally relief operations. The former International Livestock Centre for Africa (ILCA) now replaced by the International Livestock Research Institute (ILRI) was quite active in the rangelands in the past, but it has discontinued its field programmes without leaving trained staff behind.

In conclusion, institutional arrangements for research, training/education and project/programme planning and evaluation are particularly weak or absent in the pastoral states and regional rangelands. Those that existed in the past have not been maintained. What little research that had been done in the past has been on livestock and range management with a near total neglect of other classes of animals such as camels, equines, and wildlife.

The data and knowledge base of other resources such as mineral deposits, fossil fuel and other sources of energy is poor and thus hampering their exploitation, which in turn would have reduced the heavy reliance on a pastoral system of land use. The drylands will continue to be degraded and desertification and drought will continue to undermine any development effort unless the action programme and institutional arrangements and strengthening takes place soon.

CHAPTER THREE: PRIORITIZED LIST OF PROGRAMMES AND BUDGET ESTIMATE

I. Prioritized List of Programmes

The National Action Programme to Combat Desertification will be a component of the Conservation Strategy of Ethiopia (CSE). Likewise the Regional Action Programmes to Combat Desertification will be part and parcel of the respective Regional Conservation Strategies.

1. Promoting Peoples Participation in sustainable Development and Management of Natural Resources and the Environment.

components:

- Participatory Development Planning and Programme Implementation.
- Capacity Building and Institutional Support.

1.1. Participatory Development Planning and Programme Implementation.

The immediate priorities are to:

- (a) undertake formulation of Regional Action Plans to Combat Desertification through participation of stakeholders at all levels of the government hierarchy (regional, zonal, woreda);
- (b) undertake participatory local level studies in pilot areas in each region to design specific development programmes that effectively involve and benefit people, but particularly disadvantaged groups, in the arid, semi-arid and dry sub-humid parts of the country.

1.2. Capacity Building and Institutional Support

The immediate priorities are to:

- provide training in participatory methods to local development agents, on a pilot basis;
- provide training at the woreda and community levels in small project design and appraisal in work programming and budgeting, in work

supervision and simple accounting, on a pilot basis.

2. Improving Knowledge of Drought and Desertification.

Components:

- Research
- Capacity Building

2.1. Research

The immediate priority is to:

- undertake a study and assessment of priority areas for environmental research in arid, semi-arid and dry sub-humid areas.

2.2. Capacity Building.

The immediate priority is to:

- provide technical and other support to traditional and rural institutions to enable them to record and report on traditional systems of environmental research and management.

3. Action Programme Areas for Managing Natural Resources Leading to Sustainable Development.

- * Agriculture and pastoral land
- * Vegetative cover
- * Wildlife
- * Forests
- * Water resources
- * Biological diversity

The action programmes indicated in the CSE Vol IV for the six areas mentioned above are

adopted.

Actions that need emphasis, even though they are included in the CSE, are outlined below.

Components:

- Planting material and seed production
- On-farm water management
- Research, planning and other studies
- Small-scale irrigation schemes
- Species and ecosystem conservation.

Capacity building and Institutional Support.

3.1. Planting Material and Seed Production.

The immediate priorities are to:

- (a) rehabilitate at least 50 percent of existing nurseries;
- (b) compile the knowledge and experience of rural people on native trees and make up for the deficiency in scientific silvicultural knowledge in representative woredas of each region.

3.2. On-Farm Water Management.

The immediate priorities are to:

- (a) develop and Promote appropriate methods of rainwater harvesting and improved soil moisture conservation for crop and other biomass production incorporating indigenous techniques and building on them wherever possible, in order to maximize familiarity with and acceptability to, farming communities, on a pilot basis;
- (b) select and promote varieties and provenances of crops and trees that appropriately rest and reduce their water demand during the dry season so that the environment is not desiccated, covering representative woreda's in each region.

