United Nations Development Programme

Project Document template for nationally implemented projects financed by the GEF/LDCF/SCCF Trust Funds

Project title: Adapting to climate change induced coastal risks management in Sierra Leone		
Country: Sierra Leone	**Executing Entity/Implementing Partner:** UNDP	**Management Arrangements:** Direct Implementation Modality (DIM)
UNDAF Outcome: Outcome 1: By 2018, targeted Government institutions, the private sector, and local communities manage natural resources in a more equitable and sustainable way Outcome 2: By 2018, targeted communities demonstrate decreased vulnerability and increased resilience to natural and man-made disasters		
UNDP Strategic Plan Output: Output 1.3: Solutions developed at national and sub-national levels for sustainable management of natural resources, ecosystem services, chemicals and waste. Output 1.4: Scaled up action on climate change adaptation and mitigation cross sectors which is funded and implemented. Output 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy) Output 2.5: Legal and regulatory frameworks, policies and institutions enabled to ensure the conservation, sustainable use, and access and benefit sharing of natural resources, biodiversity and ecosystems, in line with international conventions and national legislation.		
UNDP Social and Environmental Screening Category: Low	**UNDP Gender Marker:** GEN2	
Atlas Project ID/Award ID number: 00102451	**Atlas Output ID/Project ID number:** 00104509	
UNDP-GEF PIMS ID number: 5178	**GEF ID number:** 5902	
Planned start date: April 2018	**Planned end date:** March 2023	
LPAC date: 18th January, 2018		

Brief project description:

The coastal zone of Sierra Leone is highly vulnerable to the increased frequency and severity of coastal erosion, flooding and storm surges which severely impact social wellbeing (health), livelihood security (and water resources) and major economic sectors such as fishing, tourism, water resources and agriculture. Coastal communities are already experiencing considerable repercussions of these impacts, notably on their livelihoods with reduced fishing productivity, ecosystem degradation and low farming outputs. The limited accessibility of climate-related data limits the ability of decision-makers to make informed planning and policy decisions for the coast (in particular marine and sea parameters databases such as wave height, wave period, wind speed and direction), and to take any clear strategic actions to remedy these negative effects. This indequate lack of knowledge is contributing towards undermining social and economic development, particularly under a changing climate.

Through this proposal, the Government of Sierra Leone (GoSL) is seeking funding from the Least Developed Countries Fund (LDCF) to implement a Full-Size Project (FSP) along the coastal zone, in six different pilot sites (Conakry Dee, Lakka, Hamilton, Tombo, Shenge and Turtle Island). The objective of this project, implemented by UNDP in collaboration with the Environmental Protection Agency (EPA SL), the Ministry of Fisheries and Marine Resources (MFMR) and the Institute of Marine Biology and Oceanography (USL-IMBO and the National Tourist Board (NTB) is designed to *"Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods"*. The project focuses on five of the national priorities presented in Sierra Leone's National Adaptation Programme of Action (NAPA) submitted to the United Nations Framework Convention on Climate Change (UNFCCC), namely priorities interventions nº 2, 4, 14, 16 and 17.

Barriers need to be overcome in order to achieve the project objective. These include: (i) the limited accessibility and use of data and information relevant to understanding coastal related climate risks, (ii) inadequate institutional and policy capacities for Integrated Coastal Zone Management (ICZM), (iii) limited awareness programmes on coastal related climate risk and human activities along the coast; (iv) Inadequate resources and financial constraints and (v) the need to introduce climate resilient livelihood options and approaches to address the climate risk facing coastal communities. The project's approach to be adopted will deliver three complimentary outcomes to address these barriers in a coherent and holistic manner. It shall also contribute to the improvement of Sierra Leone's ability to systematically manage coastal risks in the face of a changing climate.

The activities under Outcome 1 focus on enhancing the availability of high quality climate risk information that is critical for development decision-making in the coastal zone. Under Outcome 2, a series of appropriate protection measures shall be designed along with supporting policy/legal tools and integrated coordination mechanisms to improve or support the implementation of policy to help deal with current and long-term coastal challenges;Finally, Outcome 3 will promote public awareness and promote climate resilient alternatives to sand mining for better adhesion of policy makers and communities on adaptation.

FINANCING PLAN	
LDCF	9,975,000 USD
UNDP TRAC resources	190,000 USD
Cash co-financing to be administered by UNDP	N/A
(1) Total Budget administered by UNDP	**10,165,000 USD**
PARALLEL CO-FINANCING *(all other co-financing that is not cash co-financing administered by UNDP)*	

Government	31,610,000 USD
(2) Total co-financing	**31,610,000 USD**
(3) Grand-Total Project Financing (1)+(2)	**41,775,000 USD**

SIGNATURES		
Signature: print name below Hadadi John Tello	**Agreed by Government** EPA	**Date/Month/Year:** 25/4/2018
Signature: print name below Samuel Doe	**Agreed by UNDP**	**Date/Month/Year:** 25-04-2018

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List of Acronyms and Abbreviations

A4P	Government's Agenda for Prosperity
APRM	African Peer Review Mechanism
AWS	Automatic Weather Stations
BPPS	Bureau for Policy and Programme Support
CBA	Community-based Adaptation
CBD	Convention on Biological Diversity
CBO's	Community-Based Organizations
CC	Climate Change
CCA	Climate Change Adaptation
CC-DAMAS	Climate Change Data Management System
CCMART's	Centre for Skills Development and Communal Centres for Coastal and Marine Resources Transformation
CES	Community Based Extension Service
CEFCON-SL	Climate Change, Environment & Forest Conservation Consortium
CIEWS	Coastal Early Warning System
CfP	Call for Proposal
CIDMEWS	Climate Information, Disaster Management and Easrly Warning System
CIESIN	Center for International Earth Science Information Networks
CMIP5	The fifth phase of the Coupled Model Inter-comparison Project (CMIP)
CO	Country Office
CPAP	Country Programme Action Plan
CSD	Centre for Skills Development
CSEB	Compressed Stabilized Earth Blocks
CSSL	The Conservation Society Sierra Leone
CVA	Coastal Vulnerability Analysis
DECCMA	Deltas, Vulnerability & Climate Change: Migration & Adaptation Project
DEM	Digital Elevation Model
DMD	Disaster Management Department
DST	Decision Support Tool
CVI	Coastal Vulnerability Index
DMD	Disaster Management Department
EbA	Ecosystem Based Approach
EFA	Environmental Foundation for Africa
EIA	Environmental Impact Assessment
ENFORAC	Environmental Forum for Action
ENVIROFUND	Environmental Fund Management System
EPA-SL	The Sierra Leone Environmental Protection Agency
EWS	Early Warning System

FSP	Full Sized Project
GCM	Global Climate Model
GCRF	Green Climate Resilience Fund
GEF	Global Environment Facility
GEFSEC	Global Environment Facility Secretariat
GEN	Global Ecovillage Network
FBC DEPT GEO	Fourah Bay College Department of Geography
GIS	Geographic Information System
GoSL	Government of Sierra Leone
GTS	Global Telecommunications System
IA	Island Aid Sierra Leone NGO
ICZM	Integrated Coastal Zone Management
ICZMP	Integrated Coastal Zone Management Plan
USL-IMBO	Institute of Marine Biology and Oceanography
JAS	July/August/September
KMP	Knowledge Management Platform
LIDAR	Light Detection and Ranging
LDCF	Least Developed Countries Fund
LDCs	Least Developed Countries
LDRMC	Local Disaster Risk Management Committees
NGO	Non-governmental organization
MAFFS	Ministry of Agriculture, Forestry and Food Security
M&E	Monitoring and Evaluation
MFMR	Ministry of Fisheries and Marine Resources
MLCPE	Ministry of Lands, Country Planning and Environment
MLGRD	Ministry of Local Government and Rural Development
MOYA	Ministry of Youth Affairs
MWHI	Ministry of Works, Housing and Infrastructure
MTR	Mid-term Review
NAPA	National Adaptation Programme of Action
NEPAD	New Partnership for Africa's Development
NHMI	National hydro-meteorological institutions
NODCs	The pan African network of National Oceanographic Data Centres
NPAA	National Protected Area Authority
NPD	National Project Director
NPC	National Project Coordinator
NTB	National Tourism Board
ODINAFRICA	The Ocean Data and Information Network for Africa
ONS	Oceanographic Monitoring System
OND	October/November/December
ONS	The Office of National Security

PAC	Project Appraisal Committee
PIF	Project Identification Form
PIR	GEF Project Implementation Report
PMC	Project Management Cost
PMU	Project Management Unit
POPP	Programme and Operations Policies and Procedures
PPG	Project Preparation Grant
PRCM	Regional Programme for Coastal and Marine Conservation
Ramsar	Ramsar Convention - Convention on Wetlands of International Importance
SDC	Skill Development Centre
SDGs	Sustainable Development Goals
SESP	UNDP's Social and Environmental Standards
SLAFU	Sierra Leone Artisanal Fishermen Union
SLV-2025	The Sierra Leone Vision 2025
SL-ICZM-WG	Sierra Leone Integrated Coastal Zone Management Working Group
SLEPA	Sierra Leone Environmental Protection Agency
SLMA	Sierra Leone Maritime Administration
SLMD/A	Sierra Leone Meteorological Department
SLR	Sea Level Rise
SMS	Short Message Service
SSTrC	South-South and Triangular Cooperation
SRGS	Special Report on Emissions Scenarios
STAP	GEF Scientific Technical Advisory Panel
TOR	Terms of Reference
TSC	Technical Steering Committee
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
UNDP-GEF	UNDP Global Environmental Finance
USL	University of Sierra Leone
WA-BiCC	West Africa Biodiversity and Climate Change
WMO	World Meteorological Organisation
WoNES	Women's Network for Environmental Sustainability
WA-BiCC	West Africa Biodiversity and Climate Change

I. DEVELOPMENT CHALLENGE

1. Situation Analysis

1. With a land surface area of approximately 72,300 km^2, Sierra Leone (6º55' -10º00' N, 13º17' W) is among the smallest countries in the West African Upper Guinea rainforest zone. The country borders Guinea in the north, Liberia in the south, and the Atlantic Ocean in the west with a shoreline that stretches approximately 400 km long.

Figure 1. Map of Sierra Leone[1]

2. The climate is tropical with a monsoon-influenced rainy season that typically runs from May to October, and a dry season from November to April with Harmattan winds blowing in from the Sahara between December and January. Rainfall varies from a maximum recorded[2] of 5,000 mm per annum to mean annual rainfall of 2,000 mm in the north.

3. Sierra Leone has four distinct geographical regions: western coastal area, interior lowland plains, interior plateau and mountains. The highest point is the 1,948 m Loma Mansa (Mount Bintumani). The Freetown Peninsula includes a mountainous area, with peaks of up to 723 m (Sugar Loaf).

4. Sierra Leone's coastline is 560 km long. It is characterized by a high number of natural habitats namely estuaries, dunes, mangrove forests, sand banks, marine weed and swamps, though it is mainly dominated by extensive mangrove systems (230 km) and associated mud flats. Only about 150 km of the coastline (approximately 25%) is significantly settled upon and developed, which includes the capital Freetown[3]. Along these developed shorelines, a large portion of the vegetative cover that would otherwise function as natural protective barrier has been substantially removed or badly degraded, through human interventions such as mangrove deforestation as a result of the demand for wood resources for fish smoking, construction, as well as to support the fast-growing urban expansion. Human induced practices, characterized by uncontrolled and unplanned construction coupled with the widespread practice of beach

[1] https://www.cia.gov/library/publications/the-world-factbook/graphics/locator/afr/sl_large_locator.gif. Accessed on 15 October 2016.
[2] Recorded at River Number Two, Western Peninsula.
[3] Environment Protection Agency (2015). Sierra Leone State of the Marine Environment report 2015. Freetown, Sierra Leone.

sand mining are contributing towards exacerbating coastal/beach erosion caused by climate change, in particular by reducing beach volumes and exposing the geological substrate to rain, rivers and wave action.

5. Overall, the impacts of climate change, coupled with coastal landform variability and biophysical process variance from location to location is likely to have considerable negative effects on *inter alia*: fishing, tourism human health, water resources and subsistence farming. Coastal community livelihoods are already experiencing considerable pressures with reduced fishing productivity, ecosystem degradation and low farming output being most noticeable. The limited availability of data makes it difficult to take any clear strategic actions to help remedy these negative effects, in particular limited climate-related data and database of marine and sea parameters (such as wave height, wave period, wind speed and direction) to understand the dynamics of the coastal processes such as erosion.

1.1 Climate change - induced problem

6. Studies and results relating to climate change impacts from Sierra Leone's National Adaptation Programme of Action (NAPA, 2007)[4] revealed that rainfall and temperature patterns experienced in Sierra Leoneare changing. Projections of mean annual rainfall averaged from different climate model predictions show a wide range of changes in precipitation, though all indicate a trend towards overall precipitation increase, particularly during the months of July, August and September (JAS) and October, November and December (OND) (Table 1). Regional trends, indicated by the IPCC AR4, also anticipate that climate change will result in increased rainfall variability and frequency and intensity of extreme weather events, including Sea Level Rise (SLR) and higher storm surge risks within West African Coastal regions.

Variable	Value
Temperature (A1B)	
Annual (2060)	+ 1.0 – 2.6°C
Annual (2090)	+ 1.5 – 4.6°C
Precipitation (A1B)	
Summer (JAS -2090)	-27% to +29%
Winter (OND - 2090)	-19% to +33%
Mean Sea Level (2090)	
[5]SRES B1	0.13-0.43m
[6]SRES A1B	0.16-0.53m
[7]SRES A2	0.18-0.56m

Table 1. The IPCC AR4 (modified from IPCC, 2007b)[8] projected temperature, rainfall and mean sea level in the West African region under the B1, A1B and A2 scenario to the 2100-time frame (relative to 1980-1999 sea-level).

[4] Ministry of Transport and Aviation, 2007.National Adaptation Programme of Action. Final Draft. 108p.
[5] Special Report on Emissions Scenarios, SRES, The IPCC AR4 projected scenarios to the 2100-time frame: (B1) = scenario is based on the lowest trajectory of population increase which combines low fertility with low mortality.
[6] The IPCC AR4 projected scenarios to the 2100-time frame: (A1B) = where alternative directions of technological change in the energy system balance across all sources i.e. (balanced fuel sources and production of lowest emissions).
[7] (A2) = scenario is based on a high population growth scenario and assumes a significant decline in fertility for most regions and stabilization.
[8] IPCC (2007b) Summary for Policymakers. In Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. (eds. Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignor, M. and Miller, H.L.). Cambridge University Press, Cambridge.

7. Further, results from recent studies carried out as part of the second national communication (GEF-UNDP, 2012)[9] confirm the above climate change trends with records of extreme rainfall events, extensive coastal flooding throughout the country and severe and extensive coastal erosion along the coastline as result of both heavy rainfall and tidal activity.

1.2 The problem this project seeks to address

8. The continued vulnerability of coastal communities in Sierra Leone to climate induced risks and related hazards are deemed a key problem. This is further exacerbated by the limited access to accurate and timely climate data and information, to help inform decision-making on the coast. This includes the requirement for new information to be available to enhance the resilience of vulnerable communities to climate related risks, and from this, to aid the promotion of sustainable livelihood activities within coastal communities. In addition to this key problem, weak institutional regulatory capacity coupled with the absence of a national "coastal specific" community-based information system that focuses on supporting the management of climate-related risks continue to hamper long-term coastal planning, management and early warning activities (in particular an increase in frequency and intensity of floods and severe storms and long term SLR). This thereby affects the ability of coastal communities to effectively and efficiently adapt to the pressures of climate change. The current limited capacity of Sierra Leone to manage climate information, to support the implementation of improved climate risk management decision making, needs to be urgently addressed. The intended outcome of addressing this problem would be to help the Government of Sierra Leone (GoSL) to become more climate resilient while contributing towards achieving Sustainable Development Goals (SDGs). The introduction of innovative and resilient livelihood options to address the issue of sand mining along the coast of Sierra Leone shall provide a sustainable and economically viable solution that may be embraced by the GoSL and the construction sector. This latter issue is urgently required to help creating new workable livelihood methods for coastal communities to embrace.

1.3 Root causes

9. For Sierra Leone, it is not possible to separately analyze climate change impacts in the coastal zone from national development challenges. Equally, it is understood that root causes of low adaptive capacity or high vulnerability to climate change are driven by both climatic and non-climatic factors. Therefore, root causes of the problem include natural constraints (such as the intrinsic physical vulnerability of coastline), institutional weaknesses that do not support Government development plans (such as the limited capacity for oceanographic/coastal monitoring and operationalization of a Coastal specific Early Warning Service which currently does not exist and is not included in the current UNDP-supported Early Warning System project implemented by the Sierra Leone Meteorological Department (2013-2017). The EWS project is designed to analyse agricultural land use planning in flood and drought-prone areas and develop alternative land use plans but does not provide specific coastal data). In addition, the lack of coherent policies, regulations/legislation and their enforcement to address sea level rise, flooding, storm surges, and associated climate change issues are also major factors contributing to the low adaptive capacity or high vulnerability of coastal communities to climate change risks. Lastly socio-economic factors such as the need to extract or "harvest" natural resources for short term gains (i.e. Unsustainable mangrove harvesting and coastal sand mining activities), acute youth unemployment levels and limited

[9] Global Environment Facility (GEF) and United Nations Development Programme (UNDP). Sierra Leone Second National Communication, December 2012. 245p.

investment capacities to switch to alternative livelihoods all remainweak.The following root causes of climate change vulnerability include *inter alia*:

i) *Inherent Physical Vulnerability*

10. The topographic and climatic characteristics of Sierra Leone make its coastline intrinsically vulnerable to climate and other natural hazards. Extreme un-predictable rainfall patterns coupled with the low-lying topography of much of the coastal zone (of which a significant proportion of its land area is at or near below sea level) makes it exposed to sea level rise and intermittent flooding. Furthermore, many rivers with head waters that are sourced from differing countries flow into the Atlantic Ocean and converge along much of the nations' coastline. Currently, key coastal settlements are frequently affected by storms and flooding[10].

ii) Institutional Weaknesses

11. Although having 8 new automated meteorological and hydrological monitoring equipment across Sierra Leone (as part of the ongoing UNDP managed EWS project (2013-2017)), and Geographic Information Systems (GIS), the ability of the Sierra Leone Meteorological Department (SLMD/A), the Ministry of Water Resources, the Environment Protection Agency (EPA SL), the Ministry of Fisheries and Marine Resources (MFMR), the Office of National Security (ONS) and the USL-IMBO to manage information on coastal specific related climate risks and other marine conditions remains relatively low. In addition, the ability of these institutions to develop any newly created coastal early warning system (CIEWS) that is required for the protection of coastal communities and assets, is consequently very limited. Furthermore, these institutions do not possess the financial resources, nor the adequate capacity to assess, measure, monitor and collect the necessary information required for effective and sustainable coastal management. There is therefore the need to further strengthen the capacity of these institutions to manage climate-related coastal risks.

12. Calculating risks for known coastal vulnerabilities requires a comprehensive archive of information that relates to vulnerable coastal communities, infrastructure, flood prone areas, cropping patterns etc. Currently the UNDP/GEF project "Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change" is addressing the current issue of disconnected climate databases across the different government departments and ministries by developing a centralized database (CIDMEWS, www.cidmews.solutions) for climate information, with a comprehensive and participatory content and supporting national agencies to undertake GIS mapping of vulnerable communities. However, this project does not specifically focus on coastal related early warning information, which currently remains lacking in order to undertake and implement informed coastal hazard planning. For example, as a consequence of a lack of resources and technical capacity, MFMR, whom has the legislative mandate to plan, develop, rationally manage livelihood enhancement of fishing communities and increase contribution of fish resources to the national economy, is unable to address the current challenge associated with unrestricted beach sand mining and mangrove logging nor provide, as a consequence, any alternative income generating activities that may successfully address these socio-economic problems that are facing coastal communities. The lack of data collection, fundamentally caused by a lack of policy direction, exacerbated by limited resources and human resources development (capacity) has undoubtedly affected the country's tourism potential particularly in light of the recent

[10] R.G. Johnson (2006): Sierra Leone Coastal Vulnerability Assessment

phenomena of sargassum/seaweed "bloONS" that are washing up on the nations beaches. In this situation, the National Tourism Board (NTB), who have the primary responsibility for beach management, have also been powerless to address and minimize this unwanted impact as a result of having limited technical capacity and resources.

iii) Limited (and dispersed) information and knowledge management

13. All Sierra Leonean institutions with responsibility of generating coastal specific information (that may be usable for risk management purposes), possess some basic, yet dated levels of coastal data that may be utilised for decision and policy making. Despite this, they possess limited or no capacity to initiate, maintain or operate any data collection equipment or computer data system (for example, sea wave recording stations). The emphasis of the project in terms of coastal data collection is therefore placed directly on strengthening key aspects of the existing GoSL data collection/storage infrastructure that may help provide the format and type of information that is needed to deliver on coastal adaptation objectives. The environmental *status quo* for ICZM delivery is that the majority of climatic or coastal data (plus any other related information relative to the coastal zone that may facilitate the development of detailed risk and vulnerability assessments) is limited and dispersed across various ministries and institutions. There are also limited mechanisms in place to aid the dissemination of CIEWS information (storm surge risks/coastal flooding events for more remote and vulnerable coastal communities. There is also limited packaging of climate information and warnings and inappropriate communication to different sectors and end-users linked towards helping the implementation of ICZM policies in the future. This is partly because of limited available data collection and information, non existent sharing agreements in place or specific inter-ministerial operational channels that hinder the vertical and horizontal dissemination of information between different agencies that are (or maybe in the future) tasked with implemting ICZM specific policies. Therefore, national and local administrations currently in place have limited systematic knowledge of climate change risks occurring within the coastal zone, nor do they have expertise in proposing suitable coastal adaptation options, and individual, institutional and systemic capacities designed to address such risks.

iv) Inadequate policy and legislation

14. Currently, development planning in Sierra Leone does not consider or possess the capacity to mainstream coastal information within it. In addition, climate change issues are not yet fully mainstreamed into many sectoral policies, plans and programmes. Furthermore, there is weak enforcement of laws and/or policies in key sectors, particularly in the areas of urban land use planning, house construction standards coastal hazard zones (building regulations) and the management of forest and sand reserves (addressing depleted forest cutting and uncontrolled sand mining practices). MDAs have limited tools to guide key planning, regulatory and policy instruments through the steps of internalizing coastal risks investment and governance issues.

15. Even though EPA-SL has developed (i) a national climate change policy and climate change mainstreaming guidelines to support the effective integration of climate change adaptation and mitigation into national development planning and budgeting and (ii) an Integrated Coastal Zone Management (ICZM) Plan to foster effective and sustainable management of coastal resources by relevant stakeholders; a more robust implementation of these policy instruments and guidelines (including the mainstreaming of climate change) is still required for the effective integration of climate change issues in sectoral and local plans and programmes.

v) *Socio-economic factors – Population and Poverty*

16. The total population of Sierra Leone is 7.075,641 (2015)[11] with up to 55% of its population inhabiting the coastal zone. Notably, the country has a very young population (Figure 2), with one third of the population aged between 15 and35. Of interest, 41.93% aged between 0 and 14 years, 54.34% between 15 and 64 years and 3.73% are 65 years and above (2015 est.)[12]. Based on the country's age structure, the total Age Dependency Ratio (the percentage of the population that have dependents to look after) was put nationally at a very high 81.9%, with the Youth Dependency Ratio being particularly high at 77.1% whilst the Elderly Dependency Ratio is much lower at 4.9%. The Age Dependency Ratio shows that each person within the working age category of 15-64 years has at least one additional person to support.

17. To compound this situation, Sierra Leone is extremely poor and nearly half of the working-age population engages in subsistence agriculture. Poverty remains widespread with more than 60% of the population living on less than US$ 1.25 a day whilst unemployment and illiteracy levels remain high, particularly among youth[13]. For example, approximately 70% of youth are underemployed or unemployed with an estimated 800,000 youth currently actively searching for employment. As part of the response to climate change impacts, coastal communities (where low fishing catch and reduced crop production is prevalent) are facing a high level of male migration which is already evident in coastal locations such as Tombo, Lakka, and Hamilton (see Annex 4 – Gender Report). This migration takes place especially towards western (more urban) parts of the country where individuals are in search for better employment opportunities. This male migration contributes little to family security, as it inevitably increases the workload of women and youth members including children[14]. The extra work load imposed on women may include additional water and firewood collection duties (often meaning additional travel distances of about 2 km and 4 km away from their home in Tombo and Conakry Dee and Lakka locations). Within Annex 4, one key conclusion states that women coped better with altered coastal zone conditions in the communities, however, has required tremendous personal sacrifice and compassion and a strong will to accept the psycho-physical burden. Importantly, the anticipated intensity of degradation due to climate change was apparently overwhelming for the women to cope with in a sustainable way for even basic survival.

18. The female population, as a percentage of the national total, was last measured at 50.54% in 2014[15]. Sierra Leone has a Gender Inequality Index value of 0.662, ranking 137th out of 146 countries in 2011, thus reflecting significant gender-based inequalities in reproductive health, empowerment and economic activity[16]. Under these circumstances, the issue of poverty reduction in an attempt to adapt to climate change needs to be adequately addressed in any future project. This is because, it would be difficult to engage coastal communities in climate change adaptation (CCA) activities unless there is adequate support at a micro economic level to guarantee livelihood security or to better create the conditions necessary for generating alternative income activities.

[11] The Sierra Leone 2015 Population and Housing Census (PHC). SIERRA LEONE 2015 POPULATION AND HOUSING CENSUS. PROVISIONAL RESULTS. Department of Statistics of Sierra Leone. March 2016.

[12] https://www.cia.gov/library/publications/the-world-factbook/geos/sl.html

[13] http://www.sl.undp.org/content/sierraleone/en/home/countryinfo/,

[14] JUANA BLYDEN BHONOPHA. 2016. Gender Analysis for the Development of a GEF-LDCF Project on Climate Change Adaptation and Coastal Zone Management in Sierra Leone. Draft Report. PPG gender field assessment study. Freetown. August. 2016.

[15] The World Bank. http://www.tradingeconomics.com/sierra-leone/population-female-percent-of-total-wb-data.html

[16] http://www.sl.undp.org/content/sierraleone/en/home/countryinfo/

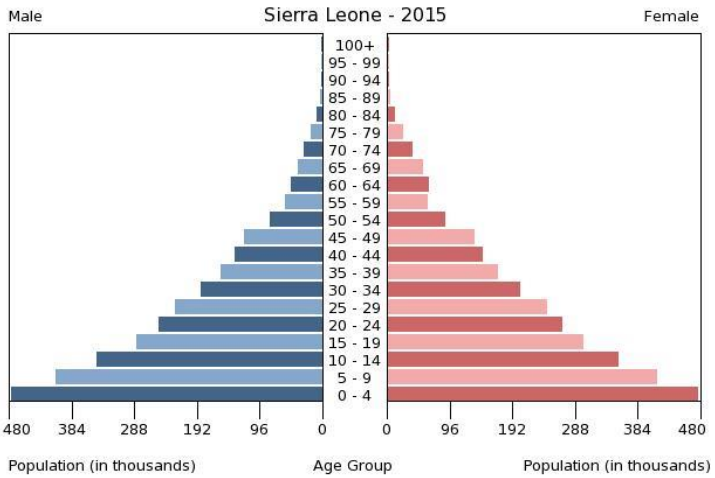


Figure 2. Sierra Leone's population pyramid

1.3.1 Long-term solution and barriers to achieving the solution

19. Considering the above climate and non-climate change induced problems and their probable causes, a number of preferred responses (normative situation) for managing the likely consequences of climate change, as well as barriers that need to be overcome in order to achieve the responses, have been identified. These are: (i) Enhance the availability of high quality climate risk information that is critical for adaptation decision-making in the coastal zone; (ii) Develop appropriate protection measures, policy/legal tools and integrated coordination mechanisms to improve /support policy design and implementation in dealing with current and long-term coastal challenges; and (iii) Promote public awareness and support climate livelihood options that provide sustainable household income without adverse environmental impact (learning from community / civil society experience as appropriate).

(i) Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone

Preferred responses

20. The preferred solution would result in the the installation of new climate and oceanographic monitoring equipment, located along the coastal zone, that is complimented with suitable data processing systems that all are designed to transmit real time data to the existing Climate Information, Disaster Management and Easrly Warning System (CIDMEWS) web portal. The portal is being developed and implemented by INTEGEMS under the UNDP sponsored "Support to Communications and Dialogue on Early Warning, Forecasting Products and Climate Information Project" to enhance the availability and dissemination of high quality climate risk information that is critical for developing decision making in ICZM. It would also seek to develop the human resources capacities required for operating the equipment and the interpretation of collected and processed data.

21. The preferred solution will also strengthen institutional capacities to better handle and use data collected in hydrodynamic modelling to assist in the development of coastal Risk/Vulnerability Mapping. Of critical importance to achieve this shall be to fully appreciate existing data systems and capabilities (e.g.: EPA-SL GIS unit) that are currently in place and from this, formulate the framework for a future Sierra Leone Integrated Coastal Zone Management (SL-ICZM) programme, which can embrace (in the future)

the ongoing CIDMEWS platform to collect, process and use socio-economic data to more accurately monitor and forecast extreme coastal events. In the preferred solution, a two-pronged approach will be implemented to scope out adaptation options at a series of 6 target pilot community sites to address the impacts of climate change and coastal erosion. Community-level Coastal Vulnerability Analysis (CVA) will be undertaken in six pilot communities (target sites), focusing on their vulnerability and protection of livelihoods from the predicted risks of climate change. The preferred solution will support the extension of the current CIDMEWS to better address coastal zone hazard issues that are required to help protect fishing and farming communities against extreme weather variabilities (livelihood security and survival at sea).

(ii) Develop appropriate protection measures, policy/legal tools and integrated coordination mechanisms to improve /support policy design and implementation in dealing with current and long-term coastal challenge

22. The preferred solution would assess all adaptation options that relate to coastal ecosystem protection and enhancement to better address the expected effects of climate change on the coast zone. The preferred solution would also result in the development of scientific and technical capabilities for a number of parameters and indicators needed to evaluate and monitor ICZM performance and delivery over time. These could include improvements in measuring important climate and sea level rise parameters as well CVA better characterization of SLR impacts, how to undertake detailed topographic analysis along the coastline to ascertain detailed setback values, how to develop coastal erosion profiles thereby contributing to the development of national coastal zone vulnerability and risk maps from the targeted pilot sites to improve policy design and implementation. The outputs will be also used to build on existing capacity capabilities that are being used to date in supporting other institutions to help improve the overall institutional capacity of MFMR, EPA-SL, ONS-DMD, SLMA, SLMD/A and MWR to better address the current and long-term coastal challenges through the development of appropriate protection measures, policy/legal tools and establishment of integrated coordination mechanisms.

23. The preferred solution will help formulate and initiate a community based participatory planning process, which is critical to instill ownership of any proposed adaptation measure (primarily Ecosystem Based Approaches (EbA) on the coast). Investment will be focused on degraded coastal areas with EbA being prioritized, using (as appropriate) local vegetative species within nature based interventions which may (for example) help to promote viable "bio-shield" coastal features. Mangrove species will (as appropriate) be used to reduce wave and tidal energy and hence seek to minimise coastal erosion. In the preferred solution, Communities will be involved in the monitoring and evaluation schemes to gauge the actual effectiveness of the proposed 'soft' coastal stabilization measures. The preferred solution would also introduce a relevant national policy instrument (that includes new coastal development guidelines, environmental policy guidelines and strategic environmental assessment reguations etc) to support implementation of future EbA approaches as part of a future Integrated Coastal Management Plan (ICZMP) for Sierra Leone.

(iii) Enhance public awareness and promote climate resilient alternatives to environmentally unsustainable income-generating activities for better adhesion of policy makers and communities on adaptation.

24. This is a critical aspect of the overall project. The preferred solution would see specific actions being undertaken to foster and develop public awareness of potential climate change impacts on the various economic sectors and livelihoods of coastal communities. This shall entail undertaking extensive capacity

building and awareness raising activities with staffs from relevant ministries and departments. Coastal fishing communities shall also be a priority focus for awareness raising programmes in order to improve household understanding of EbA on the coast. The preferred solution would be local capacity strengthening to effectively respond to and manage climate change related risks on the coast. This shall be achieved through the delivery of two related outcomes. Firstly, coastal communities would be better educated about alternative approaches and solutions, through the use of appropriate measures, tools and technologies (e.g. *Centre for Skills Development and Communal Centres for Coastal and Marine Resources Transformation (CCMART's*) that follow the Global Ecovillage Network (GEN) approach[17]), to respond to climate change risks that threaten livelihoods of women, youth and fishing communities. Secondly, communities situated near mangrove forests and/or beach sand mining hotspots would be equipped with the knowledge and the means to pursue climate-resilient alternative livelihoods and thus, provide economic livelihood alternatives (e.g.: new compressed earth blocks approach) which shall be used towards reducing the pressure they had previously placed on these habitats. A "learning by doing" community feedback mechanism for all aspects shall be inculcated into the project design.

25. The following barriers have been identified that preclude the realization of the preferred adaptation solution.

Barriers:

Barrier #1: *Lack of availability and use of data and information relevant to understanding coastal risks*:

26. The limited collection of climate-related data (largely the result of years of political upheaval and conflict) limits the effective assessment and response towards addressing climate change impacts on the coastal zone. Whilst this situation has been improved upon through the introduction of new targeted project interventions (such as the GEF-UNDP EWS project (2013-2017)), this has often benefitted aspects that are not specifically coastal in nature. The scientific and technical capabilities required to effectively identify hazards and forecast their potential impacts on vulnerable communities remains weak. Furthermore, the trained capacity of GoSL officials in complex predictive coastal modelling and forecasting techniques (wave and water level predictions) remains non-existent. In addition, detailed GIS-based time series datasets of coastal landforms/processes to better understand morphological and environmental change along Sierra Leone's coastline are also unavailable. As a result, the current understanding of coastal volatility is very limited, and hence there is inadequate ability to set short and long term coastal policy direction with any conviction/accuracy.

Barrier #2: *Weak institutional and policy capacities for Integrated Coastal Zone Management*:

27. Legislation and regulations designed to directly (or indirectly) protect the coastal zone are often sectoral and poorly enforced and further support is required on legal framework adjustments coupled with an improved alignment of relevant policies. This integrated challenge is demonstrated in that a total of 15 institutions, from central ministries (e.g. Ministry of Lands Country Planning & Environment, Fisheries & Marines Resources, Water Resources, etc.), specialized agencies (e.g. EPA), research institutes (e.g. USL-IMBO), local government (districts councils), NGOs (e.g. Conservation Society of Sierra Leone) and the private sector (e.g. the tourism industry) all have a stake in delivering ICZM though all have limited coherence in their administrative jurisdictions to carry out preliminary technical assessments in a coordinated manner. This paucity in integrative policy and institutional governance structures is

[17] http://gen.ecovillage.org/en/projects/561/all

contributing towards a clear overlap in mandate and an increasing sense of reduced ownership and responsibility for mainstreaming coastal zone management delivery. In addition, there is limited use of real time climate data and incorporation of risks and opportunities to improve policy design and implementation. There are also ineffective coordination mechanisms, including over-centralized system of planning and the absence of a coastal zone planning enforcement policy or guidelines standards. Furthermore, there is no guidance on how to build climate resilient engineering or ecosystem based adaptation (EbA) approaches or intervention measures on the coast.

Barrier #3: *Lack of awareness on coastal risks along the coast*:

28. At present, there is a general lack of awareness of coastal risks amongst communities. This may, partly, be the consequence of very few climate change awareness raising activities being undertaken within the coastal zone as well as limited knowledge, tools and financial resources to support the adaptive capacity of coastal communities to reduce the impact of extreme weather events. There has also been little progress, if any, to build the adaptive capacity of rural coastal communities to cope with current climate variability. Coastal communities lack the knowledge and tools to adapt to worsening climatic conditions. For example, many fishing communities are under threat from over fishing and diminishing fish stocks due to man and natural induced issues including mangrove logging, coastal erosion, sand mining and sargassum invasion. Improved awareness programmes on livelihood security measures are therefore critical as coastal communities often do not have knowledge on alternative "approaches" to those historically undertaken, many of which have extracted finite natural resources (e.g.: sand or mangrove wood). Nor do communities have the required capacity, technical skill and/or assets to enable them to reduce their dependence on coastal resources or to utilise natural resources in a sustainable manner. At the same time, there is a need to reduce local vulnerabilities caused by the dependency on a single livelihood source such as mangrove logging or sand mining. Communities therefore should be introduced to a range of alternative economic livelihoods to become more resilient to climate change, encouraging options such as landscaping/gardening/horticulture as occupations to name a few possibilities. Currently, local communities have few coping mechanisms or alternatives to depending on coastal resources.

Barrier #4: *Inadequate resources and financial constraints*:

29. Sierra Leone, like many other countries, is facing significant barriers and constraints regarding planning and implementing adaptation efforts, including the lack of the necessary finance and technology. It also has limited resources at the national level to support adequate initiatives that will attract coastal communities to embrace new technologies that are more environmentally sensitive. The GoSL is well aware that urgent action is needed to address the threats posed by climate change on coastal resources. The EPA-SL has been at the forefront of taking forward the principles of ICZM and has recently developed key reports, including the state of the Marine Environment in Sierra Leone[18] and the ICZMP[19]. The latter has estimated implementation costs of US$79,415,000 to properly implement the ICZMP for the five years (2016 - 2020). Like in other Least Developed Countries (LDCs), these adaptation costs are high relative to its GDP. Most Ministries also have limited adequate technical capacity and financial resources to put forward and implement a package of adaptation choices to reduce current vulnerabilities. These adaptation costs are especially high for a country facing wide-spread rural poverty which limits any adaptive capacity and a range of economic problems including the impacts of the recent Ebola outbreak

[18] Environment Protection Agency (2015). Sierra Leone State of the Marine Environment report 2015. Freetown, Sierra Leone

[19] Environment Protection Agency (2015). Integrated Coastal Zone Management Plan for Sierra Leone. Freetown, Sierra Leone

and global recession and country's dependence on imports of food, oil and manufactured products. Therefore, the GoSL appreciates that there is scarcity/inadequacy of resources for adaptation and that this constitutes a key constraint in the implementation of the ICZMP. The supporting role and involvement of NGOs and community based organisations (CBOs). Coupled with the financial partnership of the private sector and international partners is paramount for future success.

1.4 Stakeholder Baseline Analysis

30. This GEF/LDCF project builds on the stakeholder engagement process that was undertaken as part of the preparations for Sierra Leone's NAPA (2007). This was guided by a comprehensive and extensive participatory process that involved all relevant stakeholders. This included the participation of local community members as well as professionals from different sectors to facilitate multidisciplinary integration. This complementary approach built upon existing plans and programmes, including national action plans and national sectoral policies.

31. During the consultation process (May 2016 to October 2016), over 200 stakeholders were engaged at national, sub-national, district and community level. Key stakeholders with a major direct role in the project were identified and consulted at different stages to obtain inputs and feedback for designing the project. Two workshops during the Inception Workshop (from 15th and 25th May 2016) and one national workshop for Validation of Project Document (April 12th, 2017)as well as a series of bilateral meetings with GoSL and International Institutions, site visits and interviews with community Members, NGO's and CBO's (Annex 2)[20]. Details of stakeholder consultations – including reports, programmes and participant lists – are included in Annex 3[21].

Primary Stakeholders

32. The implementation of this LDCF-funded project *"Adapting to climate change induced coastal risks in Sierra Leone"* will involve the engagement of specific GoSL institutions. The primary stakeholders which will be leading the various project Outcomes and their potential roles are shown in Table 2.

Stakeholders	Mandates
	Primary stakeholders
EPA-SL Environment Protection Agency of Sierra Leone	The EPA-SL is placed under the Office of the President, headed by an Executive Chairperson, steered by a Board, and coordinates with both national and local Government institutions on issues relating to environmental protection and management. The Agency advices government on the formulation of policies on aspects relevant to the environment as well as climate change impacts. *EPA-SL is the main Responsible Party for the project and will coordinate the activities linked to Outcome 2.*
USL-IMBO Institute of Marine Biology and Oceanography	*Institute of Marine Biology and Oceanography* (hereinafter called the USL-IMBO) is the institution with the mandate to teach and deal with all aspects in Oceanography and Management of the Marine Environment and its Resources, in particular, with coastal erosion and sea level rise issues. It also carries out research activities as well as national

[20] Stakeholders Consultation Report
[21] Inception Workshop Report

Stakeholders	Mandates
	services particularly in the context of the coastal and marine environment at the national, regional and international level. *USL-IMBO is a Responsible Party for the project and will coordinate the activities linked to Outcome 1.*
MFMR Ministry of Fisheries and Marine Resources	*Ministry of Fisheries and Marine Resources* with the mission to plan, develop, rationally mange and conserve living aquatic resources for the benefit of the country by establishing sustainable Monitoring, Control and Surveillance procedures with respect to livelihood enhancement of fishing communities and increase contribution of fish resources to the national economy. *MFMR is a Responsible Party for the project and will jointly coordinate with NTB the activities linked to Outcome 3.*
NTB National Tourist Board	*The National Tourist Board*, a semi-autonomous body and the professional arm of the Ministry of Tourism and Cultural Affairs which oversees the development and promotion of (sustainable) tourism opportunities; and monitoring and maintaining the operations of all tourist establishments to ensure quality service delivery in order to enhance socio-economic development. *NTB is a Responsible Party for the project and will jointly coordinate with MFMR the activities linked to Outcome 3.*

Table 2. Primary stakeholders and their mandates.

Secondary Stakeholders

33. Project implementation will require the support and involvement of a number of additional secondary stakeholder partners as follows: (see Annex 2 for full details on *Secondary stakeholders):*

- The Sierra Leone Meteorological Department (SLMD/A);
- The Disaster Management Department (DMD);
- The Ministry of Local Government and Rural Development (MLGRD);
- The Sierra Leone Maritime Administration (SLMA);
- The Ministry of Youth Affairs (MOYA);
- The Ministry of Lands, Country Planning and Environment (MLCPE); and
- The Ministry of Works, Housing and Infrastructure (MWHI)
- National Protected Area Authority (NPAA)
- The Sierra Leone Navy,

Non-Government Organizations

34. The committed engagement by NGOs, CBOs and communities in the project was emphasized by Government partners, including the need to ensure that future consultations capture the full range of perspectives, including those of minorities, women and youth, less vocal groups and stakeholders who may not have been present at the time of the consultation. The importance of addressing issues related to gender equity was emphasized throughout the consultation process. Therefore, to attain these goals the following NGOs and CBOs were identified to work in the various activities and pilot sites (see Annex 2 for full details on *Non-Government Organizations)*:

- The Conservation Society Sierra Leone (CSSL);
- The Environmental Foundation for Africa (EFA);

- The Environmental Forum for Action (ENFORAC);
- The Island Aid Sierra Leone (IA);
- The Women's Network for Environmental Sustainability (WoNES);
- The Climate Change, Environment & Forest Conservation Consortium (CEFCON-SL);
- Sierra Leone Artisanal Fishermen Union (SLAFU);
- Civil Society Alliance on Climate Change.

The West Africa Biodiversity and Climate Change (WA-BICC).

II. STRATEGY

2 Project Rationale

2.1 Policy Conformity

35. Sierra Leone became party to the UNFCCC on 10th November 2006 and is classified among the non-Annex 1 parties. Sierra Leone belongs also to the group of the Least Developed Countries (LDC). Sierra Leone has developed and submitted its National Adaptation Programmes of Action (NAPA), published in 2007 in accordance with the requirements outlined in the UNFCCC COP 7, which listed 24 urgent and immediate adaptation needs. The following five were identified as being most relevant to Sierra Leone (Table 3). The GoSL has requested the Least Developed Countries Fund (LDCF) to support this Full-Sized Project (FSP) in order to implement Sierra Leone's NAPA priority interventions nº 2, 4, 14, 16 and 17.

NAPA Priority Rank	Activity
2	Rehabilitation & Reconstruction of meteorological/climate Monitoring stations throughout the country
4	Sensitization and awareness raising campaigns on climate change impacts on women relating to the three conventions of biodiversity, desertification and UNFCCC
14	Development of an Integrated Coastal Zone Management Plan for Sierra Leone.
16	Development and enactment of appropriate policies and regulations relevant to the development of coastal communities, urban growth planning, and critical coastal ecosystems preservation
17	Establishment of a National Sea-Level Observing System in Sierra Leone

Table 3 Sierra Leone NAPA priority Rank and activities

36. The project in conjunction with other baseline and adaptation related initiatives will address the barriers (see Section 1.3) that are identified as preventing Sierra Leone from reducing its vulnerability to climate change. These barriers will be addressed through the delivery of a coherent project framework which comprises three Outcomes:

37. Firstly, Outcome 1 of the project will tackle the issue of institutional and human capacity constraints by focusing specifically on improving the effectiveness of coastal data collection monitoring programmes and establishment of supporting information management systems. The focus is therefore on building capacity to collect key data on coastal dynamics through the the installation of Oceanographic Monitoring Systems (ONS - which are oceanographic monitoring stations with telemetry, archiving and data processing facilities) and improving human resource capacity to process data and use the newly collated

data within hydrodynamic models to help generate information that shall be used for vulnerability and risk mapping. The CIDMEWS web based GIS system shall be updated to complement the existing system being set up under the current EWS project (UNDP 2013-2017). This shall be adapted to act as a national (coastal specific) Knowledge Management Platform (KMP) to help nurture cross sectoral links on ICZM related issues. Current government officers within relevant institutions will have improved capacity building programme developed to better monitor, measure and assess the impact of specific climate change parameters on coastal dynamics.

38. Secondly, in Outcome 2, in order to maintain and build sustainable coastal protection interventions, the project will support ongoing efforts through the integration of coastal related risk into the National Vulnerability Assessment Plans. These shall clearly identify the key local risks (per District) to help EPA-SL to improve its legislative enforcement capacity, assist in revised policy design and from this, assist in future plan implementation. This outcome will strengthen national coastal planning, in addition to providing the catalyst for improved budget allocations in relation to delivering ICZM so that resilience-building initiatives (identified in the integrated coastal zone management programmes) can be financed by either domestic or external resources and executed in a more sustainable manner. For this to occur, the capacities of local/district government levels shall be strengthened so that they have the improved knowledge and resources available to help deliver a future national ICZMP.

39. Thirdly, the focus of Outcome 3 shall be on building local level community awareness to divert current day practices away from environmentally damaging practices into alternative and sustainable income generation activities that are climate resilient in nature. The project will undertake the design and implementation of an adaptation "package" that shall encourage the promotion of nature based interventions on the coast at six selected pilot sites. At the same time, women and youth will be specifically targeted (through capacity development programmes) to help with the future replication of nature based interventions that (through coastal monitoring) demonstrate international best practice of climate change adaptation on the coast. It is expected that, by the end of the project, the key stakeholder groups will possess the necessary skills at a range of levels, within both local communities and GoSL. Capacity building at these two levels will therefore be a building block towards effective and sustainable coastal protection interventions that will extend beyond the LDCF project lifecycle.

LDCF Conformity

40. This project is consistent with GEF's Strategy on Adaptation to Climate Change for the LDCF. LDCF resources will be used also to provide relevant coastal risk information to policy makers and communities to support them about how to deal with coastal erosion through the consideration of nature based interventions, and how to use this material to better guide coastal planning decision making on coastal erosion management (CCA-2.1 outcome) and how to mainstream adaptation within coastal development plans to enable smart investment in the adaptation sector (CCA-1.1 outcome).

41. The project conforms to the LDCF's eligibility criteria, namely: i) undertaking a country driven and participatory approach; ii) implementing the NAPA priorities; iii) supporting a "learning-by-doing" approach; iv) undertaking a multidisciplinary approach; v) promoting gender equality; and vi) undertaking a complementary approach, as described below:

Gender equality:

42. The project outcomes will contribute towards an understanding of how adaptation responses can be designed to strengthen gender equality. To achieve this, the project will ensure that women attend workshops and contribute to the decision making process regarding pilot study intervention options, community based CIEWS, and also the composition of community management committees. In addition,

the project will undertake gender sensitive training, that focuses on how to better communicate climate related hazards or warning techniques which must be better conveyed and disseminated to vulnerable communities. A gender analysis has been conducted for the project and this is available in Annex 4.

43. **Complementary approach**: In order to build upon existing plans and avoid the duplication of efforts, the project will be working in conjunction with relevant ongoing projects in Sierra Leone (see Section 2.3.2 for details).

Overall GEF Conformity

44. The Project has been designed to meet overall GEF requirements in terms of design and implementation. For example:

- **Sustainability:** the project shall have a sustainable impact, at village and at national level. See section 2.5.4 (Sustainability) for more details.
- **Monitoring and evaluation:** the project is accompanied by a supporting M&E framework that will enable ongoing adaptive management of the project. It shall also ensure that lessons are learnt, management decisions are taken based on relevant and up-to-date information, and regular progress reports are available for concerned parties.
- **Replicability:** The approach to be adopted by establishing pilot sites that shall be subjected to new marine and climate monitoring techniques plus a new functional Coastal Early Warning System (CIEWS) approaches will help to adopt new methods that maybe replicated elsewhere in Sierra Leone and used to contribute towards the establishment of a fully functional national approach. See section 2.5.4 for more details.
- **Stakeholder involvement:** The project has been designed in a participatory manner to ensure significant stakeholder inputs, and will be implemented in a way to ensure their full participation in all implementation aspects including monitoring and evaluation.
- **GEF Gender Equality Action Plan:** The project has a strong gender aspect embedded in the activities. A gender expert was recruited as part of the PPG to ensure gender is successfully taken into account, in alignment with the GEF Gender Equality Action Plan. A gender analysis was conducted – see Annex 4 – and integrated measures to mitigate possible adverse gender impacts, to integrate gender sensitive activities with indicators to monitor and evaluate the mainstreaming process.

2.2 Country ownership: country eligibility and country drivenness

2.2.1 Country drivenness

45. The Sierra Leone Vision 2025 (SLV_2025) and the Government's Agenda for Prosperity (A4P), for the period 2013 – 2018, were the guiding documents in the design of the project. SLV_2025 lays out a long-term plan aimed to transition Sierra Leone from an LDC to a middle-income status by 2035 through conservation and promotion of the rational use of the Nation's natural resources. This remains consistent with the overall goal of sustainable development for the country. The SLV_2025 mission also promotes the i) Sensitization of the public on environmental management and ii) Strengthening the capacity of the government institution responsible for the environment to lead the process of harmonization and enforcement of policies regarding the conservation and utilization of natural resources. The elaboration

of an inter-sectoral and community based disaster preparedness plan is one of the principal challenges identified in the National Vision 2025 as requesting urgent attention.

46. The project will also contribute to the advancement of the Nationally Determined Contribution (NDC) of Sierra Leone, presented ahead of the COP21 in Paris on October 1st, 2015 and ratified in November 1st, 2016. More specifically, the project will support the achievement of the following strategies:

Strategy 5:	Management of coastal and fisheries resources through promotion of non-destructive fishing techniques to maintain resilience of marine ecosystems
Strategy 6:	Promotion and facilitation of early warning and disaster preparedness system.
Strategy 9:	Enhance the resilience of the tourism value chain.
Strategy 10:	Create enabling environment for the resilience of private sector investment, demonstrate an operational business case.

47. The GoSL has drafted and implemented a wide-range of policies that directly or indirectly relate to climate change adaptation and risk mitigation. The A4P (2013 – 2018) represents the country's Third Generation Poverty Reduction Strategy Paper (2013 – 2018) which is underpinned by eight Pillars, two of which ("Economic Diversification to Promote Inclusive Growth" – Pillar 1 and "Manage Natural Resources" - Pillar 2) are related to the aims set by this LDCF project.

48. The national environmental policy and environmental assessment (EA) legislation and procedures relevant to the project, are outlined below.

- *The National Biodiversity Strategy and Action Plan (2003);*
- *The National Environmental Policy (NEP), 1994;*
- *The National Land Policy (2015);*
- *The National Disaster Management Policy, Strategy and Action Plan (draft 2016);*
- *The National Environmental Action Plan (2002);*
- *Integrated Coastal Zone Management Plan for Sierra Leone 2015;*
- *The Environmental Protection Agency Act (2008);*
- *The Environmental Protection Agency (Amendment) Act, 2010;*
- *The National Security and Central Intelligence Act No. 10 of 2002;*
- *The National Disaster Management Policy (Draft);*
- *The National Commission for Relief, Rehabilitation and Reconstruction Decree, 1996 [NPRC Decree No. 12];*
- *The National Climate Change Policy (2016;*
- *The National Protected Area Authority Act (2012).*
- *The Fisheries and aquaculture policy 2016 and*
- *The fisheries strategy of 2016.*

2.3. Design Principles and Strategic Considerations

2.3.1 Linkages with national policy framework

49. The Project is linked with the current UNDP Country Programme 2013-2014 that address natural resource management issues through capacity enhancement for improved environmental governance. It

furthermore feeds into two environment related Outcomes of the new UNDAF 2014-2018 (Outcome 1: By 2018, targeted Government institutions, the private sector, and local communities manage natural resources in a more equitable and sustainable way; Outcome 2: By 2020, targeted communities demonstrate decreased vulnerability and increased resilience to natural and man-made disasters). The project supports UNDP Strategic Plan Outcome 3: Resilience-building. It will support the integration of disaster risk reduction with adaptation to climate change and address differentiated social and economic impacts; and preparedness for disaster management and recovery at the sub-national and national levels.

50. The project is also aligned with Sierra Leone's targets for SDGs 1, 2, 5, 7, 11, 13 and 15 (see Section 2.3.3). Furthermore, the activities to be developed by the project are in the context of the Government's medium term development plan (A4P – see Section 2.2.1) for the period 2013 – 2018" to promote mainstreaming of environmental and disaster management issues.

2.3.2 Linkages with relevant national and regional initiatives

51. To ensure that the LDCF funds are used in a strategic manner, the LDCF project aims to build upon existing climate adaptation in coastal areas in Sierra Leone and abroad, plus work associated with EWSs and livelihoods-related activities that are being implemented by both government and NGOs. This includes coordinating with community-based livelihoods and existing rural development efforts plus strengthening the national framework for coastal CCA implementation. A stocktaking exercise conducted during the PPG phase has identified relevant GEF and non-GEF interventions to the LDCF funded project. Therefore, the project builds on an existing portfolio of initiatives which will provide information and experience in relation to the use of climate information and planning/development of climate change adaptation measures. The proposed LDCF project will closely coordinate with the following adaptation initiatives to utilize the potential synergies and maximize adaptation benefits for Sierra Leone:

National Initiative

(i) **SLMD/A and SLMA Project Proposal:** *"Strengthening weather and climate information and services for enhanced marine meteorological service delivery for timely Early Warning Systems for the protection of live and property at sea".* This project with a budget of **US$3.350 million** is aiming at the strengthening of the early warning systems of the SLMA, largely through improving national capabilities to generate and use /weather/climate information in the planning for and management of weather/climate induced hazard risks. The project is also timed to strengthen and support the further roll-out of GoSL and donor activities under the Second Poverty Reduction Strategy Paper (the Agenda for Change) (the UNPRSP II) 2008-2012 and the Agenda for Prosperity.

Regional Initiatives

(i)The **West Africa Biodiversity and Climate Change (WA-BiCC).** Total USAID Funding: **US$48.9 million**. Life of Project: May 2015 – May 2020. This project has West African Partners such as the ECOWAS, Mano River Union, the Abidjan Convention. Amongst other objectives this project aims at:

- Improve Coastal Resilience in West Africa through integrated planning and the strengthened capacity of local, national and regional frameworks. WA-BiCC will build local, national and regional capacity to generate and use climate information in coastal planning, support the National Adaptation Planning process, and pilot and scale up coastal adaptation strategies that are effective.

- Reduce Deforestation, Degradation and Biodiversity Loss in key forests through WA-BiCC technical and knowledge management support. The program will improve capacity for economic planning and development of Low Emissions Development Strategies, REDD+, and transboundary conservation strategies while simultaneously engaging the private sector and supporting frameworks to integrate best practices for the sustainable management of natural resources. This project has been active in integrating coastal adaptation and mangrove ecosystem conservation into national and regional policies and frameworks, as well as disseminating mangrove conservation best practices for intensive site based mangrove conservation activities in the Greater Freetown Landscape.

(ii) **Earthworks Construction (G) Limited (hereafter "Earthworks")** is an established construction company that works almost exclusively with Compressed Stabilized Earth Blocks (CSEBs) and was the first company to employ this technology in The Gambia in 2005. Earthworks have championed this technology at Sandele Eco-Retreat and Learning Centre ('Sandele") which was constructed using CSEBs. Sandele's proprietors purchased a single Aurum Press 3000 from Aureka, an Indian company. So much interest was expressed in the technology that Earthworks was registered as a company in 2007. Since then, Earthworks has constructed 7 water tanks in rural villages; a small eco-tourism camp at Tanji for the National Environment Agency; 6 houses; extended an MRC clinic at Farafenni; built a health centre and mosque for the Muslim Development Agency; completed a 300-seat theatre for the Ebanjan Theatre Association; and is currently building an Inclusion Centre for disabled children in Gunjur. Earthworks now owns 5 machines, which gives them the capacity to currently construct a 3-bedroom low cost show house at Tujering in collaboration with the Ministry of Social Security and Housing Finance and an inclusion centre for disabled children for Disability Africa at Gunjur. The Gambian Association of Construction Contractors and Consultants (GACCON) commissioned Earthworks in 2012 to provide training for 65 block makers, masons and engineers with funds provided by the World Bank. This was a very successful programme and GACCON representatives expressed satisfaction with the training that was provided. With the success of this initiative, the CSEB technology is slowly being recognized and introduced by a small number of entrepreneurs; and local architects communicated their willingness to recommend the technology to their clients.

52. The following are the programmes that form the baseline for the proposed LDCF project and provide co-financing against the climate related additional funding.

53. Table 4 outlines the associated baseline projects and the indicative co-financing amounts upon which this LDCF project shall build. This is further elaborated in Section 2.4 for each of the LDCF project's outcomes and the co-financing letters of support are given in Annex 13.

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (US$)
*Recipient Government	Government of Sierra Leone - Agenda for Prosperity - Pillar 1 - Economic Diversification to Promote Inclusive Growth. Pillar 2 - Managing Natural Resources.	Grant	4,150,000
*Recipient Government	Envrionmental Protection Agency	Grant	299,250

*Recipient Government	Government of Sierra Leone – National Platform for Disaster Risks Reduction in Sierra Leone.	Grant	27,160,750
GEF Agency	UNDP	Grant	190,000
Total Co-financing			31,800,0000

Table 4. Associated baseline projects and the co-financing amounts

2.3.3 Macro, national and local benefits of the project

54. The project will seek to benefit: i) the poorest segments of society, who have the least socio-economic resilience to coastal hazards; ii) national institutions including MFMR, EPA-SL, SLMA, USL-IMBO, ONS-DMD, SLMD/A and the GEO DEPT, who will benefit from enhanced capacity to monitor parameters relevant to coastal change and develop predictive models on the expected local impacts of climate change; iii) agencies who will receive tailored information relevant to long-term climate resilient planning and ICZM; iv) sectors such as those under the MFMR and NTB, which are susceptible to climate change-induced coastal change, including fisheries, construction, tourism and transport.

