

**DIAGNOSTIC ANALYSIS
OF
CLIMATE CHANGE AND DISASTER MANAGEMENT
IN RELATION TO THE PRSP III
IN
SIERRA LEONE**



UNDP-SL

**Prepared by:
Dr. Patrick Tarawalli
14th AUGUST 2012**

	Table of Contents	Page
	List of Figures	iv
	List of Tables	iv
	Abbreviations	v
	EXECUTIVE SUMMARY	ix
Chapter 1.0	GENERAL OVERVIEW	1
1.1	Country Background	1
1.2	Mapping of Climate Change and Disaster Management Circumstances in Sierra Leone	4
Chapter 2.0	CURRENT SITUATION ON CLIMATE CHANGE AND DISASTER MANAGEMENT IN SIERRA LEONE	7
2.1	Introduction	7
2.1.1	Climate Trends	7
2.1.2	Poverty Reduction Strategy Paper 111 (Agenda for Prosperity)	7
2.2	Analysis of Climate Change and Disaster Management Concerns	8
2.2.1	Climate Variability	8
2.2.2	Projected Climate Change	9
2.2.3	Potential impact of climate change	9
2.2.4	Vulnerability Profile	9
2.3	Technology Transfers of climate change and disaster management	16
2.3.1	Major issues and concerns	16
2.3.2	Types of Technology Transfer	16
2.3.3	Measures to adapt and integrate best practices	17
2.4	Institutional arrangement on climate change and disaster management	17
2.4.1	Institutions and Conventions	17
2.4.2	National Policies and Plans: Existing Policies having bearing with the Convention	19
2.4.3	Requirements under the Convention	19
2.4.4	Organizations Involved in the Implementation of Rio's Conventions	20
2.4.5	Disaster Management	23
2.4.6	DRM Strategic Framework	23
2.4.7	DRM Institutional Framework	24
2.4.8	DRM Legal Framework	26
2.4.9	Institutional capacity development and strengthening	27
2.5	Financing climate change and disaster management activities in Sierra Leone	27
2.5.1	DRM Financing	28
2.5.2	The main ongoing projects contributing to DRM	29
2.6	Data and Information Management	31
2.7	Awareness Raising on climate change and disaster management	32
2.7.1	Major issues and concerns	33
2.7.2	Measures to Manage Impacts	34
2.8	Cross-cutting issues and linkages to climate change and Disaster Management	34
2.8.1	Land use and agriculture linkages to climate change and disaster management	34

2.8.2	Habitats and ecosystems linkages to climate change and disaster management	35
2.8.3	Watershed and coastal management relations to climate change and disaster management	36
2.9	Risk Assessment, Risk Monitory and Early Warning Systems	37
2.9.1	Risk Assessment	37
2.9.2	Risk Monitoring and Early warning system	38
2.9.3	Preparedness	41
2.9.4	Response	42
2.9.5	Disaster Prevention and Risk Reduction (Mitigation)	44
Chapter 3.0	CAPACITY DEVELOPMENT NEEDS OF CLIMATE CHANGE AND DISASTER MANAGEMENT FOR REMOVING THE BARRIERS	47
3.1	Projections of Climate	47
3.2	Institutional Capacity development needs urgently required to facilitate the management of climate change	48
3.3	Capacity Constraints Matrix	49
3.4	Adaptation	50
3.5	Mitigation	51
3.6	Programmes in Support of capacity development needs for climate Change Issues	53
3.7	Capacity development needs of DM	53
3.8	Main needs for improving risk assessment	54
3.9	Main needs identified for improving and optimizing disaster risk monitoring and early warning	54
3.10	Key needs identified to improve preparedness status and implementation	55
3.11	Key needs identified to improve response implementation and status	56
3.12	Key needs identified to improve disaster prevention and risk reduction implementation and status	56
3.13	Key needs identified to improve NSCC and DRM data and Information Management	57
Chapter 4.0	INTEGRATED APPROACH TOWARDS BARRIER REMOVAL	59
4.1	Proposed Poverty Reduction Strategy Paper (PRSP) 111 on Climate Change and Disaster Management	59
4.2	Integrated approach to correct or minimize climate change and disaster risk reduction impact and effects	59
4.3	Integration of Disaster Risk Reduction (DRR) and Adaptation to Climate Change (ACC)	60
4.4	Broader integrated approach of the diagnostic analysis	60
Chapter 5.0	MAJOR GUIDELINES FOR MAINSTREAMING CLIMATE CHANGE AND DISASTER MANAGEMENT WITHIN THE PRSP111	63
5.1	Introduction	63
5.2	Development of mainstreaming policies	64
5.3	Disaster Risk Reduction (DRR) Mainstreaming	65

5.4	Economic diversification to promote inclusive growth	65
5.5	Managing mineral and marine resources: hoping for a blessing rather than a curse	70
5.6	Accelerating MDGs for Human Development	71
5.7	International competitiveness	72
5.8	Employment and Labor Strategy	72
5.9	Social Protection	72
5.10	Governance and Public Sector Reforms	73
5.11	Mainstreaming Constraints	73
5.12	Mainstreaming Recommendations	74
Chapter 6.0	ROADMAP FOR EPA AND ONS TO FULLY CAPACITATE THE MANAGEMENT OF CLIMATE CHANGE AND DISASTER MANAGEMENT	77
6.1	Introduction	77
6.2	National Greenhouse Gas Inventory	78
6.3	Greenhouse Gas Mitigation Assessment	79
6.4	Vulnerability (Impact and Adaptation) Assessment	79
6.5	Roadmap of the National Climate Change Secretariat	80
6.6	Roadmap Strategies	80
6.7	Disaster Management Roadmap	81
6.8	The Durban Meeting	81
Chapter 7.0	ACTIVITY AND INVESTMENT PLAN OF ACTION FOR CLIMATE CHANGE AND DISASTER MANAGEMENT WITHIN THE PRSP111.	84
7.1	Introduction	84
7.2	Institutional Strengthening, policy and legislative framework	85
7.3	Environmental Education and awareness raising on climate change related issues	85
7.4	Development of an Integrated Natural Resources and Environmental Management programme for Sierra Leone	85
Chapter 8.0	PROPOSED STRUCTURAL ARRANGMENTS IN ADDRESSING CLIMATE CHANGE AND DISASTER MANAGEMENT	86
8.1	Proposed structural arrangements in addressing climate change in Sierra Leone	86
8.2	Proposed Structure of Disaster Management Commission or Agency	87

	List of Figures	Page
Figure 1	Sierra Leone at Glance in 2011	3
Figure 2	Disaster Occurrence Reported in Sierra Leone, from 1980 to 2010	10
Figure 3	The Office of National Security for Disaster Management	24

	List of Tables	Pages
Table 1	Summary international/regional treaties and their Implementation	21
Table 2	The main ongoing projects contributing to DRM	29
Table 3	Capacity constraints matrix	49
Table 4	Mainstreaming Recommendations	74

	page
REFERENCES -	89
LIST OF CONTACT PERSONS -	95
ANNEX 1 -	96
ANNEX 2 -	104

ABBREVIATIONS

ACC	Adaptation to Climate Change
AfDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
AMF	Adaptive Management Framework
AML	Abandonment Managed Land
BASED-SL	Bolstering Agriculture Sector Development in Sierra Leone
CBD	Convention on Biological Diversity
CBOs	Community Based Organizations
CCD	Convention to Combat Desertification
CDM	Clean Development Mechanism
CCPO	Climate Change Project Office
CEP	Country Environment Profile
CHEC-SL	Council for human Ecology in Sierra Leone
CITES	Convention on International Trade in Endangered Species of wild fauna and flora
CO	Carbon monoxide
CO ₂	Carbon dioxide
CSSL	Conservation Society of Sierra Leone
CSP	Country Strategy Paper
DACO	Development Assistance Coordination Office
DALA	Damage and Loss Assessment
DFID	Department for International Development – UK
DISEC	District Security Committee
DM	Disaster Management
DMO	District Medical Officer
DNA	Designated National Authority
DRM	Disaster Management Department
DRR	Disaster Risk Reduction
DoE	Department of Environment
DoF	Department of Forestry
EC	European Commission
ECOWAS	Economic Commission for West Africa States
EDF	European Development Fund
EEZ	Exclusive Economic Zone at sea
EI	Energy Industries
EIA	Environmental Impact Assessment
EFA	Environmental Foundation for Africa
ENFORAC	Environmental Forum for Africa
ENSO	El Nino Southern Oscillation
EPA	Environment Protection Act
EPA-SL	Environment Protection Agency Sierra Leone
EPD	Environment Protection Department
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan

EU	European Union
EWS	Early Warning System
FAO	Food and Agriculture Organization
FBC	Fourah Bay College
FCC	Freetown City Council
FD	Forestry Division
FGL	Forest and Grasslands
GBS	General Budget Support
GCM	General Circulation Model
GDP	Gross Domestic Products
GEF	Global Environment Facility
GFDRR	Global Facility for Disaster Risk Reduction
GHG	Green House Gas
GIS	Geographic Information System
GNI	Gross National Income
GNP	Gross National Products
GOSL	Government of Sierra Leone
GRS	Governance Reform Secretariat
HDI	Human Development Index
HE	His Excellency
HFA	Hyogo Framework of Action
HIV	Human Immunodeficiency Virus
JAS	Joint Assistance Strategy
JICA	Japan International Cooperation Agency
IBA	Important Bird Area
IFAD	International Fund for Agriculture Development
IGG	Inclusive Green Growth
IMBO	Institute of Marine Biology and Oceanography
INC	Initial National Communication of Climate Change
INWG	International Negotiations Working Group
IPCC	Intergovernmental Panel on Climate Change
ITCZ	Inter – Tropical Convention Zone
LDC	Least Developed Countries
LDCF	Least Developed Countries Fund
LDP	Local Development Plan (1 year cycle)
LFWB	Land and Forest Woody Biomass
LGA	Local Government Authority
LPG	Liquid Petroleum Gas
LWDD	Land and Water Development Division
LWG	Long term mitigation Working Group
MAFFS	Ministry of Agriculture, Forestry and Food Security
MCI	Manufacturing and Construction Industries
MDA's	Ministries, Departments and Agencies
MDGs	Millennium Development Goals
MEA's	Multilateral Environment Agreements
MEST	Ministry of Education, Science and Technology

MEWR	Ministry of Energy and Water Resources
MFAIC	Ministry of Foreign Affairs and Internal Cooperation
MLCPE	Ministry of Lands Country Planning and Environment
MMR	Ministry of Minerals Resources
MoFED	Ministry of Finance and Economic Development
MoHS	Ministry of Health and Sanitation
MSWGCA	Ministry of Social Welfare, Gender and Children's Affairs
MTA	Ministry of Transport and Aviation
MWHI	Ministry of Works, Housing and Infrastructure
MTCA	Ministry of Tourism and Cultural Affairs
MP	Metal Product
MPA's	Marine Protected Areas
MRV	Measurement, Reporting and Verification
MW	MegaWatt
NACEF	National Commission on Environment and Forestry
NACSA	National Commission for Social Action
NAPA	National Adaptation Programme of Action
NAP	National Action Plan
NBSAP	National Biodiversity strategy Action Plan
NCSA	National Capacity Self – Assessment
NDPRP	National Disaster Preparedness and Response Plan
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NEPB	National Environment Protection Board
NEPAD	New Partnership for Africa Development
NFAP	National Forestry Action Plan
NFF	National Fire Force
NGOs	Non-Governmental Organizations
NIP	National Indicative Programme
NMVOC	Non-Methane Volatile Organic Compound
NOX	Nitrogen Oxides
NPA	National Power Authority
NPF	National Platform for Disaster Risk Reduction and Climate Change Adaptation
NRM	Natural Resource Management
NSC	National Security Council
NSCC	National Secretariat of Climate Change
NSCCG	National Security Council Coordinating Group
NTFPs	Non-Timber Forest Products
ODS	Ozone Depleting Substances
ONS	Office of National Security
PAGE	Promoting Agriculture, Governance and Environment
PARCC	Protected Area Resilient to Climate Change
POP's	Persistent Organic Pollutants
PROSEC	Provincial Security Committee
PRRO	Protected Relief and Recovery Operations
PRSP	Poverty Reduction Strategy Paper

REDD	Reduced Emission from Deforestation and Degradation
RSPB	Royal Society for the Protection of Birds
RWG	Resilience Working Group
SALWCO	Sierra Leone Water Company
SEA	Strategic Environment Assessment
SEFA	Sustainable Energy for All
SL	Sierra Leone
SLIS	Sierra Leone Information System
SLMET	Sierra Leone Meteorological Department
SLP	Sierra Leone Police
SLRCS	Sierra Leone Red Cross Society
SL-WPBCP	Sierra Leone Wildlife Protection and Biodiversity Conservation
SNAP	Sustainable Nutrition and Agriculture Promotion
SNC	Second National Communication on climate change
SSL	Statistics Sierra Leone
TNC	Third National Communication of Climate Change
UN	United Nation
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment Development
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commission for Refugees
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organizations
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for International Development
USL	University of Sierra Leone
VCA	Vulnerability and Capacity Assessment
WADMCB	West Africa Disaster Management Capacity Building
WAFR	Western Area Forest Reserve
WAPF	Western Area Peninsula Forest
WCB	Wildlife Conservation Branch of the Forestry Department
WFP	World Food Programme
WSD	Water Supply Division
WSSD	World Summit on Sustainable Development

EXECUTIVE SUMMARY

The main objective of the diagnostic analysis is to provide a pathway for the implementation of the integration and mainstreaming of climate change and disaster management in relation to the Poverty Reduction Strategic Paper 111 (PRSP111) of Sierra Leone.

Sierra Leone is considered by the UN classification as a Least Developed Country (LDC) with significant inequality in income distribution among its people. While it has substantial mineral, agricultural, and fishery resources, its economic and social infrastructure are not well developed, which hampers its economic development. Furthermore, unsustainable practices of Agriculture, forest exploitation and mining has led to the degradation of the environment causing serious climate change effects and disasters thereby affecting the development of the country.

The country though not a major emitter of green house gases, has been ranked as one of the least countries in terms of human development index and is highly vulnerable to the impacts of climate change shocks. Disasters couple with the effects of climate change threatens the country's abilities to reach the MDGs

Naturally, there is a very strong link between disaster management, climate change and development. Not only does action within one realm affect capacity for action in the others, but also that there is much that can be learnt and shared between realms in order to ensure a move towards a path of integrated and more sustainable development.

The diagnostic analysis is in eight chapters; chapter one provides general overview of Sierra Leone, chapter two deals with the current situation on climate change and disaster management, chapter three highlights the capacity development needs, chapter four outlines the integrated approach towards barriers removal, chapter five provides the major guidelines for mainstreaming climate change and disaster management, chapter six highlights the roadmap for EPA and ONS to fully capacitate the management of climate change and disaster department, chapter seven provides activity and investment plan of action for climate change and disaster management and chapter eight outlines the proposed structural arrangement in addressing climate change and disaster management in Sierra Leone.

The ethos of this approach is to build on the activities undertaken to date and to improve the coordinated and integrated management and mainstreaming of these activities, moving away from sectoral and institutional delivery, to more effective and efficient collaborative implementation into the PRSP111.

The findings and recommendations of the diagnostic analysis are outlined in this report on the following strategic areas: capacity development needs in chapter three, integrated approach towards barriers removal in chapter four and major guidelines for mainstreaming in chapter five.

Currently, there seems to be some disconnected or very little coordination between disaster management, climate change and development, which is due to the fragmented manner of addressing climate change, disaster management and environment issues and the lack of coordination and synergies.

Poor communities and livelihoods have suffered most from the adverse effects of climate change and severe natural disasters as the economy is largely environment driven. These are causing a major obstacle to efforts to promote sustainable economic and social development and to reduce poverty.

The major recommendations on climate change and disaster management are outlined below for further consideration and action by the PRSP111 team:

- There should be massive and continuous awareness raising and sensitization campaigns throughout the country on climate change impacts, adaptation strategies and disaster management including, Optimizing risks knowledge and surveillance, and early warning system (EWS) multihazard;
- The country should develop an integrated Natural resources and environment management programme;
- Promote the use of efficient and affordable renewable energy in Sierra Leone;
- Energy efficiency and conservation should be given due considerations;
- Develop the Management and protection of forest resources catchment areas in Sierra Leone including Wetlands;
- Strengthen the institutions that is implementing climate change and disaster management administration and projects;
- Capacity building for adaptation to long-term climate change in the country;
- Strengthen the overall national DRM coordination and key mechanisms;
- Strengthen the response capacity and readiness of the central level;
- Optimize Community based Local Level Disaster and Risk Management (DRM) and Adaptation to Climate Change (ACC) ;
- Strengthen disaster prevention and risk reduction implementation and status in the country;
- Develop an integrated approach towards climate change and disaster management;
- Mainstreaming climate change and disaster management functions into the inclusive green growth;
- Impliment all protocols, articles and conventions in relation to climate change and disaster management.

1.0 GENERAL OVERVIEW

1.1 Country Background

Sierra Leone is situated in Western Africa with a total land area of approximately 72,325 sq. km, located between latitudes 6° 55' and 10° 00' north and between longitudes 10° 14' and 13° 17' west. It is bordered in the northwest by the Republic of Guinea, in the south and southeast by the Republic of Liberia and west of Greenwich Meridian by the Atlantic Ocean. According to Statistics Sierra Leone (2012), the population is estimated at 6.0 million in 2011 with a growth rate of 3.3%. The capital city of Freetown is located in the western area of the country and is home to approximately 1.25 million people (~21% of the total population). Sierra Leone has a tropical climate with hot and humid weather in the rainy season, which usually spans from June to November and a dry season, which typically spans from December to May. The country has an ambient temperature range of 27°C - 35°C and relative humidity varying from an average of 80% in the rainy season to about 50% in the dry season.

Sierra Leone is considered by the UN classification as a Least Developed Country (LDC) with significant inequality in income distribution among its people. While it has substantial mineral, agricultural, and fishery resources, its economic and social infrastructure are not well developed, which hampers its economic development. Furthermore, unsustainable practices of Agriculture, forest exploitation and mining has led to the degradation of the environment causing serious climate change effects and disasters thereby affecting the development of the country.

This rainfall season is largely controlled by the movement of the tropical rain belt (also known as the Inter-Tropical Convergence Zone, ITCZ), which oscillates between the northern and southern tropics over the course of a year, affecting Sierra Leone when it is in its northern position. When the ITCZ is in this northern position, the dominant wind direction in regions south of the ITCZ is south-westerly, blowing moist air from the Atlantic onto the continent. This pattern is referred to as the West African Monsoon, and causes exceptionally high rainfalls on the coastline of western Africa in the wet season. Monthly rainfall in coastal Sierra Leone can exceed 1000mm, but decrease rapidly inland to around 300mm per month in the far west. In the winter, the dominant wind direction is reversed, the dry and dusty 'Harmattan' winds blow from the Sahara desert. The seasonal rainfall in this region varies considerably on inter-annual and inter-decadal timescales, due in part to variations in the movements and intensity of the ITCZ, and also to variations in timing and intensity of the West African Monsoon. The most well documented cause of these variations is the El Niño Southern Oscillation (ENSO). El Niño events are associated with drier conditions in West Africa.

The country has substantial deposits of mineral resources such as diamonds, rutile, titanium, bauxite, iron ore, gold, and chromium. According to Statistics Sierra Leone (2004), the average

population density is about 75 inhabitants per square kilometres. Life expectancy at birth is 41.1 years and the fertility rate (i.e. births per woman) is 6.5. The infant mortality rate is 165.4 out of 1,000 live births.

Her economic and social development factors pose a major challenge to development and make the country vulnerable to many national and international pressures. Efforts to improve the quality of life of its people have been hampered by extreme poverty, structural weakness in the economy, and the lack of capacity weaknesses related to growth and development. All these can be further aggravated by the negative impacts of climate change and disaster impacts. The Government has done the Initial National Communication (INC) and in partnership with UNDP is now in the process of developing the Second National Communication (SNC) on climate change with the primary objective to identify existing/remaining gaps and new areas from emerging climate change issues for adaptation to climate change and minimizing its adverse impacts in the country. The report will be submitted to the Conference of Parties through the United Nations Framework Convention on Climate Change (UNFCCC) through the Secretariat in Bonn. The strategy of the project is to build on experience gained during the implementation of the previous projects and various studies from 1993 to date, particularly the INC of Sierra Leone. The main components of the project are (a) update national circumstances (b) Further conduct inventory of greenhouse gas emissions (c) undertake programs containing measures to facilitate adequate adaptation, and mitigation of climate change (d) undertake programs and national action plans that are considered relevant for the achievement of the programs of the UNFCCC (e) document constraints and gaps related to financial, technical and capacity, (f) Undertake monitoring and annual review.

The project will further enhance the national capacities and will further raise general knowledge and awareness on climate change and its effects. It will also contribute to putting climate change issues higher on the national agenda through strengthened cooperation and increased involvement of all relevant stakeholders in the process. In addition, it will strengthen and build national capacities for participation in different mechanisms related to GHG mitigation and to fulfilling other commitments to the UNFCCC.

The National communications are the periodic assessment of countries sources and sinks of greenhouse gases taking into consideration the national circumstances and necessary solutions to address the likely effects of the perceived climate change issues. The compilation is one of the obligations of countries to the United Nations Framework Convention on Climate Change (UNFCCC).

We are at the last phase of the completion of the Second National Communication (SNC), but considering the rapidity and accuracy of our reports on the various steps of the communication done so far, we have been given the green light to commence the Third National Communication (TNC).

The Disaster Management Unit of the Office of National Security (ONS) in collaboration with other stakeholders is presently in the process of setting up the National Platform for Disaster Risk Reduction (DRR) in Sierra Leone. Below is a key statistics data in 2011 on the economy and demography of Sierra Leone as shown in figure 1.

Figure 1: Sierra Leone at Glance in 2011

Key Statistics	2011
Population (millions)	6.0
Urban population (% of total population)	38.8
Average annual growth (%)	2.1
Human Development Index (HDI)	0.336
Gross Domestic Product (GDP) per capita (PPP\$)	808
Gross National Income (GNI) per capita (constant 2005 PPP\$)	737
Population in severe poverty (%)	53.2
Population vulnerable to poverty (%)	13.1
Population below the income national poverty line (%)	66.4
Life expectancy at birth (years)	47.8
Environmental performance index (0-100)	32.1 (2010)
Natural resources depletion (% of GNI)	2.1
Death due to water pollution (per million people)	3.271 (2004)
Adult literacy rate (% ages 15 and older)	40.9(2005-2010)
Primary Education gross enrollment ratio (%)	85.1(2001-2010)
Secondary Education gross enrollment ratio (%)	26.5(2001-2010)
Tertiary Education gross enrollment ratio (%)	2.0 (2001-2010)

Source: UNDP.(2011).“Human Development Report 2011”.

The Sierra Leone inventory and gas flows report of 1990 shows that 360Gg CO₂ were emitted into the atmosphere while 303,058Gg CO₂ were removed from the atmosphere for the period by various social activities.

Emissions of 360Gg CO₂ were due to emissions of 355Gg from energy industries (ET), 151Gg from manufacturing and construction industries (MCI) and 6Gg from metal products (MP). Land use change and forestry category was responsible for the net CO₂ removal of over 300,000Gg and this net removal is due to the emissions of 86,357Gg due to conversion of forest and grasslands (FGL) into other land use types and removals of other woody biomass (LFWB) and 329,106 CO₂ due to abandonment of managed lands (AML). Thus Sierra Leone is a net sink of CO₂. Other gases emitted into the atmosphere are Nitrogen Oxides (NOX), Carbon monoxide (CO), and non-methane volatile organic compounds (NMVOC).

A total of 6,108Gg CO was emitted in the atmosphere in 1990. Of this, 82 % (4,893Gg CO) came from the agricultural sector and about 18% from the land use change and forestry sector. Burning of savannahs is responsible for 80 % (4,884Gg CO) of the CO emissions in the country. NMVOC emissions were registered in the industrial process. About 390Gg were emitted in 1990 in the process of production of metals.

It is evident that emissions of methane are more important than the other GHGs based on comparison of their global warming potentials. Methane emitted is equivalent to 1.2x10¹⁵ tons CO₂ equivalent (TCO₂E) and represents 100% of the total emissions in Sierra Leone. The bulk of these emissions come from rice cultivation.

Practical steps undertaken internationally to cope with problems related to climate change started after the establishment in 1988 of the Intergovernmental Panel on Climate Change, the United Nations Framework Convention on Climate Change of 1992 in Rio- de- Janeiro and its Kyoto protocol of 1997.

To date the meteorological department under the Ministry of Transport and Aviation has been the Focal point of climate change issues in Sierra Leone.

The country is also in the process of setting up a National Secretariat for Climate Change and Carbon Trading that will comprise of a National Climate Change Committee, National Registry for Reduced Emissions from Deforestation and Degradation (REDD), REDD Plus and Non-REDD Carbon Trading and a Designated National Authority (DNA) for issues relating to Clean Development Mechanism (CDM) designed to both attract investment and to establish an effective regulatory framework for project approval, Measurements, reporting and verification (MRV). The monitoring and evaluation aspects of projects though will be undertaken by the Environment Protection Agency (EPA), whose mandate it is to execute this function.

1.2 Mapping of Climate Change and Disaster Management Circumstances in Sierra Leone

Sierra Leone is endowed with abundant natural resources. These resources have continued to determine the path and pattern of economic growth, depending on how they are managed. The economy largely depends on our natural resources, and as such, understanding their nature, distribution and mode of exploitation is essential for their optimal utilization without jeopardizing the environment. If these resources are properly utilized and managed efficiently, environmental hazards and man made disasters and to some extent some natural disasters can be prevented.

Sierra Leone has not been branded as a “**disaster zone**”, however, some of the common practices adopted could be recipes for disasters. Prominent among these factors is deforestation which is rapidly accelerating in Sierra Leone and if it continues unchecked, could carry grave consequences, such as floods, which cause physical damages on private and public infrastructures as well as loss of lives. Saturation of soil is also likely to cause landslide or ground failure, injuries requiring hospitalization and sometimes death due to drowning etc.

Maritime accidents have also caused significant amounts of deaths in the recent past due to the absence of facilities to assist people in distress at sea, in danger on the shoreline or offshore etc. Other common emergencies include disease and epidemics such as Malaria, Lassa fever, Diarrhoea, HIV and AIDS, Population Movement (involving refugees, returnees and ex-combatants) and on a much smaller scale, air accidents. The country is vulnerable to several natural hazards, including drought-like conditions, floods and erosion, and tropical storms. One of the main challenges at the moment is the severe erosion (linked also to the deforestation problems) which have direct implications for electricity and power production (siltation and reduced storage of dams & reservoirs) in the country as well as significant health and livelihood impacts.

Disasters and hazards have been grouped into two broad categories; natural and man-made.

a. NATURAL DISASTERS/ HAZARDS

Meteorological Hazards	–	drought, Wind, storm, thunder and lightening
Geological Hazards	-	coastal erosion, upland erosion, mudslides, landslides
Hydrological Hazards	-	flooding
Pest Hazards	-	pest invasion & Infestation, weeds

b. MAN-MADE DISASTER/ HAZARDS

Ecological Hazards	-	wild fires deforestation biodiversity
Waste Management	-	domestic/municipal (solid) waste clinical & health waste industrial waste
Pollution	-	air pollution water pollution soil pollution

Accidents

- domestic fire, road traffic, maritime, air

Social Hazards

- civil disturbances
- child welfare
- population movement
- housing construction

Mining Hazards

- sand, stone, diamond, bauxite, rutile, iron ore
gold

2.0 CURRENT SITUATION ON CLIMATE CHANGE AND DISASTER MANAGEMENT IN SIERRA LEONE

2.1 Introduction

The current situation on climate change and disaster management in Sierra Leone according to the second national communications highlights the following issues: climate trends, PRSP111, analysis of climate change and disaster concerns, technological transfer, institutional arrangements, financing, data and information management, awareness raising, cross-cutting issues, risk assessment, monitoring and early warning systems.

2.1.1 Climate Trends

Temperature

- Mean annual temperature has increased by 0.8°C since 1960, an average rate of 0.18°C per decade.
- There are insufficient daily data available to determine trends in daily temperature extremes for all seasons. Available data do, however, indicate significantly increasing trends in the frequency of 'hot' nights.