3.3. Research, Planning and other studies.

The immediate priorities are to:

- (a) given the lack of information for strategic livestock production planning on livestock numbers and production parameters, to undertake livestock survey and production study in the arid, semi-arid and dry sub-humid areas;
- (b) undertake detailed environmental and social impact studies on existing irrigation schemes in the pastoral areas and formulate, with participation of affected people, a programme of correcting their negative environmental, social and economic impacts through developing irrigated dry season grazing, forage production, water points for the livestock of pastoralists, etc;
- (c) given the dearth of information, to undertake detailed resource, ecological, socio-economic and infrastructural surveys in the Ethiopian rangelands, including the seasonal grazing areas and local resource management institutions.

3.4. Small-scale Irrigation Schemes

The immediate priority is to:

- construct earth dams and ponds for irrigating peasant farms on pilot basis.

3.5. Species and Ecosystem Conservation

The immediate priorities are to:

- (a) carry out bio-diversity studies in arid, semi-arid and dry sub-humid areas of the country to identify the animal and plant species that require protection and to develop action programmes for their sustainable use and conservation;
- (b) develop a system that would help to map out the country's eco-system/ecology

to identify and register the diverse biological resources and to collect, store, protect and utilize the plant and animal genetic resources therein.

3.6. Capacity Building and Institutional Support

The immediate priorities are to:

- 3.6.1. develop and implement intensive in-service training programmes at all levels, in appropriate approaches to local level participatory research and technology evaluation, problem diagnosis, planning and development of improved crop and animal husbandry technologies, integrated and multipurpose land use and the optimum use of rain water and soil moisture for crop and livestock feed production;
- 3.6.2. provide training and technical assistance in MoA and regional agricultural bureaus to develop methodologies of environmental policy review and strategic planning for sustainable agricultural development;**
- 3.6.3. build, through training programmes, the capacity of local governments and traditional institutions to determine their own priorities, and to plan and implement development programmes;
- 3.6.4. build, through training programmes and institutional support, the capacity of the extension service to assist local pastoral communities in planning and implementation;
- 3.6.5. provide training and to raise conservation awareness through workshops and meetings with local communities in and around the parks and sanctuaries;
- 3.6.6. strengthen the bio-diversity conservation role and capacity of traditional institutions, including churches, mosques and communities.

4. Improving the Socio-economic Environment

Components:

- Awareness creation
- Credit facilities
- Capacity building

4.1. Awareness Creation

The immediate priorities are to:

- (a) undertake awareness programmes that will sensitize policy makers, professionals, NGOs as well as farmers and pastoralists about the National Action Programme to combat desertification;
- (b) undertake awareness programmes aimed at communities (farmers and pastoralists) to facilitate full appreciation of their rights to land tenure security and access to natural resources.

4.2. Credit Facilities

The immediate priorities are to:

- establish, on pilot basis, credit facilities to individuals and cooperatives that engage themselves in non-farm activities;
- formulate rules and regulation of credit operations to which beneficiaries need adhere to.

4.3 Capacity Building

The immediate priority is:

- provision of training, on a pilot basis, to farmers and pastoralists to establish and run their own credit institution.

5. Improving Basic Infrastructure

component:

- Capacity Building and Institutional Support

The immediate priority is to:

- render technical assistance to communities involved in infrastructural development, on a pilot basis.

6. Promotion of Alternative Livelihood Systems

Components:

- Capacity Building and Institutional Support

The immediate priorities are to:

- provide skill development training programmes;
- provide technical support to communities in the identification of projects focusing on off-farm activities, on a pilot basis, such as fishing, mining, etc.;
- provide technical and extension services to persons engaged in small-scale mining and quarrying;
- provide vocational training, aiming at skills development;
- provide credit facilities to persons engaged in mining, quarrying, woodlot establishment, fishing, making of fishing equipment, etc.

7. Intensification of Agriculture

Components:

- Small-scale irrigation
- Animal breeding
- Research

7.1. Small-scale irrigation

The immediate priority is to:

- establish small-scale irrigation schemes, on a pilot basis, for the production of food and fodder.

7.2 Animal Breeding

The immediate priority is to:

- formulate animal breeding programmes relevant to the area of concern.