Macro-economic benefits

55. This project supports national development goals and plans to achieve the following SDGs;

- SDG 1: *End poverty in all its forms everywhere* - This project aims to improve flood and marine forecasting within the coastal zone of Sierra Leone, providing useful climate information such as daily and seasonal forecasts to considerable number of population, particularly coastal fishing communities. Therefore, by 2030, the project will seek to improve the resilience of the poor, reducing their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

- SDG 2: *End hunger, achieve food security* – This LDCF will contribute towards ensuring that sustainable food production systems are initiated and that climate resilient agricultural practices are implemented within vulnerable coastal communities so as to increase productivity and production. The project will work with local Women's Associations and, under the technical guidance of the Ministry of Agriculture, Forestry and Food Security (MAFFS) extension services develop resilient coastal small-scale farming including the provision of small scale water sources and irrigation systems to withstand droughts episodes.

- SDG 5 *Achieve gender equality* – Women account for over 90% of the people engaged in fish marketing, over 80% of retailers of food products and vegetables, and over 90% of operators involved in the artisanal processing of agricultural and fishery products. The project shall seek to ensure that women will be better empowered by encouraging them to take action to get involved in local coastal adaptation projects that invest in sustainable livelihood activities. Women focused NGOs have been involved throughout the project design and implementation phase of this LDCF. The project will therefore ensure that women continue to fully participate in its implementation. Equal opportunities for leadership at all levels of decision-making shall be ensured within the implementation of all adaptation measures.

- SDG 11: *Resilient cities and human settlements* - The LDCF project will effectively develop national capability to better predict future climate scenarios of SLR and related impacts on coastal communities, as well as systematic processes for packaging, translating and disseminating climate information and warnings so as to strengthen disaster risk management within the coastal zone and to improve the protection of vulnerable coastal communities and settlements.

- SDG 13: *Fighting climate change and its impacts* - The LDCF will strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in the coastal zone through characterization of SLR impacts and through the undertaking of detailed topographic analyses along the coastline to develop coastal erosion profiles and from this to better ascertain detailed setback values, as part of the development of a national coastal zone vulnerability and risk mapping programme. The new knowledge base generated on future climate risks will be integrated into national policies, strategies and planning processes. The project will also improve education, awareness-raising and human and institutional capacity strengthening on topics such as climate change adaptation, impact reduction and early warning systems. Planned project activities will also promote mechanisms for raising capacity for effective climate change resilience, which places a particular focus on women and youths.

- SDG 15: *Protect, restore and reverse land degradation* – In an attempt to restore degraded mangrove forests, the project will support nature based interventions (including mangrove afforestation and reforestation programmes) as well as promoting the implementation of sustainable community based alternative income generation activities to help address deforestation. In addition, the foundation of this project shall be to ensure environmental sustainability by mainstreaming climate resilience into national policies, planning, and decision-making and; by focusing on building Sierra Leone's capacity to deliver ICZM in the long term. Such endeavours can assist in the sustainable use of natural resources through adherence to ICZM principles and adopting good ICZM practices.

National benefits

56. The activities undertaken in Outcomes 1, 2 & 3 will support to advance the national adaptation process in Sierra Leone by:

- Enabling key GoSL institutions to be able to access new data (climate scenarios, historical climate data and information on climate change impacts constituting) and systems (including storm surge alerts or extreme predicted or forecast events impacting on the coastal zone) that better informs coastal planning decisions.
- Through this project activity, approximately 60,000 members of the artisanal fishing community (of which 11,000 are directly linked to fishing activity) will benefit from improved safety measures in daily coastal navigation through a combination of activities that focus early warning dissemination and disaster response mechanisms. It is estimated that approximately 116,000 people from Conakry Dee, Lakka, Hamilton, Tombo, Shenge and the Turtle Islands will benefit from the project in this respect;
- Providing necessary preparatory elements for mainstreaming coastal adaptation into national and subnational development plans (e.g.: Code on Land and Urban Development, Community Vulnerability Maps, SLR induced coastal erosion risk profiles, etc.). This will support the updating of legal and regulatory frameworks at national level by considering the expected risks of climate

change (e.g., sea level rise) so as to influence development and the application of coastal adaptation measures to provide long-term positive benefits for vulnerable coastal populations and infrastructure;

- Developing implementation strategies through the prioritization of climate change adaptation within disaster risks plans, enhancing capacity for planning and implementation of adaptation, and promoting coordination and synergy under the adapted CIDMEWS web based approach will facilitate decision-making for effective ICZM implementation;
- The projects nature based interventions at the pilot sites of Conakry Dee, Lakka, Hamilton, Tombo, Shenge and the Turtle Islands will ensure that the sustainability of actions towards improving coastal resilience is achieved along with specific activities that are designed to support community livelihood improvements through the adoption of an integrated programme for coastal management that embraces climate variability which is based on new vulnerability and risk mapping outputs to be carried out;
- The initiatives to be developed by the project will help build the capacity of GoSL planners and technical officers to identify, develop and appraise no/low regrets investment options and integrate these into national planning processes, programmes and plans.

Local benefits

57. The activities undertaken in order to achieve Outcomes 1, 2 & 3 will strengthen the resilience of local communities, ecosystems and infrastructure against climate change impacts on the coastal areas as follows:

- The risk assessment and adaptation planning exercise undertaken for the pilot areas will provide a climate sensitive basis for the ongoing, integrated management of each pilot site which will contribute to the overall goal of improving and safeguarding conditions throughout the coastal ecosystems benefiting the regeneration of natural coastal habitats (such as mangrove stands etc).
- The LDCF funding will strengthen the in-country capability with approximately 10,000 people (at least 50% are women) benefiting from the establishment of *Communal Centres for Coastal and Marine Resources Transformation (CCMART's)* to promote community based adaptation initiatives based on the concept of Eco-Villages. In addition, around 10,000 youth (at least 50% women) across the sites will benefit from services provided by a *Skill Development Centre (SDC)* to assist youth in developing skills for alternative income generating activities[22] to curb degradation of the coastline through environmentally unsustainable activities such as mangrove cutting and sand mining.
- The private sector will also be potential beneficiaries of the project by creating Public Private Partnerships (PPPs) between hotels and local community members (e.g. through NGOs) to undertake coastal adaptation interventions, training and the creation of job opportunities in support of local tourism development and ICZM.
- Compliance with SDG5 (gender equality) has been described above. To embellish the points already made, the project will contribute to women's empowerment through two additional avenues: enhanced participation and increased responsibilities. Participation of women in the implementation of adaptation measure is expected to be tangible and gender considerations have been integrated into the project indicators, targets and activities. At the end of the project implementation, the project will specifically look into gender-differentiated impact of the project

[22] In close cooperation with The Sierra Leone Artisanal Fishermen Union – SLAFU: Fish net mending techniques, boat construction/repair/maintenance, carpentry, welding, electrical technicians, plumbing, etc.

by engaging a gender (technical) specialist. Results from this assessment will be widely disseminated at a regional or national workshop, contributing to heightened awareness and understanding about the impact of coastal protection and nature based interventions on gender equality or empowerment. Responsibilities will also be given to women not only in the development of these interventions (i.e.: simple 'soft' coastal protection measures), but also as the key agents for the improvement of waste management techniques and creation of alternative livelihoods through waste collection, waste recycling and ecotourism. In addition, women shall be trained as "leaders" of small-scale Communal Centres for CCMART's as well as being the key members of the local Women's Associations involved in alternative farming and fish smoking techniques to be implemented by the Project. These responsibilities will be financially rewarded, initially through the project budget under a "cash for work" scheme during the implementation.

2.3.4. Brief Introduction to Project Pilot Sites

58. Six demonstration sites were identified through an extensive consultative process held at both the national, District and community (Chiefdom) levels. The following sites were selected based on priorities drawn per their importance in relation to the vulnerability of coastal communities, the magnitude of sea level rise-induced risks of flood and coastal erosion process, and impacts on the livelihoods of local communities. These are: *Conakry Dee* in the Kaffo Bullom; *Lakka*; *Hamilton*; *Tombo*; *Shenge* and *Turtle Island* (see Annex 3 for full details of these sites).

59. The vulnerability assessment conducted during the PPG phase in the six pilot communities clearly showed that fishing, and subsistence agriculture represent two major types of livelihoods that are affected by climate change. Other relevant problems observed within the communities were:

- severe coastal erosion;
- youth unemployment;
- beach sand mining
- mangrove logging
- fresh Water scarcity
- waste management issues
- sea water intrusion
- sargassum invasion; and
- depletion of fish stocks

60. The community specific analyses were collated into a Table (presented in Annex 3) summarizing the key coastal climate change issues facing each community and outlining the range of potential treatment options. Given that estimates indicate that the population of the six pilot sites reaches over 116,000 people the conservative estimate of the total number of people who will directly benefit from the project investments are at least 60,000.

61. For each project Pilot (target) Site, a strategic partnership will be established in order to complement their activities and to encourage a portal for lessons learnt as appropriate. Therefore, the proposed partnership approach will establish the opportunity to test the effectiveness of Community based "teams"

that will support the delivery of activities associated with any relevant aspect of the project (coastal and disaster management related activities).

2.3.5. UNDP Comparative advantage

62. UNDP has established trusted relationships with key Government partners, national research institutions, civil society organizations and local communities in Sierra Leone. It has a strong comparative advantage as a partner for environmentally sustainable development interventions due to its neutral position and convening power, as well as its strong track record of working with government partners and other national stakeholders on complex issues related to natural resource management, CCA, DRM, youth empowerment and employment, gender mainstreaming and inclusive growth.

63. UNDP has helped Sierra Leone to prepare the Initial and the 2nd National Communication to the UNFCCC and the Country's National Adaptation Programme of Action (NAPA), the (Intended) Nationally Determined Contributions (INDC) and is overseeing the implementation of the following GEF projects:

- The UNDP_GEF "Building adaptive capacity to catalyse active Public and Private Sector participation to manage the exposure and sensitivity of water supply Services to Climate Change" ($2.9 millions);
- The UNDP GEF "Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change – Country: Sierra Leone" ($3.6 millions);
- The UNDP GEF "Energy Efficient Production and Utilization of Charcoal through Innovative Technologies and Private Sector Involvement" (1.7 millions).

64. UNDP also supports the Disaster Management Department (DMD) in the Office of National Security (ONS), the national body responsible for disaster prevention and management, through the Environment and Natural Disasters Project to prepare and respond to disasters more efficiently across Sierra Leone. With UNDP's support, the DMD/ONS is now engaged in Disaster Risk Reduction and emergency preparedness activities, and is working to strengthen the country's capacity to reduce the risks posed by disasters, build resilience and minimize the population's vulnerability, both at national and community level. The project also supports the Government of Sierra Leone to build strong institutional and legal frameworks for coordination and leadership as well as technical capacity for disaster risk reduction, emergency preparedness and response.

65. The UNDP Sierra Leone Country Office is well resourced to provide the necessary support to the GoSL in implementing this LDCF funded project. The UNDP over the course of several years developed a solid working relationship with the relevant MDAs that will ensure effective implementation of the project. The UNDP has a strong track-record on supporting the government on an integrated approach to environmental management and development. The UNDP has an in-depth knowledge of the institutional setting and can work productively with the government in addressing these constraints within the context of the GEF project.

66. The UNDP CO, with the support of expertise in the Regional UNDP-GEF team, will assist the Government through the different Responsible Parties of the project. Staff working with national and local partners on programming and projects related to sustainable management of natural resources, and climate change (especially those focused on adaptation) will be mobilized to support the Government with this project. In particular, a Head of Unit (P4), two national professionals will provide technical and

policy support. The CO team is currently focused in supporting the Government in the following key areas: 1) assistance to the international climate negotiations; 2) capacity building to access and implement climate finance; and 3) effectively integrating climate change into a country's national plans, policies and strategies to ensure development is both low-emission and climate resilient. Other management support services will also be provided based on need including on procurement & finance services.

III. RESULTS AND PARTNERSHIPS

2.4. Project Objective, Outcomes and Outputs/activities

67. The Project Objective is to "*Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods"*. This LDCF intervention will be articulated around three Components:

- Component 1: Generating sound scientific knowledge and access to information;
- Component 2: Climate information internalized into coastal development policy and plans;
- Component 3: Awareness and alternative, innovative activities to support adaptation in the coastal zone.

68. The ultimate goal of the LDCF project is to increase the resilience of Sierra Leone's vulnerable coastal communities and associate economic sectors (including fisheries, agriculture, tourism, transport, and water) to the negative impacts of climate change. At a national level, the project will strengthen the GoSL current attempts to deal with coastal adaptation in order to reduce the vulnerability of coastal communities to climate related risk. The institutional and capacity building provided by the project will enable key Government agencies and Departments to be better equipped to implement adaptation planning. In the long-term, the investments of the LDCF project will generate continuous benefits for coastal communities and vulnerable economic sectors beyond the lifespan of the project. For example, the increased infrastructural and technical capacity within MFMR, EPA-SL, SLMA, USL-IMBO, ONS-DMD, SLMD/A and the GEO DEPT, will support the generation climate and weather data of coastal areas to inform the timely issuing of early warnings for site-specific climate induced coastal hazards from national agencies such as Disaster Management Department (DMD).

69. Through these components, the project will work towards the removal of those policies and any informational barriers that are preventing Sierra Leone, as a nation, to systematically manage coastal risks. This will contribute to the vulnerability reduction of both coastal communities and ecosystems and strengthen institutional capacity and adaptation planning.

70. Project duration is 5 years, starting in 2017 with an overall budget of US$ 9,975,000 and the project's outcomes (Components) are as follows:

Component 1: Generating sound scientific knowledge and access to information

71. This component seeks to establish a functional network of coastal climate and sea level rise (meteorological and oceanographic) monitoring stations and associated infrastructure (e.g.: satellite transmissions system and hydrodynamic modelling and forecasting facilities) as a basis for enhancing the availability of high quality climate risk information that is critical for developing decision-making within

the coastal zone. An updated CIDMEWS (web based GIS platform for coastal related datasets) shall be a key output of this Component, designed to help and generate information and to assist in the systematic storage, analyses and incorporation of climate, environmental and coastal data. The updated CIDMEWS shall assist in national decision making, conceptualization and implementation of strategies, policies and programmes at the national level. This shall be supported by an ancillary institutional capacity programme in addition to a gender sensitive human capacity development programme to enhance and strengthen the current understanding and assessment of natural hazard risk and climate risk vulnerability.

OUTCOME 1. Enhanced availability of high quality climate risk information that is critical for development decision-making in the coastal zone.

Baseline – without LDCF intervention

72. Environmental monitoring and assessment programmes, of direct relevance to the coastal and marine environments have been limited in Sierra Leone. Any data collection exercises or research is restricted to activities undertaken by the Institute of Marine Biology and Oceanography (USL-IMBO) and the Department of Geography, Fourah Bay College and Njala University. These institutions continue to face significant constraints in taking forward scientific understanding as a direct consequence of the limited availability of high quality data. National data and information of specific relevance to SLR induced coastal erosion events, coupled with any real time monitoring of coastal volatility parameters (associated with climate change) is currently very limited. The only existing tidal gauge in Sierra Leone is installed at Aberdeen Point, though this has not been functional for many years and the meteorological station network that provides contemporary real time data specific to coastal situations is extremely fragile (2 poorly maintained stations). The capacity to collecte and analyse data, calibrate and run hydrodynamic models is, as a result, limited. In addition, the availability of accurate topographic and long-term extreme weather event datasets may also not be available.

73. The EPA-SL has completed the marine and coastal oil spill sensitivity mapping with the support of the Regional Programme for Coastal and Marine Conservation (PRCM) and the United Nations Development Programme (UNDP- Prevention Development Programme). Despite this, the lack of real time data collection on meteorological datasets is having an inevitable impact on the accuracy of the sensitivity mapping exercises that are being undertaken in parallel hence climate change risks are not being taken into consideration to any significant degree. The SLMD/A is responsible for collating regular weather and climate monitoring and warning data. But equipment being used to collate it is not fully operational, even though it has lately been addressed by the UNDP EWS project which has enhanced the capacity of hydro-meteorological services and networks to better predict climatic events and associated risks.

74. It is expected that the LDCF funds will complement the PRCM pilot coastal zone management project that was implemented in 2009 - 2011 by covering the coastline of Sierra Leone that was not included in its entirety. Although SLMD/A and SLMA have put forward a project to install four Marine Meteorological Stations at Bakuma (close to the Guinean boarder), Falcon Bridge (Freetown), Nitty (Sierra Rutile area) and Sulima (Close to the Liberian Boarder), there remains no guarantee that this new equipment will be in installed any time soon. Moreover, given the size of Sierra Leone's coast, even if these stations are deployed, significantly more than 4 stations would be needed to sufficiently cover the whole coastal zone. Therefore, there is currently insufficient investment on marine meteorological stations and the relevant technical staffs are not trained to maintain the equipment, nor skilled to make effective use of the data

collated (i.e.: to use the data for coastal modelling purposes and from this, better understand SLR and coastal storm prediction impacts.

75. In addition to a lack of equipment to collate real time data on the coast, there is inadequate and insufficient resource capacity (technical and financial) to ensure institutions such as MFMR, EPA-SL, SLMA, SLMD/A, ONS-DMD and USL-IMBO are able to undertake coastal monitoring, planning and ICZM regulatory enforcement in order to address and put forward implementable and sustainable procedures and policies to reduce climate change vulnerabilities for coastal populations. At the national level, for example, a very limited number of staff members within institutions such as MFMR, EPA-SL, SLMA, SLMD/A, ONS-DMD and USL-IMBO have the necessary skills and understandings of climate change impact on the coastal environment, let alone how to effectively integrate these understandings into plans and financial forecasting of budgets etc. There is therefore a strong need for improving access to climate data, combined with capacity building, to support decisions-makers.

Sierra Leone Government interventions supporting the project

The **National Platform for disaster risks reduction** in Sierra Leone was established in 2011 under the Office for National Security. The platform addresses climate change disaster and early warning response through its different responsibilities, including:

- To lobby GoSL 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 analyse the risks and develop strategies for preparedness, mitigation and response to national emergencies (natural and man-made).
- To embark on nationwide consultations to build consensus in order to generate information in support of GoSL's policy formulation on DRR.
- To facilitate resource mobilization both internally and externally in support of DRR activities.
- To allocate resources to support DRR activities indicating clear timelines for interventions by stakeholders and to ensure effective reporting, monitoring and evaluation of the process.
- To raise awareness of stakeholders and the general public on DRR initiatives with a view to enhancing their knowledge base.
- To encourage the promotion and adoption of innovative ideas and to reduce the risk of disaster occurrences.

The dedicated co-financing for the project is US$ 27,160,750.

Adaptation alternative – with LDCF intervention

76. LDCF resources will focus on the core tasks of improving the availability of water level data (tidal) and oceanographic related data and to make information accessible and usable to a broad range of users (Component 1). To attain this objective the following actions will be undertaken:

(i) climate and oceanographic monitoring equipment's (e.g. 6 ONS's– 4 ONS's in: (a) Conakry Dee, (b) Lakka or Hamilton, (c) Tombo, (d) Shenge or Turtle Island and 2 ONSs reserved as spare parts) and related data processing systems will be installed along the coastal zone to improve the measurement of climate and

sea level rise parameters to improve the knowledge base for better understanding the impacts of future climate risks.

(ii) Acquisition of equipment to facilitate the downscale of global/regional products to Sierra Leonean coastal locations and conditions using regional climate models and/or GCM data from CMIP5. A supporting and systematic human capacity development programme shall support this work.

(iii) Climate and Oceanographic data will be shared between national institutions (including MFMR, EPA-SL, SLMA, SLMD/A, ONS-DMD and USL-IMBO) via the adapted CIDMEWS. Science based qualitative and quantitative hazards, vulnerability and risk data for the coastal zone will be processed to be centralized within adapted CIDMEWS and will be confronted and fine-tuned with results from community participatory assessment outputs derived from the field. Hydrodynamic modelling shall be undertaken to better predict the behaviour of the coast under varying oceanographic conditions. Existing GIS technology (within CIDMEWS and DAMAS) shall be used, using detailed topographic analysis of the coastal zone to support the development of a conceptual Coastal Vulnerability Analysis (CVA) exercise that uses historical data/information to help develop a Coastal Vulnerability Index (CVI) for each target coastal districts. The CVI shall use baseline risk mapping outputs that are fine-tuned with results derived from community participatory assessments that are produced from Output 2.1 and 2.2;

(iv) The Coastal and marine research and data collection will be linked to the CIDMEWS to improve the facilitation of data exchange with other sectors which shall enable the systematic storage, analyses and incorporation of climate, environmental and coastal data at the national level. This will be supported by trained staff on Coastal Vulnerability Capacity Assessment techniques.

77. Specifically, LDCF funds will build on the above-mentioned baseline projects in the following manner:

- **Output 1.1:** Climate and oceanographic monitoring network (with 6 automated oceanographic monitoring systems) and related data processing systems installed along the coastal zone to improve the knowledge base for measuring future climate induced risks.
- **Output 1.2:** Institutional capacity of MFMR, EPA-SL, SLMD/A, ONS, SLMQ and USL-IMBO for assessing coastal hazard risk and vulnerability to climate change through probabilistic modelling is strengthened.
- **Output 1.3:** A systematical link between the collected data and the existing CIDMEWS (web based GIS) is established.
- **Output 1.4:** The human capacity of the MFMR, EPA-SL, MLGRD is strengthened, skilled and trained on CVA techniques.

78. Overall, the activities undertaken within Component 1 (through the above four Outputs) will result in institutional and human capacities being strengthened and built within relevant national-level institutions, particularly MFMR, EPA-SL, SLMA, SLMD/A, ONS-DMD and USL-IMBO in order to effectively manage climate change risks within the coastal zone.

Costs Component #1	
Co-financing:	US$ 27,160,750
GEF allocation:	US$ 2,285,693

Output 1.1: *Climate and oceanographic monitoring network (with 6 automated oceanographic monitoring systems) and related data processing systems installed along the coastal zone to improve the knowledge base for measuring future climate induced risks*

79. Under Output 1.1, LDCF resources will be used for the procurement, installation and functioning of six complete (weather and marine) tidal gauging systems that include telemetry, archiving and data processing facilities. Four of these systems will be installed at *Conakry Dee in the Kaffo Bullom; Lakka* or *Hamilton*; *Tombo*; *Shenge* or Turtle Island depending on the baseline and feasibility studies to be carried out during project initiation phase. The output of these feasibility studies shall be used to assess local conditions of both site security and station accessibility (for the retrieval of data). The two remaining systems will be reserved as spares. ONS's, linked with the CIDMEWS website, will be installed under existing WMO standards, protocols and procedures for data weather transmissions as part of the Global Telecommunications System (GTS). The actual installation (by phases) will take place approximately 12 months after the capacity development (Output 1.2) had been initiated and USL-IMBO, EPA-SL and SLMD/A have enough human capacity to handle ONS equipment functioning and the data management. During this period, appropriate physical infrastructure shall be built at the identified coastal sites including platforms for easy access to RADAR Gauge during "Leveling and Calibration" operations. Security arrangements should be put in place beforehand at each location to guarantee the safety of the ONS equipment and Automatic Weather Stations (AWS). AWS should also be provided with a lightning rod or a lightning conductor engineered to protect the AWS in the event of lightning strike so to avoid constant malfunction at the time meteorological information is most required.

80. New information on nearshore wave climates for Sierra Leone is needed, not only to improve knowledge on coastal vulnerability, climate change and development standards (e.g.: setback lines), the same information can be used to help improve knowledge on coastal safety aspects for the fishing industry and local fisherfolk[23]. Apart from the international global sources providing information on offshore wave climate including extreme wave heights, this Output 1.1 will make funds available for the GoSL institutions to be able to acquire offshore model/information and/or equipment to help use this to better determine nearshore wave heights that are more relevant to the design of coastal structures/interventions (through specific wave modelling tasks). This exercise will require the production of a high resolution wave model and Digital Elevation Model (DEM). Notwithstanding the availability of such information through international sources[24] and separate regional modelling exercises, the project will support specific Light Detection and Ranging (LIDAR) topographic and bathymetric acquisition data to assist the separate topography and bathymetry surveys.

Activities to be carried out:

1.1.1 Assess site conditions for ONS installation (equipment housing, security, personnel) and test remote transmission system to EPA-SL & SLMD/A-Lungi Airport in partnership with USL-IMBO;

1.1.2 Procure and install six ONS equipment and establish EPA-SL/MFMR/MWR/USL-IMBO-USL/SLMD/A/SLMA partnerships for future coastal monitoring network;

1.1.3 Procure, install (at the EPA-SL GIS unit) and operationalize four remote sensing image processing software packages and equipment to assist climate and oceanographic monitoring

[23] Wave generation and refraction model SWAN (Simulating WAves Nearshore)

[24] e.g. South African Hydrographic Office and NOAA's National Geophysical Data Center (NGDC)

1.1.4 Training of four technical staff (locally and internationally) of EPA-SL, MFMR, SLMD/A, SLMA on remote sensing techniques, operationalization of the equipment and processing data.

1.1.5 Strengthen human capacity for six technical staff of MFMR, EPA-SL, ONS, SLMA, SLMD/A and USL-IMBO on baseline studies, nearshore wave modelling studies, shoreline change studies and sediment transport studies etc.;

1.1.6 Detailed topographic and bathymetry analysis of the coastal zone (DEM).

Output 1.2: *Institutional capacity of MFMR, EPA-SL, SLMD/A, ONS, SLMA and USL-IMBO for assessing coastal hazard risk and vulnerability to climate change through probabilistic modelling is strengthened.*

81. Within this Output, the GoSL will be able to use LDCF funds to further strengthen the technical capacity of USL-IMBO to make use of the generated data and from it, produce improved and more accurate daily and seasonal coastal and marine condition forecasting. This will be achieved in three distinct ways: i) access to international (e.g. WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM), NOAA's Ocean Prediction Centre (OPC)) and regional centre (South African Navy Hydrographic Office) year-round marine forecasting products, ii) acquisition of equipment to facilitate the downscale of global/regional products to specific Sierra Leone coastal locations and conditions using regional climate models and/or GCM data from CMIP5 and; iii) a systematic human capacity development programme. Therefore, it is proposed that partnership arrangements with international/regional institutions will be fostered and nurtured. At least six (6) advanced workstations will be purchased in addition to probabilistic models to support coastal/marine forecasting and necessary IT infrastructure. Given the reduced number of marine forecasters available in Sierra Leone as well as Met ocean technicians to make use of the newly acquired equipment and facilities, a systematic gender sensitive capacity development programme will be developed using the LDCF funds. Therefore, it is proposed that under this programme: at least four (4) Oceanography /Marine Technicians will be trained with marine forecasting skills to handle and maintain tidal gauge equipment. In addition, these four technicians shall be supported by six (6) Marine Meteorological Technicians, two (2) of which shall be trained specifically on ”state of the art” electronic and data transmission and exchange skills. Given that the project will support the establishment of a DEM plus a mobile mapping amphibious drone based GIS technology[25] (to undertake detailed topographic to study nearshore processes that are relevant to operational wave modelling), LDCF funds will also be used to train at least two (2) USL-IMBO technicians with coastal hydrodynamic software modelling skills. Finally, to be able to address the current problem of sargassum invasion being experienced on many beaches in Sierra Leone, project funds will be used to develop a programme (led by USL-IMBO) to study the seasonal dynamics of seaweed/sargassum impacting on the coastline.

Activities to be carried out:

1.2.1 Setup/strengthen twelve technical staff from the MFMR, EPA-SL, SLMD/A, ONS, SLMA and USL-IMBO Climate & Oceanographic/Marine Forecasting Capacity;

1.2.2 Acquire, install and run six hydrodynamic models (e.g. MIKE11 flood, Nearshore Wave Prediction System (NWPS[26])), plus enhance human capacity on coastal modelling approaches to better understand and interpret/research the seasonal dynamics of seaweed/sargassum.

[25]http://blog.nature.org/science/2014/08/11/innovation-drone-mapping-of-coral-reefs-and-the-coastal-zone/

[26] Nearshore Wave Prediction System (NWPS)

1.2.3 Establish a working partnerships between various WMO Regional Meteorological Centres (UK, Dakar) to initiate a programme for regional or in-country gender sensitive training/capacity.

1.2.4 Establish partnerships between SLMD/A, Regional and International Oceanographic Centres to help develop, install and operationalize a Coastal Nowcast, and medium and short term marine forecasting products.

Output 1.3: *A systematical link between the collected data and the existing CIDMEWS is established*

82. Within this Ouput, the existing CIDMEWS shall be updated to provide a coastal repository with data and analysis tools to help deliver and implement effective ICZM. This integrated GIS and Management Information System (MIS) system coupled with mobile data collection technologies (already being produced) shall provide a family of sophisticated tools and Web services for collecting, managing, visualizing, mapping, analysing, monitoring, evaluating and reporting on various aspects of coastal planning and management in Sierra Leone to help understand coastal change overtime and provide timely information to help support the setting of coastal policy. CIDMEWS shall thereby be updated using a combination of free open source software and Environmental System Research Systems (ESRI) ArcGIS technology.

83. CIDMEWS shall then be utilised to generate Coastal Vulnerability Indices for the 6 target pilot sites which is based on new baseline information collated and generated from the adapted CIDMEWS. This shall include early warning mechanisms to enable decision makers to set or adapt policy to address monitored coastal erosion (shoreline retreat), sea water quality changes and natural environmental events such as sargassum bloom outbreaks. The project will also operationalize an innovative mobile system by using amphibious drone based GIS technologies[27] to help undertake detailed topographic (above and below sea) analyses[28]. Mobile Mapping processes are being adopted in this project as these techniques can significantly lower costs and reduce worker safety risk and assure ease of repetition if required. This methodology can also be used in risk and vulnerability assessments by enabling resource savings and more accurate results to be attained from more robust coastal hydrodynamic modelling (of the effects of SLR on coastal zones) to be studied to assess shoreline vulnerability identifications to be made which shall assist in the development of the Climate Change Risk/Vulnerability Mapping exercises. Finally, under the leadership of USL-IMBO, but in close partnership with SLMD/A and ONS-Disaster Management Department, an early warning mechanism (focusing on Sea Water Quality, SLR-induced erosion, urban flooding and seaweed/sargassum dynamics) will be designed and implemented.

Activities to be carried out:

1.3.1 Develop all the necessary communications, transmission and data exchange interventions for integrating Sierra Leone ONS data into existing SLMD/A EWS network and the global monitoring network to support an updated CIDMEWS;

1.3.2 Create CVI for the six target coastal districts using the above baseline natural risk mapping exercise and fine tuning with results of community participatory assessments from Output 2.1 and 2.2.

1.3.3 With cooperation from USL-IMBO, SLMD/A and ONS-Disaster Management Department, design and implement an early warning mechanism focusing on sea water quality, SLR-induced erosion, urban flooding and seaweed/sargassum dynamics.

Output 1.4: *The human capacity of MFMR, EPA-SL, and USL-IMBO is strengthened, skilled and trained on Coastal Vulnerability Assessment techniques.*

84. Within Output 1.4, LDCF resources will be used to procure technical assistance to strengthen the human capacity of the USL-IMBO and EPA-SL as well as to provide the hardware and software necessary for the functioning of their respective GIS platforms. To this end, financial resources from the project will be used to provide USL-IMBO and EPA-SL with four (4) advanced workstations each (including high performance computers) to exchange and archive data. An internal Training Needs Analysis (TNA) will also be carried out for stakeholders such as USL-IMBO, EPA and SLMA senior staff to support the operationalization of adapted CIDMEWS at both the national and district levels. It is anticipated that the following staffs shall be trained:

- at least four (4) key technical staff (2 EPA-SL & 2 USL-IMBO) with skills to handle GIS systems and develop risk/vulnerability mapping;
- two (2) key technical staff (1 MFMR & 1 USL-IMBO) with electronic and data transmission and exchange skills; and
- 6 decision makers (from all GoSL concerning institutions) will be trained to understand and respond to the impacts of climate change induced risks/disasters on coastal infrastructure, economies and livelihoods.

85. A special training and capacity building will be developed to produce enough staff with a range of skills to carry out Participatory Community CVAs including participatory mapping, vulnerability and risk assessment, climate models, GPS mapping techniques, coastal vulnerability map interpretation etc. Funds from the project will also be used to train a suitable number of officers to carry out post vulnerability assessment work including identification of adaptation actions, prioritization of actions, budget allocation, adaptation actions implementation, feedback, monitoring, etc. TNA will be carried out to scope and identify potential candidates from the relevant institutions for tertiary education (i.e.: MSc qualifications) in subject areas linked to SLR coastal impact assessment, climate change vulnerability and risk assessment and modeling skills for development of flood risk and storm surge warnings.

Activities to be carried out

1.4.1 Setup/strengthen USL-IMBO *and* EPA-SL by providing to each of these two institutions: i) Four (4) advanced workstations (including high performance computer) to exchange and archive the data from multiple systems and end users[29].

1.4.2 Renewal/purchase of Oceanographic/Marine modelling licenses and carry out the following staff training: at least
   (i) Two (2) EPA, one (1) MFMR and one (1) USL-IMBO technicians with hydrodynamic/probabilistic modeling skills for development of flood risk and storm surge planning;
   (ii) Four (4) Geographic Information Systems Specialists with raster modeling capabilities.

1.4.3 Develop training programme for at least 10 MFMR, USL-IMBO and EPA staff to carry out Participatory Community CVA (including participatory mapping, vulnerability and risk assessment and climate models, GPS mapping techniques, CVA map interpretation);

[29]Including acquisition of advanced methods and tools for assessing climate change induced coastal risk assessment and adaptation planning DIVA, COSMO, CVAT, SMP, GLOSS, JCOMM and IOC global products.

1.4.4 Develop training programme for at least 10 MFMR, USL-IMBO and EPA staff to carry out post vulnerability assessment work (identification of adaptation actions, prioritization of actions, budget allocation, adaptation actions implementation, feedback, monitoring, etc.);

1.4.5 Identify 10 relevant candidates from MFMR, IBMO & EPA-SL to undertake an post graduate degree that includes sea level rise and coastal impact assessment, climate change vulnerability and risk assessment and modeling skills.

Component 2: Climate information "internalized" into coastal development policy and plans.

86. Component 2 seeks to strengthen Sierra Leonean ICZM by creating sustainability "tools" and carrying out climate change based Strategic Environmental Assessment (SEA), to support mainstreaming climate change issues and environmental threats into existing or new environmental laws and regulations. In this context, this Component also develops Coastal Vulnerability Reports for each of the six Districts as well as Decision Support Tools (DST) based on a "decision tree" type model with multiple options to guide government decision makers in the selection of appropriate coastal defence /adaptation options for delivering long term ICZM.

OUTCOME 2. Appropriate protection measures, policy, budgeting and legal tools and integrated coordination mechanisms developed to improve and support policy design and implementation in dealing with current and long-term coastal challenges.

Baseline – without LDCF intervention

87. Sierra Leone has enacted and implemented a wide-range of policies that directly or indirectly relate to climate change and coastal adaptation. However, given the dynamic nature of changes in the coastal zone, some policies are already out of date and require urgent updating with current science based knowledge. The expected co-financing of the GoSL to help undertake baseline policy actions (both from government and partner) is estimated to be 1.35 million USD through its Third-Generation Poverty Reduction Strategy Paper -– The Government's Agenda for Prosperity (A4P) for the period 2013 – 2018 of which Pillar 2 (*Managing Natural Resources)* includes a *Sub-sector 2. Environment: Sustainable Management of Marine Resources* with specific activity for identifying and implementing adaptation strategies for prevention and control of coastal erosion, which harms livelihoods of fishing communities countrywide. Target Ministries have included in their budgets actions for the implementation or monitoring of policies and legislations related to this issue.

88. Currently, most climate and environmental data and information in Sierra Leone that relates to the coastal zone (that could be used to develop a CVA) is dispersed across various ministries and institutions and has not yet been comprehensively assembled, analysed or shared/ disseminated. For that reason, no detailed climate change risk and vulnerability mapping of the country, that considers SLR impact and identified hazards, has ever been produced. The GoSL has recently produced an ICZMP for Sierra Leone 2015, though recorded real time information on coastal erosion rates is often estimated from anecdotal evidence or past erosion events that includes questionnaire responses. Therefore, suggested erosion rates of circa 4-6 metres per year at some locations (e.g. Conakry Dee, Lumley, Lakka, Hamilton, Plantain Island, etc.), may be very inaccurate. Therefore, there is a need to produce science based assessments of coastal erosion rates which are site specific and based on recorded evidence. In addition, future scenarios of the impact of SLR in the coastline of Sierra Leone should be developed to properly assess the extent to which coastal communities and infrastructures will be affected.

89. Sierra Leone is already developing and implementing improved management strategies to mainstream environmental concerns into national policy, regulatory, and institutional mechanisms that are critical to achieving sustainable results. These include improvements in many of the regulations governing the marine environment, designation of new MPAs and proposals for new coastal protected areas. However, improved regulations also require focused enforcement efforts to assist in sustaining gains in environmental protection, rebuilding stocks, and maximizing the long-term benefits. In addition, the biggest challenge that Sierra Leone faces is the lack of a proper scientific data base of real time monitored coastal data. The lack of this data has made it very difficult to compare time scales and rate of coastal change over time. Risks for the Sierra Leone's coastal and marine environment have been developed on ad-hoc fashion and based on observed trends (see: *Environment Protection Agency (2015). Sierra Leone State of the Marine Environment report 2015. Freetown, Sierra Leone*). Elements of vulnerability to SLR impact on the coastal zone have also been identified. However, both the risks and the vulnerability issues need to be re-addressed in a systematic manner and properly mapped and strengthened with a sensitivity analysis.

90. The policy framework for coastal zone development in Sierra Leone is also very weak and inadequately enforced which compromises the resilience of coastal communities and natural ecosystems to climate change impacts. For example, coastal development takes place without consideration of setback lines and zoning, which renders coastal communities, ecosystems and infrastructure more vulnerable to a climate change-induced increase in SLR impact, storm surges and related flooding. Furthermore, the current setback lines and zoned hazard areas (if these exist) are not based on any scientific evidence or knowledge. Presently, extensive human development (related to infrastructure, water resources and irrigation) has taken place unrestricted in all coastal provinces, without consideration of climate change impacts and future climate change risks.

91. EPA–SL is leading the development of coherent environmental policies, regulations and standards on environment and climate change through EU support. However, EPA has limited tools to guide key planning, regulatory and policy instruments through the steps of internalizing coastal risks investment and governance issues. Finally, the UNDP- Preventive Development project is supporting the integration of disaster risk reduction concerns into development plans and helped to establish Disaster Management Committees to encourage proactive risk reduction strategies at the community-level.

Sierra Leone Government interventions supporting the project

92. **Under the GoSL "Agenda for Change" programme Pillar 2. *Managing Natural Resources***. The sub-sector 3.2.4 Sustainable Management of Marine Resources specifically points the need to set up *Adaptation Strategies to Control Coastal Erosion*. For that, GoSL expects to work with other stakeholders to identify and implement adaptation strategies for prevention and control of coastal erosion, which harms livelihoods of fishing communities countrywide. In this regard, special attention will go to gender related issues. **US$1.35 million** will be used as co-financing for this project.

Adaptation alternative – with LDCF intervention

93. Using LDCF resources, measures will be taken to improve the policy framework for the future implementation of ICZM so it is better designed to deal with current and long-term coastal challenges. This is intended to be achieved through the development of appropriate protection measures, policy/legal

tools and establishment of integrated coordination mechanisms for ICZM delivery. The current ICZMP[30] defines the coastal zone as *"the area bounded by the shoreline up to the mean high-water mark on its landward side and by the outer limit of the territorial sea on its seaward side, including all coastal waters"*. Terrestrial boundaries are all features found within five kilometres landward from the mean high water mark are considered in this Plan as representative of the zone of influence, which immediately affects the coastal environment. The zone encompasses all coastal communities as well as the distribution of natural features and resources found in marine and coastal ecosystem where water levels (a) are influenced by tidal action, (b) are contiguous with sea-level, (c) have a saline influence, or (d) facilitate migration of fauna between fresh and saline water. This includes extensive riverine, estuary, and wetland systems of the coastal area. Marine Boundaries-The other boundary within the territorial sea is the six nautical miles Inshore Exclusion Zone provided for the management of the country's coastal fisheries resources under the Fisheries Management and Development Act of 1994. The northern portion of the Sierra Leone continental shelf is wide about 30-60 miles on average. The southern portion of the shelf is narrow being part of the Liberian shield and is about 15 miles (45 km) wide. The bottom slope is steeper than in other parts of the shelf, probably due to its narrowness. The ability of coastal communities to remain resilient to coastal hazards within this zone is rooted in understanding their potential exposure and vulnerabilities. The main achievement for this Outcome is the production of "easy to understand" CVA reports for the targeted districts/regions of the coast zone. This objective will be attained via four distinct avenues: (i) Coastal Vulnerability Reports for each of the six Districts, (ii) Designing guidance of Ecosystem based adaptation to support future climate resilient planning and development, (iii) Climate Change based Strategic Environmental Assessment to support development of ICZM Plan, implementation Guideline Manual, (iv) Strengthening ICZM in Sierra Leone .

(i) Development of Coastal Vulnerability Reports for each of the six Districts

94. Detailed topographic analysis of the coastal zone will be undertaken to assist in modelling the effects of SLR on the coastal zone. The output shall be used as part of a specific Climate Change Risk/Vulnerability Mapping exercise for the coastal zone which shall include SLR climate change scenario assessments. This will be further complemented with community-level data and GIS based techniques to run specific modelling exercises for 100-year return period to help develop physical coastal and community coastal risk profiles (CVA Reports) for each of the proposed six Districts.

(ii) Designing guidance of Ecosystem based Adaptation to support future climate resilient planning and development

95. A DST shall be prepared to guide government decision makers in the selection of appropriate (hard vs soft) coastal defense /adaptation options (e.g.: nature based interventions, hybrid structures, upgrading the armour stone required to protect vulnerable coastal infrastructure, upgrading gabion and groynes, stabilization of beach façade, low grade beach nourishment, mangrove restoration, etc.). Any recommended coastal protection options will then need to be subjected to more detailed feasibility studies to determine their cost-effectiveness and technical/financial viability. A "decision tree" type of model shall be designed within the DST that outlines multiple options, ranging from categories of standard of protection, materials to use, natural habitats considerations into the design, intervention costs, etc.

(iii) Climate Change based Strategic Environmental Assessment to support development of ICZM Plan, implementation Guideline Manual

[30] Environmental Protection Authority. 2015. Integrated Coastal Zone Management Plan for Sierra Leone 2015. Sierra Leone. Freetown. 166p.

96. Efforts shall be introduced to review the existing EIA procedures within EPA-SL, and where appropriate, to consider the role of a new policy guidance on Strategic Environmental Assessment (SEA), will be undertaken to support the future mainstreaming of climate change issues within a national environmental context (plans, policies and national programmes etc.). The new proposed SEA direction shall review existing or the need for new environmental laws and regulations to help prevent environmental damage at the policy and programme level. The results of this SEA policy will be used to developed, though the production of a nationally accepted and legally bound "directive". A specific SEA guide manual or "route map" shall be prepared to help support its implementation. Clear guidance shall be provided on how climate change issues can be inculcated into sectoral plans and policies and how strategic environmental issues should be mainstreamed into existing laws, policies, plans and mandates and in particular, the EPA-SL's recently developed ICZMP. Regulations and enforcement mechanisms governing coastal land use, supported by existing project specific EIAs will be strengthened to include climate change risks management requirements, with a focus on coastal development planning, zoning of lands and the siting and construction of infrastructure and tourist facilities along the coast.

iv) *Strengthening Integrated Coastal Zone Management (ICZM) in Sierra Leone*

97. An inter-ministerial Institutional legal framework will be supported by the creation of a Sierra Leone Integrated Coastal Zone Management Board to harmonize all ICZM activities at both urban and district level. Simultaneously a training and capacity development programme will be delivered to Local Government technical staff and SL-ICZM-WG/ Board officers/decision makers on how to integrate climate change adaptation into district plans and budgets. The proposed ICZM Working Group (SL-ICZM-WG) will be further strengthened with mechanisms including the development of rules, procedures and operational instruments and corresponding fiduciary standards. In addition, a national programme will be set up, by catalyzing the resources dedicated to ICZM at the national level, to assist in long-term implementation of ICZM.

98. Specifically, LDCF funds will build on the above-mentioned baseline projects in the following manner:

- **Output 2.1:** Sea Level Rise and coastal erosion profiles developed for the six target pilot sites to support the strengthening of Coastal Zone Management Plans at both urban and district levels.
- **Output 2.2:** Ecosystem based adaptation design guidance to support future climate resilient planning and development in place.
- **Output 2.3:** Marine spatial plan framework to compliment with ICZM is developed
- **Output 2.4:** Sierra Leone ICZM is strengthened with the establishment of SL-ICZM-WG and sustainability mechanisms.

99. Overall, this Outcome will contribute towards the strengthening of ICZM and marine spatial planning in Sierra Leone, by developing community and science based coastal information and tools to improve policy design and implementation in dealing with current and long-term coastal challenges. This Outcome will also encourage the effective use of climate data within future coastal protection schemes. It shall also encourage the incorporation of risks and opportunities to improve ICZM implementation as well as the provision of support tools (and policies) to help guided more sustainable decision making in the long term to prevent and mitigate impacts from SLR induced flooding and coastal erosion**.**

Costs Component #2	
Co-financing:	US$ 1,350,000
GEF allocation:	US$ 1,974,667

Output 2.1. Sea Level Rise and coastal erosion profiles developed for the six target pilot sites to support the strengthening of Coastal Zone Management Plans at both urban and district levels

100. Through this Output, climate risk and vulnerability mapping will be produced by local communities and scientists from the undertaking of field participatory assessments and conceptual modelling exercises as developed in Outcome 1. This Output shall improve the accuracy and utility of the climate risk information to then enable to production of CVA Reports for each of the six Districts. This Output will undertake new baseline field surveys of beach volatility to better measure beach profile change and hence shoreline erosion rates. SLR and climate change scenarios shall be developed throughout this process to assist in the determination of future shoreline position and from this, new setback distances may be calculated by determining the locations/extent of coastal areas that could be affected by natural hazards.

101. This Output will also undertake Community Participatory CVA at Municipal and Chiefdom levels. These shall determine the key climate sensitive sectors and key climate hazards, in addition to assessing the vulnerability of specific economic sectors to projected climate change scenario (2025-2050-2100) for each target pilot sites. The outcome shall be to prioritize and determine potential adaptation options to threats/hazards with each target pilot sites. This vulnerability and risk assessment information will be fine-tuned with results from adapted CIDMEWS (see Output 1.3 in Outcome 1) to develop specific Coastal Vulnerability Reports for each of the six Districts.

Activities to be carried out

2.1.1 Undertake field surveys (profiles) to determine current erosion rates along the coastline and from this, define new setback values;

2.1.2 Develop SLR climate change scenarios (e.g. map the inundation of the land based on ents of SLR of 50 cm, also considering) and gather historical shoreline data to:

(i) Assist determination of future shoreline positions for coastal planning purposes;

(ii) Accurately determine the locations/extent of coastal hinterland that could be affected by known hazards (sea level rise, coastal erosion, shoreline recession and sea water flooding) as well as its probabilities to affected communities;

2.1.3 Carry out community participatory CVA on selected coastal areas at Municipal and Chiefdom level.

2.1.4 Carry out baseline mapping of natural hazards and risks to critical coastal infrastructure, natural resources, and populations (based on the outputs of vulnerability and risk assessments);

2.1.5 Based on the results from Activities 2.1.1-2.1.5 develop CVA Reports for each of the six Districts.

Output 2.2 Ecosystem based adaptation design guidance to support future climate resilient planning and development in place.

102. Under this Output, the results from the CVA to carry out a detailed analysis of appropriate coastal stabilization structures and coastal protection options (and nature based interventions) that the GoSL may consider developing (short and long term) to protect communities and infrastructures from hazards such as coastal erosion, coastal inundations, flash floods and salt water intrusion). Project funds will also support the cost of carrying out feasibility analyses for all identified intervention options, with a specific

focus on prioritizing cost-effective solutions. Overall, this Output will provide a DST which is intended for informational and guiding purposes, to make communities and government decision-makers better aware of their coastal environment, the different adaptation options available to them, and the applicability of the options under different climate change scenarios. These options will be listed in a "decision tree" type of decision model with multiple options.

Activities to be carried out

2.2.1 Undertake an assessments of community assets (infrastructure and ecosystems) vulnerable to coastal storms and sea level rise;

2.2.2 Based on the results of Activity 1.1.5 and Output 2.1, develop vulnerability maps for the six coastal communities' infrastructure and ecosystems;

2.2.3 Based on the risk profile mapping developed, design an urgent and long term intervention Action Plan containing all prioritized coastal protection options;

2.2.4 Develop a decision support tool, to guide government decision makers in the selection of appropriate (hard vs soft) coastal defense /adaptation options;

2.2.5 Develop specific EbA guidance manual to support construction of ecosystem based interventions (planting of mangrove, seagrass, native trees, etc.) (see link to Output 3.4).

Output 2.3. Marine spatial plan framework to compliment with ICZM is developed

103. Marine Spatial Planning (MSP) as a process within the Sierra Leonean context, can play a vital role in decision making not only for marine resources use and spatial allocation/zoning, but one that helps promote the management and protection of the marine and coastal areas. MSP, in tandem with ICZM, can also guide development beyond the coastal zone, to take into consideration several "blue economy" factors such as offshore development priorities. In trying to meet international benchmarks such as the SDG's, and promoting blue growth, it is crucial for Sierra Leone to have in place a broad-based mechanism for ocean management. The need for including such output under this LDCF project is to ensure that marine space utilization is guided to meet future demands and at the same time reduce the possibility of conflict among different users.

104. The LDCF project shall seek to start a Sierra Leone MSP Initiative which shall focus on resilience and sustainable use of marine ecosystems at the scale of the entire Exclusive Economic Zone (EEZ). The overall goal for the MSP Initiative shall be to develop (in the future) an integrated marine plan to optimise the sustainable use and effective management of Sierra Leonean marine environment while improving the social, cultural and economic wellbeing of its people. In order to develop a comprehensive marine plan in the future, the process needs to (through LDCF funds in the first instance) enable input from a diverse array of stakeholders, encompassing commercial fishing, tourism and marine charters, biodiversity conservation, renewable and non-renewable energy, and maritime transport, safety and security authorities. The plan, when completed, will identify and propose areas for marine protection to meet high and medium biodiversity objectives.

105. The LDCF project shall help to fund the initial stages of the MSP Initiative only. This shall define the governance arrangements that need to be addressed as part of the MSP Initiative, encompassing responsibilities for the future marine spatial plan as well as specific arrangements for the protected areas and other zones created by the process. The arrangements shall also seek to achieve policy coherence and must allow for clear legal mandates for monitoring and enforcement of conservation and

management measures. Moreover, solutions shall be presented that are cost effective, ideally aiming to build on existing capacity for expensive aspects of implementation such as monitoring, control and surveillance. Once a preferred governance arrangement is identified, an implementation plan shall be defined in addition to organizational and operational structures, the investment and capacity-building needs, and changes required to legal and institutional frameworks.

Activities to be carried out

2.3.1 Review current marine use planning policies and guidelines;

2.3.2 Undertake a gap analysis of national development plans and policies (including the EIA procedures) to determine existing institutional frameworks for protected areas and fisheries management (portfolios, responsibilities and linkages).

2.3.3 A desktop review of international best practices for implementing marine spatial planning that encompasses protected areas in other countries, and their application to the national context.

2.3.4 Development of options for MSP governance arrangements (including cost effectiveness, investment and budget requirements, human and technological capacity, institutional integration, and legislative and policy coherence etc).

2.3.5 Presentation of the governance options to Ministers for a decision on the governance arrangements.

2.3.6 Preparation of a draft implementation plan based on the selected governance structure with stakeholder input.

Output 2.4: Sierra Leone ICZM is strengthened with the establishment of SL-ICZM-WG and sustainability mechanisms.

106. Under this Outcome, there shall be efforts to strengthen policy and institutional capacity of government to better integrate climate risk and resilience into its ICZM legislative, regulatory and policy frameworks. A participatory and self-sustainable Integrated Coastal Zone Management (ICZM) process shall be established providing guidance and direction on future climate resilient management of the coastal zone of Sierra Leone. The ICZM process will be supported by the establishment of a Technical Working Group and sustained through the creation of an ICZM Board that will harmonize all ICZM activities at urban and district level.

Activities to be carried out

2.4.1 Review of legislation and policies for infrastructure to identify climate change requirements. The following tasks will be completed:

(i) Development of agreed vision and objectives for the coast;

(ii) Develop an inter-ministerial Institutional legal framework;

(iii) Establishment of a Technical Working Group on ICZM;

2.4.2 Regulatory and policy framework for climate change at national and district level. A legislative framework for ICZM at the national level will be produced to introduce a Bill that aims at protecting and securing the coastal and marine resources of Sierra Leone from the impacts of climate change.

2.4.3 Assessment of coastal vulnerabilities:

(i) Identify priority coastal zone adaptation measures;

(ii) Conduct feasibility study for concrete coastal protection measures;

(iii) Identify viable alternatives to sand mining in Sierra Leone

(iv) Develop and deliver training sessions to Local Government technical staff and SL-ICZM-WG/ Board officers/decision makers on 1) integration of climate change adaptation into district plans and budgets, and ; 2) skills to assist coastal districts to review their plans and budgets to integrate climate change adaptation issues;

2.4.4 Following the outcomes of the review and framework development in activities 2.4.1 and 2.4.2, develop and endorse Coastal Policy Guidance documents at the National and District levels, where required for a) coastal development, b) environmental policies, and c) SEA.

2.4.5 Set up an ICZM programme which shall provide clarity on all national financing sources (ie. Public and private) to provide a means to adopt a coordinated approach to ICZM. The programme will be established within the EPA-SL (reporting to the ICZM Steering Committee) to evaluate community based projects designed to advance ICZM nationally and to help engage and coordinate community-based adaptation activities/projects in Sierra Leone. This will include:

(i) Preparation of a Guidance Manual for adaptation project developers that seek access to national climate finance

(ii) Selection of Technical Theme Areas. The thematic areas covered will be as follow: Thematic Area 1: Awareness-building on Climate Change and Coastal Adaptation Measures. Thematic Area 2: Sustainable Livelihoods and Resources in Coastal Communities;

(iii) Support towards initiation of a first Call for Proposal Announcement. This shall involve ensuring that all administrative procedures, outreach materials and trainings are undertaken prior to the announcement of the first CfP. The CfP will provide an opportunity (i) at the national level to identify priority interventions that best responds to local needs to guide the formulation of the programme and (ii) at the local level by proposing a centralized programme to ICZM.

Component 3: Awareness and alternative, innovative activities to support adaptation in the coastal zone.

107. The activities developed under Component 3 seek to establish a range of adaptation measures for six coastal pilot sites that are selected based on community vulnerability. Overall the activities of this Component will raise community awareness, strengthen capacity building of decision makers dealing with ICZM and develop coastal protection measures (including community based CIEWS) to reduce the impact of both climate change induced risks and related anthropogenic interventions

OUTCOME 3. Public awareness enhanced and climate resilient alternatives to sand mining promoted for better adhesion of policy makers and communities on adaptation.

Baseline – without LDCF intervention

Coastal erosion

108. Coastal erosion has been and is still posing a serious problem for coastal managers in Sierra Leone. This phenomenon has attained rates of up to 4-6 metres per year at some locations. e.g.: Conakry Dee,

Lumley, Lakka, Hamilton or Plantain Island with Goderich, Lakka and Hamilton beaches being the most observable areas of erosion. It is this erosion that this LDCF project proposes to address. Natural coastal dynamics such as currents, waves and tides, but also sediment budget regime changes play a key role in determining coastal erosion rates. However, human activities are documented to clearly influence coastal erosion rates through poor shoreline planning and constructions, as most shoreline development is undertaken without recognizing nearshore dynamics and shoreline evolution patterns. Anthropogenic activities such as construction of harbour protecting structures, jetties, beach sand mining, construction of dams upstream depriving the beach of sediment nourishment, and deforestation are causes of high rates of erosion. Notably, Coastal degradation in Sierra Leone has been connected to sand mining[31], mangrove degradation[32] and invasion by Sargassum (see below for full commentary).

Mangrove Clearing

109. NPAA are given the mandate to manage all wetlands within Protected Areas as the proposed project is covering about four sites which are within Protected areas (Shenge, Tombo, Turtle island, and Conakry Dee,). Huge pressure is being placed on mangroves which are fastly depleted for livelihood activities in coastal communities. The NPAA is now working on modalities to engage these coastal communities to achieve agreement for co-management in other for these areas to be gazetted to ensure full legal protection. NPAA sees the legal/co-management approach as integral to the goals of the proposed project and which is why it emphasizes on its critical role in the project.

Sand mining

110. Sierra Leone has lost many houses along Freetowns beachfront, due to sand mining activities. The practice has been ongoing for many years, despite efforts by Government to sensitize people to adopt a sustained sand mining practice (see Annex 5). The Sierra Leone Community depends on the sand to build houses, roads, bridges and other habitable structures. Sand mining has been a key activity in Sierra Leone since the widespread use of cement was introduced and became the normal approach to construction. Sand mining from beaches is an economically lucrative activity in Sierra Leone, with many local coastal communities benefiting from it. In most parts of the country, sand and cement blocks are considered as the modern way to construct virtually all buildings while traditional building materials are thought to be of lower quality. This has led to a decreased use of “mud block” buildings as the current transformation process of these blocks makes low quality blocks, which are highly vulnerable to wet conditions and buildings frequently collapse. An exception can be observed in inland rural areas, where sand and cement cannot be afforded and more traditional materials are still largely used, making the population highly vulnerable to the increased occurrence of floods.

111. Many jobless youths within the Peninsular Area have reverted to sand mining for their livelihoods. The activity is very deleterious for the environment, but also for local fishermen and new tourist business that have developed over the last decade. The authorities are aware of this situation and resources have been devoted to complement bilateral youth programmes supported by UNDP and WB expected to be around US$ 5.5million. The Medium-Term Expenditure Framework of the Government to promote employment, and employment quality (described as “decent work”), under Pillar 5 of the recent PRSP, however, there is no specific reference in addressing the sand mining issue in particular.

[31]Environment Protection Agency (2015). Sierra Leone State of the Marine Environment report 2015. Freetown, Sierra Leone.

[32]Global Environment Facility (GEF) and United Nations Development Programme (UNDP). Sierra Leone Second National Communication, December 2012. 245p.

Sargassum/seaweed beach invasion

112. In 2011, the seaweed species *Sargassum vulgare* and recently (2014), *Sargassum natans and Sargassum fluitans* invaded, for the first time, the country's coastal waters in unusually large amounts littering the entire coastline and thus affecting the tourism industry. This massive influx of seaweed has resulted on significant disturbance of marine life living within the coastal zone. Fish and sea turtles have been found dead when Sargassum washing onto the shore in massive quantities, Massive Sargassum deposits on beaches has had negative impact on the socioeconomic and livelihood (tourism, fishery industries etc.) of coastal communities, hence the need to develop national and regional strategy to promote an ecologically acceptable management intervention to address the Sargassum seaweed concern. Currently the authorities have no clear strategy in how to confront this challenge (see Annex 5 for further details).