*The average number of 'hot' nights per year increased by 38 (an additional 10.3% of Nights 2) between 1960 and 2003.¹

Precipitation

- Mean annual rainfall over Sierra Leone has decreased since 1960, but it is difficult to determine whether this is part of a long term trend because of the variable nature of rainfall in this region. The rainfall record is punctuated by wetter and drier periods; the 60s and late 70s were particularly wet, whilst the early 70s and 80s were very dry. Rainfalls in 2005 and 2006 have been very low.
- There are insufficient daily rainfall observations available from which to determine changes in extremes indices of daily rainfall.²

2.1.2 Poverty Reduction Strategy Paper 111 (Agenda for Prosperity)

The government of Sierra Leone in consultation with citizenry and all relevant stakeholders are in the process of preparing the third Poverty Reduction Strategy Paper (PRSP III) in consonance with the Millennium Development goals (MDGs) and the Inclusive Green Growth (IGG) in a bid to achieve sustainable development that is balanced with environmental friendly society and poverty reduction particularly among the vulnerable communities.

¹ UNDP climate change country profile, C. McSweeney, M. New and G. Lizcano: <http://country-profiles.geog.ox.ac.uk> (8-8-2012).

² UNDP climate change country profile, C. McSweeney, M. New and G. Lizcano: <http://country-profiles.geog.ox.ac.uk> (8-8-2012).

2.2 Analysis of Climate Change and Disaster Management Concerns

Climate change and Disaster risk are increasingly becoming a national concern and their causes and impact in one community impacts on the nature and level of risks in another. These are compounded by increasing vulnerabilities related to changing demographics, socio-economic conditions, unplanned urbanization, development within high-risk zones (such as hills, valleys and coastal communities), under-development, environmental degradation, climate variability, climate change, geological hazards, competition for scarce resources, and the impact of epidemics, points to a future where disasters could increasingly threaten Sierra Leone's economy, its population and sustainable development.

There is a very strong link between disaster risk reduction, climate change and development. Not only does action within one realm affect capacity for action in the others, but also that there is much that can be learnt and shared between realms in order to ensure a move towards a path of integrated and more sustainable development.

Current policy responses and political strides to address each of these independently however, appears redundant or, at worst, conflicting. Currently, there seems to be some disconnected or very little coordination between disaster risk reduction, climate change and development. It appears also that there are differentials in political relevance attached to these three communities of practice. Meeting the MDGs and wider human development objectives, implementing a successful response to climate change and reducing losses to man-induced and weather related disasters are aims that can only be accomplished if they are undertaken in an integrated manner.

2.2.1 Climate Variability

Report of studies relating to climate change and National Adaptation Programme of Action carried out in recent times as well as NAPA regional workshop reports have revealed that rainfall and temperature patterns of the country have been changing.

During the dry season, the harmattan (dry dusty cool air) causes lowest daily country average temperature of 16⁰C with a range of between 10⁰C and 22⁰C. However, the harmattan period in recent times has been warmer than usual. It was also observed that the pre-monsoon period which runs from April to June is now associated with stronger winds and more frequent rain/storms causing greater damage to lives and property. Calmer and dryer weather now appears to be associated with the September/November period which was usually characterized by frequent thunder and lightening and short but heavy rainfall.

The wet or monsoon season runs from July to September with a country average rainfall of about 2746 millimeters (mm) varies from 3659 mm in Bonthe in the South, 2979 mm in Lungi (Freetown) in the West and 2618 mm at Kabala and Bo in the north and central parts of the country. This period has recently been periods of delays in the rains and associated water shortages particularly in Freetown in recent times. Heavy rainfall accompanying such dry spells

often results in extensive flooding throughout the country. The effects of these unusual temperature and rainfall patterns on agriculture, water supply and sanitation are evident in various parts of Sierra Leone.

2.2.2 Projected Climate Change

It had long been perceived that Sierra Leone, blessed with its luxuriant forests, high rainfall, well-drained landscape etc. would continue to enjoy nature's bounty of good weather for ever. But recent events as evidenced by the erratic behaviour of the weather such as fog in places where they did not occur before during the dry season, flash floods, cyclone and severe storms, scarcity of fresh water due to less rain, higher evapo-transpiration in the dry season, frequent prolonged and wide spread drought/dry spells have suggested that some major changes are occurring.

2.2.3 Potential impact of climate change.

According to the published report of the Initial National Communication and the proposed Second National Communications on climate change, Sierra Leone is vulnerable to climate change and extreme weather events. The Vulnerability and Adaptation Assessment Report and the Climate Variability Report of the NAPA Project have clearly indicated that Sierra Leone is experiencing a variety of climatic hazards which include seasonal drought, strong winds, thunderstorms, landslides, heat waves, floods, intense seasonal rain fall, shifting rainfall patterns amongst others.

In some parts of the country, notably the north and South-eastern provinces (Gbondapi Pujehun), as well as in the Freetown area poor communities have suffered from floods and seasonal drought which have destroyed their crops and hampered their food production capabilities. Strong winds have also destroyed houses, damaged energy transmission lines and obstructed communications to remote areas of the country. Thunderstorms and heavy rain have disrupted flight schedules and caused a number of accidents at sea.

2.2.4 Vulnerability Profile

Sierra Leone is not actually a disaster prone area but is exposed to a large range of socio-natural³ and manmade hazards, particularly to: floods, epidemics, wind storms with thunderstorms, mass movements including landslides and mudslides, drought/dry spells, coastal erosion, fires and water sources pollution. Existing risk is mainly "extensive risk" which might evolve in intensive risk depending on vulnerability level evolvement. Sierra Leone's vulnerability is linked partly to its climate and geography specificities, but mainly to socio-economic and environmental exacerbating factors. Floods affected the most important number of people in the last 30 years (1980-2010), representing 90% of people affected by disaster in Sierra Leone. Epidemics are the deadliest hazards in Sierra Leone during the last 30 years, responsible of 83% of the total number of death due to disaster. Droughts as such have not been widely experienced; these are mostly

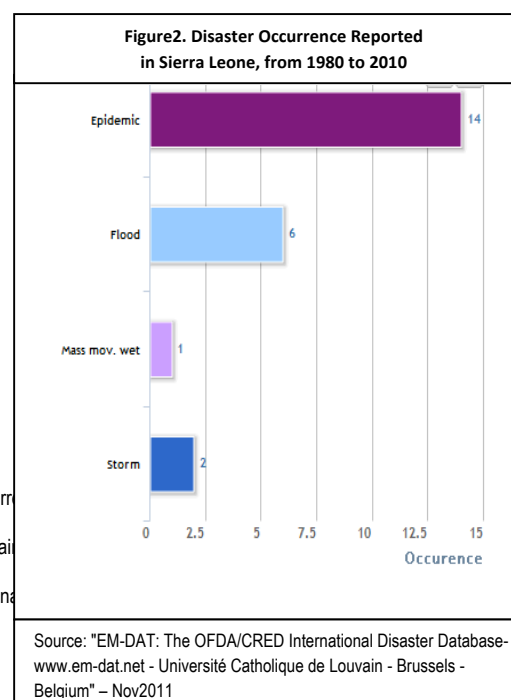
³ Social-natural hazard is a term used for the circumstances where human activity is increasing the occurrence of certain hazards beyond their natural probabilities.
"UNISDR. (2009). Terminology on Disaster Risk Reduction"

long regular dry spells. In 30 years, windstorms with associated thunderstorms and lightning, affected 3,334 people (4% of the total) and killed 24 people (5% of the total), and mass movements, mainly landslides and mudslides affected 5 people and killed 16 people (16% of the total). Coastal erosion is another powerful damaging socio-natural hazard that Sierra Leone is facing, mainly due to inadequate human activities along the coast. Fire hazards are composed of wild or bushfires and the fire accidents they cause, and pollution of water sources and soils poses a great threat to humans. Climate variability and climate change will continue to affect the incidence of existing socio-natural hazards in Sierra Leone. The level of incidences is shown in figure 2 below.

Sierra Leone is not actually a disaster prone country, some of the activities are exposed to a large range of socio-natural⁴ and manmade hazards, particularly to: floods, epidemics, wind storms with thunderstorms, mass movement including landslides and mudslides, drought/dry spells, coastal erosion, fires and water sources pollution. Current situation is characterized by the existence of actual hazard events but also latent hazard conditions that may give rise to future events. Mostly localized multiple disasters were recorded in the past rather than major national scale disasters. In 30 years (from 1980 to 2010), 23 events were recorded, affecting 234,659 people and killing 1,337 people⁵.

Existing risk is mainly “extensive risk” which might evolve in intensive risk depending on vulnerability level evolvement. Current situation is characterized by the exposure of dispersed populations to repeated or persistent hazard conditions of low or moderate intensity, often localized, which can lead to debilitating cumulative disaster impacts, as we can see in some urban and rural areas exposed to recurring localized floods, landslides storms or drought. But depending on vulnerability level evolvement, this situation might evolve to an “intensive risk” associated with the exposure of large concentrations of people and economic activities to intense hazard events, which can lead to potentially catastrophic disaster impacts involving high mortality and asset loss, as we might see for example in Freetown if a major epidemic or a major safe drinking water shortage would happen⁶.

Sierra Leone’s vulnerability is linked partly to its climate and geography specificities, but mainly to socio-economic and environmental exacerbating factors. Its physical vulnerability is mainly linked: (i) to its 465 km low-lying plain sandy coastline⁷ open to the Atlantic Ocean representing 7.3% of its territory, into which major rivers empty; (ii) to the existence of vast water resources but geographically variable and scarcer during dry



⁴ Social-natural hazard is a term used for the circumstances where human activity is increasing the occurrence probabilities in "UNISDR. (2009). *Terminology on Disaster Risk Reduction*".

⁵ "EM-DAT: The OFDA/CRED International Disaster Database- www.em-dat.net - Université Catholique de Louvain".

⁶ As per the definition in "UNISDR. (2009). *Terminology on Disaster Risk Reduction*".

⁷ « Government of Sierra Leone. (2006). *Initial Communication (INC) in Climate Change* and "Office of National Profile".

season with nine watersheds⁸ and twenty major rivers including Pampana Rokel, Sewa and Moa, Little Scarcies, Great Scarcies and Mano which have their sources in the neighbouring countries of Guinea and Liberia⁹; (iii) to a climate essentially tropical characterized by high precipitation and humidity, varying in space and time, with heavy rainfall in the wet season and pronounced dry season¹⁰. **But vulnerability is mostly due to interlinked socio-economic and environmental factors**, mainly¹¹: (i) a low economic development with a GDP per capita of \$ 480 in 2011 and a low UNDP's Human Development Index ranking Sierra Leone at 180 (with 0.336) among 187 countries in 2011; (ii) a high poverty rate with 66.4% of population below the income national poverty line (2011); (iii) overexploited or degraded land and environmental resources combined with a weak or lacking land use planning and management, mainly in urban areas. As a result of a massive internal migration during and following the 10 years civil war, Sierra Leone's population is currently about 40% urban, of which the majority lives in areas where settlement is legally prohibited and in areas classified as slums, increasing thus their exposure to hazards. Figure 2 above shows the disaster observations reported in Sierra Leone from 1980 to 2010.

Floods affected the most important number of people in the last 30 years, representing 90% of people affected by disaster in Sierra Leone. From 1980 to 2010, floods affected 221,204 people and killed 145 people (11% of people killed by disaster)¹². Floods are of regular, annual occurrence between May and October but may occur any time during rainy season. Urban and rural seasonal flooding, recurrent flash flooding, and coastal flooding are the most common observed, leading to seasonal flooding of agricultural fields and low lying areas, flooding along the coast areas and flood waters overflowing into roads and into residents' homes. Floods result mainly from heavy rainfall: torrential rains at high tides or in times of ocean surges; heavy rainfall causing increasing of rivers water volume and overflowing; heavy rains combined with blocked or diverted or narrowed water runoff. Floods main underlying factors are land reclamation from the sea and from swamps, but also the construction of houses in valley bottoms. Vulnerable areas include Western area, Eastern, Southern and Northern regions but the more specifically, the most affected areas during these last years include: Kroo Bay, Susan's Bay, Granville Brook, Lumley area in western Area, Port Loko and Kambia Districts, the Newton catchment area, Pujehun and Bo areas, Kenema and Moyamba Districts, and coastal beaches of the Western Area Peninsular. Generally floods are transient with flood water receding less than an hour but it can take up to a week or a month. Heavy rainfall in neighboring countries may cause floods in Sierra Leone in case of overflowing of three rivers: Great Scarcies and Little Scarcies rivers from Guinea and Mano from Liberia. Loss of life, crops, livestock, damage to infrastructure and settlement areas, disease outbreak are the most common floods consequences in the country¹³.

⁸ UNEP. (2010). *Sierra Leone: Environment, Conflict and Peace Building Assessment – Technical Report*

⁹Ministry of Energy and Power. (2008). *National Water and Sanitation Policy*

¹⁰Office of National Security. (2004). *National Hazard Assessment Profile*.

¹¹ UNDP.(2011).*Human Development Report 2011*.

¹² "EM-DAT: The OFDA/CRED International Disaster Database- www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium" – Nov 2011

¹³"Government of Sierra Leone, Ministry of Transport and Aviation. (2007, December). *Sierra Leone National Adaptation Programme of Action (NAPA) – Final Report* " – "Government of Sierra Leone. (2006). *Initial Communication (INC) in Climate Change*" – "Office of National Security. (2004). *National Hazard Assessment Profile*".

Epidemics are the deadliest hazards in Sierra Leone during the last 30 years, responsible of 83% of the total number of death due to disaster. From 1980 to 2010, epidemics killed 1,103 people and affected 13,447 (5% of people affected by disaster)¹⁴. Malaria and cholera are most important killer diseases in the country. In general inadequate access to sanitation and clean water, environment insalubrities and pollution, and inadequate household hygiene are their main causes in both urban and rural areas, where the majority of the population lives without access to pipe borne water. Floods are an important factor increasing the number of people exposed to water-borne diseases including cholera, but dry spells also because water resources become scarcer and competition for water increases, polluted water is then often used for drinking and bathing, spreading infectious diseases such as typhoid and cholera and gastroenteritis, mainly among urban poor. The socio-economic burden of disease is very high in Sierra Leone, particularly for the common communicable and epidemic-prone disease. It plays an important role in the poverty cycle because it slows economic growth and human development by depleting the workforce and productivity country-wide¹⁵.

Droughts as such have not been widely experienced in Sierra Leone. Rather, what has been experience mostly are long regular dry spells happening at the peak of the normal dry season between February and March. During these periods, rainfall is below normal expectation in a number of areas for an extended period. The water table becomes very low and moisture is decreasing, and drought-like conditions prevails¹⁶, leading to an important apparent surface and ground water shortage: dug up wells dry up and even wells up to 10metres deep dry up. Vulnerable areas include the Northern, Eastern, Southern Regions and Western Area, but especially in the extreme north notably Kabala¹⁷. Crop failure, fresh water shortage even in the urban cities of Freetown and Kenema, disease outbreak, increase in bush fires and hydro power decline, are the main consequences experienced during those dry spells periods, countrywide. Poor irrigation schemes, poor water supply and resources management, weak human settlement management and land use planning especially in the uplands, are among the main aggravating factors.

In 30 years (1980-2010), windstorms with associated thunderstorms and lightning, affected 3,334 people (4% of the total) and killed 24 people (5% of the total). Windstorms occur annually during the rainy season causing loss of property (housing destruction, house roofs removal), agricultural loss (crop falling and breaking), environmental loss (trees falling within and

¹⁴ "EM-DAT: The OFDA/CRED International Disaster Database- www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium" – Nov 2011

¹⁵ "Government of Sierra Leone, Ministry of Transport and Aviation. (2007, December). *Sierra Leone National Adaptation Programme of Action (NAPA) – Final Report* " – "Government of Sierra Leone. (2006). *Initial Communication (INC) in Climate Change* " – "Office of National Security. (2004). *National Hazard Assessment Profile*".

¹⁶ Office of National Security. (2004). *National Hazard Assessment Profile*

¹⁷ "Government of Sierra Leone. (2006). *Initial Communication (INC) in Climate Change* " – "Office of National Security. (2004). *National Hazard Assessment Profile*".

outside forests), and even loss of life. The most devastating event was recorded in 1976 with wind speed of over 120 km per hour blowing over Freetown resulting mainly in the removal of the roofs of more than 150 houses, disruption to both electricity and communication, trees falling. Generally accompanying windstorms and heavy rains, thunders and lightning do not occur regularly. Potentially disastrous thunder and lightning normally occur at the start April/May and end September/October of the rainy season, causing human and animal deaths. The whole country is exposed and vulnerable but more specifically open areas and areas with tall trees such as palm trees. Past events occurred mainly in Rogbane Forest Reserve in Port Loko, Bonthe District, Bo District, and in Koinadugu district¹⁸.

Mass movements, mainly landslides and mudslides affected 5 people and killed 16 people (16% of the total) in 30 years (1980-2010)¹⁹. Like other natural hazards faced by Sierra Leone, landslides and mudslides phenomena in the country are mostly socio-natural hazards. These are geological phenomena which arise with an increasing occurrence beyond their natural probabilities because of human activities mainly linked to overexploited or degraded land and environmental resources. Landslides and mudslides occurred mainly in the Western Area particularly in Freetown, in Leicester, Regent, Granville Brook, Cline Town, Moa Wharf, Hill Court Road, Kissy Brook, Dworzak, and in Charlotte in the Mountain Rural District. They resulted mainly from land cover removals and deforestation caused by construction of illegal housing and constructions in vulnerable areas such as water fronts, slums, hill slopes and hilltops (notably the Western Area Peninsular Forest). Generally localized events and classified as small-scale incidences, landslides and mudslides have important social consequences as deaths, people displacement and loss of properties. Landslides and mudslides may become very serious issues in near future if present rate of deforestation is not curtailed and land use planning and human settlement not mastered²⁰.

Coastal erosion is another powerful damaging socio-natural hazard that Sierra Leone is facing, mainly due to inadequate human activities along the coast. Resulting from illegal land reclamation and sand mining along the coast, coastal erosion is seriously threatening lives and livelihood of coastal communities. Northern, Southern, Eastern Regions and the Western Area are all vulnerable to coastal erosion, but sea level rise and coastal erosion are mostly affecting and visible along several coastal lowland areas such as: Fourah Bay College at Lakka beach, Conakridee, Krim area, Shenge, Plantain Island, Katta and Bunce Island, Adonkia, Mahera beach in Lungia area, Bullom shores, Moa wharf, and Man of War Bay²¹, causing physical alteration of

¹⁸ "Government of Sierra Leone, Ministry of Transport and Aviation. (2007, December). *Sierra Leone National Adaptation Programme of Action (NAPA) – Final Report*" – "Office of National Security. (2004). *National Hazard Assessment Profile*".

¹⁹ "EM-DAT: The OFDA/CRED International Disaster Database- www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium" – Nov 2011

²⁰ "Government of Sierra Leone, Ministry of Transport and Aviation. (2007, December). *Sierra Leone National Adaptation Programme of Action (NAPA) – Final Report*" – "Office of National Security. (2004). *National Hazard Assessment Profile*".

²¹ "Government of Sierra Leone, Ministry of Transport and Aviation. (2007, December). *Sierra Leone National Adaptation Programme of Action (NAPA) – Final Report*" – "Office of National Security. (2004). *National Hazard Assessment Profile*" – "Sierra Leone Position Paper on Climate Change – COP 17 Climate Change Conferences Durban 2011 (2011)"

coastline and destruction of infrastructures (governmental and private buildings). At Conakrider, for example the sea has moved about 100 meters inland over the last 15 years burring several houses under the sea, and at Shenge, the coastline has moved over 50 meters inland in 10 years threatening several public buildings including a secondary school and road network. In addition to loss of properties and beaches, coastal erosion and sea level rise's consequences include population displacements, coastal flooding and saline intrusion which threaten coastal aquifers, fresh water resources and agricultural water resources, undermining subsistence of local communities²².

Fire hazards in Sierra Leone are broadly divided into wild/ bushfires and domestic fires, and the fire accidents they cause. Wild or bush fires are one of the biggest causes of forest destruction and land degradation in the country particularly in the North but also in the South and East which are forested areas. The estimated wildfires prone area is between 90,000 hectares to 100,000 hectares. The major cause of bush fires nationwide is shifting cultivation using fire for land clearing during land cultivation preparation (extensive farming; slash-and-burn), but other causes include hunters flushing out game, road menders who set fire to clear roadside or to liquefy bitumen and the ignorant public (careless users of fire). Generally occurring regularly during the harmattan and dry seasons (November–March) with a high incidence peak between February and March, fires whether started deliberately for land clearing or in order to kill game and clear away old dead grass to encourage new growth for cattle to graze or inadvertently, rapidly spreads through dead grass and is difficult to control. Savanna grasslands areas are usually the most under recurrent bush fires, such as: Port Loko, Kambia, Tonkolili, Bombali, and Koinadugu in the Northern region, but also forested areas in the South and the East. In terms of fire accidents, the most prevalent type is house fire due to wildfires getting out of control burning down villages, and due to electricity and naked candles or hurricane lamps in provincial cities²³.

Domestic fires are particularly prevalent in the urban communities, especially in the capital city Freetown, where there is steady increase in the number of lives it has claimed every year due to illegal and unprofessional connections, use of sub standard building materials, careless etc.

Pollution of water sources and soils poses a great threat to humans in Sierra Leone. It is mainly caused by pesticides and chemical toxics, heavy metals, petroleum hydrocarbons and other synthetic organic compounds, germs-laden water and other microbes and radioactive minerals. Pesticides were generally used in Sierra Leone in pest control programs in agriculture and health during several years, but limited records on the quantity and types of pesticides used are available. However, increased pesticides use was reported in the 1970s and 1980s with 30 metric tons in 1977 and 60 metric tons in 1989. Larger quantities may have been imported over the years. Most of pesticides used, which are persistent in action and which use has been banned in the developed world, include: Dushan, Diazinon, Malathion, Endosulphan, Heptachlor and Agrothion. Heavy

²² Office of National Security. (2004). *National Hazard Assessment Profile*.

²³ « Office of National Security. (2004). *National Hazard Assessment Profile*” – “Government of Sierra Leone. (2006). *Initial Communication (INC) in Climate Change*”

metals, petroleum hydrocarbons and other synthetic organic compounds do pose also a threat to human health. They are mainly generated from motor vehicle mechanics spray cars in open air without using gas masks, worn out lead accumulator batteries, electronic components and lubricating oils. But some Sierra Leoneans drink petrol to rid themselves of tapeworms. Another serious problem in Sierra Leone is the drinking water pollution by seepage of germs-laden water and other microbes from toilets or waste run-off. The country is inadequately supplied with pipe-borne water and springs and dugout wells, which are common sources of drinking water, are not well protected, causing high prevalence of typhoid fever in urban areas like Freetown. The Mining sector which is the second largest sector of the economy after Agriculture poses also serious threat in terms of water sources pollution, mainly concerning rutile mining and gold mining. In fact, rutile is associated with some radioactive heavy minerals which are often left behind in the sand tailings after mining the rutile. No attention has been paid to these minerals, which might find their way into the ponds and ultimately into the fish and other organisms such as algae. For gold mining, the threat is linked to the use of mercury to amalgamate gold. Mercury improper use can result in contamination of water sources and exposing the community to health hazards²⁴.

Climate variability and climate change will continue to affect the incidence of existing socio-natural hazards in Sierra Leone. Change in rainfall and temperature patterns has been observed in Sierra Leone these last years. The harmattan period is becoming warmer than usual, calmer and dryer weather now appears to be associated with the September/November period which was usually characterized by frequent thunder and lightning and short but heavy rainfall. The period from July to September characterized by the wet or monsoon season with a country average rainfall ranging from 2618 mm to 3659 mm, has been these last few years periods of delays in the rains causing water shortages particularly in Freetown in recent times. Heavy rainfall accompanying such dry spells often results in extensive flooding throughout the country. Future scenarios confirm the weather changing trend with an expected increase of the average temperature in 2100 by about 7% to 9% of the average for the period 1961-1990, an expected decrease in precipitation levels by 50.28mm and a decrease in rainfall of about 3 – 10% below the current monthly and annual rainfall. Climate change will affect the frequency of floods and droughts/dry spells. For sea level rise a rise of 0.2m – 0.5m is expected by the year 2100 and could change to 1– 2m under the same emission scenario. Impacts of rising sea levels on the coastal zone will include shoreline recession, increased flood frequency probabilities, inundation of coastal lands and wetlands, and the salinization of surface waters and ground-waters²⁵. Health, agriculture and food security, forestry, water, fisheries and marine life, biodiversity and coastal habitats are the main sectors to be impacted by Climate change in Sierra Leone.

2.3 Technology Transfers of Climate Change and Disaster Management.

²⁴ « Office of National Security. (2004). *National Hazard Assessment Profile*” – “Government of Sierra Leone. (2006). *Initial Communication (INC) in Climate Change*”.

²⁵ “Government of Sierra Leone, Ministry of Transport and Aviation. (2007, December). *Sierra Leone National Adaptation Programme of Action (NAPA) – Final Report*” – “Government of Sierra Leone. (2006). *Initial Communication (INC) in Climate Change*”.

Assessments of technology transfer and technology needs were not fully undertaken during the Initial National Communication (INC). In the preparation of the Second National Communication for Sierra Leone it is planned to fully implement the activity, focusing on the needs assessment in environmental sound technologies identifying factors for the enabling environments for the acquisition, adaptation and development of those technologies, and the establishment of appropriate mechanisms for technology transfer. The criteria for assessment and selection of priority technologies will be examined. Technological needs, and cost effectiveness and opportunities for their adoption, development and application will be revised. A national activity to be undertaken include among others:

- Technology needs assessment,
- Establishment of an efficient information system in support of Technology transfer,
- Capacity building in the promotion of the widespread dissemination, application and development of environmentally sound technologies and know-how.
- Establishment of a database of environmentally sound technologies that include mitigation and adaptation technologies making use of international data bases and clearing houses such as those housed at the UNFCCC and UNDP.

2.3.1 Major Issues and Concerns

Sierra Leone should earnestly conduct technology needs assessment through a consultative process, which will sought to engage stakeholders to select and prioritize portfolios of technologies largely in the energy, and waste sector using a national criteria.

Currently, Sierra Leone has no specific legislation or policy on technology transfer. However, there are existing policies, legislative instruments, institutional frameworks, guidelines, and standards, which should be taken into account if there is an intention to introduce a new technology into the country.

The extent, to which Sierra Leone can implement its proposed prioritized technologies and help in addressing the global problem of climate change, will depend on the provision of adequate technology and financial resources. This is necessary to ensure that efforts to address climate change technologies (mitigation and adaptation) needs are wide enough to support resilience building and low carbon footprint intervention.

2.3.2 Types of Technology Transfer

We may need the following:

- Sustainable Energy Sources and Energy efficiency technologies
- Weather forecasting and early warning technologies
- Irrigation development technologies
- Geographical Information systems and Global Positioning Systems
- Food diversification technologies
- Technology on assessing the vulnerability and risk of climate change
- Technology on Clean Development Mechanism (CDM)

- Technology on Carbon trading
- Technology on waste incineration, composting, recycling, landfills and open-dumps

2.3.3 Measures to adapt and integrate best practices

- Diffusion and transfer of technology to Africa particularly for adaptation
- Agreement should be based on principles of affordability, accessibility, appropriateness and adaptability of the technology.
- Developed countries to meet full costs and full incremental costs
- Removal of barriers preventing access to climate-related technologies and the on climate-related technologies for developing-country parties
- Establishment of Climate Technology Acquisition Fund
- Each developed country to report on how they are reaching their targets for the provision of financial and technological support in their national communications
- Mechanism to address all aspects and means of implementation for adaptation and mitigation including access to financing, technology and capacity-building

2.4 Institutional arrangement on climate change and disaster management

2.4.1 Institutions and Conventions

The Meteorological Department in the Ministry of Transport and Aviation is the National Focal Point for the United Nations Framework Convention on Climate Change and the Designated National Authority (DNA) for the Kyoto Protocol.

The Environment Protection Agency- Sierra Leone (EPA-SL) is the government body for the implementation of environmental issues related to climate change in Sierra Leone. The EPA-SL has set up a National Climate Change Committee to provide guidance and direction for the formulation of a national climate change policy and strategies and regulation of climate and carbon trading issues in Sierra Leone.

The process for setting up of a National Secretariat for Climate Change (NSCC) has started which will enable Sierra Leone to access public sector funding from development partners for climate change mitigation and adaptation actions in achieving the millennium development goals and sustainable development.

The NSCC will ensure the development of required procedures for Reduced Emissions from Deforestation and Degradation (REDD), REDD-Plus and Non-REDD Carbon Trading and Clean Development Mechanism (CDM) projects.

The NSCC will also ensure the formulation of guidelines for climate change projects approval and establishment of a measurement, reporting and verification (MRV) mechanism for reporting mitigation actions taken and reported through our national communications to the UNFCCC Secretariat.

