

**THE STATE OF ERITREA**  
**MINISTRY OF LAND, WATER AND ENVIRONMENT**  
**DEPARTMENT OF ENVIRONMENT**  
**ERITREA'S FIVE YEARS ACTION PLAN**  
**(2011-2015)**



**FOR**  
**THE GREAT GREEN WALL INITIATIVE (GGWI)**  
**DRAFT**

**Asmara, Eritrea**  
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### **Acronyms**

AEAS	- Association of Eritreans in Agricultural Sciences
AMFS	- Applied Marine and Fisheries Science
AEA	- Agricultural Extension Department
CAA	-Civil Aviation Authority
CCA	-Climate Change Adaptation
CITES	-Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMI	-Coastal Marine and Island
CMS	-Convention on the Conservation of Migratory Species of Wild Animals
COP	-Country of Party
DoE	-Department of Environment
DoL	-Department of Land
EAE	-Environmental Agency for the Environment
EAPGREN	-Eastern Africa Plant Genetic Resources Network
ECMIB	-Eritrean Coastal Marine and Island Biodiversity
EEQ	-Environmental Evaluation Questionnaire
EIA	-Environmental Impact Assessment
ERCWP	-Eritrean Country Water Partnership
EINC	-Eritrea's Initial National Communication
ER	-SNRMF Eritrean Sustainable Natural Resource Management Forum
EU	-European Union
FAO	-Food and Agriculture Organization
GEF	-Global Environmental Facility
GIS	-Geographical Information System
GHG	-Green House Gas
GGWI	-Great Green Wall Initiative
GoSE	-Government of State of Eritrea
ICAM	-Integrated Coastal Area Management
ICZMP	-Integrated Coastal Zone Management Plan
IPM	-Integrated Pest Management
IUCN	-The World Conservation Union
MoA	-Ministry of Agriculture
MoLWE	-Ministry of Land, Water and Environment
MoLG	-Ministry of Local Government
NBSAP	-National Biodiversity Strategy Action Plan
NEMP-E	-National Environmental Management-Eritrea
NEPFAP	-National Economic Policy Framework and Programme
PAS	-Protected Areas System
SNRM	-Sustainable Natural Resources Management
UNFCCC	- United Nations Framework Convention on Climate Change
UNCCD	- United Nations Convention on Combat Desertification
UNCBD	- United Nations Convention on Biological Diversity

## **Executive Summary**

Desertification process is a big challenge that directly affects billions of people in our globe. The particular situation in Africa is relevant because two-thirds of the continent is dry lands and deserts. Nowadays, the increasing number of communities and countries that continue to suffer by the negative impacts of land degradation and desertification is clearly a source of priority concern for the international community. The combined effect of localized land degradation which follows deforestation, over-exploitation of forests, bushfire, grazing land and soil resources, and inadequate soil and water resource management highlighted the influence of local human activity on the environment. Therefore, an initiative named as the “Great Green Wall Initiative (GGWI)” is now launched to combat desertification for countries bordering along the Sahara Desert. This massive green strip will be 7,100 km long and 15km wide, tracing a path between Dakar and Djibouti through 11 countries: Senegal, Niger, Nigeria, Burkina Faso, Mali, Mauritania, Chad, Sudan, Eritrea, Ethiopia, and Djibouti and its main goal is to fight off the advancement of the Sahara desertification and its consequences.

This initiative opens a good opportunity to Eritrea to contribute in halting the advancement of the Sahara Desert. At the first ordinary session of the ministers' council in N'djamena, Chad (3 March 2011), the 11 countries were requested to prepare their Five Years Action Plan to pursue the GGWI. Accordingly, the Government of the state of Eritrea is fully committed to prepare its action plan as this initiative is very relevant to the nationally ongoing projects aimed at food security through increasing agricultural products, soil and water conservation and other activities.

The Eritrea's Five Years Action Plan highly focuses on all necessary activities that help in mitigating land degradation, reducing desertification, adapting climate change, increasing agricultural products so as to improve the lively hood of the people. This action plan includes implementation of Sustainable Natural Resources Management (land, water, forest and wild life) in six Zones of the country (these are Maekel, Debub, Gash Barka, Northern Red Sea, Southern Red Sea, and Anseba) through afforestation, soil and water conservation, establishment and management of enclosures as well as promotion and establishment of nursery sites. In addition, economical trees (like Acacia Senegal, Acacia seyal) will be planted in three zones of the country, Debub and Gash Barka and Anseba. In addition, Sand dune fixation will be introduced in Southern Red Sea Zone.

Side by side, five Protected Areas will be established, namely Semienawi and Debubawi Bahri (100,000ha), Buri-Irrori-Hawakil Islands (180,780 ha); Bara'soli 800ha, Riverine habitat along Gash and Barka Rivers (195, 024ha), and Nakfa Reserves (16,390ha). Besides ex-situ conservation is considered to enhance gene bank, botanical gardens, animal zoo, and historical □□places. To assure sustainability use of natural resources and improve the livelihood of the people, alternative energies (solar energy, modern stoves and briquettes) are under consideration.

To success the application of the action plan on the ground, an effective community awareness programme, training for farmers and pastoralists and other communities, workshops, seminars for students, workers, and government policy makers are included. Moreover, to assure the sustainability of the project, monitoring and evaluation activities are scheduled accordingly in all sites of the project.

Thus, Eritrea is determined to do everything possible to achieve the GGWI in general and get tangible results in stopping further land degradation, loss of agricultural productivity, and conservation of biodiversity as a national priority in particular.

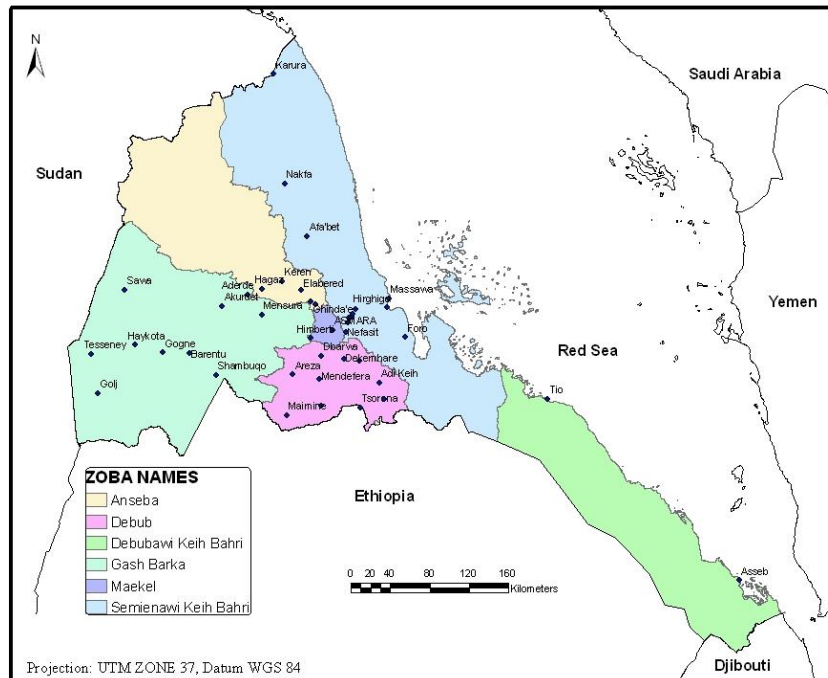
## CHAPTER .I. Introduction

### 1. Biophysical Features

#### 1.1. Location

Eritrea is located at the northern part of the Horn of Africa, between latitudes 12° 40" and 18° 02" North of equator and longitudes 36° 30" and 43° 20" east of Greenwich. It has a landmass area of, about 125,700 km<sup>2</sup> inclusive of the islands, and a coastline spanning some 1,900 kilometers. It shares borders with Sudan in the north and west, Ethiopia in the south, Djibouti in the southeast and the Red Sea in the East (see Figure 1).

Figure.1: Map of Eritrea



Source: Ministry of Land, Water and Environment)

Eritrea's physical features are characterized by central and northern highlands extending for about 350 km north to south; flat coastal plains of the eastern lowlands; and flat plains of western lowlands interspersed with hills. The altitude across the country varies considerably, from 1,500 to 2,400 meters above sea level in the highland areas; from 0 to 500 meters in the eastern lowland areas; and from about 700 to 1,400 meters in the western lowlands.

#### 1.2. Agro Ecological Zones of Eritrea

The whole country is divided into six agro-ecological zones representing two rainfall regimes, summer and winter, whose patterns and amounts are affected by the difference of physiognomic regions (see Fig.2.). The summer rains are brought by south-westerly monsoon winds and are concentrated mainly in

the months of July and August. They affect the central highland and the western lowland areas. The winter rains typically occur from November to March and are influenced by the north-easterly continental winds. These rains affect coastal areas and the eastern and southern escarpments.