Artisanal fishing

113. The end result is that SLR induced coastal erosion, beach sand mining and Sargassum seaweed invasion has greatly impacted on the fishing activity with significant reduction of fish stocks in the country. Therefore, fishing communities along the coastline are being deprived of their main livelihood and pressurize to fish increasingly further away in open seas vulnerable to potential extreme climate events. As a consequence of SLR induced severe coastal erosion and habitat degradation, there is currently a migratory pattern of fish communities from the estuaries and creeks to the open shelf areas and vice versa. A number of species are limited by the depth of the thermocline and they are influenced by the type of sea bottom deposits (sand and silts), and the depths on the continental shelf, the slope of which is variable. Given this situation, all fish communities in Sierra Leone are under some threat from over fishing common fish species, however the most threatened are the estuarine and the inshore communities. Consequently, the MFMR is encouraging more off shore than inshore fishing, which also relieves pressure on the breeding grounds for marine fisheries. This could represent an opportunity for the LDCF project to support the GoSL intended reduction in shore fishing and capacitate fisher folk to fish more off shore.

114. Accelerated SLR induced coastal erosion has also disrupted livelihoods of coastal fishing communities in major locations of Sierra Leone by destroying infrastructures supporting artisanal fishing activity. The artisanal fishery is conducted in six coastal districts with a total of more than 7620 boats operating at 641 fish landing sites (Table 6). Five main types of artisanal fishing vessels operate in Sierra Leone. Over 100,000 metric tonnes of fish are produced yearly by the artisanal sector, thus contributing immensely to the enhancement of livelihood in coastal communities[33]. Any dramatic effect of climate change impacts of these infrastructures would greatly undermine the mitigating capacity of the country to the problem of malnutrition in remote rural communities throughout the country and jeopardise all linked livelihoods activities. This is the case of fish landing sites and other infrastructure supporting the handling, storage and processing of fish catch. The Government authorities aware of this have put forward under the new PRSP (Pillar 1 with US$ 3.15 million) proposals for improving harbor facilities allowing industrial fishers to increase efficiency and facilitate exports and provide training in sustainable fishing practices including the establishment and operationalization of a *Fisheries Training Institute*. The activities undertaken as part of this pillar are expected for the project co-financing. However, the new PRSP - Pillar 1 does not clearly address climate change threats to the needs of improving coastal facilities for the artisanal fishing sector.

[33]Sellu Mawundu & Konrad Thorisson. 2011. ARTISANAL FISHERIES STATISTICS IN SIERRA LEONE, COLLECTION METHODS, ANALYSIS AND PRESENTATION. Final Project 2011. United Nations University. Fisheries Training Programme. Iceland.

115. A recent study jointly carried out by SAFLU and the MFMR, shows confirmations (from earlier information) that there are 641 artisanal fish landing sites in the country and 400,000 fishers[34].

Table 6. Percentage distribution of fishing crafts by coastal district of Sierra Leone artisanal fisheries[35].

Coastal District	Fishing Craft/Boat					% total	Total Number of Crafts/Boats
	Kru canoe	Std 1-3	Std 3-5	Std 5-10	Ghana Boat		
Kambia	1.1	71.7	16.2	8.5	2.5	100	791
Port Loko	9.9	68.7	13.3	7.6	0.5	100	1774
Western Area	26.6	29.4	15.3	18.3	10.4	100	1288
Moyamba		52.2	27.9	10.1	0.5	100	786
Bonthe		69.1	19.1	2.5	0.1	100	2594
Pujehun		67.1	2.6	0.8	2.3	100	386
Grand total							7619

Std 1-3: artisanal fishing vessels operating a crew capacity of 1 to 3 persons and is also propelled by a paddle; *Std 3-5*: artisanal fishing vessels propelled by a paddle and some are powered by an outboard engine and they have a crew capacity of 3 to 5 persons; *Std 5-10*: artisanal fishing boats powered by an outboard engine with a crew capacity of 5 to 10 persons; *Ghana Boat*: the largest artisanal fishing boats, is powered by a 40 horse power engine and has a crew capacity of more than 10 persons.

116. Thus, the artisanal fishery sector provides direct employment to about 400,000 Sierra Leoneans including women and children mostly involved in fisheries related activities like fish processing and marketing. It also provides employment for youths in technical areas like boat repairs, engine repairs, boat building etc. (Seisay 2006[36]). Almost all coastal locations have fishing as the dominant economic activity but sites such as Conakry Dee and Tombo fishing communities are larger with over 300 fishing vessels in the community, some of which are large boats (30 crew) and with some canoes purely for transportation. In all, the average size of the targeted fishing communities is estimated at 10,000, plus a least 1,000 others (mostly women) in fish handling, transactions and product transformations[37]. Therefore, there is a need to strengthen the resilience of the sector against further climate change impact. MFMR has prepared a project on "Fish market and cold chain development project" which includes development of fish post-harvest value chains. The target beneficiaries of the intervention will be the women fish processors, small scale fish traders and the artisanal fishermen who are often capital starved and at the same time incur heavy losses as a result of fish spoilage due to poor or inappropriate storage and distribution facilities.

Coastal subsistence farming

117. Subsistence agriculture is another income-earning activity in the fishing communities, second only to fishing and livestock production. Rain-fed agriculture is only undertaken during the wet season (April

[34]SLAFU COMMEMORATES WORLD FISHERS DAY(/index.php/recentnews/104-slafu-commemorates-world-fishersday). http://mfmr.gov.sl/index.php/recentnews/104-slafu-commemorates-world-fishers-day.

[35]Sellu Mawundu & Konrad Thorisson. 2011. ARTISANAL FISHERIES STATISTICS IN SIERRA LEONE, COLLECTION METHODS, ANALYSIS AND PRESENTATION. Final Project 2011. United Nations University. Fisheries Training Programme. Iceland.

[36]Seisay, M.B.D. (2006). Defining a Strategy for Fisheries Sector Support in Sierra Leone. Report for the DFID mission. Fisheries of Sierra Leone, Annual Report

[37] For more details go to Annexes and see National Experts Reports developed under the PPG phase.

to November), when maize, beans, groundnut and cassava are cultivated. During the dry season, watermelon, tomato, lettuce, etc. are cultivated. The natural vegetation is degraded coastal savannah, with less than 10% tree cover and no grass layer. Erratic rainfall is one of climate change expression in coastal areas of Sierra Leone and drought episodes have been recurrent on these communities with dramatic results on their capacity to produce food particularly due to lack of available water for watering crops. The IFAD/GEF_LDCF Project: *"Sierra Leone: Integrating Adaptation to Climate Change into Agricultural Production and Food Security in Sierra Leone"* has been intervening in sustainable development of climate resilient inland valley swamp but the coastal areas are not within their target areas. The Government has also included under Pillar 1 of their new PRSP for 2013-2018 activities and funds focusing on restoration of rainfed agriculture resilience to weather events in the sub-sector dealing with Agriculture. However, the target areas of this LDCF have not yet benefitted from these funds and remain vulnerable to the impacts of climate change in the coastal zone. The project will therefore support the development of Community based Extension Service (CES) that will promote the diffusion of resilient coastal farming practices.

Adaptation alternative – with LDCF intervention

118. This LDCF will support the GoSL to undertake specific actions for enhancing public awareness and to disseminate results from Components 1 & 2 in a better way to inform communities and policy makers on coastal adaptation. In addition, youth associations will be supported with livelihood activities that are adaptive to climate change risks and increase community and coastal reslience. LDCF resources will be then used to: (i) design and implement an outreach program to improve decision-making, strengthen information access and data resources for key stakeholders, disseminate project-generated data and information, and foster public awareness about the potential impacts of climate change; (ii) design and implement adaptation strategies for alternative livelihoods to strengthen women and sand miner youth association's resilience to Climate Change (CC) impact so to reduce pressure on coastal zone resources; (iii) introduce CSEB technology to offer a sustainable response to the construction needs in Sierra Leone while mitigating the risk of sand mining; (iv) provide means and capacities to implement urgent and priority medium-scale soft (non-structural) and hard (structural) coastal adaptation works to protect coastal communities at risk and build resilience to climate shocks including livelihood diversification; and (v) in straight collaboration with Sierra Leone Meteorological Department, extend the CIEWS to communities at each of the pilot project sites (namely Conakry Dee, Lakka, Hamilton, Tombo, Shenge and Turtle Island).

119. Specifically, LDCF funds will build on the above-mentioned baseline projects in the following manner:

- **Output 3.1:** An outreach communication, information and awareness strategy designed and implemented to enhance decision-making and foster public awareness and safety about the potential impacts of climate change;
- **Output 3.2:** Adaptation strategies for alternative livelihoods are designed to strengthen women and sand miner youth association's resilience to CC impact on the coastal zone so as to reduce pressure on natural resources.
- **Output 3.3:** CSEB practices are introduced to mitigate the risk of unregulated sand mining in Sierra Leone.
- **Output 3.4:** Participatory implementation of urgent and priority medium-scale soft (non-structural) and hard (structural) coastal adaptation works undertaken to protect coastal community at risks.

- **Output 3.5:** Early Warning Systems are extended to target sites in the coastal zone to protect fishing and farming communities.

120. Under this Outcome, actions will be undertaken to reduce socio-economic losses due to coastal erosion through the piloting of adaptation investments in high risks areas to protect coastal infrastructure and communities' assets whilst enhancing public awareness for better adhesion of communities and policy makers on adaptation and implementation of urgent and priority medium-scale soft (non-structural) and hard (structural) coastal adaptation works to protect coastal community at risks.

121. The national Agenda for Prosperity (A4P), pillar 1 is linked to this Outcome, namely:

Pillar 1 – Economic Diversification to Promote Inclusive Growth. (Sub-sectors 1, 2 and 3 - **US$ 2.8 million** to be used for co-financing). More specifically the pillar will contribute to the project through:
Sub-sector 1. Agriculture: Increasing Agricultural Productivity and Value-Added. The specific activities of the proposed sub-sector of this Pillar 1 contributing to this LDCF are:

i) Supporting sustainable productive increases which can restore natural capital through increasing vegetation and tree cover, restoring soil fertility and reducing erosion, and restoring rainfed agriculture's resilience to weather events;
ii) Improve farmers' use of technology – increase the activities of research and extension services, with plans that focus on use of technology.

Sub-sector 2. Fisheries. The specific activities of the proposed sub-sector of this Pillar 1 contributing to this LDCF are:

i) Improve harbour facilities allowing industrial fishers to increase efficiency and facilitate exports;
ii) Provide training in sustainable fishing practices: complete the establishment and operationalization of the Fisheries Training Institute.

Sub-sector 3. Tourism: Promoting Local and International Tourism. The specific activity of the proposed sub-sector of this Pillar 1 contributing to this LDCF is:

i) Ensure the preservation of key ecotourism sites: set up coordination mechanisms among relevant MDAs and Local Councils to ensure the preservation of potential ecotourism sites such as rainforests, beaches, and protected areas.

Costs Component #3		
Co-financing:	US$	2,800,000
GEF allocation:	US$	4,824,640

Output 3.1. An outreach communication, information and awareness strategy designed and implemented to enhance decision-making and foster public awareness and safety about the potential impacts of climate change.

122. Through this Output, LDCF funds will be used primarily to develop and deliver training and capacity building sessions (to Local Government technical staff and SL-ICZM-WG Board officers as well as decision makers) on a range of issues relating to climate change adaptation and ICZM including: i) processes of identification of effective ways of incorporating the different guidelines developed under Outcome 2 within existing policy frameworks and processes for land use planning, coastal zone management; ii) processes of identifying policy barriers to climate change adaptation and adjustment of municipal land

use policy; iii) climate change adaptation investment planning for coastal zone management. At least 30 Government technical officers and policy makers linked to coastal zone and climate change issues per main coastal districts (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island) will be targeted for these training sessions and they will be drawn from the following sectors/areas: Environment, agriculture, water, infrastructures, natural resources, livestock, fisheries, tourism, land planning, forestry, oceanography/meteorology; community development; and health.

123. As a priority, this Output 3.1 will dedicate a significant amount of funds to enhance public awareness to disseminate results from Components 1 & 2 and complement current efforts being developed by the DMD-ONS for better adhesion of communities and policy makers on coastal adaptation. Therefore, funds from LDCF will be made available to promote public awareness campaign by training at least 15 community leaders' trainers (which 50% are women) in each of the six target sites to carry out countrywide public awareness raising interventions at District and Chiefdom level on existing and potential coastal hazards vulnerability to climate change and importance and benefit of the different adaptation options being promoted. Project funds will also be used to develop a web-based platform to share methodologies, dissemination of project results and lesson learnt generated from the project to promote replication beyond the project sites. Finally, dissemination of project outputs and findings will be undertaken through communication and the sharing of lessons learned during national and international fora, meetings and conferences. At District/Chiefdom level dissemination of project results will be undertaken to promote replication of successful adaptation approaches. In this context, at least one exposure visit will be organized by the project management to bring decision-makers and planners at the national, provincial and municipal level who are not already engaged directly with project to promote adaptation initiatives being developed at the demonstration sites.

Activities to be carried out

3.1.1 Develop and deliver training and capacity building sessions on ICZM, Climate Change Vulnerability Assessment, and Sectoral and Livelihood Adaptation Planning for at least 50 Government technical officers and policy makers per main coastal districts (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island);

3.1.2 Undertake public awareness campaign with training for trainers at least 25 community leaders (which 50% are women) of each of the six target sites on climate change risks and costs and benefits of different adaptation options;

3.1.3 Communicate on the lessons learned from the project through media support systems and carry out sharing of lessons learned during national and international fora, meetings and conferences;

3.1.4 Develop the existing CIDMEWS web-based platform to focus on assisting ICZM to improve data sharing protocols and methodologies, results and lessons learnt generated from the project to promote replication beyond the project sites and to enhance women's role on implementation of adaptation measures at local level;

3.1.5 Promote replication of successful adaptation approaches including at least one exposure visit to bring decision-makers and planners at the national, provincial and municipal level who are not already engaged directly with project to project demonstration sites.

3.1.6 Sub-Contract services to carry out: (i) audio-visual production (booklets and videos) for community awareness raising consultations and events (e.g. for Community members, schools and TV) for different age groups (Women & Youth); (ii) at least 3 documentary short film (Participatory Video of about 10 minutes including YouTube publication) to be produced to document climate risks in

the coastal zone and adaptation benefits generated by the project in the demonstration sites/communities, which can be used for further communication and advocacy work.

Output 3.2. *Adaptation strategies for alternative livelihoods are designed to strengthen women and sand miner youth association's resilience to CC impact on the coastal zone so as to reduce pressure on natural resources.*

124. Through this Output 3.2 LDCF funds shall be used to design and implement an adaptation strategy focusing primarily on livelihood-based interventions within the six selected pilot sites. At the same time, women and youth groups will be specifically targeted for training and capacity development as well as financial investment supporting re-alignment of their current primary livelihoods source (sand mining and mangrove logging). For that reason, LDCF funds will be used to deliver a package of adaptation measures targeting primarily youth groups in sand mining communities to (i) support and encourage more offshore rather than just inshore fishing, so to relieve pressure on the breeding grounds for marine fisheries; and (ii) support local youth groups to return to artisanal fishing and embrace ecofriendly and sustainable fisheries to divert from the sand mining activity.

125. In line of this pursuance, LDCF funds will be made available to support MFMR to design and implement measures which would include provision of standard artisanal fishing equipment to youths within at least 10 separate groups within sand mining hotspot sites such as Lakka and Hamilton. These groups will be trained to involve in alternative income generating activities that will provide economically tangible alternatives to mangrove cutting and sand mining. Not only will participants be trained in understanding the implications of climate change on the coast (with reference to the unsustainable use of natural (living and non-living) coastal resources, they will have access to providing skills training and capacity building[38] to assist youths to become professionals as crew members, and shore based group members expected to supply all operations (e.g. fuel supply, repair of nets, boat repairs, etc.). The youth groups will be invited to undergo further training (through the *Centre for Skills Development (CSD)* to be established near Lakka and Hamilton sites). These interventions will also provide an opportunity to youth groups to improve practical "day to day" operations to enable and to identify improved access to more offshore pelagic fish stocks (marine) as opposed to over fishing more coastal/nearshore stocks. By providing the encouragement and advice/support to move fishing techniques/operations further offshore from the coast, partnership arrangements between fishers (organisations/individuals) shall be encouraged to reduce fuel costs to access pelagic stocks and in the process, the approach shall reduce the pressure on more sensitive and over-fished nearshore fishstocks which are already being impacted upon by climate change,. This activity shall also provide a tangible support action to promote specific approaches towards the design of the proposed Marine Spatial Planning framework (see Output 2.3). In addition to the above fishery related livelihood support, this Output will also make available funds to set up *Communal Centres for Coastal and Marine Resources Transformation (CCMART's)* following the Global Ecovillage Network (GEN) approach to promote community based adaptation initiatives including the establishment of a community-based small-scale processing units of fruit-based products, poultry, mushroom farming, honey production, artisanal craft and pottery industry and/or cattle products (milk, cheese, tannery) to improve Communities livelihoods for target pilot sites (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island).

[38] In close cooperation with MFMR Fisheries Training Institute and The Sierra Leone Artisanal Fishermen Union – SLAFU: Fish net mending techniques, boat construction/repair/maintenance, carpentry, welding, electrical technicians, plumbing, etc.

126. Under this Output, LDCF funds will also be used to support MFMR project on "Fish market and cold chain development project" which includes improving harbour facilities such as fish landing points and investment in post-harvest value chain for artisanal fishing communities. Each site of post-harvest value chain will comprise of a fish handling and processing section, cold room, ice making plant, rodent free store for smoked fish, smoke ovens, training hall with the availability of water and hygienic facilities. Smoke ovens to be used are the modified altona[39] oven which requires considerably more capital investment than the traditional banda[40] system but uses approximately 40 percent less fuel and only one fourth the labour required by the banda per unit of fish processed. Finally, the LDCF funds under this Output will support pilot demonstration activities that are designed to assist in the implementation of Community based Extension Service (CES) actions. These may include interventions such as the development of water sourcing and storage and Small Scale Irrigation systems to benefit women communities in *Conakry Dee and Tombo to* master drought resilience agricultural techniques.

Activities to be carried out

3.2.1 Support at least 10 voluntary local youth groups to return to artisanal fishing and embrace ecofriendly and sustainable fisheries to divert from the sand mining activity by:
   (i) Procuring and providing standard artisanal fishing equipment to youths within sand mining hotspot areas such as Lakka and Hamilton;
   (ii) Undertaking youth skills training and capacity building[41] to become professional as crew members, and shore based group members expected to supply all operation (e.g. fuel supply, repair of nets, boat repairs, etc.)

3.2.2 Following the GEN approach set up[42]:
   (i) Six *CCMART's* to promote community based adaptation initiatives including the establishment of a community-based small-scale processing units of fruit-based products, poultry, mushroom farming, honey production, artisanal craft and pottery industry and/or cattle products (milk, cheese, tannery) to improve Communities livelihoods for target pilot sites (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island)[43];
   (ii) Two CSD located near Lakka and Hamilton sites to assist youth associations in developing skills for alternative income generating activities[44].

3.2.3 Support the establishment and operationalization of two complete[45] pilot post-harvest value chain units at Conakry Dee–Port Loko axis and Tombo/Hamilton–Freetown axis in coastal zone;

3.2.4 Support the development of two post-harvest value chain components in Shenge (1) and Turtle Island (1) sites by:

[39]The improved smoking ovens layer the fish on six or seven wire racks stacked on top of each other and heat passes through several layers before escaping; thus, reducing fuel cost.

[40]Raised smoking platform (banda) universally used throughout the coastal areas in West Africa.

[41]In close cooperation with The Sierra Leone Artisanal Fishermen Union – SLAFU: Fish net mending techniques, boat construction/repair/maintenance, carpentry, welding, electrical technicians, plumbing, etc.

[42] http://gen.ecovillage.org/en/projects/561/all

[43] The sites where to establish CCMART's will be identified through the Feasibility study to be developed before project implementation.

[44] In close cooperation with The Sierra Leone Artisanal Fishermen Union – SLAFU: Fish net mending techniques, boat construction/repair/maintenance, carpentry, welding, electrical technicians, plumbing, etc.

[45]Comprising of a fish landing point, transportation means, fish handling and processing section, cold room, ice making plant, rodent free store for smoked fish, smoke ovens, training hall with the availability of water and hygienic facilities.

(i) Carrying out installation of extended/upgraded fishing landing points at Shenge and Turtle Island sites;
(ii) In each of these two sites, build infrastructure to support fishing communities that enhance their livelihoods. Interventions may include installation of small solar powered cold storage facilities, non-metal/fiber glass fish stands, fresh water points, hygienic fish cleaning facilities, first aid/ hygienic installations, etc.
(iii) Building pilot activities at Shenge and Turtle Island sites on efficient fish drying facilities (including modified altona ovens) to reduce the pressure on the mangroves for firewood;
(iv) Carrying out training for at least 200 women in fish processing techniques using elected alternative fuel sources;
(v) Under the leadership of MFMR "Partnership with Women in Fisheries Initiative", USL-IMBO and EPA-SL carry out research on alternative fuel sources: Testing the potential use of Sargassum (sargassum briquettes and biogas) and other sources (sugar cane straw, acacia) as alternative Fish smoking fuel source;

3.2.5 Work with the local Women's Associations and under the technical guidance of MAFFS extension services and MFMR to develop Community based Extension Service (CES) to strengthen resilient coastal small-scale farming[46].

3.2.6 Establish a partnership with local CBOs (including organisations such as The Women's Network for Environmental Sustainability (WoNES), The Climate Change, Environment & Forest Conservation Consortium (CEFCON-SL), Sierra Leone Artisanal Fishermen Union (SLAFU) and Women in Fisheries Association) to help young local entrepreneurs and businesses to develop new climate resilient ideas with focus on youth and women sector.

Output 3.3. Compressed Stabilised Earth Block (CSEB) practices are introduced to mitigate the risk of sand mining in Sierra Leone.

127. The Ministry of Works, Housing and Infrastructure is responsible for regulating building construction works in Sierra Leone and one of its key objectives is the carrying out of research and promotion on the use of local building materials as alternative means to the construction of houses in Sierra Leone. Effective collaboration with the Ministry (especially the Housing Division) shall be undertaken in trying to achieve this Output to avoid overlapping or duplication of efforts. The Ministry also has legislative instruments such as i) National Housing Policy and ii) National Building Code (Building Act and Building Regulations) that need to be taken into account to ensure national compliance is attained. This Ouput shall therefore ensure that the construction of any alternative industry shall be in line with the Ministry's objectives with regards to building and material standards currently in place within Sierra Leone.

128. The use of compressed, stabilised earth blocks (CSEB) will have significant benefits on the reduction of erosion due to sand-mining activities. By introducing an alternative construction technology to cement, that uses only a minimal amount of sand for its production, CSEB will reduce the pressure on sand resources in the coastal zone. Another major environmental benefit of CSEB use is that much less cement is required in the country therefore reducing the important pollution caused by cement production activities. The early impact of the use of CSEBs in relation to sand mining in Sierra Leone will

[46] This will include the introduction of field water storage capacity and practical training on small scale irrigation methods and water management to women farmers as well as support to the establishment of small-scale vegetable plots and investigation on the potential use of seagrass/sargassum based fertilisers.

always be a low use technology until it becomes known and more people are trained to use it. However, the impact of CSEB technology can be greater than expected because not only less sand is used to make blocks but, as already mentioned, a much smaller proportion of cement is used as well. The reduced use of cement often results in a reduction in carbon emissions, transport costs to contractors and money leaving the country to pay for imported goods.

129. LDCF funds will hereby be used to introduce an alternative construction technology, establish a production and training centre that will demonstrate the utility, versatility and logistical ease of use of machines producing CSEBs. The overall objective of the planned action is to promote economic alternatives to using beach sand for specific construction purposes. Whilst the early overall impact of CSEB use may be small, at an operational level the impact on sand use is possibly significant. Currently, sand and cement blocks (S&CBs) are mosty comprised of a 25% cement and 75% sand mix. As CSEBs are made essentially with 80% earth, beach sand is only added when the clay/silt content of the earth is too high (even in this situation, no more than 10% of sand is usually required). Whereas a trip to gather beach sand may prove quite expensive, the cost of using and transporting earth is often minimal, especially when earth is available at the construction site or from within a disused quarry.

130. LDCF funds will be made available for the future widespread use of CSEB technology in Sierra Leone, in compliance with national standards. Awareness on CSEB construction is spreading very slowly and a strong awareness raising campaign by GoSL is included within this Outcome to help prove the approach is beneficial. Therefore, funds shall be used to improve awareness and to reduce any uncertainties relating to some deep-seated prejudices that already exist about their use which may have to be overcome for this technology to be introduced and accepted as a mainstream product. For example, reference to "earth blocks" is frequently associated to "mud blocks" and how they are not adapted to the changing climate – in particular increased occurrence and intensity of floods. There is often little understanding of the effectiveness of compression in rendering CSEBs. Examples of very strong results will need to be demonstrated to allay such fears.

131. The LDCF proposes to construct a CSEB production centre where CSEB block making and masons are trained and prepared for the switch to an alternative construction technology.

132. The Aurum Press 3000 will be purchased, due to its highly portable nature and only human power is required to operate this machine. It uses no diesel or electricity and therefore contributes a negligible carbon footprint. It has therefore a great potential to generate employment – with a typical team comprising of circa seven (7) people to operate. Since the importation of the machines began in The Gambia in 2005, 12 machines have been used there, of which 2 were transferred separately to Guinea Bissau for use. In 2013, it was established that only 13 machines had been imported in West Africa, offering a great expansion potential within the region.

133. In the medium term the LDCF funds shall help towards training a large number of people in a hands-on, practical way, to engage with a construction technology that is an economic alternative to the heavy use of beach sand. At the end of the training period a CSEB production centre with two Aurum 3000 will remain available to the community and to the industry.

134. Training costs have included the acquisition of sand and cement, and some lime, to enable the production of the first CSEBs. Plastic sheeting will also be purchased in order to cure the blocks successfully. The blocks, once made to an appropriate standard, will be made available for immediate sale. This income will be used to offset the costs of the training and other costs as needed (additional machine purchase, reparation costs, etc). The proposal within this action is that there will be five training periods funded by the LDCF that will be spread over a maximum of 25 weeks.

135. Shelter areas will also be erected in order to provide shade for the trainees while being trained and for rest and meal taking periods. These will be of simple construction to start with but will be gradually replaced by earth block structures as the construction can be used as practical exercises for the masons.

136. Nevertheless, to ensure local communities do not fall back into S&CB practices in case the CSEB sector does not succeed to expand, the LDCF project will, in partnership with the Ministry of Works (MoW) conduct additional research in order to identify possible alternative sustainable and low-cost construction techniques.

Activities to be carried out

3.3.1 Consultations with the MoW to determine the appropriateness of the CSEB technology and awareness raising among the public to communicate how CSEB could be adopted as an alternative to S&CBs.

3.3.2 Construction of a CSEB Production and Training Center to both manufacture CSEBs plus also to act as a training centre to help increase the awareness and understanding of the benefits (both economic and environmental) of promoting the construction of CSEBs.

(i) Prepare the site: digging boreholes to supply the water needed to mix the earth, cement and lime in which to make the blocks; shading and covering the areas where the machines will be installed; procuring cement and lime to mix with the earth.

(ii) Procure and install two machines – Aurum Press 3000 Block making machine. In addition, spare parts will be procured to rapidly repair the machines in case of break-down. Additional moulds will also be imported to make alternative sized blocks.

3.3.3 Organize six 18-day training sessions for 180 people (30 people per session):

(i) 90 Block Makers will receive trainings on (i) the responsibilities of each member of the block making team; (ii) the set up of the block making machine; (iii) the composition and characteristics of the soil that is appropriate for block making; (iv) the method to be followed in preparing and mixing the soil; (v) the quantities of cement or other stabilizer to be used for making blocks for different purposes; (vi) the way in which the machine should be operated; (vii) the curing process to be followed once blocks are made; (viii) the way in which blocks should be stacked during the curing process; (ix) the way in which the blocks should be stacked during the longer term drying process (one to two months depending on the composition of the block);

(ii) 90 masons will receive trainings on (i) the difference involved in using CSEBs rather than S&CBs; (ii) how to work with earth mortars; (iii) how to lay blocks using less mortar and less cement in the mortar mix; (iv) how to clean the face of blocks once laid; (v) how to supervise labourers in handling CSEBs; (vi) how to build unusual structures (vaults and domes) without form work, including how to make roofs without metal or wood sub structures.

3.3.4 Work with the GoSL relevant institutions to draw up an industry standard and code of conduct that reflects best practices in CSEB production. Tests at the national level, on the compressive strength of the CSEB will be conducted by a national Technical Training Institute.

3.3.5 Work with the MoW to explore the opportunities for additional innovative techniques that could respond to the construction needs in Sierra Leone, while supporting the search for cheap and sustainable resources conducted by the MoW.

Output 3.4. Participatory implementation of urgent and priority medium-scale soft (non-structural) and hard (structural) coastal adaptation works undertaken to protect coastal community at risks.

137. LDCF funds will support the GoSL efforts to protect coastal communities at risk by implementing a series of medium-scale "nature based interventions" (non-structural) and hard (structural) coastal adaptation works. These interventions may range from: i) mangrove restoration; ii) protection of coastal degraded areas; iii) development of medium scale hard protection measures; iv)actions to address sargassum/seaweed beach invasion; and v) implementation of community-based CIEWS etc. These objectives will be achieved by using project funds to invest mainly in local vegetative species which can constitute a viable bio-shield coastal structure that is complemented by sea grape coastal vegetation planting that help in binding process in dune rehabilitation. Specific areas within the selected demonstration sites identified by the baseline and feasibility studies to be carried out during the project initiation will be targeted with actions to address the damage caused to mangrove stands by encroachment on those sites or on their vicinity. A restoration programme will be designed (using results from Outcome 2 and the adapted CIDMEWS outputs designed in Outcome 1) through a participatory planning process by communities to identify priority areas covering a total of 500ha.

138. Implementation of this programme will be through local experienced NGO's and CBO's using local labour from women and unemployed youths on a "cash for work" scheme. Drone based GIS technology (Outcome 2) will be used to map and measure progress on survival rates and status of current no-take zones in the mangrove restored areas. In addition, project funds will be used to identify degraded beach areas[47] in the selected demonstration sites and main touristic beaches where ecosystem based approaches will be undertaken by planting of native grass and tree species on dune systems and/or on the beach to stabilize sand and to protect mangrove ecosystems. Some specific resilience building action for beach/dune protection will also be undertaken, including signage, pathways from adjacent roads to positioning of new garbage bins. Under this Output funds will be used to carry out limited hard measures such as upgrading the groynes protecting specific stretches of the Lumley beach and complement with support local groups to enhance their livelihoods; stabilization of beach facade, slope adjustment and sediment addition; and low grade beach nourishment on seaweed/sargassum affected beaches of touristic importance.

139. Finally, under this Output, some LDCF funds will be made accessible to both National Tourist Board and MFMR to explore innovative means of mechanically clearing seaweed/sargassum advance wave in most popular beaches during tourist peak season; and/or set up an innovative responsive strategy for beach protection against seaweed/sargassum invasion including clearing up of beaches, transformation/utilization of debris using a Youth Task Force on a "cash for work" scheme and/or private entrepreneurship.

Activities to be carried out

3.4.1 Establish community-run nurseries for propagation of mangrove and other local vegetative species[48] to support mangrove restoration and dune fixation;

3.4.2 Carry out rehabilitation of 500ha of degraded mangrove with suitable varieties on identified critical areas[49] within the proposed project demonstration sites in close cooperation with local NGO's,

[47] Identified through baseline and feasibility studies to be carried out during the project initiation phase.

[48] Local native and/or adapted vegetative species identified during the Project Initiation Phase.

[49] Identified through baseline and feasibility studies to be carried out during the project initiation phase and in close coordination

CBO's and labour contribution from sand miner youth associations and Women Associations under a "cash for work" scheme;

3.4.3 Set up a monitoring committee involving key institutions and using drone based GIS technology for mapping, carry out assessment of survival rates and status of current no-take zones in the mangrove restored areas.

3.4.4 On a "cash for work" scheme, partner with sand miner youth associations and Women Associations to:

(i) Carry out rehabilitation[50] of identified degraded beach area[51] using ecosystem based approaches and assist in resilience building - signage, pathway through from adjacent roads to the placement of rubbish bins;

(ii) Undertake planting of native tree species on dune systems and/or on the beach to stabilize sand and to protect mangrove ecosystems and vulnerable villages from increased storm activity because of climate change.

3.4.5 In close partnership with The Sierra Leone Tourist Board, The Ministry of Youths and Sports, USL-IMBO, SLMD/A, SLMA promote and based on cost-effectiveness and the results of Outcome 2 - Activity 2.2.3 implement selected Engineering Designs for selected[52] coastal protection options:

(i) Upgrading the gabion and groynes protecting some stretch of the Lumley beach;

(ii) Stabilisation of beach facade, slope adjustment and sediment addition;

(iii) Low grade beach nourishment on seaweed/sargassum affected beaches of Touristic importance;

(iv) Build infrastructures[53] to support local Women in Fisheries to enhance their livelihoods such as non-metal/fiber glass fish stands, fresh water points, hygienic fish cleaning facilities, first aid/ hygienic installations.

3.4.6 In close partnership with The Sierra Leone Tourist Board, The Ministry of Youths and Sports, USL-IMBO, SLMD/A, SLMA promote the following adaptation measures against seaweed coastal invasion:

(i) Explore innovative means of clearing seaweed/sargassum in most popular beaches during tourist peak season; and/or

(ii) Alternatively set up an innovative responsive strategy for beach protection against seaweed/sargassum invasion including clearing up of beaches, transformation/utilization of debris using a Youth Task Force on a "cash for work" scheme and/or private entrepreneurship;

Output 3.5: *The Coastal Early Warning System (CIEWS) is extended to target sites in the coastal zone to protect fishing and farming communities.*

140. Through this Output, resources will be used to further strengthen the operationalisation of the existing UNDP funded EWS project outputs in Sierra Leone by extending the current network into the

with GEF6 PIF on "Sustainable and integrated landscape-level management of the Western Peninsula's natural assets in Sierra Leone" to avoid overlapping.

[50] Undertaking building sand fences (hessian and date palm), planting of seagrass, trees (native *Casuarina* spp. or other local beach tree) and native locally adapted vegetative grassy plants species on dune systems over approximately 1-2 Km of beach to stabilize sand and to protect mangrove ecosystems and vulnerable villages from increased storm activity because of climate change.

[51] Identified through feasibility studies to be carried out during the Project Initiation Phase.

[52] Identification and selection of coastal protection options carried out through Feasibility study carried out in each of the project pilot sites.

[53] Infrastructures identified through the feasibility study/analysis to be carried out during the Project Initiation Phase.

coastal zone to be able to give protection, through early warnings, to the vulnerable fishing and farming communities. The existing CIDMEWS shall be updated and developed further to ensure existing work is complemented within this output. This objective will be met through the following:

- establishment of an integrated community based CIEWS network of 4-5 pilot Climate and oceanographic monitoring demonstration sites and this is linked directly to the ongoing CIDMEWS work,
- training of marine & weather forecasting technicians,
- establishment of appropriate data collection and transfer system, communication and handling facilities and
- development of forecasting products covering the coastal zone in partnership with SLMD/A.

141. LDCF funds will also be used by relevant institutions to develop and deliver capacity building and Training Workshops to relevant stakeholders regarding the setting up of appropriate EWS dissemination, response and recovery strategy for the various targeted Districts/ChiefdONS. Training of local coastal civil protection officers/leaders, establishing partnership with local NGO's & CBO's for the development of training awareness programme for local women communities in further assessment of local risk levels and analysis/identification of appropriate mechanisms for dissemination of Early Warnings on extreme events in the coastal zone will also be funded by the project.

142. The project funds will also support the strengthening and operationalisation of activities of Local Disaster Risk Management Committees (LDRMC), Community Radio stations at *Conakry Dee and Tombo* and The Sierra Leone Coastal Guard by delivering equipment, communication means and capacity development in CC risk based knowledge, in particular to effectively establish warning dissemination and response service to coastal community groups. In this context, this Output seek to establish a community-based communication and information sharing tool with a strong participation of women and youth in the coastal zones and target sites, using local languages (community media: TV, radio and newspaper) for climate extreme events and hazards dissemination. On the rescue and response side, this Output will make funds available to deliver additional resources to the local and relevant institutions to strengthen the CIEWS response capability by providing at least two engine powered rubber inflatable boat for high sea rescue of fishermen under extreme climatic event to be delivered to Conakry Dee & Tombo where there is significant concentration of fishermen exposed to extreme events. Targeting the safety of fishing crews exposed to extreme events in open seas this Project through this Output will disburse funds to deliver additional resources including Hand Crank / Solar Powered Weather Alert Radio to fishing communities to be able to receive forecasts and warnings while at sea. Resources will also be made available to local mobile phone providers and other relevant institutions to establish a toll-free mobile number and toll-free text and pictorial "sms"[54] to warn fishermen at sea.

Activities to be carried out:

3.5.1 Support the extension of the CIEWS by strengthening warning dissemination and response service to coastal community groups (fishermen, farmers and women associations);

3.5.2 Develop capacity and make provision to strengthen Community Radio stations[55] in target districts (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island) and establish with a strong participation of women and youth a community-based communication and information sharing tool

[54]Short Message Service (SMS) is a text messaging service component of phone, Web, or mobile communication systems. It uses standardized communications protocols to allow fixed line or mobile phone devices to exchange short text messages.

[55]Community Radio stations and ancillary equipment (radio equipment, battery, solar or wind Energy source, etc) identified during the feasibility study to be carried out during the Project Initiation Phase.

in the coastal zones and target sites using local languages (community media: TV, radio and newspaper) for climate extreme events and hazards dissemination

3.5.3 Deliver Training Workshops on: developing local warning dissemination and response mechanisms, including the strengthening of Local Disaster Risk Management Committees (LDRMC), to at least 5 local coastal civil protection officers (per pilot sites x6=30), Community leaders, Districts representatives in charge and/or dealing with Coastal Disaster Management;

3.5.4 Develop all the necessary communications, transmission and data exchange interventions for integrating coastal and marine data into existing SLMD/A EWS network and the global monitoring network[56] to support the existing CIDMEWS;

3.5.5 Strengthen the Sierra Leone Coastal Guard communication network for EWS dissemination/response and coastal disaster information management with provision of:

- at least 15 ("AquaQuake") VHF IC-M71 radios;
- at least two (Conakry Dee &Tombo) engine powered rubber inflatable boats for high sea rescue of fishermen under extreme climatic event;
- Provide 100 AM/FM Weather Alert Radio sets[57] with Solar Power, Flashlight and Cell Phone Charger (Red) to the fishing communities in pilot sites to enable reception of warnings while at sea.

2.4.1 Partnerships

143. The implementation of project activities presupposes the establishment of several sectoral partnerships. These have been assessed taking into consideration their role in addressing the development challenge and the expected results that each partner will accomplish that are critical for the achievement of project results. In this context, the following potential partnerships were identified to increase the likelihood of the project achieving the expected goal and to amplify the results. These are expected to be established between the Project Management Unit and the respective entities by the initial stages of project implementation.

Entity	Overarching goals and areas of responsibility
Led by EPA-SL with involvement from the following Partners: Ministry of Works, Housing and Infrastructure (MWHI), The Ministry of Lands, Country Planning and Environment (MLCPE) and the The Ministry of Local Government and Rural Development (MLGRD), The Sierra Leone Maritime Administration (SLMA) and USL-IMBO.	Community and participatory shoreline assessment of community assets (infrastructure and ecosystems) vulnerable to coastal storms and sea level rise process to develop the vulnerability maps for coastal communities' infrastructure and ecosystems to: a. Develop a "decision tree" type model to be used as decision maker's decision support tool, with multiple options to guide government in the selection of appropriate (hard vs soft) coastal defense /adaptation options; b. Develop specific EbA guidance manual to support construction of ecosystem based interventions (planting of mangrove, seagrass, native trees, etc,).

[56] http://www.odinafrica.org/products/sea-level-data-collection.html and http://sealevel.odinafrica.org/

[57] American Red Cross FRX3 Hand Crank NOAA AM/FM Weather Alert Radio with Solar Power, Flashlight and Cell Phone Charger (Red). http://www.etoncorp.com/en/productdisplay/frx3-american-red-cross

Led by a network of NGO's with Special knowledge on climate change adaptation in the coastal zone.	Public awareness campaign on climate change risks and costs and benefits of different adaptation options – Activity 3.4.1
	The setup of *CSD* and *Communal Centres for Coastal and Marine Resources Transformation (CCMART's)* to promote community based adaptation– Activity 3.2.2.
	Establishment and operationalization of two complete[58] pilot post-harvest value chain units at Conakry Dee–Port Loko axis and Tombo/Hamilton–Freetown axis – Activity 3.2.3.
	Establishment of post-harvest value chain components in Shenge and Turtle Island sites – Activity 3.2.4.
Led by the Ministry of Fisheries and Marine Resources supported by the relevant GoSL institutions.	The setup Community based Extension Service (CES) to strengthen resilient coastal small-scale farming – Activity 3.2.5.
Led by the Ministry of Work with support from a national training center	The introduction of the CSEB industry and the test of compressive strength of the CSEB for the formulation of an industry standard and code of conduct. Output 3.3
Led by EPA-SL but undertaken by local and well experienced NGO's and CBO's with necessary guidance and support from the National Protected Areas Authority (NPAA), Project Experts and MAFFS.	Community participatory planning process and promotion of adaptation measures based on Ecosystem Based Approach (EbA) – Activities 3.4.1 & 3.4.2.
Led by The Sierra Leone Tourist Board, with strong support and collaboration from The Ministry of Works, Housing and Infrastructure (MWHI), The Ministry of Youths and Sports, USL-IMBO, SLMD/A, SLMA.	The Lumley beach upgraded package – Activities 3.4.5
Led by the ONS-DMD with straight support from EPA-SL, Ministry of Fisheries and Marine Resources, SLMD/A, USL-IMBO and local NGO's & CBO's (Youths and & Women).	The CIEWS warning dissemination and response service to coastal community groups strengthening, Community Radio stations, Local Disaster Risk Management Committees (LDRMC), local coastal civil protection officers, Community leaders and Districts representatives. – Output 3.5 - Activities 3.5.1-3.5.3.
Partnerships with the NGO's and CBO's	To support the implementation of the various activities of the project particularly in the context of: a. Community participatory planning process and promotion of adaptation measures based on Ecosystem Based Approach (EbA); b. Communal Centres for Coastal and Marine Resources Transformation (CCMART's) to promote community based adaptation; c. Public awareness campaign and dissemination initiatives at the District and Chiefdom level of project results to promote replication; d. Help young local entrepreneurs and businesses to develop new climate resilient ideas with focus on youth and women sector.

[58]Comprising of a fish landing point, transportation means, fish handling and processing section, cold room, ice making plant, rodent free store for smoked fish, smoke ovens, training hall with the availability of water and hygienic facilities.

West Africa Biodiversity and Climate Change (WA-BICC)	WA-BICC GIS-based coastal assessments will feed into the analysis conducted under the outcome 1 and the output 3.5. Strong collaboration is also planned during the implementation of the mangrove restoration activity, through the sharing of lessons learned.

2.4.2 Stakeholder engagement

144. Ongoing public consultation is critical for successful implementation and stakeholder consultation has been a key feature in the design of this LDCF Proposal. Stakeholders have been involved in identifying and prioritizing the proposed intervention activities and details of the stakeholder baseline analysis during the PPG Phase were provided in Section 1.4 above where key project stakeholders were identified as well other potential secondary stakeholders, NGO's and CBO's. This section outlines some of the key consultation principles and processes at a strategic level that will need to be translated into practical action during the project implementation to ensure that the different target groups, in particular the women and youth groups, they have access to and are aware of mechanisms to submit concerns about the social and environmental impacts of the project. It provides guidance based on the initial stakeholder analysis, conducted as part of the project preparation process, and the consultations so far. This can therefore be used to define exact activities that will form part of a communications and consultation strategy developed during the inception period of implementation.

145. The following three distinct overlapping steps are required:
a) Awareness campaign (Information & Education): e.g., community radio programmes and meetings, brochures, displays, public events, media coverage, e-mail. The main goal of this action is to i) inform stakeholders about specific issues, and what they can do about them, and/or ii) to inform them about a project decision or activity and how they can get involved. For the public institutions, the project foresees (in Output 3.5) to establish with a strong participation of women and youth a community-based communication and information sharing tool in the coastal zones and target sites using local languages (community media: TV, radio and newspaper).

b) Consultation e.g., through workshops, interviews, meetings, "workbooks", surveys, advisory committee meetings etc, the goal shall be to allow stakeholders to influence a project decision or activity, by inviting their comments and views. To this end the project will sub-Contract services to carry out: (i) audio-visual production (booklets and videos) for community awareness raising consultations and events (e.g. for Community members, schools and TV) for different age groups (Women & Youth); (ii) at least 3 documentaries or short films (Participatory Video of about 10 minutes including YouTube publication) shall be produced to document climate risks in the coastal zone and adaptation benefits generated by the project in the demonstration sites/communities, which can be used for further communication and advocacy work.

c) Participation building partnerships in design and/or implementation: e.g., project planning, field work, pilot project demonstrations, management committees, community monitoring, contracting NGOs, private sector or civil society with the ultimate goal of encouraging direct stakeholder participation and/or sharing responsibility for a project decision or activity. To contribute to the attainment of this objective the project through Output 3.1, Activity 3.1.5 sponsors dissemination at the District/Chiefdom level of project results to promote replication of successful adaptation approaches which includes at least one

exposure visit to bring decision-makers and planners at the national, provincial and municipal level who are not already engaged directly with project to project demonstration sites.

146. Overall, the project design contemplates various forms of public awareness campaign and specifically includes in Output 3.1 several strategies of awareness campaign for target groups (women and youth) and community residents of target districts at Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island on coastal adaptation issues (value of mangroves, impact of SLR and coastal erosion, benefits of sustainable use of resources, etc). Consultation with various stakeholders during implementation shall also be the main feature of this LCDF and this is particularly expressed in Outcome 2 & 3 where most of the activities being developed in the project are guided by a participatory approach, particularly towards the local communities where demonstrations are being carried out. The stakeholder consultation during project implementation will be expected to support all outcomes. Overall, the objective of the consultation plan is to provide a framework to guide and promote two-way engagement between the key Responsible Parties and the key stakeholders with whom the project will engage and directly impact upon.

147. Analysis carried out in Section 1.4 shows that project stakeholders include a range of types of groups, all with their own interests and concerns. They have different roles to play in the project and Table 7 below indicates key stakeholders and their possible roles. National level groups will include central government, and autonomous GoSL agencies like EPA-SL, USL-IMBO, SLMD/A, SLMA, ONS-DMD, The Sierra Leone Tourist Board, the NPAA, the Ministry of Youths and Sports, The Ministry of Lands, Country Planning and Environment (MLCPE), the Ministry of Works, Housing and Infrastructure (MWHI) and Ministry of Fisheries and Marine Resources. At District level, most of these national agencies have representations which will also be locally involved in the implementation and monitoring, particularly the EPA-SL, SLMD/A, SLMA, MFMR and MLGRD. Sub-National institution group Non-state groups will include local (district, municipality) government and nongovernment and civil society groups, research bodies, local populations within and downstream of the target area particularly the specialized NGO's and CBO's identified during the PPG phase. In addition, there are those International Agencies and Donor Partners supporting the project activities through potential Co-financing.

Table 7. Stakeholder Engagement Plan with key stakeholders and their possible roles

Project Outcomes and Outputs	Potential Stakeholder Involvement
OUTCOME 1	**Lead Institutions and Stakeholders roles**
• **Output 1.1:** Climate and oceanographic monitoring network (with 6 automated oceanographic monitoring systems) and related data processing systems installed along the coastal zone to improve the knowledge base for measuring future climate induced risks.	USL-IMBO will be leading the Output activities in straight collaboration with SLMD/A in terms of equipment procurement, installation, communications, operationalization and WMO standardization of ONS equipment. SLMA will be also collaborating in the security arrangements for ONS field installations.
• **Output 1.2:** Institutional capacity of MFMR, EPA-SL, SLMD/A, ONS, SLMQ and USL-IMBO for assessing coastal hazard risk and vulnerability to climate change through probabilistic modelling is strengthened.	UNDP will be leading the activities of this Output in the procurement of equipment and organization of all training and capacity building of human resources in straight collaboration with SLMD/A in the delivery and WMO standardization.

• **Output 1.3:** A systematical link between the collected data and the existing CIDMEWS (web based GIS) is established.	UNDP will be leading the activities of this Output with constant and straight support from EPA-SL (CC-DAMAS) in the procurement and acquisition of equipment, software, modelling exercises and development of all conceptual work on CVA & CVI. USL-IMBO, SLMD/A and ONS-DMD will also support this Output in technical support and advisory roles. Collaboration will also be expected from MAFFS (Food and Nutrition Early Warning Platform) for the extension of AMESD (ex-PUMA) e-station terminal for Environmental Marine Monitoring.
• **Output 1.4:** The human capacity of the MFMR, EPA-SL, MLGRD is strengthened, skilled and trained on CVA techniques.	UNDP will be leading the activities of this Output in straight collaboration with EPA-SL in the procurement of equipment and delivery of all training and capacity building actions as well as operationalization of GIS and modelling facilities. A strong collaboration with WA-BICC will also be established to ensure a complementarity in the data collected and models developed.
OUTCOME 2	**Lead Institutions and Stakeholders roles**
• **Output 2.1:** Sea Level Rise and coastal erosion profiles developed for the six target pilot sites to support the strengthening of Coastal Zone Management Plans at both urban and district levels**.**	Activities of this Output will be entirely led by EPA-SL who will seek appropriate collaboration form other GoSL institutions for *ad-hoc* collaboration and technical advisory roles. This includes the USL-IMBO, ONS, SLMA, SLMD/A, MFMR, MOYA, MLGRD, MLCPE and MWHI in the process of developing Coastal Vulnerability Reports for each of the six Districts.
• **Output 2.2:** Ecosystem based adaptation design guidance to support future climate resilient planning and development in place.	Activities of this Output will be entirely led by EPA-SL who will seek appropriate collaboration form other GoSL institutions for *ad-hoc* collaboration and technical advisory roles. This includes MFMR, MLCPE, MWHI and MAFFS on the development of "decision tree" type of decision support tool, to guide government decision makers in the selection of appropriate (hard vs soft) coastal defense /adaptation options.
• **Output 2.3:** Marine spatial plan framework to compliment with ICZM is developed.	Activities of this Output will be entirely led by EPA-SL who will seek appropriate collaboration form other GoSL institutions for *ad-hoc* collaboration and technical advisory roles.
• **Output 2.4:** Sierra Leone ICZM is strengthened with the establishment of SL-ICZM-WG and sustainability mechanisms.	Similarly, the activities of this Output will be entirely led by EPA-SL who will seek appropriate collaboration from other GoSL institutions for *ad-hoc* collaboration and technical advisory roles. This includes all the Institutions involved on the ICZM, UNDP CO and other key Departments from ONS-DMD.
OUTCOME 3	**Lead Institutions and Stakeholders roles**
Outputs: • **Output 3.1:** An outreach communication, information and awareness strategy designed and implemented to enhance decision-making and foster public awareness and safety about the potential impacts of climate change;	This Output will be led by the MFMR closely supported by EPA-SL and DMD-ONS as well as those local and dedicated NGO's and CBO's in the promotion of public awareness campaign and training at least 15 community leaders' trainers per site; and dissemination of project results. It is expected that NGO's will be called to take active part in the development of the activities. This is the case of The Environmental Foundation for Africa (EFA), The Environmental Forum for Action (ENFORAC), The Island Aid (IA) in Shenge and Turtle islands.
• **Output 3.2:** Adaptation strategies for alternative livelihoods are designed to strengthen women and sand miner youth association's resilience to CC impact on the coastal zone so as to reduce pressure on natural resources.	This Output will also be led by the MFMR closely supported by The Ministry of Youths and Sports, The Ministry of Local Government and Rural Development and Minister of Labour and Social Security in the setting up of *CCMART's & CSD; and by:* MAFFS extension services to develop Community based Extension Service (CES) to strengthen resilient coastal small-scale farming; It is expected that NGO's will be called to take active part in the development of activities that will help

	young local entrepreneurs and businesses to develop new climate resilient ideas with focus on youth and women sector. This is the case of The Women's Network for Environmental Sustainability (WoNES), The Climate Change, Environment & Forest Conservation Consortium (CEFCON-SL), Sierra Leone Artisanal Fishermen Union (SLAFU) and Women in Fisheries Association.
• **Output 3.3:** CSEB practices are introduced to mitigate the risk of unregulated sand mining in Sierra Leone.	This Output will be led by the MWHI, with continuous support from the MLGRD. The national Technical Training Institute will be involved in the test of the compressive strength of the CSEB and will support the formulation of an industry standard and code of conduct. Earthworks will also be called in to share its knowledge and experience in using CSEB machines and Earth Blocks.
• **Output 3.4:** Participatory implementation of urgent and priority medium-scale soft (non-structural) and hard (structural) coastal adaptation works undertaken to protect coastal community at risks.	This Output will also be led by the MFMR but with specific contribution in responsibilities from EPA-SL and local NGO's (Women and youth Associations) towards the Mangrove restoration and dune protection activities; with support from NTB, The Ministry of Youths and Sports, USL-IMBO in the implementation of selected Engineering Designs for selected coastal protection options and development of adaptation measures against the impact of seaweed coastal invasion.
• **Output 3.5:** Early Warning Systems are extended to target sites in the coastal zone to protect fishing and farming communities.	The activities of this Output will fall largely under the responsibility of USL-IMBO in close partnership with SLMD/A, ONS-DMD and SLMA to carry out strengthening warning dissemination and response service to coastal community groups; strengthening of Local Disaster Risk Management Committees (LDRMC), and local coastal guards, and civil protection officers and with great support from local Radios and involvement from fishermen, farmers and women associations;

2.4.3 Mainstreaming gender

148. Global experience has shown that climate change challenges are not gender or generation neutral. Increases in extreme weather conditions (including floods, droughts and cyclones) serve to accentuate and accelerate risks to the most vulnerable and least empowered people in the Sierra Leone society including women, children, older people and persons with disabilities. Key findings from the gender assessment undertaken during project preparation (see Annex 4 – Gender Report for details), have shown that women in coastal areas of Sierra Leone, because of their responsibility to secure food and water, energy for cooking and income from market sales, women are highly dependent on local natural resources for their family's health and livelihood. Therefore, current negative impacts of Climate Change on natural resources in Sierra Leone have disproportionally affected women.

149. Women play a key role in fishing activity, especially in fish processing and conservation. To cope with these negative impacts, women have grouped themselves in several strong Women and Fisheries Associations dedicated to smoking fish one of the major activities. In addition, women in the coastal target areas also depend on vegetable gardening as another main source of income. Both of these livelihoods have been badly hit by climate change induced drought (farming and water) and SLR (fishing) phenomena as well as by anthropogenic activity such as mangrove logging (fishing). A consequence of men's migration to urban centers included the discharge of reproductive work which was not entirely women's role. This represents another extra load on women living in the coastal areas putting further stress in sharing time among the expanded responsibilities. For example, the distances covered in search of water (about 2 km in Tombo and 4 km in Conakry Dee) and those for fetching firewood and water (2 km in Lakka and 1 km in Hamilton) has been increasing in the past few years due to climate change induced environmental degradation. Given the degree of vulnerability of Sierra Leone the impacts of climate change on women

in coastal areas are likely to be even more extreme - hence the urgent need for safeguarding through proactive resilience investment. Therefore, gender considerations have been part of the formulation process. Women have been represented in all consultations fora.

150. It is therefore under this background that the project aims at implementing adaptation measures in a very participative fashion, through the inclusion of all social groups, included those marginalized, but having women at the core of the delivery target to guarantee maximum coverage of impact and structural consideration in planning adaptation intervention of the most vulnerable (and exposed to the impact of climate change) in the group receiving beneficial effects.

151. Women's participation in the identification and design of adaptation measure has ensured that their needs were met and that their constraints are addressed in the various adaptation option put forward in this document. Project outcomes will contribute to an understanding of how adaptation responses can be designed to strengthen gender equality. Apart from this, the project will also contribute to women's empowerment through two additional avenues: enhanced participation and increased responsibilities. To achieve this, the project is ensuring that women attend workshops and are part of adaptation option interventions on pilot sites and community based CIEWS, and also community management committees. More specifically, women members of society, in addition to youth groups, will receive skills training and technical assistance to acquire the skills and tools for developing, small scale adaptation livelihoods. This included training women and men in new skills in agriculture, forestry and fishery techniques such as building irrigation systems and cultivation of high crop varieties (Outcome 3). Furthermore, the project in close partnership with MAFFS extension services will implement programs to diversify subsistence crops and have access to improved technologies (irrigation) with skill training in agro-processing and in fish processing and preservation.

152. Additionally, partnerships will be established with local CBOs (including organisations such as The Women's Network for Environmental Sustainability (WoNES), The Climate Change, Environment & Forest Conservation Consortium (CEFCON-SL), Sierra Leone Artisanal Fishermen Union (SLAFU) and Women in Fisheries Association) to help young local entrepreneurs and businesses, to develop new climate resilient ideas with an emphasis on women initiatives. Therefore, the project will create conditions where at least 50% of the beneficiaries of the fund are voluntary women.

153. Besides, most of the 10,000 people benefiting from the establishment of *CCMART*' to promote community based adaptation initiatives, will be women. In addition, the 10,000 youth benefiting from the creation of the *CSD's* to assist youth associations in developing skills for alternative income generating activities to curb intense degradation of the coastline through mangrove cutting and sand mining, will be gender disaggregated and measures will be taken to ensure women are effectively integrated into the activities.

154. Through these efforts, the project will ensure significant gender benefits. Women Associations will participate in the rehabilitation of identified degraded dune area using ecosystem based approaches and assist in beach resilience building on a "cash for work" scheme. Similarly, degraded mangrove on identified critical areas will be rehabilitated with strong involvement with local NGO's, CBO's and labour contribution from sand miner youth associations and Women Associations under a "cash for work" scheme.

155. Gender-focused NGO's & CBO's will continue to be implicated throughout the project implementation particularly in the community participatory Coastal Vulnerability Analysis (CVA) on coastal areas at Municipal and Chiefdom level, the implementation of adaptation measures and engagement in alternative income generating livelihood activities.

156. During implementation of the project, they will be consulted in order to ensure women are properly engaged/warned and the end of the project implementation, the project will specifically look into gender-

differentiated impact of the project and results from this assessment will be widely disseminated at a regional or national workshop, contributing to heightened awareness and understanding about the impact of coastal protection on gender equality or empowerment.

157. Gender-disaggregated data, together with a strong focus on womens empowerment in tandem with male appreciation, involvement and acceptance of this new focus, will be combined with awareness activities to ensure men understand the benefits of integrating women in decision-making and other activities.