The NSCC will also provide for institutional strengthening and capacity building for environmental protection and management as well as the country's adaptation and mitigation efforts to climate change.

Practical steps undertaken internationally to cope with problems related to climate change started after the establishment in 1988 of the Intergovernmental Panel on Climate Change (IPCC), the United Nations Framework Convention on Climate Change (UNFCCC) of 1992 in Rio de Janeiro and its Kyoto Protocol of 1997. Sierra Leone ratified UNFCCC on the 22 of April, 1995 and the Kyoto Protocol in June, 2005.

The monitoring and evaluation aspects of projects will be undertaken by the Environmental Protection Agency (EPA), who has the mandate to execute this function.

The NEP which is a key governance document on the environment does not reflect the existing situation in environmental and natural resources management and there are also emerging issues that the nation should have preparedness for including the production of bio fuels, offshore oil drilling, chemical mining, ozone depletion and climate change that render the policy obsolete. Currently, there are efforts to update the NEAP of 1994 and this process is expected to be completed soon.

Sierra Leone has endorsed and signed several international Conventions and Protocols including:

- Convention on Biodiversity (CBD),
- United Nations Framework Convention on Climate Change (UNFCCC),
- United Nations Convention to Combat Desertification (CCD),
- Convention on International Trade in Endangered species of Wild Fauna and Flora (CITES),
- Convention on Wetlands of International Importance (Ramsar),
- Convention on Bio-safety, United Nations Convention on the Law of the Sea (UNCLOS),
- Bassel Convention, Vienna Convention, and Montreal Protocol.
- Stockholm Convention and Montreal Protocol on Persistent Organic Pollutants

These Conventions and Protocols are in their different stages of implementation as shown in table 1 below, but in general implementation is slow as many have not been ratified or harmonized with the laws, policies and programmes of Sierra Leone. As a result Sierra Leone trails far behind in the implementation of the provisions of these conventions.

2.4.2 National Policies and Plans: Existing Policies having bearing with the Convention

Cross-Sectoral coverage:

- Government of Sierra Leone VISION 2025
- Poverty Reduction Strategy Paper (PRSP)
Response to Multilateral Environment Agreements (MEAs)
- National Biodiversity Strategy Action Plan(NBSAP)

- National Action Plan to Combat Desertification
- First Initial National Communication for the UNFCCC, and Second communication under development and National Adaptation Report
- National Environmental Policy
- Strategic Environmental Assessments for the Oil Sector, Mining etc
- Sierra Leone Minerals Sector Environmental Regulations
- Land tenure, land use and soil conservation
- Forestry and Wildlife
- Biodiversity and Cultural Heritage
- Environment Protection Act, 2008
- Bolstering Agriculture Sector Development in Sierra Leone(BASED-SL)
- Mineral Resources Act
- National Forestry Policy
- Integrated rural Development Policy
- Food Security Plan
- Local government Act

2.4.3 Requirements under the Convention:

- Preparing National Communications
- Developing National Climate Change Programmes
- Preparing and Managing Greenhouse gas inventories, including emission database management
- Assessing vulnerability and Adaptation plans and measures
- Assessing mitigation options
- Research and systematic observation of climate and other functions
- Developing and transferring technology
- Improved decision-making, including assistance for participation in international negotiations
- Clean Development Mechanism
- Needs arising out of Articles 4.8 and 4.9 of the Convention
- Education, Training and Public awareness
- Information and Networking, including databases In addition, obligations directly require the following capacity-building, notably through Secretariat or focal Points
- Enhancement of the enabling Environment

2.4.4 Organizations Involved in the Implementation of Rio's Conventions:

- Ministry of Lands, Country Planning and the Environment

- Environment Protection Agency
- Ministry of Agriculture, Forestry and Food Security
- Ministry of Mineral Resources
- Ministry of Energy and Water Resources
- Ministry of Tourism and cultural Affairs
- Local and Private Sector Institutional Arrangements
- Personalities and Village Level Organisations
- Traditional Authorities, i.e Chiefs and Elders
- Producers Associations, Farmers Associations etc
- Market Women Associations
- Mutual Support Groups for farming activities
- Fire Volunteer Squads
- Local Government Councils
- Non-Governmental Organizations(NGOs)
- Academic Institutions
- Statistics Sierra Leone

Table 1: Summary international/regional treaties and their Implementation

Convention/ Treaty	Adoption date	Ratification Date	Objectives	Implementation Programmes/projects
1. Convention on Biological Diversity (CBD)	June, 1994	12 th Dec., 1994	1. Promote Conservation of Biological Diversity 2. Sustainable use of its components 3. Fair and equitable sharing arising out of the utilisation of genetic resources	1. Development of National Biodiversity Strategic Action Plan (NBSAP).
2. The Cartagena Protocol on Biosafety to the Convention on Biological Diversity	Jan, 2000	2003	1. To contribute to ensuring an adequate of protection in the field of living modified Organisms resulting from modern biotechnology	1. National Biosafety Framework Project launched in 2002 2. Establishment of Biosafety Clearing house
4. United Nations Convention to Combat Desertification	June 1994	25 th Sept. 1995	1. To combat desertification and mitigates the effect of drought in countries experiencing serious droughts and or desertification	1. Development of National Action programme (NAP). 2. Development of Medium Size Projects (MSP) to combat land degradation
5. The United Nations Framework Convention on Climate Change	May 1992	April 1996	1. To achieve stabilisation of green house gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climatic system	1. Initial Communications to Fulfil the Country's Obligations to the UNFCCC.
6. Kyoto Protocol	Dec. 1997	(Advanced stage)	1. To strengthen the commitment of developed country Parties with a view to reduce their overall emissions	1. National Capacity Self Assessment
7. The Vienna Convention on Protection of Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer	Sep. 1987	Apr. 1993	1. Protect human Health and the environment against adverse effects resulting from modifications of the ozone layer from anthropogenic emissions of substances proved scientifically to have high ozone depleting potential	1. Phasing out of Ozone Depleting Substances (ODS). 2. Capacity building of Institutions dealing with ODS
8. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Mar. 1989	Apr. 1993	1. To reduce trans- boundary movements of hazardous and other wastes to a minimum consistent to their environmentally sound management 2. To treat hazardous wastes and other wastes 3. To minimise the generation of hazardous wastes.	
9. Protocol on liability and compensation on damages resulting from trans-boundary	Dec 1999	Not yet	1. To provide for a comprehensive regime for liability and for adequate and prompt compensation for damages resulting from the	

movements of hazardous waste and their disposal			trans-boundary movements of hazardous wastes and their disposal including illegal	
---	--	--	---	--

Convention/ Treaty	Adoption date	Ratification Date	Objectives	Implementation Programmes/projects
			traffic of those wastes	
10. Bamako Convention on the ban of the import into Africa and the control of trans-Boundary movements of hazardous wastes within Africa (Bamako convention)	Jan 1991	April. 1993	<ol style="list-style-type: none"> 1. To protect by strict control the human health of African population against adverse effects which may result from hazardous waste by reducing their generation to a minimum in terms of quantity and or hazard potential 2. To adopt precautionary measures ensure proper disposal of hazardous waste and to prevent dumping of hazardous wastes in Africa. 	
11. Stockholm Convention on Persistent Organic Pollutants (POPs)		9 th Sept. 2003	<ol style="list-style-type: none"> 1. To strengthen National Capacity and to enhance knowledge and understanding amongst decision makers , managers, industry and the public at large on POPs 2. To develop a National implementation Plan (NIP) to manage the elimination of POPs. 	<ol style="list-style-type: none"> 1. Enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Sierra Leone.
12. Abidjan Convention And Protocol on Management And Protection Of Coastal and Marine Environment In The Sub-Region		7 th June, 2005	For the Cooperation in the Protection and Development of the Marine and Coastal Environment of west African Region.	Guinea Large Marine Ecosystem to Combat Living and Fisheries Marine Depletion
13. Ramsar Convention On Wetlands		7 th June, 2005	<ol style="list-style-type: none"> 1. To manage wetland systems so that the human uses of these areas are undertaken In such a way as to retain their natural capital for future generation. 2. To encourage and support countries to develop and implement national policy and legislative frameworks, education and awareness raising programmes, as well 	

			as inventory, research and training projects.	
--	--	--	---	--

Source: MLCPE, EPA –SL, MET-SL, 2012.

2.4.5 Disaster Management

The Millennium Summit held in September 2000, at UN, New York, stipulates specific time-bound targets to be reached by 2015, in what is widely known as the Millennium Declaration. This was done with the purpose of combating poverty and inequality. In order to achieve this, a set of eight goals and targets, the Millennium Development Goals (MDGs), were set. These goals were integrated into the World Summit on Sustainable Development (WSSD) Johannesburg Plan of Implementation in 2002.

The WSSD made particular reference to disaster reduction as necessary and integral factor to achieving the goals of sustainable development which encompass the social, economic and environmental aspects. The WSSD Johannesburg Plan of Implementation (2002) encourages “An integrated, multi-hazard, inclusive approach to address vulnerability, risk assessment and disaster management, including prevention, mitigation, preparedness, response and recovery, as an essential element of a safer world in the 21st century”.

In a bid to address the above issues and in consonance with the Millennium goal and the World Summit on Sustainable Development (WSSD) Johannesburg Plan of Implementation in 2002, the Government of Sierra Leone in 2002 by an Act of Parliament mandated the Office of National Security (ONS) (Office of the National Security Act: 2002) to be the Government of Sierra Leone’s primary coordinator of national disasters, natural and artificial.

Furthermore, there are institutions whose activities could also contribute to climate change and disaster effects like energy, water, health, employment and finance. These institutions have been identified as important players in climate change and disaster management issues, hence required the need to be strengthened (both technically and financially), to continuously support research and systematic observation, aimed at contributing actively to national, regional and global climate research programmes.

2.4.6 DRM Strategic Framework:

The Sierra Leone Disaster Management Policy was drafted in 2008.

The existence of such a Policy document is a key achievement, but the DRM strategic framework remains weak because of the following: **(i) The Policy is not yet fully implemented pending its enactment**, and as the Cabinet approval process was too long (almost 5 years), some its contents **might be outdated** – **(ii) The Policy document content is not fully adequate for a practical use** – **(iii) Some detailed strategic actions are stated to fulfill the Policy** but they do **not cover some key required areas**, and no implementation details and timeframe to serve as a reference for stakeholders are yet defined (normally should be part of a separate document) – **(iv)**

The Policy is yet to be fully domesticated by the relevant stakeholders despite the adopted participatory process for its design.

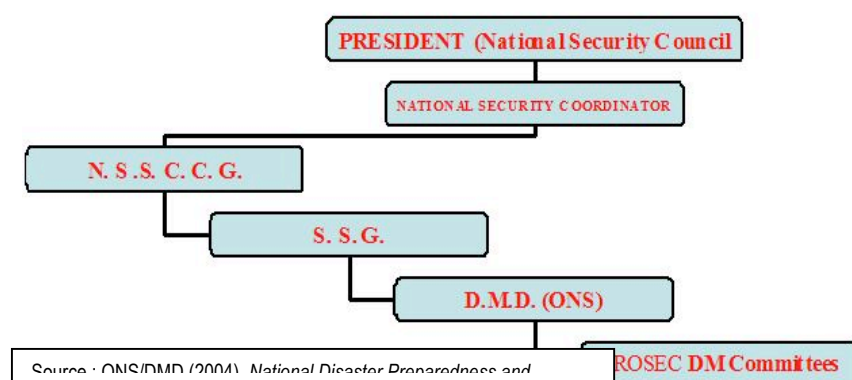
Main needs to setting up an adequate DRM Strategic Framework would include:

(i)- The review for improvement of the National Policy (its updating is already planned by DMD/ONS) through a participatory process; **(ii)- The clear definition of strategic actions and activities with clear agenda and responsibilities to serve as the Policy implementation framework/roadmap, through the development and implementation of National DRM Strategy and Action Plan**, according to a large participatory and iterative process, including all stakeholders at all levels; **(iii)-Increasing information, participation, ownership and commitment of stakeholders, at all levels (high decision-making and technical levels) for such an important strategic process, through strong stakeholders' awareness-raising about the National Policy content and implementation steps.**

2.4.7 DRM Institutional Framework:

DRM is considered as a national security issue, deliberation and decision are made through the National security structure, primarily through the National Security Council (NSC) headed by HE the President and the National Security Council Coordinating Group (NSCCG), at the central level²⁶. The figure below indicates the existing Office of the National Security (ONS) Structure.

Figure 3: The Office of the National Security for Disaster Management



The Office for National Security (ONS) headed by the National Security Coordinator, is the designated national DRM coordinator, through one of its directorate: the Disaster Management Department (DMD).

²⁶ Office of National Security, Disaster Management Department Sierra Leone. (2004). *National Disaster Preparedness and Response Plan*.

A National Platform (NPF) for Disaster Risk Reduction and Climate Change Adaptation was created and launched in August 2011 by His Excellency the President. The National Platform is composed of seven sub-committees covering seven thematic areas namely: Floods, mudslides/landslides and storms; Displacement and migration; Transport disasters (marine, aviation and road); Fires; Epidemics; Pests infestation; Climate change, pollution and explosions. National Platform's missions include among others: to lobby Government of Sierra Leone to be firmly committed and take ownership of Disaster risk reduction (DRR) and response at all levels; to advocate for the enforcement of policies, standards and regulations by Ministries, Departments and Agencies (MDAs) for DRR; to identify, assess and analyze the risks and develop strategies for preparedness, mitigation and response to national emergencies (natural and man-made). The National Platform is composed of members from Government ministries (all line Ministries), departments and agencies (40), civil society organizations (14), Media (3), UN/Donor Agencies (16), Private Sector (4) and Faith-based organizations. It is under the supervision of a governing body called the Disaster Management Governing Council (DMGC)²⁷.

The national security structure has decentralized representatives Provincial Security Committees (PROSECs) and District Security Committees (DISECs), in which Disaster Management Committees were established to serve as 'first responders'.²⁸.

Community based volunteers play key roles in DRM at decentralized and local levels.

Apart from the high anchorage of DRM coordination mechanism and its given high priority as a national security issue which are key acquired achievement, the institutional framework is weak, mainly, because of the following: **(i) The mechanism for the technical stakeholders' coordination (NPF) is not yet really functioning,** without defined operating mechanism, tools, and required internal organizational arrangement within each institution member (including about focal point: obligation, power, mandates, and needs); **(ii) The National Platform is still in its formative stage** and is subject to amendments/ review by stakeholder committee members until a more effective approach is designed. The mandate of the DM department is a coordinating one, implying that they pull together the resources of all stakeholders for risk reduction and response to disasters. For this to happen effectively however, these resources (man-power, skills, equipment and other logistics) must be available and readily accessible for DM department to use in time of need. For now though, there seems to be weak capacity for effective delivery. **(iii) The current institutional arrangement of the DRM** coordinating body operating as a department within the Office of National Security poses serious challenges for effective delivery to the extent that the unit is not subvented by GoSL. The absence of national emergency funds is the most serious challenge faced by the department. Without nationally designated funds for risk reduction and response, effective and efficient response becomes a remote possibility. Added to this problem, the department remains grossly ill-equipped and understaffed with only one field vehicle with only

²⁷ Sierra Leone National Platform for Disaster Risk Reduction and Climate Change Adaptation – Draft Working Document June 2011.

²⁸ Office of National Security, Disaster Management Department Sierra Leone. (2010). *National progress report on the implementation of the Hyogo Framework for Action (2009-2011) – interim*

seven (7) staff directly assigned to carry out these complex and demanding responsibilities. To this end, the full implementation of its coordinating, facilitating and mobilizing roles are being hampered. DMD as a directorate among 9 others within the ONS - Internal organization based on territorial/geographic coverage (DRM approach is different from habitual national security issues handling approach); **(v) Not all DRM stakeholders know the current DRM coordination framework;** **(vi) Links between structures in charge of DRM at various levels (central and decentralized) are not clearly defined and understood** as wished by most of the concerned DRM stakeholders, especially non-security sector members and the international organizations.

Main needs for setting up an adequate DRM Institutional Framework would include:

(i)- Transforming the Disaster Management Department as a separate and full blown Agency or Commission either under the Office of the President or the Office of the Vice President. Best practice across the world and in Africa in particular have shown that disaster management agencies function best under the Office of the President, Vice President or the Prime Minister , as the case may be, thus allowing for increased political commitment for enhanced effectiveness. For better delivery, these structures are usually well decentralized and replicated at all levels, national, provincial, district and chiefdom levels. Adapting the existing National DRM coordination mechanism to better allow for a more efficient and inclusive DRM implementation, in keeping the high level of anchorage and the consideration of DRM as a national security issue, which are key gained success conditions; **(ii)- Clearly defining and implementing the adapted DRM institutional coordination framework;** **(iii)- Clearly defining the coordination mechanism at local level for a strong collaboration between local authorities and communities (links, roles and responsibilities): strengthening local DRM framework implementation;** **(iv)- Defining, setting up and implementing a more adequate, sustainable internal organizational structure for the DRM coordinating institution (DMS/ONS) to allow it to carry out more efficiently all its coordination roles and responsibilities;** **(v)- Clearly defining and implementing required organizational arrangement (internal and external) for each stakeholder,** including focal point designation (mandates, power: to be a real institutional representative); **(vi)- Promoting and implementing the sectoral responsibility approach** and commitment within the National Platform; **(vii)- Strengthening commitment of all DRM stakeholders** through adequate information and awareness rising about the existing DRM system, its functioning and their roles and responsibilities.

2.4.8 DRM Legal Framework:

Pending the enactment of the National DRM Policy, the National Security and Central Intelligence Act, 2002 is currently the only existing law directing DRM in Sierra Leone.

Various Acts directing sectoral issues or multisectoral aspects contributing to DRM exist and contribute to DRM implementation, such as: The Mines and Minerals Act, 2009 - The National Social Security and Insurance Trust Act, 2001 - The Town and Country Planning Act,

2001 - The Environment Protection Act, 2000 - The Local Government Act, 2004 - The Refugees Protection Act, 2007, etc.

The DRM legal framework remains weak for the following reasons: **(i) The National Policy is not yet enacted and institutionalized** despite a long process starting five years ago (2006); **(ii) There is no clear available legislation formalizing the DRM coordination institutional framework and its operating mechanism.** Even officially launched by HE the President, the National Platform has no legal basis and no clear legal text states about the required internal arrangement for DRM stakeholders.

Main needs for setting up an adequate DRM legal Framework would include:

(i)- Facilitating the DRM Policy enactment process; (ii)- Increasing awareness, knowledge and understanding of DRM among key stakeholders mainly decision-makers, politicians (including parliamentarians) and technicians within concerned institutions; **(iii)- Increasing advocacy for DRM** among the above mentioned targets; **(iv)- Developing and setting up all legal instruments required** for an optimal functioning and efficiency of the DRM institutional coordination mechanism, at all levels, regarding: organizational structure, roles and responsibilities, relationship and communication, operating mechanism, for all phases and aspects of DRM: Strengthening the overall DRM coordination legal framework; **(v)- Informing stakeholders about existing legal references** for any relevant key structural organization or operating mechanism to increase their understanding, reliance and commitment.

2.4.9 Institutional capacity development and strengthening.

Strengthening institutional capacity is key need with recommended focus on: (i)- Enhancing awareness and information of technical institutions involved; (ii)- Setting up adequate NSCC and DMD structure and overall capacity; (iii)- Evaluation and enhancement of the technical capacity (knowledge and know-how); (iv)- Evaluation and strengthening of material capacity of the governmental stakeholders; (v)- Assessment of financial capacity of institutions involved; (vi)- Providing stakeholders with key general skills on planning, facilitating process, and organizing work; (vii)- Strengthening capacity of few key institutions acting as first responders in emergency response and those primarily concerned by reducing high potential risk; (viii)- Supporting and facilitating fund raising processes.

2.5 Financing climate change and disaster management activities in Sierra Leone

Donor mapping for disaster management and climate change funded programmes including GoSL's counterpart support.

- i. Through financial assistance from the Global Environment Facility (GEF) and UNDP, Sierra Leone completed the preparation of its Initial National Communications (INC) on climate change in 2006 and the National Adaptation Programme for Action (NAPA) in 2008.
- ii. Currently, with funding from GEF and UNDP, Sierra Leone is working on the Second National Communications (SNC) to enable Sierra Leone submit its communications on climate change to the Conference of Parties to the UNFCCC through its secretariat in Bonn. This project seeks to

build capacity and facilitate the process of taking climate change into account in Sierra Leone future plans thus facilitating the country to cope with climate change and its adverse impacts. The project has five main components which are i) Description of National Circumstances, ii) Inventories of anthropogenic greenhouse gases emissions and sinks, iii) Mitigation of greenhouse gases (GHGs), iv) Vulnerability, Impacts and Adaptation Assessment of national ecosystems and socio-economic sectors, and v) capacity building to assess technology needs and modalities to absorb them. The project has a project steering committee with the Director of the Environment Protection Agency Sierra Leone as chairman and being implemented under the supervision of the Ministry of Transport and Aviation.

- iii. The Ministry of Transport and Aviation in collaboration with government line ministries and the Environment Protection Agency has launched the project entitled “Building the adaptive capacity of water supply services to climate change in Sierra Leone. This project funded by Global Environment Facility seeks to enhance the adaptive capacities of decision makers in the private and public sectors involved in water provision to plan for and respond to climate change risks and shocks. This project is being funded by Global Environment Facility.
- iv. The World Bank Biodiversity Conservation Project under the supervision of the Ministry of Agriculture, Forestry and Food Security is currently with the aim to assist the Government of Sierra Leone in improving the management of selected priority biodiversity conservation sites (CSs) and enhancing its capacity for replication of best biodiversity conservation practices.
- v. The UNEP Regional Project on Protected Areas Resilient to climate change (PARCC) in West Africa focuses on the issues of climate change and protected areas in five West African Countries (Mali, Chad, Gambia, Togo and Sierra Leone) to address the heavy and increasing pressure from anthropogenic threats, compounded by climate change and enhance existing capacity to manage resources on developing science-based tools to support improved management of protected area systems in response to climate and other change impacts. The implementation of this project is underway as the Forestry Division in the Ministry of Agriculture, Forestry and Food Security (MAFFS) and the Environment Protection Agency Sierra Leone are working on modalities for the effective implementation of the project.
- vi. MAFFS is implementing an IFAD Project on Integrating Adaptation to climate change into agricultural production and food security in Sierra Leone. The project aims to reduce the vulnerability of the food supply to the deleterious impacts of climate change on vulnerable rural communities, as well as on natural resources critical for sustaining agricultural production and increasing food security.
- vii. Quite recently, the Environment Protection Agency Sierra Leone in collaboration of the country office of EU launched the Environmental Governance and Mainstreaming Project. The project which is funded by the European Commission will be implemented by the Environment Protection Agency. One of the major components of the project is to establish a National Secretariat for Climate Change in Sierra Leone, a responsibility assigned to the Agency by the Office of the President. The project will address climate change adaptation and mitigation issues to implement our initial communications and NAPA through approval of proposals on climate change and empowerment of women and youths to reduce their vulnerability to climate change.
- viii. A National Climate Change Restoration Fund will be established to meet its objectives in keeping with national aspirations.

- ix. Government of Sierra Leone will establish carbon market (i.e. carbon trading) and financing mechanisms through the implementation of REDD schemes and Clean Development Mechanism (CDM) projects to generate revenue.
- x. Government of Sierra Leone will also source funding from the Adaptation Fund and Green Climate Fund to implement priority projects on climate change adaptation.

2.5.1 DRM Financing

The Disaster Preparedness and Emergency Fund were officially launched by HE the President in August 2011. However, though some DRM funding mechanisms exist, they are not always adequate or fully functioning: (i)- Financing of the DRM coordinating institution (DMD/ONS) is inadequate; (ii)- The Disaster Preparedness and Emergency Fund does not get enough contribution to date; (iii)- Funding of DRM interventions within concerned sectoral institutions is inadequate, Key needs identified in terms of DRM financing would include: (i)- Securing funding for the DRM coordinating institution (DMD) with adequate funding mechanism and allocation; (ii)- Defining and implementing a clear and transparent mechanism for the mobilization and use of the Disaster Preparedness and Emergency Fund; (iii)- Advocating and mobilizing partners to contribute in the Fund; (iv)- Promoting and optimizing mobilization and use of Government's funds by DRM sectoral institutions.

2.5.2 The main ongoing projects contributing to DRM

The main ongoing projects contributing to DRM are in **table 2 below**

Ongoing Projects related to DRM in Sierra Leone	
<i>Organizations/ Projects</i>	<i>Indicative budget / years</i>
GEF/IFAD (International Agency for Agricultural Development): "Sierra Leone Integrating Adaptation to Climate Change into Agricultural Production and Food Security" project	\$ 3,074,280 (2011 – 2015)
PLAN: "Children at the Center of Disaster Risk Reduction" project	- Ongoing
WFP Sierra Leone: Protracted Relief and Recovery Operations (PRRO) Sierra Leone – "Protection of Livelihoods and Support to Safety Nets for Vulnerable Populations Recovering from Conflict"	\$ 41,170,067 (2010-2012)
ACDI/VOCA/USAID: "Sustainable Nutrition and Agriculture Promotion (SNAP)" program (Title II MYAP)	\$ 60,000,000 (2010-2015)

ACDI/VOCA/USAID: “Promoting Agriculture, Governance and Environment (PAGE)” project	\$ 13,200,000 Ongoing (4 years)
GEF/UNEP WCMC: “Evolution of PA systems with regard to climate change in the West Africa Region” Project	\$ 12,119,471 (2010-2015)
World Bank Sierra Leone: “Sierra Leone-Rapid Response Growth Poles: Community-Based Livelihood and Food Support “Program	\$ 2,810,000 (2010-2014)
World Bank Sierra Leone: “Bumbuna Hydroelectric Environmental and Social Management” Project	\$ 53,800,000 (2005-2012)
World Bank Sierra Leone: the “Wetlands Conservation” Project	\$ 1,800,000 (2011-2015)
World Bank Sierra Leone: “Sierra Leone Artisanal Mining Community Development and Sustainable Livelihoods” Project	\$ 2,890,000 (2011-2015)
World Bank Sierra Leone: the “SL-GEF Biodiversity Conservation” Project	\$ 23,800,000 (2010-2014)
AfDB under the JAS (AfDB/IDA/IFC Joint Assistance Strategy 2009-2012): “Towns Water Supply and Sanitation” Project	\$ 25,230,000 (2010-...): ongoing
AfDB under the JAS: “Rural Water Supply and Sanitation” Project	\$ 25,000,000 (2011-...): ongoing
AfDB: “Strengthening of District Health Services” project	\$ 17,000,000 (2007-2011)
AfDB: “Agriculture Sector rehabilitation” project	\$ 12,000,000 (2006-2011)
EU: “Conservation of the Western Area Peninsula Forest Reserve (WAPFor) and its Watersheds”	- Ongoing
EC: “TA Ministry of Mineral Resources: Monitoring and evaluation of the reopening of Sierra Rutile Ltd. And capacity building of the Ministry of	\$ 1,283,900

Mineral Resources” project	(2005-2011)
GFDRR: “Community Co-Management for Disaster Risk Management of Marine Resources in West Africa” project (Regional project covering: Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mauritania, Senegal, Sierra Leone).	\$ 900,000 Ongoing
UNDP: “Preventive Development disaster Management » project	\$ 300,000 (2008-2011)
UNDP/GEF: “Capacity Building for Sustainable Land Management in Sierra Leone” project	\$ 700,000 (2010-2011)
GEF/UNDP: “Enabling activities for the preparation of Sierra Leone’s Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC)” project	\$ 405,000 (2007-2011)
UNICEF: “Education in Emergencies and Post-Crisis Transition (EEPCT)”	\$ 4, 242,500 (2007-2011)
IFAD: “Rural and Agricultural Development Project (RADEP)” project	- Ongoing
FAO/Government of Germany: “Development of a Sustainable Seed Programme in Sierra Leone” project	- Ongoing
FAO/Government of Italy: “Food Security through Commercialization of Agriculture” project	- Ongoing
JICA: “Agricultural Development” project	- Ongoing
IFAD: “Enhancing Smallholder Access to NERICA Seed for Alleviating Rural Poverty in Western and Central Africa” program	- Ongoing
Sierra Leone Red Cross Society: “West Africa Disaster Management Capacity Building (WADM CB) pilot project” (regional project covering: Benin, Côte d’Ivoire, Liberia, Nigeria, Sierra Leone and Togo)	- Ongoing

2.6 Data and Information Management

Data and Information Management activities are key in climate change and disaster management data collection and information systems. **In general, NSCC and DRM Data and information management is ensured on an individual basis by NSCC and DRM sectoral stakeholders.** Each stakeholder has its own data and information system or mechanism, and often proceeds to data and information search, collection, storage, sharing and exchange when there are needs or requests. Data and information sharing and exchange are also often carried out during various regular sectoral and multisectoral working groups' meetings.