Figure .2.Map of the six agro-ecological zones of Eritrea

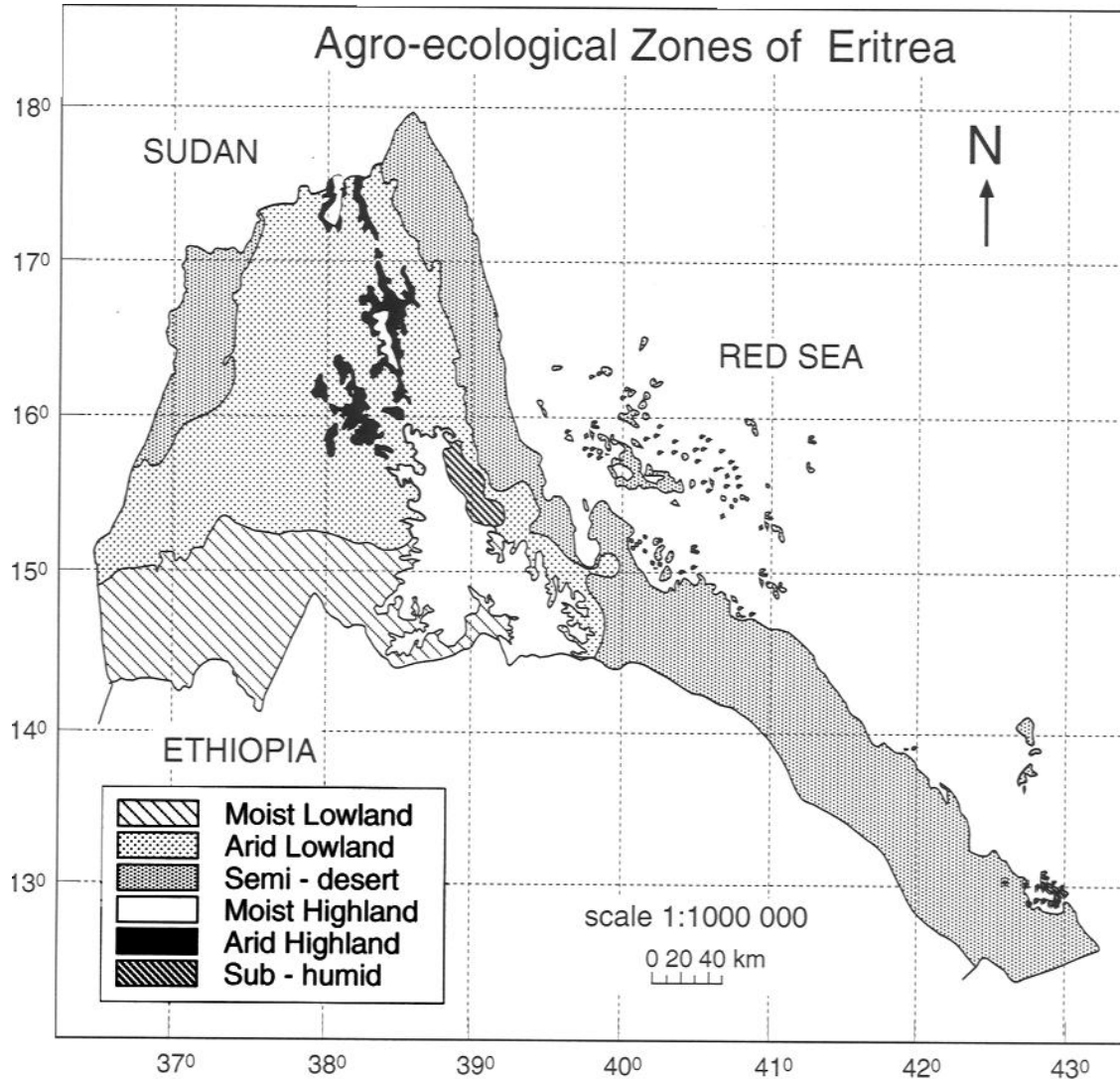


Table.1. PET is Potential Evapo-transpiration, DLGP is Dependable Length of Growing Period, and MLGP is Median Length of Growing Period.

Characteristics	agro ecological zone					
	sub-humid	arid highland	moist highland	moist lowland	arid lowland	semi-desert
area (km <sup>2</sup> )	1,006	3,143	9,302	20,363	43,115	48,772
Total area (%)	1	3	7	16	34	39
Slope (%)	8-100	2-100	2-30	2-30	0-30	0-30
Altitude (m a.s.l.)	600-2600	1600-2600	1600-3018	500-1600	400-1600	<100-1355
Rainfall (mm)	700-1100	200-500	500-700	500-800	200-500	<200
temperature (°C)	16-27	15-21	15-21	21-28	21-29	24-32
PET (mm) <sup>(1)</sup>	1600-2000	1600-1800	1600-1800	1800-2000	1800-200	1800-2100
DLGP (days) <sup>(1)</sup>	60-210	0-30	60-110	50-90	0-30	0
MLGP (days) <sup>(1)</sup>	90-240	30-60	90-120	60-120	30-60	<30

Source: FAO (1997).

### 1.3. Climate

Eritrea's climate regime is highly variable, being influenced by the expanding Sahel-Saharan desert, the proximity to the Red Sea and the land's physical features. Altitude and topography play major roles in determining climate in general and temperature in particular. Typically, mean annual temperature declines by 1 °C for each 200-meter rise in elevation. Ambient average temperatures vary considerably, with the eastern lowland having an annual mean of 31 °C reaching as high as 48 °C; while in the highland areas the annual mean is 21 °C with a maximum of 25 °C. In the western lowland areas, the annual mean is 29 °C with a maximum of 36 °C.

Eritrea has a mostly arid climate with about 70% of its land area classified as hot and arid and receiving average annual rainfall of less than 350 mm. The main rainy season in most parts of the country is from June to September. There is also a short rainy season involving a small number of highland areas which occurs between March and May. In the eastern coastal areas and parts of the adjacent escarpment, the rainy season is between December and February. The eastern lowland has an average annual rainfall between 50 and 200 mm; while northern areas, given that they fall within the eastern limit of Sahelian Africa, receive less than 200 mm/year of rain. Southern areas experience average annual precipitation of 600 mm, with the central highland areas receiving about 400-500 mm per year.

A main feature of rainfall patterns in Eritrea is the *extreme variability within and between years, and spatial variation over very short distances*. The southwest monsoon winds are responsible for the main and small summer rains in Eritrea. The northern and north-eastern continental air streams are responsible for the winter rains along the coast and in southern part of the escarpment of the central highlands. The northern and north-eastern winds are dry in their nature but take moisture while crossing the narrow Red Sea water body.

### 1.4. Vegetation

Studies on the natural vegetation of Eritrea are scarce. Nevertheless, some studies revealed that the vegetation cover of Eritrea has been reduced from time to time due to excessive collection of firewood and construction wood, forest fire, Over grazing/over browsing, expansion of settlements, villages and towns, Recurrent droughts, and Invasive alien species (*Opuntia ficus indica* in the highland forest and *Prosopis juliflora* in the low lands) .Below is summarized the land cover, including forest and wood land:

Table.2. Eritrean Land cover, including forest and woodland

<b>Land Cover Category</b>	<b>Area (km<sup>2</sup>)</b>	<b>Land Area (% of Total)</b>
Closed Woodland	4,600	3.7
Open Woodland	11,200	8.9
Grassland	25,700	20.4
Bush/shrub land	53,400	42.5
Riverine Forest	1,900	1.5
Mangroves	100	0.1
Agriculture	7,700	6.1
Barren	18,700	14.9
Others	100	0.1
Not Classified	2,300	1.8
<b>Total</b>	<b>125,700</b>	<b>100.0</b>

Source: DoE (1997)

### 1.5. Soils

There has been a very little systematic study of soils carried out in Eritrea and the information is very scarce. But, the soils of Eritrea could be considered in a more general way. Soils in the high land areas especially in the depression areas with some colluvial materials, the soils are relatively deep and in many of the places soils are shallow due to sever erosion that left the land barren. In general the soils are of sandy texture including sandy loam where parent materials are derived from granite, gneiss, sand stone and quartzite. Soils of lowlands are shallow, gravelly, and stony soils with coarse or very coarse texture occur. Generally, soils in this area are classified as chromic luvisols, eutric cambisols, lithosols and haplic xerosols. Soils of coastal plains are of coarse texture with sand, loamy sand and sand loam. In the coastal plains soils are also calcareous and are either dark brown or dark grey brown in color. In the north soils belong to regosols. In southern part of Denakil plains saline soils dominate, besides regosols and lithosols. Soils of western plain belong to yermosols, regosols, chromic vertisols, cambisols, luvic, xerosols and fluvisols.

However, soil erosion is a major problem in Eritrea. Every year millions of tones of fertile soil is eroded due to torrential rainfall, deforestation, overgrazing etc. As a result agricultural product has been reduced from time to time.



## 1.6. Water Resources

Three main drainage systems can be distinguished:

- The Mereb-Gash and Tekeze-Setit River systems, draining into the Nile River
- The eastern escarpment and the Barka-Anseba River systems, draining into the Red Sea
- The river systems of a narrow strip of land along the south-eastern border with Ethiopia, draining into the closed Danakil Basin

Although no measurement of runoff is available, the internally produced renewable water resources are estimated at around 2.8 km<sup>3</sup>/yr, most of which are located in the western part of the country (FAO, 2008).