2.4.4 South-South and Triangular Cooperation (SSTrC):

158. The South-South and Triangular Cooperation is underpinned in the long-term vision for international engagement in fragile states which is to build legitimate, effective and resilient state and other country institutions. This LDCF initiative provides an excellent opportunity for engagement of GoSL institutions, classified as fragile states such as Sierra Leone. As the project foresees the installation of a climate and oceanographic monitoring network (with up to 6 complete tidal gauging system) and related data processing systems installed along the coastal zone, there are ample prospects for Sierra Leone's institutions, as stakeholders of the project involved in these issues, to establish links within other fragile states (under the South-South cooperation and triangular framework) in four distinct areas:

- **Cooperation in training activities** by establishing partnerships with WMO Regional Meteorological Centers (Dakar, Lagos) for regional or in-country gender sensitive capacity development of at least four (4) Oceanography /Marine Technicians with skills to handle and maintain the ONS equipment; In addition, there are other regional centers and initiatives exist for further assistance and collaboration such as: The NEPAD framework has provided a path for the participation of Southern African countries in various collaborative programmes, especially in agriculture and food security, regional integration and infrastructure, and the APRM. In that sense, NEPAD contributes to promoting regional interdependence with the participation of Southern African countries.
- **Data collection and data exchange**: The Ocean Data and Information Network for Africa has been one of the most successful projects of the International Oceanographic Data and Information Exchange programme (IODE) of the Intergovernmental Oceanographic Commission of UNESCO (IOC). The Ocean Data and Information Network for Africa (ODINAFRICA) brings together more than 40 marine related institutions from twenty-five countries in Africa (below) to address the challenges faced in accessing data and information for coastal management. The focus of the current phase of the project is strengthening the pan African network of National Oceanographic Data Centre (NODCs), and marine related institutions, as a sustained mechanism for application of data, information and products in marine and coastal management in Africa.
- **Cooperation in the development of coastal erosion profiles** with neighbouring countries within the context of South-South cooperation, such as Ghana in the framework of the (DECCMA) project. New revolutionary methods and equipment such as drones is being used to assess coastal erosion in Ghana which may ensure added effectiveness and sustainability in project development. The study is part of the deltas vulnerability and climate change: migration and adaptation (DECCMA) project, which analyze the impacts of climate change and other environmental drivers across deltas in Bangladesh, Ghana and India.
- **Regional Cooperation in Sargassum Invasion** through The Abidjan Convention – the Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region and its related protocols which one of the objectives is the reduction of threat to the marine and coastal environment, its ecological equilibrium, resources and legitimate uses posed by

pollution and by the absence of an integration of an environmental dimension into the development process. The first step of this cooperative approach has been already undertaken through the first Regional Expert Group Meeting on Sargassum Invasion in West Africa that brought together marine-biologists, oceanographers, policy experts from 9 affected countries in the region (Benin, Côte d'Ivoire, Ghana, Guinea, Liberia, Nigeria, Senegal, Sierra Leone, and Togo), organizations (national and international) working on marine and coastal biodiversity management in the region. The objective was to "Formulate a draft common Regional Strategy on the collection of seaweeds and the creation of "Inclusive Green Jobs" in affected countries in the region.

- **Global Ecovillage Network[59].** The proposed establishment of *CCMART's* to promote community based adaptation initiatives and the creation of the *CSD)* to assist youth associations in developing skills for alternative income generating activities to curb intense degradation of the coastline through mangrove cutting and sand mining opens a door to south-south cooperation opportunity by integrating the targeted pilot sites into the Global Ecovillage Network through the GEN-Africa - African ecovillage association which promotes social resilience, environmental pro-tection and restoration of nature through the concept of ecovillages as models for sustainable human settlements. This initiative has been already tested in various other locations in Africa (Sudan, South Africa, Senegal, Benin, Congo, Cameroon, Kenya, etc.) and their experiences and lesson learn coupled with the funds being awarded by the project could strengthen the overreaching goals set for the *CCMART's and CSD's.*

159. In addition, the project team will participate to different international events where they will share the lessons learned and develop relationships with other relevant initiatives to learn from them and improve cooperation.

160. However, triangular cooperation is facing some challenges, including the absence of national policy frameworks to guide engagement by beneficiary countries with pivotal countries, and lack of long term strategic frameworks of operation by pivotal countries for engaging with both the North and the South (UNDP, 2009).

IV. FEASIBILITY

2.5.1 Cost efficiency and effectiveness

Cost-effectiveness of LDCF-financed alternatives

161. Strengthening the adaptive capability of Sierra Leone to climate change impacts was identified in the NAPA as an urgent and immediate adaptation priority, as it possessed the highest cost-benefit ratio. This project is fulfilling NAPA's five out of twenty-four identified urgent and immediate priority adaptation options that require urgent attention due to the high financial losses caused by climate change impacts. The estimated economic losses as a result of climate change for Sierra Leone, has been calculated based on different climate scenarios. For example, and using some scenarios, the International Panel on Climate Change (IPCC) references projections of a 21% decline in the annual landed value for fish by 2050 resulting in a nearly 50% decline in fisheries-related employment and a total annual loss of US$ 311 million to the region's economy (IPCC, 2014).

[59] http://gen.ecovillage.org/

162. In line with the GEF Council's guidance on assessing project cost-effectiveness, the project formulation team developed a scenario planning approach to assess and compare different future alternatives. Four scenarios emerged under different conditions in terms of planning capacities (high or low) and funding (lack or availability). The current LDCFproposal aims for a trajectory of coastal resilience based on a cost effectiveness scenario, linking a higher planning capacity with an adequate availability of funding to support the proposed actions. Nevertheless, without the project approved, three other scenarios could emerge, with a baseline situation (business as usual) leading to a potential vision of coastal collapse (worst case scenario) and also two other less negative scenarios, according to different conditions of effectiveness. The Figure below presents four alternative scenarios and related strategic visions for the future of Sierra Leone's coastal areas. Each of the following scenarios are described below to help the reflection on how the project design indeed looks to achieve a strong cost effectiveness.

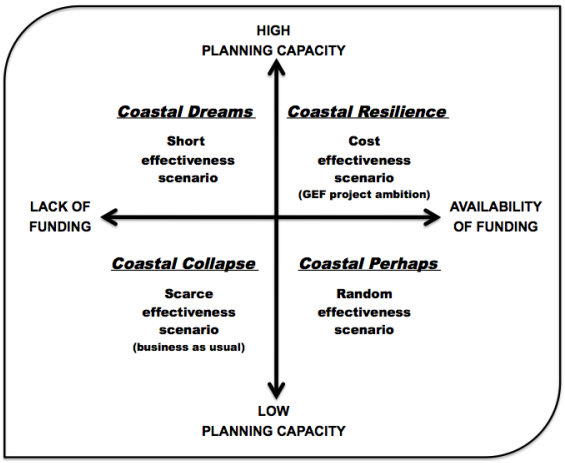


Figure 3: Alternative effectiveness scenarios and related strategic visions for coastal Sierra Leone

The scarce effectiveness scenario ("coastal collapse")

163. If the current trends and problems that are affecting Sierra Leone's coastal areas (including local communities and economic sectors) would continue into the future, in result of low planning capacities associated with the lack of funding to support adaptive strategies and interventions, the strategic vision of "Coastal collapse" emerges very strongly. This is the "Scarce effectiveness scenario", representing the "business as usual reality", in a country demonstrating a low adaptive capacity to support the impacts associated with climate change. This scenario represents the extension of the baseline situation without GEF funding under the current project proposal. The baseline scenario is a representation of what would reasonably be expected to have occurred in the project's absence. In previous sections of the document, the climatic, biophysical and socio-economic expression of the baseline scenario was described.

The short effectiveness scenario ("coastal dreams")

164. If Sierra Leone achieves a higher planning capacity as a result of other ongoing baseline projects, even if not directly targeting the problems related to coastal management associated with climate change, there might be some conditions to plan and to adapt better to the specific problems, at least in theory. Nevertheless, if that higher planning capacity is not associated to support the actions planned, the strategic vision will not happen and it might be seen as an unachievable "coastal dream". Without the LDCF resources it is not possible to implement adaptive strategies over the coastal areas to protect communities, livelihoods and activities. This scenario represents an evolution from the baseline situation,

assuming that other projects might enhance some adaptive capacities and strategies, without LDCF funding under the current project proposal.

The random effectiveness scenario ("coastal perhaps")

165. If Sierra Leone's stands on a situation of low planning capacity, even with a higher availability of funding provided by international donors, the current trends associated with climate change over the coastal areas might not be properly addressed. Availability of funding is not always a synonym of solution and there are many situations where money is not properly spent. The enhancement of planning capacities is crucial to deal with the uncertainty associated to climate change on socio-ecological systems, and especially in coastal areas where so many interlinked factors are related. When low planning capacities are supported by the availability of funding, we have a "random effectiveness scenario" where a strategic vision of coastal areas that "perhaps" adapts positively or "perhaps not". In Sierra Leone there are some examples of coastal physical interventions that were done over the last decade, with funding from international donors or from the private sector (tourism) that failed to solve the erosion problems and that not contributed to enhance the adaptive capacities of the country to deal with climate change and sea level rise. Nevertheless, this scenario also represents an evolution from the baseline situation, assuming that other projects will generate alternative funding, even if not supported by adequate planning, but without LDCFfunding under the current project proposal.

The cost effectiveness scenario ("coastal resilience")

166. The current LDCFproject proposal has the ambition to be the most cost effective of the scenarios, in order to promote a trajectory leading to a stronger coastal resilience. The project assumes a high planning capacity as crucial to address the several problems discussed and to implement the actions defined, making an effective and adequate use of the funding solicited to LDCF. The project has three outcomes that mutually reinforce each other, raising the ability to record new oceanographic information (Outcome 1). The investment in policy and institutional development (Outcome 2) supports the planning of the physical interventions in coastal protection for reducing key vulnerabilities, also strengthening the livelihoods of coastal communities and their socio-economic activities (Outcome 3). It is also relevant to highlight that the additionality of the project brings the possibility to articulate several other projects (and funding) from a strategic perspective, maximizing the use of the financial resources, promoting cost effectiveness. The project design also takes into consideration the need to reinforce several dimensions related to planning (e.g. oceanographic monitoring systems, capacity building actions at several institutional levels, joint actions between departments and ministries, engagement of local communities in site selection, etc.). The funding of the project under LDCFwill effectively contribute to coastal resilience of Sierra Leone, otherwise looming alternative scenarios may emerge

167. In order to fully monitor and contribute to the adaptive capability of the country to climate change impacts on the coastal zone, a good network of climate and oceanographic monitoring network stations fully equipped to adequately monitor sea level rise parameters to improve the knowledge base for future climate risks is therefore very imperative. Additionally, the project has been designed to complement and build on the on-going work of line agencies including other major donor-assisted projects, namely the UNDP/GEF_LDCF Project: "*Strengthening Climate Information and Early Warning Systems for Climate Resilient Development and adaptation to climate change",* the UNDP/GEF_LDCF Project: "*Building Adaptive Capacity to Catalyze Active Public and Private Sector Participation to manage the Exposure and Sensitivity of Water Supply Services to Climate Change*" and the IFAD/GEF_LDCF Project*: "Sierra Leone:*

Integrating Adaptation to Climate Change into Agricultural Production and Food Security in Sierra Leone" as described in detail in Section 2.3, the former intrinsically connected to this LDCF project thereby increasing its efficiency, cost-effectiveness and sustainability.

168. This approach of complementing existing related projects is more cost-effective than to carry out implementation of a separate initiative in an isolated manner. The LDCF project will work closely with existing SLMD/A project activities to co-produce outputs. This will promote cost sharing with this other project, particularly in relation to the establishment and operationalization of a CIEWS as well as activities towards the equipment maintenance and training of specialized technical staff reducing overheads and enhancing cost-effectiveness.

169. To choose the specific sites and associated adaptation measures for Outputs 3.2-3.5 (Component 3), a detailed assessment and cost-effectiveness analysis has been conducted (see Annex 5 for more details). The specific sites were chosen based on a screening analysis using a set of evaluation criteria including the population number and poverty level as well as the cost-effectiveness of site specific soft adaptation measures.

170. Cost information was determined for the small-scale, on-the-ground adaptation measures identified as a result of the consultations undertaken during the PPG Phase and, based on this, the activities were deemed cost-effective. Where actual techniques and small-scale adaptation measures are to be identified by community members and stakeholders in the inception phase (following research into various options), cost-effectiveness has been a key factor taken into consideration. In addition, the effectiveness of these activities in increasing resilience to climate change will be tested and measured during the course of the project. This will be achieved through an economic analysis and cost-benefit analyses to ascertain whether each activity is an economically viable option for a given climate change condition.

171. All costs for inputs, human resources, supplies are meant to be competitive, both in a national and international context. On the whole, the project aims to reach a total of direct and indirect beneficiaries benefiting from community livelihood enhancement of approximately 116,000 people with an average investment of *ca.* USD 80 per household (total LCDF budget, including management cost). The tangible benefits coming from this investment per household will be far outweighing the cost.

172. Moreover, the ICZM inter-ministerial platform, which will be formed using LDCF funds, will ensure that all relevant cross-sectorial data is used in development planning. The platform will set a precedent on how to coordinate between agencies and share data relevant to coastal and marine planning (to aid the future creation of a MSP (Output 2.3). Additionally, capacity reinforcement for EPA-SL to generate cost benefit and economics of adaptation analyses will ensure that EPA's coastal protection recommendations minimize additional funding needed for adaptation. Maladaptation costs resulting from sunk-costs or costs of delayed decisions will be reduced, thereby freeing financial resources. Besides, considering the awareness campaigns and trainings for decisions-makers at the national and local level conducted during the project implementation, these freed financial resources are expected to be used for additional coastal protection measures.

173. Furthermore, the chosen set of Outputs was reviewed in a validation workshop and based on Stakeholder consultations during two separate site visits. The Outputs outlined have been chosen based on their financial feasibility and have been chosen over alternative ways to address project barriers.

Resettlement alternative

174. Another alternative to the project intervention would be to resettle those populations most at risk of coastal erosion, SLR and other natural hazards on the coast. Resettling coastal communities to inland areas would inevitably reduce their vulnerability to climate change impacts in the coastal zone as well as reduce the pressure on coastal resources – including fish and sand. However, resettlement is unlikely to

be accepted by population, in particular because their revenues and livelihoods are often obtained from coastal activities, including fishing and sand mining. In addition, resettlement is an extremely complicated process, capital intensive with major social, economic and environmental impacts. This is the case as the Government would have to provide housing to displaced populations as well as job opportunities to ensure an equivalent livelihood potential.

175. Moreover, this is a long-term process that has to be conducted over years, which would therefore not be adequate in the context of a 5-year project.

Post-recovery alternative

176. Instead of supporting communities to prepare for extreme events and to adapt to the slow onset climate change impacts, an option would be to build the capacity of national and local authorities to respond to these events after they occur. Considering the human and economic losses arising after extreme events, caused by the poor quality of coastal infrastructures and the limited preparedness in case of these events, this option was not considered as cost-effective. The introduction of soft and hard infrastructures for coastal protection is expected to have much longer-term positive impacts on coastal communities' resilience and reduce significantly the losses following a climate shock.

Regulatory alternative

177. As was expressed throughout the document, sand mining is dramatically exacerbating the vulnerability of coastal areas in Sierra Leone. One of the options identified during PPG was to work with the GoSL to introduce new regulations that would regulate against the unlawful extraction of sand. However, studies have shown that without alternative livelihoods for sand miners, the successful implementation of this remains very low. Instead, by introducing alternative livelihood options, including a new focus on providing alternatives for the construction sector, coastal populations (and industry) will receive incentives to divert from unsustainable practices using beach sands for construction over the long-term.

2.5.2 Risk Management

178. During the PPG phase, projects risks were updated from those presented at the PIF stage. A revised risk analysis is now presented in Annex 1, where the risks are further elaborated and classified according to UNDP/GEF Risk Standard Categories, and assessed according to criteria of 'impact' and 'likelihood'. As per standard UNDP requirements, these risks will be monitored quarterly by the Project Manager. The Project Manager will report on the status of the risks to the UNDP Country Office who will record progress in the UNDP ATLAS risk log. Risks will be reported as critical when the impact and probablity are high (i.e. 5). Management responses to critical risks will also be reported to the GEF in the annual PIR.

179. Key indicators, risks and assumptions are indicated in the Project Results Framework. Indicators have been developed to be Specific, Measurable, Achievable, Realistic and Timebound ('SMART') and are indicated in the Project Results Framework. Risks and recommended countermeasures were identified during bilateral consultations during the project preparation phase. The project risk log is annexed to the prodoc.

2.5.3 Social and environmental safeguards

180. The UNDP Social and Environmental Screening Procedure (SESP) was undertaken (see Annex 9) to ensure this project complies with UNDP's Social and Environmental Standards. The UNDP's Social and Environmental Standards were reviewed by the UNDP accreditation panel and deemed sufficient to accredit UNDP to submit low and medium risk projects. Based on the small to medium scale coastal

developments and coastal protection infrastructure to be established at the project pilot sites, the overall social and environmental risk category for this project is classed as “Low”. It is highly unlikely that the project activities and social facilities, to be developed, will have any medium to long term and/or irreversible impacts. In addition, the potentially low to moderate risks associated with the proposed construction of coastal protection structures can be sufficiently managed. Specific project risks are listed in Section 2.5.2, together with appropriate mitigation measures. There are five key factors that determine this project is classified as a Low Risk:

1. Regarding social safeguards, the project will compliment national plans in promoting the sustainable development of the country. Communities residing within the coastal zone have been consulted and their culture and traditional practices were integrated into NAPA preparation, project preparatory phase as well as this project formulation process. Additionally, communities within the pilot demonstration sites have been and will be consulted during all stages of project implementation and will be involved in the adaptation measures in order to generate ownership of the project.
2. The project activities developed will not lead to negative impacts on women or men’s ability to use, develop and protect natural resources and other natural capital assets as the idea. It is strongly believed that project activities should improve ICZM and natural resource management and hence the livelihoods of coastal communities.
3. Furthermore, the assessment of UNDP safeguards requirements indicates that the physical interventions to be undertaken during the project implementation will not affect areas that have known physical or cultural significance to indigenous groups and other communities with settled recognized cultural claims because these will be small scale infrastructure community driven or based on cash for work scheme.
4. Likewise, and use of gender-disaggregated indicators where relevant (see Project Results Framework in Section VI), as well as through the conscious integration of gender-based groups in community-based activities (including training as well as the piloting and developing of alternative livelihoods). The gender analysis highlighted that climate change has a distinct gender dimension in that women (as well as children and the elderly) are more exposed to the adverse impacts of climate change. Moreover, women traditionally tend to have less influence over decisions related to climate change adaptation. From this perspective, it is imperative that the project’s adaptation measures at the community level are designed to ensure that women’s perspectives are reflected and that women are represented with regards to decisions affecting their livelihood. Existing tools and those developed during project implementation will be explicitly inclusive of gender criteria. Reporting on the projects progress will place special emphasis on how women are engaged in the various project activities.
5. The proposed project will not be undertaken in pristine or protected areas where the construction of a built structure could potentially cause irreversible changes to the biological, ecological and physical environment. The project will be undertaken in areas that have been impacted by both anthropogenic and natural processes (e.g. ´Mangrove logging and beach sand mining) in the past and that have ever changing environmental conditions through hydrodynamic and coastal processes as an example.
6. The only clear area that this screening has identified the need for further review is in the design and implementation of some categories of small scale rural coastal infrastructure, particularly in relation to selected coastal protection interventions (Activity 3.4.3 i); and installation of extended fishing landing points (Activity 3.2.4 i) where identification and selection of coastal interventions are carried out only after a thorough feasibility study in each of the project pilot sites has been produced and

evaluated. Therefore, recommendations have been made to follow up this issue and be raised and minuted in LPAC meetings and subsequently included as an agenda item in the project inception meeting for follow up by the UNDP Environment Unit.

2.5.4 Sustainability and Scaling Up

181. The project promotes a strong package of training and capacity development initiatives at all levels to the various Government Institutions which will ensure that decision-making is well informed of climate change risks and vulnerabilities. The degree of sustainability of project interventions are further strengthened by the strong awareness raising activities targeted at Community Leaders, including promotion of best practices, knowledge sharing on economic value of protective services the coastal ecosystems, such as mangrove stands, provide. By sensitizing communities to these values and introducing livelihood alternatives, the risk of communities returning to practices which degrade mangrove forests will be mitigated to a considerable extent. Besides, integration of mangrove forest maintenance costs into local Government development plans of targeted districts will be a means of securing financing from the State budget, for continued maintenance.

182. By the end of the project it will be demonstrated how investments in coastal and climate monitoring and associated capacity building programmes integrated into a CIEWS can help the fishing communities such as those districts where CIEWS stations will be installed be climate-resilient in terms of their wellbeing and livelihoods options. The increased awareness endorsed by this LDCF project is realized through two distinct avenues: the strengthening of local Community Radio stations in target districts with a strong participation of women and youth and; and the creation of community-based communication and information sharing tool in the coastal zones and target sites using local languages (community media: TV, radio and newspaper) for climate extreme events and hazards dissemination. Both avenues will promote the desire for replication of such monitoring units, strengthening the network around similar coastal locations in the country. It is expected that in the process of achieving this, political awareness will build up on the need for preparedness and adaptation to extreme weather events, promoting dialogue among policy- makers of the various sectors.

183. The project is also carrying out dissemination at the District/Chiefdom level on the successful adaptation approaches including at least one exposure visit to bring decision-makers and planners at the national, provincial and municipal level who are not already engaged directly with project to project demonstration sites. In addition, the project will sub-Contract services to carry out: (i) audio-visual production (booklets and videos) for community awareness raising consultations and events (e.g. for Community members, schools and TV) for different age groups (Women & Youth); (ii) at least 3 documentary short film (Participatory Video of about 10 minutes including YouTube publication) to be produced to document climate risks in the coastal zone and adaptation benefits generated by the project in the demonstration sites/communities, which can be used for further communication and advocacy work. This sort of initiatives and the lesson learnt generated from the project will help and promote the scaling up beyond the project sites.

184. Climate risk information assembled towards the development of Coastal Vulnerability Reports for each of the six Districts and will be integrated into national policies and plans, particularly in coastal land management, natural resource management and tourism which are three key government priority areas with a significant impact on economic growth, environmental risk assuagement and community vulnerability reduction. This can help the establishment of regulations and development plans that can help upscaling at provincial and community levels. The most successful activities will be prioritized for up scaling to neighboring and similarly vulnerable communities and details regarding their implementation will be disseminated widely at the workshops/training events undertaken by the project.

2.5.5 Economic analysis

During the PPG phase, a large range of consultations were conducted to identify viable alternatives to mangrove cutting and sand mining. The report of these consultations is available in Annex 5. Six options have been identified and analysed:

- Using seaweed for Biogas: considering the state of the knowledge in Sierra Leone, fertilizer and biogas production from seaweed was not included in the LDCF project. However, it was suggested to lay the foundation for informed decision making in the future by commissioning studies from University Research departments to undertake feasibility studies whose outputs are aimed at outlining workable production systems (appropriate designs etc) for Sargassum fertilizer and biogas systems with ex-ante assessments of the economic viability of the proposed systems.
- Mangrove rehabilitation: The national expert for the socio-economic study identified necessary preliminary steps before rehabilitating mangroves. (1) understand the autoecology, (2) understand the normal hydrologic patterns that control the distribution and successful establishment and growth of targeted mangrove species, (3) assess the modifications of the previous mangrove environment that occurred that currently prevents natural secondary succession, (4) design a restoration program to initially restore the appropriate hydrology and utilize natural volunteer mangrove propagule recruitment for plant establishment, and (5) only utilize actual planting of propagules, collected seedlings or cultivated seedlings after determining through Steps 1-4 that natural recruitment will not provide the quantity of successfully established seedlings, rate of stabilization, or rate of growth of saplings established as goals for the restoration project. It is anticipated that the livelihood benefits shall include the creation of over 50 employment opportunities across these communities on mangrove planting schemes, coastal protection engineering support and monitoring, community engagement/business diversity opportunities. Households will additionally find immediate protection against coastal erosion and flood risk through improved sea and river defence risk management. Mangroves have value in a range of benefits including fishing, shrimps, forest products, waste disposal costal protection – just taking into account a mid-value for coastal protection of US$5,000 per hectare means that the approach has coastal protection benefit of US$12,500 (figures from UN-REDD: http://www.un-redd.org/Newsletter16/Mangrove_Forests_and_REDD/tabid/51394/Default.aspx. This means that the loss of doing nothing is at the very least US$12,500, excluding any harvesting or wood, fish and shrimps from the new areas.
- Piloting eco-tourism: The option of eco-tourism was retained and the expert suggested its development after the rehabilitation of mangroves, in particular the development of a 1-2 km Boardwalk with associated facilities (rest areas, restaurants, sanitation facilities, tour boats) in restored mangroves, as a pilot ecotourism development activity.
- Artisanal fishing: In order to reduce overfishing within the nearshore areas and to help encourage fisher folk to fish further off-shore, and as an alternative livelihood system, the lead consultant for the formulation of the project was advised to consider financing the procurement and distribution of different types of boats (one boat per fishing group) with associated equipment (outboard motors, nets, etc.) to youth groups within sand mining communities. Also, it has been suggested to consider introducing investment to provide

employment for women, by supporting MFMR to set up and operate one or two pilot value chain extension activities with the project pilot areas of. Conakry Dee–Port Loko, Tombo/Hamilton–Freetown. A value chain may consist of the construction of a new landing site, an associated fish market, and improved transportation links between the two.

- Supporting micro-finance: The socio-economic expert did not advise to include independent project based microfinance operations. Instead it was suggested to build the capacity of existing institutions which provide enterprise loans and are in proximity to the project pilot sites to cater to needs of project beneficiaries (e.g.: “cash for work” initiatives etc).
- CSEB: A last option was retained to respond to the needs of the construction sector while reducing the pressure on sand resources. The introduction of the CSEB technology, which has proven to be a highly successful livelihood alternative in The Gambia) is expected to be an innovative tool to help reduce the quantity of beach sands extracted from already vulnerable and depleted nature resource areas where sand mining activity is common in Sierra Leone, and which is significantly impacting on coastal erosion rates along the coast. The CSEB is also aligned with the national objective of finding low-cost, resilient and innovative construction options in view of reducing sand-mining.

V. PROJECT RESULTS FRAMEWORK

This project will contribute to the following Sustainable Development Goal (s): *list relevant SDG goal (s)*

SDG 1: *End poverty in all its forms everywhere*; SDG 2: *End hunger, achieve food security*; SDG 5 *Achieve gender equality*; SDG 11: *Resilient cities and human settlements;* SDG 13: *Fighting climate change and its impacts*; SDG 15: *Protect, restore and reverse land degradation*

This project will contribute to the following country outcome included in the UNDAF/Country Programme Document:
Outcome 1: By 2018, targeted Government institutions, the private sector, and local communities manage natural resources in a more equitable and sustainable way
Outcome 2: By 2018, targeted communities demonstrate decreased vulnerability and increased resilience to natural and man-made disasters

This project will be linked to the following output of the UNDP Strategic Plan: *consult with the UNDP Country Office and the UNDP-GEF Regional Technical Advisor before selecting one of the following outputs. Delete the outputs copied below that are not selected. See opening section under further information for additional details.*

Output 1.3: Solutions developed at national and sub-national levels for sustainable management of natural resources, ecosystem services, chemicals and waste.

Output 1.4: Scaled up action on climate change adaptation and mitigation cross sectors which is funded and implemented.

Output 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)

Output 2.5: Legal and regulatory frameworks, policies and institutions enabled to ensure the conservation, sustainable use, and access and benefit sharing of natural resources, biodiversity and ecosystems, in line with international conventions and national legislation.

	Objective and Outcome Indicators	Baseline (2017)	Mid-term Target (2020)	End of Project Target (2023)	Assumptions
Project Objective: *"Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods".*	0a. The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone.	0a. The baseline will be determined in the pilot sites in the inception phase through a VRA.	0a. 20% increase in the VRA score by Mid-Term.	0a. More than 50% increase in the VRA score by the end of project.	0a. Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.
	Ob. Number of direct project beneficiaries.	Ob. The number of youth and women in the pilot sites will be determined in the inception phase through a VRA.	Ob. 23,200 youth and women in all the six pilot sites are registered as project beneficiaries and are involved in adaptation measures determined through a VRA by Mid-Term.	Ob. At least 58,000 women and youths are registered as project beneficiaries and are involved in adaptation measures determined through VRA score by the end of project.	0b. Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.

Component/Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	1. Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	1. Currently no climate/weather and marine monitoring station is installed in the six sites targeted by the project.	1. At least 30% of coastal area of the six communes is covered with coastal climate/weather and marine monitoring stations (ONSs).	1. At least 65% of coastal area of the six communes are covered with coastal climate/weather and marine monitoring stations (ONSs).	1. Costs of equipment and training will not rise dramatically during project implementation and technical expertise and equipment for upgrading the network is available. Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough
Component/ Outcome 2 *Develop appropriate protection measures, policy/legal tools and integrated coordination mechanisms to improve /support policy design and implementation in dealing with current and long-term coastal challenges.*	2. Number of ICZM plans that integrate climate change SLR induced risks and vulnerability.	2. 0. Currently the ICZM and associated policies do not integrate climate change SLR induced risks and vulnerability.	2. 0. At mid-term 6 CVA (one for each commune) have been developed and a draft implementation plan for MSP is available to inform the ICZM plans strengthening.	2. 7. At the end of the project 7 Coastal Policy Guidance documents at the National (1) and District (6) levels integrate climate change SLR induced risks and vulnerability and an EbA guidance manual to support construction of ecosystem based interventions.	2. Sierra Leone Environmental Protection Agency (EPA-SL) are able to recruit and train enough technical personnel to carry out vulnerability and risk assessments. 2. Initial coastal vulnerability studies and technical assessments are accurate in their predictions of coastal impacts. 3. GoSL are committed towards taking forward a process for MSP and in developing the "blue economy" as part of a national policy.

Component/ Outcome 3 *Public awareness enhanced and climate resilient alternatives to sand mining promoted for better adhesion of policy makers and communities on adaptation.*	3a. Number of technical officers and policy makers qualified to conduct awareness raising campaigns to disseminate knowledge on Integrated Coastal Zone Management (ICZM), Climate Change Vulnerability Assessment, and Sectoral and Livelihood Adaptation Planning issues in the six coastal districts (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island).	3a. Currently no technical officers and policy makers are qualified to conduct awareness raising campaigns capacity buildingon Integrated Coastal Zone Management (ICZM), Climate Change Vulnerability Assessment, and Sectoral and Livelihood Adaptation Planning delivered.	3a. At Mid-Term, at least 25 technical officers and policy makers qualified to conduct awareness raising campaigns on Integrated Coastal Zone Management (ICZM), Climate Change Vulnerability Assessment, and Sectoral and Livelihood Adaptation Planning issues in the six coastal districts.	3a. At the end of the project at least 50 technical officers and policy makers qualified to conduct awareness raising campaigns on Integrated Coastal Zone Management (ICZM), Climate Change Vulnerability Assessment, and Sectoral and Livelihood Adaptation Planning issues in the six coastal districts.	3a. Government Public Departments in the Districts are willing to make available sufficient candidates and are interested in collaborating in the training and capacity building activities.
	3.b Number of youth and sand mining groups previously engaged in sand mining adopt alternative climate-resilient livelihoods	3b. Currently no viable alternatives are offered to youth engaged in sand-mining	3b. At Mid-Term, at least 5 youth and sand mining groups adopted alternative livelihoods, and 90 masons and 90 block makers produce and use CSEB for construction;	3b. At the end of the project, at least 10 youth and sand mining groups adopted alternative livelihoods and 90 masons and 90 block makers produce and use CSEB for construction and are fully engaged in this activity;	3b. Youth and Women Association, NGOs/CSOs participating in the activities of adaptation through engagement in alternative income generative livelihoods are willing to cooperate 3.b Construction companies are interested in using CSEB.

	3c. Number of ha of mangrove restoration, undertaken in the six pilot sites to protect coastal community and infrastructure at risks.	3c. Currently there is no EbA work being undertaken in the six pilot sites to protect coastal community and infrastructure at risks.	3c. By Mid-Term at least 50% (250 ha) of planned area of mangrove restoration is undertaken in the six pilot sites to protect coastal community and infrastructure at risks.	3a. By the end of project 500 ha of mangrove restoration is undertaken in the six pilot sites to protect coastal community and infrastructure at risks.	3c. Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans. 3c. Government Public Works Department will provide support and resource inputs to implementation of coastal adaptation works

VI. MONITORING AND EVALUATION (M&E) PLAN

185. The project results as outlined in Section VI (Project Results Framework) will be monitored annually and evaluated periodically during project implementation to ensure the project effectively achieves these key results.

186. Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the UNDP POPP and UNDP Evaluation Policy. Whilst these UNDP requirements are not outlined in this project document, the UNDP Country Office will work with the relevant project stakeholders to ensure UNDP M&E requirements are met in a timely fashion and to high quality standards. Additional mandatory GEF-specific M&E requirements (as outlined below) will be undertaken in accordance with the GEF M&E policy and other relevant GEF policies (Table 8).

187. In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be defined during the Project Inception Workshop and detailed in the Inception Report. This will include the exact role of project target groups and other stakeholders in project M&E activities including the GEF Operational Focal Point and national/regional institutes assigned to undertake project monitoring. The GEF Operational Focal Point will strive to ensure consistency in the approach taken to the GEF-specific M&E requirements (notably the GEF Tracking Tools) across all GEF-financed projects in the country. This could be ensured by using one national institute to complete the GEF Tracking Tools for all GEF-financed projects in the country, including projects supported by other GEF Agencies.

M&E Oversight and monitoring responsibilities:

188. Project Manager: The Project Manager is responsible for day-to-day project management and regular monitoring of project results and risks, including social and environmental risks. The Project Manager will ensure that all project staffs adopt a high level of transparency, responsibility and accountability in M&E and reporting of project results. The Project Manager will inform the Project Board, the UNDP Country Office and the UNDP-GEF RTA of any delays or difficulties as they arise during implementation so that appropriate support and corrective measures can be adopted.

189. The Project Manager will develop annual work plans based on the multi-year work plan included in Annex A, including annual output targets to support the efficient implementation of the project. The Project Manager will ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality. This includes, but is not limited to, ensuring the results framework indicators are monitored annually in time for evidence-based reporting in the GEF PIR, and that the monitoring of risks and the various plans/strategies developed to support project implementation (e.g. gender strategy, KM strategy etc..) occur on a regular basis.

190. Project Board: The Project Board will take corrective action as needed to ensure the project achieves the desired results. The Project Board will hold project reviews to assess the performance of the project and appraise the Annual Work Plan for the following year. In the project's final year, the Project Board will hold an end-of-project review to capture lessons learned and discuss opportunities for scaling up and to highlight project results and lessons learned with relevant audiences. This final review meeting will also discuss the findings outlined in the project terminal evaluation report and the management response.

191. Project Implementing Partner: The Implementing Partner of the project is responsible for providing any and all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data, as necessary and appropriate. The Implementing

Partner will strive to ensure project-leve M&E is undertaken by national institues, and is aligned with national systems so that the data used by and generated by the project supports national systems.

192. UNDP Country Office: The UNDP Country Office will support the Project Manager as needed, including through annual supervision missions. The annual supervision missions will take place according to the schedule outlined in the annual work plan. Supervision mission reports will be circulated to the project team and Project Board within one month of the mission. The UNDP Country Office will initiate and organize key GEF M&E activities including the annual GEF PIR, the *independent mid-term review* and the independent terminal evaluation. The UNDP Country Office will also ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality.

193. The UNDP Country Office is responsible for complying with all UNDP project-level M&E requirements as outlined in the UNDP POPP. This includes ensuring the UNDP Quality Assurance Assessment during implementation is undertaken annually; that annual targets at the output level are developed, and monitored and reported using UNDP corporate systems; the regular updating of the ATLAS risk log; and, the updating of the UNDP gender marker on an annual basis based on gender mainstreaming progress reported in the GEF PIR and the UNDP ROAR. Any quality concerns flagged during these M&E activities (e.g. annual GEF PIR quality assessment ratings) must be addressed by the UNDP Country Office and the Project Manager.

194. The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations undertaken by the UNDP Independent Evaluation Office (IEO) and/or the GEF Independent Evaluation Office (IEO).

195. UNDP-GEF Unit: Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP-GEF Regional Technical Advisor and the UNDP-GEF Directorate as needed.

196. **Audit**: The project will be audited according to UNDP Financial Regulations and Rules and applicable audit policies on DIM implemented projects.[60]

Additional GEF monitoring and reporting requirements:

197. Inception Workshop and Report: A project inception workshop will be held within two months after the project document has been signed by all relevant parties to, amongst others:

a) Re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project implementation;

b) Discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms;

c) Review the results framework and finalize the indicators, means of verification and monitoring plan;

d) Discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E budget; identify national/regional institutes to be involved in project-level M&E; discuss the role of the GEF OFP in M&E;

e) Update and review responsibilities for monitoring the various project plans and strategies, including the risk log; Environmental and Social Management Plan and other safeguard requirements; the gender strategy; the knowledge management strategy, and other relevant strategies;

[60] See guidance here:

https://popp.undp.org/UNDP_POPP_DOCUMENT_LIBRARY/Public/FRM_Financial%20Management%20and%20Implementation%20Modality_Direct%20Implementation%20(DIM)%20Modality.docx

f) Review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; and
g) Plan and schedule Project Board meetings and finalize the first-year annual work plan.

198. The Project Manager will prepare the inception report no later than one month after the inception workshop. The inception report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board.
199. GEF Project Implementation Report (PIR): The Project Manager, the UNDP Country Office, and the UNDP-GEF Regional Technical Advisor will provide objective input to the annual GEF PIR covering the reporting period July (previous year) to June (current year) for each year of project implementation. The Project Manager will ensure that the indicators included in the project results framework are monitored annually in advance of the PIR submission deadline so that progress can be reported in the PIR. Any environmental and social risks and related management plans will be monitored regularly, and progress will be reported in the PIR.
200. The PIR submitted to the GEF will be shared with the Project Board. The UNDP Country Office will coordinate the input of the GEF Operational Focal Point and other stakeholders to the PIR as appropriate. The quality rating of the previous year's PIR will be used to inform the preparation of the subsequent PIR.
201. Lessons learned and knowledge generation: Results from the project will be disseminated within and beyond the project intervention area through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to the project. The project will identify, analyse and share lessons learned that might be beneficial to the design and implementation of similar projects and disseminate these lessons widely. There will be continuous information exchange between this project and other projects of similar focus in the same country, region and globally.
202. GEF Focal Area Tracking Tools: The following GEF Tracking Tool(s) will be used to monitor global environmental benefit results:
203. The baseline/CEO Endorsement GEF Focal Area Tracking Tool(s) – submitted in Annex D to this project document – will be updated by the Project Manager/Team and shared with *the* mid-term review consultants and terminal evaluation consultants before the required review/evaluation missions take place. The updated GEF Tracking Tool(s) will be submitted to the GEF along with the completed Mid-term Review report and Terminal Evaluation report.

204. Independent Mid-term Review (MTR): An independent mid-term review process will begin after the second PIR has been submitted to the GEF, and the MTR report will be submitted to the GEF in the same year as the 3rd PIR. The MTR findings and responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project's duration. The terms of reference, the review process and the MTR report will follow the standard templates and guidance prepared by the UNDP IEO for GEF-financed projects available on the UNDP Evaluation Resource Center (ERC). As noted in this guidance, the evaluation will be 'independent, impartial and rigorous'. The consultants that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. The GEF Operational Focal Point and other stakeholders will be involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the UNDP-GEF Directorate. The final MTR report will be available in English and will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and approved by the Project Board.
205. Terminal Evaluation (TE): An independent terminal evaluation (TE) will take place upon completion of all major project outputs and activities. The terminal evaluation process will begin three months before

operational closure of the project allowing the evaluation mission to proceed while the project team is still in place, yet ensuring the project is close enough to completion for the evaluation team to reach conclusions on key aspects such as project sustainability. The Project Manager will remain on contract until the TE report and management response have been finalized. The terms of reference, the evaluation process and the final TE report will follow the standard templates and guidance prepared by the UNDP IEO for GEF-financed projects available on the UNDP Evaluation Resource Center. As noted in this guidance, the evaluation will be 'independent, impartial and rigorous'. The consultants that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. The GEF Operational Focal Point and other stakeholders will be involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the UNDP-GEF Directorate. The final TE report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board. The TE report will be publicly available in English on the UNDP ERC.

206. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan, and will upload the final terminal evaluation report in English and the corresponding management response to the UNDP Evaluation Resource Centre (ERC). Once uploaded to the ERC, the UNDP IEO will undertake a quality assessment and validate the findings and ratings in the TE report, and rate the quality of the TE report. The UNDP IEO assessment report will be sent to the GEF IEO along with the project terminal evaluation report.

207. Final Report: The project's terminal PIR along with the terminal evaluation (TE) report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.

Table 8. Mandatory GEF M&E Requirements and M&E Budget:

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget[61] (US$)		Time frame
		GEF grant	Co-financing	
Inception Workshop	UNDP Country Office	USD 11,000		Within two months of project document signature
Inception Report	Project Manager	None	None	Within two weeks of inception workshop
Standard UNDP monitoring and reporting requirements as outlined in the UNDP POPP	UNDP Country Office	None	None	Quarterly, annually
Monitoring of indicators in project results framework	Project Manager	Per year: USD 4,000 = USD20,000		Annually (for 5 years)
GEF Project Implementation Report (PIR)	Project Manager and UNDP Country Office and UNDP-GEF team	None	None	Annually

[61] Excluding project team staff time and UNDP staff time and travel expenses.

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget[61] (US$)		Time frame
		GEF grant	Co-financing	
DIM Audit as per UNDP audit policies	UNDP Country Office	Per year: USD 5,000 = USD25,000		Annually or other frequency as per UNDP Audit policies (for 5 years)
Lessons learned and knowledge generation	Project Manager			Annually
Monitoring of environmental and social risks, and corresponding management plans as relevant	Project Manager UNDP CO	None		On-going
Addressing environmental and social grievances	Project Manager UNDP Country Office BPPS as needed	None for time of project manager, and UNDP CO		
Project Board meetings	Project Board UNDP Country Office Project Manager			At minimum annually
Supervision missions	UNDP Country Office	None[62]		Annually
Oversight missions	UNDP-GEF team	None[3]		Troubleshooting as needed
Knowledge management as outlined in Outcome 4	Project Manager	1% of GEF grant USD 99,750		On-going
GEF Secretariat learning missions/site visits	UNDP Country Office and Project Manager and UNDP-GEF team	None		To be determined.
Mid-term GEF Tracking Tool to be updated by (add name of national/regional institute if relevant)	Project Manager	USD 10,000		Before mid-term review mission takes place.
Independent Mid-term Review (MTR) and management response	UNDP Country Office and Project team and UNDP-GEF team	USD 30,000		Between 2nd and 3rd PIR.
Terminal GEF Tracking Tool to be updated	Project Manager	USD 10,000		Before terminal evaluation mission takes place
Independent Terminal Evaluation (TE) included in UNDP evaluation plan, and management response	UNDP Country Office and Project team and UNDP-GEF team	USD 30,000		At least three months before operational closure
Translation of MTR and TE reports into English	UNDP Country Office	None		
TOTAL indicative COST Excluding project team staff time, and UNDP staff and travel expenses		***USD 235,750***		

[62] The costs of UNDP Country Office and UNDP-GEF Unit's participation and time are charged to the GEF Agency Fee.

VII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

208. The project will be implemented by UNDP under its Direct Implementation Modality (DIM) according to the DIM authorization for the UNDP CO in Sierra Leone.The project is a five-year intervention expected to run from October 2017 to October 2022. The project will be executed by UNDP in close collaboration with EPA-SL, USL-IMBO, GEO DEPT, MFMR and the NTB as responsible parties, as well as the NGO's in selected pilot communities responsible for the local level pilot interventions of the project. Letters of Agreement (LoA) will be established with the relevant responsible parties, and a Memorandum of Understanding (MoU) and Terms of Reference (TOR) indicating the role of each executing agency will be developed during project implementation.

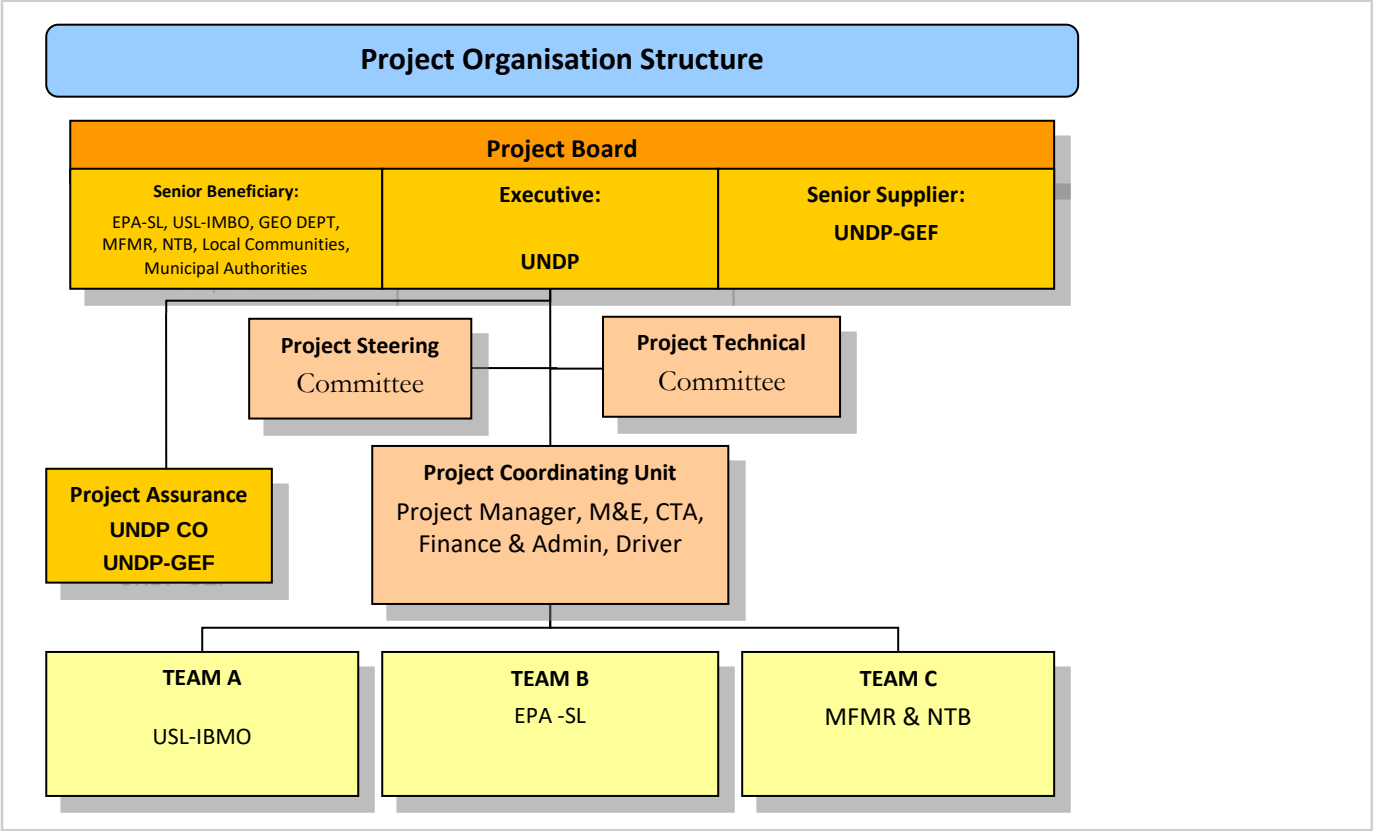
209. Under DIM arrangements, UNDP is held accountable for the disbursement of funds and the achievement of the project goals, according to the approved work plan. Working closely with the Government, and in particular the Responsible Parties, UNDP Country Office will be responsible for: (i) providing financial and audit services to the project, (ii) recruitment of project staff and contracting of consultants and service providers, (iii) overseeing financial expenditures against project budgets approved by the Project Steering Committee, (iv) appointment of independent financial auditors and evaluators; and (v) ensuring that all activities, including procurement and financial services, are carried out in strict compliance with UNDP-GEF/LDCF procedures. In the context of this specific UNDP-implemented, LDCF-financed project, the UNDP-GEF Staff (led by the Regional Technical Advisor) will provide an additional layer of oversight, and will participate in regular project team calls to monitor progress and oversee project implementation.

210. UNDP CO in Sierra Leone has applied DIM to the majority of the projects (25 out of 27) and was granted DIM authorization following the Ebola outbreak. The DIM authorization has been extended for 2016 and 2017. During the fight against Ebola, the Sierra Leone Budget Report (31/12/2016) reports that "findings of the 2016 UNDP HACT Assessment reveal that government partners present a higher level of risk than other responsible partners and the assessment report recommends that UNDP continue to implement under DIM" [63]. In addition, the report notes the up-coming Presidential and Parliamentarian elections in 2018, making the national electoral bodies "unable to bear the additional burden of managing and accounting for donor funds". Over the past two years, UNDP CO in Sierra Leone has successfully implemented on-going project under DIM. It is envisioned that the project team will be housed at EPA-SL. EPA-SL will have a major role in the ICZM process as well as climate change related programmes and policies, and as such will execute relevant outputs under Component 2 of the project. The USL-IMBO has the major mandate for coordinating the climate and oceanographic monitoring network and marine forecasting and therefore will lead the execution of Component 1 in close partnership with the GEO-DEPT. MFMR and NTB will execute all the Outputs linked to implementation of adaptation measures under proposal in Component 3.

211. UNDP will provide Direct Project Services (DPS), according to UNDP policies on GEF funded projects. DPS costs are those incurred by UNDP for the provision of services that are execution driven and can be traced in full to the delivery of project inputs. Direct Project Services are over and above the project cycle

[63] Request for extension of blanket DIM authorization for Sierra Leone Country Office for 2016, 7 March 2016

management services. They relate to operational and administrative support activities carried out by UNDP. DPS include the provision of the following estimated services: i) Payments, disbursements and other financial transactions; ii) Recruitment of staff, project personnel, and consultants; iii) Procurement of services and equipment, including disposal; iv) Organization of training activities, conferences, and workshops, including fellowships; v) Travel authorization, visa requests, ticketing, and travel arrangements; vi) Shipment, custom clearance, vehicle registration, and accreditation. As is determined by the GEF Council requirements, these service costs are assigned as Project Management Cost, identified in the project budget as Direct Project Costs. Eligible Direct Project Costs should not be charged as a flat percentage. They should be calculated on the basis of estimated actual or transaction based costs and should be charged to the direct project costs account codes: "64397 – 'Services to projects - CO staff' and 74596 – 'Services to projects - GOE for CO'.



212. Project activities will primarily be implemented at a national level with a demonstration component at sub-national level. UNDP will establish a Project Board (PB) comprising national and sub-national representatives to guide and oversee the project.

213. The **Project Board** (also called Project Steering Committee) is responsible for making by consensus, management decisions when guidance is required by the Project Manager, including recommendation for UNDP approval of project plans and revisions. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international

competition. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP Programme Manager. The Project Board is comprised of the following individuals:

214. The **Project Manager** will run the project on a day-to-day basis on behalf of UNDP within the constraints laid down by the Board. The Project Manager function will end when the final project terminal evaluation report, and other documentation required by the GEF and UNDP, has been completed and submitted to UNDP (including operational closure of the project).

215. The **project assurance** role will be provided by the UNDP Country Office and the UNDP-GEF team in the region and HQ.

216. Additional quality assurance will be provided by the UNDP Regional Technical Advisor as needed.

217. Agreement on intellectual property rights and use of logo on the project's deliverables and disclosure of information**:** In order to accord proper acknowledgement to the GEF for providing grant funding, the GEF logo will appear together with the UNDP logo on all promotional materials, other written materials like publications developed by the project, and project hardware. Any citation on publications regarding projects funded by the GEF will also accord proper acknowledgement to the GEF. Information will be disclosed in accordance with relevant policies notably the UNDP Disclosure Policy[64] and the GEF policy on public involvement[65].

Project management*:*

218. The day- to- day management of the project shall be entrusted to the Project Management Unit (PMU) which will be accountable to the UNDP CO and Project Board for the performance of the project. The project team will be based in Freetown and will be manned by a fulltime staff complement comprising a Project Manager, Monitoring and Evaluation (M&E) Officer, Finance / Administrative Assistant, Technical Steering Committee, Local Committees financed from the LDCF grant and a Technical Advisor.

219. National Project Director (NPD): A UNDP staff member will be assigned as NPD and will have the responsibility to administer the project on a day-to-day basis on behalf of UNDP. The National Project Director's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. The National Project Director will liaise and work closely with all partner institutions to link the project with complementary national programs and initiatives. The National Project Director is accountable for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. The NPD will ensure coordination among actors/other projects during the implementation of the project, through two technical commissions created for this purpose (described below). More details of the NPD position are indicated in Annex 8.

220. Project Manager: The day-to-day administration and implementation of the project will be carried out by the National Project Manager. The PM will be recruited by UNDP CO using appropriate rules and regulations and ensuring international standards on recruitment processes. The PM will be based in Freetown to ensure smooth implementation. The PM is accountable to the National Project Director for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds.

[64] See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/

[65] See https://www.thegef.org/gef/policies_guidelines

221. Monitoring and Evaluation (M&E) Officer: The M&E Officer will be recruited by UNDP and will report to the Project Manager and UNDP programme analyst. S/he will support the PM and the project task teams to prepare the relevant M&E systems required to monitor and assess quality of progress, to identify, collect, analyze, document and disseminate lessons learned through an annual project meeting, and support the preparation of project evidence for sharing through the UNDP Adaptation Learning Mechanism (ALM). The M&E Officer will liaise with the PM to prepare data collection protocols to enable the task teams to consistently collect data on project progress from project sites and its processing by the PM for national reporting purposes.

222. Finance / Administrative Assistant: The project support role provides project administration, management, financial and technical support to the Project Coordinator as required by the needs of the project or individual activities. He/she will work closely with the UNDP CO on financial management issues relevant to project implementation. In order to ensure the Assistant has sufficient capacity to conduct financial management tasks, he/she will be trained by the UNDP CO.

223. Technical Steering Committee: A Technical Steering Committee (TSC) will be formed to support the Project Coordinating Unit. They will meet monthly with the PM to provide technical advice. They will equally support the PM with the management of the project for the institutions/agencies they represent The TSC will be composed of focal points from each of the six traget district: Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island to appointed at the project initiation phase.

224. Local Committees: Focal points from EPA-SL District branches in Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island will be responsible for facilitating coastal adaptation actions on the ground. They will work with the local NGOs/CSOs and local Authorities in project implementation. These EPA-SL Disctrict focal points are required to regularly communicate with the Project Manager and provide any relevant information to the Monitoring and Evaluation (M&E) Officer and the Project Manager.

VIII. FINANCIAL PLANNING AND MANAGEMENT

225. The total cost of the project is USD 41,775,000. This is financed through an LDCF grant of USD 9,975,000, USD 190,000 in cash co-financing to be administered by UNDP and USD 31,610,000 in parallel co-financing. UNDP, as the GEF Implementing Agency, is responsible for the execution of the GEF resources and the cash co-financing transferred to UNDP bank account only.

226. Parallel co-financing: The actual realization of project co-financing will be monitored during the mid-term review and terminal evaluation process and will be reported to the GEF. The planned parallel co-financing will be used as follows:

Co-financing source	**Co-financing type**	**Co-financing amount (USD)**	**Planned Activities/Outputs**	**Risks**	**Risk Mitigation Measures**
Government – Agenda for Prosperity	Grant	4,150,000	Promote inclusive growth through economic diversification in fisheries and tourism.	Local population do not adopt the improved practices.	The Government and UNDP will emphasize the need for sensitization and awareness at the community level

			Improve the management of natural resources.		
Government – EPA-SL	Grant	299,250	Salaries of staff, Office space, infrastructure development	Office space is not made available	EPA-SL committed through the co-financing letter to provide office space to the project team
Government – National Platform for Risk Reduction	Grant	27,160,750	Provide financing for climate change preparedness and early warning systems.	Lack of coordination between the collected information	The use of the CIDMEWS platform is improving the coordination between national data collected.

227. Budget Revision and Tolerance: As per UNDP requirements outlined in the UNDP POPP, the project board will agree on a budget tolerance level for each plan under the overall annual work plan allowing the project manager to expend up to the tolerance level beyond the approved project budget amount for the year without requiring a revision from the Project Board. Should the following deviations occur, the Project Manager and UNDP Country Office will seek the approval of the UNDP-GEF team as these are considered major amendments by the GEF:
a) Budget re-allocations among components in the project with amounts involving 10% of the total project grant or more;
b) Introduction of new budget items/or components that exceed 5% of original GEF allocation.

228. Any over expenditure incurred beyond the available GEF grant amount will be absorbed by non-GEF resources (e.g. UNDP TRAC or cash co-financing).

229. Refund to Donor: Should a refund of unspent funds to the GEF be necessary, this will be managed directly by the UNDP-GEF Unit in New York.

230. Project Closure: Project closure will be conducted as per UNDP requirements outlined in the UNDP POPP. On an exceptional basis, only, a no-cost extension beyond the initial duration of the project will be sought from in-country UNDP colleagues and then the UNDP-GEF Executive Coordinator

231. Operational completion: The project will be operationally completed when the last UNDP-financed inputs have been provided and the related activities have been completed. This includes the final clearance of the Terminal Evaluation Report (that will be available in English) and the corresponding management response, and the end-of-project review Project Board meeting. When operational closure has been completed, the relevant parties will have already agreed and confirmed in writing on the arrangements for the disposal of any equipment that is still the property of UNDP.

232. Financial completion: The project will be financially closed when the following conditions have been met:
a) The project is operationally completed or has been cancelled;
b) All financial transactions have been reported;
c) UNDP has closed the accounts for the project;
d) UNDP has certified a final Combined Delivery Report (which serves as final budget revision).

233. The project will be financially completed within 12 months of operational closure or after the date of cancellation. Between operational and financial closure, UNDP will identify and settle all financial obligations and prepare a final expenditure report. The UNDP Country Office will send the final signed closure documents including confirmation of final cumulative expenditure and unspent balance to the UNDP-GEF Unit for confirmation before the project will be financially closed in Atlas by the UNDP Country Office.