Several structures and institutions have more structured data and information system which are mostly relevant for risk assessment and monitoring. The Statistics Sierra Leone, the Meteorological department and Disaster Management cover data and information about vulnerability and capacity to many hazards and climate change related issues. Structure like the National Early Warning System (EWS) on Food Security and Nutrition, the EPA, the Ministry of Health provide and manage more DRM oriented data and information informing about existing and potential hazards status but also about vulnerability and capacity regarding those hazards: e.g. Crop forecast, Market information Forecast; Agro-meteorological Forecast; Nutrition Forecast; Food Security Forecast; Forestry Product Forecast, Environmental Monitoring data, etc)²⁹.

But there is no consolidated system addressing key data and information required for an optimized DRM implementation, specifically for preparedness and response implementation. Currently, there is, even within DMD/ONS, no database and no data and information management system for collecting, storing, processing and sharing data and information about the pre-disaster period and the post-disaster. Some key coordination information such as: the mapping of DRM interventions and stakeholders and their geographical coverage countrywide, the detailed information about logistical facilities for post-disaster response operations, the detailed information about existing emergency response capacities, some baselines on key most at risk areas to be ready for use for future post-disaster needs assessment, and finally a system for compiling post-disaster damages assessment results are not yet available.????

2.7 Awareness Raising on climate change and disaster management

Countrywide public awareness raising interventions are carried out by DMD/ONS with support from partners such as consultative meetings, jingles and skits, radio and TV debates. Community-based volunteers play key roles in local community sensitization in Sierra Leone. A workshop was organized by DMD to sensitize members of the House of Parliament. A DRR school outreach programme on the theme "Disaster Risk Reduction Begins at School" has been initiated by DMD in collaboration with NGO and UN agencies. DRR actions targeting children and youth in general not involved in formal education are undertaken. The teaching of DRM is integrated in university curricula through courses modules provided in various departments.

²⁹ Jesus Cespedes. (2010). *Capacity Assessment of the Disaster Management Department, Office of National Security: A review of current situation, constraints, challenges, options for an institutional reform and a suggested action plan with a budget for immediate needs*

Researches contributing to DRM are carried out in Sierra Leone. But, despite efforts and achievements, existing DRM public sensitization, education and research interventions are still limited, inadequate regarding needs to be covered: (i)- Current public sensitization initiatives are not yet carried out on permanent basis and do not yet systematically cover all public categories, all disaster prone areas and all hazards; (ii)- Contribution of the media in public sensitization and education is still very limited; (iii)- Existing DRR training program in primary and secondary schools do not yet cover the whole territory; (iv)- In higher education, there is no specific DRM training module or degree; (v)- To date, specific researches on DRM as regular or permanent activities are not carried out. Key identified needs to strengthen public knowledge, awareness and education on DRR, and the contribution of higher education and research to DRR, would include: (i)- Defining and implementing specific public systematic sensitization and communication strategy and plan on DRR; (ii)-Strengthening regular information and sensitization of heads of governmental institutions; (iii)- Systematic and regular information and sensitization of all technical agents involved in DRM and their institutions technical hierarchy; (iv)- Ensuring a more systematic and adequate information, education and sensitization of the local population in areas most at risk; (v)- Strengthening commitment of journalists and media in DRM; (vi)- Expanding and improving the DRM education outreach program in primary and secondary schools to the whole country; (vii)- Carrying out a DRM job market assessment in the country; (viii)- Setting up a specific DRM certificate or Diploma degree (university degree or professional training) if requested; (ix)- Setting up exchange and discussion forum for DRM professionals and researchers; (x)- Designing and implementing specific research program on DRM. Very little or no public awareness is done on effect of climate change.

2.7.1 Major issues and concerns

- I. The concept of climate change and disaster risk reduction need to be explained in a manner that the illiterate man could understand.
- II. The causes and impacts of climate change and disaster risk management need to be explained to the people of Sierra Leone.
- III. The Mitigation, Adaptation and disaster risk reduction options and strategies must be understood by stakeholders and the public.

2.7.2 Measures to Manage Impacts

In addressing the major issues and concerns raised above, the following awareness raising campaign should be carried out in order to sensitize the public on climate change and disaster management effect on life and property.

- a) Organize regular radio and television discussion programmes
- b) Organize community outreach programmes
- c) Production of Newspapers, Magazines, Newsletters, brochures and leaflets
- d) Organize Workshops and seminars
- e) Engage the school going pupils through the established Nature Clubs by EPA-SL
- f) Inclusion of Climate Change and disaster management in our education curriculum at all levels
- g) Road and film shows on the impacts of climate change and disaster management and their effects on the people
- h) Strengthen the role of women, youth and vulnerable groups in climate change risk management.
- i) Strengthen the role of traditional authorities and other opinion leaders in public awareness programmes.

2.8 Cross-cutting issues and linkages to climate change and Disaster Management

2.8.1 Land use and agriculture linkages to climate change and disaster management

Household activities regarding past and present practices for adaptation to climate change and variability in the agricultural sector include, seeking access to other sources of income that can provide reliable and relatively substantial income to assume the role of the main activity when agricultural production fails. These include charcoal production, petty trading etc. In non-household activities, farmers adapt by cultivating the swamps during extended dries and the upland during extensive rains. Other adaptation measures according to regional workshop findings include, switching crops in such a way so as to identify those that are most suitable to an agricultural land type during unfavourable climatic conditions.

Subsistence farmers have also suffered from poor crop yields due to changing rainfall patterns which in turn threaten food security and sufficiency.

Floods generally occur every year between July and September after heavy rains. Most of the floods are transient, with flood water receding, sometimes less than an hour after the rains but in some cases it can take up to a week or more. Floods in the south and east of the country destroyed crops and increased droughts and caused water shortages in some areas of the country. In the Port Loko and Kambia Districts floodwater in 2003 and 2004 lasted for about a month. During this period a lot of destruction is done to newly planted crops particularly rice. In some areas the floodwater can be more than one metre deep. Not only are the valley bottoms flooded but the nurseries up the slopes can also be affected.

Increase in food production and security is one of government's top priority on its national agenda. Mechanisms have now been put in place to ensure that higher crop yields are obtained

in order to reduce on food imports to save more foreign exchange earnings that could be used for other development programmes and projects.

The following specific agricultural policy measures are strongly urged to mitigate the impact of current and future climate challenges:

- Support the establishment of adequate weather stations around the country in order to provide adequate support to the Sierra Leone Agricultural Research Institute as well as Njala University to develop appropriate crop varieties and production practices that will enhance resilience to adverse weather conditions.
- Reliable and adequate weather data that will be useful to properly inform farmers.
- Develop and maintain seed banks to provide a variety of seed types that preserve biological diversity and enable farmers to make informed choices.
- Promote innovative and adaptive approaches such as irrigation and water harvesting, to protect farmers from variability in rainfall.
- Make provision for the construction of appropriate roads particularly feeder roads in the rural areas to be able to withstand increasing rainfall.
- Take appropriate measures to control rapid increase in population as well as providing appropriate infrastructure, social services and mechanization of agriculture in the rural areas to slow down massive movements of youths into urban areas.

2.8.2 Habitats and ecosystems linkages to climate change and disaster management

The following are strategies and priority actions to reduce the impact of climate change on land use change and forest cover.

- Increase conservation efforts in Sierra Leone through the establishment of a network of twelve Protected Areas by 2015.
- Sustainable management and protection of Forest Reserves and Catchment areas in Sierra Leone including mangroves, coastal and inland Wetlands.
- Delineate and Restore vulnerable habitats and Ecosystems in the Western Area of Sierra Leone particularly the Aberdeen Creek which is one of our Ramsar Site.
- Provide support to the Forestry Division of the Ministry of Agriculture, Forestry and Food Security for a national assessment on forest resources.
- Improve forest governance to maintain the proportion of land area covered by forests to at least 3.4 million ha by 2015, through the development of legislation, regulations and bye-laws for environmental protection, including control of deforestation, firewood collection and charcoal production and through capacity building, training and support to

law enforcement services and the Forestry Department in the Ministry of Agriculture, Forestry and Food Security

- Introduce conservation farming and promote the use of other sustainable agricultural practices, e.g. Agro-forestry, etc.
- Support the Bali Roadmap through forest conservation practices and reduce emissions from deforestation and forest degradation (REDD).
- Industrialized countries to strengthen the carbon market and commitments of reducing their GHGs emissions.
- The implementation of effective carbon trading and payments for ecosystems services.
- Improve forest management, expand forest areas, and encourage tree planting to increase the size of carbon sink in the country and
- Adapt agricultural practices which reduce emissions of methane and nitrous oxide

2.8.3 Watershed and coastal management relations to climate change and disaster management

Coastlands and sandy beaches of Sierra Leone have been affected by climate change due to sea level rise which is accelerating the rate of recession of sandy shores and destruction of coastal structures such as houses and the jetties along the coastline. The estimated population along the coastal areas at risk for 1m rise of sea level is about 2,315,860.

The effect of sea level rise induced by climate change is visible in coastal areas such as Yeliboya and Kortimor in the north, and in Shenge and Plantain Island in the south of the country. There are also visible signs of severe coastal erosion around Adonkia, Mahera Beach in the Lungi area, Conakry Dee and Eureka which resulted to the physical alteration of coastline and destruction of structures as well as displacement of people in coastal communities. The effect is that most the livelihoods of the people are threatened. In Shenge, Moyamba District, it has been recorded that the sea has eaten into the land by 100metres. Some government and private buildings are trapped under the flood water. At Lakka beach, the sea has eaten into the land by 41metres. This is considered as one factor for the collapse of guest complex structures by sea erosion. Below is the picture of collapsed building.

Due to sea level rise along the coastal low lying areas are visible signs of severe erosion around Adonkia, Mahera beach in the Lungi area, Conakry Dee and Eureka which resulted in the physical alteration of coastline and the destruction of structures.

Strategies and priority actions for coastal zone management include the following:

- Development of an integrated coastal management plan.

- Establishment of a Coastal Management Board/Studies on Coastal erosion in Sierra Leone.
- Delineation of flood and erosion hazard areas.
- Improvement on the quality of topographic data for the Coastal Zones.
- Strengthening of the monitoring of the Coast.
- Development of programmes on education and research on the Coastal Zone of Sierra Leone.

Past and present adaptation practices to climate change and climate variability in the coastal sector involve controlled abandonment of erosion devastated areas as well as those prone to coastal flooding and other hazards. Creation of setback is another approach often used in order to combat coastal hazards aggravated by climate change. However, in most cases, 'do nothing' is the popular option as coastal communities are poor and government lacks the resources to employ coastal adaptation technologies to help protect vulnerable portions of the coastline.

In the fisheries sector adaptation practices take on board fisheries management activities such as the discouragement of environmentally unfriendly fishing methods e.g. poisoning, use of explosives and inappropriate fishing gear. Local fishermen may also switch to other sources of income e.g. tailoring, trading and farming amongst others.

2.9 Risk Assessment, Risk Monitory and Early Warning Systems

2.9.1 Risk Assessment

As a logical first step, a **RISK ASSESSMENT STUDY** was commissioned to look at various types of disasters both natural and man made disaster and group the risks for disasters/hazards into three levels.

- (a) Disasters that can happen and needs immediate response.
- (b) Disasters that will happen if not responded to now.
- (c) Disasters that can be prevented through a longer preventive strategy.

The types of disasters/hazards identified for Sierra Leone as mentioned in section 1 above include: weather and climate hazards such as drought and tropical storms (strong winds), thunderstorms and lightening; hydrological hazards such as flooding; geological hazards involving earth movements, erosion (coastal and upland), landslides mud slips and rock fall; pest hazards, ecological hazards (deforestation, wild fires, wastes and pollution), social hazards which include accidents, civil strife, population movement (refugees and internally displaced persons), poverty and unemployment, including a chapter on vulnerability.

Interventions towards or contributing to Risk assessment are carried out but remain very limited.

A National Hazard Profile was developed in 2004 It presents an inventory and an analysis of all the natural and manmade hazards the country is facing, with their period of occurrence, their frequency, geographical coverage, duration and scale, according to historical data.

Vulnerability and Capacity Assessment (VCA) exercises were carried out in some key local at risk areas with support from NGOs (mainly Sierra Leone Red Cross) and other stakeholders like NACSA (National Commission for Social Action), the Police, UNDP and UNOCHA, such as in: Bombali, Pujehun, Kambia, **Kenema**, Kailahun, and Bo Districts. The main objective of the VCA was to understand the nature and level of risks that the communities have to face.

Environmental Impact Assessments (EIA) are systematically carried out for mining operations.

Identification and assessment of threats and risks to National security is regularly carried out. A Joint Intelligence Committee (JIC), in which all representatives of all security services shall sit, approve assessments of intelligence and other related information prepared by the security services and processed by a joint assessment team³⁰.

However, risk assessment remains weak in Sierra Leone: (i) only a small part of a complete risk assessment exercise has been carried out through the Hazard profile design (only an inventory and a classification of main hazards based on historical data). *See in Annex 6: the detailed weaknesses and gaps of the Hazard profile document* – **(ii) Some sectoral risk assessments are undertaken but limited** to an area or a hazard or an activity and are **not probabilistic risk assessments**, for example the study entitled “Cholera Prevention and Domestic Water Management in Freetown, Sierra Leone” undertaken by Action contre la Faim in 2008, which highlights the cholera risk exposure – **(iii) VCA exercises’ results are not really structured, relevant, and useful.** They seemed have been undertaken as isolated exercises not included in a local DRR Planning process as required. They, finally, do not cover for the moment all the country – **(iv) There is no spatial analysis of risk (risk mapping)** for both scientific and participatory local risk assessment– **(v) Main risk assessment interventions are carried out almost by partners** through DMD’s coordination/ collaboration but not by specialized national institutions (except Environmental Impact Assessments) – **(v) There is no scientific risk assessments covering all key hazards** faced by the country, and **no governmental mechanism** or system for carrying it out systematically or regularly.

2.9.2 Risk Monitoring and Early warning system:

Interventions towards or contributing to risk monitoring and to the establishment of early warning systems are existing /undertaken but very limited.

³⁰ *The National Security and Intelligence Act. (2002).*

Even not yet fully operational, the Sierra Leone Meteorological Department (SLMET) is ensuring regular weather and climate monitoring and warning. The rehabilitation of SLMET's capacity following the war is now ongoing. Important effort has been achieved in that regard mainly from partners' support (such as UNDP). Currently the SLMET can provide: tailored weather and climatologic Services, climatic data and daily forecast weather information to various end-users such as the Aviation wing at the Freetown International Airport, the Ministry of Agriculture and Food Security in FEWSNET/CILSS Food security monitoring and early warning system; and provide media weather warnings in close collaboration with the DMD/ONS. But the SLMET is still under its normal capacity and other needs include: The establishment or rehabilitation of standard weather observation station (Synoptic Stations, Marine/HydroMet stations, AgroMet Stations, Rainfall Stations, Automatic weather Stations); The Provision of other service delivery specialized equipment and logistics for routine forecast operations and other end-user service provision (storm detecting radar that could also help in issuing early warning - weather RANET system for data dissemination – SADIS system for Aviation forecasting - internet system in each of the regional office and head quarter – the SSB communication set for real time dissemination of synoptic data)³¹.

The Ministry of Health (MoHS) is regularly ensuring epidemics risk monitoring and warning. Responsible for public health and sanitation in the country, the Ministry has Health Information Management and Surveillance Systems within the MoHS that capture data from most of the health facilities

Flood risk monitoring and warning are ensured by volunteers at local level in some communities. In absence of adequate national hydrological monitoring and forecasting system (no hydrometric and monitoring stations and no gauges for measuring water flow and level in the major river basins³², no available hydrological services products)³³, at risk communities relies on local floods early warning system with a central role played by volunteers as for all other hazards, as requested by the National Disaster Preparedness and Response Plan.

The Environment Protection Agency (EPA) is in charge of ensuring environment monitoring and database management.

An initiative of “Definition and Deployment of a National Early Warning System (EWS) and Remote Monitoring Network on Food Security and Nutrition for Sierra Leone”³⁴ is piloted by the Ministry of Agriculture, Forestry and Food Security (MAFFS). Its main objective is to set up an Early Warning system and Sector Monitoring to assess food insecurity and vulnerability at the national level and to provide timely and appropriate evidence based and decision oriented recommendations for program responses on the prevention of possible threats to food security and

³¹ Sierra Leone Meteorological Services. (2011, July). *Strategic Plan 2011-2015*

³² Government of Sierra Leone. (2006). *Initial Communication (INC) in Climate Change*.

³³ Government of Sierra Leone, Ministry of Transport and Aviation. (2007, December). *Sierra Leone National Adaptation Programme of Action (NAPA) – Final Report*.

³⁴ Jesus Cespedes. (2010). *Capacity Assessment of the Disaster Management Department, Office of National Security: A review of current situation, constraints, challenges, options for an institutional reform and a suggested action plan with a budget for immediate needs*

management of food crisis. This initiative includes the collaboration of several institutions including: CILSS Regional Food Security Monitoring Network, FAO, UNDP, WFP, and Meteorological Department. A National Early Warning Task Force Committee has been established to direct the activities of the multi-disciplinary working group. It is planned that the system will implement nine modules: National Cropping calendar; Crop forecast, Market information/Intelligence Forecast; Rain Water Forecast/Agro-meteorological Forecast; Pastoral and veterinary services forecast; Hydrology Forecast; Nutrition Forecast; Food Security Forecast; and Forestry Product Forecast.

A system for warning and monitoring risks to national security is functioning, involving ONS. The National Security Council is ensuring the gathering of all information relating to the country security, PROSEC and DISEC provide early warning to Government of the existence or likelihood of any security threat to the district, to the province, to the country or to the Government.

A down top early warning system has been developed by the Sierra Leone Red Cross Society (SLRCS). Composed of a free hotline, that system will be managed by the SLRCS. It will allow the transmission of information from the local level (community) to the central level, primarily DMD, for action.

Alert reception and utilization component of a national early warning system is not clearly defined.

However, disaster risk monitoring and early warning systems are still very weak in Sierra Leone, very partially ensured and not covering all the key hazards. More specifically:

(i)- **A real risk monitoring is not carried out and institutionalized.** Ongoing interventions ensure only a more or less efficient hazard monitoring (weak epidemic monitoring, weak hazardous weather and climate monitoring as part of various natural hazards monitoring), and not covering all the existing key hazards (no hydrological monitoring as part as flood and drought monitoring, no wildfires monitoring, etc). There are: no systematic technical monitoring of all key vulnerabilities for each key hazard and no system for doing so, no systematic technical monitoring of all key hazards, and no formal system set up for carrying it out. (ii)- **To date, there is no adequate national Early Warning System covering all the socio-natural hazards faced by the country.** The case of dry spells well illustrates the situation. Despite the fact that the country experiences each year a dry season during the months of December to April, and that in some years the dry season has been so severe causing diminished flows in rivers and low water levels in reservoirs and resulting in reduced or very limited availability of water for users, no adequate **early warning and inadequate drought monitoring were set up and no drought mitigation plans developed**³⁵.

³⁵ Ministry of Energy and Power. (2008). *National Water and Sanitation Policy*.

(iii)- **An adequate early warning system ensuring adequate “Alert dissemination and Communication” does not exist.** There are: no clearly defined and established formal mechanism for warning technical collection, processing and communication of DRM warnings for any hazard from the central level to the local level and vice versa; and no clearly established formal system for specific DRM alerts dissemination among stakeholders at the central level, apart from the existing national security system which is not necessarily adapted to DRM.

(iv)- **An adequate early warning system ensuring adequate “Alert reception and utilization” does not exist.** There is no clearly defined, established and fully operational mechanism, for the reception of warnings, for any hazard, by the population at the local level and by the concerned institutions at central level (even within the National Fire Forces/NFF). The reactions responses to be adopted by the concerned institutions and the public upon reception of warnings are not clearly defined, standardized, and disseminated on a large scale for education and awareness raising purposes.

2.9.3 Preparedness

Preparedness interventions are ensured / carried out but they are very limited.

A National Disaster Preparedness and Response Plan (NDPRP) has been developed in 2004, awaiting currently approval by Parliament.

Few contingency plans were designed at central level. In preparation to catastrophic events, contingency plans for fires, health related hazards, civil unrest, election, windstorms were prepared together by the DMD/ONS, national stakeholders and international partners, mainly NGOs like SL Red Cross.

Simulation exercises were carried out to test institutional capacities³⁶. The main recent simulation exercise was undertaken in 2011 on the theme of fire accident.

At local level, community preparedness is mainly ensured through sensitization and education. Several NGOs carry out interventions at the grassroots level to prepare people to deal with hazards, such as the SLRCS which was conducting community training for cholera preparedness: 300 Red Cross volunteers were equipped with cholera demonstration kits in selected branches, which were used in teaching community people how to prepare ORS³⁷.

Despite willingness (DMD and at the State highest level) and efforts undertaken, preparedness in Sierra Leone is still weak, not covering adequately all required

³⁶ Office of National Security, Disaster Management Department Sierra Leone. (2010). *National progress report on the implementation of the Hyogo Framework for Action (2009-2011) – interim*

³⁷ IFRC. (2011). *Source: West Coast Africa – MAA61002 – 19 May 2011 – Report covering the period 1 January 2010 to 31 December 2010*. From <http://www.ifrc.org>

aspects/components and not allowing an optimal/adequate preparedness and readiness, at all levels:

(i)- Framework and tools guiding preparedness and response interventions are not operational and adequate: The National Disaster preparedness and response Plan drafted about 6 years ago is not yet fully implemented because not yet officially approved - Content and structure of the National Disaster preparedness and response Plan present some technical weaknesses to be improved (incomplete response plan structure – preparedness plan covering only one out of at least three aspect of preparedness – response plan not detailed with no sectoral plans) - Contingency plans without scenarios and detailed interventions in time and in space with clear allocation of responsibilities - The plans designed to date do not cover all the existing key hazards

(ii)- Plan testing is not systematic undertaken and very limited (in number): majority of the contingency plans developed seemed have not been tested and only one simulation exercise on the fields would have been carried out the last 3 years due to lack of resources.

(iii)- Limited knowledge and know-how of preparedness Planning and implementation:

(iv)- Lack of ownership of some key stakeholders who did not participate effectively in the development of National Disaster preparedness and response Plan. Planning and plan review exercises are not yet institutionalized, limiting the participation of all concerned stakeholders.

(v)- Weak community-based local disaster preparedness mechanism and organization: There are no response and preparedness plans prepared at local level as a continuation of VCA exercises. Preparedness and response are based mainly on community sensitization, awareness and education.

(vi)- Weak capacity (material, technical, financial) of some key responders at all levels. Some key institutions assigned to respond to critical needs in time of disaster are not ready because of a lack of resources such as equipments: e.g. the National Fire Forces which are the first responders in charge of victims search, rescue for all types of disaster, the Ministry of Water Resources ensuring emergency water supply, Ministry of Health in charge of medical and surgical issues, decentralized and local structures which current capacity status is not known.

2.9.4 Response

Response interventions are ensured/carried out but not often adequately regarding the needs (coverage, time and quality).

Post-disaster needs assessments for emergency response and recovery are undertaken but not adequately. Following the Floods in July 2011, a joint floods needs assessment has been undertaken 1.5 months after the event happening. Both urgent and recovery needs have been identified during the same exercise. Methodology adopted was designed just during the assessment planning period. The assessment was carried out in few targeted sample affected areas. Needs were defined but less clearly than damage. Led by the DMD/ONS the assessment was carried out by various stakeholders such as ONS/DMD, UNDP, UNEP, FAO, UNHCR, EPA-SL,

SLP, NaCSA, Human Right Commission, Civil Society, Concern Worldwide, Action Aid Sierra Leone and Sierra Leone Red Cross Society, but was not involving some key national stakeholders like the Ministry of health (for sanitation and health sectors), the Ministry of water resources (for safe drinking water supply), the Ministry of Works and Housing (for Housing and Road infrastructures sector), and the National Fire Forces (for emergency rescue, research, etc).

Response comprising emergency response and recovery is not yet adequately carried out.

At the time of the joint assessment, 1.5 months after the July 2011 floods event, some critical types of post-disaster emergency needs were still not covered, such as staple food (Rice), bulgur, flour, cooking oil, safe drinking water, plastic sheeting/tents, soap, drugs, treated mosquito nets, blankets, cooking pots, plates and spoons, buckets, soap (toiletries)³⁸. Following the joint assessment there was no intervention to respond to these identified urgent needs. The recovery needs identified during the joint assessment, including early recovery and longer term recovery, such as rehabilitation of damaged schools, road networks, bridges, contaminated water wells and hand pumps, health centers, provision of rice seeds were not also covered³⁹. No actions like the design of a recovery plan or the mobilization of resources for its financing has been carried out following the joint assessment.

Disaster response is carried out at the local level but remains weak despite ongoing efforts.

Solidarity between community and family members is the main disaster response mechanism. Often, there is no real defined response organization among community members, except within existing local disaster management committees involving volunteers, which are not yet really operational. Community leaders, according to the National Disaster Preparedness and Response Plan should play the key role of coordinating community resources to address the full spectrum of action to prevent, prepare for, respond to and recover from disasters, in communication to the local community and in helping community people, business and organizations cope with the impact of disasters, and in mobilizing community volunteers as first responders to disasters.

Despite willingness and efforts undertaken, response implementation is still weak/inadequate, not covering all required aspects/components and not allowing the provision of optimal/adequate responses, mainly because:

(i)- There are no clearly defined, standardized, adequate mechanism, methodology and tools for post-disaster needs assessments (for both emergency and recovery needs assessment). A same assessment was carried out to identify both emergency and recovery needs, using the same methodology just defined and agreed just prior to the assessment. Some partners (mainly NGos) have their own method, assessment forms, and assessment team to undertake post-disaster needs assessment in which DMD/ONS was not often participating

³⁸ Office of National Security, Disaster Management Department Sierra Leone. (2011). *Joint Assessment Report on Floods and Fire Disasters in Kenema, Kambia and Freetown for year 2011*

³⁹ *Ibid*

(ii)- There are no clearly defined, adequate and formal mechanisms for the implementation of both post-disaster emergency response and post-emergency recovery. Emergency needs still existing 1.5 after the event, there were no follow-up and actions to address identified needs after the joint assessment.

(iii)- There seems a weak knowledge about response planning, process and implementation, mainly about recovery among stakeholders and the public.

2.9.5 Disaster Prevention and Risk Reduction (Mitigation)

Disaster prevention and risk reduction (DRR) are carried out through interventions addressing part or all risks underlying factors.

Interventions contributing to reduce manmade and socio-natural disaster risks underlying factors are implemented in Sierra Leone. They are not specifically designed to address risks linked to existing or potential hazards, but they contribute in addressing some key aspects or factors largely involved in creating or increasing hazards and vulnerabilities. These are mainly sectoral interventions in the areas of: environment and natural resources management and protection including forests, water resources, mineral resources, soil and land, but also land use planning, energy, agriculture and food security, education, health, livelihoods and social protection. These interventions are generally performed at national level through the implementation of Governmental sectoral policies, strategies, action plans and programmes such as: National Social Protection Policy, National Water and Sanitation Policy, National Housing Policy, National Forest Policy, Sierra Leone Energy Policy, Sierra Leone Education Policy, National Health Policy, National Environmental Policy, National Land Policy, National Environmental Action Plan for Sustainable Development, National Action Program to Combat Desertification, National Adaptation Programme of Action. Key Acts include among others the: [National Security and Central Intelligence Act, 2002](#), [Mines and Minerals Act, 2009](#), [Town and Country Planning Act, 2001](#), [Environment Agency Protection Act, 2008](#), [The National Commission for Social Action 2008](#), [Environment Protection Act, 2000](#), [Hospital Boards Act, 2003](#), [Sierra Rutile Agreement Act, 2002](#), [National Social Security and Insurance Trust Act, 2001](#), [Petroleum Exploration and Production Act, 2001](#). Some key policies and acts are still currently under development such as a comprehensive policy covering Land use and planning and the Environmental and Social Regulations for the Minerals Sectors.