There is only one perennial river, the Setit River, which also forms the border with Ethiopia. All other rivers are seasonal and contain water only after rainfall and are dry for the rest of the year. Artificially dammed water bodies are found in different parts of the country.

Ground water can be tapped in all parts of the country. Here, four hydro-geological units, based on the different geological units, recharge conditions and hydraulic characteristics can be detailed:

- Granular aquifers, which cover large areas in the western and eastern lowlands and along river valleys and flood plains. Unconsolidated aquifers consisting of the alluvial and colluvial sediments are also found in the Asmara area, Red Sea coastal plains and at the foot of fault scraps and mountains
- Fissured and jointed volcanic aquifers, which are found in the central highland plateau southeast of Asmara and west of Assab, the Alid and May Wu'ey hot spring and in the southern part of the country
- Fissured and karstic aquifers of consolidated sedimentary rocks, limestone, coral reefs, evaporate deposits and the marbles of metamorphic assemblages
- Fissured aquifers of the basement rocks of crystalline metamorphic rocks and associated intrusive rocks, which are localized along weathered and fractured zones, with limited groundwater resources .

Thousands of water points haven dug. Most of them are unprotected dug wells. Typical boreholes depths are in the range of 20 to 70 m. Deep aquifers are not known. Problems of groundwater depletion have been reported in various parts of the country. Apparently there are a few natural springs.

## 1.7. Overview of Eritrea's biodiversity

The biodiversity resources of Eritrea is not yet exhaustively studied and documented. After independence, the Department of Environment of the Ministry of Land, Water and Environment and other line ministries have taken considerable effort on the conservation of biological diversity resources, despite the existing large shortfall in the number of personnel, institutions and financial resources, which would be required to fill this information gap.

The conservation status of most species at all the three levels (genetic, species, and ecosystem) is not known in detail. However; for the Terrestrial Biodiversity, at ecosystem level, has been partially studied and identified in a number of national land use classifications like Eco-geographical, agro-ecological, and vegetation cover classifications for Eritrea. These classifications capture the main regional

ecological variations within the country but provide very little detailed information about the species diversity, which exists within these regions. In almost all cases, the level of ecological/biodiversity information about particular ecosystems and habitats (e.g. *Juniperus* forest, riverine forest, and coral reefs) is incomplete.

In all cases there is a long time gap between information collected prior to 1960 and that collected since 1991 has created a major problem distinguishing between what has been recorded as historically present and what may actually be present today. A century ago Eritrea was endowed with all sorts of natural resources, which include fertile land, enough water resources, dense forests, various wild animals and birds. Thirty years of armed struggle, combined with the persistent drought and neglect have impacted on the natural resource of the country. Its rich natural resources have been denuded and are currently left with fragile ecosystems.

It has been recognized that a total of 126 mammal species, 577 species of Birds out of this around 320 are resident, of which about 50% have historical breeding records, around 195 are migrants and around 50 are recorded as breeding in Eritrea and the remaining are either vagrants or of unknown status. Eritrea also shares up to 13 species of Birds "endemics" with Ethiopia alone. A total of 90 reptiles and 19 amphibian species have been recorded for Eritrea. There are two possible endemic reptiles and one possible endemic amphibian. In the absence of a comprehensive national checklist, a number of site-specific checklists are included one list of almost 700 species indicates that considerable plant diversity may persist in human-altered landscapes (stocktaking assessment, 1999).

There have been identified extinct/endangered wild animals and plants. At least 11 species on the list have become extinct this century. E.g. Cercopithecidae (*Theropithecus gelada*), Canidae *Lycaon pictus*, *Canis simienseis*, Felidae *Panthera leo* etc. A further 30 species are considered to be at risk of national extinction (endangered) e.g. African elephant (*Loxodonta africana*), Equidae *Equus africanus*, Green turtle etc. Over 60 species are of unknown status in Eritrea and around 20 can be considered common and secure in conservation terms e.g. Soemmerring's Gazelle, warthog *Phacochoerus africanus aeliana*, and Dugong (*Dugong dugon*). Some of the endangered species of wild plants are *Olea africana*, *Acacia nilotica*, *Balanites aegyptiaca*, *Capparis decidua*, *Codia Africana*, *Dobera glabra*, *Ehretia amoena*, *Mimusops kummel* etc.

The Eritrean coastal, marine and island zone is situated in the southern sector of the Red Sea, an almost enclosed, hot, saline body of water that harbors a flora and fauna derived from the Indo Pacific Ocean at some time in the last 10-20,000 years. The diversity of the Red Sea is a subset of that found in the Indo Pacific Region. A total of 500 fishes and 38 genera of stony corals have been recorded. In addition, Eritrea's coast is inhabited by possibly 5 marine turtles, 8 or more cetaceans and the dugong almost all of these species are of conservation concern globally.

Eritrea is recognized as a centre of origin and centre of diversity for a number of crops, notably the cereals: sorghum, wheat and barley. There is a rich diversity of crop landraces still available in Eritrea. Even though the inventory that has been made is not a complete one, 20 cultivars of sorghum, 8 for maize, 6 for barley, 5 for taff, 3 for pearl millet, 3 for finger millet, 3 for sesame and 2 for Niger (Nihug) seed have already been identified (DoE, 1999). Though not complete, a list of insect, weed and microbial pests was compiled by Ministry of Agriculture. A total of 52 major insect pests are reported to be found in Eritrea.

The level of knowledge of diversity of the lower taxa is weak as attempts made to compile checklists or to assess conservation status is little.

## CHAPTER .II. Socio-economy

Eritrea is one of the developing countries. Two thirds of its population lives in rural and semi-rural areas. The country is still recovering from a thirty-year of War for Independence which ended in 1991. The government has developed a national development policy in 1994 to ensure the real development on the ground.

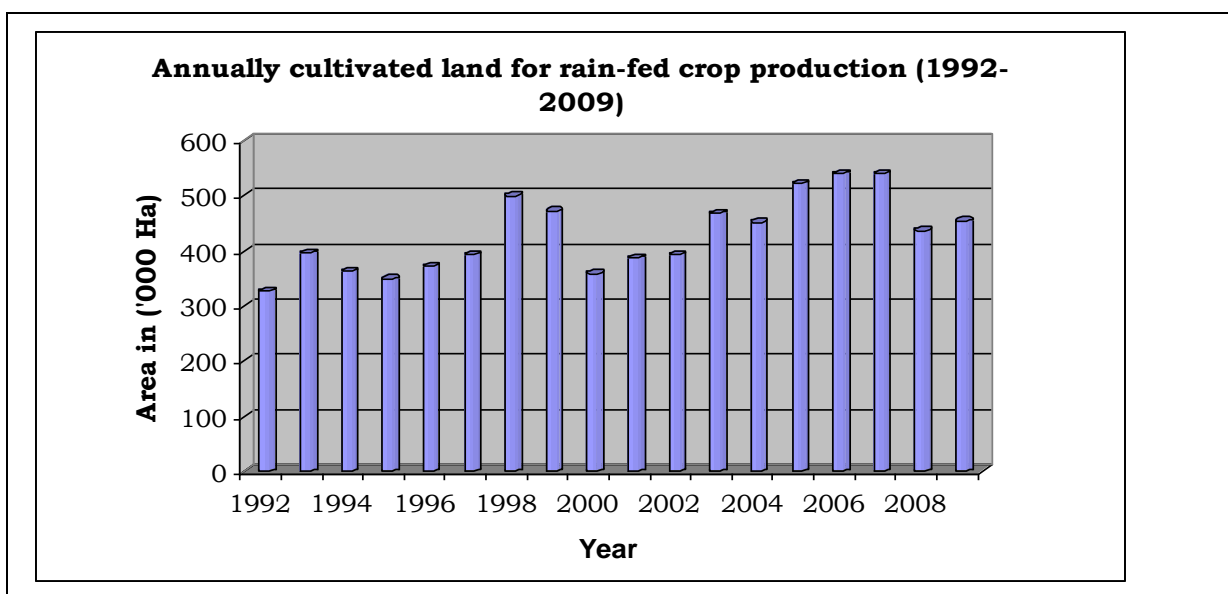
Eritrea's long-term development objective is to attain rapid and widely shared economic growth with macroeconomic stability and a steady and sustainable reduction in poverty. The transitional medium-term (2004-06) objectives sought to promote economic growth and development including developing exports, increasing agricultural productivity, attracting investment in fisheries, tourism, construction, manufacturing, developing strong financial sector, and expanding and modernizing the country's basic infrastructure. Below are some of the important sectors boosting the economy of the country.

### 2.1. Agriculture

80% of the population depends on traditional subsistence agriculture, including crop production and livestock husbandry. However, agricultural production is affected by a host of factors including high rainfall variability with recurrent and long drought periods, continuous degradation of the soil, and loss of agricultural biodiversity, frequent pest outbreaks and lack of research and extension services.