7.3 Research

The immediate priorities are to:

- (a) formulate research projects that will help to discover, popularize and develop fast growing, drought-resistant and multipurpose tree species so as to rehabilitate and develop degraded environments;
- (b) help communities, on a pilot basis, formulate site-specific research aimed at integrating indigenous knowledge and practices with modern science into ecologically and socially sustainable farming systems.

8. Promotion of Awareness

Components

- School clubs
- Environmental publications
- Environmental information resource centres -

Capacity Building

8.1. School Clubs

The immediate priority is to

- support school environmental or environment related clubs, on a pilot basis, so that they compile local information and alert communities to it.

8.2. Environmental Publications

The immediate priority is to:

- produce environmental awareness creation publications relevant to the arid, semi-arid, and dry sub-humid areas of the country.

8.3. Environmental Information Resource Centres.

The immediate priority is to:

- establish environmental information resource centres for use by journalists and mass media personnel as well as other interested individuals.

8.4. Capacity Building.

The immediate priority is to:

- provide training of trainers aimed at promoting understanding of environmental issues by local communities, on a pilot basis.

9. Improving Institutional Organization and Capacity.

Components:

- Capacity Building
- Institutional Support

9.1. Capacity Building.

The immediate priorities are to:

- (a) provide training and logistical support to Natural Resource Database and Information System Service in EPA;
- (b) provide technical and other support to traditional and rural institutions to enable them to record and report on traditional systems of environmental research and management, on a pilot basis;
- (c) build, through training programmes, the capacity of local governments and traditional institutions to determine their own priorities, and plan and implement development programmes.

9.2. Institutional Support

The immediate priorities are to:

- (a) review and revise curricula and textbooks to ensure that environmental issues are addressed adequately and the appropriate values are cultivated among school children, using appropriate languages;
- (b) provide training and to raise conservation awareness through workshops and meetings with local communities in and around the parks and sanctuaries;
- (c) establish natural resources monitoring stations, including monitoring of meteorological resources in the arid, semi-arid and dry sub-humid parts of the country.

10. Empowerment of Women

Components:

- Capacity Building
- Studies

10.1. Capacity Building

The immediate priorities are to:

- (a) train women extension agents for the arid, semi-arid and dry sub-humid parts on the country, on a pilot basis;
- (b) establish and/or strengthen women associations which advance empowerment of women with the aim of strengthening the capacity of women to negotiate with male dominated institutions, on a pilot basis in each region.
- (c) organize consultative workshops to identify key gender issues in arid, semi-arid, and dry sub-humid parts of the country.

10.2. Studies

The immediate priority is to:

- undertake studies to identify possible activities that can provide alternative livelihoods or supplementary income to women in the arid, semi-arid and dry sub-humid parts of the country, to carry out at least two studies per region.

II. ESTIMATED FINANCIAL REQUIREMENTS IN US DOLLARS

Item	Element	Responsible Agency	Project Duration	Project Cost USD
1	Undertake formulation of Regional Action Plans to Combat Desertification	- Reg.En.F.P. - Regions, at all levels of gov.	1 yr	330,000.00
2	Undertake participatory local level studies in each region (pilot areas) in the identification of local natural resources, in at least two woredas per region	NGOs BoA	2 yrs	330,000.00
3	Provide training in participatory methods on pilot basis to local development agents in at least two woredas per region	BoA NGOs	2 yrs	330,000.00
4	Provide training at woreda and community levels in project design, appraisal programme budgeting, in work supervision and simple accounting, on pilot basis, in at least one woreda per region.	BoA NGOs	2 yrs	165,000.00
5	Undertake study and assessment of priority areas for environmental research in arid, semi-arid and dry sub-humid areas.	BoA BCRI EARO EPA	2 yrs	150,000.00
6	Provide technical and other support to traditional and rural institutions to enable them to record and report on traditional systems of environmental research and management.	BoA NGOs EARO	2 yrs	200,000.00
7	Rehabilitate at least 50 percent of existing nurseries in arid, semi-arid and dry sub-humid areas	BoA NGOs	2 yrs	150,000.00
8	Compile the knowledge and experience of rural people on native trees and make up for the deficiency in scientific silvicultural knowledge in representative woredas, one in each region.	Higher Ed. BoA EARO MoA	2 yrs	55,000.00
9	Develop and promote appropriate methods of rain water harvesting and improved soil moisture conservation for crop and other biomass production incorporating indigenous techniques and building on them wherever, possible, in order to maximize familiarity with and acceptability to farming communities on pilot basis, in at least two woredas per region.	ESTC NGOs BoA	2 yrs	100,000.00
10	Select and promote varieties and province of crops and trees that appropriately rest and reduce their water demand during the dry season so that the environment is not desiccated, covering one representative woreda in each region.	BoA EARO	2 yrs	200,000.00