Interventions specifically carried out to address, reduce risks linked to specific manmade and socio-natural hazards are also implemented in the country. Covering one or several sectors, they are of different forms including structural or non structural mitigation measures. Two Committees have for example been recently set up following HE President's order through the National Security Council Coordinating Group (NSCCG) to critically look into the important issues of "sand mining and aggregate stone mining, and human settlement in disaster prone areas", and to proffer practical and logical recommendations that could help decision makers in finding a lasting solution to address the problems. Reduction of floods and drought impacts on agriculture and food security, in the broader framework of climate change, is undertaken in the "Sierra Leone

Integrating Adaptation to Climate Change into Agriculture Production and Foods Security” project through structural and non structural measures such as improving drainage system and water control measures in lowland sites and promoting small-scale irrigation schemes, along with a training of farmer-based organizations. The issues of population pressure and sprawling settlements and acute demand for land for dwelling in Freetown, are partly addressed through joint agricultural and land planning approach of demarcating/zoning and attribution of urban and peri urban wetlands suitable for agriculture to recognized existing farmers. This initiative resulting from the agreement “on mapping and allocation of land for urban and peri urban agriculture in Freetown and Western Area Rural District” in 2010, between the Sierra Leone Ministry of Agriculture, Forestry and Food Security, the Ministry of Land Country Planning and Environment, the Freetown City Council and the Western Area Rural District Council, is still at proposal stage, awaiting funding. Environmental Impact Assessments and design of related mitigation plans covering potential environmental and social impacts are systematically carried out for legal mining activities/operations.

DMD specifically is involved in facilitating several disaster risk reduction activities. Several press conferences, using local media (TV, radio, and newspapers) providing advice on how to minimize risks and requesting city council and other government agencies to provide assistance to affected families have been initiated. Inter-agency assessment visits to illegal dwellers in slum areas with very high risk of landslides have been undertaken. DMD’s staff is actively involved with government and UN agencies on the process to demarcate Government Forest Reserve areas in Western Area Forest due to high environmental degradation. Assessment visits to illegal sand mining were conducted as well⁴⁰.

At the local level, interventions helping the population to know and reduce risks are implemented. Mainly carried out through community-based volunteers, these interventions include training and mobilizing population on identifying and preparing hazard maps, on carrying out vulnerability and capacity assessments, and on analyzing specific hazard/disaster risks in their communities. The aim is to help the targeted vulnerable disaster prone communities to be able to have disaster preparedness and reduction strategies to limit their exposure to the disaster impacts⁴¹.

Despite willingness and initiative from highest level of State, disaster prevention and risk reduction are still weakly covered, with limited concrete actions on the fields, not addressing all priority risks, through a comprehensive, multisectoral approach for several reasons:

(i)- The lack of comprehensive, multisectoral and temporal approach to disaster prevention and risk reduction (DRR). DRR interventions are often addressing isolated sectoral aspects. In the reality, deep underlying causes of risks are often overlooked mainly livelihoods and social protection aspects. The establishment of such two committees addressing indiscriminate sand and

⁴⁰ Jesus Cespedes. (2010). *Capacity Assessment of the Disaster Management Department, Office of National Security: A review of current situation, constraints, challenges, options for an institutional reform and a suggested action plan with a budget for immediate needs*

⁴¹ Office of National Security, Disaster Management Department Sierra Leone. (2011). *UNDP Preventive Development disaster Management project - 2nd Quarter Report (April to June 2011)*

stone aggregate mining and human settlement issues is relevant model and starting for a systemic multisectoral analysis and approach to DRR.

(ii)- The implementation of some key sectoral policies contributing to DRR is weak. This is mainly due to the weak technical capacity of several Ministries to perform their “normal” assigned mandates and responsibilities, but also a lack of financial resources with not enough adequate funding allocation and strong sectoral fund-raising approach.

(iii)- There are few or practically no specific concrete national program addressing risk linked to specific hazard. There is for example no specific multisectoral program on floods or drought and dry spells, or on Fires, or on Landslides. However, the NAPA proposes as one priority action, the development of an Integrated Coastal Zone Management Plan for Sierra Leone to address the issue of coastal erosion.

(iii)- The lack of technical capacity of some key ministries. A weak awareness about their mandates and the way to perform them, but also the lack of adequate “know-how” for their implementation, are among the key factors. Some Ministries would not have enough specialized staff such as the Ministry of Land Country Planning and Environment which would have only one urban Planner, which is largely inadequate regarding the huge tasks required for urban land use planning.

(iv)- The lack of laws enforcement and coordination among governmental institutions. Hills and catchments should not be inhabited and legal text prohibiting settlements in such areas exist. However, illegal inhabitants in water catchments would have legal documents allowing them to settle and build housing infrastructures.

(v)- The non-coordinated implementation of DRR within a framework of a common vision for the entire country considering all levels, areas and sectors. There seems a weak focus on local level for the implementation of context specific DRR initiatives concrete projects or initiatives, including not only non structural mitigation measures such as awareness rising but also concrete structural measures. The adequacy of interventions planned and piloted from central level to local reality is not yet sufficiently looked at.

(vi)- The lack of adequate key basic infrastructures for the normal development that are the basis of DRR, such as well equipped medical public centers and hospitals, adequate sanitation networks which are still under construction and not covering all areas even in Freetown (even for water supply).

(vii)- The lack of commitment and willingness of some sectoral actors. Despite orders from the highest level of the State, there are not always concrete realization and achievements. Lack of motivation but also political fear of unpopularity at election time and of population’s reactions, are among the identified reasons.

3.0 CAPACITY DEVELOPMENT NEEDS OF CLIMATE CHANGE AND DISASTER MANAGEMENT FOR REMOVING THE BARRIERS

3.1 Projections of Climate

Temperature

- The mean annual temperature is projected to increase by 1.0 to 2.6°C by the 2060s, and 1.5 to 4.6°C by the 2090s. The range of projections by the 2090s under any one emissions scenario is 1.0- 2.0°C.
- The projected rate of warming is most rapid in the northern inland regions of western Africa than the coastal regions.
- All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate.
- * Annually, projections indicate that 'hot' days will occur on 26-63% of days by the 2060s, and 37-84% of days by the 2090s. Days considered 'hot' by current climate standards for their season are may increase most rapidly in JAS, but the range between model projections is large, occurring on 50-99% of days of the season by the 2090s.
- * Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 41-79% of nights by the 2060s and 54-92% of nights by the 2090s. Nights that are considered hot for each season by 1970-99 standards are projected to increase most rapidly in JAS, occurring on 72-100% of nights in every season by the 2090s.
- o Projected increases in hot days and nights are more rapid in the coastal regions of West Africa than inland.
- All projections indicate decreases in the frequency of days and nights that are considered 'cold'³ in current climate. Cold days and nights occur on less than 2% of days by the 2090s and do not occur at all by the 2090s in any projections under the highest emissions scenario (A2)⁴².

Precipitation

- Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of changes in precipitation for Sierra Leone, but tend towards over all increases, particularly in JAS and OND. Rainfall in JAS is projected to change by -27 to +29% by the 2090s, and -19 to +33% in OND.
- The proportion of total annual rainfall that falls in heavy⁴ events tends towards increases in the ensemble projections. Seasonally, this varies between tendencies to decrease in JFM and to increases in JAS and OND.
- 1- and 5-day rainfall maxima in projections all tend towards increases, particularly in JAS. The range of changes in projections from the model ensemble covers both increases and decreases in all seasons.⁴³

Regional Climate Change Information

⁴² UNDP climate change country profile, C. McSweeney, M. New and G. Lizcano: <http://country-profiles.geog.ox.ac.uk> (8-8-2012).

⁴³ UNDP climate change country profile, C. McSweeney, M. New and G. Lizcano: <http://country-profiles.geog.ox.ac.uk> (8-8-2012).

- Model simulations of precipitation changes for the Sahelian and Guinea coast regions of Africa are strongly divergent and most models fail to reproduce realistic inter-annual and inter-decadal rainfall variability in the Sahel in 20th century simulations. Our understanding of the processes causing tropical rainfall is insufficient to allow a prediction of the direction of change with any certainty. The IPCC identify this as an area requiring further research to understand the variety of model responses in this region (Christensen *et al.*, 2007).
- Model simulations show wide disagreements in projected changes in the amplitude of future El Niño events. West African climate can be strongly influenced by ENSO, thus contributing to uncertainty in climate projections for this region.
- The coastal regions of Sierra Leone may be vulnerable to sea-level rise. Sea-level in this region is projected by climate models to rise by the following levels⁵ by the 2090s, relative to 1980-1999 sea-level:
 0.13 to 0.43m under SRES B1
 0.16 to 0.53m under SRES A1B
 0.18 to 0.56m under SRES A2⁴⁴

3.2 Institutional Capacity development needs urgently required to facilitate the management of climate change:-

- The provision of the Satellite Aviation Data International Service (SADIS) system will assist not just the aviation wing, but our general service to all.
- Our storm detecting and rescue logistics radar that was destroyed at Tower hill needs replacement. This tool will save lives during boat, air and similar disasters
- We need Two (2) Ranet Systems for out station data collection. It is cheaper than the internet and tailored for MET use.
- There is at the moment no SSB set for data dissemination from our out stations.
- We need some 15 SSB sets in each of the districts and regions for timely data dissemination for the farmers and other end users
- There is need for the reopening of 14 automatic stations especially for rainfall to aid the farmers and for early warning.
- The department needs the storm detecting radar in order to help our fishermen and local boat travellers. This will prevent/ minimize sea disasters.
- We need funds for the external training of the three (3) Pupil Meteorologist and five (5) Meteorological Officers.
- The department's present official building is very old and partly dilapidated. We need to put up a structure to house the Meteorological Office, the Climate Change Secretariat and the Department's training school.
- We need capacity building in training for all levels of personnel

⁴⁴UNDP climate change country profile, C. McSweeney, M. New and G. Lizcano: <http://country-profiles.geog.ox.ac.uk> (8-8-2012).

3.3 Capacity Constraints Matrix

Sierra Leone has identified a number of potential barriers to the smooth implementation of the proposed activities. These barriers have been presented in the matrix below in table 3

Table 3: Capacity constraints matrix

Priority Issues	Individual Capacity Constrained	Institutional Capacity Constraints	Systemic Capacity Constraints
Rehabilitation of climate change institutions with needed scientific technology to implement UNFCCC in Sierra Leone	Individual members of the national climate change committee (NCCC) are constrained by the poor working environment	The proposed NCCC Expertise Task Force and its collaborating institutions are constrained by financial resources with the appropriate scientific and technical assistant.	Limited or non-existence of an enabling environment is a constraint
Limited technology, technician, professional at the national level in the assessment of adaptation and mitigation option	Individual members of NCCC are constrained by lack of training to handle climate change issues	The NCCC to be set up by NAPA Project and its collaborating institution are constrained by financial resources with the appropriate scientific and technical expertise NCCC and its collaborating	Limited or nonexistence technical infrastructure and depleted expertise is a constraint.
Current policies, strategies and regulatory mechanism have limited in or no consideration of climate change issues.	Limited capacity of law officers to deal with environmental legislation.	NCCC and its collaborating institutions are constrained by human resources with the appropriate scientific and technical expertise.	Limited or existence of an enabling environment is a constraint.

Lack of trained manpower to manage climatological programmes	Individual NCC members have limited/ no capacity to manage climatological programmes	Inadequate institutional capacity to manage climatological programmes	Inadequate systemic capacity to manage climatological programmes
Public Awareness	Individual remembers need adequate training to create results-focused awareness	Institutional capacity is inadequate to sustain multi-media public awareness	No public awareness system has been established for climate change sensitization
Lack of reliable/updated of data	Individual NCCC members require adequate training for reliable data collection	No institutional capacity available for reliable data collection	Systemic capacity for data collection and updating is negligible
Financial support at all levels (international, regional and national levels) Financial support at all levels (international, regional and national levels)	Capacity of individual NCCC members have not been built to source financial support at all levels	Institutional capacity needs to be strengthened in order to increase/influence more financial support at all levels	Systemic capacity needs to be fortified in order to mobilise financial support at all levels

3.4 Adaptation

Adaptation is an ecological, social or economic systems put in place in response to actual or expected climate stimuli and their effects or impacts. It is mainly about warning people about certain events in advance and preparing themselves to deal with vulnerability and uncertainty of climate change impacts.

In response to the decision of the Seventh Session of the Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC) for LDCs to develop their national adaptation programme of actions (NAPAs), Sierra Leone has developed its National Adaptation of Action (NAPA), with the Bali declaration in mind, which set priority activities and projects to be undertaken in order to meet its immediate needs and respond to her most urgent

concerns about adaptation to the adverse effects of climate change. There is an urgent need for the implementation of the NAPA, which touches and almost all areas of climate change, and development activities to meet the immediate adaptation strategies and needs of the vulnerable communities to mitigate or adapt to climate change related disasters.

Major improvement

- There should be massive and continuous awareness raising and sensitization campaigns throughout the country on climate change impacts and adaptation strategies
- The country should develop an integrated Natural resources and environment management programme
- Promote the use of efficient and affordable renewable in Sierra Leone
- Energy efficiency and conservation should be given due considerations
- Management and protection of forest resources catchment areas in Sierra Leone including Wetlands
- Strengthen the institutions that implementing climate change climate related projects.
- Capacity building for adaptation to long-term climate change in the country

3.5 Mitigation

Climate change mitigation is not a stand-alone problem. It will both affect and be affected by socio-economic policies and by choices involving development, sustainability and equity. Policies to limit net emissions can best promote sustainable development if they are consistent with broader societal objectives. Some mitigation options can even promote benefits far beyond immediate climate change concerns such as reducing health problems, increasing local employment, minimizing certain subsidies and taxes and accelerating the development and diffusion of energy-efficient technologies.

In a bid to significantly contribute towards the reduction of the sources and potential sources of GHG emissions and to enhance carbon sinks, Sierra Leone in response to the Copenhagen Accord, noted that it would undertake appropriate mitigation actions as follows:

- Establishment of the National Secretariat for Climate change (NSCC):
- Institutional strengthening and capacity building for environmental protection and management as well as the country's mitigation and adaptation efforts to climate change:
- Increase conservation efforts in Sierra Leone. The Establishment of a network of twelve Protected Areas by 2015
- Sustainable management and protection of Forest Reserves and Catchment areas in Sierra Leone including, mangroves, coastal and inland Wetlands.

- Delineation and Restoration of Vulnerable habitats and Ecosystems in the Western Area of Sierra Leone.
- Provide support for a national assessment on forest resources.
- Improve forest governance to maintain the proportion of land area covered by forests to at least 3.4 million ha by 2015, through the development of legislation, regulations and bye-laws for environmental protection, including control of deforestation, firewood collection and charcoal production and through capacity building, training and support to law enforcement services and the Ministry of Agriculture (forestry Department).
- Setting/developing air, water and soil quality standards, and ensure regular assessments and monitoring through control programs. Introducing conservation farming and promoting the use of other sustainable agricultural practices, e.g. Agro-forestry, etc.
- Development of an integrated Natural Resources and Environmental Management programme for Sierra Leone, including sustainable land management programmes, particularly in relation to Ecosystems.
- Expanding clean energy utilization (e.g. solar, mini-hydro electric power, LPG, biomass stoves etc) Development of energy efficiency programmes through sensitization and awareness raising campaigns. Sustainable production of charcoal and reduce dependence on firewood
- Development of alternative energy sources such as biofuels from sugarcane, corn, rice husk, etc.
- Developing agricultural and urban waste incineration programmes for energy production.
- Improved waste management through composting and recycling.
- Development and enforcement of regulations on regular maintenance of vehicles (vehicle emissions testing); formulation of transport plans.
- Improving and promoting use of public transport (e.g. road and water): for passengers and cargo to reduce traffic congestion and GHG's emissions.

3.6 Programmes in Support of capacity development needs for climate Change Issues

- Conservation of the Western Area Peninsula Forest Reserve and its Watershed. This project is financed by European Union and is implemented in partnership with civil society actors, the environmental Forum for Action (ENFORAC) and cooperation with Forestry Department of the Ministry of Agriculture, Forestry and Food Security. The activities have already made communities such as Waterloo, Hastings and Tombo agreed on environmental protection by signing bye-laws to be observed by the communities themselves.
- Eco-tourism Supporting community Development and Conservation (Tiwai Island Wildlife Sanctuary). The island is richly populated with a variety of animal and plant life making it attractive for tourists and researchers alike. It houses the second highest concentration of primate in the world, including rare and endangered species such as the Diana Monkey.
- Trans-boundary forest co-management, modeled on Guinea is piloted in Sierra Leone. There is EU funded project on conservation between Sierra Leone and Liberia, namely the Joint Peace Park.
- The Gola Forest Management in perpetuity.
- Capacity Building projects on the designated national parks.
- Management of Marine Parks.
- Clean and renewable energy production. The Government in collaboration with GEF is embarking on the development of Mini-hydro projects all over the country and solar energy for domestic and mini-industry uses (Rural Electrification) .
- Potential dams have been identified for the development of safe water supply.

The implementation of the United Nations convention to combat desertification/land degradation is an opportunity for Sierra Leone to take on board the environmental initiative of the New Partnership for Africa's Development (NEPAD) in its national development strives and it is part of the MDG.

3.7 Capacity development needs of DM by implementing and improving on the following issues:-

- Mainstreaming of DM into development plan
- Strengthening of partnerships
- Overall improvement in the response to coordination meetings from NGO's and line ministries
- Understanding of UN and NGO's working procedures during emergencies
- Provision of National emergency funds
- Adequate provision of logistics
- Ensure prompt information sharing by all MDAs and NGOs

3.8 Main needs for improving risk assessment would include:

(i)- Improving and updating the National Hazard profile; (ii)- Carrying out complete scientific (probabilistic) risk assessment and mapping for key priority hazard(s), with national coverage, up to the possible scale (local level preferably). The objective is to cover the entire country for all hazards but given the cost of such an exercise, it can be done and extended progressively; **(iii)- Improving local VCA quality and coverage** (technique, content and coverage): extending areas and hazards covered, highlighting links between hazard-vulnerability-capacity, **integrating it into local DRR/DRM planning process, carrying out local participatory risk mapping; (iv)- Setting up a Geographic Information System (GIS) for DRM to facilitate future spatial risk assessment, monitoring and updating and access** through a dynamic system, with support from existing capacity within Sierra Leone Information Systems (SLIS) located in the Ministry of Finance and Economic Development, which has 3 units: The Management Information Unit, the Web Development Unit and the Geographic Information Systems (GIS) Development Unit. EPA would be another relevant partner in that exercise; **(v)- Setting up adequate national risk assessment system and capacity** for key natural and manmade hazards.

3.9 Main needs identified for improving and optimizing disaster risk monitoring and early warning would include:

- **Setting up and strengthening a national mechanism/system for the systematic monitoring of key risks:** **(i)-** Defining, setting up and institutionalizing an adequate system/mechanism for technical (scientific) risk monitoring implementation and coordination at central level (sectoral and general), including the establishment of a coordination and data sharing unit (at DMD?) ; **(ii)- Defining, setting up and institutionalizing a countrywide adequate community based risk monitoring at local level** involving volunteers, local organizations and authorities; **(iii)- Strengthening capacities (material, technical, financial) of all risk monitoring stakeholders at all levels mainly for four key institutions at central level** including the Meteorological Department (which will become an Agency from 2012, needs assessment done and strategic plan developed for support), the hydrologic forecasting unit within the Water Sources Division of the Ministry of Energy and Water Resources (MEWR) (needs assessment done, policy and strategic action plan developed for support), the Ministry of Health and Sanitation (MoHS) (for Epidemics risk monitoring to optimize), the Environment Protection Agency (for environment monitoring to optimize), and at local level: volunteers, local organizations and DRM committees, including local authorities.
- **Defining, setting up and strengthening a countrywide adequate national early warning system covering all key hazards, with clear definition of the organization, mechanisms, roles and responsibilities of all involved parties at all levels, specifically**
 - (i)- At central level: Define and set up a governmental system/mechanism for collecting, processing and disseminating warnings for specifically DRM,** not included within the

national security early warning system as a classical intelligence issues - Clearly define and state interventions to be undertaken by all institutions and stakeholders concerned upon reception of warnings - Establish warnings coordination and follow-up unit at the central level (DMD?)

(ii)- At local level: Carry out an inventory of and extend and strengthen existing community-based local early warning mechanisms covering the reception of warnings by local people and their diffusion at the local level within the community, the utilization of warnings in terms of the ability of local population to react and respond to warnings for any hazard in the whole country, and the links and coordination with local authorities.

(iii)-Strengthening capacities (material, technical and financial) of all concerned stakeholders at all levels, mainly the communities at local level.

3.10 Key needs identified to improve preparedness status and implementation, include:

For all levels:

(i)- Promoting sectoral responsibility approach along with hazard-oriented approach to ensure systematic coverage of response and preparedness aspects, and all stakeholders' commitment.

(ii)- Carrying out and institutionalizing systematic response and preparedness Plans Testing: small-scale simulation (in a room or using a software) and practical simulation exercises on the fields.

(iii)- Establishing and institutionalizing systematic monitoring, evaluation and improvement of preparedness: covering the implementation of preparedness and response Plans, and the revision/improvement of plans based on testing (Lessons Learnt exercises).

(iv)- Carrying out systematic and regular Stakeholders' sensitization: mainly about the preparedness and response mechanisms and their roles and responsibilities inside.

(v)- Strengthening key stakeholders' capacity: beginning with material and technical capacities with the provision of minimum DRM and general skills and some key emergency equipments/tools for communication, rescue, transportation, relief, etc. Some of these needs should be identified through more deep assessment at the central level (National Fire Force or NFF, MEWR, MoHS, etc), at the decentralized level (districts and especially city councils like Freetown) and local level (for the population, the volunteers, the authorities, and the DRM committees).

For Central and decentralized levels:

(vi)- Developing sectoral Response plans,

(vii)- Reviewing and improving the National Disaster preparedness and response Plan (as a general Plan for reference), including the preparation of a preparedness plan with two parts.

(viii)- Developing sectoral preparedness plans

(ix)- Developing/reviewing national contingency plans for priority hazards, following clear scenarios (worst and best cases), and using the general Plan model developed.

For the local level:

(x)- Developing Local Response Plans and Preparedness Plans, based on VCA (Vulnerability and Capacity Assessment) process and results, involving local authorities.

(xi)- Supporting the implementation of designed local response and preparedness plans through plans testing, stakeholders' capacity strengthening, duplication of relevant existing local preparedness initiatives and technical accompaniment.

3.11 Key needs identified to improve response implementation and status, which should be addressed as part of the preparedness phase, would include:

(i)- Strengthening post-disaster needs assessments process and implementation (for both emergency and recovery needs assessment), in defining and institutionalizing standardized, adequate mechanism, methodology and tools; providing training to relevant stakeholders involved at all levels (e.g. for filling in the assessment forms at local level for emergency needs assessment); and carrying out small scale and practical exercises. Training might include DALA methodology (Damage and Losses Assessment methodology), for economic evaluation of disaster impact.

(ii)- Strengthening post-disaster emergency response and post-emergency recovery process and implementation, in defining and institutionalizing adequate mechanism, methodology and tools; providing training to relevant stakeholders involved at all levels; carrying out small scale and practical exercises.

(iii)- Enhancing stakeholders' knowledge and understanding of emergency response and recovery concept, planning, process and implementation, through mainly training and awareness raising actions targeting all stakeholders involved, including population at the grassroots level (harmonization of understanding)

3.12 Key needs identified to improve disaster prevention and risk reduction implementation and status, include:

(i)- Realization of complete risk assessment and mapping exercises at all levels (know the risk) to get clear and adequate tools for DRR planning.

(ii)- Strengthening local level DRR through adequate VCA and development of risk reduction plans for priority areas. VCA should be included in the broader framework of DRM planning: extend, complete VCA and develop the related DRR plans in all at risk areas in beginning in areas where VCAs were already carried out. Promoting technical structural and non structural mitigation measures to reduce risks at the community level, such as building fire and flood resistant houses, securing drinking water sources, through adequate low-cost structural measures, use of adequate agricultural technique respecting the environment, and all every day practices that reduce vulnerabilities and hazards.

(iii)- Development and implementation of a comprehensive national disaster risk reduction (DRR) Programme for the whole country, multisectoral, for the short, medium and long terms, based on a comprehensive diagnosis of the situation, mainly at the local level. The results of local VCA exercises and more specifically the compilation of local DRR Plans would be the basis of the future Programme and of the design process. The National Platform members should play central roles in the process.

(iv)- Development and implementation of specific DRR projects to reduce specific risks. One or several existing or potential risks in specific areas/locations requiring specific attention or urgent interventions should be targeted by specific DRR projects.

(v)- Implementing urgent measures to reduce urgent and high potential disaster risk issues (in parallel with the above process), such as the problems of cholera risk, fires risk (fire extinguishing equipment in public buildings, education and awareness of people in threatened areas), urgent measures to improve sanitation, waste management and safe drinking water supply (WC, public taps construction, etc).

(vi)- Strengthening technical and material capacities of several public institutions which are key for DRR to allow them to perform their “normal” activities/mandates: e.g. Ministry of Lands, Country Planning and Environment (MLCPE), City Councils, MoHS, MEWR, etc.

(vii)- Supporting the implementation of “normal” activities of some key stakeholders which achievement contribute greatly to DRR, for example: Development of urban development plans and master plans – Zoning – Preparation and revision of key Acts - Rehabilitation of hospitals and equipment support - Sanitation networks improvement – Drinking water supply in some areas highly vulnerable along with water sources protection interventions - Support to the development and implementation of sectoral policies contributing to DRR (such as the Water and Sanitation Policy).

(viii)- Increasing awareness and education of stakeholders and the public, with much stronger support for the media/journalists.

(ix)- Promoting stronger coverage of thematic, cross-cutting areas that are at the basis of DRR in Sierra Leone. Regardless of hazard types, the following cross-cutting issues should be more covered and addressed through a more systematic and comprehensive, multisectoral approach: Livelihoods and Social protection - Land use planning and management - Sustainable environment and natural resources management and Food Security.

3.13 Key needs identified to improve NSCC and DRM data and information management would include:

(i)- Reviving, operationalizing and improving the NSCC and DRM database and data management system that existed before managed by SLIS. In fact, in 2002, the Sierra Leone Information Systems (SLIS) established by UN OCHA ensured collection of war related socio-economic destruction data down to Chiefdom level, but also the establishment of a “Who does What, Where” database to identify the various Humanitarian Relief actors, their projects and project locations on Chiefdom level. District Data Packs, Sector Data Packs and the annual Sierra

Leone Encyclopedia Compact Disc, were among the main SLIS products, which served as the basis for Consolidated Appeals Process (CAP) during Humanitarian Relief phase. But functioning of the established database and the data management system was interrupted after the shifting of SLIS's focus from humanitarian relief to development and its transfer at the Ministry of Finance and Economic Development in 2008⁴⁵. DMD could host again this information and data management system, and benefit from SLIS capacity transfer.

(ii)- Developing a NSCC and DMD's Website to optimize information and data communication and sharing with support from SLIS.

4.0 INTEGRATED APPROACH TOWARDS BARRIER REMOVAL

⁴⁵ *Ibid*

4.1 Proposed Poverty Reduction Strategy Paper (PRSP) 111 on Climate Change and Disaster Management

The government of Sierra Leone in consultation with citizenry and all relevant- stakeholders is in the process of preparing the Poverty Reduction Strategy Paper (PRSP III) in consonance with the Millennium Development goals (MDGs) and the Inclusive Green Growth (IGG) in a bid to achieve sustainable development and poverty reduction particularly among the vulnerable communities.

4.2 Integrated approach to correct or minimize climate change and disaster risk reduction impact and effects.

Tourism

- Promote eco-tourism and carbon trading programmes.

Wastes

- Developing agricultural and urban waste incineration programmes for energy production.
- Improved waste management through composting and recycling.

Transport

- Develop and enforce regulations on regular maintenance of vehicles and vehicle emissions testing and formulate transport plans.
- Improve and promote the use of public transport, particularly road and water means for passengers and cargo to reduce traffic congestion and GHG's emissions.
- Provision of a clean and energy-efficient urban transportation and railway transport system to save energy, reduce carbon emissions and cut costs.
- Financial incentives for 'green' transportation

Environment

- Set up/develop air, water and soil quality standards, and ensure regular assessments and monitoring through control programs. Use cleaner energy sources and technologies to reduce emissions of carbon dioxide and other pollutants that cause acid rain and other environmental problems.
- Promote the use of strategic environmental assessments and environmental impact assessments for sustainable utilization of natural resources and integration of climate change adaptation in development policies, programmes and strategies develop an integrated Natural Resources and Environmental Management programme for Sierra Leone, including sustainable land management programmes, particularly in relation to Ecosystems. Presently, the Sierra Leone Environment Protection Agency is implementing

a sustainable land management project in partnership with the United Nations Development Programme.