In the subsistence-farming sector, the Government policy is to enhance food security through efficient utilization of capital, land and labour. This will be achieved through "a combination of factors that include expanding areas under cultivation, use of modern inputs, intensification of land use, irrigation, and other improvements in factor productivity plus increasing the production of cotton, oil seeds, and a variety of fruits and vegetables, and cut flowers. In the commercial sector, the government is working to establish large scale, export-oriented commercial estates in the most promising parts of the country i.e. irrigated agricultural projects in the eastern and western lowlands. Below is a table that shows most of the crop production depends on rain fed agricultural practices.

Table.3. Annually cultivated land for rain fed crop production (1992-2009):



Source: Ministry of Agriculture.

In the livestock sector, the emphasis is on increasing livestock production through the introduction and distribution among farmers of more and better breeds, expanding vaccination and other veterinary services, improving the quality and availability of animal feed, and introducing effective pasture management, as well as providing technical advice to producers, by helping create market outlets, by encouraging the establishment of refrigerated transportation for perishables, and by improving the management and marketing capabilities of livestock producers.

The Ministry of Agriculture has a National Agricultural Research Institute (NARI) that has a great role in storing indigenous seeds having thousands of accessions in the gene bank, conducting tissue culture and other researches for better agricultural productions. Within the forestry sector, the government is encouraging the establishment of community forests in the cities, towns and villages of the country. These are to be designed and managed by local communities with the Ministry of Agriculture providing the seedlings and overall guidance, but the Government is also using the Summer Youth and Warsay Yike'alo Program to enhance its afforestation, soil and water conservation activities throughout the country.

## **2.2. Fisheries**

Marine and coastal resources, particularly fisheries, are recognized as one of the very important areas, which could have a very crucial role in the economic development of the country. Eritrea has the potential to sustainably harvest around 80,000 tons of fish annually, but nonetheless the current fish catch is known to be around 13,000 metric tons per year.

The coastal area of the red sea inhabits mangrove forest is found roughly on linear extension of 380 km and covers an area of 6400 ha that represents 15% of the coastline. It has a great role for reproduction of different marine creatures and as livestock food and construction purposes. They are found in patches all along the Eritrean coastline and also on the islands. However, they are prone to climate change.

Having 1900 km of coastline, Eritrea has a very high potential not only to exploit its fish and other marine resources but also has an excellent opportunity to develop its tourist industry. This sector also will have a great role in alleviation poverty especially people living in the coastal area.

## **2.3. Tourism**

The Ministry of Tourism has developed a comprehensive development strategy for the tourist industry, and it is taking action to introduce Eritrea as a tourist destination. To improve accommodation for visitors, the Government is encouraging the establishment of new hospitality facilities. More efforts are being carried out to expand tourism services to preserve and enhance Eritrea's environmental resources.

## **2.4. Manufacturing**

The Government policy for this sector is to take measures to encourage the development of small and medium scale enterprises, and to pursue industrial expansion based on commercial and long-term economic efficiency. Emphasis will be placed on textiles and garments, leather products, general agro-processing, metal fabrication, plastic processing and conversion, construction materials, and other resource based industries. However, there is a need to fill the gaps in management systems.

## **2.5. Energy**

The Government recognizes that Eritrea's current pattern of energy consumption is unsustainable and that expediting appropriate changes in the current energy-consumption pattern, increasing efficiency in the use of energy, and promoting energy conservation are matters of great urgency and, therefore, top priority of the Eritrean Government". These changes will be encouraged through: creating a "policy and regulatory framework conducive to private investment in prospecting, exploration and development of hydrocarbon resources"; modernization and expansion of the country's power generation system; exploration of potential for harnessing hydro, solar, and wind power, and biogas; and Economic pricing of energy to facilitate the development of alternative energy sources, to promote cost-effective energy utilization and conservation, and to protect the environment".

## **2.6. Infrastructure**

The economic development goals of the country cannot be met without large-scale expansion of communication, power, water and transport services. Already, extensive rehabilitation and expansion of the telecommunication, power transmission and road networks are underway and will continue. Similarly, the planned improvement and increase in water supply throughout the country may have a significant impact on biodiversity depending upon the mechanisms used.

However, most of the infrastructure activities are done with out proper environmental impact assessment. As consequence land degradation has been increased. These activities also have the potential to have both direct and indirect impacts on biodiversity and ecosystems.

## **2.7. Health**

Eritrea has conducted much more efforts to achieve the Millennium Development Goals (MDGs).The current trends demonstrate that it is on track to achieve it. Eritrea is also doing well on child health, maternal mortality, HIV/AIDS, malaria and other major diseases, and access to safe water. Many clinics, hospitals have been constructed in major cities, urban and rural areas. The government has trained many nurses, and recently started to train medical doctors.

## **2.8. Education**

Within the national development program, efforts are being made to meet the manpower needs of the economy and to increase human capital formation by raising the standards of kindergartens, elementary, Junior, secondary, vocational and professional schools and institutes, as well as of higher education. Efforts are being made to make school curricula more relevant by giving appropriate emphasis on introduction new science and technology. All of these activities have the potential to include a strong component of practical environmental education that can raise awareness of the government's goal: restoration, enhancement, and preservation of Eritrea's ecological integrity.

## **CHAPTER.III. SITUATIONAL ANALYSIS ON LEGAL AND INSTITUTIONAL FRAMEWORKS TO COMBAT DESERTIFICATION**

### **3.1. Policy Framework**

Since independence, the nation has tried to ensure that real development on the ground is not slowed by the lack of a full policy framework. However, in 1994 it developed the National Development Policy and in 1995 the National Environmental Management Plan for Eritrea (NEMP-E) was adopted and provides the basic policy document for action in the environmental sector and lays out a strategy for action for conservation activities. Its guiding principles include recognition of the strategic importance of conserving natural resources and maintaining environmental quality as a part of national economic growth and development processes, to develop integrated and multiple uses of natural resource use strategies at the same time ensuring local involvement and equity in environmental resources.

At present, there is no formal environmental legislation for Eritrea. However, an Environment Proclamation is being prepared by the Department of Environment. The absence of formal environmental legislation does not mean that the environment, including biodiversity, has no legal status. Recently promulgated legislation for other sectors contains a number of key articles which have the potential to provide strong protection for the environment and biodiversity. Under is a described different proclamation with respective Ministries.

#### **3.1.1. Ministry of Land, Water and Environment:**

The ministry has released the following proclamations and documents:

- a. Land Proclamation No. 58/1994 which established that land is owned by the state and citizens have the right to use.
- b. Water Resources Proclamation No.162/2010: Article 3: states that promotion of integrated water resources development as well as judicious prioritization of allocation and use of the same.
- c. National Environmental Assessment Guidelines and Procedures, NBSAP, Biodiversity Stocktaking Assessment Report, Economic Assessment of Biodiversity Resources, and Environmental law draft.

#### **3.1.2. Ministry of Agriculture (MoA)**

Under this Ministry there is a proclamation: i.e. Proclamation **for the Conservation and Development of Forestry and Wildlife 155/2006**. This proclamation has been already released in 2006. With in this proclamation: Article 5 states the objectives of the Ministry [of Agriculture], with respect to forestry and wildlife, as: To conserve, protect and establish a system of sustainable use for the forests and wildlife of Eritrea; To establish national parks and other areas for the conservation and management of wildlife; To implement the international agreement on trade in endangered species (CITES) with particular reference to forestry and wildlife; and To promote awareness of and participation by the population in the conservation and development of forestry and wildlife.

#### **3.1.3. Ministry of Marine Resources (MoMR)**

In 2007 the MoMR has drafted 1.) Integrated Coastal Area Management (ICAM) Proclamations; 2) A Proclamation to Establish Coastal Area Authority; 3) a National Coastal Policy. The draft Integrated Coastal Area Management (ICAM) Proclamations (Thematic area 10- Action 1) has included a provision in Article 12 for the Creation of Protected Areas with in CMI.

Even though an Integrated Coastal Area Management Plan has been produced as one of the key CMI biodiversity project output, but not incorporating CMI specific EIA guidelines. The ministry has also

gaps in establishing policies for safeguarding against invasive alien species, including licensing, screening, monitoring and containment procedures and an eradication and containment program for known and potentially harmful alien invasive species.

#### **3.1.4. Ministry of Local Government (MoLG)**

The MoLG is supposed to operationalise policies drawn by ministries of the central government. These operational activities are carried out by the six zonal administrations which are under the MoLG. The MoLG, in collaboration with relevant ministries, is in the process of strengthening the operational capacity of the government institutions represented at the Zones. This implies, therefore, that the MoLG through its Zone Administration plays an important role in environmental conservation activities, particularly in influencing the public participation for the betterment of national biodiversity conservation. Proclamation for the Establishment of Local Governments No.86/1996 also empowers the administration of the Regional Government to "take the necessary measures to conserve and develop the national environment"

#### **3.1.5. Energy**

The sufficient, reliable and sustainable production and supply of affordable energy throughout Eritrea is the main objective of the Government's policy in the energy sector. The general policy is to provide the energy services based on a diversified supply of energy sources. The specific objectives of this policy are twofold. Firstly, it is the intention to facilitate the economic growth through the provision of adequate, reliable and sustainable refined energy at an economic price and at appropriate locations. Secondly, the policy is aimed at improving the living standards of the population through the provision of affordable energy.