IX. TOTAL BUDGET AND WORK PLAN

Award ID:	00102451	Project ID(s):	00104509
Award Title:	Adapting to climate change induced coastal risks in Sierra Leone		
Business Unit:			
Project Title:	Adapting to climate change induced coastal risks in Sierra Leone		
PIMS no.	5178		
Implementing Partner /Executing Agency	UNDP		

SOF (e.g. GEF) Outcome/Atlas Activity	Responsible Party/	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
	Implementing Agent											
OUTCOME 1: Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.	UNDP	62160	GEF LDCF	71200	International consultant	66,667	66,667	66,667	66,666	66,666	333,333	1
				71400	Contractual Services - Individual	116,300	46,300	33,800	33,800	31,800	262,000	2
				72100	Contractual Services - Companies	250,000	250,000	0	0	0	500,000	3
				71300	Local Consultants	60,000	30,000	60,000	0	0	150,000	4
				72300	Materials and Goods	260,000	100,000	0	0	0	360,000	5
				72800	Information Technology Equipmt	100,000	100,000	50,000	0	0	250,000	6
				74200	Audio Visual and Print Production Costs	7,500	7,500	7,500	7,500	10,000	40,000	7
				75700	Training, Workshops and Conferences	100,000	100,000	0	0	0	200,000	8
				74100	Professional Services	25,000	10,360	10,000	10,000	10,000	65,360	9
				71600	Travel	15,000	15,000	15,000	15,000	15,000	75,000	10

				72200	Equipment and Furniture	20,000	10,000	10,000	10,000	0	50,000	11
				Total Outcome 1		**1,020,467**	**735,827**	**252,967**	**142,966**	**133,466**	**2,285,693**	
OUTCOME 2: Develop appropriate protection measures, policy/legal tools and integrated coordination mechanisms to improve /support policy design and implementation in dealing with current and long-term coastal challenges.	**UNDP**	**62160**	**GEF LDCF**	71200	International consultant	50,000	145,334	50,000	31,333	100,000	**376,667**	12
				71400	Contractual Services - Individual	91,600	126,600	96,600	11,600	11,600	338,000	13
				72100	Contractual Services - Companies	50,000	50,000	205,000	180,000	0	485,000	14
				71300	Local Consultants	15,000	30,000	15,000	30,000	0	90,000	15
				72800	Information Technology Equipmt	75,000	0	0	0	0	75,000	16
				74200	Audio Visual and Print Production Costs	13,000	13,000	13,000	13,000	13,000	65,000	17
				75700	Training, Workshops and Conferences	90,000	55,000	40,000	5,000	5,000	195,000	18
				71600	Travel	20,000	20,000	20,000	20,000	20,000	100,000	19
				72200	Equipment and Furniture	210,000	10,000	10,000	10,000	10,000	250,000	20
				Total Outcome 2		**614,600**	**449,934**	**449,600**	**300,933**	**159,600**	**1,974,667**	
OUTCOME 3: Public awareness enhanced and climate resilient alternatives to sand mining promoted for better adhesion of policy makers and communities on adaptation.	**UNDP**	**62160**	**GEF LDCF**	71200	International consultant	125,000	175,000	50,000	0	0	350,000	21
				71400	Contractual Services - Individual	79,600	184,600	179,600	84,600	19,600	548,000	22
				72100	Contractual Services - Companies	822,500	812,500	552,500	482,500	280,000	2,950,000	23
				71300	Local Consultants	111,040	52,480	37,480	21,000	6,000	228,000	24
				72300	Materials and Goods	110,000	83,000	0	0	0	193,000	25
				74200	Audio Visual and Print Production Costs	5,000	5,000	5,000	7,000	8,000	30,000	26
				75700	Training, Workshops and Conferences	45,000	102,820	132,820	115,000	30,000	425,640	27
				71600	Travel	20,000	20,000	20,000	20,000	20,000	100,000	28
				Total Outcome 3		**1,318,140**	**1,435,400**	**977,400**	**730,100**	**363,600**	**4,824,640**	
	UNDP	**62160**		71200	International consultant	25,000	25,000	25,000	10,000	5,000	90,000	29

OUTCOME 4: KM and M&E (as per the results framework)			**GEF LDCF**	72100	Contractual Services-Companies	0	0	50,000	0	60,000	110,000	30
				74100	Professional Services	5,000	5,000	5,000	5,000	5,000	25,000	31
				75700	Training Workshops and Conferences	0	0	25,000	25,000	10,000	60,000	32
				74500	Miscellaneous	26,000	26,000	26,000	26,000	26,000	130,000	33
				Total Outcome 4		**56,000**	**56,000**	**131,000**	**66,000**	**106,000**	**415,000**	
Project MANAGEMENT UNIT (PMU)	**UNDP**	**62160**	**GEF LDCF**	71400	Contractual Services - Individual	27,000	27,000	27,000	27,000	27,000	135,000	34
				73100	Rental & Maintenance-Premises	35,000	35,000	35,000	35,000	35,000	175,000	35
				74596	Direct Project Costs	30,000	30,000	30,000	30,000	30,000	150,000	36
				75700	Training Workshops and Conferences	3,000	3,000	3,000	3,000	3,000	15,000	37
				Sub-total GEF		**95,000**	**95,000**	**95,000**	**95,000**	**95,000**	**475,000**	
	UNDP	**4000**	**TRAC**	72200	Equipment and Furniture	2,000	2,000	2,000	2,000	2,000	**10,000**	38
				72400	Communication & Audio Visual Equipment	2,000	2,000	2,000	2,000	2,000	**10,000**	39
				71400	Contractual Services - Individual	12,000	12,000	12,000	12,000	12,000	**60,000**	40
				72200	Equipment and Furniture	84,400	6,400	6,400	6,400	6,400	**110,000**	41
				Sub-total UNDP		**100,400**	**22,400**	**22,400**	**22,400**	**22,400**	**190,000**	
				Total PMU		**195,400**	**117,400**	**117,400**	**117,400**	**117,400**	**665,000**	
				Total GEF		**3,104,207**	**2,772,161**	**1,905,967**	**1,334,999**	**857,666**	**9,975,000**	
				PROJECT TOTAL (GEF+TRAC)		**3,204,607**	**2,794,561**	**1,928,367**	**1,357,399**	**880,066**	**10,165,000**	

Summary of Funds	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Amount Year 5	Total
GEF	3,104,207	2,772,161	1,905,967	1,334,999	857,666	**9,975,000**
UNDP (Grant + Core Resources)	100,400	22,400	22,400	22,400	22,400	**190,000**
Government	10,000,000	7,000,000	6,000,000	4,000,000	4,610,000	**31,610,000**
Total	**13,204,607**	**9,794,561**	**7,928,367**	**5,357,399**	**5,490,066**	**41,775,000**

Budget Notes

Budget Note	Description of cost item
	OUTCOME 1: Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.
1	*With exception of Chief Technical Adviser and M&E expert all Consultancies are of 60 days and costs include travelling and DSA.* • International Chief Technical Advisor @$310,000 spread over Outcome 1 & 2. Spread over Year 1, 2, 3, 4 & 5 • International Coastal Early Warning (CIEWS) developer specialist. @$60,000ea. Spread over Year 1 & 3. • International Oceanography/Marine Meteorologist coastal zone monitoring Expert. @$60,000ea. Spread over Year 1 & 3. • International Oceanography/Marine/ Meteorological communications specialist. @$60,000ea. Spread over Year 2 & 4.
2	• Contractual Services (Individual) costs for Project management. @$310,000. Spread over outcomes 1, 2, 3 and PMC (@ $59,000 under component 1). Year 1, 2, 3, 4 & 5. • Hire Consultancy Services to carry out Baseline study to update RF indicators and targets at the start of the Project implementation @$60,000ea. Year 1. • Contractual Services (Individual) for Project Focal Points for Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island. @$108,000. spread over Outcome 1&3 and over Year 1, 2, 3, 4 & 5. • Contractual Services (Individual) for assessment of sites conditions for ONS (equipment housing, security, personnel) and supporting installation and make arrangements for testing of remote transmission system to USL-IMBO in Freetown & SLMD/A-Lungi Airport; @$5,000. Year 1. • Under the leadership of USL-IMBO procure Contractual Services (Individual) to develop communications, transmission and data exchange National Framework for integrating Sierra Leone CIDMEWS coastal and marine data into CIDMEWS and the global monitoring network (link to Activity 1.3.5); @$5,000. Year 1 & 2. • Under the leadership of USL-IMBO and close partnership with SLMD/A and ONS-Disaster Management Department, procure Contractual Services (Individual) to design and implement early warning mechanisms (link to Activity 2.1.5); @$5,000. Year 1 & 2. • Under USL-IMBO leadership procure Contractual Services (Individual) to develop research programme on seasonal dynamics of seaweed/sargassum. @$5,000. Year 1, 2, 3 & 4. • Design and implement early warning mechanisms focusing on Sea Water Quality, SLR-induced erosion, urban flooding and seaweed/sargassum dynamics; @$10,000. Year 1. • Contractual Services (Individual) to acquire advanced methods and tools for assessing climate change induced coastal risk assessment and adaptation planning (e.g. DIVA, COSMO, CVAT, SMP, etc.) and related training package; @ $5,000. Year 1 & 2.
3	• Hire technical services to install 6 Oceanographic Monitoring System (ONS) instruments complete with remote data transmission and archiving (either a stand-alone or integrated with the tide gauge data logger) including spare parts, field installation structures, functioning with remote data transmission and training of operators. @$300,000 spread overYear 1 & 2. • Sub-Contract services to carry out Activity 1.3.1: (i) science based qualitative and quantitative hazard, vulnerability and risk databases ; (ii) climate change monitoring indicators for assessing risks and trends ; (iii) undertaking regional climate change scenarios; (iv) identify risks/hazards; (v) mobile innovative amphibious drone based GIS technology to to assist Risk/Vulnerability Mapping; (vi) conceptual Coastal Vulnerability Analysis (CVA) and Coastal Vulnerability Index (CVI). @$200,000 spread over. Year 1 & 2.

4	• National Marine and Meteorology Expert to support installation of Oceanographic Monitoring Systems (ONS) and Automatic Weather Stations (AWS) and make arrangements for testing of remote transmission system to USL-IMBO in Freetown & SLMD/A-Lungi Airport. @$30,000. Spread over Years 1 & 3. • National climate change data base developer to set up national framework for countrywide integration of all Met/Oceano/Marine stations. @$30,000. Year 2. • National GIS climate change modeller/risk and vulnerability assessment and mapping Expert to undertake regional climate change scenarios and carry out conceptual Coastal Vulnerability Analysis (CVA) using historical data/information from each of the six-target site. @$60,000. Spread over Year 1 & 3. • National adaptation, early warning system and disaster management consultant. @$30,000. Spread over Year 1 & 3.
5	• Four (4) advanced workstations with PC for USL-IMBO to exchange and archive the data from multiple systems and end users. Procure equipment (hardware and software) and ensure connectivity (internet modems and access) for 4 modern forecasting workstations to support USL-IMBO/SLMD/A and synoptic/marine stations @$30,000ea. Year 1. • Four (4) advanced workstations with PC for EPA to exchange and archive the data from multiple systems and end users, procure equipment (hardware and software) and ensure connectivity (internet modems and access) for 4 modern GIS compatible workstations to support EPA@$30,000a. Year 1. • Procure one mobile AWS (standing at USL-IMBO) for field calibrations.@$50,000. Year 1. • Procure and acquire equipment, model and capacity for USL-IMBO to carry out Baseline Studies on Coastal and Oceanographic Processes including Nearshore Wave Study, Shoreline Change Study, Sediment Transport Study, etc.; @$100,000. Year 1 & 2. • Carry out detailed topographic and bathymetry analysis of the coastal zone using Digital Elevation Model (DEM) to enable dynamic modelling the effect of SLR on coastal zones and proceed on the shoreline change and vulnerability identification; @$100,000. Year 1 & 2. • Renewal/purchase of Oceanographic/Marine modelling licenses. .@$25,000. Year 1. • Communications materials and infrastructure including connections to optical fibre, portable computers, computer models and software licenses. @$25,000. Year 1.
6	• Procurement of a complete GIS system of upgrading existing GIS supporting equipment to provide updates to the existing CIDMEWS including all ancillary equipment and spares. @$250,000. Year 1, 2 & 3.
7	• Printing materials for at least 10 training workshops and awareness activities in target communities. @$40,000. Year 1, 2, 3, 4 & 5.
8	• Training costs of WMO Class I Meteorologist/Marine (6); technicians with software modelling skills (6); four (4) key technical staff (EPA-SL, MFMR, SLMD/A,SLMA) with skills to handle remote sensing techniques; two (2) key technical staff (1 EPA-SL & 1 GEO DEPT) with electronic and data transmission and exchange skills, six (6) key technical staff (MFMR, EPA-SL, ONS, SLMA, SLMD/A and USL-IMBO) on baseline studies, nearshore wave modelling studies, shoreline change studies and sediment transport studies. @$100,000. Spread over Year 1& 2. • Training cost of (2) GEO DEPT technicians trained with hydrodynamic/probabilistic modelling skills for development of flood risk and storm surge planning; Two (2) Geographic Information Systems Specialist with raster modelling capabilities; Develop training programme for at least 10 GEO DEPT, USL-IMBO staff to carry out Participatory Community CVA; Develop training programme for at least 10 stakeholders (from for example GEO DEPT, USL-IMBO staff) to carry out post vulnerability assessment work @$100,000. Spread over Year 1& 2.
9	Service providers for mobile communications and data transfer from ONS. @$65,360. Year 1, 2, 3, 4 & 5
10	• Travel cost associated with activity implementation under Output 1. @$75,0000. Year 1, 2, 3 4 & 5
11	• Procurement and acquisition of Office Tables, chairs, mobile phones, field cameras, GPS sets, computers, office general equipment (photocopying machines and scanners) and consumables.@$50,000. Spread over Year 1, 2 3 & 4.

	OUTCOME 2: Develop appropriate protection measures, policy/legal tools and integrated coordination mechanisms to improve /support policy design and implementation in dealing with current and long-term coastal challenges.
12	• International Chief Technical Advisor @$310,000 spread over Outcome 1 & 2. Spread over Years 1, 2, 3, 4, & 5. • International Coastal Zone Management Consultant - with GIS climate change modeller/risk and vulnerability assessment and mapping capacity for development of Sea Level Rise climate change scenarios for determination of setback values to aid Coastal Zone land planning @$50,000ea. Year 2. • International Oceanography/Marine drone based coastal zone erosion mapping expert for systematic physical and undersea mapping of coastal erosion and contribute to risk development @$50,000ea. Year 1 & 3. • International Coastal Zone Management Consultant - For mainstreaming Coastal Vulnerability Reports into long-term zoning and land use planning in coastal zone in the context of climate change @$50,000ea. Years 2 & 5. • International Coastal Zone Management Consultant expert in training and developing field Vulnerability Capacity Assessments & Vulnerability Reduction Assessments. @$50,000. Spread over Years 2 & 5. • International Climate programme design expert to develop rules, procedures and operational instruments and corresponding fiduciary standards designed to support the establishment of an a national ICZM programme board within EPA-SL, reporting to the ICZM steering committee. @$20,000ea. Year 2.
13	• Contractual Services (Individual) costs for Project management. @$310,000. Spread over outcomes 1, 2, 3 and PMC (@ $58,000 under component 2). Year 1, 2, 3, 4 & 5. • Hire Consultancy Services to conduct feasibility studies of proposed adaptation measures at project sites. @$60,000. Years 1 & 2. • Sub-Contract services to (i) Carry out community participatory CVA; (ii) 2.1.4 Carry out mapping of baseline of natural risk to understand potential risk to critical infrastructure, natural resources, and populations; (iii) undertake development of coastal vulnerability maps; (iv) and with other ancillary data develop Coastal Vulnerability Reports for each of the six Districts. @$60,000. Year 1, 2 & 3. • Hire Consultancy services to undertake detailed topographic analysis of the coastal zone to model the effect of SLR, determination of current erosion rates along the coastline of Sierra Leone, ascertain detailed setback values so to develop Sea Level Rise climate change scenarios and assist determination of future shoreline positions for coastal zone management and planning purposes. @$60,000. Year 1, 2 & 3. • Hire Consultancy Advisory and Technical services to: (i) Undertake Community and participatory shoreline assessment of community assets (infrastructure and ecosystems) vulnerable to coastal storms and sea level rise; (ii) develop the vulnerability maps for coastal communities' infrastructure and ecosystems; (iii) design an urgent and long term intervention plan containing all prioritized coastal protection options and related appropriate Engineering Designs for inclusion on the Sierra Leone Integrated Coastal Zone Management Plan ; (iv)develop a decision support tool, to guide government decision makers in the selection of appropriate (hard vs soft) coastal defence /adaptation options; (v) 2.2.5 Develop specific EbA guidance manual to support construction of ecosystem based interventions. Budget for the above @$60,000. Year 2 & 3. • Contractual Services (Individual) costs for Activity 2.2.4 to carry out feasibility analysis focusing on all identified coastal protection options under Activity 2.2.3 and determine the cost-effectiveness of coastal protection options against available funds; @$15,000. Spread over Year 1 & 2. • Contractual Services (Individual) costs for development of an inter-ministerial Institutional legal framework for the creation of the Sierra Leone Integrated Coastal Zone Management Board. @$15,000. Spread over Year 2 & 3. • Contractual Services (Individual) costs for the operationalization of an ICZM national programme. @$10,000. Spread over Year 2 & 3
14	• Hire technical services to determine climate change induced coastal erosion risk profiles, develop Sea Level Rise climate change scenarios, CVA, mapping of baseline of natural risk and development of coastal vulnerability maps for Coastal Vulnerability Reports for each of the six Districts. @$180,000. Year 3 & 4.

	• Hire technical services to carry out Community and participatory shoreline assessment of community assets (infrastructure and ecosystems) vulnerable to coastal storms and sea level rise, develop the vulnerability maps for coastal communities' infrastructure and ecosystems, develop a decision support tool, to guide government decision makers in the selection of appropriate (hard vs soft) coastal defence /adaptation options to be included in the long term coastal intervention plan, develop specific EbA guidance manual to support construction of ecosystem based interventions. @$180,000. Year 3 & 4. • Hire technical services to undertake a gap analysis of national development plans and policies including the EIA procedures, 2.3.4 Develop options for Marine Spatial Planning (MSP) governance arrangement and 2.3.6 prepare a draft implementation plan for MSP. @$125,000. Year 1, 2 & 3.
15	• National policy and strategy advisor to: Undertake a gap analysis of national development plans and policies including the EIA procedures; Review current marine use planning guidelines and processes; Draft proposals for Coastal Policy Guidance documents; Strengthen Regulations and Enforcement mechanisms governing coastal land use and EIA to include climate change risks management and Develop best coastal management practice guidelines to feed into the MSP. @$30,000. Spread over Year 2 & 3. • National Expert for field data collection, VCA & VRA Expert. @$30,000ea. Spread over Year 1 & 4. • National Expert in GIS climate change modeller/risk and vulnerability assessment and mapping Expert. @$30,000ea. Spread over Year 2 & 4.
16	• A low-cost amphibious drone based application for identifying and mapping of coastal erosion and support study of Ocean dynamics complete with supporting interface for data storage, communications and training package. @$75,000ea. Year 1.
17	• Cost of acquisition of GIS images and key data and information for hydrodynamic modelling. @$65,000. Year 1, 2, 3 4 & 5.
18	• Kick-off National Inception Workshop. @$30,000. Year 1. • Cost of editing, printing and publishing protocols, maps, handbooks, policy and information briefs and/or guidelines on climate change adaptation in coastal zone. @$30,000. Year 1, 2, 3, 4 & 5. • Cost of training (i) Two (2) EPA technicians trained with hydrodynamic/probabilistic modelling skills for development of flood risk and storm surge planning; @$50,000. Year 1 • Cost of training Two (2) Geographic Information Systems Specialist trained with raster modelling capabilities; Develop training programme for at least 10 EPA staff to carry out Participatory Community Coastal Vulnerability Assessment; Develop training programme for at least 10 EPA staff to carry out post vulnerability assessment work. @$50,000. Year 1 & 2 • National Conference on Coastal Zone Adaptation focusing: (i) coastal monitoring and CIEWS, (ii) Development of coastal risk profile, (iii) coastal zone risks and vulnerability mapping, (iv) coastal zone community socio-economic vulnerability and risk mapping including gender dimension, (v) Mainstreaming of coastal risks and vulnerability for marine spatial planning, (vi) Climate Change Adaptation measures for coastal zone and (vii) Operationalization of an ICZM national programme. @$35,000. Year 3.
19	• Travel cost associated with activity implementation under Output 2. @$100,000. Year 1, 2, 3 4 & 5.
20	• A set of Sargassum clearing machines. Tables, chairs, mobile phones, field cameras, GPS sets, computers, office general equipment (photocopying machines and scanners) and consumables. @$250,000. Year 1, 2, 3 4 & 5
	OUTCOME 3: Public awareness enhanced and climate resilient alternatives to sand mining promoted for better adhesion of policy makers and communities on adaptation.
21	• International Climate Change Coastal Adaptation training and workshop facilitator to develop and deliver training and capacity building sessions on: (i) Integrated Coastal Zone Management (ICZM), Climate Change Vulnerability Assessment, and Sectoral and Livelihood Adaptation Planning for at least 25 Government technical

	officers and policy makers linked to coastal zone and climate change issues per main coastal districts (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island; @$50,000. Year 2 & 3. • International Climate Change Coastal community livelihoods enhancer to advise best design and functioning of Centre for Skills Development (CSD) to assist youth associations in developing skills for alternative income generating activities. @$50,000. Year 1 & 2. • International Climate Change Coastal community livelihoods enhancer to advise best design and functioning of Communal Centres for Coastal and Marine Resources Transformation (CCMART's) following the Global Ecovillage Network approach to promote community based adaptation initiatives. @$50,000. Year 1 & 2. • International Consultant specialized in alternative construction techniques to (i) conduct a baseline study and define the appropriateness of the CSEB technology in Sierra Leone and (ii) work with the Ministry of Works to identify additional opportunities for the construction sector. @50,000. Year 1 & 2 • International Climate Change Coastal Consultant expert in small scale farming and community irrigation water management. @$50,000. Year 2 & 3. • International Coastal Zone Management Consultant with strong EbA experience to support restoration efforts in the coastal zone. @$50,000. Year 1 & 2. • International Climate Change Consultant with strong background in Community Artisanal Fishing Management. @$50,000. Year 1 & 2.
22	• Contractual Services (Individual) costs for Project management. @$310,000. Spread over outcomes 1, 2, 3 & PMC (@ $58,000 under component 3). Year 1, 2, 3, 4 & 5. • Procure specialised services of an Agronomist and Rural Development capacity to assist the establishment of small-scale vegetable plots and investigate the potential use of seagrass/sargassum based fertilisers, as well as train women farmers' community in irrigation management. @$60,000ea. Year 1 & 2. • Under the leadership of MFMR Partnership with Women in Fisheries Initiative, USL-IMBO and EPA-SL Sub-Contract Individual Consultancy to carry out research on alternative fuel sources: Testing the potential use of Sargassum (sargassum briquettes and biogas) and other sources (sugar cane straw, acacia) as alternative Fish smoking fuel source; @$60,000. Year 2 & 3. • Procure consultancy of a Coastal Early Warning Systems (CIEWS) Expert to (i) ensure coordination on data collection and strengthening of Local Disaster Risk Management Committees (LDRMC) and Community Radio stations to effectively establish warning dissemination and response service to coastal community groups; (ii)) develop local warning dissemination and response mechanisms, including the strengthening of Local Disaster Risk Management Committees (LDRMC), to at least 5 local coastal civil protection officers (per pilot sites x6=30), Community leaders, Districts representatives in charge and/or dealing with Coastal Disaster Management. @$60,000. Year 3 & 4. • Sub-Contract Individual Consultancy to work with target coastal communities specifically with women and youth along the main beaches to establish pilot activities towards improvement of waste management techniques and creation of alternative livelihoods through waste collection, waste recycling and ecotourism. @$50,000. Year 2 & 3. • Sub-Contract services to carry out: (i) audio-visual production (booklets and videos) for community awareness raising consultations and events (e.g. for Community members, schools and TV) for different age groups (Women & Youth); (ii) at least 3 documentaries short film (Participatory Video of about 10 minutes including YouTube publication) to be produced to document. @$50,000. Year 2 & 3. • Sub-Contract services to set up a monitoring committee involving key institutions and using drone based GIS technology for mapping, carry out assessment of survival rates and status of current no-take zones in the mangrove restored areas. @$50,000. Year 3 & 4. • Hire a consultancy of a Gender Expert to guide, support and advise the Project management on specific actions and on the right strategy to ensure gender integration, gender empowerment and gender mainstreaming in the implementation of all project's adaptation measures. @$60,000. Year 1&2. • Sub-Contract Individual Consultancy to guide, support and advise the Project management in all activities related to Mangrove restoration starting from the identification of the mangrove area to be restored and carry out a feasibility study on cost-benefit. @$60,000. Year 2 & 3.

	• Contractual Services (Individual) costs with establishing a strong participation of women and youth a community-based communication and information sharing tool in the coastal zones and target sites using local languages (community media: TV, radio and newspaper) for climate extreme events and hazards dissemination; @$10,000. Spread over Year 1, 2, 3 4 & 5 • Contractual Services (Individual) for Project Focal Points for Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island. Project Focal Points for Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island. @$10,000. per site spread over Outcome 1&3 and over Year 1, 2, 3, 4 & 5. • Contractual Services (Individual) costs with research on the Alternative Fish smoking techniques using other fuel sources (e.g. sugar cane straw, sargassum briquettes, acacia tree, etc.); @$10,000. Spread over Year 1, 2, 3 4 & 5. • Contractual Services (Individual) costs with establishing small scale vegetable gardens for demonstration to master/access agricultural techniques@$10,000. Spread over Year 1, 2, 3 4 & 5.
23	• Sub-Contract services to carry out: (i) audio-visual production (booklets and videos) for community awareness raising consultations and events (e.g. for Community members, schools and TV) for different age groups (Women & Youth); (ii) at least 3 documentary short film (Participatory Video of about 10 minutes including YouTube publication) to be produced to document climate risks in the coastal zone and adaptation benefits generated by the project in the demonstration sites/communities, which can be used for further communication and advocacy work. @$ 59,500. Year 1, 2, 3, 4 & 5. • In each of these two sites (Shenge and Turtle Island) build infrastructures to support fishing communities to enhance their livelihoods such as: small solar powered cold storage facilities, non-metal/fiber glass fish stands, fresh water points, hygienic fish cleaning facilities, first aid/ hygienic installations, etc. @$100,000. Year 2 & 3. • Sub-Contract services to carry out installation of extended fishing landing points on identified locations along the coastline at Shenge and Turtle Island pilot sites; @$150,000. Year 1 & 2. • Sub-Contract services to build at Shenge and Turtle Island pilot sites efficient fish drying facilities (including modified altona ovens) to reduce the pressure on the mangroves for firewood. @$ 50,000. Year 1 & 2. • Sub-Contract services to carry out construction of at least one well/borehole and/or rehabilitation of not less than 2 existing wells/boreholes to each of the pilot sites (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island) depending on the baseline and feasibility study to reduce vulnerability of Women Communities to drought conditions. @$100,000. Year 1. • Sub-Contract services to carry out constrution of two wells/boreholes in the CSEB site. @$40,000. Year 2 • Sub-Contract services to provide field water storage capacity and practical training on small scale irrigation methods and water management to women farmers. @$50,000. Year 1 & 2. • Sub-Contract services to carry out (i) Upgrading (or providing alternative interventions to gabions and groynes) to better protect an agreed stretch of the Lumley beach, (ii) Stabilisation of beach facade, slope adjustment and sediment addition, (iii) Low grade beach nourishment on seaweed/sargassum affected beaches of Touristic importance. @$50,000 Year 1. • Sub-Contract services to establish small-scale Communal Centres (including buildings and basic tools) for Coastal and Marine Resources Transformation (CCMART's) to promote community based adaptation initiatives including the establishment of a community-based small-scale processing units of fruit-based products, poultry, mushroom farming, honey production, artisanal craft and pottery industry and/or cattle products (milk, cheese, tannery) to improve Communities livelihoods for target pilot sites (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island. @$100,000. Year 1, 2 & 3. • Sub-Contract services to build infrastructures to support local Women in Fisheries to enhance their livelihoods such as non-metal/fiber glass fish stands, fresh water points, hygienic fish cleaning facilities, first aid/ hygienic installations. @$50,000. Year 1

	• Sub-Contract services to establish small scale vegetable gardens for demonstration to master/access agricultural techniques - (seed/plant resistant to drought, irrigation and fertilizer management) - adapted to increased climate variability in target pilot sites particularly in Conakry Dee and Tombo; @$50,000. Year 2 • Setup partnerships with local CBOs to help young local entrepreneurs and businesses to develop new climate resilient ideas with focus on youth and women sector. @$150,000. Year 1, 2, 3, 4 & 5. • Support 10 youth mining groups in hotspots such as Lakka and Hamilton to return to artisanal fishing and embrace eco-friendly and sustainable fisheries to divert from the sand mining activity including skills training and capacity building. @$300,000. Year 1, 2, 3, 4 & 5. • Support Centre for Skills Development (CSD) for daily management and running of the Centre including payment to instructors and social support to trainees. Total @$450,000. Year 1, 2, 3, 4 & 5. • Establishment and operationalization of two complete pilot post-harvest value chain units at Conakry Dee–Port Loko axis and Tombo/Hamilton–Freetown axis as well as two post-harvest value chain components in Shenge and Turtle Island sites. @$800,000. Year 1, 2, 3 & 4. • Engagement of local NGOs and CBOs for Output 3.4.1 based on a proposal in response to a specific call for proposals. This will involve the launching of a call for proposals for Mangrove restoration (500ha) and dune fixation. @$150,000. Year 1, 2, 3, 4 & 5. • To explore means of clearing seaweed/sargassum in most popular beaches during tourist peak season; and/or; To set up an innovative responsive strategy for beach protection against seaweed/sargassum invasion including clearing up of beaches, transformation/utilization of debris using a Youth Task Force on a "cash for work" scheme and/or private entrepreneurship; @$150,000. Year 1, 2, 3, 4 & 5. • Engagement of local Women NGO's & Women Associations for Output 3.4.2 based on a proposal in response to a specific call for proposals. This will involve the launching of a call for proposals for "cash for work" scheme. @$150,000. Year 1, 2, 3, 4 & 5.
24	• National Expert in EbA and Shoreline Management. @$30,000. Spread over Yea 3 & 4. • National expert in Fisheries and fish preservation to develop a design and build pilot efficient fish drying facilities and carry out training for women in fish processing techniques using elected alternative fuel sources. @$30,000ea. Year 1. • National expert in mangrove restoration and dune fixation to carry out rehabilitation of degraded mangrove on identified critical areas. @$30,000ea. Year 1. • National training and workshop facilitator to support training and awareness activities at the pilot sites. @$28,920ea. Spread over Year 1, 2, 3, 4 & 5. • National Water infrastructure developer and irrigation Management Expert. @$30,000ea. Spread over Year 1, 2, & 3 • National expert in alternative construction techniques to (i) support the international consultant for the baseline study and conduct trainings for masons and block makers and (ii) work with the Ministry of Works to identify additional opportunities for the construction sector. @$18,000. Spread over Year 1, 2 & 3 • National Expert in Coastal waste (including Seaweed/Sargassum) Management and beach cleaning & Planning. @$30,000ea. Spread over Year 1 & 2 • National Agronomist expert in rural and livelihood development to work with the local Women's Associations and under the technical guidance of MAFFS extension services to test seaweed/sargassum based fertilisers and train in water management. @$30,000ea. Spread over Year 1 & 2.
25	• Two engine powered rubber inflatable boat for high sea rescue of fishing communities at Conakry Dee & Tombo for rescue under extreme climatic event.@$50,000. Year 1 & 2. • Two hundred (200) - AM/FM Weather Alert Radio sets with Solar Power, Flashlight and Cell Phone Charger (Red) to the fishing communities in pilot sites to enable reception of warnings while at sea.@$50,000. Year 1 & 2. • 30 VHF radios and other Mobile equipment for relaying warnings and communications e.g. sirens, radios, mobile phones etc. @$60,000Year 1. • Plastic sheeting to cure the blocks successfully @$3,000. Year 2 • Purchase of 2 Aurem 3000 CSEB machines @$20,000. Year 2 • Spare parts for CSEB machines @$10,000. Year 2

26	• Cost of translation into local languages of film and leaflets, individual reports and other information and communication materials produced on climate risks and adaptation measures demonstrated in each of the 3 sites into local languages. @$20,000. Year 4 & 5. • Printing and audio-visual material (booklets and videos) @$10,000. Spread over Year 1, 2, 3, 4 & 5
27	• Training of at least 50 Government technical officers and policy makers linked to sand mining and CSEB issues. @$60,000ea. Year 2, 3 & 4. • Undertake public awareness campaign with training for trainers for at least 25 community leaders (which 50% are women) of each of the six target sites on climate change risks and costs and benefits of different adaptation options; @$70,000. Year 1, 2, 3 & 4 • Undertake public awareness campaign with training for trainers for at least 25 community leaders (which 50% are women) of each of the six target sites CSEB awareness activities; @$70,000. Year 3, 4 & 5 • Communicate on the lessons learned from the project through media support systems and carry out sharing of lessons learned during national and international fora, meetings and conferences; @$40,000. Year 3 & 4 • Training of at least 180 people (90 masons and 90 CSEB block makers) through 6 training sessions training 30 people each for a period of 18 days in the use and production of CSEB; @$35,640. Year 2 & 3 • Develop a web-based platform to share methodologies, results and lesson learnt generated from the project to promote replication beyond the project sites and enhancing women's role on implementation of Adaptation measures at local level; @$50,000. Year 3 & 4 • Carry out dissemination at the District/Chiefdom level of project results to promote replication of successful adaptation approaches including at least one exposure visit to bring decision-makers and planners at the national, provincial and municipal level who are not already engaged directly with project to project demonstration sites. @$60,000. Year 2, 3 & 4 • Carry out training for women in fish processing techniques using elected alternative fuel sources. @$40,000. Year 3 & 4.
28	• Travel cost associated with activity implementation under Output 3. @$100,000. Year 1, 2, 3, 4 & 5.
	COMPONENT/OUTCOME 4: KM and M&E
29	• Outcome 1 - International M&E expert. @$30,000. • Outcome 2 - International M&E expert. @$30,000. • Outcome 3 -International M&E expert. @$30,000.
30	• Costs for Mid-Term Evaluation. @$40,000. Year 3. • Costs for Final Evaluation. @$50,000. Year 5. • Mid-term GEF Tracking Tool updating costs. @$10,000. Year 3. • Terminal GEF Tracking Tool updating costs. @$10,000. Year 5.
31	• Annual Project Audit costs. @$25,000. Year 1, 2, 3, 4 & 5.
32	• Mid-Term National Conference to support Mid- Term Evaluation process of Project Results. @$30,000. Year 3. • National Conference for Final Project Results presentation and discussion at National Level. @$30,000. Year 5.
33	• Monitoring of indicators in project results framework. @$65,000. Year 1, 2, 3, 4 & 5. • Cost of Project Steering Committee Meetings. @$32,500. Year 1, 2, 3, 4 & 5. • Technical Committee Meetings. @$32,500. Year 1, 2, 3, 4 & 5.
	PROJECT MANAGEMENT

34	• Contractual Services (Individual) costs for Project management. @$310,000. Spread over outcomes 1, 2, 3 and PMC (@$135,000 under PMC). Year 1, 2, 3, 4 & 5.
35	• Common premises. @$175,000. Year 1, 2, 3, 4 & 5.
36	• Direct Project Costs for the implementation of the activities – See annex 14 for more details. @$150,000. Year 1, 2, 3, 4 & 5
37	• Project Board meetings and Project Management Unit specific training needs. @$15,000. Year 1, 2, 3,4 & 5
	UNDP COMPONENT
38	• Tables, chairs, mobile phones, field cameras, GPS sets, computers, office general equipment (photocopying machines and scanners) and consumables. @$10,000. Year 1, 2, 3, 4 & 5.
39	• Communication cost (internet, cellphones, etc.), editing, printing and publishing protocols, handbooks, policy and information briefs and/or guidelines. @$10,000. Year 1, 2, 3, 4 & 5.
40	• Finance Assistant salary @$30,000. Year 1, 2, 3, 4 & 5 • Administration Assistant salary @$30,000. Year 1, 2, 3, 4 & 5
41	• 2 vehicles @$80,000. Year 1 • 6 motorcycles @$18,000. Year 1 • Gasoline @$12,000. Year 1, 2, 3, 4 & 5

Annex 1. Risk Analysis

Project risks					
Description	**Type**	**Impact & Probability (1-5, low to high)**	**Mitigation Measures**	**Owner**	**Status**
1. Insufficient institutional engagement and coordination may prevent successful project delivery especially in the current context, in Sierra Leone	*Organizational, Strategic*	P=3 I=3	A strong commitment from the GoSL and the political leadership of the Environmental Protection Agency of Sierra Leone (EPA-SL), as well as from the Institute of Marine Biology and Oceanography (USL-IMBO), The Sierra Leone Meteorological Department (SLMD/A), the Sierra Leone Maritime Administration (SLMA) and the Ministries of Fisheries and Marine Resources (MFMR) will minimize such a risk as they will be the first beneficiaries of the measures to be developed/applied. Additionally, the project will be prepared and carried out under the oversight of UNDP CO and support from the (EPA-SL) ICZM Board, an inter-ministerial platform which brings together the main government institutions concerned with this project.	GoSL EPA-SL USL-IMBO SLMD/A SLMA MFMR	
2. Lack of qualified personnel within the USL-IMBO and EPA-SL to operate and maintain new equipment, data transmission/treatment/storage processes and forecasting models.	*Operational*	P = 4 I = 5	The USL-IMBO and EPA-SL are able to recruit enough technical personnel for project implementation. In addition, the technical assistance and training package foreseen to be delivered by the project will ensure that by the end of the project at least 26 technicians and senior staff will be trained and/or capacitated to deal with a number of activities ranging from climate/marine monitoring, climate and SLR modelling, equipment maintenance, and early warning operation, development of GIS based products such as coastal vulnerability and risk mapping, coastal planning.	USL-IMBO EPA-SL	

3. Procurement and installation of equipment is delayed due to slow release of funds, lengthy administration processes and deficient data transmission systems locally.	*Organizational, Strategic*	P = 4 I = 5	UNDP supervision will ensure that funds are released on time for speedy procurement processes and international and national technical assistance will be in place for equipment installation, testing and operationalisation.	UNDP CO	
4. Early Warnings do not reach local radios in the communities and local Radios are not capacitated to receive and broadcast early warnings.	*Operational*	P = 3 I = 4	The project will use project funds to develop the existing capacity and make provision to strengthen Community Radio stations in target districts to carry out warning and Alert dissemination using local languages. The project is also using funds to Strengthen the Sierra Leone Costal Guard communication network for EWS dissemination by providing powerful VHF radios as well as providing the fishing community with 100 AM/FM Weather Alert Radio sets with Solar Power, Flashlight and Cell Phone Charger (Red) to the fishing communities in pilot sites to enable reception of warnings while at sea. Finally, the project will also be advocating with national mobile phone provider and other relevant institutions a toll-free mobile number and toll-free text and pictorial "sms" to warn fishermen at sea.	Project team UNDP CO Local radios	
5. Youth and Women Association, NGOs/CSOs participating in the activities of adaptation through engagement in alternative income generative livelihoods are not willing to cooperate.	*Strategic*	P = 3 I = 3	The project foresees in the third component a partnership with local NGO's under the leadership of Ministry of Fisheries and Marine Resources (MFMR) and strong involvement of Ministry of Local Government and Rural Development (MLGRD), and The Ministry of Youth Affairs (MOYA). In addition, The Women in Fisheries Association have been working in partnership with MFMR for long time in similar activities. The commitment of these GoSL Institutions and the Youth and Women Groups have been shown early on during the PPG phase. In addition, one selection criterion to choose NGOs to implement coastal adaptation project will include the demonstration of a good track record in implementing and managing projects.	MFMR MLGRD MOYA Women Associations	
6. Equipment installed in the coastal sites (weather and marine tidal gauging system with telemetry) may be stolen	*Organizational, Strategic*	P = 4 I = 5	This risk was identified during the PPG phase and discussion were held with SLMA and SLMD/A and well as the ONS-DMD. For this reason, it was decided that the locations to be selected for installation of the equipment	SLMA	

and/or vandalised threatening the success of the functioning of Coastal EWS.			will be inside existing SLMA structure where equipment had been previously installed and with permanent presence of staff. In addition, each installation will be made with a metal enclosure with safety locks. Adding to these arrangements at each site there will be a Focal Point paid by the project resources permanently dealing with this equipment on a daily basis.		
7. Impacts of Climate Change are greater than expected	*Environmental*	Impact: 4 Probability: 2	The outcome 1 will directly work towards the mitigation of this risk by providing improved climate data and capacity to forecast climate events. Besides, the project team will continuously consult available climate data to ensure the activities are planned and carried out to reduce to the extent possible the impacts of climate change on the results.	Project Team	

Annex 2. Stakeholder consultations

Stakeholder consultation has been a key feature in the design of this LDCF Proposal, and stakeholders have been involved in identifying and prioritizing the proposed intervention activities. Details of the stakeholder engagement during the PPG Phase were provided in Section 1.4. and 2.4.2 above. Ongoing public consultation is critical for successful implementation. During the consultation process from May 2016 to December 2016, more than 200 professionals were engaged at national, sub-national, municipal and community level. Key stakeholders (Table 9) with a major direct role in the project were identified and consulted at different stages during the Project Preparation Grant (PPG) phase to obtain their inputs and feedback for designing the project. The stakeholder consultation process that was undertaken included the following major activities summarised below:

1. National Inception Workshop (IW) - Information and consultation session held at the Hill Valley Hotel Conference Centre, Freetown, Sierra Leone on Wednesday 19th May 2016.

An interactive national Stakeholder Consultation Workshop was held on Wednesday 19th May 2016 at the Hill Valley Hotel Conference Centre, Freetown, Sierra Leone to bring together the Government Institutions, NGO's, CBO's, key representatives of bilateral/multilateral organizations and Academia to contribute towards the design phase of this LDCF initiative and endorse the overall strategic intervention areas as indicated in the Project Identification Form (PIF). Intervention areas discussed include the collection of information and useful data for project design, the validation of the indicative outcomes and outputs, and baseline information necessary to develop a participatory plan to involve communities, as well as the identification of responsible partners and negotiation pertaining to implementation arrangements and co-financing. The workshop was also used to present the intended scope of the project (as cleared by LDCF/Council) to the technical and financial partners and to exchange ideas on strategies to elaborate, implement and develop a sustainable activity towards strengthening the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructures and economic livelihoods in Sierra Leone. Annex II shows the agenda for the workshop. Fifty-three participants (Annex III) were involved in the workshop from organizations ranging from government agencies with key roles to play in the LDCF project, experts working on marine and coastal biodiversity, academics and civil society organizations as well as UN agencies, the local Universities, local Press and bi-lateral cooperation Partners. The Workshop included a Working session during the second part involving all participants divided into three Working Groups.

Outcome: The potential stakeholders that attended the Workshop were informed about the project and its objectives. Initial guidance and useful advice related to project preparation process, stakeholder identification, strategy and approach, technical issues, and site selection was gathered by the team. All he stakeholders contributed to the discussions, planning and identification of priorities in the promotion process of climate-resilient development and climate change adaptation in the coastal zone of Sierra Leone to withstand disaster risks as well as the useful EWS interventions in Sierra Leone and in particular in the Coastal Zone.

2. Community Gender Vulnerability Assessment - A gender vulnerability assessment was conducted between 3rd and 8th of August in the potential demonstration sites engaging coastal communities in the Western Area, including Lakka, Hamilton, Tombo and Conakry Dee in Port Loko District, involving farmers' associations, Community-Based Organizations (CBOs) and women's groups in the Western Area and Port Loko District, respectively. A total of 40 key informant interviews were conducted in each of the pilot sites.

Additionally, several key informants were interviewed, including traditional chiefs (local authority) and ward councillors (government authority) involving around 150 people who have shared their views on the potential role of women in the project and contributed with their ideas on how to address the current vulnerability of women to climate change risks in coastal communities (See Annex 4 for further details).

3. Community Livelihood Vulnerability Assessment -

A Community Livelihood Vulnerability Assessment was carried out between 21st and 23rd August. – Field visits were undertaken on Wednesday 21st at Hamilton/Lakka, Thursday 22nd = at Konakry Dee, Friday 23rd – at Tombo, to carry out community consultations and gather data for Community alternative livelihood assessment using Focus Group Discussions & Key Stakeholder Interviews. Further field consultations were undertaken to Turtle Islands and Shenge/Plantain Islands communities to allow the collection of the wealth indicators for the pilot sites (See Annex 5 for further details). Within that Annex, a key finding states that in order to develop an alternative livelihood system in this area, the LDCF project should first undertake five critical activities at selected sites along the coastline of Sierra Leone: (1) understand the auto-ecology (individual species ecology),
(2) understand the normal hydrologic patterns that control the distribution and successful establishment and growth of targeted mangrove species,
(3) assess the modifications of the previous mangrove environment that occurred that currently prevents natural secondary succession,
(4) design a restoration program to initially restore the appropriate hydrology and utilize natural volunteer mangrove propagule recruitment for plant establishment, and
(5) only utilize actual planting of propagules, collected seedlings or cultivated seedlings after determining through Steps 1-4 that natural recruitment will not provide the quantity of successfully established seedlings, rate of stabilization, or rate of growth of saplings established as goals for the restoration project.

4. Project Validation Workshops (PVW)

The Validation Workshop for the UNDP-GEF coastal adaptation project took place at the New Brookfields Hotel, in Freetown on Wednesday 12th April 2017. The purpose of this workshop was to update stakeholders on the Project design, solicit feedback on the information presented, and agree upon any changes to be made to the Project design. The three Project outcomes and their respective Activities to be carried out and indicators were presented at the workshop. These outcomes were endorsed by the fifty participants who attended the workshop, including representatives from government agencies with key roles to play in formulating and implementing the project. Some important suggestion for adjustments were made by the participants to be introduced in the project document concerning the implementation of Activities to be carried out so to seek better coordination between on-going initiatives and better articulation between all execution partners, particularly the Environment Protection Agency, The Ministry of Fisheries and Marine Resources and USL-IMBO.

The Ministry of Works, Housing and Infrastructures, present at the validation workshop, provided its support for the introduction of CSEB in the construction industry. The representant of the Ministry also insisted on the importance of working in synergy during the implementation of the activities.

5. Bilateral consultation throughout the project preparation process

Two extended workshops were held in between the Inception and the validation phase from 15th September and 31st October 2016 with at least 40 representative of the main and secondary stakeholders in each of them as well as a series of bilateral meetings with GoSL and International Institutions, site visits and interviews to community Members and NGO's and CBO's (Annex 3)[66]. These project preparation workshop included a series of bilateral discussions between members of the PPG Team and representatives and resource persons from national and local government institutions, international organisations, academic institutes, NGOs and representatives from target communities in Conakry Dee, Lakka, Hamilton, Tombo, Shenge and Turtle Islands.

Table 9. Key stakeholders with a major direct role in the project

[66] Inception Workshop Report

Stakeholders	Interests/ role in the project
EPA-SL (Environment Protection Agency of Sierra Leone)	The Environment Protection Agency was established by an Act of Parliament in September, 2008 as a body that aims to effectively protect and sustainably manage the environment and its natural resources. The EPA-SL is placed under the Office of the President, headed by an Executive Chairperson, steered by a Board, and coordinates with both national and local Government institutions on issues relating to environmental protection and management. The Agency (i) advices government on the formulation of policies on aspects relevant to the environment as well as climate change; (ii) prescribes standards and guidelines relating to ambient air, water and soil quality; (iii) ensures compliance with relevant procedures in the planning and execution of development projects; (iv) issues EIA permits; and (v) promotes relevant studies, research, surveys and analyses.
MLCPE (The Ministry for the Lands Country Planning and the Environment)	The Ministry for the Lands Country Planning and the Environment is the Policy Enactment institution for environmental issues management. It created the Environment Protection Agency of Sierra Leone (EPA-SL) in order to enable better coordination of all sectors of environmental activity, and encourage a proper planning and use of natural resources for sustainable environmental development. The Agency is Governed by a board of Directors drawn from various line ministries and other stakeholder institution/organization for endorsement of the Agency's planned activities and budgetary controls. It is managed by a Directorate and various divisional heads located in each region of the country as well as on specific issues such as waste, mining, industry etc. The Environmental Impact Assessment (EIA) license granted to operational projects before operations captures the main element of climate change issue management, and the protection of the environment. .
NCCS National Climate Change Secretariat	The National Climate Change Secretariat was established in May 2012 under the EPA-SL, as a Coordinating Body with a focus on ensuring that climate change activities, programmes and relevant policy development and implementation are handled promptly and in a harmonized manner. The Executive Chairperson of the EPA-SL supervises the operations of the NSCC. The Secretariat aims to (i) ensure mainstreaming of climate change concerns into national development planning to reduce vulnerability and promote environmental sustainability; (ii) promotion and strengthening of national initiatives relating to climate change mitigation and adaptation in a participatory manner involving relevant socio-economic sectors.
DMD (Disaster Management Department) of the ONS (Office of National Security	The Disaster Management Department of the Office of National Security is a public institution with administrative autonomy directed to the prevention and mitigation of natural disasters. It has three fundamental areas of action: (i) prevention and mitigation; (ii) support to victims of disasters and (iii) administration and coordination of disaster response and management. Under its institutional mandate DMD has a responsibility to (i) direct and coordinate disaster management, prevention and mitigation; (ii) reduce vulnerability of people, infrastructure and assets; and (iii) coordinate and collaborate with other stakeholders in each of the abovementioned areas.
MAFFS Ministry of Agriculture, Forestry and Food Security	The Ministry of Agriculture, Forestry and Food Security is charged with the growth and development of the agriculture sector. Through its Rural Development Strategy the Ministry aims to facilitate: (i) increased competitiveness, productivity and rural wealth accumulation through smallholder commercialization; (ii) productive and sustainable management of natural resources including lowland rice and food crop production initiatives; (iii) growth in human capital, innovation and technology using Agricultural Business Centres; (iv) diversification in social capital, institutional efficiency and effectiveness; and (v) good governance and market planning.
SLARI Sierra Leone Agricultural Research Institute	The Sierra Leone Agricultural Research Institute (SLARI) under MAFFS is responsible for generating knowledge and technological solutions to facilitate higher yields in production, agro-business and food and nutritional security. SLARI is responsible for implementing research activities that contribute to the development of strategies for environmentally sustainable management and use of land for agricultural production. The institute is responsible for the

Stakeholders	Interests/ role in the project
	coordination of key research programmes, in cooperation with national centres specialised in research on agricultural and horticultural crops, fisheries, forestry, as well as land and water.
NPAA National Protected Area Authority	The National Protected Area Authority was established by an Act of Parliament in 2012 with the aim to ensure the sustainable use of biodiversity and forest resources with regards to their benefit for soil and water conservation, economic development, wildlife habitats, and aesthetic and recreational values. The NPAA focuses on the following intervention areas: (i) biodiversity and wildlife conservation through the development of strategies for sustainable use of the ecosystem services and genetic resources; (ii) enhancement of stakeholder capacity for forest reserve management; (iii) promotion of watershed management in critical catchment areas to protect domestic water supply systems; (iv) reduction of land degradation; (v) increase support for NGOs; (vi) community tree-planting programmes.
MLCPE Ministry of Lands, Country Planning and Environment	The Ministry is mandated to develop appropriate policies and programmes for lands, country planning and the environment. The Ministry is responsible for effective land administration and management, land use planning and development control.
MTA Ministry of Transport and Aviation	The Ministry of Transport and Aviation's mission is to develop policies and provide effective and efficient guidelines for the delivery of safe, reliable, affordable and sustainable maritime, land transport, aviation, and rail systems throughout Sierra Leone. The goal of the Ministry is to: (i) increase access through the provision of transport services; (ii) connect rural farming populations as well as urban poor to market centres; (iii) provide social and economic services through efficient, affordable and sustainable transport systems; (iv) effective coordination of relevant agencies resonated by policy directives and effective monitoring. The MTA includes amongst others: the National Roads Authority, Meteorological Department, Ports Authority, Road Transport Corporation, Road Safety Authority, National Shipping Company, Transport Infrastructural Development Unit and the Maritime Administration. The Roads Authority includes an environmental unit that aims to ensure environmental sustainability concerns are taken into consideration during the planning, implementation and maintenance of road infrastructure.
SLMD/A Sierra Leone Meteorological Department	The Sierra Leone Meteorological Department of the Ministry of Transport and Aviation is mandated to: (i) plan, install and ensure functionality of meteorological stations; (ii) register, record, archive, analyse and publicize the observation results; (iii) promote and ensure functionality of the Centres of Analysis and Meteorological Forecasts; (iv) issue warnings of severe weather events for the protection of lives and property; and (v) conduct studies and research in the field of meteorology and climatology.
MWR Ministry of Water Resources	The Ministry of Water Resources was established in 2013 and is responsible for monitoring and sustainable management of national freshwater resources. MWR is in charge of policy formulation within the water sector with regards to strategic planning, investment and the setting of minimum standards through effective policy evaluation, analysis and implementation. It is also responsible for effective coordination, supervision and monitoring of the different stakeholders within the sector. Amongst other things, MWR has responsibility to: (i) review and develop policies and water sector development framework on behalf of the people and Government of Sierra Leone; (ii) oversee the provision of safe and sustainable drinking water to the people of Sierra Leone to improve their health outcomes and living standards; (iii) develop and manage both surface and underground water resources in a responsible and sustainable manner to drive the country's socio-economic development; (iv) maintain cross-sectoral linkages between water resources development and other sectors such as health, education, environment, local government administration and gender. MWR has under its responsibility the Sierra Leone Water Company, (SALWACO), Guma Valley Water Company, the Electricity and Water Regulatory Commission and the National Water Resources Management Agency.
SLMA (Sierra Leone Maritime Administration)	The Sierra Leone Maritime Administration (SLMA)is a public institution under the Ministry Transport and Aviation created to monitor the Sierra Leone coastal waters for safety of users of the resources, develop research programs on the marine and coastal ecosystems, contribute to integrated planning and implementation of good practices in the coastal and marine

Stakeholders	Interests/ role in the project
	environments, implement experimental activities and demonstrations on the conservation and sustainable utilization of coastal and marine environments
MLGRD Ministry of Local Government and Rural Development	The Ministry of Local Government and Rural Development was established as part of a national drive for decentralisation. MLGRD provides leadership in policy formulation, coordination, standard setting and oversight in order to ensure democratic local governance. The Ministry is mandated to: (i) formulate, implement, monitor, evaluate and coordinate reform policies and programmes to democratize governance and decentralize the machinery of government; (ii) reform and energize local governments to serve effectively as institutions for mobilizing and harnessing local resources for local and national administration and development; (iii) design and implement capacity building programmes for local government to improve service delivery and management of public resources; (iv) build local ownership and operational efficiency of the decentralization process through effective development planning and budgeting, financial management, monitoring and evaluation, and other managerial functions; (v) strengthen the coordination between and among Ministries, Local Councils and Service delivery agencies; (vi) reform chiefdom governance in line with the decentralization framework and principles of good governance. The implementation of the decentralisation policy is actively supported at the local level by NGOs.
MOYA Ministry of Youth Affairs	The Ministry of Youth Affairs was established 2014 and is responsible for developing policies and plans relevant to youth development and employment. The Ministry includes the National Youth Commission (NAYCOM). Roles and responsibilities of the Ministry include: (i) ensuring that youth enjoy their fundamental rights; (ii) ensuring that a comprehensive youth development framework is understood through active marketing and advocacy work, implemented, and used as a basis for all programming efforts for the youth; (iii) establishment of a youth fund with resources contributed by government, the private sector and international partners; (iv) establishment of an National Youth Service to encourage youths to contribute to national development; (v) establishment and supervision of District, Chiefdom and Zonal Youth Councils; (vi) facilitating youth to contribute towards their communities and eventually to national development, by encouraging participation in local community projects or activities.
NTB National Tourist Board	The National Tourist Board, established by an Act of Parliament in 1990, is a semi-autonomous body and the professional arm of the Ministry of Tourism and Cultural Affairs. The Board's main objectives are: (i) development and promotion of (sustainable) tourism opportunities; and (ii) marketing of Sierra Leone as a tourist destination in order to enhance socio-economic development. The NTB aims to achieve these objectives through: (i) implementation of government policies; (ii) developing and executing appropriate marketing campaigns; (iii) designing and disseminating promotional materials; (iv) assessing, licensing and classifying all tourist establishments and to encourage the active participation of the private sector in the tourism industry. The Board is also tasked with monitoring and maintaining the operations of all tourist establishments to ensure quality service delivery in compliance with the ECOWAS standards of classification of Tourist Establishments.
MFMR Ministry of Fisheries and Marine Resources	The Ministry of Fisheries and Marine Resources has the mission to plan, develop, rationally mange and conserve living aquatic resources for the benefit of the country. To achieve this, the Ministry promotes the following: (i) good governance, including co-management practices; (ii) establishment of sustainable Monitoring, Control and Surveillance procedures; (iii) livelihood enhancement of fishing communities; (iv) commercial fisheries development; (v) increased contribution of fish resources to the national economy; (vi) adherence to and active participation in regional and international fisheries management organizations; (vii) adoption of best practices in the management of the resources, including codes of conduct for responsible fisheries.
MWHI (Ministry of Works, Housing and Infrastructure)	The present Ministry of Works, Housing and infrastructural development is the implementing ministry for housing and infrastructural development. According to the National Environmental Action Plan, Sierra Leone does not have a defined long term energy policy. The short term strategy however focuses on ensuring that adequate and reliable infrastructure is available, as well as strengthening the institutional framework for effective sector management.

Stakeholders	Interests/ role in the project
	This Ministry is also working in close collaboration with the Sierra Leone Roads Authority, the agency responsible for the Management of the National Road Network. The main goal of this authority is to provide a national road system with an acceptable level of serviceability which will adequately support economic growth on an environmentally sound and sustainable basis. An environmental unit was therefore set up in the authority to ensure that environmental unit are taken into consideration during the planning, implementation and maintenance for the road infrastructure.

Secondary stakeholders

234. However, the process of implementation of this LDCF project will require the support and involvement of other closest partners considered as the secondary stakeholders in which the following institutions are included:

- The Sierra Leone Meteorological Department (SLMD/A) of the Ministry of Transport and Aviation with the mandated to (i) plan, install and ensure functionality of meteorological stations; (ii) register, record, archive, analyse and publicize the observation results; (iii) promote and ensure functionality of the Centres of Analysis and Meteorological Forecasts; (iv) issue warnings of severe weather events for the protection of lives and property. The SLMD/A will support the operation towards the climate and coastal monitoring as well as the processing of data and issue of warnings for the Coastal Early Warning System (CIEWS);
- The Disaster Management Department (DMD) of the Office of National Security dealing with the prevention and mitigation of natural disasters in three fundamental areas of action: (i) prevention and mitigation; (ii) support to victims of disasters and (iii) administration and coordination of disaster response and management. The DMD will support the Dissemination and Response of the CIEWS as well as the training and awareness activities;
- The Ministry of Local Government and Rural Development (MLGRD**)** with the mandated to: (i) reform and energize local governments to serve effectively as institutions for mobilizing and harnessing local resources for local and national administration and development; (ii) design and implement capacity building programmes for local government to improve service delivery and management of public resources; (iii) strengthen the coordination between and among Ministries, Local Councils and Service delivery agencies. The MLGRD will be supporting the implementation of the project by establishing coordination amongst all the GoSL institutions in matters linked to functioning and sustainability of infrastructures o de established in the pilot sites;
- The Sierra Leone Maritime Administration (SLMA) with responsibility to: (i) monitor national coastal waters for the safety of users; (ii) develop research programs on marine and coastal ecosystems; (iii) contribute to integrated planning and implementation of good practices in coastal and marine environments; and (iv) implement experimental activities and demonstrations on the conservation and sustainable utilization of coastal and marine environments. The SLMA will support the establishment, security and sustainability of the future Oceanographic Monitoring System (ONS);
- The Ministry of Youth Affairs (MOYA) which includes the National Youth Commission (NAYCOM) with responsibility for developing policies and plans relevant to youth development and employment and ensuring that a comprehensive youth development framework is understood through active marketing and advocacy work, implemented, and used as a basis for all programming

efforts for the youth; and facilitating youth to contribute towards their communities and eventually to national development, by encouraging participation in local community projects or activities. Given that this LDCF project will primarily address the vulnerability and adaptation needs of youths, MOYA will be supporting all the activities to be developed and specifically linked to the youth group particularly in the coordination of training and capacity building.