Item	Element	Responsible Agency	Project Duration	Project Cost USD
11	To undertake livestock survey and production study in the arid, semi-arid and dry sub-humid areas	BoA	2 yrs	80,000.00
12	To evaluate environmental impacts of existing irrigation schemes.	Reg EPA	1 yr	130,000.00
13	Formulation, with participation of pastoralists, a programme of correcting negative impacts of existing irrigation schemes, through development (i) of irrigated dry season grazing, forage (ii) forage production (iii) water points.	BoA BoA NGOs BoA NGOs	2 yrs 2 yrs 2 yrs	100,000.00
14	To undertake detailed resource, ecological, socio-economic and infrastructural surveys in the Ethiopian Rangelands, including the seasonal grazing areas and local resource management institution	EPA BoA NGOs	2 yrs	150,000.00
15	Construction of earth dams in at least in two communities per region in arid, semi-arid and dry sub-humid areas of the country.	ESRDF BoA NGOs	2 yrs	330,000.00
16	To carry out biodiversity studies in arid, semi-arid and dry sub-humid areas of the country to identify the animal and plant species that require protection and to develop action programmes for their sustainable use and conservation.	AAU BI	2 yrs	250,000.00
17	Develop a system that would help to map out the country's ecosystem/ecology to identify and register the diverse biological resources and to collect, store, protect and utilize the plant and animal genetic resources therein.	Higher Ed. BI EPA	2 yrs	20,000.00
18	Develop and implement intensive in-service training programmes at all levels, in appropriate approaches to local level participatory research and technology evaluation, problem diagnosis, planning and development of improved crop and animal husbandry, one per region	BoA NGOs EPA	2 yrs	165,000.00
19	Provide training in MoA and regional agricultural bureaus to develop methodologies of environmental policy review and strategic planning for sustainable agricultural development.	MoA BoA EPA	2 yrs	200,000.00
20	Carry out training programmes at least in two woredas per region that enhance capacity of local governments and traditional institutions to determine their own priorities and to plan and implement development programmes.	BoA NGOs MoA	2 yrs	330,000.00
21	Carry out programmes (training, workshops, etc) that will build the capacity of the extension service to assist local pastoral			