4.3 Integration of Disaster Risk Reduction (DRR) and Adaptation to Climate Change (ACC)

Climate Change and disaster management issues are addressed in Sierra Leone. The Sierra Leone National Adaptation Programme of Action (NAPA) was developed in 2007 and adopted in 2008. The initial national communication (INC) on climate change was issued in 2006 and the second national communication (SNC) is currently under development. The “Sierra Leone Position Paper on Climate Change” – COP 17 Climate Change Conferences Durban 2011, has been drafted. To implement the NAPA, the project entitled "Sierra Leone Integrating Adaptation to Climate Change into Agricultural Production and Food Security" was developed, financed by GEF/LCDF grant and implemented by IFAD. DRR is addressed in ACC interventions and ACC is addressed in DRR interventions but very weakly. Despite achievements, DRR and ACC are not yet adequately and systematically integrated, still often addressed as separate issues in separate agenda, framework and interventions, because: (i)- Mostly DRM stakeholders are not aware about the key importance of climate change in DRM concept and implementation; (ii)- DRR and ACC integration tends always to be more theoretical than practical mainly regarding integrating ACC in DRR interventions/initiatives. Key needs identified to enhance the integration of ACC and DRR would include: (i)- Strengthening DRM stakeholders' awareness and knowledge on the need to address climate change and the link between adaptation to climate change and disaster risk reduction; (ii)- Increase awareness and knowledge about the process of integrating ACC and DRR (carrying out both ACC and DRR); (iii)- Systematically integrate ACC as part of all DRR planning process at all levels; (iv)- Improve ACC consideration in some key ongoing DRR programs/projects; (v)- Promote the use of the same available tools and methodologies to assess and monitor risk for both ACC and DRR interventions..

4.4 Broader integrated approach of the diagnostic analysis is outlined below:-

- i. An integrated approach is recommended for action which includes the harmonization of policies, protocols, guidelines, standards, and legislation in pursuant of mainstreaming the climate change and disaster management in the PRSP111.**
- ii. Non-Availability of Sustainable National Emergency Funds.** This is the most serious challenge affecting the smooth operations of the department. Since the establishment of the DM department in 2004, GoSL is yet to establishment national emergency funds to address disasters. As such, the conduct of risk reduction and response activities to prevent/mitigate and respond to disasters has been a real challenge for the DMD/ONS

over the years. The National Preparedness Fund that was launched last year was a token made by ECOWAS to GoSL for the provision of humanitarian assistance to the 2009 flood disaster victims. However, because the funds were only remitted a year on after the incidence itself and the affected victims had gone on with their lives, a decision was reached by GoSL to use these funds instead as 'seed money' for the establishment of National Disaster Funds.

Since then, these resources have only been depleted as they were continually being used with no additional inputs made into the account to replenish them. As such there are no substantive national emergency funds that could be used to address such emergency issues.

iii. Non/Weak Enforcement of Laws and/or Policies In Key Sectors, particularly in the areas of urban land use planning, construction of houses in disaster-prone areas, depletion of forests reserves, uncontrolled sand mining and the enforcement of building regulations and other laws to protect Sierra Leone's natural environment. Until such enforcement is carried out to serve as deterrence, defaulters will continue to break laws at the expense of Sierra Leone's future.

iv. Non Inclusion of Disaster Risk Reduction into Sectoral/Development Plans. The integration of a multi-hazard approach to disaster risk reduction into policies, planning and programming related to sustainable development at all levels, with a special emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction is apt.

Increased efforts to reduce disaster risks be systematically integrated into policies, plans and programmes for sustainable development and poverty reduction, and supported through institutional, sectoral partnerships. Thus accelerated efforts must be made to build the necessary capacities at the community and national levels to manage and reduce risk. Such an approach is to be recognized as an important element for the achievement of internationally agreed development goals, including those contained in the Millennium Declaration.

The 'Agenda for prosperity' PRSP111, a good opportunity for mainstreaming of DRM into all the relevant sectors.

v. Weak capacity of MDAs to carry out their respective mandates remains a grave challenge to the responsible institutions. Even where the required skills set is available; many of the MDAs lack the requisite resources to for an effective and efficient response. The development and strengthening of institutions, mechanisms and capacities at all levels, in particular at the community level, that can systematically contribute to building resilience to hazards. This must include capacitating GoSLs MDAs with the appropriate

skills, equipment and other logistics to enable them enhance their effectiveness and efficiency prior to and after emergencies.

Keeping in mind that the mandate of the DMD/ONS is to serve as primary coordinators of national emergencies such as disasters, it is but prudent that the institutions whose services we may be requiring are reasonably equipped to carry on the task for which they may be called upon to perform. A good example is that of the National Fire Force, which as it stands, could only boast of five (5) fire engines nationwide. Of these five, only three are readily available (two in Freetown, one in Bo) in the entire country, whilst the remaining two are yet to be cleared from the port and commissioned to Kenema and Makeni respectively.

vi. Establishment of the Disaster Management Department/ Agency into a separate agency/commission.

5.0 MAJOR GUIDELINES FOR MAINSTREAMING CLIMATE CHANGE AND DISASTER MANAGEMENT WITHIN THE PRSP111

5.1 Introduction

In a bid to ensure that the country move towards climate resilient and low-emission development, there is dire need to mainstream climate change and disaster management into national development planning and budgeting. Climate scientists, disaster managers, development planners, decision and policy makers should be made to become aware of the relevance of climate change and disaster management mainstreaming in development plans and programmes. Climate change and disaster management should be mainstreamed at strategic planning levels and lower levels of governance. Climate change adaptation, mitigation and disaster management support more sustainable development which enhances society's response capacity.

Since climate change and disaster management are cross-cutting, there is need to use management and planning tools such as the strategic environmental assessments to mainstream climate change and disaster management into national and sector policies, strategies, plans and programmes whilst the environmental impact assessment tool at the project level.

Tools such as cost benefit analysis and cost effectiveness analysis can be used for costing and assessing adaptation, mitigation and disaster risk reduction options in the national budgetary process, and the multi-criteria analysis tool for prioritizing and selecting adaptation, mitigation and disaster risk reduction options. Public expenditure reviews as a tool can also be used for mainstreaming climate change and disaster management in the budgetary process.

There is also need to mainstream climate change and disaster management in monitoring systems to know why climate monitoring should be integrated into wider national and specific development monitoring systems, what should be monitored and why. There should be performance measurement and monitoring in terms of objectives, impacts, outcomes and output indicators in relation to climate change and disaster management mainstreaming projects and implementation.

The above mentioned planning and management tools should be given serious consideration in mainstreaming climate change and disaster management in the PRSP111.

This assessment should also provide the opportunity to identify areas that will need urgent integration of relevant climate change policy interventions.

The economic cost of climate change and disaster management on Sierra Leone's sustainable development will also be assessed.

5.2 Development of mainstreaming policies on the following:-

Reduce the risks of flooding and drought by promoting wetland and watershed protection and restoration, improved land-use planning, improving and applying more widely techniques and methodologies for assessing the potential adverse effects of climate change on wetlands;

Develop integrated water resource management and programmes for mitigating the effects of extreme water related events; integrate measures to prevent and combat desertification as well as mitigate the effects of drought through relevant policies and programmes;

Provide affordable local access to information to improve monitoring and early warning related to desertification and drought;

Improve techniques and methodologies for assessing effects of climate change;

Strengthen institutional capacities and support the establishment of effective National strategies and scientific and technical institutional support for disaster management;

Encourage the dissemination and use of traditional and indigenous knowledge to mitigate the impact of disasters, and promote community-based disaster management planning by local authorities, through training activities and raising public awareness;

Promote cooperation for the prevention and mitigation of, preparedness for, response to and recovery from major technological and other disasters with an adverse impact on the environment;

Deal effectively with natural disasters and conflicts, including their humanitarian and environmental impacts, recognizing that conflicts in Africa have hindered and, in many cases, obliterated both the gains and efforts aimed at sustainable development, with the most vulnerable members of society, particularly women and children, being the most impacted victims;

Provide financial and technical assistance to strengthen the capacities, including institutional and human capacity, especially at the local level, for effective disaster management, including observation and early warning systems, assessments, prevention, preparedness, response and recovery;

Support construction of adequate and secure housing for the poor, taking into account, climate, specific social conditions and vulnerability to disasters – urban risk reduction;

Improve policy and decision-making at all levels through, inter alia, improved collaboration between natural and social scientists, and between scientists and policy makers;

Increase the use of scientific knowledge and technology, and increase the beneficial use of local and indigenous knowledge in a manner respectful of the holders of the knowledge and consistent with national law.

5.3 Disaster Risk Reduction (DRR) Mainstreaming

DRR Mainstreaming in both Development and Disaster Risk Management (DRM) is ensured in Sierra Leone, even though not adequately. DRR mainstreaming will be stated as one of the preconditions for achieving strategic priorities of the “Sierra Leone Agenda for prosperity (2013-2017)” (the PRSP 111 document). Some sectoral policies states DRR as a priority, such as the Water and Sanitation Policy and an important effort has been achieved to mainstream DRR into Health sector, a Country Capacity Assessment and a road map for full DRR mainstreaming, with clear roles of stakeholders, was developed and validated. At the decentralized level, DRR is integrated in few development plans. DRR mainstreaming in preparedness and response is stated in some documents and carried out in several interventions. Despite efforts achieved to date, DRR mainstreaming in development remains often theoretical, inadequately covered and implemented. (i)- DRR is not yet mainstreamed in all key sectoral policies, strategies or programs at the central level and development plans at decentralized level; (ii)- Some stakeholders lack awareness of the Sierra Leone agenda for prosperity requirement; (ii)- DRR mainstreaming process, methodology and tools are not often known by stakeholders; (iii)- Lack of willingness limits stakeholders’ commitment for carrying out DRR mainstreaming. Key needs identified to improve DRR mainstreaming implementation would include: (i)- Sensitization of stakeholders at all levels about the requirement of the SL Agenda for Change; (ii)- Developing and disseminating approaches and tools for mainstreaming DRR; (iii)- Providing training to stakeholders on the practical realization of DRR mainstreaming; (iv)- Supporting and accompanying the implementation/realization of the DRR mainstreaming by stakeholders at all levels.

5.4 Economic diversification to promote inclusive growth

Impacts of sectors on climate change and disasters in Sierra Leone

Sierra Leone also has national policies and legislation related to the environment, land management, mining, sustainable agriculture, fisheries and marine resources in order to promote effective environmental and natural resources management and achieve food security. In a bid to cope with the increasing demand of water and energy supplies in the major cities of the country and the urgent need to reduce climate change impact, Government is now reviewing its policy actions in those sectors. All these efforts are geared towards the protection and conservation of the country’s natural resources base and mitigate climate change and disaster impacts in improving the quality of the environment and livelihood of our people.

Environment Sector

The environment of Sierra Leone has been severely degraded as a result of unsustainable agriculture practices such as slash and burn agriculture, charcoal and fuel-wood collection, timber logging, improper waste management, unplanned urbanization, particularly in the capital city of Freetown. Other reasons included land degradation, deforestation, and loss of biodiversity, fresh water pollution and coastal erosion. Extensive damage is being caused to the ecosystems due to improper environmental management in the mining sector

Economic Sector

It is now evident that Sierra Leone like other developing countries is experiencing the negative impacts of climate change and variability. As reported in the national adaptation programme of action (NAPA) on climate change for Sierra Leone, poor communities have suffered most from the negative impact of climate change due to occurrence of extreme weather events including strong winds, thunderstorms, heat waves, etc.

This current situation is worsening by the negative effects of human-induced climate change causing an increase in the frequency and severity of disasters such as flooding and landslides in the country. Among other things, these disasters have and continued to cause loss of lives, severe disruption of social structures and materials losses, causing a severe economic and psychological burden to our nation. The ultimate result leads to poverty, poor health, slow pace of human development, injury to people, more especially the poor, and disorganization of their normal activities and diminishes their chances of improving their livelihoods.

Subsistence farmers have also suffered from poor crop yields due to changing rainfall patterns which in turn threaten food security and sufficiency.

Floods in the south and east of the country destroyed crops and increased droughts and caused water shortages in some areas of the country. In the Port Loko and Kambia Districts floodwater in 2003 and 2004 lasted for about a month. During this period a lot of destruction is done to newly planted crops particularly rice. In some areas the floodwater can be more than one metre deep. Not only are the valley bottoms flooded but the nurseries up the slopes can also be affected.

In 2006 there were shifting and erratic rainfall patterns which caused acute water shortage in Freetown and its environs. This affected the populace in varying dimension. The city experienced cholera outbreak, school children were intermittently late for school due to low accessibility of adequate drinking water. Water had to be rationed for the inhabitants of the city. In that year GUMA dam recorded the lowest volume of rainfall.

A series of flash flood events were recorded as a result of changing rainfall patterns and variability. In 2008, a rolling boulder killed people in New England Ville and the Kroo Bay

became flooded. On Monday 20th April, 2009 flooding also hit the Susan's Bay and Mabela Communities, east end of Freetown. Coastal communities along Lakka and Hamilton have also witnessed flash floods which resulted to destruction of their settlements and properties.

In September 2009, extreme weather events also resulted to land and mudslides in different parts of the western area especially at the Granville Brook valley and New England Ville which left a number of people dead and properties worth millions of leones destroyed. Frequent flash floods which resulted to crop and property destruction were also witnessed in Kenema and Moyamba districts.

Coastlands and sandy beaches of Sierra Leone have been affected by climate change due to sea level rise which is accelerating the rate of recession of sandy shores and destruction of coastal structures such as houses and the jetties along the coastline. The estimated population along the coastal areas at risk for 1m rise of sea level is about 2,315,860.

The effect of sea level rise induced by climate change is visible in coastal areas such as Yeliboya and Kortimor in the north, and in Shenge and Plantain Island in the south of the country. There are also visible signs of severe coastal erosion around Adonkia, Mahera Beach in the Lungi area, Conakry Dee and Eureka which resulted to the physical alteration of coastline and destruction of structures as well as displacement of people in coastal communities. The effect is that most the livelihoods of the people are threatened. In Shenge, Moyamba District, it has been recorded that the sea has eaten into the land by 100metres. Some government and private buildings are trapped under the flood water. At Lakka beach, the sea has eaten into the land by 41metres. This is considered as one factor for the collapse of guest complex structures by sea erosion. Below is the picture of collapsed building.

Due to sea level rise along the coastal low lying areas are visible signs of severe erosion around Adonkia, Mahera beach in the Lungi area, Conakry Dee and Eureka which resulted in the physical alteration of coastline and the destruction of structures. The land in Sierra Leone has the potential land cover of about 6% tropical wet forest, 49% tropical moist forest, 21% sub-tropical wet forest, and 23% sub-tropical moist forest.

Sierra Leone as projected in the Holdrige Life Zone Classification analysis, as a result of climate change due to projected decrease in precipitation and associated increase in bio-temperature, 60% of the country will be under tropical dry forest, 24% under tropical very dry forest, and 12% cover under sub-tropical moist forest particularly in the south and east of the country. This is reverse of the current situation and indicates a northward shift in the vegetation, that is, from tropical rain forest to tropical dry forest.

The Forest Gap Simulation scheme undertaken on twelve species indicate that there is an overall gradual increase in total biomass production.

There is no drought in Sierra Leone. What is becoming prevalent in Sierra Leone is Meteorological and Agricultural Droughts (Green Droughts) as seen in the rainfall patterns. Rainfall is below normal expectation (average) in a number of areas for an extended period especially in the (extreme) north notably, Kabala. Drought-like conditions prevails in such areas at the peak of the dry season between February and March. During these periods the water table becomes very low and moisture deficit can be experienced in the first 100 – 120 cm. In some areas some of the dug up wells dry up. It is not uncommon for wells up to 10metres deep to dry up. Most of the wells that were sunk by the erstwhile Magbosi Integrated Agricultural Project have dried up. No structured study on a national scale has been under taken on the hydrological dynamics on both surface and ground water. What is evident is that there is an apparent surface and ground water shortage. This affects crops considerably.

Agriculture, Forestry and Food Security Sector

A critical look at the profile of the agriculture and food security sector indicates that the sector is highly vulnerable to climate change and climatic variability. Increase in food production and security is another Government's top priority on its national agenda. Mechanisms have now been put in place to ensure that higher crop yields are obtained in order to reduce on food imports to save more foreign exchange earnings that could be used for other development programmes and projects.

In assessing the vulnerability and impact of climate change on the agriculture and food security sector in Sierra Leone, it has become clear that three key areas could be affected negatively (i) Land Management, (ii) Crops and Livestock Husbandry and (iii) Socio-economic Aspects of Agricultural Production.

Despite their large extent, rapid growth and increasing importance at the local, national and regional levels for the products and service they provide, forest are not afforded adequate prominence in forest policy, planning and research. There is a general lack of policies regulating and encouraging forest management, use and conservation. Ecological, silvicultural, and socio-economic knowledge regarding forests exists to a certain extent, and there is an increasing volume of research regarding restoration, rehabilitation and management.

Several factors and implementation constraints still render the sector vulnerable to climate change. Prominent among these are:- institutional constraints, land situation, agriculture activities, un-coordinated rural programmes, rural community needs, poverty and ignorance, disregard for traditional culture/values, inconsistent legislation and policies, mineral exploitation.

Energy Sector

The way in which we generate energy is probably the biggest contributor to greenhouse gases (GHGs) in Sierra Leone.

Although Sierra Leone like most developing countries is among the lowest emitters of GHGs, the country is still very much dependent on imported fossil fuels for power generation and transport needs. Most of the country also relies heavily on fuelwood and charcoal for their basic energy needs. Critically, there is need to increase energy supply and consumption to address poor access to energy. The net result is deforestation, land degradation and emissions of GHGs, the key drivers of climate change. The challenge is how to meet our development goals and play a part in the collective effort against climate change.

The country has taken a step in the right direction by completing the first phase of Bumbuna hydroelectric power plant with a capacity of 50 MW. The facility which was commissioned in late 2010 harnesses only a small fraction of the country's massive hydroelectric potential (approx 1200MW) and is now providing electricity to a large portion of the inhabitants of the capital city of Freetown. This development will lessen dependency on diesel powered machines and result in a reduction of the country's emission of GHGs.

The development of more hydroelectric power is being pursued and the government in cooperation with UNIDO, EU and the Chinese government is planning the development of three mini hydropower projects in parts of Western Area and in the Port Loko, Tonkolili and Moyamba districts.

The Ministry of Energy and Water Resources (MEWR) has formulated the National Energy Policy and one of the main objectives of the Energy Policy is the development of cleaner energy by fast-tracking the development of hydropower nationwide and exploiting other renewable energy resources including solar energy and biomass to reduce dependency on fossil fuels.

The MEWR has taken steps in developing the required framework and building capacity to address the challenges of climate change in the sector

Water Sector

The vulnerability of the water resources sector to climate change has been assessed in the Vulnerability and Adaptation Report contained in Sierra Leone's First National Communications on Climate Change. It is evident from the report that water resources will be affected by climate change if and when it happens. Various General Circulation Models (GCMs) have been used in developing climate change scenarios for Sierra Leone. The models predict an increase in temperature as indicated section 2 above. The increase in temperature will increase the amount and intensity of precipitation. An increase in rainfall could lead to an increase in surface runoff, resulting in flooding. On the other hand a decrease in the amount and intensity of rainfall may lead to drought.

5.5 Managing mineral and marine resources: hoping for a blessing rather than a curse

Mining Sector

In the mining sector, extensive damage is being caused to the ecosystems due to improper environmental management. Both large and artisanal mining operations have resulted in extensive land devastation, removal of the top soil cover, thereby rendering the land unsuitable for farming or other viable economic activities. Water air quality changes and siltation in tidal creeks/river systems affect maritime life and also drinking water resources of the communities living downstream. Mining carried out in hilly areas and slopes have resulted to severe erosion and flooding downstream. In certain instances, the activities of the miners divert surface drainage. The recent major mining activities by London mining, Africa minerals, Sierra Rutiles etc. should be environmental friendly and disaster free.

Fisheries Sector

The ocean is the natural carbon sink from thermal engines, burning of fuel wood etc. This accumulation of carbon has an effect on the seabed ecosystem and the natural primary productivity and eventually fisheries production.

Also changes in climatic condition can have profound effect on ocean's natural events like coastal upwelling which has a bearing productivity in the coastal area.

The bonding of carbon in the fisheries sector is difficult to quantify as this has to do with the ability of phytoplankton in the sea to absorb carbon dioxide from the atmosphere. However the adverse effect of climate change on fisheries cannot be overemphasized. According to study carried out by the Vulnerability and Adaptation group in the Initial National Communications on the impact of Climate Change on productivity, rising temperatures will affect the diverse species of fish and shrimp stocks of the EEZ of SL differently.

In this regard the measures which the fisheries sector has embarked upon are more of adaptation and range from policy to management options and can be listed as follows:

- Promotion of effective formulation and implementation of the fisheries strategic management plan
- Effective protection of spawning sites and fishing nursery areas
- Promotion of research and development
- Promotion of effective monitoring, control and surveillance of fishing grounds and fish stocks for sustainable exploitation

Marine life like life on the entire earth depends on a stable climate and any change in climate will be reflected in the species composition and location of the various marine communities. The current distribution of marine plant and animal communities is a reflection of how different

species and ecosystems have adapted to past climates. Future climate changes will affect the boundaries of ecosystems and the mix of species that inhabit them. This will have major implications for human activities particularly in fisheries and coastal formations such as mangroves and coral. The main marine biological communities can be defined in relation to seawater temperature and salinity, which are directly dependent on such climatic variables as precipitation and evaporation. When past climatic was substantially different from the present, as in the glacial and warm interglacial periods, there were major shifts in the distribution of marine plant and animal communities.

Coastal Habitats and Biodiversity

The collateral impacts of rising sea levels on the coastal zone will include shoreline recession, increased flood frequency probabilities, inundation of coastal lands and wetlands, and the salinization of surface waters and ground-waters. These impacts will in turn affect coastal habitats and biodiversity. In Sierra Leone, the retreat of the shoreline will result in significant loss of the mangroves of the Kambia district and elsewhere, strand vegetation, coastal swamps and the habitat of marine biodiversity (turtles, snails etc). The species of mangrove vegetation of risk from flooding and shoreline retreat includes *conocarpus erectus*.

The most vulnerable wetlands are those of the Kambia district and areas of the Western area (Freetown) i.e. Aberdeen creek which is one of the Ramsar sites in Sierra Leone.

The loss of beach will adversely affect the survival of intertidal organisms and those that make use of the sandy beaches at some stage of their life cycle e.g. the semi-terrestrial ghost crabs, *ocypoda cursor* and *O. Africana*. The marine turtles that could be impacted on are the leather back (*Dermochelys coiacea*), the hawksbill (*Erectmochelys imbricata*), green turtle (*Cheloniamyda*), the loggerhead (*caretta carretta*) and the most abundant of all olive ridley (*lepidochelys olivacea*).

5.6 Accelerating MDGs for Human Development

Health Sector

Climate change is already affecting the health of the people of Sierra Leone through an increased incidence of cold and cough as well as water and other air-borne diseases. This situation has been aggravated by the prevalence of HIV/AIDS that has negatively impacted on communities both rural and urban and jeopardizes their efforts in achieving food security and improved livelihood because of the burden of increased number of dependent orphans.

In the health sector, adaptation practices involve the improvement of health delivery services, water and sanitation, and the conservation of biodiversity which is critical to the sustainability of traditional medicine.

5.7 International competitiveness

The GHG emission level in Sierra Leone is very low compared to other countries which qualifies the country to access the carbon credit facilities and funds. Such fund could be used to develop renewable energy for productive use and increase access to modern energy in Sierra Leone, thereby supporting the sustainable energy for all (SEFA) goals of the country.

5.8 Employment and Labor Strategy

The Sierra Leone unemployment figures for age groups of 25-44 and 45-65 have been fluctuating, unemployment for the youth (15-24) have been continuously on the increase and thus poses a major threat to security. This threat is further compounded given that every year university graduates add up to the pool of unemployed since the absorptive capacity of the formal /public sector is almost at its brim.⁴⁶

Poverty is a catalyst for most social hazards. Most social amenities are beyond the reach of most Sierra Leoneans. Majority of Sierra Leonean lived below the poverty line. As a result of poverty they resort to exploitation of natural resources unabated as well as using illegal means for their survival.

Sierra Leone had lagged behind in almost all dimensions of development over the last three decades. Data collection on labour and poverty indicators in the country is at a nascent stage. Household and labour force surveys are the sources of the calculation of the poverty line and the corresponding indicators of income poverty and labour market information respectively.

5.9 Social Protection

Biodiversity

Sierra Leone's biological diversity is prone to drought, dry spells, temperature fluctuations and changes in precipitation patterns leading to changes in habitat. The status of wild life in our National Parks and Game Sanctuaries shows that many forest birds and game animals have declined in numbers even to the extent that some species have been decimated to a vulnerable and endangered status. The terrestrial and aquatic areas of the country support a large number of diverse biological populations, both plants and animals. Notwithstanding insufficient baseline information on biological resources, it is believed that uncontrolled exploitation and mismanagement have caused a significant depletion of terrestrial and aquatic species diversity. Over-exploitation of some very common and endangered species in an unwise manner has led to their being reduced to a vulnerable and endangered status.

⁴⁶ National hazards assessment profile of sierra leone, FBC; 2004.

5.10 Governance and Public Sector Reforms

- Creation of Centre for Climate Change Research
- Institutional Strengthening of the Line Ministries and Agencies
- Capacity Building of Target Communities
- Incorporating Climate Change Training in the School of Environmental Services in Njala University
- Capacity Building in the Government Information Services
- Policy Reforms in the Implementation of UNFCCC
- Implement Practical Aspects of the UNFCCC

Non-governmental Interventions

Since April 2007, Conservation society of Sierra Leone (CSSL) in collaboration with Birdlife International and the Royal Society for the Protection of Birds (RSPB) has been implementing a project titled “Conservation in the face of Climate Change: Developing an Adaptive Management Framework (AMF) for the conservation of birds and other biodiversity across Africa”. The project specifically is (1) to develop a national Protected Area system for high-biodiversity sites across Sierra Leone using the Important Bird Area network, (2) to refine and progress implementation of the Gola Forest Programme as a model case-study region and (3) to develop an country-wide knowledge-exchange facility for climate change and biodiversity information and research.

To determine the likely impacts of predicted climate change on birds within Important Bird Areas (IBAs or KBAs), CSSL has organized site-based workshop on Adaptation to Climate Change in the Gola Forest and the Yawri Bay coastal zone area in order to engage with key stakeholders from government agencies, academic institutions, local communities and civil society to develop an adaptive Management Framework and a national Protected area system approach for the conservation of the designated KBAs and IBAs (including potential Marine Protected Areas –MPAs- in the face of climate change and to assess future information needs.

5.11 Mainstreaming Constraints

- Weak mechanisms for coordinating climate change issues at the grassroots level
- Inadequate capacity for effective coordination, mainstreaming and financial resources.
- Policy analysis and development management including the assessment of alternative promoting economic development.
- Technology cooperation including that related to technology transfer and know-how.
- Majority of the people in Sierra Leone still lack a sufficient understanding of environmental issues to enable them to relate problems of agricultural yields, droughts, water scarcity

among others to climate change. Therefore, it is important that people are educated on climate change and disaster issues that affect their lives.

- There is still a considerable lack of awareness of the interrelated nature of human activities and the environment, due to increase or insufficient information.

5.12 Mainstreaming Recommendations

The table 4 below outlined the recommendations of mainstreaming the climate change and disaster management issues.