- Ministry of Lands, Country Planning and Environment (MLCPE) which mandate is to develop appropriate policies and programmes for lands, country planning and the environment and with responsibilities towards the effective land administration and management, land use planning and development control. MLCPE will contribute for the development of a comprehensive adaptation plan which includes guidance on zoning and land use planning in the context of climate change in the coastal zones of Sierra Leone.
- Ministry of Works, Housing and Infrastructure (MWHI): The present Ministry of Works, Housing and infrastructural development is the implementing ministry for housing and infrastructural development. This Ministry is also working in close collaboration with the Sierra Leone Roads Authority, the agency responsible for the Management of the National Road Network. An environmental unit was therefore set up in the authority to ensure that the environmental unit is taken into consideration during the planning, implementation and maintenance for the road infrastructure. MWHI will give contribute in the feasibility assessment of coastal defense /adaptation options to facilitate budgeting and future land use planning and also in the establishment of small-scale coastal structure foreseen in the adaptation measures to be developed by the project.

Non-Government Organizations

235. The importance of strong engagement by NGOs, community-based organizations and communities in the project was emphasized by Government partners, including the need to ensure that future consultations capture the full range of perspectives, including those of minorities, women and youth, less vocal groups and stakeholders who may not have been present at the time of the consultation. The importance of addressing issues related to gender equity was emphasized throughout the consultation process. Therefore, to attain these goals the following NGO's and CBO's were identified to work in the various activities and pilot sites:

- The Environmental Foundation for Africa **(**EFA**)** an international non-governmental organisation with representation in Sierra Leone, which aims to protect and restore the environment in West Africa. EFA specializes in environmental awareness raising and capacity building at the national, regional and international levels using high impact communications tools and training programs to build an environmentally conscious society motivated to maintain the integrity of nature. The involvement of EFA will be primarily through the Biodiversity and Renewable Energy Learning Centre where it is expected to be developed a significant number of Climate Change based training, capacity building and awareness initiatives.
- The Environmental Forum for Action (ENFORAC) a national non-profit consortium of environmental NGO's, community organisations, university faculties, environmental journalists and volunteers with the aim to coordinate activities relevant to biodiversity conservation and environmental sustainability. ENFORAC aims to bring about unity in action to influence policy, management, donor agendas and behaviour at a national level. The Forum supports its members by building the capacity of each organization through skill trainings and cooperative ventures;

- Island Aid is a national non-governmental organisation that advocates for and promotes biodiversity conservation, generation of sustainable livelihoods and balanced development of the local communities that are living on Sierra Leone's coastal islands.
- The Women's Network for Environmental Sustainability (WoNES) is a national non-governmental organisation with a special focus on the gender dimensions of environmental hazards and climate change with emphasis on how these impacts on the lives of women and children in the short, medium and long terms.
- The Climate Change, Environment & Forest Conservation Consortium (CEFCON-SL) is a national non-governmental organisation that has as its motto "Safer earth, Save Lives".
- Sierra Leone Artisanal Fishermen Union (SLAFU): SLAFU represents local fishermen and those in ancillary occupations (such as boat builders, wood cutters, fish processors, basket makers, machinists, transporters, and so on). Formed on 26 December 2001, it aims to harmonize the concerns of members and act as their collective vanguard[67]. The organization was also formed to promote the welfare of its members and sustainable management of the country's marine resources in collaboration with government, regional and sub regional fisheries organizations.
- Civil Society Alliance on Climate Change
- West Africa Biodiversity and Climate Change (WA-BiCC) addresses both direct and indirect drivers of natural resource degradation to improve livelihoods and natural ecosystems across the West-Africa region. The project works with partners at the community, nati>onal and regional levels to strengthen policies and systems that will improve natural resource management and the health and resilience of selected coastal and upland forest ecosystems.

Stakeholder's involvement plan

This Annex also outlines some of the key consultation principles and processes at a strategic level that will need to be translated into practical action during the project implementation. It provides guidance based on the initial stakeholder analysis, conducted as part of the project preparation process, and the consultations so far. This can be used to define exact activities that will form part of a communications and consultation strategy developed during the inception period of implementation. Consultation is a regulatory process by which the Stakeholder's input on matters affecting the community is sought. The main goals are primarily in improving the efficiency, transparency and public involvement in large-scale project activities and policies. As involvement means the act of sharing in the activities of a group, it is important therefore, to specify goals and objectives for Stakeholder Involvement Plan, identifying key stakeholders and their interests relative to the project and to describe how stakeholders will be involved in the implementation of each project outcome. The table of stakeholder's involvement plan of this LDCF was shown in section 2.4.2 Stakeholder engagement - Table 7.

[67] Sierra Leone ARTISANAL FISHERIES. Clear Challenges, Options. SAMUDRA REPORT NO. 55. https://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/6015/art03.pdf?sequence=3&isAllowed=y. Accessed 27.11.2016

Annex 3. INCEPTION REPORT - Brief Introduction to Project Pilot Sites

"Adapting to climate change induced coastal risks in Sierra Leone"

INCEPTION WORKSHOP REPORT

Author:
Dr. T C Ferreira
International Consultant
May, 2016

1. Background of the Project

The coastal zone of Sierra Leone is one of the most densely populated areas of the country including the capital, which harbours around 1.8 million people according to the latest census[68]. Quite a large percentage of the population is found in the coastal area and up to 55% of them directly depend on coastal resources such as fisheries, mangroves, sand mining, and tourism to support their livelihoods.

The coastal population is not uniformly distributed. In the north, around the Scarcies River and Lungi areas, the population is around 80,000 whilst in the Freetown Peninsula areas it is about 1,250,000. In the south around Shenge, the population is close to 9,000 inhabitants and is around 8,000 in the Bonthe Sherbro area. The population of the coastal area is therefore approximately 1,347,000 persons[69].

Sierra Leone's coastline reaches 560km much of which is sheltered. The sheltered coast is dominated by extensive mangrove systems (230 km) and mud flats. Only about 150 km of the coastline is significantly developed and this includes Freetown (the capital). Over time, vegetative cover along the coastline in the identified hotspots has been degraded for several (climate- and anthropogenic-driven) reasons. On the one hand, anthropogenic activities, particularly due to mangrove wood demands to smoke fish and for construction have reduced the cover of mangroves that would otherwise function as a natural protective barrier to coastline erosion. In addition, the mining of sand is a current practice along the coastline of Sierra Leone contributing to coastal/beach erosion by disturbing the surface and exposing the substrate to rain, rivers and wave action.

The IPCC predicts that, by 2100, the global sea level could rise by up to one metre (IPCC 2001a). Sierra Leone is already suffering from the impact of climate change with a number of natural and man-made hazards taking place including, inundations from the major rivers flowing through and to the coast of Sierra Leone, (notably in the Pujehun district); flash floods which come down from a number of rivers during the monsoon period; saline intrusions due to decreased river flows in the dry season (e.g. along the Scarcies River) as well as aggravated coastal erosion.

It is in this background that the Government of Sierra Leone (GoSL) has requested the Least Developed Countries Fund (LDCF) to support this Full-Sized Project (FSP) in order to implement the following intervention of Sierra Leone's NAPA: "Development of an Integrated Coastal Zone Management Plan for Sierra Leone". The Global Environment Facility (GEF), through its LDCF, approved a Project Identification Form (PIF) presented by UNDP on behalf of the Environment Protection Agency of Sierra Leone (EPA-SL) on "Adapting to Climate Change Induced Coastal Risks in Sierra Leone". A Project Preparatory Grant (PPG) was approved by the GEF Council for the preparation of an integrated proposal for a full-sized project document to be submitted for CEO endorsement within 12 months, commencing with a Project Preparation Phase.

1.1 Project Details

[68]Mariatu to provide the latest census reference.

[69] Environment Protection Agency (2015). Sierra Leone State of the Marine Environment report 2015. Freetown, Sierra Leone

The Project Objective is to "strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods". To attain the set objective the PIF presents three Components and respective Outcomes shown on Table 1.

Project Components

Project Components	Expected Outcomes	Indicative Grant Amount ($)
Generating sound scientific knowledge and access to information;	Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone	2,500,000
Climate information "internalized" into coastal development policy processes;	Develop appropriate protection measures, policy/legal tools and integrated coordination mechanisms to improve /support policy design and implementation in dealing with current and long-term coastal challenges	2,000,000
Awareness and alternative, innovative activities to support adaptation in the coastal zone	Public awareness enhanced and climate resilient alternatives to sand mining promoted for better adhesion of policy makers and communities on adaptation.	5,000,000
TOTAL		9,500,000

The indicative GEF grant amount totals 9.5 million USD distributed over the three Components so to support the development of the proposed Outputs shown on Table 2.

Project Expected Outputs

Outcome Nº	Expected Outputs
Outcome 1	Output 1.1: Climate and oceanographic monitoring equipment's (e.g. tidal gauging, Kalesto radar gauge; pressure sensors; Logosens-2 datalogger; OTT HDR DCP satellite transmitter for the Meteosat, weather monitoring network, etc.) and related data processing systems installed along the coastal zone for measuring climate and sea level rise parameters to improve the knowledge base for future climate risks; Output 1.2: Probabilistic modelling and assessment of natural hazard risk and vulnerability to climate change impacts undertaken; Output 1.3: Economic impact modelling on the projected costs of climate change impacts and costs and net benefits of adaptation options; Output 1.4: Design and implement a National Coastal Risk Information and Planning Platform that will facilitate decision-making on coastal development based on objective assessment of natural hazards and climate change risk criteria.

Outcome 2	Output 2.1. Engineering Designs for Coastal Stabilization structures realised for further integration into the coastal urban planning and tourism development plan on the basis of technical, climatic, environmental and socioeconomic criteria; Output 2.2. Integrated Coastal Management Plans taking into account sea level rise and coastal erosion impacts developed for further integration into Urban and districts development plans; Output 2.3. Guidelines & recommendations developed to revise the EIA procedures, upgrading technical norms for infrastructure and properties taking into account climate risks and coastal erosion assessments; Output 2.4: Establish a dedicated budget (including budget management capacities) for the realization and sustainability of the coastal ctabilization structures.
Outcome 3	Output 3.1. An outreach program designed and implemented to improve decision-making, strengthen information access and data resources for key stakeholders, disseminate project-generated data and information, and foster public awareness about the potential impacts of climate change; Output 3.2. Means and capacities (business development & management skills, access to micro-credit, etc.) provided to at least 2 sand miner youth associations on the Western Area Peninsula to pursue relevant and profitable climate resilient alternative livelihoods (ecotourism, agro-business, beach rehabilitation, etc.) to reduce pressure on the beach. Output 3.3. Participatory implementation of urgent and priority medium-scale soft (non-structural) and hard (structural) coastal adaptation works undertaken to protect coastal community at risks.

1.2 Objectives of the Mission

The mission was undertaken between 15th and 25th May 2016 in order to engage with the Government of Sierra Leone through the Environment Protection Agency and other key stakeholders in the design of a project on “adapting to climate change induced coastal risks in Sierra Leone” to be financed by GEF Least Developed Country Fund (LDCF) resources.

The primary tasks of this mission were:

To facilitate a kick-off meeting for the design phase gathering the information needed and data to complete the project document and support the approved indicative outcomes and outputs;

To develop the work plan for the technical assessments that will be undertaken during the PPG contributing to development of the UNDP project documents for the LDCF financed project on “adapting to climate change induced coastal risks in Sierra Leone”; and

To understand and consult with on-going development initiatives (both public and externally-funded) to fully align the proposed LDCF financed project with those already on-going/planned, making sure to identify all relevant on-going initiatives in the country on Coastal Climate Change Adaptation (CCA)

initiatives in the coastal zones of Sierra Leone that must be born in mind in the design. Annex I provides the full mission schedule.

These tasks were addressed by: i) holding a workshop among the stakeholders, including Government Institutions, NGOs/CBOs, donors and UNDP; ii) and conducting bilateral meetings with key representatives of bilateral/multilateral organizations represented in Sierra Leone; and iii) carrying out site visits for identification of potential Project implementation pilot sites. Potential co-financing sources, including Sierra Leone' Government Institutions, projects and organizations managing/developing relevant on-going/planned costal adaptation related initiatives were also consulted to ensure the UNDP-GEF/LDCF project can leverage and mutually support (and be supported by) other projects.

Activity 1: National Stakeholder Consultation Workshop

An interactive national Stakeholder Consultation Workshop was held on Wednesday 19th May 2016 at the Hill Valley Hotel Conference Centre, Freetown, Sierra Leone to bring together the Government Institutions, NGO's, CBO's, key representatives of bilateral/multilateral organizations and Academia to contribute towards the design phase of this LDCF initiative and endorse the overall strategic intervention areas as indicated in the Project Identification Form (PIF). Intervention areas discussed include the collection of information and useful data for project design, the validation of the indicative outcomes and outputs, and baseline information necessary to develop a participatory plan to involve communities, as well as the identification of responsible partners and negotiation pertaining to implementation arrangements and co-financing.

The workshop was also used to present the intended scope of the project (as cleared by LDCF/Council) to the technical and financial partners and to exchange ideas on strategies to elaborate, implement and develop a sustainable activity towards strengthening the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructures and economic livelihoods in Sierra Leone. Annex II shows the agenda for the workshop.

The workshop involved fifty-three participants (Annex III) from organizations ranging from government agencies with key roles to play in the LDCF project, experts working on marine and coastal biodiversity, academics and civil society organizations as well as UN agencies, the local Universities, local Press and bi-lateral cooperation Partners. The Workshop included a Working session during the second part involving all participants divided into three Working Groups (Annex IV).

Opening statements and introduction presentations were held to provide the necessary background information and framework for subsequent group discussions and feedback. Working Groups were set up with experts dealing with different project baseline issues, which were grouped into three main themes. The summary results obtained from each of the three working groups on the discussion conducted around each of themes proposed are shown below (for detailed working group reports see Annex V).

Activity 2: Bilateral Stakeholder Consultations

In addition to the national Stakeholder Consultation Workshop, consultations were carried out through bilateral meetings with key representatives of bilateral/multilateral organizations represented in Sierra Leone. Therefore, the following stakeholders were approached:

United Nations Development Programme, UNDP

The Ministry of Local Government and Rural Development

The Ministry of Youths and Sports

The Sierra Leone Tourist Board

The Ministry of Tourism

National Protected Area Authority

The Ministry of Fisheries and Marine Resources

The Office of National Security

The Sierra Leone Maritime Administration

The Meteorological Department, Sierra Leone

The Environmental Protection Agency, Sierra Leone

The Office of the European Community Delegation in Sierra Leone

The Institute of Marine Biology and Oceanography

The purpose of these meetings was to inform the relevant institutions and departments of the scope of the proposed LDCF project, to understand the role of key information and coastal adaptation actors, elicit details that could be factored into the LDCF project during the design phase so as to ensure that the LDCF financed project coordinates and complements other ongoing and planned initiatives. Full report is found in Annex VI.

Activity 3: Site Assessment - Field Visits

During project implementation, a strategic partnership will be developed with the above projects listed in Section 2.3.2 in order to complement their activities. Therefore, the proposed LDCF will establish pilot sites where will collaborate with above projects to test the effectiveness of Community based Coastal EWS units that will support seasonal weather, climate and marine forecasting for coastal communities and disaster management activities.

The demonstration sites were identified through an extensive consultative process held at both the national, District and community levels. During the stakeholder consultation process undertaken during the project inception phase between 15th and 25th May 2016, the interviews with community members and NGO's and CBO' carried out during the Field Assessment Activities that took place between 17-23rd August 2016 and one national workshop for Validation of Project Document on April 12th, 2017, as well as a series of bilateral meetings with GoSL and International Institutions, discussions were conducted to identify a list of potential demonstration sites for the project (Figure 2).

Figure 2. Map of Locations of Project Pilot Sites[70]

Priorities were drawn for these sites according to their importance in relation to the vulnerability of coastal communities, the magnitude of sea level rise-induced risks of flood and costal erosion process, and impacts on the livelihoods of local communities. Therefore, the following criteria were used to select pilot sites for community-based interventions:

Poverty level and population size.

Prevalence of unemployment among women and youth.

Level of coastal degradation and exposure to climate change-induced risks (sea level rise, coastal erosion)

Impact of climate variability to community livelihoods;

The need and potential for installation of Weather and Marine monitoring stations; and

Potential synergy with ongoing relevant projects;

Cost-effectiveness of site-specific soft adaptation measures.

Site Assessment

The Freetown Peninsula

[70]*Konakridie* in the Kaffo Bullom (Lat. 8°41'58.13"N; Long 13°14'24.86"W; 3m alt)); *Lakka* (Lat. 8°23'45.39"N; Long 13°16'0.35"W; 5m alt); *Hamilton* (Lat. 8°23'13.59"N; Long 13°15'45.27"W; 3m alt); *Tombo* (Lat 8°12'50.06"N; Long 13° 5'49.64"W; 3m alt);*Shenge (Lat.* 7°54'02.20"N; Long 12° 56'26.89"W; 6m alt); and *Turtle Islands* (*Lat.* 7°38'11.90"N; Long 13° 03'21.09"W; 3m alt);

Aberdeen Creek site: The Team observed how community members led by EPA and partners (forestry/Agriculture, tourism, MFMR, NPAA). Institutions are presently carrying out mangrove reforestation. However, the poor current structure that has been set up for replication of vegetative material and the general deficient organizational conditions under which these activities are being carried out in the field and the size of the area targeted by these mangrove reforestation activities need to be supported by the LDCF project so to extend the target area in terms of size and also set up proper and technically sound nurseries for replication of vegetative material as well as increase the number of community members involved with youths and women.

Plate 3. View of the mangrove forestation area (left) and; current structure for replication of vegetative material (right).

Key Findings and Specific Needs:

Ecosystem Based Approach Adaptive measures (establishment of native, locally adapted local vegetative species (grass and plants)

Extension of the target area for mangrove reforestation in terms of its size

Nurseries for replication of vegetative material

Increase the number of community members

Awareness raising and community sensitization

Technical guidance

Lakka and Hamilton sites: The site visit to Lakka confirmed the existence of serious sea coastal erosion due to long time sand extraction leading to the degradation of coastal infrastructure.

Plate 4. View of the degree of coastal zone retreat and eating up of infrastructures (left) and; natural wave breakers made of rocks (right) at Lakka.

This is clearly threatening general communities' livelihood as they have been losing revenue due to low touristic activity. Increasing risk of beach loss as a result of inadequate beach protection measures. Interestingly some natural wave breakers made of rocks can be seen in one side of the beach.

Hamilton. The same pattern of coastal degradation with signs of Intensive erosion due to sand extraction. Fish was being unloaded at beach with no access to landing site for fishermen.

Plate 5. View of the degree of coastal zone retreat and eating up of infrastructures (left) and; Intensive beach erosion due to sand extraction and sea level rise (right) at Hamilton.

At both sites the Consultants were informed of the current acute youth unemployment and the high demand for sand in building/construction business leading to their adhesion to sand mining activities.

Key Findings and Specific Needs:

A combination of hard and soft measures to arrest the coastal erosion threat

Require some kind of protection to stabilize the beach. Perhaps some kind of wave breakers at the coastal waters.

Awareness raising and community sensitization

Alternative livelihoods for youths and women groups

Mini landing sites for the fishermen particularly at Hamilton

Alternative livelihoods by setting up a Centre for Skills Development (CSD's).

Tombo: This was the fourth site to be visited and the coastal scenery and problems were similar to those observed at Lakka and Hamilton sites: intense degradation of the coastline by both human activities (mangrove cutting and sand mining) and sea level rise wave activity with severe beach erosion.

Plate 6. View of the community attempt to fight against coastal/beach erosion (left) and; the lack of supporting infrastructure to fishing activities with the product being unloaded onto the soil (right) at Tombo.

As Tombo is traditionally a fishing community, a large part of its population is directly depended to coastal resources. There are about 250 large boats each carrying on average 25 fishermen (6,250) and almost a similar number of people from Bo, Kenema, Makene (including women and youths) involved in the handling, transaction and transformation of fisheries products. They are organized within an Umbrella Union (The Sierra Leone Artisanal Fishermen Union – SLAFU). The population tried to fight against coastal erosion with their own resources using large stones, an insufficient measure to deter sea water wave activity. There are also a considerable number of youths unemployed with no skills, which are presently earning income through sand mining. Therefore, there is a need to support with creativity this community with alternative livelihoods.

Key Findings and Specific Needs:

Semi- hard measures to complement the community's own initiative of coastal protection and arrest the coastal erosion threat

Installation of an extended fishing landing point along 500m of coastline

Awareness raising and community sensitization

Alternative livelihoods for youths and women groups including microfinance products if possible

Infrastructures to support fishing communities to enhance their livelihoods such as solar powered cold storage facilities to preserve the surplus, fish stands, hygienic fish cleaning facilities, etc.

Extension of Coastal Early Warning System (CIEWS) with strong response/recovery component.

CIEWS dissemination component strengthened with support of solar powered local FM Radios.

Conakry Dee - Conakry Dee, in the Port Loko distruct: This was the fifth site to be visited located further north. Similar to Tombo this is an essentially fishing community with about 275 fishing vessels of mix size. Some large boats carrying a crew of 30 and other smaller ones (canoes) carrying 3-4 people. On average

it is estimated that the average size of the fishing community is around 2,000 fishermen plus about 1,000 other people involved in the handling, transaction and transformation of the product.

Additionally, there are a significant number of people dedicated to rice farming and vegetable gardening. There is a strong Women & Fisheries Association Unit dedicated to fish smoking using mangrove logs. FAO have in recent past years built a small fish-smoking house where they work. However, there are serious concerns amongst the community on the continuation of using such facilities and the mangrove logs due to Polycyclic Aromatic Hydrocarbons (PAH), which are released when mangrove logs are burnt for fish smoking. This is extremely hazardous as these PAH can stick on the fish and it can cause cancer related health issues to women exposed and to those eating the product[71]. Therefore, there is a need to support this community to try and lessen the impact of this activity, perhaps through a better ventilated premise and/or use of alternative fuel material (seaweed/sargassum briquettes) or even use of filters to minimize the impact[72].

Plate 7. View of the beach with some of the community fishing fleet (left) and; the coastal erosion signs where the landing point use to stand (right) at Conakry Dee.

This community has also seen the involvement of Community Action for Restoration of Life (CARL) in some kind of microfinance activity. Other supporting actions that he LDCF could eventual contribute are similar to Tombo in relation to Infrastructures to support fishing communities to enhance their livelihoods such as solar powered cold storage facilities to preserve the surplus, fish stands, hygienic fish cleaning facilities, etc. In addition, given that the nearest local FM radio is at Yongro near Lungi About 16km away the Extension of Coastal Early Warning System (CIEWS) should also be considered the provision of signal strengthening devices so to be able to disseminated warnings and weather alerts to the fishing community at Conakry Dee.

Key Findings and Specific Needs:

Semi- hard measures to complement the community's own initiative of coastal protection and arrest the coastal erosion threat

[71] Stołyhwo, A., and Sikorski, Z. E. (2005). Polycyclic aromatic hydrocarbons in smoked fish – a critical review. Food Chemistry 91, 303-311.

[72] Essumang, D. K., Dodoo, D. K., and Adjei, J. K. (2014). Effective reduction of PAH contamination in smoke cured fish products using charcoal filters in a modified traditional kiln. Food Control 35, 85-93.

Installation of an extended fishing landing point along 500m of coastline

Awareness raising and community sensitization

Alternative livelihoods for youths and women groups including microfinance products if possible

Infrastructures to support fishing communities to enhance their livelihoods such as solar powered cold storage facilities to preserve the surplus, fish stands, hygienic fish cleaning facilities, etc.

Extension of Coastal Early Warning System (CIEWS) with strong response/recovery component.

CIEWS dissemination component strengthened with support of solar powered local FM Radios.

Conclusions

The Inception Mission has given the opportunity to launch the activities of the project and to be able to have the LDCF initiatives identified in the PIF endorsed by the bilateral/multilateral organizations and Academia contributing towards the design phase of the project.

Field trips to potential project sites were undertaken by the International and National Consultants to assess the physical and socio-economic conditions of two of the potential Project pilot sites communities and numbers of direct beneficiaries of the Community Based Coastal EWS (CBEWS). These site visits were carried out during May to October 2016 with the objective of assessing the physical and environmental and socio-economic conditions of proposed project site, namely; i) Pre-inception field assessments of project sites carried out on the 20th and 21th May; ii) Community Livelihood Vulnerability Assessment was carried out between 21st and 23rd August to Turtle Islands and Shenge/Plantain Islands communities; iii) A gender vulnerability assessment was conducted between 3rd and 8th of August in the potential demonstration sites engaging coastal communities in the Western Area, including Lakka, Hamilton, Tombo and Conakry Dee in Port Loko District; iv) Socio-economic assessment of Communities undertaken between 21st and 23rd September in the northern coast and beaches along the Western Area Peninsula, and Yawri Bay, The northern regions of Kambia and Conakry Dee including field consultations undertaken to Turtle Islands and Shenge/Plantain Islands communities to allow the collection of the wealth indicators for the pilot sites; v) a pre-feasibility assessment of proposed project activities undertaken during September month at the same sites of Lakka, Hamilton, Tombo and Conakry Dee in Port Loko District and including the Turtle Islands archipelago of six islands west to North West of the Bonth Island, in the Diema Chiefdom, Bonth District, in the Southern Province of Sierra Leone.

All the information and data collected through the various field consultations and assessments were summarised in Table 10 which shows project pilot sites information on main risks, vulnerabilities, community livelihoods, numbers of direct beneficiaries and preferred adaptation initiatives.

Table 10. Project pilot sites information on main risks, vulnerabilities, community livelihoods, numbers of direct beneficiaries and preferred adaptation initiatives.

Pilot Site	Population Youth Women	Main Climate Change Impacts*	Main Risks/ Vulnerability*	Main Livelihoods*	Special Features	Preferred Adaptation initiative
Conakry Dee	23,700	Strong winds Strong wave activity, Floods Drought	Coastal erosion Depletion of fish stocks Sargassum invasion Sand mining	Fishing Fish Smoking Sand mining Zircon mining	Fresh Water Scarcity Waste management issues Sargassum	Fish post-harvest value chain adaptation package *New skills in agriculture* *Water Sources*
Lakka	15,000	Strong wave activity, Strong winds Floods	Coastal erosion Sargassum incursion Depletion of fish stocks	Sand mining Fishing Ecotourism Charcoal production	Sargassum Fresh Water Scarcity	*Centre for Skills Development (CSD)*
Hamilton	15,000	Strong wave activity Strong winds Floods	Coastal erosion Sargassum incursion Depletion of fish stocks	Sand mining Fishing Charcoal production	Sargassum Fresh Water Scarcity	*Centre for Skills Development (CSD)*
Tombo	33,979	Strong winds Strong wave activity Floods Drought	Coastal erosion Depletion of fish stocks Sargassum incursion	Fishing Trade Farming	Fresh Water Scarcity	Fish post-harvest value chain adaptation package
Shenge	20,000	Strong wave activity Strong winds Floods	Coastal erosion Mangrove deforestation Depletion of fish stocks	Fishing Zirkon mining Petty trade Tourism	Mangrove exploitation Waste management issues	*Communal Centres for Coastal and Marine Resources Transformation (CCMART's)*
Turtle Islands	8,526	Strong wave activity, Strong winds Floods	Coastal erosion Mangrove deforestation Saltwater intrusion of freshwater supplies Depletion of fish stocks	Fishing Eco-Tourism Petty trade	Sea water intrusion Waste management issues	*Communal Centres for Coastal and Marine Resources Transformation (CCMART's)*
TOTAL	116,205					

*Priority ranked

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 (Table 11). 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). Loss of land as result of sea level rise can occur from erosion of sandy shores and erodible cliffs, the retreat of the shoreline results from the offshore transport of sand. On the northern section of the Sierra Leone coast, sea level rise may have an insignificant impact as result of the cliffed nature of the shoreline (e.g. Conakry Dee) where cliff erosion of lateritic like material is ongoing. Land loss from low-lying coast sheltered from wave attack will suffer most as a result of inundation. The most vulnerable wetlands are those of the Kambia district and areas of the Western area (Freetown). The northern coast around Kambia and the low beaches of the Western area are particularly vulnerable. The land at risk includes significant areas that are currently wetland and substantial amounts of mangroves (approx. 183,782 ha) and Sandy beaches/Intertidal mudflat (50,459 ha).

Table 11. Impacts on Ecosystems (Coastal Habitats and Biodiversity)

Morphological unit	Ecosystem at risk	Area at risk (ha) H, M, L	Assets at risk	Vulnerability Assessment H, M, L
Unit1 Guinea border to the Southern banks of the Scarcies	Mangroves	13.007	Coastal /Residential Structures	H
	Sandy beaches/Intertidal mudflat	10,000	Infrastructure	H
	Rocky shores		Tourist/ Commercial facilities	L
	Great & Little Scarcies		Industrial facilities	L
Unit 2 Bullom Peninsula	Mangroves	34.234	Residential Structures	H
	Sandy beaches/Intertidal mudflat	26,125	Infrastructure	H
	Sierra Leone River Estuary		Tourist/Commercial/ Industrial Facilities	M
Unit 3 Freetown Peninsula	Mangroves	7.189	Residential Structures	H
	Sandy beaches/Intertidal mudflat	5,234	Infrastructure	H
	Rocky shores		Tourist facilities	H
	Bays		Commercial facilities	M
	Sierra Leone River Estuary		Industrial facilities	M
Unit 4 Yawri Bay	Mangroves	29.505	Residential facilities	H
	Sandy beaches		Infrastructure	L
	Rocky shores		Tourist facilities	H

	Intertidal mudflat	9,100	Commercial facilities	M
			Industrial facilities	L
Unit 5 Sherbro Area	Mangroves	99.854	Residential facilities	H
Unit 6 Turners Peninsula	Sandy beaches		Residential facilities	H
TOTAL	Mangroves	183,782		
TOTAL	Sandy beaches/Intertidal mudflat	50,459		

The estimated land at risk as a result of sea level rise and accelerated coastal erosion is presented in Table 12 as a result of the Vulnerability Assessment of Morphological Units. A total of 170.9 km2 is estimated to be lost if nothing is done. As the figures indicate most of the affected areas are within the northern and southern coasts.

Table 12. Vulnerability Assessment of Morphological Units

Morphological unit	Major coastal towns/settlements	Population at risk	Land at risk (km^2)	Vulnerability Assessment H, M, L
Unit1 Guinea border to the Southern banks of the Scarcies	Kambia	268,671		H
	Port Loko	105,007	3.0	H
Unit 2 Bullom Peninsula	Mahera	233,839	6.7	H
	Lungi	337,055	9.6	H
Unit 3 Freetown Peninsula (Atlantic coast)	Lumley	317,729	9.1	H
	Lakka	186,231	5.3	H
	Hamilton	183,266	5.2	H
	York	329,344	9.4	H
	Kent	243,051	6.9	H
Unit 4 Yawri Bay	Tombo	84,467	2.3	
	Shenge	469,776	13.4	
Unit 5 Sherbro Area	Sherbro Island	3,515,812	100	

Unit 6 Turners Peninsula				
TOTAL		6,274,248	170.9	

The beaches, which have suffered from this activity, include Lumley, Goderich, Lakka and Hamilton (Johnson & Johnson 19….). The low-lying coasts of the Western area peninsula will be affected by sea level rise. The beaches here are mainly medium to coarse sand and most of the Risk Zone is sandy. The population density within this segment of coast averaging about 120 persons per square kilometre is high compared with the national average of 67 persons per square kilometre. The impacts of sea level rise can be expected from the effects of erosion, flooding and inundation, which are already occurring and devastating communities. Land loss as a consequence of sea-level rise will displace the population within the Risk Zone if no action is taken to protect the area. Accurate determination of the population involved will demand counts of people living in the vulnerable areas. In the absence of this data, appropriate population parameters are combined with information on land area that will be lost due to erosion and inundation to determine the population displaced. From the Vulnerability Assessment of Morphological Units shown above the estimated number of people directly at risk that will be impacted both by inundation and shoreline recession reaches a total of around 2,305,860. Most of this population is within the northern and southern regions of the Sierra Leone coastline (see table) and represent a good proportion of the population within the coastal zone. Given that estimates indicate that the population of the six pilot sites reaches over 100,000 people (Table 10) the conservative estimate of the total number of people who will directly benefit from the project investments are at least 2,305,860.

2. Key Findings

2.1 National Stakeholder Consultation Workshop

Results on the Working Group discussion:

Group 1.

Theme: Climate change Adaptation baseline: including identification of current and past projects addressing climate change coastal adaptation, as well as responsible institutions and respective project sites.

Institutions	Identified Projects	Project sites
EPA-SL	“Coastal and marine oil spill sensitivity and mapping”.	Coast of SL
EPA-SL	“Integrated coastal zone management plan”	Coast of SL
EPA-SL	“State of the marine environment”	Coast of SL
EPA-SL	“Land use/land cover mapping for SL”	Nation wide
EPA-SL	“Re-vegetation of the Aberdeen creek”	Aberdeen Ramsar site
SLMA	“National oil spill contingency plan”	Coast of SL
MET	“Early warning system on climate change”	Nation wide
MAFFS/NPAA	“Wetlands conservation Project”	SL River Estuary

		Wetlands/
CEFCON-SL/CAN-SL	"Awareness Raising on adaptation measures to climate change"	Magazine wharff, Congo Town Wharff, Regent, Ogo Farm, Laka
NFORAC	WAPFOR "Responsible Eco Tourism" "Sea Turtle and migratory birds nesting project" "Mangrove planting"	SL River Estualries, Tombo, John obay/Bureh Town, Hamilton/Sussex, Yelibuya and Shabro Island

Group 2.

Theme: Land-Use and Policies: including Identification of main issues in land-use/planning in coastal zones; appropriate engineering designs for coastal stabilization; gaps in current policies; main vulnerabilities to be addressed by the coastal erosion risk profiles; training needs for policy-makers.

Identified Issues for Discussion	Working Group 2. Discussion Results
Land –use planning guidelines	There is a land-use policy that can be accessed from the Ministry of Lands, Country Planning and Environment.
Main vulnerabilities to be addressed by the coastal erosion risk profiles	Coastal infrastructural damage Sand mining Coastal deforestation Flooding Wind & storm Seaweeds
Key legislations to be reviewed	Draft Wetlands Act, 2015 Crown Lands Ordinance, 1961
Existing preliminary assessment of appropriate engineering designs for coastal stabilization	Not aware of any preliminary assessment of appropriate engineering designs for coastal stabilization
Gaps in current Policies/Coordination Mechanisms for Coastal Adaptation	Weak institutions/implementation mechanisms Poor enforcement of policies Conflicting mandates i.e. EPA and Ministry of Lands, Country Planning and Environment Weak and out-dated policies
Key training needs for policy – makers.	Capacity building
Identification of Potential Project Sites – selection and justification	Western Area Peninsular Coastline – due to sand mining Yawri Bay - coastal biodiversity conservation

Group 3.

Theme: Gender issues: including identification of projects involving gender mainstreaming, proposal for potential indicators for gender mainstreaming; identification of potential project risks.

Identified Projects involving gender mainstreaming	Institutions involved
"Aberdeen creek project planting of mangrove"	Implementing Agency: EPA and partners (forestry/Agriculture, tourism, MFMR, NPAA.
"Mangrove project of Orugu Project"	Implemented by FAO, Ministry of Agriculture
"Awareness raising project on climate change adaptation in Tombo fishing communities on the use of mangrove as source of energy for fish processing"	Implementing partners: Ministry of Agriculture and Fisheries
"Sea weed project"	Implementing partners: (NTB, MTCA, EPA, NPAA, MFA,
DEPHE project (Alleviating poverty and enhancing gender Quality in coastal communities in Sierra Leone:	Implementing partners: Britsh council and USL-IMBO)
Lumley beach reclaim nation project:	Implementing partners: (NTB, MTC). Women united project: implementer- Girl child Network sierra Leone.
Project development issues	**Contributions from the 3rd Working Group**
Proposed Potential Indicators for Gender mainstreaming	Acreage of mangrove planted Acreage of ecosystem restoration Number of women and men employed by the project Level of diversification in farming system Number of women using domestic plants as energy for fish processing Number of gender tourist guards. Change in number of tourist guards Change in number of tourist activities per communities Acreage of fire wood plantation created for domestic energy Level of diversity in art and craft articles
Assessment of project feasibility	Project is feasible because it has been successively implemented by other organizations mentioned above.
Assess and identify risk of the project	Availability of fund Political will Capacity of the communities to adapt to the project Unfavourable natural conditions: Instability (civil unrest)

2.2 Results from the Bilateral Discussions

The Ag. Deputy Director of Fisheries in the Ministry of Fisheries and Marine Resources:

Informed of the setting up of Community Management Associations within the various declared Marine Protected Areas (MPAs) facilitated by the WARF project;

Highlighted the need to train women in fish processing techniques and the return of the Cooperatives.

The General Manager of the SL-Tourist Board

Raised concern about the recent occurrence of the sargassum seaweed on the Sierra Leone shores posing a serious threat to the tourism industry.

The UNDP Team Leader Saskia Marijnissen:

Stressed the need to focus on the ecosystem based approach on setting up coastal adaptation strategy rather than on "hard measures";

Advised the Team to engage with UNEP on mangrove habitat restoration during the project development.

The Ministry of Local Government and Rural Development:

Welcomes the support of the project for the development and delivery of climate change awareness campaign strengthening the Ministry paradigm shift in the management of natural resources to local communities which requires their involvement in the protection of the environment;

Acknowledges the activities of youths regarding sand mining and mangrove cutting amongst others and the risks climate change pose to their wellbeing and the need to adapt to the adverse consequences;

The Tourist Board:

Informed about plans to develop tourist facilities all along the coastline targeting ecotourism products in particular;

Informed of their concerns in relation to widespread sand mining, mangrove cutting and in particular the periodic invasion of our beaches by the sargassum seaweed which poses a serious threat to the industry.

The National Protected Area Authority (NPAA):

Informed of plans to carry out rehabilitation of degraded mangrove areas along parts of the Sierra Leone River estuary and Aberdeen Creek in collaboration with the Environment Protection Agency, Sierra Leone;

NPAA also expressed the need for the LDCF project to identify alternative livelihood to sand mining from the beaches;

NPAA informed of the lack of sea level rise and coastal erosion risk and vulnerability mapping.

Office of National Security (ONS):

Expressed concern about the rate and level of degradation of coastal areas of the country and the challenges being faced by the law enforcement agencies in protecting the environment.

The Executive Director SLMA:

Highlighted the importance of monitoring the coastline of the country for Climate Change Adaptation initiatives;

Underscored the readiness and willingness of SLMA to collaborate with the project in the setting up of monitoring facilities in the coastal zone including water quality, and their strategic position in offering protection to any equipment that might be installed in locations under their responsibility.

The Meteorological Department (SLMD/A):

Expressed the willingness to support the LDCF project, sharing some of the training and monitoring initiatives with their own sister LDCF project as well as the intended idea of extending the Early Warning System into the coastal zones.

The Executive Chairperson, Environmental Protection Agency (EPA):

EPA expressed satisfaction for the start of the LDCF and requested contribution to Vulnerability and climate change coastal erosion risks mapping using GIS systems to support mainstreaming of Climate Change onto key country legislation;

EPA informed the need to support training programmes for their staff;

EPA recommended emphasis on the Ecosystem-Based Approach (naturalised, domesticated, native, and non-evasive) on Coastal Adaptation rather than on the "hard measures".

EPA expressed concern on the seasonal invasion of local beaches by the sargassum seaweed and requested contribution from the LDCF project towards the development of an adaptive solution to this phenomenon.

The EU representative:

Informed of all EU funded projects in Sierra Leone in addition to the Regional initiatives for co-financing mechanisms;

The EU informed of their support to the Regional Decade for West Africa which focuses on natural resources and the fight against desertification, restoration of the mangroves as well as the coastal region and climate change related projects within the context of regional collaboration73.

Institute of Marine Biology and Oceanography (USL-IMBO):

Informed of their willingness to cooperate with the LDCF particularly in matters related to sea costal monitoring and vulnerability and risk assessment and sensitivity analysis;

Expressed their full support for the extension of Costal Early Warning System that the LDCF project is prepared to carry out;

IBMO expressed concerns on lack of resources particularly in relation to key monitoring equipment, scientific material and training for their technical staff.

(For summary of all relevant comments and advice noted from the bilateral discussion see Annex VII).

[73] https://ec.europa.eu/europeaid/sites/devco/files/eeas-2015-rip-west-africa_fr.pdf

Annex 4. Gender Analysis for project sites

GLOBAL ENVIRONMENT FACILITY
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GENDER ANALYSIS FOR THE DEVELOPMENT OF GEF LDCF PROJECT ON CLIMATE CHANGE ADAPTATION AND COASTAL ZONE MANAGEMENT IN SIERRA LEONE

REPORT

FREETOWN
AUGUST, 2016

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Executive Summary

Sierra Leone is one of the countries in Sub-Saharan Africa that is hard hit by climate change due to its geographical location. Thus, different levels of adaptation measures are urgently needed to cope with the impacts of climate change on the country. These must be gender-sensitive, considering the differentiated roles women and men play in rural and coastal areas. In recognition of the need to adapt to the new environmental conditions, the Government of Sierra Leone (GoSL) has reformulated the national legal and institutional framework to deal with climate change. Because the existing environmental legislation is not conducive for the mainstreaming of climate adaptation, its contribution to mainstreaming a gender perspective into climate change adaptation is still not realized.

Thus, this study was conducted as part of a GEF project funded by UNDP Sierra Leone. Its aim was to investigate gender differentiated impacts of climate change at a proposed site in the coastal zone of Sierra Leone. However, this research also looked at the Western Area and Port Loko District in Sierra Leone. The research questions under the study were:

Are women and men in the investigated communities differently impacted by climate change?

How are women and men differently impacted by climate change?

What are the physiological, political, economic and social causes for the differences?

What are the current coping and adaptation strategies and capacities to climate change?

How can the capacity of women and men be strengthened to better adapt to climate change?

To achieve the above objectives, a qualitative study of a combination of various data collection and analysis methods was conducted. Data collection included informal and semi-structured interviews of households and key informants (traditional and government chiefs and heads of local associations), focus group discussions and documentation of life histories of the most elderly women and men in the communities. Data analysis also included a combination of tools such as Gender Matrix Analysis (GMA), Impact Assessment, Influencing Factors, Institutional Analysis, Access and Control, Social Profiles, Capacity and Vulnerability Analysis, and Needs Assessment.

Gender analysis was conducted in four (4) communities over two (2) districts. Three of the communities were in the rural Western Area of Sierra Leone (these communities are coastal zones which is vulnerable to various climate change). The communities were selected based a series of agreed criteria; including being rural, poor, vulnerable and facing climate change effects.

The main results of this study showed that: 1) Women and men are differentially impacted by climate change/variability, which is related to the current power relations and differentiated roles in the communities; 2) Women have access to, but not control over, natural resources and other property rights; 3) While women do most of the reproductive and part of the productive work, men are only responsible for productive work in the communities.

Successive high wet and dry seasons, see weeds, storms and flash floods in the communities in the last two years have accelerated the migration of men in search of greener pasture. This has considerably increased women's role in productive work in the last two (2) years. For example, women's participation in trading of alcoholic drinks and in raising small ruminants in Conakry Dee, Tombo and Hamilton has increased in the last two years. This has increased pressure on women who have to spend extra time for productive work at the expense of reproductive work and time spent with kids. On the positive side, men's migration has enhanced women's participation in decision-making structures. This is especially evident in Conakry Dee and Hamilton communities, where migration is more intense and therefore women have gained better positions in the decision-making structures. But as this issue was not deeply explored in this study, it was recommended that future studies do so.

A number of coping and adaptation strategies deployed in the communities include alternative sources of food, such as informal (charcoal, farm, livestock and daily-wage) and formal (migration) jobs and adoption of different lifestyles. In terms of formal and informal organizations for discussions of environmental problems, Tombo, Hamilton and Lakka communities were better organized than Conakry Dee. However, Conakry Dee and Tombo have a better representation of women in decision-making structures through strong Local Council Ward Committee membership and Elderly Advisory Groups.

There is a general consensus amongst policy-makers and academics on four (4) ways to strengthen the capacity of women and men for a better adaptation to climate change. These included: 1) implementation

of existing policies and programs; 2) allocation of resources; 3) capacity building; and 4) reinforcement of women's participation in local institutions.

Due to the key played in the communities, women should always be considered a priority group in any activity. Since agriculture is the mainstay of women in the communities, it was strongly recommended to focus on capacity building of women in agriculture, agro-processing and pastoral techniques through, for example, the creation of farmers' clubs, the creation and enforcement of local institutions and discussion forums, and the formation of an environmental multi-institutional task force (including EPA, Ministry of Lands, Ministry of Agriculture Forestry and Food Security, Ministry of Youth and Sports, ONS, Fisheries, etc.).

Introduction

The projected most striking impacts of climate change over West Africa are increases in the frequencies and severities of extreme hydrological events such as droughts, floods and storms. Due to its geographical location, Sierra Leone is at high risk of being affected by climate change and climate variability. Located on the West Coast of Africa, Sierra Leone has a total area of 71,740 km2 and with an estimated population of 6 million. Average annual temperature in the country has increased by 0.8 °C since 1960 and that of temperature is projected increase by 1.0–2.6 °C by the 2060s (McSweeney et al., 2010). Other projections also suggest a substantial increase in the frequency of days and nights considered 'hot' under the current climatic conditions.

Sierra Leone is a member of the group of Least Developed Countries (LDC) in the United Nations Framework Convention on Climate Change (UNFCCC). According to World Health Organization (WHO), flooding now poses the biggest threat to health in Sierra Leone as it increases exposure to water-borne diseases such as cholera, diarrhea and dysentery. Sanitation, storm water drainage and sewage disposal are often disrupted by flood events (MTA, 2007).

Although projections of average annual rainfall vary over different models, it tends towards an overall increase, particularly in the latter half of the year (McSweeney et al., 2010). Regional model studies suggest an increase in the number of days with extreme rainfall over West Africa. Seasonally, this varies between a decreasing tendency in January to March and an increasing one in the latter half of the year. The frequency and duration of cholera outbreaks are associated with heavy rains, especially in coastal West Africa. This implies that Coastal Countries in West Africa will experience a significant negative impact of climate change, including increased frequencies of cholera outbreaks in the affected sub-region.

Also in West Africa, fisheries depend mainly on coastal upwelling. This ecosystem will be affected by climate change and climate variability through ocean acidification, sea surface temperature rise and changes in upwelling. Some scenarios of the International Panel on Climate Change (IPCC) have projected a 21% decline in annual landed value of fish by 2050. This will result in nearly 50% decline in fishery-related employments and in a total annual loss of US$ 311 million to the economy West Africa (IPCC, 2014). Thus, in recognition of the need to improve the capacity to overcome the consequences of slow progress to develop strategies to adapt to climate change, the Government of Sierra Leone (GoSL) with support of GEF reformulated and created a series of National Legal Instruments. These efforts are further supported by a series of the Rio Conventions ratified by Sierra Leone, including the United Nations Convention to Combat Desertification (UNCCD) and United Nations Framework Convention on Climate Change (UNFCCC).

Irrespectively, the national policy-making body for climate change in Sierra Leone has failed to adopt gender-sensitive strategies in policy decisions. This failure has not only generated concern in terms of respect for gender equity at international level, but has also strengthened the shortcomings in climate-related measures and instruments in the country. While the discourse on gender and climate change is maturing quite rapidly, very little groundwork has been done in Sierra Leone (and very much so in the whole West Africa), resulting in quoting the same sources and examples by most publications and reports. It is therefore critical to understand the need to build a Gender Differentiated Impact of climate change and the existing Coping Strategies which must be supported and strengthened.

Thus, this study is part of a GEF Gender Analysis Project developed to investigate Gender Differentiated Impacts of Climate Change in Sierra Leone. Specifically, the project will cover selected coastal towns in the search to address the following research questions:

- Are women and men in Sierra Leone differently impacted by climate change?

- If yes, then how women and men are differently impacted?
- What are the causes (physiological, political, economic and social) for the differences?
- What coping and adaptation strategies and capacities currently exist in coastal communities?
- How can women and men's capacity be strengthened to better adapt to climate change?

This study was funded by UNDP Sierra Leone. As the emphasis of UNDP is on Gender Integration in project developments, it is in a unique position to provide new and cutting-edge ideas on mainstreaming gender aspects into climate change and climate variability. Furthermore, as an organization that promotes Gender Equality and Women Empowerment, the information so generated can and must be used to influence policy and decision makers to take into account the gender aspects of climate change at national level.

Literature Review

2.1. Geographic and socioeconomic framework

Sierra Leone is located on the West Coast of Africa between the 7th and 10th parallels north of the Equator and the 10th and 13th verticals west of the Greenwich Meridian. It is bordered by Guinea to the north and northeast, Liberia to the south and southeast and the Atlantic Ocean to the west. With a total area of 71,740 km2, 99.8% (71,620 km2) of the country is land and 0.2% (120 km2) under water.

Geographically, Sierra Leone has four (4) distinct regions — coastal Guinean mangroves, wooded hills, upland plateau and the eastern mountains. Eastern Sierra Leone is characterized by large plateaus that are interspersed with high mountains, where the highest mountain (Mount Bintumani) rises to 1,948 m. Administratively, Sierra Leone is divided into four (4) provinces that are in turn divided into twelve (12) districts (Figure 1, Annex 3), with the major urban centers organized into six (6) municipalities.

Sierra Leone has made a substantial progress in its socio-economic indicators since the end of the war, moving 10 places upwards from the unenviable human development position it held a few years ago. Despite this progress, significant challenges remain in socio-economic development, which is persistently fragile. Results from the 2011 Sierra Leone Integrated Household Survey (SLIHS) indicate a decline in poverty rate from 66% in 2003 to 52.9% in 2011, with the decline being more in urban than in rural areas. Underlying this poverty reduction was an annualized 1.6% per capita increase in real household expenditure from 2003 to 2011. Also, urban poverty declined from 46.9% in 2003 to 31.2% in 2011 and district-level poverty analysis showed that most districts converged to a poverty level of 50–60% in 2011. In relation to the decline in poverty, 20.7% and 64% of the households in the top two quintiles are in Freetown (the capital city) and the urban areas of Sierra Leone, respectively.

Sierra Leone is considered by the UN classification as a Least Developed Country (LDC) with a significant inequality in income distribution among its people. While it has substantial mineral, agricultural and fishery resources, its economic and social infrastructures are not well developed, hampering economic development. Furthermore, unsustainable practices of agriculture, forest exploitation and mining have led to environmental degradation, causing serious climate-change-induced disasters that in turn affect the development of the country. Economic and social development processes are sluggish and fragile, making the country vulnerable to national and international pressures. Efforts to improve the quality of life of its people are hampered by extreme poverty, structural weakness in the economy and the lack of capacity related to the weak growth and development.

Sierra Leone has a substantial deposit of mineral resources such as diamond, rutile, titanium, bauxite, iron ore, gold and chromium. According to Statistics Sierra Leone (2004), the average population density is about 75 inhabitants per square kilometers. Life expectancy at birth is 41.1 years, fertility rate (i.e. births per woman) is 6.5 and infant mortality rate is 165.4 per 1,000 live births.

The wet season is largely controlled by the movement of the Tropical Rain Belt, also known as the Inter-Tropical Conversion Zone (ITCZ), which oscillates between the northern and southern tropics over the course of a year and therefore affects Sierra Leone when in the northern tropics. When in the northern tropics, the dominant winds (the westerlies) blow moist air from the Atlantic Ocean onto the continent. This pattern is referred to as the West African Monsoon, which causes exceptionally high rainfalls on the coastline of western Africa in the wet season. Monthly rainfall in coastal Sierra Leone can exceed 1000 mm, but drop rapidly inland to around 300 mm in the east. In winter, the dominant winds (the Harmattan) blow dry and dusty conditions from the Sahara Desert. Seasonal rainfall in the region varies considerably at inter-annual and inter-decadal timescales due in part to variations in the movement and intensity of the ITCZ

and also to variations in the time and intensity of the West African Monsoon. The most well documented cause of the variations is the El Niño Southern Oscillation (ENSO), which events are associated with drier conditions in West Africa.

2.2. Political and institutional framework

The Legal System of Sierra Leone includes its Constitution and the Common, Statutory and Customary Laws. The 1991 Sierra Leone Constitution, the supreme law of the land, includes a Bill on Rights in Section 15, guaranteeing the human rights of all Sierra Leoneans irrespective of their sex. Although this is reinforced in Sections 278 and 171 (15)9, Section 27 (d) of the same Constitution nullifies these provisions by exempting discrimination in laws relating to adoption, marriage, divorce, burial, devolution of property on death or other matters of personal law. This section thus excludes customary law and practices, which are biased against women according to non-discriminatory provisions in the Constitution. As a result, women have no legal recourse when discriminated against on issues relating to these exemptions, which are at the core of gender relations in Sierra Leone.

As part of its post-war Gender Equality Agenda to protect and promote the rights of women and girls, the GoSL has enacted a number of laws to promote equality between women and men in both the public and private realms of society. This includes:

The Anti-Human Trafficking Act (2005);

The Citizenship Amendment Act (2006);

The 2007 Gender Bills on Domestic Violence;

The Registration of Customary Marriages and Divorce;

The Devolution of Estates;

The Child Rights Act (2007);

The Chieftaincy Act (2009);

The National Gender Policy; and

The final draft national land policy.

For example, the Domestic Violence Bill criminalizes violence, and the Registration of Customary Marriages and Divorce Act protects girls from forced marriage before the stipulated 18 years' minimum age for customary marriage and requires the consent of both parties. The Chieftaincy Act emboldens women to contest for Paramount Chieftaincy in areas where they were barred by traditional norms and values.

To pursue these objectives, the GoSL has made efforts towards integrating climate concerns in National Development Planning as demonstrated in current 5-Year Plan on Agenda for Prosperity. These are assisted by collections of Legal Instruments including The National Gender Policy that aims at equity of participation and access for both women and men, recognizing their roles pertaining to sustainable national development objectives. Its principles are based on the promotion and strengthening, given that even though the existing Environmental Legislation is conducive for mainstreaming climate adaptation, its contribution to mainstreaming Gender Perspective into climate change adaptation remains unrealized. In recognition of the need to strengthen Gender Perspective in National Planning, the GoSL has undertaken some initiatives including the inclusion of a holistic vision of gender in the current 5-Year Plan and inclusion of Gender and Women's Empowerment in pillar eight (8) of Sierra Leone's Five-Year Development Plan. Therefore, in addressing climate change issues, public entities are required to undertake public awareness drives and consultations and to ensure gender mainstreaming.

Internationally, Sierra Leone acknowledges and adheres to international efforts aimed at ensuring environmental sustainability. Some of these include the Vienna Convention on the protection of the ozone layer, the adopted (May 1999) and ratified (2 April 1996) UNFCCC, the Kyoto Protocol (as a non-Annex I Party), and the Montreal Protocol on the substances that destroy the ozone layer and the respective London and Copenhagen amendments

2.3. Gender and climate change

"Climate change will have different impacts on women and men and in most cases the adverse effects of climate change disproportionately affect women. For example, with increasing drought, it is women who have to walk longer distances to collect water. Women are often the main repositories of vital local and traditional knowledge" (LEG, 2002, p3).

The United Nations system is formally committed to gender mainstreaming within all United Nations policies and programs. UNESCO (2004) maintains that gender mainstreaming will not be achieved unless gender equality issues are highly visible in organizational and sectoral policies and programs, including the need to systematically include gender perspectives within existing frameworks and analyses.

A multitude of authors have raised gender issue fundamentally as a response to the feminization of poverty, as well as the invisibility of women at most scales of the climate change debate (Denton, 2000). This is surprising, given that addressing gender issues can increase the efficiency as well as the equity of a range of interventions, especially in relation to adaptation (Wamukonya and Skutch, 2002). Literature and experience all steer towards the conclusion that gender equality (i.e. equal treatments for women and men) is pivotal in developing successful initiatives.

The value of incorporating gendered stakeholder analysis into adaptation projects is obviously not in the portrayal of poor women as victims who need to be saved. Similarly, the point of gender analysis is not to reinforce binary oppositions or to place men in a subordinate role, but is simply to sophisticate the scope of multi-scalar analysis (Wilson, draft report). Gender analysis and action has clearly added value in at least three key areas (Wilson, draft report): 1) Vulnerability — the need to take account of the different forms of (and reason for) vulnerability of women and men and of inequalities in the level of vulnerability between women and men, as well as compounding influences of other social characteristics; 2) Adaptive capacity — the need to analyze the difference in options/potentials and the consequences for women and men in different areas of adaptive capacity; and 3) Policy making — how to ensure that women and men have equal or equitable influence on knowledge production and decision-making at all levels and on the policy-making resulting from the whole NAPA process? In all three areas, gender analysis can be approached as an essential element both in terms of program efficiency and empowerment.

Sierra Leone has identified a number of potential barriers to the smooth implementation of gender equality and women empowerment proposed activities in climate change and climate variability. These barriers are presented in a table matrix by consultations.

Materials and Methods

3.1. Site selection and location

This research was carried out in the Western Coastal Zone of Sierra Leone, specifically in the coastal communities in the Western Area, including Lakka, Hamilton, Tombo and Conakry Dee in Port Loko District, involving farmers' associations, Community-Based Organizations (CBOs) and women's groups. Climatic conditions across the research area vary from semi-arid (the central and north zones) to tropical sub-humid and humid (at the coast). Lakka, Hamilton and Tombo belong to the Western Rural District, one of the 14 districts in Sierra Leone. Based on the 2015 census, the population of the Western Area Rural District is 442,951. Waterloo is the district capital and largest city, with most of the other towns and villages located in close proximity. The Sierra Leone portion of the coastal zone comprises of and is characterized by a dense network of rivers, streams and lagoons in almost all the districts. Given the geographic and climatic conditions, the district has three (3) main ecological zones:

The coastal area characterized by dunes, vegetation and mangroves, including extensive beaches;

The valley area characterized as agricultural zone; and

The inland area that includes wood and shrub savannah.

On the one hand, the location and diversity of the western coastal zone suggest the existence of a range of resources and therefore a potential area for agriculture, livestock, tourism, fisheries and industrial development. On the other hand, it suggests an area susceptible to climate change and variability. The NAPA Sierra Leone has identified several coastal zones as vulnerable to floods. In addition to the above factors, the section of the coastal zone investigated in this research was based on the indicators of poverty, vulnerability and visible impacts of climate change/variability. Thus, four (4) communities were selected for investigation — one in Port Loko district in the north (Conakry Dee Community) and the other three in Western Rural Districts (Lakka, Hamilton and Tombo Communities).

The communities therefore represent a good contrast in terms of environmental and socio-economic conditions. The two districts fall within the priority category targeted for the reduction of the impact of Natural Disasters (a plan developed by the Western Rural and Port Loko District Councils) that supports the Agenda for Prosperity. This strategic plan envisages sustainability, zero poverty, social justice, equity and sustainable socio-economic development. It includes, among others, sustainable management of water

resources, intensification of crop and livestock production, prevention and reduction of the impact of natural disasters impacts, promotion of gender equity, increase in women's participation and contribution to district development.

3.2. Data collection

In an inception report agreed upon, the lead consultant and UNDP discussed a common gender analysis methodology to make the case studies comparable. A qualitative research approach based on three data collection techniques (Key informant interviews, focus groups (see Figure 3) and desk review) was used. For the research question, a combination of techniques was used to obtain as much information as possible. The field data collection was done in a total of 20 days. All conversations during the field data collection were held in both the local languages and English, and those in the local languages translated into English.