In the Interim Poverty Reduction Strategy Paper (I- PRSP), the GoE emphasizes that access to sustainable sources of energy by the poor is a necessary and critical input for poverty alleviation and sustainable human development. Modern source of energy contributes to improved health by lowering indoor and outdoor air pollution; reduces the burden on women and young children many of whom spend hours collecting and carrying firewood; and frees up time for income generation. Energy is also a critical input for providing a host of social services, from education and health care to communications. Even though the government is enhancing alternative energy (solar, wind, modern stoves etc) is at the highest consideration. Deforestation has been a real problem. Most of the people has been used wood forest for fuel consumption, construction and furniture. This has a contributed land degradation and biodiversity loss.

#### **3.1.6. Meteorological Service Division of the Civil Aviation Authority (CAA)**

It is an important division that has been functioned in predicting episodes of drought, flood, and other natural disasters. It has strategies and priorities. These are: Ensuring prevention against drought and desertification; integrating effective early warning systems into the national action plans and development strategies; mobilizing the required funding to strengthen the capacity of the service; improving the prediction of El Nino/La Nina and broadening the implementation of Climate Information and Prediction Services.

However, the authority has still lack of in human resource, equipments and information systems concerning environmental information.

## **CHAPTER. IV. NATIONAL INITIATIVES ON ENVIRONMENTAL CONSERVATION**

The Government of Eritrea has done great efforts to wisely manage the precarious state of the environment. One of the great efforts done was establishing of national soil conservation program. Under this program, a total ban on cutting live trees with out permit, hunting or the capture of wild animals and also on charcoal making was introduced and is still in force. Parallel to these control measures. Over the last decade, large-scale public soil and water conservation works and afforestation programmes have been implemented through students summer programme, Warsay Yike'alo Campaign and Community based afforestation programme resulting in 206,000 ha of permanent forest closures and more than 90 million tree seedlings have been planted; more than 300 dams and millions of kms of hillside terracing have been constructed in different parts of the country.

The Government has also made efforts to establish protected areas as a national priority to conserve and manage biodiversity of the country. The NEMP-E (1995) for example proposed five locations as priority areas. These are: Semienawi and Debubawi Bahri, Gash Setit, Riverine habitat along the Gash and Barka Rivers, Buri-Peninsula Dahlak Islands. Recently, the Semienawi and Debubawi Bahri is declared as a National Park. The identification of these protected areas needs to demonstrate the use of the national level policy and institutional setup for the creation, governance and management.

The Ministry of Marine Resources in collaboration with other relevant sectors has been launched the Eritrea's Coastal, Marine and Island Biodiversity (ECMIB). One of the important outputs of that project was the submission to the Ministry of Justice of two documents that will lead to two protected areas to be gazetted: the Sheik Said and Dissie National Parks. The project will further build on the key conclusions and results of the ECMIB: i) awareness was built) ii. Capacity within the Ministry of Marine Resources was developed over the course of the project.

In recognition of the fact that tourism can be a stimulus for conservation of the country's natural environment and cultural heritage, because these features comprise the primary attractions for tourists. The government also recognizes that if it is not carefully planned, developed and managed, tourism can also generate problems of environmental degradation, loss of economic benefits and social distortions. The government recognized that in addition to conserving biodiversity, Protected Areas have played a key role world-wide in generating funds for national development, through tourism. Thus, mostly local Community is benefited from established protected areas, recognizing that the Government has made priorities to establish protected areas to conserve the biodiversity aiming reducing the land degradation and mitigating climate change impacts on the environment.

Regarding alternative energies, the government has achieved in introducing solar, wind energies, kerosene, LPG, biogas, rural electrification and expanding of hundredth of thousands of modern stove in different parts of the country to reduce deforestation. This has a great role in reducing deforestation and improve livelihood.

Finally, all the above mentioned activities are will continue. The GGWI also will be integrated with the government on going projects.

### **4.1. Cooperation with sub-regional, regional and international organizations, treaties and initiatives on issues related to environmental management**

Eritrea is party to:

- CBD (Convention of Biological Diversity, 21 March 1996)),



- CPB (Cartagena Protocol on Biosafety to the Convention on Biodiversity, acceded 10 March 2005),
- CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora, 22 January 1995),
- CMS (Convention on Migratory species ,November ,2005),
- WHC (World Heritage Convention, 2001)
- CCD (Convention to Combat Desertification, ratified in 1994 and acceded in1996)
- UNFCCC (United Nations Framework Convention on Climate Change, 24 April 1995)
- Rotterdam Convention (Rotterdam Convention on Prior Informed Consent (PIC) for Certain Hazardous Chemicals and Pesticides in International Trade, March 1st 2005),
- Vienna Convention (Vienna Convention for the Protection of the Ozone Layer, March 2nd 2005), Montreal Protocol (Montreal protocol on Substances that Deplete the Ozone Layer March 2nd 2005),
- Stockholm Convention (Stockholm Convention on Persistent Pollutants (POPs) March 1st 2005),
- The Basel Convention (The Basel convention on Trans Boundary Movement of Hazardous Wastes and their Disposal March1,2005)and
- Kyoto Protocol acceded on 27July 2005,

## **4.2. The three Rio Conventions in Eritrea**

### **4.2.1. UNFCCC**

Eritrea acceded the UNFCCC and its Kyoto Protocol in 1995 and 2005, respectively. In response to the obligations under Article 4 Paragraph 1 and Article 12 Paragraph 1 of the Convention, it had prepared and submitted its Eritrea's Initial National Communication (EINC) in December 2001. There is an ongoing preparation of the Second National Communication (SNC) since 2008. In response to decision 7/CP.7, paragraph 6, it has also prepared its NAPA in 2007 to address the urgent and immediate needs of the most vulnerable segment of the population. NAPA follow-up activities have been designed and prioritized. There are also various activities implemented by various governmental, non-governmental and private institutions that have direct or indirect relevancy to Eritrea's commitment to the UNFCCC. The implementation and mainstreaming are now well ongoing across the various socio-economic sectors, national development plans and policies.

### **4.2.2. UNCBD**

In this context, the CBD was acceded by Eritrea on the 21<sup>st</sup> of March 1996. In response to Article 26 of the CBD, Eritrea has to date prepared and submitted four national reports to the CoP of the CBD. It has also prepared the National Biosafety Framework (NBF) in response to the Cartagena Protocol on Biosafety to which it is a party. There are also other biodiversity related MEAs ratified by Eritrea. In response to Article 6, 8 and 10 of the CBD, Eritrea had prepared and submitted its NBSAP in 2000.

### **4.2.3. UNCCD**

Eritrea ratified the Convention to Combat Desertification (CCD) in 1994 and acceded in1996. As a party to the UNCCD, Eritrea had prepared and submitted four national reports to date. The UNCCD in Eritrea is now moving to a new indicator-based reporting system under the emerging reporting system under the new Performance Review and Appraisal System (PRAIS) of the UNCCD. In 2002, pursuant to Articles 9 and 10 of the Convention the country has prepared a National Action Program (NAP) to combat desertification and to mitigate the effects of drought. The NAP has identified several activities and prioritized 23 of them for implementation. Nonetheless, the actual implementation is very slow

mainly as a result of lack of funding on one hand and the regional nature of the UNCCD contrasting the universal nature of the UNFCCC and the CBD.

This indicates that the country's commitment to environmental protection. In order for Eritrea to fulfill its commitments under these international treaties, there are regular follow-ups to these treaties through report writing and participation in meetings organized by the secretariat of these treaties. For the period 2009-2011 it is envisaged that the Government of Eritrea may consider its membership to some more international treaties. Membership in one or more of these treaties will have implications in competing with the technical resources of the Department of Environment.

Despite the excellent National Initiatives there are still gaps that need to be addressed, including:

- Shortage of fund to develop project proposals attractive for funding and implement and monitor already on going programs related to the conservation and sustainable use of biological diversity;
- Low level of communication and data collection system.
- Limitation on human and institutional capacity
- Limitation of policy and legal frameworks and management instruments.

## CHAPTER.V. FIVE YEARS ACTION PLAN

The Government of the State of Eritrea has prepared its action plan arranging a consultation meeting with different relevant institutions aiming at combating desertification and land degradations in its five years action plan. It has a high expectation that the GGWI will enhance the ongoing projects aimed at food security through increasing agricultural products, soil and water conservation, afforestation and other activities.

### 5.1. Justification for the Core Problem

Eritrea is situated at arid and semiarid areas that indicates the advancement of the Saharan desert is affecting the country. Thus the country has made great efforts to combat desertification as a major environmental problem. Causes of desertification are created due to low precipitation, high evapo-transpiration, deforestation, mismanagement of natural resources, overgrazing, climate change etc. As a result people who live especially in the dry land are much more prone to drought, because of less agricultural production that depends on rain fed and traditional agricultural practices. In those area there is a shortage of agricultural inputs. In addition, the lack of knowledge concerning environmental management of the people is another factor.