Table 4: Mainstreaming Recommendations

Sector/themes	Problem/Issues or Source	Policy Recommendations / Illustrative Interventions
BROWN AGENDA (Management of the Built Environment)		
Rural and Urban (Settlements)	<input type="checkbox"/> Water contamination <input type="checkbox"/> Water availability/scarcity <input type="checkbox"/> Living Conditions <input type="checkbox"/> Illegal settlements	<input type="checkbox"/> Develop and implement Strategic Urban Development Plans <input type="checkbox"/> Develop and implement Village, Town and City Physical Plans <input type="checkbox"/> Ensure community ownership of water resources and sanitation projects
Water Resources/ Management	<input type="checkbox"/> Water pollution <input type="checkbox"/> Water scarcity <input type="checkbox"/> Water use conflicts <input type="checkbox"/> Access to safe drinking water <input type="checkbox"/> Poor sanitation	<input type="checkbox"/> Integrated water resources management <input type="checkbox"/> Enhance water basin management principles <input type="checkbox"/> Public-private partnerships <input type="checkbox"/> Water supply and sewerage master plans/projects <input type="checkbox"/> Closer cooperation between key ministries in Sanitation issues
Solid waste management	Uncontrolled disposal of solid waste Public Health hazards	<input type="checkbox"/> Implementation solid waste management programmes <input type="checkbox"/> Promotion of waste reduction practices and recycling activities <input type="checkbox"/> Review Environmental health issues
Air and Noise	Green House Gases Environmental health hazards	<input type="checkbox"/> Awareness raising <input type="checkbox"/> Forest conservation programmes

		<input type="checkbox"/> Innovative climate change projects
Energy (Climate change)	<input type="checkbox"/> Power shortages <input type="checkbox"/> Excessive Use of firewood, Charcoal <input type="checkbox"/> Insecure and unreliable energy supplies	Enhance accessibility, equity, energy conservation of non-renewable energy, alternative sources of energy, management of adverse impacts of energy development project
Industry	Effluent pollution Waste disposal	<input type="checkbox"/> Cleaner production concept <input type="checkbox"/> Promoting more efficient/environmental friendly technologies
GREEN AGENDA (Natural Resources Management)		
Biodiversity, Natural and Cultural heritage	<input type="checkbox"/> Loss of biodiversity	<input type="checkbox"/> Review wildlife act and harmonization of legislation <input type="checkbox"/> Review institutions <input type="checkbox"/> Implementation of protected areas programmes <input type="checkbox"/> Enhance operationalisation of Wildlife Management Areas
Coastal and Marine Resources	<input type="checkbox"/> Declining harvests of marine and coastal living resources <input type="checkbox"/> Loss of coastal and Marine biodiversity <input type="checkbox"/> Coastal pollution <input type="checkbox"/> Beach (coastal) erosion	<input type="checkbox"/> Protection of marine resources <input type="checkbox"/> Implementation of the integrated coastal zone management project <input type="checkbox"/> Investigate alternatives to use of sand in construction
Fisheries & Marine resources	<input type="checkbox"/> Decline of fisheries stock	<input type="checkbox"/> Review fisheries act/Decree <input type="checkbox"/> Revisit deep sea fishing issues <input type="checkbox"/> Review artisanal fishing issues
Forestry	Deforestation Forest degradation Biodiversity loss Mangrove loss Illegal logging Weak forest governance	Enhance Participatory Forestry Management including formation of Village Forest Reserves Regulate use of commercial charcoal burners and promote the use of efficient wood burning stoves Strengthen forest fires control measures Study and promote use of non-wood forest products Promote better forest law enforcement

		Innovative climate change projects
Mining	The impact of mining on environment (efficient use of energy and water, impact on human health, landscaping issues, etc)	Application of regulations Environmental monitoring and enforcement Cleaner production practices
Agriculture	<input type="checkbox"/> Land degradation <input type="checkbox"/> Loss of agro-biodiversity <input type="checkbox"/> Biosafety (potential risks to human health, etc)	<input type="checkbox"/> Reduce the use of water and agro-chemicals in agriculture. Increasing agriculture production per unit area; <input type="checkbox"/> Reducing agricultural risks to the health of air and the atmosphere; <input type="checkbox"/> Reducing agricultural risks to the health of water resources; <input type="checkbox"/> Reducing agricultural risks to the health of soils; and <input type="checkbox"/> Ensuring compatibility between biodiversity and agriculture
Land Resources	<input type="checkbox"/> Desertification <input type="checkbox"/> Land degradation	<input type="checkbox"/> Undertake a detailed assessment of the land resources base <input type="checkbox"/> Study the land tenure system <input type="checkbox"/> Prepare land use plan <input type="checkbox"/> Conserve and improve soil fertility <input type="checkbox"/> Assess range land activities

Source: MLCPE, EPA, DM, MET, MAFFS; 2012

6.0 ROADMAP FOR EPA AND ONS TO FULLY CAPACITATE THE MANAGEMENT OF CLIMATE CHANGE AND DISASTER MANAGEMENT

6.1 Introduction

At present, there is no national institution that formally coordinates the effective implementation of the recommended actions of national climate change documents such as the Initial National Communications (INC), Second National Communications (SNC) on climate change and the national adaptation programme of action (NAPA) for climate change in Sierra Leone. These documents are the national blue prints of the Convention to enable us meet our obligations and objectives of the United Nations Framework Convention on Climate Change (UNFCCC) and its associated Kyoto Protocol. These documents need to be summarized in brochures and bulletins to enable the public and pupils/students in schools become aware of the existing climate change situation in Sierra Leone.

The implementation of our national adaptation programme of action (NAPA) and national appropriate mitigation action (NAMA) is a good starting point for addressing the climate change challenge without compromising development objectives. This will promote green growth and provide green jobs.

In order to ensure effective implementation of the above mentioned climate change documents and Sierra Leone to meet its obligations to the UNFCCC and its Protocol as well as the Bali Action, the government has given the responsibility of establishing a National Secretariat for Climate Change (NSCC) to the Environment Protection Agency Sierra Leone.

There is also need to have a national climate change policy and strategies and the regulation of climate and carbon trading issues in Sierra Leone. The development of a draft national climate change policy to address climate change problems and issues is near completion.

There is also need to promote awareness rising countrywide on climate change issues and building partnerships among government departments, NGOs and local authorities (e.g local councils) in addressing climate change related issues.

Both national and international training in climate change adaptation and mitigation and risk assessment need to be provided to build the capacity of staff of NSCC and government departments and local councils.

Sierra Leone aligns herself to the African position before Copenhagen from the African Negotiators coordination meeting in Addis Ababa which amongst others called for:

- The extension of the implementation of the Kyoto Protocol beyond 2012.
- Focusing on the need for effective capacity building and to equitable and transparent financing

-To undertake climate solutions within the context of Africa's development needs in order for these solutions to be effective

-Support of Africa's priorities in the negotiations: adaptation, capacity building, technology transfer, financing, and knowledge sharing.

In fulfilment to Eco-Development, it will strategic for the PRSP111 builders to focus on the following:

- Development and implementation of Land Use Plan at levels;
- Demarcation of already identified catchment areas,
- Harmonization and implementation of Legislations on the management of Disaster Prone areas; and
- Complete and implement Strategic Environmental Assessment on all Sectors

6.2 National Greenhouse Gas Inventory

Sierra Leone has satisfactory activity data in most of the economic sectors of the country e.g. Energy, Industrial, Agriculture, Land Use Change and Forestry and waste management. Some of the equipment used in industrial sector are so old that the labels on them fade out or are non-existent. This makes estimation from the industrial processes difficult. Additional surveys on savannah burning, crop residue management and livestock numbers will be undertaken. Data on fuel wood needs improvement as a result a nationwide survey on fuel wood consumption is to be conducted especially during the wet season to compliment that done during the 1993 dry season. Solvent and other product use category of 1996 revised IPCC guideline has not been reported on because the methodology for this is still being developed. It will become useful in the preparation of the SNC.

All emission factors (EFs) used in the Inventory Report contained in the INC were default values presented in the 1996 IPCC Revised Guidelines. The GEF/UNDP Regional Project "Capacity Building for improving the quality of Greenhouse Gas Inventories (West/Central Africa Region)" is working towards the development of some Regional emissions factors. These factors will become very useful in the development of the inventory of the Second National Communications (SNC) thereby improving its overall quality. Sierra Leone is actively considering to developing EFs which are appropriate to the country to improve the SNC.

Where feasible, validation of EFs should be conducted for the main emission categories so that the quality and reliability of the GHG inventory is improved.

As there is now a new 2006 IPCC guidelines for the development of national Inventories in place, Sierra Leone through the NCCC will take advantage to train the greenhouse gas inventory task force by organizing national workshops with the help of a National and an International Consultant for the Second National Communications (SNC).

6.3 Greenhouse Gas Mitigation Assessment

Basic data for the analysis of Mitigation options is available in Sierra Leone. Because of time constraint, the task force assigned with the development of the mitigation study during the INC could not execute some of the available analytical tools (EXCEL, COMAP, LEAP (long range energy alternates planning) and EEPP (energy and environment power planning). The INC training did not cater for a resource person to undertake the economics of climate change and specifically as related to mitigation assessment. The mitigation task force of the SNC will deal with the economic issues of climate change by conducting a national mitigation workshop involving all relevant stakeholders in the country with the assistance of a consultant.

Emissions projections will be assessed to about 2050 and the mitigation analysis will be conducted for the same period. There is also need to update and revise all details made under the INC.

6.4 Vulnerability (Impact and Adaptation) Assessment

The technical expertise of the NCCC should be developed to execute climate change scenario development tools (GRADS, SENGEM, IMAGE, etc) and biophysical models (DSSAT, WATBAL Holdridge and Forest Gap etc) in the assessment of vulnerability (impacts and adaptation) of the economy to climate change.

The SPUR2, DSSAT models were not executed because of limited time and expertise of some of the members assigned for this exercise. In the forestry sector only six of the twelve species identified were simulated.

- prepare and adopt a national programme and strategy for research and systematic observation and early warning system with special focus on natural disasters (drought and floods).

- Strengthening of the climate data base of the national meteorological services and other relevant sister institutions of the country. This can be done by providing up to date computer facilities and train experts in the input and storage of climate related data.

- Provide automatic recording equipment and instruments for continuous recording of meteorological, hydrological and climatological elements and phenomena.

- Rehabilitation and expansion of meteorological stations for the collection and monitoring of all categories of data.

- Capacity building in Human Resource in the Meteorological department should be urgently embarked upon to meet the present and future challenges.

- Education and sensitization of the public on climate change issues should be intensified and given high priority.

- Create a National Climate Change Secretariat which should meet frequently to advise the Government and stakeholders on Climate Change issues.

- The need to intensify Research on Climate Change issues in collaboration with the universities and other institutions in the country and also with Regional Global organizations/Institutions in the fields of climate change.

6.5 Roadmap for the National Climate Change Secretariat

- Strengthening the climate data base of the Meteorological Department
- Rehabilitation and reopening of more climate data collection and monitoring stations
- Training of Personnel
- Speeding up the department's semi-autonomous process of the Agency creation
- Provision of necessary logistics and incentives for this highly scientific discipline for expected service delivery
- Education, Training and sensitization of the public on climate change issues
- Creation of an independent National Climate Change Committee and Secretariat with all stakeholders involvement to include Climate issues in the country's governance structures.
- Undertake Climate Research with line institutions and other interested parties

6.6 Roadmap Strategies

Outlined below are some of the strategies that will aid EPA and ONS in enhancing the management and operations of climate change secretariat and disaster management activities.

Strategies to limit Greenhouse Gas Emissions

- Use cleaner energy sources and technologies to reduce emissions of carbon dioxide and other pollutants that cause acid rain and other environmental problems.
- Improve energy efficiency so as to reduce its demand and hence the amount of carbon dioxide produced during energy generation.
- Improve forest management, expand forest areas, and encourage tree planting to increase the size of carbon sink in the country.
- Adapt agricultural practices which reduce emissions of methane and nitrous oxide

Strategies to Reduce the Impact of Climate Change

- Develop emergency and disaster preparedness policies and programs.
- Improve the efficiency of natural resources use to minimize the impact of Climate Change on food security, water supplies and biodiversity.
- Adaptation fund established under the UNFCCC to be operational.
- Determination of a clear plan of action on how industrialized countries should meet their commitments towards reducing their GHGs emissions and how developing countries will be assisted in meeting the adaptation needs during the implementation of their NAPAs.
- Provision of a clean and energy-efficient urban transportation and railway transport system to save energy, reduce carbon emissions and cut costs.
- Financial incentives for 'green' transportation
- Procurement policy that is environmentally friendly
- Promote and support sustainable agricultural practices.

- Support the Bali Roadmap through forest conservation practices and reduce emissions from deforestation and forest degradation (REDD).
- Promote the use of strategic environmental assessments and environmental impact assessments for sustainable utilization of natural resources and integration of climate change adaptation in development policies, programmes and strategies
- Industrialized countries to strengthen the carbon market and commitments of reducing their GHGs emissions.
- The implementation of effective carbon trading, payments for ecosystems services a benefit sharing schemes as an incentive to local stakeholders in Sierra Leone.

6.7 Disaster Management Roadmap

Considering the country current situation in terms of hazard and vulnerability, the country needs to be ready and capable: *to respond appropriately to localized disasters to avoid them becoming national scale disasters and to national scale disasters that can possibly happen now, considering the importance certain hazards and vulnerabilities; and *to avoid that existing risks become disasters and potential risks become real risks;

As risks are often localized and given the current level of capacity at the central level for DRM in general and for response especially and given the low level of DRM capacity at local level and decentralized level that might rapidly be exceeded in case of important disasters even localized, requiring the direct intervention of the central level, we therefore need to take the following steps: 1)- strengthening DRM mechanism and effectiveness at the local level, 2)- strengthening DRM mechanism and effectiveness at central level, and finally 3)- strengthening the overall national coordination mechanism from the central level, are key priorities which should need to be addressed in parallel.

The following six (6) Strategic actions are then proposed:

- 1)- Strengthening the overall national DRM coordination and key mechanisms ;
- 2)- Strengthening the response capacity and readiness of the central level ;
- 3)- Optimizing Community based Local Level Disaster and Risk Management (DRM) and Adaptation to Climate Change (ACC) ;
- 4)- Strengthening disaster prevention and risk reduction implementation and status in the country;
- 5)- Strengthening knowledge and understanding of DRM and ACC countrywide;
- 6)- Optimizing risks knowledge and surveillance, and early warning system (EWS) multihazard.

6.8 The Durban Meeting

As a way forward, the recent concluded DURBAN meeting agreed that the climate change negotiations should be delivered on the following platform:-

- As part of the shared vision, the call of over 100 countries and many civil society groups and movements for warming to be kept well below 1 or 1.5C must be acted upon; developed countries must peak their domestic emissions in the shortest possible time and become carbon neutral well before 2050, developing countries must have equitable access to global atmospheric space.

- The principle of just transition adopted in Cancun as part of the shared vision must be strengthened and operationalised through, among other things, the adoption of concrete measures in all fundamental elements of the international regime on climate change that support structural economic transformation in Africa and ensure a socially just and equitable global response to climate change. In this regard, we support the call for LDCs to be given the mandate to oversee the operationalisation of just transition and report on progress at all Conferences of the Parties.
- Developed countries must halve their emissions by 2017 through all available domestic measures. These must be undertaken in accordance with their legally binding obligation to adopt a second commitment period starting in 2013 under the Kyoto Protocol. The United States, which has been outside the Kyoto Protocol, must adopt “comparable” efforts in scale, legal form and compliance under the Convention. Developed countries must close all accounting loopholes relating to market mechanisms, land-use, surplus allowances and marine and aviation transport, which threaten to undermine their contribution by demonstrating reductions “on paper” without delivering them in practice.
- Developing countries should undertake ambitious nationally appropriate mitigation actions to the extent they are enabled and supported by finance, technology and capacity as legally required from developed countries. Oversight and review of developing country mitigation actions must reflect their responsibilities and capabilities and thus be substantially less onerous than for developed countries.
- Existing carbon market mechanisms in the Kyoto Protocol as well as proposals to create new carbon market mechanisms under the Convention, both generally and in relation to forests management (REDD) must be discontinued, and the use of market mechanisms ultimately eliminated.
- Financial resources under the Convention must come from public sources and should not provide a means by which developed countries shift the burden of mitigation further to developing countries, thereby appropriating an even greater share of the Earth’s limited remaining atmospheric space.
- Climate change presents a fundamental threat to agriculture in Africa and elsewhere. Developed countries must not be allowed to shift attention from emission reductions in their own highly industrialized, subsidized and polluting agriculture sector towards mitigation in developing countries. Efforts to connect soil carbon to carbon markets must not be allowed as they threaten to transfer rights over the soil of the poorest farmers in developing countries, to the richest financial institutions and most polluting corporations in developed countries, to enable those countries to continue emitting the climate pollution that threatens food security in Africa.
- Addressing agriculture and climate change in developing countries must emphasize food security and sovereignty, farmers’ rights and rural livelihoods, and focus on adaption, public finance and the transfer of appropriate technologies.

- The effect of response measures taken by developed countries must be evaluated for their economic, social and environmental consequences on all developing countries. Climate measures must not be used as a means of arbitrary or unjustifiable trade discrimination. The spill-over effects of developed countries' policies must be minimized and fully compensated, while also addressing other fundamental challenges relating to a just transition, the elimination of poverty and sustainable development.
- Adaptation is a central priority for Africa and for all developing countries. The people of Africa-including workers, farmers, women, indigenous peoples, and other affected groups must be fully compensated for the adverse impacts of climate change, for the costs of avoiding impacts wherever possible, and for lost opportunities for development. Mechanisms to address loss and damage must address adverse impacts to agriculture and other sectors in Africa. Developed countries must pay their adaptation debts, while "adapting" their own lifestyles to reduce climate pollution and minimize future impacts on Africa. There must be an Adaptation Committee that is fully supportive of, and responsive to the needs of, African and other developing countries.
- The technology mechanism established in Cancun, including an executive committee, centres and network, must be forged into an effective constellation of institutions, including technology centres in each country, with clear reporting and accountability to Convention Parties. Patents and other intellectual property rights that inhibit the transfer of accessible, affordable, sound and adaptable technologies to developing countries must be removed, and domestic capacities and technologies in developing countries enhanced.
- Developed countries must provide financial resources to address their climate debts and implement their commitments under the Convention. The \$30 billion pledged as "fast start" finance has emerged as neither new nor additional, but as largely repackaged official development assistance. The \$100 billion pledged to be mobilized offers a start, but as an ultimate level of financing for 2020 is arbitrary, inadequate and inconsistent with the requirements of the Convention. "We therefore support the African Group's call in Copenhagen for immediate funding of "150 billion in Special Drawing Rights, \$400 billion in short-term finance, and 5% of Annex 1 GNP in longer-term finance". In addition, mechanisms must be established to evaluate the necessary scale of finance; clarity provided over the sources of funds; "innovative sources" evaluated for their incidence on developing countries; and the Green Climate Fund and Standing Committee established in Cancun must be fully operationalized. The role of the World Bank as interim trustee of the Green Climate Fund must be narrowly defined, and it must have no further role in the Convention's financial architecture.
- Finally, the system of binding emission reductions for developed countries must be continued and extended. The United States and other wealthy countries must not be allowed to replace the agreed science, equity-and rules-based system being negotiated under the Kyoto Protocol with a weak system of domestic pledges that are not negotiated, not binding in international law and not subject to robust oversight and compliance.

7.0 ACTIVITY AND INVESTMENT PLAN OF ACTION FOR CLIMATE CHANGE AND DISASTER MANAGEMENT WITHIN THE PRSP111.

7.1 Introduction

In a bid to address climate change adaptation in Sierra Leone there is need to consider the inclusion of the following identified priority activities of the National Adaptation Programme of Action (NAPA) for climate change and that of the disaster management activity and investment plan into the PRSP111. These plans are shown in ANNEXS 1, 2 & 3.

a) Agriculture Sector

1. Develop irrigation and land drainage system for agriculture;
2. Develop and implement agricultural land-use and land cover management;
3. Promote swamp land farming.
4. Development of Inland Valley Swamps for Rice Production in the Moyamba District.
5. Development of Irrigation and drainage systems for agricultural production in the Bombali District.

b) Forestry Sector

1. Establish forest reserves, protected Areas and National Park/Sanctuaries and redemarcate existing ones in order to maintain their integrity;
2. Management and protection of forests reserves and catchments areas including wetlands and reduce dependence on firewood and charcoal by using liquid fuel (LPG) and bio fuels (ethanol/methane/oils).
3. Establishment of new Forest Reserves, Protected Areas and National Parks in Sierra Leone.
4. Management and Protection of Forest Reserves and Catchment areas in Sierra Leone including Wetlands.

c) Water/Hydrology Sector

1. Improve water research, monitoring and management;
2. Improvement of the efficiency of existing water supply systems in both urban rural areas;
3. Promote rain water harvesting and develop an integrated management system for fresh water bodies.

d) Coastal Zone

1. Develop an Integrated Coastal Zone Management Plan;
2. Rehabilitate degraded coastal habitats in the Northern Province/Kambia District;
3. Develop and enact appropriate policies and regulations relevant to the development of coastal communities, urban growth planning, and wetland preservation;
4. Establish a National Sea-Level Observing System in Sierra Leone;
5. Delineation and Restoration of Vulnerable Habitats and Ecosystems in the Western Area of Sierra Leone.

e) Fisheries Sector

1. Promote sustainable fishing practices and develop aquaculture;
2. Improve weather forecasting and develop marine meteorological services;
3. Preserve and restore essential habitats;

4. Promote conservation and environmental education.

f) Health Sector

1. Increase the use of insecticide treated materials (ITMs) as a key strategy in malaria control;
2. Support HIV/AIDs prevention activities; and
3. Develop appropriate sanitation programs.

g) Meteorology Sector

1. Establish a National Early Warning System;
2. Improve research and weather forecasting capabilities and rehabilitate national weather stations as well as educate meteorological department personnel to forecast and inform about particular dangerous or extreme events;
3. Raise public awareness and mainstream gender perspectives into climate change issues;
4. Foster cooperation with International Conventions and Programmes.

h) Energy Sector

1. Promotion of the use of renewable energy (Solar Energy) in Sierra Leone and improvement of energy efficiency and conservation of energy resources.
2. Promote the use of renewable energy (solar energy) and improve energy efficiency and conservation by retrofitting existing and future structures;

7.2 Institutional Strengthening, policy and legislative framework.

1. Establishment of a National Secretariat for Climate Change
2. Formulation of a national climate change policy, response and strategy
3. Development of regulations and By-Laws to the legislation for the environmental protection and sustainable development, including control of deforestation, firewood collection, charcoal production; waste management; and promotion of appropriate technology, agro-diversity, Water and soil conservation; and environmental impact assessment, biodiversity conservation and efficient energy use.
4. Provision of capacity building of the NSCC in the Environment Protection Agency Sierra Leone, Meteorological Department and Disaster Management Department through training of personnel for the country's adaptation to climate change
5. Rehabilitation & Reconstruction of meteorological/climate monitoring stations throughout the country for advocacy, data collection, analysis, monitoring and evaluation;

7.3 Environmental Education and awareness raising on climate change related issues

1. Sensitization and awareness raising campaigns on climate change impacts on youths and women relating to the three conventions of biodiversity, desertification and UNFCCC.
2. Enhancing environmental awareness and active involvement of NGOs and local communities in environmental protection and management and climate change related programmes

7.4 Development of an Integrated Natural Resources and Environmental Management programme for Sierra Leone. This is shown in annex 2.

8.0 PROPOSED STRUCTURAL ARRANGEMENTS IN ADDRESSING CLIMATE CHANGE AND DISASTER MANAGEMENT

8.1 Proposed structural arrangements in addressing climate change in Sierra Leone

Quite recently, the Environment Protection Agency Sierra Leone launched the Environmental Governance and Mainstreaming Project. One of the major components of the project is to establish a National Secretariat for Climate Change (NSCC) in Sierra Leone, a responsibility assigned to the Agency by the Office of the President. The NSCC will be headed by a National Coordinator whilst the National Climate Change Advisory Committee (NCCAC) will have the oversight responsibility of the Secretariat.

The NSCC will ensure that the outcomes on the decisions of the Conference of Parties to the UNFCCC are conveyed to the Government and all parties involved in addressing climate change issues and problems in the country, and the publication of the decisions of the Conference of Parties and the sensitization of the public on climate change issues.

The NSCC will also ensure that a public forum and radio and television programmes be held to inform government and the public on the outcomes of the yearly meetings of the Convention. The issues relating to Clean Development Mechanism (CDM) to attract investment and establish an effective regulatory framework for projects approval for use of the adaptation fund and other Climate Change Green Fund will be addressed to reduce climate change impacts to our vulnerable communities.

The NSCC will also ensure that climate change adaptation and mitigation are mainstreamed into national development planning and budgeting. The linkages between climate change, environment and development, and how climate change is both an environmental issue and development issue will be properly addressed to move to climate-resilient and low-emission development in order to achieve sustainable development and the millennium development goals, particularly environmental suitability.

The NSCC will also ensure resource mobilization of climate financing and advocate for the integration of climate change into the national planning process of national programmes and projects.

The NSCC will promote the development of required procedures for Reduced Emissions from Deforestation and Degradation (REDD), REDD-Plus and Non-REDD Carbon Trading and Clean Development Mechanism (CDM) projects.

The NSCC will also ensure the formulation of guidelines for climate change projects approval and establishment of a measurement, reporting and verification (MRV) mechanism for reporting mitigation actions taken and reported through our national communications to the UNFCCC Secretariat.

The NSCC will also provide for institutional strengthening and capacity building for the country's adaptation and mitigation efforts to climate change.

NCCAC also oversees the work of three Working Groups namely the International Negotiations Working Group (INWG), Long Term Emissions and Mitigation Working Group (LWG) and the Resilience Working Group (RWG). The International Negotiations Working Group (INWG) will work out our strategy in the international climate change negotiations under the UN Framework Convention on Climate Change. The Long Term Emissions and Mitigation Working Group (LWG) will study how Sierra Leone can stabilize its long term emissions and the Resilience Working Group (RWG) will study our vulnerability to the adverse effects of climate change and develop long-term plans to ensure that Sierra Leone is able to cope with climate change.

8.2 Proposed Structure of a Disaster Management Commission or Agency in the Office of the President or Vice President.

Establishment of the Disaster Management Department/ Agency into a separate agency/commission should be the way to go, if disaster risk reduction / effective response is to be achievable. According to the National Security and central Intelligence Act 2002, the ONS is given the mandate to be GoSL's primary coordinator for the management of national emergencies such as disasters, both natural & man-made. This responsibility had been, over the years, ably carried out by the ONS, along with its wider security responsibilities.

Making the Disaster Management Department a Separate Government Agency.

The current institutional arrangements are such that the Disaster Management Department lies within the Office of National Security. **Section 18, sub-section 1V of the National Security and Central Intelligence Act 2002** gives the Office of national Security to be 'GoSL's primary coordinator for the management of national emergencies such as disasters, both natural and man-made'.

Since the inception of the programme in 2004, the ONS had provided institutional direction and the much needed support required during those early years of its development. Whilst the department had benefitted immensely from the strategic direction and propping provided by the ONS especially during those early years of the department's establishment, it has now become clear that the complexities of the job and the responsibilities that come along with that cannot merely be handled by a small unit within an organization.

What is recommended rather is a transformation of the department into a full blown Agency or Commission, with its own budgetary allocations. Most importantly, because of the level of commitment and support required by such an Agency for effective delivery, it may be necessary for this unit to be placed under the office of the President or the Vice President. Amongst other things, such arrangements could allow for the agency to be capacitated in terms of human, financial and logistical requirements such as machinery, transportation etc. for its effective operations.

At the moment, there are only six (6) staff officially assigned to the department at ONS. Whilst there are constraints in terms of the available human resource, recruitment of additional personnel could only be made within the limitations of the ONS' recruitment strengths. As such, the few staff in the unit have been over-stretched and over-burdened with the pressure of work, as against the available human resources.

Best practice across the world and in Africa in particular have shown that disaster management agencies function best under the Office of the President, Vice President or the Prime Minister , as the case may be, thus allowing for increased political commitment for enhanced effectiveness. For better delivery, these structures are usually well decentralized and replicated at all levels, national, provincial, district and chiefdom levels. Transformation into an agency could go a long way to ease off such pressure and make the office more effective and efficient in service delivery.

REFERENCES

Allport, G.M., Ausden, P.V. Hayman, P, Robertson, P. and Wood, P 1989. The conservation of the birds of Gola forest, Sierra Leone. Report of the UEA-ICBP Gola Forest Project (Bird Survey), October 1989 to February 1989.

Aqua Terra Consulting, 2003 Environment and Social Impact Assessment

Biodiversity Strategy Action Plan. 2002 Biodiversity and of the Sustainability of the use of Biological Resources in Sierra Leone. Action Plan Report. MCHE. Freetown.

Birchall C.J., Bleeker P, and Cusani-Visconti C. 1979. Land in Sierra Leone: A reconnaissance Survey and Evaluation for Agriculture. LRSP Technical Report 1.

Bomah, A.K. S.S. Sama ,1990, “Deforestation and Soil Degradation in Sierra Leone: The role of forest removal in upland Erosion in a Rural Catchments under multiple uses”. International Journal of Ecology and Environmental Sciences 16, 97 – 105.

Bomah, A.K. 1992 Indigenous farming and Land Degradation in Sierra Lone: A Case Study of Sierra Leone Upland Farmers, Social Science Research.

Chaytor D.E.B 1990 Pictorial Identification of Species of Fish taken in the Artisanal Catches. Institute of Marine Biology and Oceanography (IMBO/FBC). Freetown, Sierra Leone.

Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability,

Cole, N.H.A. 1968 The Vegetation of Sierra Leone. Njala University College Press, Sierra Leone.

Concept Note , DM, (2012) ; on disaster risk reduction and risk management in Sierra Leone.

Concept Note on the SNC on Sierra Leone, 2012.

Conservation society of Sierra Leone 1993 “Wildlife and nature Reserves in Sierra Leone of Support from German Embassy, Freetown.

EC Country Strategy Support, February 2005, Cooperation between the European Union and the Republic of Sierra Leone Final Joint Annual Report 2003

Economic Commission for Africa 2000, Food Security and Sustainable Development Division, Population, Agriculture Environment in Africa: Some Key Indicators, Addis Ababa.
ECA/FSSDD/03/07

EM-DAT: The OFDA/CRED International Disaster Database- www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium" – Nov 2011

Environmental Health Unit, Ministry of Health and Sanitation, Medical Statistics 2004

ESCG, 1988. Environmental and Scientific Consulting Group. The Study of Watershed Degradation in Sierra Leone., Final Report, National Aid Coordinating Secretariat , Freetown, Sierra Leone.

DACO 2006: Sierra Leone encyclopedia 2006

Davies A. G. and Palmer P. 1989. Conservation of Forest Resources in Sierra Leone. Report for the Joint FAO Inter-Agency Forestry Sector Review of the Tropical Forestry Action Plan. 18pp.
Davies G and Richard P: 1991 Rainforest in Mende Life

Diara, M.A. and Koroma S.D. 1995, Population Projections and Policy Implications of the 1985 Population Census. National Population Commission, Freetown.

Global Environment Facility, 2001. A Guide for Self- Assessment of Country capacity Needs for Global Environmental Management, Washington D.C. U.S.A
Global change Newsletter No.35 , September 1998. International Geosphere-Biosphere programme (IGBP) 1998.

Government of Sierra Leone: Poverty Reduction Strategy Paper11. 2008

Gordon, O.L.A., A. G. Kater and D.G. Schwaar. 1979. Vegetation and Landuse in Sierra Leone. UNDP/FAO Technical Report No. 2. AG:DP/SIL/73/002

Government of Sierra Leone 1994: The National Environmental Policy.

Government of Sierra Leone, 2004. The Local Government Act

Government of Sierra Leone, 1991. The constitution of Sierra Leone

Government of Sierra Leone, 2000. The Sierra Leone Maritime Administration Act

Government of Sierra Leone, 1998. National Forestry Act

Government of Sierra Leone, 2000. National Environment Protection Act.

Government of Sierra Leone, 2004. National Biodiversity Strategy Action Plan.

Government of Sierra Leone, 2005. National Land Policy

Government of Sierra Leone, 1994 Mines and Minerals Acts (Amendments 1999)

Government of Sierra Leone, 1994 National Environmental Action Plan, Volume 1

Government of Sierra Leone, 1989 The Forestry Regulations

Government of Sierra Leone, 2004 Proposed Strategies and Actions for Biodiversity Conservation (Biodiversity Strategy and Action Plan).

Government of Sierra Leone, 2000 Report on the Environmental and Socio-economy Impacts of Sand Extraction at the Lakka Beach.

Government of Sierra Leone, 2003 Road Transport Authority Act.

Government of Sierra Leone, 2003 Sierra Leone National Recovery Strategy Assessment, Final Report.

Government of Sierra Leone. (2006). *Initial Communication (INC) on Climate Change*

Government of Sierra Leone, Ministry of Transport and Aviation. (2007, December). *Sierra Leone National Adaptation Programme of Action (NAPA) – Final Report*

IFRC. (2011) : *West Coast Africa – MAA61002 – 19 May 2011 – Report covering the period 1 January 2010 to 31 December 2010*. From <http://www.ifrc.org>

Iles, M, Seville PS and Koker G Interim management plan for Gola Forest – 1993

IUCN. 1992. The Conservation Atlas of Tropical Forests – Africa. Eds Jeffery A.Sayer, Caroline S. Harcourt, and N. Mark Collins. Chapter 29: Sierra Leone. 99. 244-250. Gland; International Union for the Conservation of Nature

IUCN 2000 Red Data Book, 2000

Institute of Marine Biology and Oceanography, 2002, Management Plan for Sand Extraction in Sierra Leone. Country Profile Sierra Leone, United Nations (<http://www.un.org/esa/agenda21/natlinfo>)

Jesus Cespedes. (2010). *Capacity Assessment of the Disaster Management Department, Office of National Security: A review of current situation, constraints, challenges, options for an institutional reform and a suggested action plan with a budget for immediate needs*.

Johnson, M. J. 2003, An Investigation into How to Rationalize and Institutionalize EIA in Sierra Leone

Karim A.B. 1996. Assessment of Damages caused to the Environment and Biodiversity, Mining and Agriculture. Proceedings of the National Workshop on The Protection and Rehabilitation of Sierra Leone's Environment: The Way Forward; Eds. A.B. Karim, Reynold G. Johnson and Raymond G. Johnson.

Karimu, M. 1992. Community Perception of Environmental Problems: An Opinion Survey in Bo and its Complementary Regions. Njala University College

Kingston,B. 1986.A Forestry Action Plan for Sierra Leone. ProjectFO;CD/SIL/84/OO3 – FIELD document No. 4. 110p +Annexes

Koroma A. P., 2004.Causes of Forest Loss and Degradation and Issues of unsustainable Forestry in Sierra Leone

Koroma A.P., 2004. The Global Forest Policy and Advocacy Project in Sierra Leone

Koroma, A.P. 1988. Forest Resources of Sierra Leone, Paper prepared for the Seminar on Nitrogen Fishing Trees in Sierra Leone, Njala, University College, 6-8 January, 1988.

Lebbie, A.R. 2002. “Western Guinea Lowland Forest”. In New of the World. NGS-WWF Publication.

Ministry of Health and Sanitation –25. National Environmental Action Plan Vol. 1. 1995,

Ministry of Lands, Country Planning, Case Studies of the Impact of Natural Resources and the Environment, 2001,Management on Sierra Leone’s Environment and Economy NACEF, 2006, Report on Working Visit to Eastern Province (Kono and Kenema Districts)

National Security and Intelligence Act. (2002).

OECD (2000): Shaping the Urban Environment in the 21st Century: From Understanding to Action, a Development Assistance Committee Reference Manual on Urban Environmental Policy.

Office of National Security. (2004). *National Hazard Assessment Profile. FBC-USL*

Office of National Security, Disaster Management Department Sierra Leone. (2004). *National Disaster Preparedness and Response Plan.*

Office of National Security, Disaster Management Department Sierra Leone. (2010). *National progress report on the implementation of the Hyogo Framework for Action (2009-2011) – interim.*

Office of National Security, Disaster Management Department Sierra Leone. (2011). *Joint Assessment Report on Floods and Fire Disasters in Kenema, Kambia and Freetown for year 2011*

Office of National Security, Disaster Management Department Sierra Leone. (2011). *UNDP Preventive Development disaster Management project - 2nd Quarter Report (April to June 2011)*

Okoni-Williams, A.D., H.S.S. Thompson, P. Wood, A.P. Koroma and P. Robertson. 2001. Sierra Leone. In Important Bird Areas in Africa and Associated Islands – Priority Sites for

Conservation, edited by L.D.C. Fishpool and M.I. Evans; Pp. 769-778. Birdlife International and Pisces Publications.

Philipson J. 1978. Wildlife Conservation and management in Sierra Leone. Report to the Ministry of Agriculture and Natural Resources. The British Council, Freetown.

Ramsar Convention on Wetlands. (2005). The List of Wetlands of International Importance. Retrieved (2005) from: http://ramsar.org/key_sitelist.htm.

Sankoh, S. K., 2001 Report of the Scientific Investigation on the Environmental Effects of Sewage Discharge and Solid Waste Dumping into the Sierra Leone Estuary.

Savill P.S and Fox J.E.D. 1967 Trees of Sierra Leone. Government Printers.316p.

Sierra Leone National Platform for Disaster Risk Reduction and Climate Change Adaptation – *Draft Working Document June 2011.*

Sierra Leone Country Environment Profile 2006.

Sierra Leone Disaster & Risk Management Report, 2011. “*situation Overview Diagnostic and Strategic Action Proposal.*”

Sierra Leone Meteorological Services. (2011, July). *Strategic Plan 2011-2015*

Sierra Leone Energy Policy and Strategic Plan 2009.

Statistics Sierra Leone 2005 Provisionsl results of the Population and Household Census

Statistics Sierra Leone (2004) National Census Report.

Suart S.N. and Adams R.J. 1990. Biodiversity in sub-Sharan Africa and Its Islands Conservation, Management and Sustainable Use. Occasional Papers of the IUCN Species Survival Commission No. 6, 1990. IUCN, Gland, Switzerland.

Tejwani, K.G.1988. Watershed Management. Joint Interagency Forestry Sector Review Mission: Sierra Leone. MANRF, UNDP and FAO. FO: DP/SIL/87/010. Field Document No.3. Rome.

United Nations Environment (UNEP), 2002, Global Environment Outlook Programme

UNDP/UNEP/FAO/UNHABITAT, November 2005, Report on the Joint United Mission on the proposed National Commission on Environment and Forestry in Sierra Leone (10 – 21 October 2005).

UNDP, CBD, GOSL (2003) Biodiversity Status and Trends in Sierra Leone Past, Present, Future United Nations, 1994, United Nations Convention to Combat Desertification United Nations, New York/Government of Sierra Leone, 2004. United Nations Convention to Combat Desertification and Land Degradation Third Country Report

United Nations, 1992. United Nations Framework Convention on Climate Change. United Nations, New York.

United Nations Convention to Combat Desertification. United Nations, 1994, New York.

UNDP 1997 Global Human Development Report 1997.

UNEP-CEDR, (Centre for Economic Development Research). 2001. The Study on the Impact of Privatization of Trade in Forest Products.

United Nations Environment Programme, 1992. Convention on Biological Diversity. UNEP, Nairobi.

UNDP: "Human Development Report 2011".

UNDP climate change country profile, C. McSweeney, M. New and G. Lizcano: <http://country-profiles.geog.ox.ac.uk> (8-8-2012).

UNISDR. (2009). *Terminology on Disaster Risk Reduction*

UNEP. (2010). *Sierra Leone: Environment, Conflict and Peace Building Assessment – Technical Report*

Ministry of Energy and Water Resources. (2008). *National Water and Sanitation Policy*

World Bank/DFID/NACEF, Concept note for a Strategic Environmental Assessment of the Mineral Sector in Sierra Leone (2006)

LIST OF CONTACT PERSONS

UNDP – SL STAFF

Mr. Mohamed Abchir	-Deputy Country director
Mrs. Mariatu Swaray	-Portfolio Manage Envir.
Mr. Benjamin Maturu	-Economic Advisor
Dr. Patrick Tarawalli	-Consultant

MLCPE

Mr. Steven Syril Jusu	-Chief Environ. Officer
-----------------------	-------------------------

MAFFS

Mr. Sheku Mansaray	-Ag. Director of Forestry
--------------------	---------------------------

EPA - SL

Mrs. Haddijatou Jallow	-Executive Chairperson
------------------------	------------------------

CLIMATE CHANGE PROJECTS

Mr Momodu Bah	-Asst. Deputy Dir. Policy, Planning
---------------	--

Prof. Ogunlada Davidson	-Senior Consultant
-------------------------	--------------------

Mr. Tamba E. Nyaka	-Environment/Ozone Officer
--------------------	-------------------------------

Dr. Raynold Johnson	-Project coordinator / Consultant IGG
---------------------	--

Dr. Reynold Johnson	-Lecturer FBC- USL
---------------------	--------------------

DISASTER MGT.

Ms Mary Mye-Kamara	-Director Disaster Mgt. Dept.
--------------------	----------------------------------

PRSP 111 CORE TEAM

Mr Mohamed Dabo	-Asst. Desk Officer
-----------------	---------------------

Mr. Alimamy Bangura	-Chairman
---------------------	-----------

Mr.Lamin Tarawally	-Member
--------------------	---------

Mr. Samuel Braima	-Member
-------------------	---------

Mr. Denis Lansana	-Director
-------------------	-----------

Dr. Nana Pratt	-Member
----------------	---------

Mr. Alpha Bockari	-Deputy Director
-------------------	------------------

Mrs. Naasu Fofana	-Member
-------------------	---------

Mrs. Sanira Deen	-Member
------------------	---------

Mr. Morlia Bangura	-Member
--------------------	---------

MET. Dept.

ANNEX 1

The Proposed activity needs and investment plan following the Annotated guidelines for the preparation of the NAPA.

	Implementing Agency	Proposed Climate Change activities/ Disaster Management	Objective	Estimated Funding
1	GoSL, MeTSL, SLAA, SLMA, SLPA, EPA, MEWR, SLA	Develop an Early Warning System in Sierra Leone	<p>To build the capacity of the Sierra Leone Meteorological Department in order to enable it properly monitor the weather systems and climate and in particular to be in a position to provide Early Warning of Imminent Hazardous Weather or Climate.</p> <p>To enable the Meteorological Department to give timely information on weather event that are likely to adversely affect the country and its people</p>	US\$ 751,950

2	GoSL, MeTSL, MEWR, EPA	Rehabilitation & Reconstruction of meteorological/climate monitoring stations throughout the country	To rehabilitate and improve the Meteorological/Climatic data collection, data analysis and storage of the country in order for the department to carry out its obligations towards the NAPA project	US\$ 1,231,651
3	GoSL, MeTSL, MEWR, EPA	Capacity building of the MET Dept through training of personnel for the country's adaptation to climate change	To recruit and/or train meteorological personnel at the various levels in order to capacitate the department in its National adaptation program of action of the perceived climate change effects.	US\$ 152,800
4	GoSL, MeTSL, MEWR, EPA, Njala University	Sensitization and awareness raising campaigns on climate change impacts on women relating to the three conventions of biodiversity, desertification and UNFCCC.	To make the public, especially the women and children aware of the three conventions on Climate Change, Desertification and Biodiversity and how to work together in meeting our obligation as enshrined in these conventions.	US\$ 132,000
5	GoSL, MAFFS, PPP, MLG	Development of Inland Valley Swamps For Rice Production in the Moyamba District.	To increase the area under cultivation for increased rice production.	US\$ 1,075, 00 (five years)
6	GoSL, MAFFS, PPP	Development of an Integrated Natural Resources and Environmental Management System for Sierra	To promote community based (CBO) approach in agricultural development and environmental management. To conduct a natural resources inventory and	US\$1,205,000 five year

		Leone.	mapping of degraded areas. To promote capacity building To review existing environmental and resource use policies and regulation Off-farm land and natural resource management Promote protected area management activities	
7	GoSL, PPP, MLCPE	Development of Irrigation and drainage systems for agricultural production in the Bombali District of Sierra Leone:	to develop irrigation and drainage systems in the vulnerable areas of the country for increased food production.	US\$1,055,000 five year
8	GoSL, MEWR, USL, PPP	Promotion of the use of renewable energy (Solar Energy) and improvement of energy efficiency and conservation in Sierra Leone.	The selected towns and villages to have community owned and controlled centres that will address their needs for. Example improved energy source for cooking and heating, coupled with better health, social, environmental and educational conditions of the community.	US\$1,500,000 four year
9	GoLS, MAFFS, Tourism, Lands	Establishment of Forest Reserves, Protected Areas and National Parks/ Sanctuaries in Sierra Leone.	To exercise legal and effective control over the un-reserved forest lands by the establishment of Protected Areas, National Parks, Sanctuaries and Forest Reserves. The conservation of the country's unique ecosystems	US\$ 2,500,000 over 5 years

			<p>and their biological diversity</p> <p>-To increase the forest area with the concomitant increase in the uptake of atmospheric CO2.</p> <p>-To stem the rate of wanton destruction of the country's forest resources</p>	
10	GoSL, MAFFS, EPA, MEWR, NCCC, MLCPE	Management and Protection of Forest Reserves and Catchments areas including Wetlands in Sierra Leone.	<p>To put all catchment forests of national importance under sustainable management for water, soil and ecosystem conservation, and multiple production of forest products and services,</p> <p>Ø To place all mangroves and other wetlands of national importance under sustainable management and be substantially developed.</p> <p>Ø To ensure that areas under forest management are substantially increased i.e. forest area under un-reserved status be reduced through reservation.</p> <p>Ø To ensure that all Forests, both natural and artificial regeneration, are placed under effective protection against fire, pests and diseases.</p> <p>Ø To motivate the local communities to participate in the conservation of forests and carry out silvicultural activities with a view to increasing their incomes,</p>	US\$ 5 million over five years.

			<p>restoring biodiversity and increasing the forest vegetation cover</p> <p>Ø To increase forest vegetation cover which is one of the proven ways to effectively increase the up-take of atmospheric CO2 by the biosphere.</p> <p>To reduce the dependence on firewood and charcoal by using liquid fuels (LPG) and other bio-fuels (ethanol/methane/oils)</p>	
11	GoSL, MEWR, MLG	Institutional Strengthening In the Water Resource Sector of Sierra Leone.	The overarching objective of the project is to build capacity in the water resources sector through institutional strengthening with a view to ensuring the effective delivery of hydrological services, predicated on the realization that workable options for adapting to climate change is consistent with collaborative research, monitoring, and efficient management of our finite resources.	US\$ 2.25 million
12	GoSL, MEWR, MLG	Improvement Of The Efficiency Of Existing Water Supply Systems In Both Urban And Rural Areas of Sierra Leone.	to maximize the use of water resources for sustainable development by ensuring the efficient functioning of existing urban and rural water supply systems.	US\$ 2.95 Million
13	GoSL, MEWR, MLG	Promotion of Rain Water Harvesting	to increase water availability for domestic and commercial	US\$ 2.8 Million

		and Development of An Integrated Management System for Fresh Water Bodies	use through sensitization of communities about the possibility of capturing, storing and utilizing rainwater.	
14	GoSL, USL, IMBO	Establishment of a Permanent Study Programme of the Multi Species Fisheries in Sierra Leone	<p>To improve knowledge about the biology of the multi-species</p> <p>To generate species-specific habitat and physiology data</p> <p>To generate data on habitat characteristics</p> <p>To study the abundance, distribution and feeding habits of other fish species that have a high commercial potential value.</p> <p>To provide information on growth rates reproductive success and mortality of select species.</p>	US\$ 395,000
15	GoSL, USL, IMBO	Delineation and Restoration Of Vulnerable Habitats And Ecosystems in The Western Area of Sierra Leone.	<p>To prevent or reduce the destruction of vulnerable fishing habitats</p> <p>To reduce the possibility of the decline of fishery productivity</p>	US \$ 420,000
16	GoSL, USL, IMBO	Improve On The Quality On Fisheries Related Data and Research	To improve on the quality of data and research for better understanding of the different types of ecosystems.	US\$455,000
17	GoSL, USL, IMBO	Development of an Integrated Coastal Zone Management	To develop an Integrated Coastal Zone Management Plan for Sierra Leone.	US \$ 90,000

		Plan for Sierra Leone.		
18	GoSL, National Coastal Area Mgt. Board	Rehabilitation of degraded coastal habitats in the Northern Region of Sierra Leone.	Restore the ecological integrity and productivity of Coastal habitants. Restore source of livelihood for coastal dwellers. Ensure proper management of coastal habitats	US\$ 317,000
19	GoSL, National Coastal Area Mgt. Board	Develop and enact appropriate policies and regulations relevant to the development of coastal communities, urban grow planning, and critical coastal ecosystems preservation.	To development appropriate policies and regulations for planning growth and development of coastal community's critical coastal ecosystems preservation.	US\$ 60,000
20	GoSL, MTA, USL	Establishment of a National Sea-Level Observing System for Sierra Leone	To have an operational permanent sea-level observing station for reporting monthly main averages to the national marine meteorological service. To collect, analyze and make available data products for practical and/or scientific applications.	US\$ 180,000
21	GoSL, MHS, DMO	Monitoring and control of malaria prevalence in the Moyamba District of Sierra Leone.	To prevent and/or reduce malaria infection of vulnerable groups of Moyamba District's population. To increase the access of the	US\$ 520,000

			population to insecticide treated bed-nets.	
22	GoSL, MHS, DMO	Monitoring and control water and sanitation activities in the Koinadugu District of Sierra Leone.	To improve the existing unsanitary conditions and develop appropriate water and sanitation projects	US \$ 1,680,000
23	GoSL, MHS, DMO	Monitoring and control of HIV/AIDS prevalence in Koinadugu District of Sierra Leone	To galvanise support for HIV/AIDS prevention activities, To improve the community's capability to control and prevent HIV/AIDS, To reduce climate change related stress on HIV/AIDS control and prevention activities.	US\$ 1,200,000
24	GoSL, MHS, FCC, DMO	Monitoring, evaluation and control of water and sanitation activities in slum areas of Freetown, the capital city of Sierra Leone.	To improve the existing unsanitary conditions and develop appropriate water and sanitation projects for urban slums in Freetown.	US \$ 2,070,000

**ANNEX 2: ACTIVITY AND INVESTMENT PLAN FOR DISASTER
MANAGEMENT DEPARTMENT**

Proposed strategic action components	National stakeholders	Potential partners	Indicative Budget (\$)/timeframe	General and Specific objectives	Key Actions
Component 1: Strengthening the overall national DRM coordination and key mechanisms	DMD, All National platform Members, SLIS, MoFED. Decentralize d authorities.	UNDP – UN Agencies – All Partners, including NGOs.	640,000 (2012-2014)	<p>General Objective (GO): Optimize DRM coordination and commitment through clearly defined and owned coordination framework and operational mechanism</p> <p>Specific Objectives (SO): Get adequate DRM:</p> <p>(1)-Strategic framework, (2)-Institutional framework, (3)-Legal Framework, (4)-Operational mechanism, and (5)-Funding</p>	<p>Support for:</p> <p>(1)- National DRM Policy updating and adoption (2)- National DRM Strategy development and adoption (3)- National DRM Action Plan development and adoption (4)- Adoption of a clear, adequate overall national DRM coordination mechanism (including adequate form and anchorage of the coordinating institution). (5)- Operationalizing an adequate DRM coordinating institution (with adequate internal organizational structure, operating and</p>

				mechanism, agreed by all DRM stakeholders.	financing mechanisms) (6)- Operationalizing the National Platform (organizational arrangement and operating mechanism) (7)- Facilitating DRM Policy enactment (8)- Facilitating legalization of adopted institutional and operational mechanism/framework (9)- Optimizing DRM financing mechanism effectiveness
Component 2: Strengthening the response capacity and readiness of the central level	DMD, All National Platform Members, Decentralized authorities, NFF, MoHS, MEWR, City Councils mainly Freetown City Council	UNDP – UN Agencies – All Partners, including NGOs.	1,100,000 (2012-2014)	GO: Get stakeholders at central level more prepared, ready and enable to respond in case of disaster overwhelming local and decentralized levels' capacities. SO: 1)- Strengthening response implementation and efficiency 2)- Strengthening preparedness implementation and efficiency	Support for: (1)- Carrying out adequate Response and preparedness Planning (2)- Setting up adequate Response mechanism (3)- Setting up post-disaster needs assessment mechanism (4)- Ensuring adequate Preparedness implementation (5)- Enhancing Response capacity of key institutions (first responders)
Component 3: Optimizing Community based Local level DRM and ACC	DMD, All National Platform Members, Decentralized and local	UNDP – UN Agencies – All Partners, including	1,400,000 (2012-2015)	GO: Ensure that local level have more adequate capacity to respond to small scale localized disaster/incident, and	Support for: (1)- Enhancing key local DRM mechanisms and processes in all targeted priority at risk areas (improvement and coverage

	authorities	g NGOs.		<p>ensure all DRM and ACC aspects and issues including prevention and risk reduction</p> <p>SO: (1) Strengthen the local level institutional and legal frameworks for DRM implementation – (2) Strengthen all local stakeholders' awareness raising and capacities (including vulnerable populations) – (3) Enhance risk knowledge and monitoring – (4) Strengthen the reduction of disaster risk underlying factors, and its integration into local development planning – (5) Strengthen local level early warning system – (6) Strengthen disaster preparedness at local level for an effective emergency response and recovery.</p>	<p>extension), mainly: VCA – Response and preparedness Planning – Organizational structure and operational mechanism - Prevention and reduction Planning – Preparedness implementation – local EWS.</p> <p>(2)- Enhancing technical and material capacity of key stakeholders in all targeted priority at risk areas, mainly: DM Committees – Volunteers – Local authorities – Populations.</p> <p>(3)- Implementing integrated DRM and ACC pilot projects in few specific areas (addressing systematically all hazards and all DRM phases and aspects – areas identification criteria to be defined).</p>
Component 4: Strengthening disaster prevention and risk reduction implementation and status in the country	DMD, MLCPE, EPA, City Councils including primarily Freetown City Council –	UNDP – UN Agencies – All Partners, including NGOs.	1,250,000 (2012-2015)	<p>GO: Ensure that disaster prevention and risk reduction are more adequately addressed, implemented and covered.</p> <p>SO: 1)- Support all processes and</p>	<p>Support for:</p> <p>(1)- The design and adoption of a National DRR program.</p> <p>(2)- Enhancing the concrete mainstreaming of DRR in development policies and strategies at all levels.</p> <p>(3)-Developing or updating, and implementing sectoral</p>

	MWHI – MoHS – MMR – MEWR – MSWGCA			<p>initiatives contributing to achieve disaster prevention and risk reduction</p> <p>2)- Define priority interventions to serve as a framework/roadmap for the implementation of disaster prevention and disaster risk reduction during the next 5 years.</p> <p>3)- Ensure that concerned stakeholders have and concretely use, adequate understanding, technical knowledge and tools to carry out DRReduction and Adaptation to Climate Change planning and their mainstreaming</p>	<p>policies which are key for DRR and ACC (mainly those relating to livelihoods, environment, water and sanitation, health, mining, land use planning, urban planning, food security, climate change).</p> <p>(4)-Strengthening Capacity of key sectoral institutions primarily involved in preventing / reducing existing high potential manmade disaster risks (priority risks concerned to be identified and prioritized)</p> <p>(5)- Developing and implementing specific targeted, urgent disaster prevention and risk reduction projects (addressing urgent specific issue in one or several areas).</p>
Component 5: Strengthening knowledge and understanding of DRM and ACC countrywide	DMD, All National Platform Members, Decentralized and local authorities, MEST	UNDP – UN Agencies – All Partners, including NGOs.	750,000 (2012-2015)	<p>GO: Knowledge and understanding, by all categories of DRM stakeholders at all levels including the populations, of DRM concept, process, implementation and aspects in Sierra Leone, and their respective roles and responsibilities, are improved.</p> <p>SO: 1)- Strengthen DRM knowledge and</p>	<p>Support for:</p> <p>(1)- Implementing systematic public and stakeholders' awareness raising campaign targeting all categories of DRM or non DRM stakeholders in Sierra Leone.</p> <p>(2)- Ensuring the complete integration of Disaster and risk management, and adaptation to climate change in primary and secondary school curriculum.</p> <p>(3)- Setting up a National Training of trainers program for various targets.</p>

				<p>understanding of institutional stakeholders</p> <p>2)- Strengthen DRM knowledge and understanding of populations</p> <p>3)- Strengthen DRM knowledge and understanding of children , for information, advocacy and technical capacity building purposes.</p>	
<p>Component 6: Optimizing risks knowledge and surveillance, and early warning system (EWS) multihazard</p>	<p>DMD, All National Platform Members, Decentralized and local authorities, Meteorological Department, MEWR, SLIS</p>	<p>UNDP – UN Agencies – All Partners, including NGOs.</p>	<p>1,250,000 (2012-2015)</p>	<p>GO: Existing and potential disaster risks are systematically identified monitored, and warnings could be timely issued and adequately used.</p> <p>SO:1)- ensure comprehensive, systematic, permanent risk assessment and monitoring.</p> <p>2)- ensure continuous availability of adequate and up to date data and information on risks</p> <p>3)- Ensure that a National Early Warning System is operational (multihazard)</p> <p>4)- Ensure that Early Warning System is effective mainly at local level</p>	<p>Support for:</p> <p>(1)- Carrying out and institutionalizing adequate risk assessment from the central level</p> <p>(2)- Carrying out and institutionalizing adequate VCA at the local level</p> <p>(3)- Operationalizing an adequate National EWS (multihazard).</p> <p>(4)- Operationalizing an EWS coordination unit at the central level</p> <p>(5)- Optimizing Local EWS effectiveness.</p>

TOTAL			6,390,000 (2012-2015)		