Both informal and semi-structured interviews were conducted with key informants. Informal interviews were part of the everyday conversations with both the local authorities and people. The informal discussions concentrated on issues related to the environment and gender roles/responsibilities. The key informant interviews were conducted using a guiding questionnaire designed from the inception phase.

A total of 30 and 10 key informant interviews were conducted in the Western Area and Port Loko District, respectively. Additionally, several key informants were interviewed, including traditional chiefs (local authority) and ward councilors (government authority).

The Focus Group technique was also used in to collect data from specific groups of natural resources users within certain age ranges and sex, criteria defined at inception workshop. This technique initiates group discussion regarding such topics as climate change and gender issues. Questions were asked in interactive group settings where participants felt free to talk with other group members. For each community, a total of 3 to 4 groups were engaged for discussions in line with aforementioned criteria and the availability of people. The number of participants per group varied between 5 and 8 based on the availability of people.

The four (3) groups engaged in Lakka and Hamilton communities included:

Middle age women in fisheries (6 participants);

Young women in sand mining (6 participants); and

Middle age men in fisheries, agriculture (5 participants).

The four (3) groups engaged in Tombo community included:

Middle age women in fish processing/selling (6 participants);

Young women in agriculture (3 participants);

Middle age men in fishing (3 participants); and

And then the (3) groups engaged in Conakry Dee community included:

Middle and young age women to fish processing/selling vegetable garden (4 participants);

Middle age men in fishing (4 participants); and

Middle age and young men (5 participants).

Gatherings were done in community open space, headmen resident, etc. (see Annex 3). (under the shade of trees of the coastal) and discussions initiated by explaining the purpose of visit, the aim of the group discussions relating to gender issues and climate change adaptation and then proceeded with guiding questions defined in the inception report. The discussions were facilitated and guided by the gender specialist, but participants were allowed to freely discuss topics, the specialist intervening only to clarify points and avoid misleading conversation. Discussions were also focused on alternative strategies to cope with climate change/variability. Each group conversation lasted for about one hour and was held either in the morning or in the afternoon.

The third technique used was Extensive Desk Review, carried out with the primary focus on related documents in the UNDP system, international treaties, conventions, and national laws and policies. This involved reviews of studies and scholarly articles on the subject. It was very useful in providing insights into the existing gender gaps, hence a valuable input in contextualizing the issues under investigation. The approach to the literature review consisted firstly of document selection to identify the official documents dealing with the subject. This included the NAPA, National Gender Policy, Local Development Strategy, other GEF-related documents, Sustainable Development Goals and International Conventions adopted by

Sierra Leone. Other documents reviewed included articles and reports from development partners. The criteria used for the desk review were: a) the consistency of each policy document with the gender approach; and b) whether gender is well treated in the document. The major challenge with reviewing selected policy documents was access to reliable editions. This Desk Review also provided the basis for a critical reflection on some empirical findings in the project document development, particularly the recommendations going forward.

3.3. Influencing factors

The influencing factors were those that determine/influence the differences identified in gender division of labor and access to or control over resources. These factors can be race, demography, finance, political, institutional, health/disability, education/training, culture/religion, history/community norms and social hierarchy. The factors intended to answer questions on what social, political, economic and cross-cutting issues existed. They highlighted which opportunities/constraints affected women and men and vice-versa, and aimed to increase the involvement of specially women in community activities. The tool addressed aim number 3 of the study.

3.4. Institutional analyses

This dealt with how institutions (i.e. structures and mechanisms of social order and cooperation governing the behavior of two or more individuals) behaved and functioned in relation to both empirical rules (informal rules and norms) and also theoretical rules (formal rules and law). It aimed at finding how individuals and groups constructed institutions, how institutions functioned in practice and which effects institutions had on society. Research questions 4 and 5 were answered using this too.

3.5 Access, control and social profiles

These techniques intend to answer the questions about who had access to and control over knowledge, resources, services and decision-making and what kinds of relationship created gender differences. This indicated whether people had access to resources that controlled the use and distribution of benefits in the community. On the other hand, social profile identified social relations used to assess what roles and responsibilities communities had, the rights and control over their own lives and the availability of tangible and intangible resources. The two techniques were used to address questions 2 and 3 of the study.

3.6 Capacity and vulnerability analyses

Capacities and vulnerabilities were used to identify what helped (capacities) and what hindered (vulnerabilities) the adaptation to climate change. Vulnerabilities were the long-term factors that weakened people's ability to cope with challenges, while capacities were the existing strengths of individual and social groups in terms of physical, material and social resources, their beliefs and attitudes. This tool was used to respond to questions 4 and 5.

3.7 Needs assessment

This assessed the practical needs and strategic interests the women and men had that must be addressed. Practical needs were those which, if met, would assisted people in their activities. Then strategic interests were those, if met, transformed existing balance of power. This meant achieving the objectives of social justice, participatory democracy, non-violent resolution of conflicts and ecologically sustainable development. This tool was helpful in answering question 5.

3.8 Li mitations

The main constraints to this work came up during fieldwork, and were related to poor accessibility of the study areas, especially the Lakka Community. There were low levels of participation in interviews and focus groups. According to the people, the main reason for this were being tired of interviews without realizing any tangible results. To overcome this problem, extra time was spent explaining the objectives and relevance of the study to the people. Other reasons for the low participation included high migrating of men and the reluctance of women to express their opinions (as it was the case in Tombo Community). In both communities, but especially in Tombo, drunken people attended the interviews and focus group discussions, some of whom gave evasive responses.

To avoid withdrawal of respondents at the middle of an interview, the interviewers grouped some questions to reduce the time with key informants and focus groups. Additionally, for group discussions, prolonged periods were encouraged to break the ice and to prevent a few from dominating discussions. Apparently in all communities, this kind of discussions was not often done, dampening the initial enthusiasm. In the Conakry Dee, some men sat in women's groups for discussions. In those cases, women

apparently refrained from freely expressing their opinions. Thus, interviewers frequently had to cautiously ask the men to leave the discussions, which was not entirely welcome.

Another difficulty with the interviews lied in explaining the concept of climate change. At first, people had problems understanding what it was. So, the researcher had to meticulously make sure that the participants sufficiently understood the concept before interviews and discussions were held. Some Participants in Lakka, Conakry Dee, and Hamilton did not give their consent for inserting their pictures in this report, but their contacts are available.

Results And Analyses

Here, the major findings of the research were organized into two sub-sections. The first section described the bio-geographic settings of each community, including social and institutional organizations, individual and community activities, and constraints and capacities. Then the second section comparatively discussed the results of each of the research questions.

4.1. Description of communities

4.1.1. Rural Western District (Tombo, Lakka and Hamilton)

Lakka is a coastal resort town around the peninsular in the Western Area Rural District of Sierra Leone. The town lies about ten miles west of Freetown (the capital). The major industries in Lakka Town are tourism and fishing. Lakka is known for its large beaches and therefore tourist attraction. It is a small community of about 5,000 people, over 50% of who are women.

Lakka Town is ethnically diverse, as it is inhabited by several ethnic groups, although the Sherbro and Krio remain the principal inhabitants. The people are mainly engaged in fishing. Lakka Town has a famous hospital, several hotels and primary schools, and a secondary school. The inhabitants are largely of the Christian denomination. Although part of the Western Area Rural District Council, Lakka has its own directly elected Local Town Council that is headed by a Town Head.

A high percentage of interviewees in the focus groups and key informants in the communities faced several climatic and environmental challenges. Thus the main challenges included:

- Prolonged wet season — communities have experienced prolonged wet seasons in two consecutive years now;

- High speed winds; and

- Seaweed boom

The main consequences due to the challenges were:

- Fishing activity severely hampered;

- Drastic drop in productivity or catches;

- High migration of men;

- Increased disease incidence, e.g. malaria, cholera;

Subsistence fishing is the main activity in the Lakka community (almost all the interviewees fished and processed fish for sale). Rain-fed agriculture is done between May/October and April, during which period maize, beans, groundnut and squash are cultivated. The natural vegetation has degraded due to improper human activities. Alternative livelihood strategies in the town include charcoal production, sand mining, tourism, and other informal jobs like construction and farming. Both women and men are fully engaged in these livelihood activities.

A high percent of the interviewees in the focus groups and key informants faced several climatic and environmental challenges in the past few years.

The identified challenges included:

Prolonged wet season, experienced two years in a row now;

High speed winds; and

Sea weed blooming

Irregular seasonal variation

Sand and salt water intrusion

Mangrove wood cutting and charcoal production

Over-fishing and illegal fishing

Coastal Erosion,

Sea level rise,

heavy windblown,

flood and land slides

Then the main consequences resulting from the challenges included:

Severe hindrance of fishing activity;

Drastic drop in fish productivity or catches;

Intensive seaweed blooming;

High rates of migration of men to especially western urban towns;

Increased disease incidence (e.g. malaria and cholera); and

Malnutrition among women, children and the ageable.

The primary concerns expressed by women in Sierra Leone Climate Change Adaptation Coastal target areas included:

Food Security: increasing population, invasive species, crop quality and increased spoilage, reduced fisheries

Clean, accessible water supply

Access to health and education services during the wet season

Access to markets and the economic viability of producing/transporting food crops to market for sale; and

Lack of voice in local level decision-making processes.

Tombo is a fishing coastal town with a population of 33,979 (16,823 male and 17,156 female). The main economic activities are fishing, ecotourism, construction, rearing small ruminant and domestic poultry, vegetable gardening, quarrying, petty trading, charcoal production and migration. Tombo has its own local radio station — Radio Tombo on MHz 96.0. Coastal erosion, rainstorm, seaweed bloom, high temperature and flooding were the impacts of climate change on the community. Women are mainly engaged in fish processing and trading, but petty trading was the leading women's

Both the focus groups and key informants interviewed (Figures 2, 3 and 4, Annex 3) highlighted that as a result of climatic change, the communities were facing several environmental challenges.

Division of labor was not balanced between women and men. In fact, most men had migrated to either western urban areas or other places in the country in search of greener pastures, leaving women in charge of the households for long periods of time. Migration had reversed the gendered nature of division of labor in the rural west communities. For instance, more women interviewees were household heads for at least a fraction of the year (usually, men come home only once in a month or year). Moreover, migration has resulted in de-jure, de-facto female headed households. Thus, women were in charge of both productive and reproductive work, while men were only responsible for productive job. For female-headed households, the day-to-day decisions were made by women. However, for major decisions (such as finding new places to live or to cultivate or looking for employment, etc.), it was the men who had the last saying. Decision-making, despite the migratory patterns, remained a male-dominated activity.

While sand mining was done by both women and men, livestock rearing and charcoal production were the responsibility of men. Women were also responsible for fetching water and firewood, and collecting fruits. However, the decision-making structure was composed by the elderly (both women and men), headmen, government authorities (including councilors and ward committees) and women heads. This structure was responsible for decision-making, but not including land allocation, conflict resolutions, etc. Other institutions in the communities included Women Social Groups and NGOs (e.g. Action Aid which helped resolve women-related problems and Plan International which provided basic needs to orphans and school-going children).

4.1.2. Tombo community

Tombo a coastal fishing town located in the peninsula plains in the Western Area Rural District of Sierra Leone. It is some 30 mi (49 km) east of Freetown (the capital city), with fishing as the main industry. Other industries in the town include coal mining and farming. Cosmopolitan Tombo is a major fishery trade and transport hub with good mix of ethnicity (e.g. Temne, Sherbro, Krio and Limba). With a predominantly Muslim population, Tombo is known for its deep Islamic faith. The town has its own local radio station (Radio Tombo, MHz 96.0). Although a part of the larger Western Area District Council, Tombo is locally governed directly by an elected town council headed by a Town Head.

Although fishing is the main alternative strategy that has gained importance, respondents of the study highlighted that fishing activities have been weakened by decreasing fish sizes; a result of seaweed bloom and salinization. Due to climate change, the communities were facing increased environmental problems (see Table 4, Annex 2).

Subsistence agriculture is another income-earning activity in the community, second to fishing and livestock production. Rain-fed agriculture is done during the wet season (April to November), when maize, beans, groundnut and cassava are cultivated. During the dry season, watermelon, tomato, lettuce, etc. are cultivated. The natural vegetation is degraded savannah, with less than 10% tree cover and no grass layer. Fruits, construction materials (stakes and thatches) and firewood are collected from the degraded savanna. Additionally, the savanna is used as forage for domestic animals (ruminants). Bust as the area is facing considerable levels of desertification; resources gathered from the savannah are dwindling.

4.1.3. Conakry Dee community

Although Conakry Dee is located in Port Loko District in northern Sierra Leone, it is much closer to the Western Area. Fishing is the dominant economic activity for men whereas farming and petty trading are the main source of livelihood for women. With over 300 fishing vessels in the community, some are large (30 crew) boats and some canoes purely for transportation. The average size of the fishing community is estimated at 2,000, plus 1,000 others (mostly women) in fish handling, transactions and product transformations. There are strong women & fisheries associations dedicated to smoking fish using mangrove wood. Recently, FAO built a small fish-smoking house, but serious concerns emerged on the use of the facility as mangrove combustion emits polycyclic aromatic hydrocarbons (PAH), extremely hazardous carcinogenic compounds when inhaled, or eaten as smoke stock on fish. This required the development of alternative solutions in the community. Additionally, a significant number of people depend on riverine farming and vegetable gardening. The above concerns were confirmed in respondents' reports below:

***Socio-economic conditions of women**: Konakridie is a coastal town community where fishing is the dominant economic activity for men and both farming and petty trading the source of livelihood for women. Several strong Women and Fisheries Associations dedicated to smoking fish were in the region. Smoke released from burning mangroves contains extremely hazardous PAH that causes cancer-related health issues when inhaled or eaten via smoked fish. Natural disasters affected the livelihoods of community members by reducing fish catch. Women grew vegetables as an alternative source of income, but were hindered by land ownership and control. Migrating men abandoned families to women who were also victims of delayed response to disaster warning. The perceived impacts of climate change were rainstorm, thunder storm, flood, salinity, seawater intrusion and water logging. Fish processing and petty trading*

Based on the experience of Key informants, natural disasters constituted a major problem distorting community livelihood. For instance, seaweeds have over-bloomed in the past three years, making catch impossible and families going for days without food and money. Sometimes not only fishing nets, but also boats get damaged by seaweed. Due to high costs, fishing kits are generally hard to replace. A male respondent in Conakry Dee had this to say: "for some of us engaged in farming in this community, it has taken two years without a good harvest because the Atlantic Ocean sometimes flows over the entire area affect planting".

The women also depend on vegetable gardening as another main source of income. Huge quantities of vegetables are consumed in Freetown and there a good source of earning. Vegetables are largely grown in December through May, follow by rice. Among the challenges is land ownership and control, which are decided by community heads and the men folks. The role women in the community was not formally recognized or accounted for in any mitigation, adaptation or relief efforts. Women are knowledge about the ecosystem and have strategies, experiences and skills to cope with natural disasters and water shortages, which qualities are grossly ignored.

Women in the coastal areas of Conakry Dee were aware about issuance of early warnings. However, the male counterparts first received the warnings and sometimes failed to pass them on respective family members. Consequently, women were generally the victims to delayed response to such warnings. Even if warnings went out in good time, male counterparts often reacted more rapidly than their female counterparts due to physiological and social differences. Women entirely managed the households and therefore had to take precautionary measures to safeguard every bit of asset in the homes.

What Conakry Dee community perceived as the impacts of Climate Change included: storms in Coastal Islands constituted a natural disaster as many people fell victims to storm conditions every year. Women were differently vulnerable than men due various physical and social reasons. Two separate Female Group Discussions (FGDs) were conducted to get the perceptions of women on climate-change-related vulnerabilities. A number of climatic hazards were identified by the FGD participants, including rainstorm, flood, salinity, seawater intrusion, water logging and thunder storm.

It was noted in both FGDs and key informant interviews that many men left their families forever. In the areas where coastal erosion and storms were common and acute, women headed households were common. This was because husbands left in search of employment and never returned, forcing the women to take responsibility for the households. Young women were without reliable alternative to earn income were forced into gimmicky ways of generating income for survival.

Risk and vulnerability of women: *Women worked in both household and income-generating sectors, but enjoyed little rights compared to men in all studied project areas. The productive work and livelihood of women included agriculture, daily-wage labor, livestock and poultry rearing, fishing, fish frying, crab and snail collection, tailoring, petty trading, fruit collection, etc. Women took only minor family decisions, except in women-headed families. The positive changes brought by the intervention of NGs included increased women's visibility in social forums, but still not strong enough to influence social actions and decisions. Conservatism and patriarchy, coupled with religious norms and practices, denigrated women's autonomy and social position in the communities. Women never owned lands or claimed paternal properties, but had social safety net facilities, though not enough to meet basic needs. Institutional capacity was weak and women's coping efforts were further challenged by gender issues and power structures within both households and communities. Despite provisions for inclusion in (local) governance, gender bias towards men hindered meaningful participation of women in decision-making. Lapses in good governance*

4.2. Gender-differentiated impacts of climate change/variability

This section was organized in sequence with the research questions. The first question was analyzed in conjunction with the others and the responses provided in the concluding chapter. The following were the results of the analysis of research questions 2 to 5 (see Annex 1).

4.2.1. Research question 2

How were women and men differently impacted by climate change? The analyses of this question suggested that the perceived impacts of climate change had gender-differentiated factors.

Due to environmental conditions in the past few years (high rainfall, high temperature, strong winds, severe coastal erosion, strong seaweed blooming and environmental degradation) in the selected coastal communities, the people spent more time in petty trade and agriculture to get the same (or sometimes lower) production yield than before. As a consequence, there was an increasing trend in migration of men to Western Urban and mining areas. This human flow was stronger in Hamilton and Lakka than in the other communities. Although the reasons and consequence were still not evident, people in Conakry Dee noted that the migration of men household-heads was due to environmental degradation (Figure 4). Also, an increasing number of the men who migrated failed to return. The coastal zones of Sierra Leone are traditionally less productive than the other parts of the country, but its pool of economic assets of the average rural household is higher. This was attributed to the large labor flow in the western rural coastal zones.

On the negative side, instead of lessening family activities, the movement of young men increased the workload on family members including women and children. In general, women became the de facto household heads. In Tombo, Hamilton and Lakka specifically, women headed households and took men roles in addition to their productive and reproductive ones. Women used to perform housework, but due to low fish catches, they were forced to find alternative income-generating activities such as petty trading in alcoholic drinks and fishery-related activities. According to the women, these jobs provided additional income for the family, but at the expense of the time dedicate to household reproductive activities. As a result of migration, men became vulnerable to diseases such as STD, HIV/AIDS, TB and sometimes death. Indirectly, women suffered the consequences of epidemics such as the past Ebola Virus Disease outbreak, HIV and TB by infection through the men counterparts. Women also carried increased burden as caretakers of AIDS patients in the homes. Increasing levels

of disease put additional pressure on women, as apart from suffering from the diseases themselves, they took responsibility for finding formal or informal health services for the family.

Another load on women was the discharge of care for, nurture and sustain human beings - covering cooking, cleaning, washing, feeding, and all tasks usually identified with a mother (reproductive work). This was as a consequence of increased movement to other part of country as the it was evident in Tombo, Lakka and Hamilton communities. Households with migrating men were relied less on activities related with natural resources for both income and food. A respondent noted that the Western Rural Area of Sierra Leone was traditionally less productive than the South Eastern and Northern regions of the country, but that the pool of economic assets of an average rural household in the west was higher than that in the east and north. This was attributed to the larger labor migration in the Rural West.

Women became the de facto household heads, especially in Tombo, Hamilton and Lakka where women took over as heads of households and men's roles in addition to their productive and reproductive activities. Another extra load on women as consequence of men's migration evident in Tombo and Lakka included the discharge of reproductive work which was not entirely women's role; putting further stress on women in sharing time among the expanded responsibilities. For example, the distances covered in search of water (about 2 km in Tombo and 4 km in Conakry-Dee) and those for fetching firewood and water in Lakka (2 km and 1 km, respectively) has been increasing in the past few years due to environmental degradation

On the negative side, migrating men contributed little to the family, which in turned increased the workload of family/household members including women and children. In general, women became the de facto heads of household, especially in communities where women headed households took over men's roles in addition to women's roles in the family. For example, in both Tombo and Lakka communities, women were responsible for all it took to run households. Thus, women had to search for alternative income-generating jobs such as petty trading, selling alcoholic drinks and fishery-related activities as fish catches and crop yields dwindled due to climate change. The community women reported that although the alternative jobs provided additional income, they were left with little or no time for reproductive household activities.

Also, due to migration, men became vulnerable to diseases such as STD, HIV/AIDS, TB or even death (where some never have the opportunity to return home alive). Indirectly, women suffer the consequences of increased epidemic diseases contracted by their men. Thus, women carried further burdens as care-givers disease patients in terms of family care. This put additional pressure on women because despite the likelihood of suffering from the diseases, they also were responsible for providing health services (formal or informal) to the family.

Women in decision-making: *Most women in Conakry-Dee participated in critical decision-making structures of the community (6 men to 4 women). In contrast, in Tombo where men's migration was low, women hardly participated actively in decision-making process (8 men to 2 women). Given that women knew better about the state of the environment than men (where to collect water, to take the sick, to cultivate and to take animals for grazing), strong women positions meant high potential to cope the effects of climate change and climate variability.*

Under the new climatic environment, women were entirely responsible for reproductive work. For example, the distance covered to get water was about 2 km in Tombo and 4 km in Conakry Dee, while that covered for firewood and water in Lakka was 2 km and 1 km, respectively; which was steadily increasing with time due to environmental degradation. The immediate effect on women was the extra time needed to discharge those roles at the expense of the time to spend with the kids. So, kids were sometimes left entirely on their own or were forced to abandon school to help with household tasks. Although not immediately visible, such care-free upbringing could disrupt community social structures that will in turn hinder adaptation to climate change and climate variability.

Although women were crucial and active members of the communities, they had little active voice because most of the community structures were male-biased. At family level, women were submissive to their husbands. Where the

husbands were absent, women had to submit to either the oldest son or the closest family male figure in decision-makings. At the community level, decision-making structures were also very much male-biased.

Men's movement to seek for greener pasture, however, indirectly benefited women be increasing their participation in community decision-making structures. For example, in Conakry Dee, most women participated in critical decision-making structure — with 4 women to 6 men in decision-making structures in the community. In contrast, in Tombo where men's migration was minimal, women hardly participated actively in decision-making process — with 8 men to 2 women in the decision-making structures. Because women better knew about the state of the environment than men (e.g. knowing where to collect water, where to take the sick, where to cultivate and where to graze small ruminants), a strong women representation could help the community to sufficiently cope with the effects of climate change. This aspect of women empowerment on decision-making needed further research.

4.2.2. Research question 3

What were the physiological, political, economic and societal causes for the differences experienced, if any? Analysis of this question suggested that the expected impacts of climate change was gender differentiated, spurred by imbalances in the division of labor and in the structure of decision-making in the communities.

At family level, one of the main causes of the differentiated impact of the changing environmental conditions was power relations; which gave women access to, but not control over natural resources. For instance, the customary law in the communities was that land and other assets were only inheritable by men because women often left their communities of birth to join those of their husbands after marriage. This created a dependency of women on men to decide on where to build houses and the livelihood strategies to use even though women (who stayed behind in the homes and depended more on local natural resources) usually had better knowledge of their communities.

Another important cause of the differentiated impacts of climate change was the perceived rule that women were responsible for reproductive work, while at the same time women's role in productive work increased. It put further stress on women as they had to ensure that the family was stable in every aspect (health, nutrition, economics, etc.). At community level, women's participation in decision-making regarding resources and conflict resolution was still weak, an element that limited women's capacity to give advice on the aspects of life they were better in than men. Nevertheless, this position was expected to change with increasing future migration of men and the subsequent empowerment of women in decision-making.

One of the priorities of the strategic plan for the Western Rural Area and Port Loko District councils was to "promote gender equity and increase women's participation in the socio-economic development of the district". Then the key planned measures to achieve this priority included: i) Empowerment of women in leadership; ii) Promotion of women's participation in political and decision-making structures; iii) Improvement of women's access to job market; iv) Implementation of programs to diversify subsistence crops and have access to improved technologies with skill training in agro-processing and in fish processing and preservation; and v) Improvement of access to healthcare services and nutrition programs.

This could result in making decisions based on the on-the-ground realities in the communities. The communities have strong religious beliefs which hindered decision and/or adaptation measures. As there was not much the majority of the people could do about the degenerating conditions, they simply moved to other places. People resigned to the faith the "God had the power to make things happen and if He (God) wanted the situation to be what it was, then they just had to live with it".

The existing policy and institutional systems in the country were improving, but still failed to provide a strong basis for gender equality and equity in the face of climate change and adaptation to the change. However, the situation was changing and the legal framework was being adjusted to guarantee the mainstreaming of gender issues in climate change adaptation strategies. For example, the strategic plan for the Western Rural Area and Port Loko District councils had, as one of its priorities, an act "to promote gender equity and increase women's participation in socio-economic development of the district". Some of the planned measures of key activities to achieve this were to: i) Empower women in aspects of leadership; ii) Promote women's participation in politics and decision-making structures; iii) Improve women's access to job market; iv) Implement programs for the diversification of subsistence crops and

access to improved technologies with skill training in agro-processing; fish processing, fish preservation; and v) Improve access to healthcare services and nutrition programs.

4.2.3. Research question 4

What were the current coping and adaptation strategies and capacities? There existed in the communities some coping and adaptation strategies and capacities that were especially focused on alternative food sources, jobs and livelihood. Due to changes in of season patterns (dominated by high rains in the wet season and high temperatures in the dry season) and the subsequent declines in fish catches and crop production, people shifted to cultivation of vegetables (lettuce, pumpkin, tomato, etc.) in the dry season. This started since 2009 in response to the rising temperature conditions in dry season. In general, only few meters of digging was enough to tap groundwater for irrigation of the vegetable fields.

People were also increasingly relying on forests as a source of food (fruits and roots), but the sustainability of this activity remained questionable. In all the four investigated sites (Conakry Dee, Hamilton, Lakka and Tombo) there existed a high diversity of resources.

Conakry Dee and Tombo relied on fruits such as mango, which was sometimes mixed with fish to make a porridge-like food. It is worth mentioning that forest-related activities such as the collection of fruits, roots and firewood were all women's job. The extra livelihood activity in response to climate change further increased the burden on women in the communities.

Coping and Adaptation Strategies: *Several coping strategies existed and were variously gaining importance in the region. These included petty trading, ecotourism, fishing, wild fruit gathering and charcoal production. It diversified food resources, jobs and livelihood ands. Women relayed increasingly on fruits (cultivated and wild) and on wild roots to sustain the family. Although fishing was important, catches had steadily fallen in the past three years due to seaweed blooming. Charcoal production increased in all the coastal communities, but was limited by scarcity of forests as a result degradation. Daily-wage work, quarrying, sand mining and baby-sitting (mainly women) were used as alternative source of income. Male youth increasingly migrated to areas with enough economic activity to accommodate new intakes.*

Although fishing gained importance in the four project site areas in the last few years, the blooming of seaweed (Figure 5, Annex 3) constituted a considerable to coastal fishing. The seaweed destroyed fishing net, limited fishing area and therefore reduced fish catch. Although there was fishing regulation that prohibited catching fish that was below a stipulated size, it was never observed due to low catch and high demand for fish. Increased rains and the resulting rise in water levels imposed further threat on fishing activities. The Association of Fishermen, covering all fishing activities in the region lacked the institutional capacity (material and financial) to enforce its mandate, which therefore urgently strengthening. Women played a key role in fishing activity, which was steadily increasing especially in fish processing and conservation.

Charcoal production increased in all the four coastal communities, but was limited by the scarcity of forests. However, it was not sustainable in Conakry Dee, Lakka, Tombo and Hamilton communities due to high degradation of the forests. In fact, increasing travel distances and scarcity of "good" wood species for charcoal burning were strongly cited as the main limitations to this production activity.

Informal jobs such as building construction, vegetable gardening and farming were also gaining importance in the communities. The creation of alternate jobs was considered a sustainable way to overcome the harsh environmental and living conditions in the communities. As the informal job industry was dominated by men, the creation of alternative jobs could bring back men to live (curtail migrations) and discharge their responsibilities in the communities.

Lakka, Tombo and Conakry Dee communities were better organized than Hamilton in terms of conduct of formal and informal organizations in discussing the problems of climate change. For example, these communities had an Association of Fishermen, which met regularly to discuss problems faced in the fishing community, including environmental issues. On the other hand, Conakry Dee and Tombo had a better representation of women in decision-making structure. The increasing stronger and better positioned women social groups seemed to rebalance gender differentiated impacts of climate change in the communities.

4.2.4. Research question 5

How can the capacity of women and men be strengthened to better adapt to climate change and climate variability? There was a general consensus amongst policy makers and academics on four ways of strengthening the capabilities of women and men for better adaptation to climate change, climate variability and/or environmental change. These included the implementation of existing policies and programmes, allocation of resources, capacity building and reinforcement of the participation women in local institutions. Due to the key role women played in the communities, there was need to always consider women in selection and building target groups for any activity.

As discussed previously, there were some spectra of legal instruments at both local and national levels with outlined priorities to cope and adapt to climate change. These included among others the NAPA, the Agrarian Sector Strategy and the Local Council Development Plan. All these tools prioritized agriculture, forestry, water, coastal management, education and all the related issues that cut across the sectors. However, the developed plans still needed to be put into action, which required: i) harmonization of the different instruments into a strategic synergy; ii) prioritization of the strategic synergy activities based on the needs and effectiveness; and iii) allocation of resources (financial, material and personnel) for the implement the strategic synergy at all levels.

The lack of material resources such as fishing boats, seeds, tools, infrastructure, etc. exacerbated the effects of climate change on the communities. This must be considered a priority in any effort designed to help the people cope with and adapt to environmental changes in their communities. This included improvement of access to resources such as banking facilities (e.g. lease, credit, microfinance, etc.), subsidies on inputs, distribution of resistant seed varieties, promotion of agro-processing techniques and access to market. The promotion of traditional techniques was also important, for example, the now abandoned fishing net made of wood avoids catching small fish. Given that the availability of water during the dry season was a major constraint in agriculture, the construction of irrigation schemes that use groundwater can prevent abandonment of farmlands.

Strengthening women and men's capacity to adapt to climate change required the implementation of existing policies and programmes, reallocation of resources, sustainability of capacity building and enforcement of women's participation in key decision-making structures. Access to banking facilities (e.g. lease credit, microfinance, etc.), giving subsidies on inputs, distributing resistant seed varieties and promoting agro-processing techniques. Capacity building, among others, was critical for helping communities cope and adapt to climate change. This included training women and men in new skills in agriculture, forestry and fishery; including irrigation techniques, cultivating resistant native species of cereals, tubers, fruits, vegetables, etc.

Capacity building was another key strategy to help the communities cope with and adapt to climate change. This included training women and men in new skills in agriculture, forestry and fishery techniques such as building irrigation systems and cultivation of high crop varieties (e.g. sorghum, cassava, maize, fruit trees and vegetables). Inter-community visits to learn by seeing and discussions of the measures adopted by others in coping with and adapting to the effects of climate change.

The creation and reinforcement of local institutions and discussion forums where women participate without fear of reprisals could be useful in dealing with the new environmental conditions. People were aware of the on-going climate change/variability, but had no formal discussions on the problems created by it or on the strategies of adaptation to it. Thus, as women were more likely than men to stay in the communities, such forums constituted a strategic opportunity for increased women's participation in resolving environmental and social problems. Institutional capacity was weak in the communities. For example, while fishermen association existed in Lakka, Tombo, Conakry Dee and Hamilton had nothing of such institution. There was the need to encourage women's participation in fishermen associations in order to be empowered to enable them to be pro-active in fishing activities, especially those relating to treating women as helpers and payments received for helping. The development of similar groups should be encouraged in other areas such as agriculture. For instance, with the decreasing individual production output, clubs of women and/or men (consisting farmers) can be established to cultivate common plots together. This can promote sharing of tools, inputs and knowledge and at the same time facilitate discussions on feasible resolutions to individual, group and community problems.

At Local Council Level, the formation of a multi-institutional task force for the environment can strengthen community resilience against the impacts of climate change. Units should be established to deal with

specific issues such as identification of problems, discussion of problems, developing solutions to problems, promoting solution, capacity building, alternative livelihoods, etc. This could also serve as a sustainable channel for the implementation of existing legal instruments. Regarding reinforcement of coping strategies, there were no joint programs existing between several national and international institutions. This did not exclude FAO, UNDP, UNEP, EPA, UN/HABITAT, UNIDO, Ministry of Agriculture National, Disaster Management Institute, National Meteorology Institute, etc. aimed at environmental mainstreaming and adaptation to climate change/climate variability.

Conclusions and Recommendations

This study probed into differentiated vulnerabilities of women and men under the same hydro-geophysical hazards due to climate change. The study covered selected communities in the coastal zones of the Western Rural Area (Tombo, Lakka and Hamilton) and part of Porto Loko District (Conakry Dee) in Sierra Leone.

The impacts of climate change were visible in the communities, with evident increases in migration of men from the communities to other places (e.g. mining areas and Western Urban Cities) in search of better alternatives. Evident also was increasing incidence of epidemic diseases and decreasing fish catches and crop production. As among several other strategies of coping with the effects of climate change in the communities, there was an increasing focus on alternative ways of livelihood and taking time off normal duties to discharge extra duties to earn additional income.

More readily than men, women coped better with altered coastal zone conditions in the communities. This utmost attempt to persevere through deplorable times required tremendous personal sacrifice and compassion and the strong will to accept psycho-physical burden. However, the anticipated intensity of degradation due to climate change was apparently overwhelming for the women to cope with in a sustainable way for even basic survival.

The efforts of women to cope with the effects of climate change and variability were severely challenged by gender relationships and hindered by power structure both within households and the communities. Despite the provisions for inclusion of women in (local) governance processes, gender relationships remained deeply biased towards males. This precluded women from meaningful participation in decision-making forums. Also, lapses in governance further reduced women's voice, leaving virtually no room for meaningful input in reducing the vulnerabilities in the communities.

Women, because of their responsibility to secure food and water, energy for cooking and income from market sales, women in the targeted areas in Sierra Leone are highly dependent on local natural resources for their family's health and livelihood. Combined with the rapidly increasing population movement in few of sites, the effects of climate change are making it harder to secure these resources resulting in longer work days for women, less financial resources and negative repercussions on family health and well-being due to food and water insecurity and restricted access to basic services and markets.

In these coastal sites targeted, women also face socio-cultural and political disadvantage arising from their limited access to economic assets and decision-making processes which further compound development and climate change challenges. Traditional leadership structures generally do not involve women, who are also highly unrepresented at all levels of government. Of significant concern, the NAPA is almost silent on gender and social inclusion issues. As such, it is imperative that women's and men's specific needs and priorities are collectively identified and addressed throughout the project cycle, including the requirement that women be actively involved in activity planning and monitoring.

Patriarchal elements further eliminated opportunities for women to overcome the gender-biased vulnerabilities in the communities. Women and men were differently impacted by climate change/variability because of gender-based roles and male biasness in decision-making structures in the communities. Moreover, access to and controls over resources were severely limited for women. Because women were likely to stay in the communities than men, they more directly suffered the consequences of environmental degradation due to climate change. On the other hand, women gained better positions in decision-making (a positive sign of empowerment) when men pulled out in search of greener pasture. Women in decision-making positions could enhance adaptation to climate change.

The migration of men and women in search of better life increased the incidence of diseases such as STD, HIV/AIDS and TB among the interacting population of the community. Local institutions were either nonexistent or were weak, further limiting discussions and decision-making on environmental issues.

The role of Social Safety Net (SSN) in helping communities to deal with vulnerabilities was increasing in importance. Efforts should be directed at improving SSN allocations in order to develop a healthy society. However, new modalities should be developed so that vulnerable women directly received the benefits of SSN. The current barriers had to do with illusive access to SSN for women, especially for women-headed households, which through proper planning and implementation of programs should be eliminated.

Among the several coping strategies increasingly gaining importance in the communities were petty trading, ecotourism, fishing, collection of wild fruits and charcoal production. However, alternative livelihood strategies are based largely on the use of natural resources, the sustainability of which under the rapidly changing environmental conditions was questionable. Thus, there was an urgent need to find sustainable alternative livelihood strategies in affected communities. This was only possible through materialization of existing policies and programmes, allocation of resources, capacity building and reinforcement/creation of local institutions for gender-related issues under climate change.

The programs should focus on providing the communities with the necessary tools to become more resilient to the impacts of climate change and to be able to adopt alternative livelihoods options such as sources of income generation. Capacity building was an essential component or even the building block of program implementation. Simultaneously, there should specific program components aimed to integrating results into regulation/policy decision-makings at local, national and regional levels.

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References

Arnell NW. (1999) Climate change and global water resources, *Global Environmental Change*, 9, S31–S50

Baettig MB., Wild M. and Omboden DM. (2007) A climate change index: Where climate change may by most prominent in the 21st century. Geophys. Res. Lett., 34, L01705, doi:10.1029/ 2006GL028159Constituição da República de Moçambique (2004). Official Document.

Denton F. (2000). Gender Impact of Climate Change: a human security dimension. *Energia News*, http://www.energia.org/resources/newslet-ter/en-102000.pdf

De Vletter F. (2006) Migration and Development in Mozambique: poverty, Inequality and Survival. *Migration and Policy Series, 43*. CRUSH, J. (ed.). Southern African Migration Project (SAMP).

Enarson E. (2001) "Promoting Gender Justice in Disaster Reconstruction: Guidelines for Gender-Sensitive and Community-based Planning." Disaster Mitigation Ahmedabad (Pakistan): Institute of Ahmedabad. Enarson, E., 2002. Environmental Management and Mitigation of Natural Disasters: A Gender Perspective. Panel II, Commission on the Status of Women, 46th Session, March. UN, New York, 2002.

FAO, UNDP, UNEP, Ministry for Coordination of Environmental Affairs (MICOA), UN/HABITAT, Ministry of Agriculture (MINAG), UNIDO, National Disaster Management Institute (INGC), WFP and National Meteorology Institute (INAM) (2007). *JOINT PRO- GRAMME: Environmental mainstreaming and adaptation to climate change in Mozambique.*

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

OHCHR (2008) A human rights approach to tacklingclimate change. http://www.ohchr.org/EN/NewsEvents/Pages/TackingClimateChange.aspx

Report on Conference on Climate Change, COP13, Bali, Indonesia (2007). http://unfccc.int/meetings/cop_13/items/4049.php

Where Energy is Women's Business: National and Regional Reports from Africa, Asia, Latin America and the Pacific http://www.energia.org/pubs/papers/karlsson_csdbook_lores.pdf

Ibid. Where Energy is Women's Business: National and Regional Reports from Africa, Asia, Latin America and the Pacific http://www.energia.org/pubs/papers/karlsson_csdbook_lores.pdf

Training Manual on Gender and Climate Change. Rep. IUCN, UNDP, Global Gender and Climate Alliance.Web. http://data.iucn.org/dbtw-wpd/edocs/2009-012.pdf

Solomon, S., Qin D., Manning M., Chen Z., Marquis M., Averyt KB., Tignor M. and Miller HL. (2007) *Fourth Assessment Report of the Inter-Governmental Panel on Climate Change.* Cambridge University Press, Cambridge, United Kingdom and NewYork, NY, USA.

Watkins K. (2007) *Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world.* UNDP.

IPCC (2007) Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the IPCC's Ar4

Annex 5. Socio-Economic Analysis for project sites

GLOBAL ENVIRONMENT FACILITY
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UNITED NATIONS DEVELOPMENT PROGRAM, FREETOWN, Sierra Leone

Development of a GEF/LDCF Project on Climate Change Adaptation and Coastal Zone Management in Sierra Leone

ASSESSMENT OF ALTERNATIVE LIVELIHOOD OPTIONS

Final Report

By
Dunstan S. C. Spencer

November 18, 2016

ISSUES ADDRESSED

Coastal zone degradation which the LDCF project proposes to address relate to sea level rise, degradation due to sand mining, invasion by Sargassum and mangrove degradation. This paper addresses sand mining and Sargassum. Sea level rise is addressed in other parts the project paper[74].

SAND MINING

Globally, sand mining is described as a practice that is used to extract sand, mainly through an open pit. However, sand is also mined from beaches, inland dunes and dredged from ocean beds and river beds. It is often used in manufacturing as an abrasive, for example, and it is used to make concrete. It is also used in cold regions to put on the roads by municipal plow trucks to help icy and snowy driving conditions, usually mixed with salt or another mixture to lower the freezing temperature of the road surface (have the precipitations freeze at a lower temperature). Sand dredged from the mouths of rivers can also be used to replace eroded coastlines.

Another reason for sand mining is the extraction of minerals such as rutile, ilmenite and zircon, which contain the industrially useful elements titanium and zirconium. These minerals typically occur combined with ordinary sand, which is dug up, the valuable minerals being separated in water by virtue of their different densities, and the remaining ordinary sand re-deposited.

Sand mining is a direct cause of erosion, and also impacts the local wildlife. For example, sea turtles depend on sandy beaches for their nesting, and sand mining has led to the near extinction of gharials (a species of crocodiles) in India. Disturbance of underwater and coastal sand causes turbidity in the water, which is harmful for such organisms as corals that need sunlight. It also destroys fisheries, causing problems for people who rely on fishing for their livelihoods.

Removal of physical coastal barriers such as dunes leads to flooding of beachside communities, and the destruction of picturesque beaches causes tourism to dissipate. Sand mining is regulated by law in many places, but is still often done illegally.

Sierra Leone has lost many houses along the Freetown Coastal beaches, due to sand mining activities. The practice has been ongoing for many years, despite efforts by Government to sensitize people to adopt a sustained sand mining practice. The Sierra Leone Community depends on the sand to build houses, roads, bridges and other habitable structures.

Sand mining from beaches is very lucrative in Sierra Leone, with many segments of the local communities, and political functionaries benefiting from it as shown by the figures in 0. Alternative livelihood activities have to generate equal income and benefits for local communities, or the mining will continue until the environment is completely ruined, or returns drop to levels earned in alternative activities.

[74] See Raymond Johnson, ------

Estimated returns to sand mining in Sierra Leone (Le 6,000 = US$1.00)

	John Obey Beach US Dollars	Konakre Dee Beach	US Dollars
Employment generated			
No Groups	2		
Shareholders per group (Youths)	68		30
Loaders per group	96		7
Total full time - persons	328		
Work days per year	288		288
Total Shareholders - person-days/yr	19,584		8,640
Total Loaders - person-days/yr	27,648		2,016
Returns			
No trucks loaded @ 24 days per month	6,336		288
10/12 Tyres - 6 months Dry season	576		
10/12 Tyres - 6 months Rain season	5,760		
Fees per truck (6 tires) - Total	31.67		-
Drivers Union	3.33		-
Village Council	5.00		-
LG Council	6.67		-
Hon Parliamentarian	0.83		-
Shareholders	9.17		-
Loaders	6.67		-
Fees per truck (10/12 tires)- Total	45.00		75.00
Drivers Union	3.33	Chief	10.00
Village Council	6.67	Beach Com	5.00
LG Council	8.33	Elders	20.00
Hon Parliamentarian	1.67	Councillor	5.00
Shareholders	11.67	Youths	5.00
Loaders	13.33	Loaders	25.00
	-	Women	5.00
Total returns per day	-		-
Drivers Union	73.33	Chief	10.00
Village Council	146.67	Beach Comm	5.00
LG Council	183.33	Elders	20.00
Hon Parliamentarian	36.67	Councillor	5.00
Shareholders	3.77	Youths	0.17
Loaders	3.06	Loaders	3.57
	-	Women	0.17
Total returns per year	285,120.00		20,160.00
Drivers Union	21,120.00	Chief	2,880.00

	John Obey Beach US Dollars	Konakre Dee Beach	US Dollars
Village Council	42,240.00	Beach Comm	1,440.00
LG Council	52,800.00	Elders	5,760.00
Hon Parliamentarian	10,560.00	Councillor	1,440.00
Shareholders	73,920.00	Youths	1,440.00
Loaders	84,480.00	Loaders	7,200.00
	-	Women	1,440.00

Source: Field survey, Focus Group Discussions

SARGASSUM

Sargassum is a genus of brown (class Phaeophyceae) macroalgae (seaweed) in the order Fucales. Numerous species are distributed throughout the temperate and tropical oceans of the world, where they generally inhabit shallow water and coral reefs, and the genus is widely known for its planktonic (free-floating) species (From Wikipedia, the free encyclopedia). Pelagic Sargassum (*Sargassum muticum*), commonly referred to as seaweed or the golden tides, is a floating brownish alga. Satellite narrative maps indicate that the Sargassum seaweed blossONS naturally in the Sargasso Sea, spanning 2 million square miles in the warm waters of the North Atlantic Ocean.

The unprecedented quantity of pelagic Sargassum in the Caribbean islands in the spring of 2011 was subsequently reported for the first time along the coasts of Sierra Leone and the Gulf of Guinea in June 2011 (UNEP, 2014). Satellite images show an unusual spread throughout the tropical Atlantic. However, while the expansion of floating rafts of Sargassum from the Sargasso Sea to areas like the Gulf of Guinea may be seen as biological invasion in a broad sense of the definition, their occurrence and eventual deposit along the shoreline is not indicative of their colonizing shallow coastal habitats (Smetacek and Zingone, 2013).

Presently, the exact conditions (chemical, physical, or biological drivers) responsible for the unusual bloom of seaweeds in the region are unclear. However, the probable causes for the proliferation of the massive seaweeds in recent times are suggested as follows (UNEP, 2014):

Warming and changing of ocean temperature due to global climate change.

Increased land-based nutrients and pollutants (which include nitrogen-heavy fertilizers

and sewage waters) washing into the ocean water.

Flow of nutrients from the Congo River, Amazon River, Northwest Africa iron-rich dust.

Maritime traffic as a potential introduction vector.

Effects

As stated in UNEP (2014), recent reports on the invasion of Sargassum in West Africa and the Caribbean suggest that it is becoming a regional phenomenon, negatively impacting aquatic resources, fisheries, waterway, shorelines and tourism.

Ecological effects – Unfortunately, there is very little knowledge of the ecological impacts of invasive seaweeds on the ecosystem in general which needs to be assessed. The assumption however is that massive influx of seaweed has resulted to potential disturbance of marine life living in the coastal zone (dead fish and sea turtles have been found when Sargassum washes onto the shore in massive quantities, showing the potential correlation, beach fouling, and coastal dead zones.

Socio-economic effects– Massive Sargassum deposits on beaches has negative impact on the socioeconomic livelihood (tourism, fishery industries etc.) of coastal communities, hence the need to develop regional cooperation on ocean governance and ensure an ecologically friendly management

(transformation and value-addition to animal feed and fertilizers etc.) intervention of the Sargassum seaweed.

Alternative Uses of Sargassum

There are three possible economic uses for Sargassum harvested from the shoreline - use as a mulch or for composting, for production of fertilizers, and use in production of biogas (FAO, 2003; *N'Yeurt1 and Iese* (2014).

(1) Mulch or composting: Seaweed, particularly bladderwrack, kelp or laminaria, can be either applied to the soil as a mulch (although it will tend to break down very quickly) or can be added to the compost heap, where it is an excellent activator (Colby-Williams, 2006). A perhaps less serious potential problem with seaweed is its salt content. While it is unlikely to add sufficient seaweed to seriously upset the balances of salt in the soil, it is not liked by worms, who will not live in it. It can be hosed down before adding to the soil to reduce the salt content, or left to be desalinated by rainwater. Rinsing seaweed is risky as valuable alginates are potentially lost to runoff.

A potential disadvantage of the use of seaweed as mulch or for composting is the weight of the wet material which usually means that it has to be used on farms or gardens close to the shoreline – a situation that is not very common in Sierra Leone, except in the vast disappearing vegetable gardens along the Mahera beach on the Lungi peninsula.

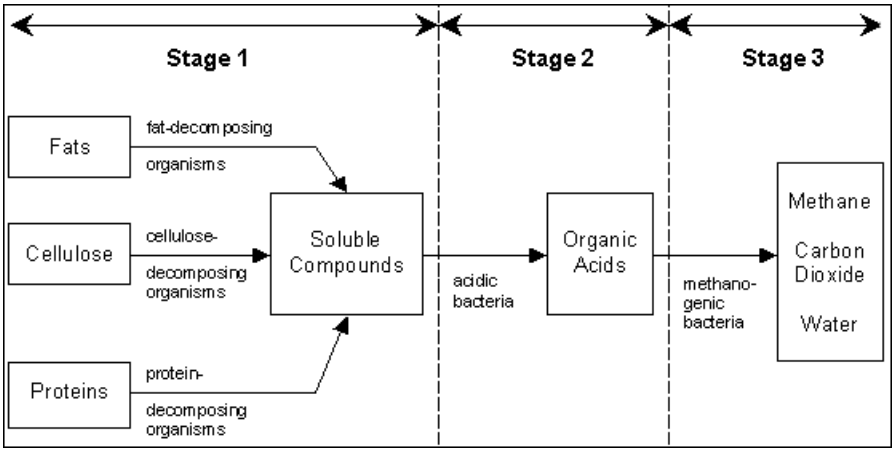
(2) Production of fertilizers: Fertilizer uses of seaweed date back at least to the nineteenth century. Early usage was by coastal dwellers, who collected storm-cast seaweed, usually large brown seaweeds, and dug it into local soils. The high fibre content of the seaweed acts as a soil conditioner and assists moisture retention, while the mineral content is a useful fertilizer and source of trace elements. In the early twentieth century, a small industry developed based on the drying and milling of mainly storm-cast material, but it dwindled with the advent of synthetic chemical fertilizers. Today, with the rising popularity of organic farming, there has been some revival of the industry, but not yet on a large scale; the combined costs of drying and transportation have confined usage to sunnier climates where the buyers are not too distant from the coast.

The growth area in seaweed fertilizers is in the production of liquid seaweed extracts. These can be produced in concentrated form for dilution by the user. Several can be applied directly onto plants or they can watered in, around the root areas. There have been several scientific studies that prove these products can be effective. In 1991, it was estimated that about 10,000 tonnes of wet seaweed were used to make 1,000 tonnes of seaweed extracts with a value of US$ 5 million (FAO, 2003). However, the market has probably doubled in the last decade because of the wider recognition of the usefulness of the products and the increasing popularity of organic farming, where they are especially effective in the growing of vegetables and some fruits.

(3) Production of biogas: The production of biomethane by anaerobic digestion is a three-step process (0) that occurs widely in nature within environments such as ocean and lake sediments, marshes, and the digestive tracts of animals, and first involves the biological conversion of the organic components of biomass into simple products such as acetate, carbon dioxide, and hydrogen by a mixed population of decomposing bacteria. A second set of acidic bacteria then converts these soluble compounds into organic acids, which are then utilized by a mixed population of methanogenic bacteria to produce methane (60%) and carbon dioxide (40%) with trace amounts of hydrogen sulfide and other gases, at an optimum temperature range of 37°C (mesophylic bacteria) to 54°C (thermophylic bacteria). Thermophylic digestion is less stable, but gives up to 20% more yield than the colder mesophylic conversion (Gunaseelan, 1997; Chynoweth, 2002; Brown & Caldwell, 2008). The overall chemical reaction can be summarized as follows:

The three stages of anaerobic digestion involving three sets of specialized bacteria

$C_6H_{10}O_5 + H_2O \longrightarrow 3CO_2 + 3CH_4$



Source: N'Yeurt & Iese (2014) siting Encyclopedia of Alternative Energy ww.daviddarling.info/encyclopedia/A/ AE_anaerobic_digestion.html)

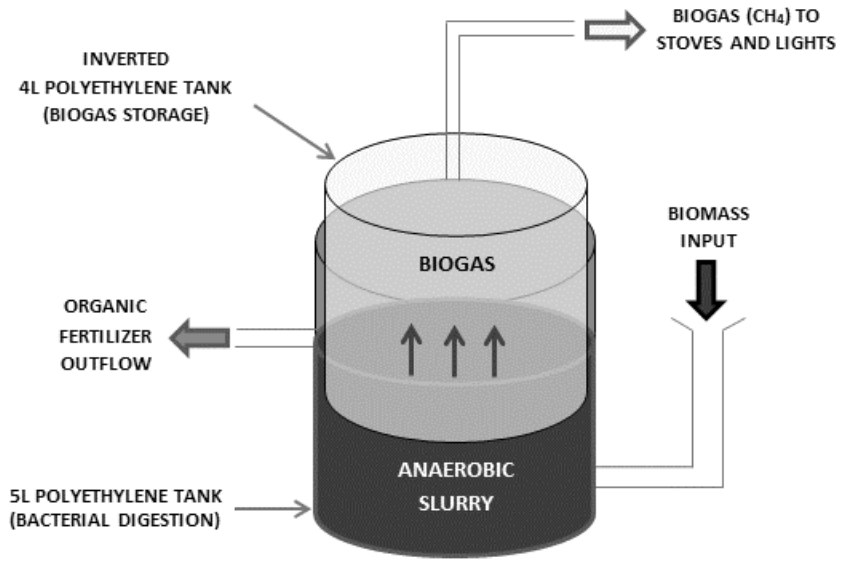
In general, brown algae such *Sargassum* spp. have a lower methane yield than green algae, but are the easiest to digest, while red algae such as *Gracilaria* spp. have higher yields but are the most difficult to process (0). While it has been demonstrated that digestion to methane can occur with macroalgae, a lot of research is still needed to fine-tune the process. In particular, for large-scale production, the performance of the anaerobic digestion process at normal tropical ocean temperatures needs to be improved, efficient bacteria need to be screened, selective breeding and expanded culture studies need to be carried out, and digesters (0) have to be designed specifically for macroalgae (Stanley, 2009). However, macroalgae have a promising future for biofuel production, due to their higher yield rate and absence of inhibiting lignocellulose compared to terrestrial plants (Sikes *et al*., 2011).

Biogas yield from different seaweed species.

Species	Methane yield (dm3 CH4 g-1 VSadd)
Gracilaria spp.	0.25 – 0.40 1, 2
Ulva spp.	0.22 – 0.33 2, 3
Sargassum spp.	0.12 – 0.19 1

Sources : *N'Yeurt & Iese (2014) citing* Bird *et al*. (1990); 2 Roesijadi *et al*. 2010 ; 3 Migliore *et al*. 2012.

Schematic of a typical domestic anaerobic digester for biomass designed in the context of renewable energy projects in Pacific Islands such as Tuvalu and Fiji.



Source: *N'Yeurt & Iese (2014)*

LGCF project interventions

From the discussions above we can conclude that to consider the conversion of beach harvested Sargassum to fertilizers in a country like Sierra Leone a number of factors have to be addressed:

The irregularity and unpredictability of the supply – what is the probability that Sargassum will appear on a given beech, when and in what quantities?

The cost of removing the salt and drying – Sargassum usually appears in the rainy season when sun drying capabilities are limited, and mechanical drying is expensive

What is the potential demand for such fertilizers in a country where fertilizer use in very low?

What production processes would be cost effective, e.g. adaptation of the system used by an entrepreneur in the Bahamas (UTube - Seaweed Use.htm)?

For production of biogas, the aim should be to develop a versatile anaerobic digestion method using low-cost, locally available materials that can cater for both marine biomass such as Sargassum, and terrestrial wastes such as pig and human manure and garden refuse, depending on respective supplies. There is a huge amount of excess biomass available, which at present is being disposed of in a less than well-managed manner.

It is evident that these imponderables make it impracticable for the proposed LDCF project to invest in fertilizer or biogas production. However, the project should lay the foundation for informed decision making in the future by commissioning studies from University Research departments to undertake studies aimed at producing appropriate designs for Sargassum fertilizer and biogas systems with ex-ante assessments of the economic viability of the proposed systems

MANGROVE REHABILITATION

Around the Sierra Leone coastal water body can be found extensive fringes of mangroves, tidal swamps and intertidal mud flats. They support thousands of migratory and shore birds, and through the process of leaf decay, provides a regular supply of nutrients to the surrounding environment, which forms the basis for the food supply to shellfish, prawns, fish and many other animals. The mangrove root system builds up land by accumulating silt and organic matter. It purifies the water by filtering out heavy metals and organic waste.

In Sierra Leone, mangrove forest in the more accessible and populated areas are over-exploited for fuelwood, charcoal and other wood products. Large tracts are also converted to rice fields and salt industry. A report submitted to Government (Chong, 1987) on the assessment of the mangrove resource and their development potential in Sierra Leone shows that mangrove woodlands occupy 47% of the Sierra Leone coastline, covering a total area of 171,600 ha and its rational management and integrated utilization can contribute significantly to the fuel wood and energy requirements in Sierra Leone and especially the coastal areas.

Mangroves in different areas of Sierra Leone

Location	Scarcies River	Sierra Leone River	(Western Area)	Yawri Bay	Sherbro River	TOTAL
Ha	13,007	34,234	(7,139)	24,505	99,854	171,600 ha
Percent	7.6	19.9	(4.2)	14.3	58.2	100.0 %

Source: Chong, 1987

In Sierra Leone, mangrove forests are found in the coastal area, usually on tidal flats at the mouths of rivers. Stilted shrubs or trees are frequent. Along creeks, the trees are larger and the forest is dense, resulting in a "gallery forest" effect. Extensive areas of large trees (*Rhizophora racemosa*) up to 40 m are found e.g. in the Sherbro River complex. The mud flats between creeks have a low mangrove cover, usually less dense. The main tree species are *Rhizophora racemosa, Rhizophora mangle* and *Rhizophora harrisonii*. The first is a pioneer species at the edge of the water. The other two are dominant upstream at the tidal limits, where *Avicennia africana* (syn *A. nitida*), *Conocarpus erectus* and *Laguncularia racemosa* can also be found. On the fringe of the mangroves, grasses occur together with ferns and halophytes.

Within the pilot project areas selected mangroves can be found in the RAMSAR site-Aberdeen Creek in Freetown and the Sierra Leone river estuary in the Kambia and Port Loko Districts. The mangroves in the Aberdeen creek (see 0), serve as a value and sieve for the runoff from the Hill Station and Wilberforce Hills. It protects the Lumley and Aberdeen communities from flooding, siltation and erosion.

Mangroves in the Aberdeen Creek

Why restore?

The mangrove forest in Sierra Leone are being cleared for fuelwood production, agriculture, salt making, boat making, tanning leather, poles for transmission of electric energy, fish and oyster traps etc

As Lewis (2001) points out, restoration or rehabilitation of mangroves may be recommended when a system has been altered to such an extent that it can no longer self-correct or self-renew. Under such conditions, ecosystem homeostasis has been permanently stopped and the normal processes of secondary succession (Clements 1928) or natural recovery from damage are inhibited in some way.

It has been reported that mangrove forests around the world can self-repair or successfully undergo secondary succession over periods of 15-30 years if: 1) the normal tidal hydrology is not disrupted and 2) the availability of waterborne seeds or seedlings (propagules) of mangroves from adjacent stands is not disrupted or blocked (Watson 1928, Lewis 1982, Cintron-Molero 1992).

Because mangrove forests may recover without active restoration efforts, it is recommended that restoration planning should first look at the potential existence of stresses such as blocked tidal inundation that might prevent secondary succession from occurring, and plan on removing that stress before attempting restoration (Hamilton and Snedaker 1985, Cintron-Molero 1992). The second step is determined by observation if natural seedling recruitment is occurring once the stress has been removed. Only if natural recovery is not occurring should the third step of assisting natural recovery through planting, be considered.