In Eritrea the main factors for environmental problems can be summarized as follows:

**a) Deforestation** is one of the accelerating factors that lead to expand desertification. It is generally accepted that the vegetation cover of the country has been reduced greatly during the last century. The forest cover at the beginning of this century was estimated to be about 30%. In 1952 it had declined to 11 %. In 1960, the forest cover was down to only 5 %. According to recent estimates it is <1 % (NEMP-E, 1995). This dramatic reduction of forest cover is caused due to high consumption for fuel wood and inadequate alternative energy resources in the country. As a result ~4.4 million m<sup>3</sup> of forest wood is being consumed annually (NEMP-E, 1995). Other factors could be high demand for more arable land and land for grazing due to population pressure, unwise expansion of agricultural activity, house construction purposes.

**b) Soil erosion** is another main factor to cause desertification due to inappropriate land use practices, improper farming practice particularly in riverine areas, limited soil and water conservation practices in nation/target areas; probably ineffective Soil and Water Conservation programme (issue of result based approach, lack of incentive, inadequate co-ordination mechanism etc), the land tenure system, overgrazing (inadequate forage and traditional herding). It is estimated that 35 million-70 million tone of fertile soil is eroded annually from an area of 2,420,000 ha MoA, 1993), in Eritrea,.

**c) Over exploitation: overexploitation** of ground water resources, low level of surface water development initiatives (construction of dams, sand storage dams, cisterns etc, inefficient use of the resources, particularly in irrigation are also some of the factors for desertification. So these all make desertification to lead to loss of environmental assets of the nation such as fertile land degradation and shortage of stock of water that leads to low carrying capacity of the ecosystem; loss in social and economic assets (shortage of forage, food and other agricultural products that leads to loss of life and /or poverty and other social problems

However, the government has done a lot of activities in a manner that actively supports the conservation of biodiversity, environmental maintenance and poverty reduction. Thus, the five years action plan is based on the premise that SNRM and establishment of protected areas are intimately linked with sound environmental in so doing will help Eritrea meet some of its Millennium Development Goals

(MDGs) .Generally, the environmental challenges will be solved by effective environmental and natural resource management system so as to improve livelihood security and reduce poverty. This is very complementary to the Governments programme.

**5.2. Vision:** To ensure proper protection and judicious use of the environment through effective harmonization of policies and programs aimed at achieving a sustainable socio-economic development in the country, especially in Dry lands and halting the advancement of the Sahara Desert.

**5.3. Strategy:** to make tangible contributions to a number of National Action Plans and programmes stressing on poverty reduction, environmental management and restoration .e improvement of synergies and compatibility amongst the action plans and programmes.

**5.4. Goal:** Rehabilitation of degraded dry lands and their components through a combination of natural succession; protected area establishment and management; and sustainable use of biodiversity and improve livelihood of the people in dry land of the country.

**5.5. Objectives:**

- Set proper Sustainable Natural Resources Management (SNRM), land, water, forest and wild live management, practices that alleviate environmental degradation while improving livelihoods of the farming communities of the country.
- Establish and manage protected areas
- Conduct afforestation on degraded landscapes and sea coasts
- Conduct training and awareness programmes

**5.6. Components of the National Action Plan**

- i. Implementation of SNRM
- ii. An enabling policy and institutional environment for reducing Biodiversity loss, Land degradation and Desertification and impacts of climate change.
- iii. Human and institutional Capacity building
- iv. Introduction of sustainable project management

Below is a table that shows the results, objectives, indicators and activities for implementation of the action plan.

Results	Objectively verified Indicators	Source of data	Assumptions
<p><b>Objective .1.</b>Set proper Sustainable Natural Resources Management (SNRM), land, water, forest and wild live management, practices that alleviate environmental degradation while improving livelihoods of the farming communities of the country</p>	<ul style="list-style-type: none"> <li>• (20%)of the degraded land treated</li> <li>•Vegetation-cover increased by (35%)</li> <li>• Soil fertility improved by (10%)</li> <li>•Agricultural-production increased by (25%)</li> </ul>	<ul style="list-style-type: none"> <li>• Zone annual reports</li> <li>• Inspection and surveillance reports</li> </ul>	<ul style="list-style-type: none"> <li>• Government and people commitment</li> <li>• If Fund is secured</li> <li>• National peace and stability</li> </ul>
<p><b>Out come.1.</b> Development and implementation of Sustainable Natural Resources Management (SNRM) as a model to reduce land degradation</p> <p><b>Output 1.1</b> Minimizing deforestation, land</p>			

<p>degradation through soil and water conservation and afforestation practices</p> <p><b>Activities.</b></p> <ul style="list-style-type: none"> <li>• Introduction of new technologies (GIS, Cartography instruments, agricultural equipments)</li> <li>□ Gully stabilization(survey and design )</li> <li>• Establish 50,000 km of hill side terracing</li> <li>• Plant 1,000,000 trees seedlings on degraded lands</li> <li>• Promotion and establishment of nursery sites in six zones</li> <li>• Plantation of economical trees □ (Acacia Senegal and Acacia seyal) (1,000ha)</li> <li>• plantation of 20,000 Mangrove seedlings at the coastal areas</li> <li>• Sand dune fixation with drought resistant trees( 400ha)</li> <li>• Strengthen the existing soil lab in Halahale(NARI)</li> <li>• Installation of Biofertilizer</li> <li>• Introduction of Compost techniques</li> <li>• Construction of diversion weir and irrigation infrastructure to promote agricultural production and nutrition.</li> </ul>	<ul style="list-style-type: none"> <li>•Lively-hood improved by (30%)</li> <li>•Gully erosion mitigated by (10%)</li> </ul>		
<p><b>Out come 2.</b> Developing and applying capacities for replicating and adapting SNRM models to halt land degradation.</p> <p><b>Output.2.1.</b> Introduction improved natural resources management practices</p>	<ul style="list-style-type: none"> <li>• Natural resources management improved by 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Zone annual reports</li> <li>• Inspection and surveillance reports</li> </ul>	<ul style="list-style-type: none"> <li>• Government and people commitment</li> <li>• If Fund is secured</li> <li>• National peace and stability</li> </ul>
<ul style="list-style-type: none"> <li>• Preparation of Training manual and implementation programmes on regarding</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural-production increased by (25%)</li> </ul>	<ul style="list-style-type: none"> <li>• Zone annual reports</li> <li>• Inspection and</li> </ul>	<ul style="list-style-type: none"> <li>• Government and people commitment</li> </ul>

<p>SNRM for different local groups(farmers,pastoralists, land managers, technical officers) and awareness programmes for the people in general is conducted</p> <ul style="list-style-type: none"> <li>Regulate utilization of natural resources</li> </ul> <p>Setup monitoring procedures</p> <p><b>Output.2.2</b> Enhancing alternative energies</p> <p><b>Activities</b></p> <ul style="list-style-type: none"> <li>Installing 20 Solar energies in six zones</li> <li>Expansion of improved stoves 20,000 in three zones</li> <li>Production of briquettes from prosopis biomass for firewood in 500ha</li> </ul>	<ul style="list-style-type: none"> <li>Deforestation reduced by (30%)</li> <li>Soil degradation reduced by (20%)</li> <li>Ground table water Improved by (25%)</li> <li>Lively hood improved by (30%)</li> <li>Agricultural-production increased by (25%)</li> </ul>	<p>surveillance reports</p>	<ul style="list-style-type: none"> <li>Fund is secured</li> <li>National peace and stability</li> </ul>
<p><b>Out come.3.</b> Establishment of five new Pas covering 392,214 ha (Buri-Irrori-HawakilIslands- 180,780ha;Semienawi/ Debubawi Bahri- 100,00ha; Bara'soli- 800ha,Reverine habitat a long Gash and Barka Rivers(195,024) and Nakfa Reserves 16,3990ha and 100,000 ha of enclosures (permanent and temporary enclosures) in six zones</p> <p><b>Output.3.1.</b>A national dialogue on the importance of protected areas in BD conservation and national development conducted involving all relevant stakeholders (to increase awareness);</p>			<ul style="list-style-type: none"> <li>Government and people commitment</li> <li>Fund is secured</li> <li>National peace and stability</li> </ul> <ul style="list-style-type: none"> <li>Government and people commitment</li> <li>Fund is secured</li> <li>National peace and stability</li> </ul>