Item	Element	Responsible Agency	Project Duration	Project Cost USD
	communities in planning and implementation, on pilot basis, 10 selected communities	BoA MoA EPA	2 yrs	110,000.00
22	Carry out at least one training programme per woreda bordering protected areas, located in the arid, semi-arid and dry sub-humid areas to raise conservation awareness (ten protected areas).	EPA EWCO NGOs	2 yrs	100,000.00
23	Provide support to traditional institutions (Churches, Mosques, etc) on pilot basis, at least in two such institutions per region, to enhance their biodiversity conservation capacity.	BI NGOS BoA	2 yrs	150,000.00
24	Undertake awareness programmes to sensitize policy makers, professionals, NGOS, farmers, pastoralists about NAPCD	EPA, BoA, Reg.	2 yrs	150,000.00
25	Carry out awareness programmes aimed at communities to facilitate full appreciation of their rights to land tenure security and access to natural resources on pilot basis, in five representative communities per region.	PAs MoA, BoA	2 yrs	165,000.00
26	Establishment of credit fund	Local banks Traditional Inst.	2 yrs	1,000,000.00
27	Formulation of projects focusing on off-farm activities on pilot basis in five representative communities per region.	BoA Local NGOS	2 yrs	550,000.00
28	Establishment of small-scale irrigation schemes on pilot basis, in two woredas per region, for the production of food and fodder.	PA BoA Reg,	2 yrs	330,000.00
29	Formulation of research projects that will help to discover, popularize and develop fast growing, drought resistant and multi-purpose tree species.	Higher Ed. BoA EARO	1 yr	110,000.00
30	Formulation of site-specific research aimed at integrating indigenous knowledge and practices with modern science into ecologically and socially sustainable farming systems, on pilot basis.	Higher Ed. BoA EARO	1 yr	55,000.00
31	Support, on pilot basis, at least five schools per region to establish and/or strengthen existing clubs so that they compile local information and alert communities to it.	NGOS BoE EPA	2 yrs	275,000.00
32	Production of environmental awareness creation publications relevant to the arid, semi-arid and dry sub-humid areas in at least five local languages on pilot basis.	MoA BoE NGOS	2 yrs	300,000.00
33	Establishment of environmental information resource centres, one in each region for use by journalists, mass media personnel or members of the public and one at Federal level	EPA MoIC	2 yrs	3,250,000.00

Item	Element	Responsible Agency	Project Duration	Project Cost USD
		Reg.		
34	Carry out on pilot basis, at least two training programmers for trainers in each region, aimed at promoting understanding of environmental issues by local communities.	NGOS EPA BoA	2 yrs	330,000.00
35	Provision of training and logistical support to Natural Resources Data-base and Information System Service in EPA.	EPA	2 yrs	150,000.00
36	Formulation of systems and at enabling traditional and rural institutions to record and report on traditional systems of environmental research and management, on pilot basis applicable to at least tow woredas per region.	BoA EPA	2 yrs	77,000.00
37	Revision of school curricula and text books to ensure that environmental issues are addressed adequately and the appropriate values are cultivated among school children.	BoE	2 yrs	110,000.00
38	Establishment of natural resource monitoring stations, including monitoring of meteorological resources, two in each region.	EMSA BoA	2 yrs	330,000.00
39	Carry out training of women to serve as extension agents for the arid, semi-arid and dry sub-humid parts of the country, on pilot basis, at least one training programme per region.	NGOS BoWA	2 yrs	330,000.00
40	Establish and/or strengthen women associations which advance empowerment of women with the aim of strengthening the capacity of women to negotiate with male dominated institutions on pilot basis, at least one per region.	BoWA	2 yrs	55,000.00
41	Management of consultative workshops on pilot basis in at least two woredas in the arid, semi-arid, and dry sub-humid parts of each region, to identify key gender issues.	BoWA NGOS BoA	2 yrs	220,000.00
42	Undertaking studies to identify possible activities that can provide alternative livelihoods or supplementary income to women in the arid, semi-arid and dry sub-humid parts of the country on pilot basis, at least covering two woredas per region.	Reg. NGOS PAS BoWA	2 yrs	220,000.00
43	Carry out, on pilot basis, at least two training programmes per region, for skills development (e.g. basket making, quarrying, mining, etc.)	Reg. NGOs	2 yrs	330,000.00
44	Carry out, on pilot basis, at least two training programmes per region to farmers and pastoralists to enable them establish and run their own credit programmes	Reg. NGOs	2 yrs	330,000.00
45	Formulate animal breeding programmes one per region on pilot basis; on animals most important in the arid, semi-arid and dry sub-humid parts of the region	Reg. BoA EARO	2 yrs	220,000.00

Item	Element	Responsible Agency	Project Duration	Project Cost USD
46	Carry out, on pilot basis, animal products processing training programmes to at least two selected communities per region.	NGO BoA	2 yrs	330,000.00
TOTAL				13,392,000.00