<p><b>Activities</b></p> <ul style="list-style-type: none"> <li>• Several sectoral development policies revised to include protected areas in sectoral development frameworks, including budgets (sectoral development plans published).</li> <li>• <input type="checkbox"/> Conduct Biodiversity survey in all protected areas</li> <li>• Socioeconomic studies(preparation of manuals ,questionnaires, preparation of awareness materials</li> <li>• Physical delineation of the five PAs done and core infrastructure put in place(border markings, administration centre, outposts)</li> <li>• Process for legislation enactment, including gazetting protected areas, institutionalized</li> </ul>		<p>Zone of annual reports</p>	
<p><b>OutCome.4.</b>Increasing of Institutional collaboration for effective management of PA</p> <p><b>Output.4.1.</b></p> <ul style="list-style-type: none"> <li>• A comprehensive Protected Areas Plan for the country developed through knowledge based participatory process, taking climate change risks into considerations. An implementation plan agreed (involving strategic partnerships between the various levels of government, private sector and communities);</li> </ul>	<ul style="list-style-type: none"> <li>• Protected area management enhanced</li> </ul>	<ul style="list-style-type: none"> <li>• Zone annual reports</li> </ul> <p>Inspection and surveillance reports</p>	<ul style="list-style-type: none"> <li>• Government and people commitment</li> <li>• Fund is secured</li> <li>• National peace and stability</li> <li>• Government and people commitment</li> <li>• Fund is secured</li> <li>• National peace and stability</li> </ul>

<p><b>Activities :</b></p> <ul style="list-style-type: none"> <li>• Develop sustainable management plan for all protected areas</li> <li>• A system for the effective implementation of the buffer zone management plans in place including appropriate institutional arrangements for collaboration, consultation mechanisms for collaboration and conflict resolution</li> </ul>			
<p><b>Outcome.5.</b>enhancement of Research and Development Output 1.promote research on terrestrial, agricultural and marine biodiversity conservation and sustainable use</p> <p><b>Output 2.</b>promote socioeconomic of the community living on arid and semi arid areas</p> <p><b>Output 3.</b>strengthen the existing research centres</p> <p><b>Activities</b></p> <ul style="list-style-type: none"> <li>• Set research infrastructures</li> <li>• Publish research results</li> </ul> <p><b>OutCome.6.</b>enhancement of Capacity Building</p>	<ul style="list-style-type: none"> <li>• The existing knowledge of status and trends of the national biodiversity improved</li> <li>• Socioeconomic of the community studied well</li> <li>• The existing research centers equipped with modern technology</li> <li>• PA staff skill enhanced by (40%).</li> <li>• Sustainable financing for the 5 PA secured (measured by PA System Financial Scorecard)</li> </ul>	<ul style="list-style-type: none"> <li>• Zone annual reports</li> <li>• Inspection and surveillance reports</li> <li>• Zone annual reports</li> <li>• Inspection and surveillance reports</li> </ul>	<ul style="list-style-type: none"> <li>• Government and people commitment</li> <li>• If Fund is secured</li> <li>• National peace and stability</li> <li>• Government and people commitment</li> <li>• If Fund is secured</li> <li>• National peace and stability</li> </ul>
<p><b>Output.6.1.</b>Biodiversity loss and human-induced degradation and halted in five effectively managed protected areas</p> <p><b>Activities</b></p> <ul style="list-style-type: none"> <li>• PA staff skill enhanced by (50%).</li> <li>• Sustainable financing for the 5 PA secured (measured by PA System Financial Scorecard)</li> </ul>	<ul style="list-style-type: none"> <li>• Resource users, local groups and associations as well as municipal entities strengthened in their planning and decision-making capacity related to sustainable resource use, adaptation/mitigation and conservation (skills)</li> </ul>	<ul style="list-style-type: none"> <li>• Zone annual reports</li> <li>• Inspection and surveillance reports</li> <li>• Zone annual reports</li> </ul>	<ul style="list-style-type: none"> <li>• Government and people commitment</li> <li>• If Fund is secured</li> <li>• National peace</li> </ul>



<p><b>Output.6.2.</b>Systems for effective and efficient management and administration of protected area system in place supported by sufficient human and financial resources</p> <p><b>Output.6.3.</b>Vulnerability of communities reduced through adoption of adaptation measures and income generating activities</p> <p><b>Activities</b></p> <ul style="list-style-type: none"> <li>● Resource users, local groups and associations as well as municipal entities strengthened in their planning and decision-making capacity related to sustainable resource use, adaptation/mitigation and conservation (skills)</li> <li>●Publish training and awareness materials</li> <li>●Conduct training, workshops, seminars for farmers, students, and policy makers.</li> <li>●Conduct Intensive awareness programme for the community through national media(news letter, TV, Radio etc)</li> </ul>	<ul style="list-style-type: none"> <li>● Lively hood improved by (30%)</li> <li>● Human capacity improved by 25%</li> <li>● Livelihood of the local community improved by 30%</li> <li>● Environmental information increased by 35%</li> <li>● Public awareness increased by 25%</li> </ul>	<ul style="list-style-type: none"> <li>● Interview</li> </ul>	<p>and stability</p>
<ul style="list-style-type: none"> <li>● Sustainability of the Project management (Monitoring and evaluation)</li> </ul>	<p><b>Activities</b></p> <ul style="list-style-type: none"> <li>● Conduct Ex-post evaluation</li> <li>● Conduct Terminal evaluation and on going review</li> <li>● Conduct On going monitoring and review</li> <li>● Conduct Mid term, semi-annual and annual monitoring and evaluation</li> </ul>		

### 5.8. Implementation Arrangement

Once defined, the implementation arrangements would outline the following:

1. A Government-led mechanism for implementing the partnership goals and objectives (including operational modalities);
2. An approach for regular review to assess agreed goals objectives (e.g. monitoring and evaluation); and Cost and financing implication

### 5.9. Actors for the implementation of the Project

Since the environmental challenge is cross-cutting issue, the project will involve relevant stakeholders.

Below is displayed the roles and responsibilities of the relevant stakeholders (see table.4.).

Table. 4. Roles and responsibilities of relevant stakeholders

Stakeholder	Roles and responsibilities
Ministry of Agriculture (MOA)	Would be responsible for conservation in the terrestrial environment - provisionally constituting the area down to the high watermark.
Ministry of Marine Resources	Would be responsible for the planning and conservation of the coastal areas.
Ministry of Land, Water and Environment (MLWE)	Would be responsible for developing standards and ensuring that environmentally sustainable practices are pursued in the development of the project. And also will have a lead role in coordinating, regulating, Management finance allocation for the project .
Ministry of Local Government	Would be responsible for provision of administrative backup and services
Ministry of Energy and Mining	Would be responsible in introducing alternative energies.
National Union of Eritrean Women (NUEW)	Would be responsible for mobilizing women for participation in project planning and implementation. NUEW will be critical in mobilizing local communities (especially women) in identifying and implementing adaptation, SNRM and protected areas techniques and income generating activities. Also in participation in planning and monitoring.
Local Communities	Custodians and beneficiaries of the PAS, pasturelands, forests, fishing grounds. Local communities will be participate in planning and management, especially identifying and implementing adaptation and SNRM techniques, income generating activities and monitoring.
Private sector	Would be responsible for advancing business, particularly in tourism and other income generating activities. The private project will especially cultivate the participation of the private sector as sector as a critical sustainability mechanism.

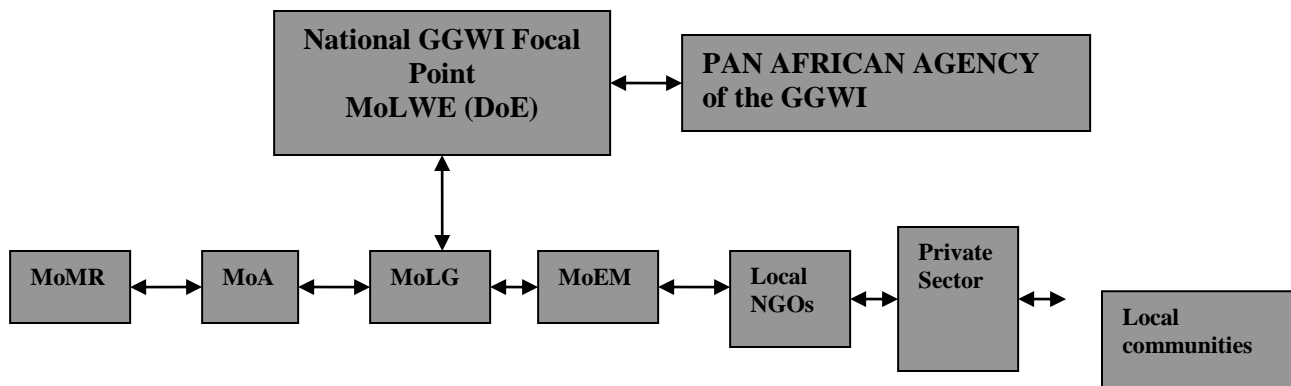
### 5.10. Proposed structure for implementation of the GGWI

The following are proposed structure for implementing the Five Years National Action Plan to Combat Desertification and land degradation in Eritrea.

### 5.11. GGWI at the National Level

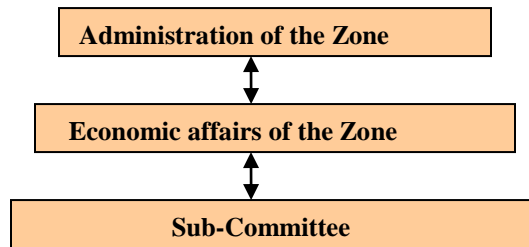
The lead institution responsible for coordinating the five year project is the Department of Environment of the Ministry of Land, Water and Environment. It will involve other institutions, particularly the Ministry of Local Government (MoLG), Ministry of Agriculture, Ministry of Marine Resources, Ministry of Energy and Mining, Local NGOs, Private sectors and Local communities in the implementation of the action plan.

The structure proposed at the **National level** is as follows:



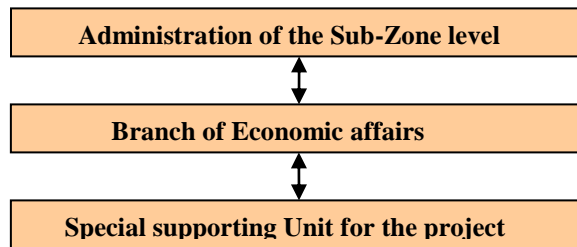
### 5.12. GGWI at Zone Level

The structure proposed at the **Zone level** is as follows:



### 5.13. GGWI at Sub-Zone Level

The structure proposed at the **Sub-Zone level** is as follows:



## **6. MONITORING AND EVALUATION**

Through a close cooperation between the Department of Environment of the Ministry of Land, Water and Environment and the Ministry of Local Government, Ministry of Agriculture, Ministry of Energy and Mining there will be joint monitoring of progress towards the annually agreed work plan for the programme for sustainability of the project. Thus, bottle necks of the project will be identified early on and timely corrective measures and will be put in place in support of an effective and efficient implementation of the plan. An annual programme progress review will be held for each Zones based on which the innervations for the coming year will be planned and funding allocated and this will ensure the effectiveness of the project.

A mid term evaluation involving other line ministries will be held to determine the need for major course corrections and changes to agree upon implementation strategies. During the last year of implementation a rapid assessment will be conducted in the project areas to gather information on the performance indicators specified in the log frame. An independent end evaluation by an external party will determine till what extend the programme has achieved its stated project purpose and verify what have been eventually benefited from the different interventions.

The zone data base will be maintained as a record of all different activities indicated in the action plan. The results of the activities will be geographically mapped using GPS equipment.

## **7. CONCLUSION**

This five year national action plan addresses the aim of the GGWI .Thus ,the project will contribute in going process of SNRM and preparation for establishing of protected areas in different areas of the Country while the broad natural resources may vary, some of the underlying principles are similar, and include the need for integrating policies and laws; Capacity building at all levels, but ensuring that such capacity is productively used; An understanding of natural resource management issues in different ecosystems; Providing an increased economic value of natural resources to communities and nations; Mitigating potential natural resource conflicts. This document also tries to concentrate on the search for food security for rural people, combined with the historically narrow traditional focus on agriculture, is coming at a high conservation and environmental cost. This results in a loss of resilience and increased risk, a factor particularly prevalent in the large dry land areas of the region. Now, contemporary thinking on food security recognizes the multiple roles that natural resources play a great role. Harmonizing the natural resource management in to food security and poverty alleviation strategies will help ensure the viability of the natural resource base.

Finally, the Government of Eritrea is carrying out many activities to improve the Sustainable Land Management (SLM)/SNRM in the country. This issue is very critical to reduce the dramatically on going land degradation. The bottle necks to SLM are expected to be reduced avoided gradually and through the sum total efforts of all stakeholders. Thus, the government is committed enough to success the GGWI integrating in to the country with the on going projects efficiently and effectively.

## Work Plan

No	Activities	Implementation Matrix				
		Year 1	Year 2	Year 3	Year 4	Year 5
□	<ul style="list-style-type: none"> <li>• Introduction of new technologies (GIS and Cartography instruments)</li> </ul>					
	<ul style="list-style-type: none"> <li>• Gully stabilization(survey and design )</li> <li>• Mapping and land classification for resources assessment in as a model in six zones: Gash Barka, Northern Red Sea, Southern Red Sea, Anseba, Maekel and Debub.</li> </ul>					
2	<b>Soil and Water Conservation</b> <ul style="list-style-type: none"> <li>• construct 50,000 km hillside terracing</li> <li>• Plant 1,000,000 trees seedlings on degraded lands</li> <li>• Construction of diversion weir and irrigation infrastructure to promote agricultural production and nutrition</li> </ul>					
3	<ul style="list-style-type: none"> <li>• Strengthen the existing soil lab in Halahale(NARI)</li> <li>• Installation of Biofertilizer</li> <li>• Introduction of Compost techniques</li> </ul>					
4	<ul style="list-style-type: none"> <li>• Sand dune fixation with drought resistant trees ( 400ha) in Southern Red Sea Zone</li> </ul>					
5	<ul style="list-style-type: none"> <li>• Plantation of economical trees□ (Acacia Senegal and Acacia seyal (1,000ha) In Gash Barka, Debub, and Northern Red Sea Zone Establishing</li> </ul>					

	of 20 nursery site in Six zones □					
6	<ul style="list-style-type: none"> <li>• Construction of diversion weir and irrigation infrastructure to promote agricultural production and nutrition in six zones</li> </ul>					
7	<ul style="list-style-type: none"> <li>• Establish 5 new protected areas covering 392,214ha and Establish 100,000ha community based enclosures (permanent and Temporary) in six zones</li> <li>• Several sectoral development policies revised to include protected areas in sectoral development frameworks, including budgets (sectoral development plans published).</li> </ul>					
	<ul style="list-style-type: none"> <li>• Conduct Biodiversity survey in the five protected areas</li> </ul>					
	<ul style="list-style-type: none"> <li>• Socioeconomic studies(preparation of manuals ,questionnaires, preparation of awareness materials</li> </ul>					
	<ul style="list-style-type: none"> <li>• Physical delineation of the five PAs done and core infrastructure put in place(border markings, administration centre, outposts)</li> </ul>					
	<ul style="list-style-type: none"> <li>• Process for legislation enactment, including gazetting protected areas institutionalized</li> </ul>					
	<ul style="list-style-type: none"> <li>• Develop sustainable management plan for all protected areas</li> </ul>					
	<ul style="list-style-type: none"> <li>• A system for the effective implementation of the buffer zone management plans in place including appropriate institutional arrangements for collaboration, consultation mechanisms for collaboration and conflict resolution</li> </ul>					
	<ul style="list-style-type: none"> <li>• Resource users, local groups and associations as well as municipal entities strengthened in their planning and decision-making capacity related to sustainable resource use, adaptation/mitigation and conservation (skills)</li> </ul>					

	<ul style="list-style-type: none"> <li>• Land use and tenure/stewardship rights articulation at the local level provides incentives to communities for “climate-safe” conservation-compatible resource use, including in PA buffer zones</li> <li>• identify and support Sustainable income generating opportunities and relevant groups</li> </ul>				
8	<ul style="list-style-type: none"> <li>• Enhancing Ex-situ conservation: genebank, botanical garden and zoo</li> </ul>				
9	<ul style="list-style-type: none"> <li>• Installing 20 Solar energies in six zones</li> <li>• Expansion of improved stoves 20,000 in three zones</li> <li>• Production of briquettes from prosopis biomass for firewood in one zone</li> </ul>				
10	<ul style="list-style-type: none"> <li>• Community awareness programme and Training □□ in six zones for 2000 people</li> <li>• establishing of committees at National, Zone and Sub zone levels □ to involve the □ implementation of the work plan</li> </ul>				
11	<ul style="list-style-type: none"> <li>• Conduct Quarterly, Semi-annual and annual Monitoring and Evaluation at all sites of the project at each year of implementation of the project.</li> </ul>				

### Estimated Budget for Implementation GGWI

For Implementation	Percentage	Budget(\$)
<b>Outcome1.</b> Development and implementation of Sustainable Natural Resources Management (SNRM) as a model to reduce land degradation	25%	7,500,000
<b>Outcome2.</b> Developing and applying capacities for replicating and adapting SNRM models to halt land degradation	15%	4,500,000
<b>Outcome 3.</b> Establishment of five new Pas covering 392,214 ha (Buri-Irrori-HawakilIslands-180,780ha;Semienawi/Debubawi Bahri- 100,00ha; Bara'soli-800ha,Reverine habitat a long Gash and Barka Rivers(195,024) and Nakfa Reserves 16,3990ha and 100,000 ha of enclosures (permanent and temporary enclosures) in six zones	27%	8,100,000
<b>Outcome 4.</b> Increasing of Institutional collaboration for effective management of PA	10%	3,000,000
<b>Outcome 5.</b> enhancement of Research and Development	5%	1,500,000
<b>OutCome.6.</b> enhancement of Capacity Building	10%	3,000,000
<b>Project Management</b>	8%	2,400,000
<b>Overall Budget</b>		<b>30,000,000</b>



### SUMMARY OF THE ESTIMATED BUDGET (\$)

Source of Co-financing	Name of Co-financer	Type of Co-financing	Amount(\$)
Government	GoE	in kind	4,000,000
GEF Agency	FAO	Cash	10,000,000
Bilateral Agent	EU	Cash	15,000,000
Private sector	communities	in kind	1,000,000
<b>Total</b>			<b>30,000,000</b>

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