No such assessment is available for mangroves under threat in Sierra Leone. However, mangrove re-planting exercises have been undertaken in projects in the past including the Forestry Department/FAO plantings in the Orogu River estuary decades ago, and the EPA "National Response Programme on the RAMSAR Site- Aberdeen Creek, Freetown, Sierra Leone, To Address The Damage Caused By Encroachment" which has reportedly partially replanted 250 acres of mangroves, The Conservation Society of Sierra Leone (CSSL) which planted 10,000 mangrove trees at the Sierra Leone River Estuary, Crab Town, Aberdeen in

Freetown to protect migrating birds and fish as well as to prevent environmental degradation by land encroachers and sand miners. CSSL earlier planted in 3,650 acres but report that the trees were destroyed by sand miners revealing that the organization believes in community sensitization and cordial relationship and would formulate bye-laws involving all stakeholders and law enforcement agencies to protect the trees.

Lewis and Marshall (1997) have suggested five critical steps are necessary to achieve successful mangrove restoration.

Understand the autecology (individual species ecology) of the mangrove species at the site, in particular the patterns of reproduction, propagule distribution and successful seedling establishment

Understand the normal hydrologic patterns that control the distribution and successful establishment and growth of targeted mangrove species

Assess the modifications of the previous mangrove environment that occurred that currently prevents natural secondary succession

Design the restoration program to initially restore the appropriate hydrology and utilize natural volunteer mangrove propagule recruitment for plant establishment

Only utilize actual planting of propagules, collected seedlings or cultivated seedlings after determining through Steps 1-4 that natural recruitment will not provide the quantity of successfully established seedlings, rate of stabilization, or rate of growth of saplings established as goals for the restoration project.

It is proposed that the project should undertake the activities above at selected sites along the coastline of Sierra Leone. Once restored, the sites, can be used for testing of ecotourism activities. Strong collaboration should be established with the on-going USAID financed West Africa Biodiversity and Climate Change project (WA BiCC). 0 provides an estimate for restoration of a 500ha pilot site.

Indicative cost of restoration of pilot mangrove sites in Sierra Leone

	Atlas Code	Total (US$)
Study of autecology and hydrology		
Contract of 2 local expert for 12 months	72125	72,000
Allow for restoration works	72105	100,000
Replanting of mangroves (if needed)		
Propagules @ 3,000 plants per ha @$0.25 per plant	72305	360,000
Labour	63105	36,000
Tools & equipment	72210	36,000
Total Cost		604,000

Source: Author estimates based on EPA experience in restoration activities at the Aberdeen Creek

ARTISANAL FISHING

There is a definite pattern in the distribution of fish species on the continental shelf of Sierra Leone (Longhurst, 1965). The available data indicate that the distribution of a number of species is limited by the depth of the thermocline and is influenced by the type of bottom

deposits (sand and silts), and the depths on the continental shelf, the slope of which is variable. There are discrete ecological fish communities, each of which is fairly homogeneous. However, there is also ecological and microgeographical heterogeneity of fish communities. Besides, migration of species from the estuaries and creeks to the open shelf areas and vice versa is known to occur.

The following fish communities are exploited by the artisanal fishing units (FAO 1986):

the estuarine and creek sciaenid sub community,

the offshore suprathermoclinal sciaenid sub community (on soft deposits),

the sparid sub community (on sandy and harder substrates),

the eurybathic fish species

the pelagic fish species.

1 Estuarine and creek sciaenid sub community

The sciaenid sub community inhabiting the estuaries and creeks consists of Pseudotolithus elongatus, Polydactylus quadrifilis, Pomadasys jubelini, Drepane africana, Arius spp., Cynoglossus, Ilisha africana, Ethmalosa fimbriata, Penaeus duorarum notialis, Parapenaeopsis atlantica, Trichiurus lepturus, Sphyraena, etc.

2 Offshore suprathermoclinal sciaenid sub community

The dominant elements of this fish subcommunity are: Pseudotolithus senegalensis and P. Typus (Sciaenidae); Galeoides decadactylus and Pentanemus quinquarius (Polynemidae); Pomadasys jubelini (Pomadasyidae); Drepane africana (Drepanidae); Arius spp. (Ariidae); Cynoglossus spp. (Cynoglossidae); Ilisha africana and Ethmalosa (Clupeidae).

3 Inshore suprathermoclinal sand and rocky bottom sparid community

Pagrus ehrenbergi, (= Sparus caeruleostictus), Pagellus coupei, Decapterus punctatus, Dentex spp. And Epinephelus are common on the sand and rocky bottms in the inshore suprathermocline areas.

4 Deepwater subthermocline sparid community

The deepwater sparid community which occurs on both sandy and muddy bottONS below the thermocline, down to the edge of the continental shelf includes: Dentex angolensis (= Dentex congoensis), Sparus caeruleostictus (Pagrus ehrenbergi), Pagellus coupei, Boops boops, Epinephelus and Arioma ledanoisi, Balistes, etc.

5 Eurybathic fish species

The fish species with a large vertical range of distribution on the continental shelf of Sierra Leone area: Cynoglossus, Vomer setepinnis, Brachydeuterus auritus, Trichiurus lepturus, Raja spp., shrimps and prawns, etc. It should be noted that this eurybathic fish species group is harvested both by the artisanal fishermen and the industrial fleet. But there is no proper documentation on migration patterns of species constituting this fish group.

6 Pelagic fish species

There is a somewhat diverse pelagic fishery resource (Okera, 1976; Longhurst, 1983). The coastal pelagic fish species include Caranx, Sphyraena, Cybium, Trichiurus, Sardinella, Ethmalosa, Chloroscombrus, Vomer, Ilisha africana, etc.

Threats to fishing

All the fish communities are under some threat from over fishing, however the most threatened are the first (estuarine) and the third (inshore) communities. Consequently, MFMR is encouraging more off shore than inshore fishing, which also relieves pressure on the breeding grounds for marine fisheries.

Returns to artisanal fishing

Artisanal fishing is lucrative in Sierra Leone (0), yielding incomes that are more than from sand mining, and still following the condition that was shown to have existed over decades (Linsenmeyer, 1976; Spencer and Byerlee, 1976).

Employment & Cost/Benefit for off shore fishing using different boats

	Sarakasa (Channel boats)		Hook & Line		Lehgo Chain		Draw Chain (Beach Seine)	
	Leones	US Dollars	Leones	US Dollars	Leones	US Dollars	Leones	US Dollars
Fisheries Standard	5-10							
Power	15 - 25HP		8-15HP		5-15HP			
Average Crew	10		4		6		5	
Costs								
Boat & Equipment	70,000,000	11,667	25,000,000	4,167	50,000,000	8,333	35,000,000	5,833
Annual Depr (5 years life)	14,000,000	2,333	5,000,000	833	10,000,000	1,667	7,000,000	1,167
Maintenance (10% per year)	7,000,000	1,167	2,500,000	417	5,000,000	833	3,500,000	583
Fuel (12 gals per day)	175,000	29	175,000	29	175,000	29	175,000	29
Annual Fuel	50,400,000	8,400	50,400,000	8,400	50,400,000	8,400	50,400,000	8,400
Revenue								
Catch per day	50-90 Bath pans		10-20 Kuta					
Average Catch per day - Value	3,500,000	583	2,250,000	375	5,250,000	875	9,000,000	1,500
Annual returns @24 day per month	1,008,000,000	168,000	648,000,000	108,000	1,512,000,000	252,000	2,592,000,000	432,000
Net gain								
Per boat per year	936,600,000	156,100	590,100,000	98,350	1,446,600,000	241,100	2,531,100,000	421,850
Per boat per day	3,252,083	542	2,048,958	341	5,022,917	837	8,788,542	1,465
Per crew per day*	325,208	54	512,240	85	837,153	140	1,757,708	293
Per crew per month*	7,805,000	1,301	12,293,750	2,049	20,091,667	3,349	42,185,000	7,031
*** Note - Crew returns include portion paid to chain drawers in Lehgo Chain & Draw Chain systems**								

Source: Field survey, Focus Group Discussions in Konakridi

Adaptation

(a) Reduce in shore fishing and capacitate fisher folk to fish more off shore

As an alternative livelihood system, the LDCF Project could consider financing of the procurement and distribution of different types of boats (one boat per group) with associated equipment (outboard motors, nets etc) to youth groups in sand mining communities (0), creating employment for youth as crew members, and shore based members. Groups will be expected to supply all operation cost item (e.g. fuel, repair of nets etc.), and maintain the boats from the revenues generated. Beneficiary crews could receive training at the MFMR training school and other establishments in Sierra Leone.

Support to youth groups for eco-friendly and sustainable fisheries

	Atlas Codes	Sarakasa (Channel boats)	Hook & Line	Lehgo Chain	Draw Chain (Beach Seine)	Fibre Glass boats	Total
No Boats/Groups		10	10	10	0		30
Unit Cost - Boats & Equipment (US$)		11,667	4,167	8,333	5,833		
Total Cost (US$)	72605	116,667	41,667	83,333	-	-	241,667

(b) Invest in post-harvest value chain to provide employment for women

The marine domestic fish supply landed on the coast comes from three different sources. Raw fresh fish are landed by a large number of small-scale producers as well as in relatively larger quantities by a few large-scale producers in Freetown. These sources are supplemented by imports of raw frozen fish from foreign trawling fleets. As reported by Linsinmeyer (1976), separate market channels have evolved to accommodate the variability and form of these three sources. A large number of smoke processors, each processing a small quantity, handle the daily catch of the small-scale producers. Smoked fish wholesalers aggregate small-scale catches and deliver them to inland markets where they may be purchased either by other wholesalers who carry the product further inland or by retailers who supply local urban and rural consumers.

Because of improvements of the transportation system from the Freetown Peninsular fish landing point to Freetown, a lot of the small scale catch in these suites are transported and sold fresh in Freetown markets. However, for most of the other landing points along the coast, most of the small-scale domestic catch is preserved and eaten in the smoked form.

Usually smoke processing is undertaken by the fisherman's wife as soon as the catch is landed, although increasing quantities are now handled by professional traders, almost all women. Larger species are gutted and sectioned to increase the surface area of the fish exposed to the heat and smoke, thus facilitating a faster and more thorough drying process.

Traditional smoking

The traditional technology of the smoking platform (banda) is still almost universally used throughout the coastal areas. The raised smoking platform may vary in size but in general, its efficiency is limited because the heat generated by the fire below is used only once as it passes through the single layer of fish. In contrast, the improved smoking ovens of Nigeria, Ghana, and Mali, layer the fish on six or seven wire racks stacked on top of each other, allowing the heat to pass through several layers before escaping; thus, reducing fuel cost.

The traditional banda may be housed in a small- corner of the family kitchen or in a separate well-ventilated structure. During the dry season, additional platforms may be constructed out of doors to facilitate processing of the increased seasonal catch. Local hardwoods provide the basic fuel with preference being given to trees of low pitch content. Coconut hulls, rice hulls and other combustibles may also be used. Kerosene is frequently used to ignite the fuels in order to create a more even temperature throughout the drying surface when a large catch is being quickly processed.

Improved smoke ovens

The modified Altona oven and the Chorkor oven have been adapted and introduced to Sierra Leone by the MFMR. The Altona oven ovens consists of seven square wooden-framed trays measuring four feet by four feet with wire mesh across the bottom, which are layered inside the oven. The oven is made of local brick with a thin cement plaster on the inside and has a corrugated iron roof. The modified altona oven requires considerably more capital investment than the traditional banda but uses approximately 40 percent less fuel and only one fourth the labor required by the banda per unit of fish processed. An additional advantage of the altona oven is that it produces a more uniform product having a longer shelf life than is capable on the traditional banda. Fish, hot-smoked for three-four hours on the traditional banda, frequently need additional re-drying by wholesalers and retailers after four-five days while fish smoked for a comparable time in the altona oven have an estimated shelf life of six to ten days depending on humidity and initial moisture content.

Modern small scale cold roONS

Modern small scale cold roONS are also being promoted by MFMR, as shown in 0 below.

Project support

MFMR has prepared a project for development of fish post harvest value chains. The target beneficiaries of the “Fish market and cold chain development project” will be the women fish processors, small scale fish traders and the artisanal fishermen who are often capital starved and at the same time incur heavy losses as a result of fish spoilage due to poor or inappropriate storage and distribution facilities. Also, to benefit from the project is the general provincial population who hardly has access to quality fresh, frozen or smoked fish products at all times. A value chain consists of a landing site, an associated fish market, and transportation between the two.

Interior view of typical cold room

The MFMR project proposes that at the fish landing sites, the project will promote the use of efficient fish handling, processing and preservation techniques and methodologies. Each site will comprise of a fish handling and processing section, cold room, ice making plant, rodent free store for smoked fish, smoke ovens, training hall with the availability of water and toilet facilities. Initially a core of MFMR personnel will be given specialized trainings to supervise the sites, before they are handed over to the communities through a public-private sector participation arrangement.

At a proposed fish market located in a District headquarter town of a Ward in Freetown, fish will be stored and sold to the public. In addition, these facilities will provide not only preservation of the fish but also produce and market ice. Markets will be set up. Each market will have one refrigerated truck for transport of fresh fish from the landing site. They will be set up in populated provincial towns, where certain basic utilities such as electrify, water supply and toilets are available, with provision made for standby facilities. Each market should have the following space and equipments - open hall/reception area, Cold room, ice making machines/plant, storage for smoked fish, generator house and generator, water well with hand pump.

An alternative for the proposed LDCF project to consider is to support MFMR to set up and operate one or two pilot value chains, in the project pilot areas, e.g. Conakry Dee–Port Loko, Tombo/Hamilton–Freetown. 0 shows the estimated cost of the proposed investment.

Indicative costs of support to post harvest processing of fish in Sierra Leone – two value/cold chains

	Atlas Codes	Landing site	Transport	Market	Total Cost (US$)
Building - Unit cost		80,000		80,000	160,000
Equipment & Cold room		80,000		100,000	180,000
Refrigerated trucks - unit Cost		60,000	60,000		120,000
Total Cost per value chain (US$)		220,000	60,000	180,000	460,000
Total Cost all value chains(US$)	72600	440,000	120,000	360,000	920,000

PILOTING ECOTOURISM

Ecotourism is described as a form of tourism involving visiting fragile, pristine, and relatively undisturbed natural areas, intended as a low-impact and often small-scale alternative to standard commercial (mass) tourism. Its purpose may be to educate the traveler, to provide funds for ecological conservation, to directly benefit the economic development and political empowerment of local communities. Since the 1980s ecotourism has been considered a critical endeavor by environmentalists, so that future generations may experience destinations relatively untouched by human intervention.

Responsible ecotourism programs include those that minimize the negative aspects of conventional tourism on the environment and enhance the cultural integrity of local people. Therefore, in addition to evaluating environmental and cultural factors, an integral part of ecotourism is the promotion of recycling, energy efficiency, water conservation, and creation of economic opportunities for local communities.[4] For these reasons, ecotourism often appeals to advocates of environmental and social responsibility.

Alternative options for project to consider include the development of a 1-2 km Boardwalk with associated facilities (rest areas, restaurants, sanitation facilities, tour boats) in restored mangroves, as a pilot ecotourism development activity. A boardwalk is a constructed pedestrian walkway along or overlooking ecological zones usually built with wood boards or as walking paths and trails over bogs and wetlands and above fragile ecosystems (See 0 & 0).

Horican Marsh Boardwalk in Wisconsin, USA (Allen_C from Prairie du Sac, WI, USA - Horicon_Marsh boardwalkTaken by w:User:Wonder al.)

Board walk with rest area

Constructing and operation of a Boardwalk in a restored mangrove area, such as Aberdeen creek has the advantage that it would provide an alternative livelihood for communities, who could be involved during the construction phase on a cash-for-work program, as well as employment in the associated tourism activities that would follow, e,g. employment as tour guides, restaurant workers, etc.. Tourists, and educational tours for students etc, would be able to view the rich

fauna, including migratory birds, and the fauna of a mangrove forest. Projected costs are in 0 below.

Indicative costing for construction and operation of Boardwalk: example of Aberdeen Creek Pilot Ecotourism site

	Atlas Code	Unit Cost	Total (US$)
Boardwalk (inclding sanitation & restaurant areas)			
Length (km)		1	
Cost /Km (US$)	72605	750,000	750,000
Sight seeing Boats			
Number		2	
Cost/boat (US$)	72605	10,000	20,000
Training			
Community sensitization	74210	50,000	50,000
Training - Guides etc	63405	50,000	50,000
Operational costs			
Number of years		4	
Annual staff costs (30 guides etc)	71310	60,000	240,000
Maitainance of Boardwalk (10% capital cost)	72105	75,000	300,000
GRAND TOTAL			1,410,000

MICROFINANCE

What is Microfinance?

Microfinance is a source of financial services for entrepreneurs and small businesses lacking access to banking and related services. The two main mechanisms for the delivery of financial services to such clients are: (1) relationship-based banking for individual entrepreneurs and small businesses; and (2) group-based models, where several entrepreneurs come together to apply for loans and other services as a group.

Microcredit is part of microfinance. Modern microcredit is generally considered to have originated with the Grameen Bank founded in Bangladesh in 1983. (Bateman, 2010). Many traditional banks subsequently introduced microcredit despite initial misgivings. Microcredit is now widely used in developing countries and is presented as having "enormous potential as a tool for poverty alleviation" (Cons and Paprocki, 2008)

Benefits and Limitations

Micro financing produces many benefits for poverty stricken, or low- income households. One of the benefits is that it is very accessible. Banks today simply won't extend loans to those with little to no assets, and generally don't engage in small size loans typically associated with micro financing. Through micro financing small loans are produced and accessible. Micro financing is based on the philosophy that even small amounts of credit can help end the cycle of poverty. Another benefit produced from the micro

financing initiative is that it presents opportunities, such as extending education and jobs. (Rutherford, 2009).

There are also many challenges within microfinance initiatives which may be social or financial. Here, more articulate and better-off community members may cheat poorer or less-educated neighbours. This may occur intentionally or inadvertently through loosely run organizations. As a result, many microfinance initiatives require a large amount of social capital or trust in order to work effectively. The ability of poorer people to save may also fluctuate over time as unexpected costs may take priority which could result in them being able to save little or nothing some weeks. Rates of inflation may cause funds to lose their value, thus financially harming the saver and not benefiting collector (Rutherford, 2009). Mission drift which refers to the phenomena through which the Micro Finance Institutions (MFIs) increasingly try to cater to customers who are better off than their original customers, primarily the poor families, also occurs often.

As reported by IFAD (2013), the MFIs in Sierra Leone extend credit which is repayable by small monthly installments without any grace period. The terms and conditions on which the MFIs extend credit to commercial enterprises are not suitable for agricultural lending due to their short maturity, frequent repayments, and the lack of any grace period. In addition, most of the MFIs prefer to deal with female customers (51% to 100% of active borrowers are female). This means that a significant section of the population (males) is not factored into their programmes and services. From the information obtained, the services of the MFIs do not address the needs of the majority of rural people, who are essentially small-scale farmers.

Microfinance in Sierra Leone

A network of rural financial institutions, consisting of Community Banks (CBS) and Financial Service Associations (FSAs) supportrd by an apex organization (Apex Bank) has been established through the MAFFS' Rural Finance and Community Improvement Program supported by the International Fund for Agricultural Development (IFAD). In addition, some commercial banks and international NGOs offer microfinance services in the country.

Community Banks (CBs): CBs, which are regulated by the Bank of Sierra Leone (BOSL), comprises a network of 17 community banks (CBs)are now offering the following products and services in rural areas: (i) deposits, (ii) remittances, (iii) payment systems, (iv) loans, (v) client financial education and (vi) small business development. At present, CBs offer both individual and group loans. These can be for commercial/trading purposes, agricultural production purposes, socio–economic purposes (salary loans), industrial activities purposes and for community activities (purchase of bicycles, motor bikes and mobile phones). They also offer overdraft facilities for schools and commercial clients. The loan size ranges from USD 40-80 to USD 8.000-16.000); loan duration is on average 1-6 months, but for agricultural loans, this can range between 10-12 months depending on the seasonality of the crop. The interest rate is around 2.5%-3.00% flat per month, but in most cases, agricultural loans are bullet paid with an interest rate of 25% per annum

Financial Services Associations (FSAs): FSAs registered with the Ministry of Social Welfare continue to mobilize savings in the form of equity. Products and services offered in rural areas are mainly: (i) safekeeping, (ii) micro-loans, and (iii) money transfers. Shareholders can access loans for a maximum amount equivalent to 4 times his/her share-capital. The co-financed IFAD and Italian Development Cooperation project introduced the first FSAs into Sierra Leone, adapting the model from the Kenya original. The model has been repeatedly improved upon and replicated/ up scaled under the IFAD-supported RFCIP. FSAs are rural financial institutions providing a range of financial services to their shareholders, who own the institutions. They aim at establishing locally accessible, locally owned and operated financial institutions. Loans to shareholders are financed principally from locally mobilized

equity, which constitutes the village banks' risk capital. The loans are guaranteed by the group lending mechanism, or by the bank's knowledge of the individual borrower, deriving from the close relationships and local knowledge held by the FSAs. The loans can be accessed only by shareholders, and the loan size is based on the individual share value (up to 4 times the value of the share). By end 2015, the number of operational FSAs reached 65.

BRAC: (formerly Bangladesh Rehabilitation Assistance Committee, and Bangladesh Rural Advancement Committee), is an international development organisation based in Bangladesh, established by Sir Fazle Hasan Abed in 1972. BRAC is present in all 64 districts of Bangladesh as well as other countries in Asia, Africa, and the Americas.

BRAC is the most active microfinance NGO in Sierra Leone. Its microfinance programme in Sierra Leone provides loans to women who are not served by other microfinance institutions, giving them the opportunity to start their own businesses in their local communities. Borrowers of microloan are not required to provide collateral, and reimburse their loans on a weekly basis against competitive interest rates. BRAC offers microloans along with other services, and provides small enterprise programme loans to entrepreneurs who are seeking to expand their business. The loans comprise of:

Microloans – delivered through village organisations (VOs), an organised group of women who come together to improve their socioeconomic position. The VOs meet weekly to make their loan repayments and to discuss credit decisions with BRAC's credit officers. BRAC provides financial literacy training and technical assistance to these members, enabling them to increase income from existing activities as well as start new income generating activities.

Small enterprise programme - BRAC offers small enterprise loans ($ 800 to $ 10,000) to individual entrepreneurs who seek to expand their business. The loans enable these business owners, who otherwise have limited access to mainstream financial services which are too big to qualify for microloans and demand larger collateral, to create new employment opportunities and provide new services. Loan repayments are made on a monthly basis, with iinterest rate - 2.5% per month, and a loan duration- 6/12 months. Some members of the microloan programme become eligible for small enterprise loan as their businesses expand, requiring bigger investment.

Microfinance in the LDCF project

Instead of attempting to set up an independent project based microfinance operation, it is proposed that the LDCF project should explore the alternative of capacitating existing institutions, such as the CBs and NGO which provide enterprise loans (e.g. BRAC) and are located in close proximity to the project pilot sites, to cater to needs of project beneficiaries. Capacitating may take the form of providing concessional funds to the financing institutions for on-lending to project beneficiaries, and working with the contracted institutions to develop lending instruments tailor-made for project beneficiaries.

Through this arrangement, it is expected that youths formerly engaged in sand mining and other deleterious activities, and willing to move into alternative livelihood activities, either as individuals or in Youths Groups/Cooperatives, will readily access concessional credit to support activities that seek to overcome barriers that entrepreneurs and SMEs face as a result of market failures that limit their capacity to access financial and business development services, technology, knowhow, partnerships, and markets. Thus, the concessional medium to long-term credit will provide funding for youth associations and SMEs to: (i) access labor and other services required for production activities; (ii) access services required to supply their commodities to markets; (iii) develop entrepreneurial capabilities; (iv) consolidate supply chains; (v) access business advisory services; and (vi) access technologies, technology transfer, and new institutional arrangements.

The choice of the CBs & NGOs such as BRAC is based on several reasons: First, they represent the widest network easily accessible to the majority of entrepreneurs in the rural areas; secondly, they have a

mechanism for savings mobilization and credit provision, based on members' shareholding capacity, thereby avoiding the risk of massive default; thirdly, this will provide an opportunity to build-up the portfolio of rural financing which is critical for sustainable rural economic. Other options such as commercial banks and FSAs institutions were considered, but the high interest rates, shorter maturity periods and limited coverage in the rural areas precluded the use of these other options.

The financing through the CBs/NGOs should be structured in such a way as to provide production support customized to the needs of the groups/entrepreneurs according to their specific activities along their chosen commodity value-chain. Mobilization, sensitization and organization of the beneficiaries will be done through relevant institutions such as the Ministry of Fisheries and Marine Resources (MFMR), Ministry of Youths, etc.

TRAINING AND CAPACITY BUILDING

It is expected that the project will develop and deliver training/capacity building sessions to Local Government technical staff and SL-ICZM-WG/ Board officers/decision makers on:

Integration of climate change adaptation into district plans and budgets;

Skills to assist coastal districts to review their plans and budgets to integrate climate change adaptation issues; and

Skills for preparation of strategy for resilient livelihoods and development pathways for coastal communities.

0 presents an estimate of the indicative costs of holding a one-week residential training workshop in Sierra Leone

Indicative costs of holding a one week residential training workshop in Sierra Leone

	Number of days		7	
WORKSHOP	International Participants (Trainers)		2	
	Local Participants		30	
	Total participants		32	
Elements des couts	Rate	No days	Quantity	Total US $
Air tickets	1,500	1	2	3,000
Per diem for International Trainers	300	8	2	4,800
Reimbursment of local transport	100	1	40	4,000
Honorium - facilitator/Local trainer	300	1	10	3,000
Rental - Plenary Room	300	7	1	2,100
Rental - Breakout roONS	200	7	1	1,400
Coffee breaks (2/day)	15	0	32	0
Lunch	30	7	32	6,720

Cocktail	3,000	7	0	0
Interpreters (2)	1,400	7	0	0
Translation of documents	300	7	0	0
Vidéo projector	20	7	1	140
Hire of Bus	300	7	1	2,100
Television coverage	700	1	0	0
Written press	300	1	1	300
File covers	5	1	32	160
Note books	5	1	32	160
Pens/pencils	1	2	32	64
Photocopying	10	1	32	320
Others	500	1	1	500
- - -				0
- - -				0
- - -				0
TOTAL (US $)				28,764

SUMMARY OF OPTIONS AVAILABLE AND RECOMMENDATIONS

Using Seaweeds

There are three possible economic uses for Sargassum harvested from the shoreline - use as a mulch or for composting, for production of fertilizers, and use in production of biogas.

It is evident that given the current state of knowledge in Sierra Leone, it is impracticable for the proposed LDCF project to invest in fertilizer or biogas production. However, the project should lay the foundation for informed decision making in the future by commissioning studies from University Research departments to undertake studies aimed at producing appropriate designs for Sargassum fertilizer and biogas systems with ex-ante assessments of the economic viability of the proposed systems.

Mangrove rehabilitation

Within the pilot project areas selected mangroves can be found in the RAMSAR site-Aberdeen Creek in Freetown and the Sierra Leone river estuary in the Kambia and Port Loko Districts.

The mangrove forest in Sierra Leone are being cleared for fuelwood production, agriculture, salt making, boat making, tanning leather, poles for transmission of electric energy, fish and oyster traps, etc.

To develop an alternative livelihood system in this area, the LDCF project should first undertake five critical activities at selected sites along the coastline of Sierra Leone: (1) understand the autoecology (individual species ecology), (2) understand the normal hydrologic patterns that control the distribution and successful establishment and growth of targeted mangrove species, (3) assess the modifications of the previous mangrove environment that occurred that currently prevents natural secondary succession, (4) design a restoration program to initially restore the

appropriate hydrology and utilize natural volunteer mangrove propagule recruitment for plant establishment, and (5) only utilize actual planting of propagules, collected seedlings or cultivated seedlings after determining through Steps 1-4 that natural recruitment will not provide the quantity of successfully established seedlings, rate of stabilization, or rate of growth of saplings established as goals for the restoration project.

Piloting Ecotourism

Once restored, mangrove swamp sites, can be used for piloting of ecotourism activities. Alternative options for project to consider include the development of a 1-2 km Boardwalk with associated facilities (rest areas, restaurants, sanitation facilities, tour boats) in restored mangroves, as a pilot ecotourism development activity. Strong collaboration should be established with the on-going USAID financed West Africa Biodiversity and Climate Change project (WA BiCC).

Artisanal Fishing

All the fish communities in Sierra Leone's coastal belt are under some threat from over fishing, however the most threatened are the first (estuarine) and the third (inshore) communities. Consequently, MFMR is encouraging more off shore than inshore fishing, which also relieves pressure on the breeding grounds for marine fisheries.

In order to reduce in-shore fishing and capacitate fisher folk to fish more off-shore, and as an alternative livelihood system, the LDCF Project could consider financing the procurement and distribution of different types of boats (one boat per fishing group) with associated equipment (outboard motors, nets, etc.) to youth groups in sand mining communities.

Also, the project should consider investing in post-harvest value chains to provide employment for women, by supporting MFMR to set up and operate one or two pilot value chains, in the project pilot areas, e.g. Conakry Dee–Port Loko, Tombo/Hamilton–Freetown. A value chain consists of a landing site, an associated fish market, and transportation between the two.

Supporting microfinance

Instead of attempting to set up an independent project based microfinance operation, the LDCF project should explore the alternative of capacitating existing institutions, such as the CBs and NGOs which provide enterprise loans (e.g. BRAC) and are located in close proximity to the project pilot sites, to cater to needs of project beneficiaries. Capacitating may take the form of providing concessional funds to the financing institutions for on-lending to project beneficiaries, and working with the contracted institutions to develop lending instruments tailor-made for project beneficiaries

Capacity building

The project should consider developing and delivering training/capacity building sessions to Local Government technical staff and SL-ICZM-WG/ Board officers/decision makers on:

Integration of climate change adaptation into district plans and budgets;

Skills to assist coastal districts to review their plans and budgets to integrate climate change adaptation issues; and

Skills for preparation of strategy for resilient livelihoods and development pathways for coastal communities.

REFERENCES

Bateman, Milford (2010). Why Doesn't Microfinance Work? Zed Books.

Clements, F.E. (1928), Plant Succession and Indicators, New York: H. W. Wilson Co.

Cintron-Molero, G. (1992), 'Restoring mangrove systems', in G. W. Thayer, ed., Restoring the Nation's Marine Environment, College Park: Maryland Seagrant Program, 223-277.

Chong, P. W. (1987), Proposed management and integrated utilization of mangrove resources in Sierra Leone. FAO / Ministry of Agriculture, Natural Resources and Forestry. FO: DP / SIL / 84 /

Chong, P. W. (1989), Mangrove management planning and implementation. FAO / Ministry of Agriculture, Natural Resources and Forestry. Field Document no. 6. 75p.

Cons, Jason and Kasia Paprocki (2008) The Limits of Microcredit—A Bangladeshi Case. Food First Background, Institute for Food and Development Policy, volume 14, number 4., 398 60th Street, Oakland, CA 94618, USA

FAO, 1986). Marine Fishery Resources of Sierra Leone: A review of exploited fish stocks, by G. W. Ssentongo FAO Fisheries Department, Rome, and M. Ansa-Emmim CECAF Project, Dakar, Rome, Italy

IFAD (2013). Rural Finance and Community Improvement Programme – Phase II (RFCIP2), Detailed design report.

Lewis, R.R. (1982a), 'Mangrove forests', in R.R. Lewis, ed., Creation and Restoration of Coastal Plant Communities. Boca Raton: CRC Press, 153-172

Lewis, R.R. (1982b), 'Low marshes, peninsular Florida', in R.R. Lewis, ed., Creation and Restoration of Coastal Plant Communities. Boca Raton: CRC Press, 147-152.

Linsenmeyer, Dean A. (1976) Economic analysis of alternative strategies for the development of Sierra Leone marine fisheries. Working Paper, No 18, African Rural Economy Program, Departments of Agricultural Economics, Njala University College, Njala, Sierra Leone & Michigan State University, East Lansing, Michigan, USA

Longhurst, A. (1965). Bionomics of the Sciaenidae of tropical West Africa. J.Cons.CIEM, 29(1):23–114

Ministry of Fisheries and Marine Resources (MFMR), 2014, Fish market and cold chain development project, project proposal

Roy R. Lewis III (2001) Mangrove Restoration - Costs and Benefits of Successful Ecological Restoration. In review, Proceedings of the Mangrove Valuation Workshop, Universiti Sains Malaysia, Penang, 4-8 April, 2001. Beijer International Institute of Ecological Economics, Stockholm, Sweden.

Rutherford, Stuart; Arora, Sukhwinder (2009). The poor and their money: micro finance from a twenty-first century consumer's perspective. Warwickshire, UK: Practical Action. p. 4. ISBN 9781853396885.

Snedaker, J. (1987), 'Mangrove mythology', Florida Naturalist. Fall, 1987, pp. 7-8.

Spencer, D.S.C., and Byerlee, D. (1976). "Technical Change, Labor Use and Small Farmer Development: Evidence from Sierra Leone", *American Journal of Agricultural Economics,* Vol. 58, No. 5, December.

Spurgeon, J. (1998), 'The socio-economic costs and benefits of coastal habitat rehabilitation and creation', Marine Pollution Bulletin 37(8-12): 373-382.

UICN (2007), Strategies for Conservation and Sustainable Management Of Mangrove Forest In Sierra Leone

USAID West Africa (2015) West Africa Biodiversity and Climate Change (WA-BiCC), Fact Sheet

Watson, J.G. (1928), Mangrove Forests of the Malay Peninsula. Malayan Forester, Record No. 6. Federated Malay States

Annex 6. Multi Year Work Plan

Task	Responsible Party	Year 1				Year 2				Year 3				Year 4				Year 5			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 1.1: Acquire and install an oceanographic monitoring network (ONS).	USL-IMBO SLMD/A																				
Output 1.2: Setup/strengthen the MFMR, EPA-SL, SLMD/A, ONS, SLMA and USL-IMBO Climate & Oceanographic/Marine Forecasting Capacity	USL-IMBO SLMD/A																				
Output 1.3: Creation of synergies with the existing CIDMEWS to share collected coastal climate data	EPA-SL																				
Output 1.3: Carry out conceptual Coastal Vulnerability Analysis (CVA); Create Coastal Vulnerability Index (CVI);	USL-IMBO EPA-SL																				
Output 1.4: Procure four (4) advanced workstations for USL-IMBO and EPA-SL	USL-IMBO EPA-SL																				
Output 1.4: Renewal/purchase of Oceanographic/Marine modelling license and train: Two (2) EPA, one (1) MFMR and one (1) USL-IMBO technicians, four (4) Geographic Information Systems Specialist, 10-20 *MFMR,* USL-IMBO, EPA staff to carry out Participatory Community Coastal Vulnerability Assessment, 10-20 *MFMR,* USL-IMBO, EPA staff to carry out post vulnerability assessment work	USL-IMBO EPA-SL																				
Output 2.1: Carry out community participatory Coastal Vulnerability Analysis (CVA) and develop Coastal Vulnerability Reports for each of the six Districts.	EPA-SL																				
Output 2.2: Conduct Community and participatory shoreline assessment of community assets (infrastructure and ecosystems) vulnerable to coastal storms and sea level rise,	EPA-SL																				
Output 2.2: Develop specific EbA guidance manual to support construction of ecosystem based interventions.	EPA-SL																				
Output 2.3: Review current marine use planning guidelines and processes; & develop options for Marine Spatial Planning (MSP) governance arrangements	EPA-SL																				

Output 2.3: Prepare of a draft implementation plan for MSP	EPA-SL																				
Output 2.4: Develop and endorse Coastal Policy Guidance documents at the National and District levels	EPA-SL																				
Output 2.4: Develop rules, procedures and operational instruments and corresponding fiduciary standards designed to support the establishment of an ICZM	EPA-SL																				
Output 3.1: Develop and deliver training and capacity building sessions on Integrated Coastal Zone Management (ICZM); & Undertake public awareness campaign with training for trainers at least 25 community leaders (which 50% are women)	EPA-SL USL-IMBO MFMR Training Institute and SLAFU																				
Output 3.1: Produce (i) audio-visual production (booklets and videos) for community awareness raising consultations and events (e.g. for Community members, schools and TV) for different age groups (Women & Youth); (ii) at least 3 documentaries short film (Participatory Video of about 10 minutes including YouTube publication)	MFMR Training Institute and SLAFU																				
Output 3.2: (i) Procuring and providing standard artisanal fishing equipment to at least 10 youth mining groups in hotspots such as Lakka and Hamilton; (ii) Undertaking youth skills training and capacity building[75] to become professional as crew members, and shore based group members expected to supply all operation (e.g. fuel supply, repair of nets, boat repairs, etc.)	MFMR																				
Output 3.2: Establish *Communal Centres for Coastal and Marine Resources Transformation (CCMART's) and Centre for Skills Development (CSD)*	MFMR																				
Output 3.2: Establishment and operationalization of two complete[76] pilot post-harvest value chain units at	MFMR																				

[75]In close cooperation with The Sierra Leone Artisanal Fishermen Union – SLAFU: Fish net mending techniques, boat construction/repair/maintenance, carpentry, welding, electrical technicians, plumbing, etc.

[76]Comprising of a fish landing point, transportation means, fish handling and processing section, cold room, ice making plant, rodent free store for smoked fish, smoke ovens, training hall with the availability of water and hygienic facilities.

Konakridee–Port Loko axis and Tombo/Hamilton–Freetown axis in coastal zone;																					
Output 3.2: Development of post-harvest value chain components in Shenge and Turtle Island sites	MFMR																				
Output 3.2: Develop Community based Extension Service (CES) to strengthen resilient coastal small-scale farming.	MFMR/ MAFFS																				
Output 3.2: Set up partnerships with local CBOs.	EPA-SL																				
Output 3.3: Construction of a training Center to increase the awareness and understanding of the benefits – both economic and environmental – of shifting to CSEBs	MWHI																				
Output 3.3: Organize five 18-days training sessions for 40 people each	MWHI																				
Output 3.3: Draw up an industry standard and code of conduct that reflects best practices in CSEB production	MWHI																				
Output 3.4: Establish community-run nurseries for propagation of mangrove.	EPA-SL NPAA																				
Output 3.4: Carry out rehabilitation of 500ha of degraded mangrove	EPA-SL NPAA																				
Output 3.4: Carry out rehabilitation[77] of identified degraded beach area[78] using ecosystem based approaches	EPA-SL NPAA																				
Output 3.4: Implement selected Engineering Designs for selected[79] coastal protection options in Lumley beach.	EPA-SL																				
Output 3.4: Explore innovative means of mechanically clearing seaweed/sargassum; Procure Youth Task Force on a "cash for work" scheme and/or private entrepreneurship for seaweed/sargassum clearing.	EPA-SL NTB																				
Output 3.5: Initiate arrangements for the establishment of Coastal Early Warning System	USL-IMBO																				

[77] Undertaking building sand fences (hessian and date palm), planting of seagrass, trees (native *Casuarina* spp. or other local beach tree) and native locally adapted vegetative grassy plants species on dune systems over approximately 1-2 Km of beach to stabilize sand and to protect mangrove ecosystems and vulnerable villages from increased storm activity because of climate change.

[78] Identified through feasibility studies to be carried out during the Project Initiation Phase.

[79] Identification and selection of coastal protection options carried out through Feasibility study carried out in each of the project pilot sites.

(CIEWS); develop all the necessary communications, transmission and data exchange interventions; Develop capacity and make provision to strengthen Community Radio stations;	SLMD/A																				
Output 3.5: Deliver Training Workshops on: developing local warning dissemination and response mechanisms to at least 5 local coastal civil protection officers (per pilot sites x6=30),	USL-IMBO SLMD/A																				
Output 3.5: Develop toll-free mobile number and toll-free text and pictorial "sms"[80] to warn fishermen at sea.	USL-IMBO SLMD/A																				
Output 3.5: Procure equipment for Strengthening the Sierra Leone Costal Guard (VHF IC-M71 radios, engine powered rubber inflatable boats, AM/FM Weather Alert Radio sets)	USL-IMBO SLMD/A																				

[80]Short Message Service (SMS) is a text messaging service component of phone, Web, or mobile communication systems. It uses standardized communications protocols to allow fixed line or mobile phone devices to exchange short text messages.

Annex 7. Monitoring Plan

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
Project Outcome 2 *Develop appropriate protection measures, policy/legal tools and integrated coordination*	***Indicator 1***	Number of ICZM plans that integrate climate change SLR induced risks and vulnerability.	*Project monitoring and APRs/PIR*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Sierra Leone Environmental Protection Agency (EPA-SL) are able to recruit and train enough technical personnel to carry out vulnerability and risk assessments.*

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
mechanisms to improve /support policy design and implementation in dealing with current and long-term coastal challenges.							*2. Initial coastal vulnerability studies and technical assessments are accurate in their predictions of coastal impacts.*
Project Outcome 3	***Indicator 1***	Number of technical officers and policy	*Project monitoring and APRs/PIR*	Annually	*Project Management*	*Consultant report*	Government Public Departments in the Districts are

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
Public awareness enhanced and climate resilient alternatives to sand mining promoted for better adhesion of policy makers and		makers qualified to conduct awareness raising campaigns to disseminate knowledge on Integrated Coastal Zone Management (ICZM), Climate Change Vulnerability Assessment, and		Reported in DO tab of the GEF PIR	*Project consultant*	*APRs/PIR*	willing to make available sufficient candidates and are interested in collaborating in the training and capacity building activities.

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
communities on adaptation.		Sectoral and Livelihood Adaptation Planning issues in the six coastal districts (Conakry Dee, Lakka & Hamilton, Tombo, Shenge and Turtle Island)					
	Indicator 2	Number of youth and sand mining groups	*Gender sensitive field survey /*	Annually	*Project Management*	*Consultant report*	Community Leaders in the six target sites are willing to

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
		previously engaged in sand mining adopt alternative climate-resilient livelihoods;	*(Questionnaire based appraisal - CBA)*	Reported in DO tab of the GEF PIR	*Project consultant*	*APRs/PIR*	cooperate in the awareness raising campaign. Specialized NGO's and CBO's are willing to cooperate in the awareness raising campaign.
	Indicator 3	Number of ha of mangrove restoration, undertaken in the six	*Project monitoring and APRs/PIR*	Annually	*Project Management*	*Consultant report*	Target communities are willing to cooperate in the participatory process of

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
		pilot sites to protect coastal community and infrastructure at risks.		Reported in DO tab of the GEF PIR	*Project consultant*	*APRs/PIR*	developing and implementing CC adaption plans. Government Public Works Department will provide support and resource inputs to implementation of coastal adaptation works

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
Mid-term GEF Tracking Tool (if FSP project only)	N/A	N/A	Standard GEF Tracking Tool available at www.thegef.org Baseline GEF Tracking Tool included in Annex 10.	After 2nd PIR submitted to GEF	*For example, national university; project consultant but not evaluator*	Completed GEF Tracking Tool	*List assumptions and risks to collecting the GEF TT data*

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
Terminal GEF Tracking Tool	N/A	N/A	Standard GEF Tracking Tool available at www.thegef.org Baseline GEF Tracking Tool included in Annex 10.	After final PIR submitted to GEF	*For example, national university; project consultant but not evaluator*	Completed GEF Tracking Tool	*List assumptions and risks to collecting the GEF TT data*

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Objective *Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods*	***Indicator 1***	The percentage change in vulnerability of youth and women living in the pilot sites to climate change induced risks threatening the coastal zone	*Gender sensitive field survey / VRA and/or local level assessments at demonstration sites (Questionnaire based appraisal - CBA)*	Annually Reported in DO tab of the GEF PIR	*Project Management Project consultant*	*Consultant report* *APRs/PIR*	*Communities (women and youths) are able to identify and engage in alternative income generating activities and resilient methods of CC adaption.* *Target communities are willing to cooperate in the participatory process of developing and implementing CC adaption plans.*
	Indicator 2	Number of direct project beneficiaries.	*As above*	*As above*	*As above*	*As above*	*As above*
Project Outcome 1 *Enhance the availability of high quality climate risk information that is critical for development decision-making in the coastal zone.*	***Indicator 1***	Percentage of coastal area in the 6 communes covered under improved observation to generate quality climate risk information.	*Local level assessments at demonstration sites.*	Annually Reported in DO tab of the GEF PIR	*Project Management*	*Consultant report* *APRs/PIR*	*Costs of equipment and training will not rise dramatically during project implementation and technical expertise* *and equipment for upgrading the network is available.* *Procurement and installation of equipment is not delayed due to slow release of funds, lengthy administration processes and data transmission systems are robust enough.*
Mid-term Review (if FSP project only)	N/A	N/A	To be outlined in MTR inception report	Submitted to GEF same year as 3rd PIR	*Independent evaluator*	Completed MTR	
Environmental and Social risks and management plans, as relevant.	N/A	N/A	Updated SESP and management plans	Annually	Project Manager UNDP CO	Updated SESP	

Annex 8. Evaluation Plan

Evaluation Title	Planned start date Month/year	Planned end date Month/year	Included in the Country Office Evaluation Plan	Management Response	Budget for consultants[81]	Other budget (i.e. travel, site visits etc…)
Mid-Term Evaluation	Between 2nd and 3rd PIR.	July 2020	Mandatory	Mandatory	US$ 30,000	Provisions made in the cost provided
Terminal Evaluation	After terminal PIR	To be submitted to GEF within three months of operational closure. January 2023	Mandatory	Mandatory	US$ 40,000	Provisions made in the cost provided
Total evaluation budget					US$ 70,000	

[81] The budget will vary depending on the number of consultants required (for full size projects should be two consultants); the number of project sites to be visited; and other travel related costs. Average # total working days per consultant not including travel is between 22-25 working days.

Annex 9. Terms of Reference for key project groups, staff and specialists

These Terms of Reference and reporting lines will be confirmed, and slighted reviewed if needed, during the LPAC meeting.

NATIONAL PROJECT MANAGER

The Project Manager will be nationally recruited, based on an open competitive process. He/She will be responsible for the day-to-day administration of the project as she/he will be delegated on full-time basis to the project implementation. He/she will take guided by the Project Director and will directly report to him/her. He/she will be responsible for the overall management of the project, meeting government obligations under the project, under the direct implementation modality (DIM), including the mobilization of all project inputs and supervision over consultants and sub-contractors.

Duties and Responsibilities

Supervise and coordinate the production of project outputs, as per the project document;

Mobilize all project inputs in accordance with procedures for directly implemented projects;

Supervise and coordinate the work of consultants and sub-contractors;

Coordinate the recruitment and selection of project personnel;

Prepare and revise project work and financial plans;

Liaise with UNDP, relevant government agencies, and all project partners, including donor organizations and NGOs for effective coordination/implementation of all project activities;

Facilitate administrative backstopping to subcontractors and training activities supported by the Project;

Oversee and ensure timely submission of the Inception Report, Combined Project Implementation Review/Annual Project Report (PIR/APR), Technical reports, quarterly financial reports, and other reports as may be required by UNDP, GEF, EPA-SL and other oversight agencies;

Disseminate project reports and respond to queries from concerned stakeholders;

Report progress of project to the PSC, and ensure the fulfilment of PSC directives.

Oversee the exchange and sharing of experiences and lessons learned with relevant community based integrated conservation and development projects nationally and internationally;

Ensure the timely and effective implementation of all components of the project;

Assist relevant government agencies and project partners - including initiatives financed by donor organizations and executed by NGOs - with development of essential skills through training workshops and on the job training thereby upgrading their institutional capabilities;

Coordinate and assists scientific institutions with the initiation and implementation of any field studies and monitoring components of the project;

Carry regular field visits of all sites and the activities.

FINANCE ASSOCIATE

The Project Finance Associate will be locally recruited by UNDP based on an open competitive process. He/She will be responsible for the overall financial administration of the project. He/she will be based in Luanda to facilitate coordination with UNDP and EPA-SL. The Finance Associate will report to the National Project Manager.

Duties and Responsibilities

Prepare and follow-up UNDP/GEF financial reports using Atlas (UNDP financial system);

Contribute to the preparation and implementation of progress reports;

Monitor budgets and financial expenditures;

Advise all project counterparts on applicable administrative and financial procedures and ensures their proper implementation;

Support the preparations of project work-plans and operational and financial planning processes;

Assist in procurement and recruitment processes;

Assist in the preparation of payments requests for operational expenses, salaries, insurance, etc. against project budgets and work plans;

Follow-up on timely disbursements by UNDP CO;

Perform other duties as required.

PROJECT ASSISTANT

The Project Assistant will be locally recruited based on an open competitive process, and based in Cunene to directly support the National Manager. He/She will be responsible for the overall administration of the project. He/she will report to the National Project Manager.

Duties and Responsibilities

Collect, register and maintain all information on project activities;

Monitor project activities

Maintain project correspondence and communication;

Receive, screen and distribute correspondence and attach necessary background information;

Assist in logistical organization of meetings, training and workshops;

Prepare routine correspondence and memoranda for Project Managers signature;

Prepare agendas and arrange field visits, appointments and meetings both internal and external related to the project activities and write minutes from the meetings;

Maintain project filing system

Maintain records over project equipment inventory; and

Perform other duties as required.

TECHNICAL ADVISER

The Technical Adviser (TA) will be internationally recruited by UNDP and she/he will be responsible for providing overall technical backstopping to the Project. He/she will provide technical support to the National Project Manager (NPM), staff and other government counterparts. To facilitate his/her functions, she/he will be based in Luanda with frequent travels to Cunene. The TA will coordinate the provision of the required technical inputs, reviewing and preparing Terms of Reference and reviewing the outputs of consultants and other sub-contractors. He/she will report directly to the National Project Director and UNDP.

Duties and Responsibilities

Provide technical and strategic assistance for project activities, including planning, monitoring and site operations;

Prepare and implement a capacity development plan on climate change adaptation;

Prepare Terms of Reference for consultants and sub-contractors, and assist in the selection and recruitment process;

Ensure quality control of interventions/outcomes/deliverables;

Support the Manager, consultants and sub-contractors for the timely delivery of expected outputs, with international quality standards, and effective synergy among the various sub-contracted activities;

Assist the National Project Manager by providing technical inputs during the preparation and revision of the Management Plan, Annual Work Plans, periodic reports such as the Combined Project Implementation Review/Annual Project Report (PIR/APR), inception report, technical reports, quarterly reports for submission to UNDP, the GEF, other donors and Government Departments, as required;

Assist the National Project Director in other Adaptation to climate change related issues, ensuring coordination among national interventions in the sector in liaison with project partners, donor organizations, NGOs and other groups to ensure effective coordination of project activities;

Assist in undertaking revisions in the implementation program and strategy based on evaluation results and orientations received from the National Director and the PSC;

Document lessons from project implementation and make recommendations to the Steering Committee for more effective implementation and coordination of project activities; and

Perform other tasks as may be requested by the National Project Director.

Annex 10. UNDP Social and Environmental and Social Screening Template (SESP)

The completed template, which constitutes the Social and Environmental Screening Report, must be included as an annex to the Project Document. Please refer to the Social and Environmental Screening Procedure and Toolkit for guidance on how to answer the 6 questions.

Project Information

Project Information	
1. Project Title	"Adapting to climate change induced coastal risks in Sierra Leone"
2. Project Number	5178
3. Location (Global/Region/Country)	Sierra Leone

Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?
Briefly describe in the space below how the Project mainstreams the human-rights based approach
This is an Adaptation project to Climate Change impacts. All the communities, NGO's and CBO's and Women Associations contacted were willing to engage and collaborate in the project design process and there no human-right issues have been identified. The proposed project has NO environmental and social impacts that could affect indigenous people or other vulnerable groups, instead all Activities and initiatives are to benefit the communities in general.
Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment
The project includes specific measures for any impacts to gender equality and women's empowerment to be positive and beneficial. Project outcomes will contribute to an understanding of how adaptation responses can be designed to strengthen gender equality. To achieve this, the project will ensure that women attend workshops and are part of adaptation option interventions on pilot sites and community based EWS, and also community management committees. In addition, the project will undertake gender sensitive training, and communication to warnings to be disseminated to vulnerable communities. Women account for over 90% of the people engaged in fish marketing, over 80% of retailers of food products and vegetables, and over 90% of operators involved in the artisanal processing of agricultural and fishery products. Women will be empowered by enabling them to take action to get involved in local coastal adaptation projects and invest in sustainable livelihood activities. Women focused NGOs are involved throughout the project design and implementation. The project will ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in the implementation of all adaptation measures. In addition, responsibilities will also be given to women not only in the development of coastal structures, and execution of simple 'soft' coastal protection measures, but also as: the key agents for the improvement of waste management techniques and creation of alternative livelihoods through waste collection, waste recycling and ecotourism; leaders of small-scale Communal Centres for Coastal and Marine Resources Transformation (CCMART's) where approximately 10,000 people (mostly women) will benefit from the establishment of these *CCMART's* to promote community based adaptation initiatives. Women will also be key members of the local Women's Associations involved in alternative Farming and Fish smoking techniques to be implemented by the Project. These responsibilities will be financially rewarded, initially through the project budget under a "cash for work" scheme during the implementation. Finally, women members of society, in addition to youth groups, will receive skills training and technical assistance to acquire the skills and tools for developing, small scale adaptation livelihoods. This included training specifically women in new skills in agriculture, forestry and fishery techniques such as building irrigation systems and cultivation of high crop varieties (Outcome 3).
Briefly describe in the space below how the Project mainstreams environmental sustainability

The project does NOT involve removing mangroves from coastal zones, NOR does encourage land use plans that would suggest building houses on coastal zones that could increase the surrounding population's vulnerability to climate change, specifically flooding. This is an adaptation project intended to regenerate degraded Mangrove ecosystem and help the development of Vulnerability and risk Mapping of coastal areas to support National Authorities to implement a better land planning in coastal zone.

In addition, the LDCF funding will strengthen the in-country capability to manage coastal and marine resources under the adverse conditions exacerbated by climate change with the provision of relevant small scale and community based alternative livelihoods and skills. A great percentage of people (including women) will benefit from the establishment of Communal Centres for Coastal and Marine Resources Transformation (CCMART's) to promote community based adaptation initiatives. In addition, the great majority of youth (gender discriminated) will benefit from the creation of the Centre for Skills Development (CSD's) located near Lakka and Hamilton sites to assist youth associations in developing skills for alternative income generating activities to curb intense degradation of the coastline through mangrove cutting and sand mining.

Part B. Identifying and Managing Social and Environmental Risks

QUESTION 2: What are the Potential Social and Environmental Risks? *Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any "Yes" responses). If no risks have been identified in Attachment 1 then note "No Risks Identified" and skip to Question 4 and Select "Low Risk". Questions 5 and 6 not required for Low Risk Projects.*	QUESTION 3: What is the level of significance of the potential social and environmental risks? *Note: Respond to Questions 4 and 5 below before proceeding to Question 6*			QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?
Risk Description	***Impact and Probability (1-5)***	***Significance (Low, Moderate, High)***	***Comments***	***Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.***
Risk 1: …. *No Risks Identified*	I = P =			
Risk 2 ….	I = P =			
Risk 3: ….	I = P =			
Risk 4: ….	I = P =			
[add additional rows as needed]				

	QUESTION 4: What is the overall Project risk categorization?		
	Select one (see SESP for guidance)		**Comments**
	Low Risk	X	
	Moderate Risk	☐	
	High Risk	☐	

	QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?		
	Check all that apply		**Comments**
	Principle 1: Human Rights	☐	

	Principle 2: Gender Equality and Women's Empowerment	☐	
	1. Biodiversity Conservation and Natural Resource Management	☐	
	2. Climate Change Mitigation and Adaptation	☐	
	3. Community Health, Safety and Working Conditions	☐	
	4. Cultural Heritage	☐	
	5. Displacement and Resettlement	☐	
	6. Indigenous Peoples	☐	
	7. Pollution Prevention and Resource Efficiency	☐	

Final Sign Off

Signature	***Date***	***Description***
QA Assessor		UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
QA Approver		UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
PAC Chair		UNDP chair of the PAC. In some cases PAC Chair, may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC.

SESP Attachment 1. Social and Environmental Risk Screening Checklist

Checklist Potential Social and Environmental Risks		
Principles 1: Human Rights		**Answer (Yes/No)**
1.	Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	No
2.	Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? [82]	No
3.	Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	No
4.	Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	No
5.	Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	No
6.	Is there a risk that rights-holders do not have the capacity to claim their rights?	No
7.	Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	No
8.	Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals?	No
Principle 2: Gender Equality and Women's Empowerment		

[82] Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

1.	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	No
2.	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	No. Women and youth will be equally involved in the process to review and update risk data, identify key adaptation solutions, and include information on any new or emerging vulnerabilities and hazards. In addition, the living conditions and employment opportunities of Women and Young will be improved through climate resilient alternatives livelihoods and extension of micro-finance products to be created by the project and used by the community (at least 50% women and Youth) to build livelihoods' resilience to climate shocks including livelihoods diversification.
3.	Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	No. All NGO's and CBO's and Women Associations contacted were willing to engage and collaborate in the project design process.
4.	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? *For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being*	No. This is an adaptation project intended to regenerate degraded Mangrove ecosystem., protect the coastal areas as well as to improve Women's livelihoods.
Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below		
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management		
1.1	Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services? *For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes*	No
1.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	No. The project is implemented jointly with the support and advice from the National Protected Area Authority.
1.3	Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	No
1.4	Would Project activities pose risks to endangered species?	No
1.5	Would the Project pose a risk of introducing invasive alien species?	No. The proposed dune fixation activity will be carried out using local vegetative species.
1.6	Does the Project involve harvesting of natural forests, plantation development, or reforestation?	No. The project only intends to carry out only rehabilitation of degraded mangrove on identified critical areas (including along parts of the Sierra Leone River estuary and Aberdeen Creek) using local some suitable varieties.
1.7	Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	No.

1.8	Does the Project involve significant extraction, diversion or containment of surface or ground water? *For example, construction of dams, reservoirs, river basin developments, groundwater extraction*	No.
1.9	Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	No.
1.10	Would the Project generate potential adverse transboundary or global environmental concerns?	No.
1.11	Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? *For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.*	No.
Standard 2: Climate Change Mitigation and Adaptation		
2.1	Will the proposed Project result in significant[83] greenhouse gas emissions or may exacerbate climate change?	No. On the contrary the intended rehabilitation of degraded mangrove areas which will reach about 500 ha will contribute for CO2 sink. In addition, the intended improvement of fish smoking techniques with the introduction of modified "altona" oven which uses approximately 40 percent less fuel and only one fourth the labour required by the currently used "banda" system per unit of fish processed will greatly reduce current greenhouse gas emissions.
2.2	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	No. This is purely an Adaptation Project.
2.3	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? *For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding*	No. On the contrary, the project's objective is to produce relevant data and climate information in support to a sustainable Land Planning in coastal zone to lessen population's vulnerability to climate change, specifically flooding.
Standard 3: Community Health, Safety and Working Conditions		
3.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	No. The project will invest in small scale rural infrastructure in multiple locations mainly linked to installation of Automatic Weather and Marine Stations. In addition, the proposed installation of coastal protection options will follow proper feasibility study guidelines. Furthermore, the investments are 'additional' to existing built infrastructure in order to increase the resilience of that infrastructure to climate risks. In this sense, there would not be any additional environmental

[83] In regards to CO_2, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]

		or social risks over and above the existing infrastructure.
3.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	No
3.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	No.
3.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	No
3.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	No.
3.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	No.
3.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	No.
3.8	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)?	No.
3.9	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	No.
Standard 4: Cultural Heritage		
4.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	No.
4.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	No.
Standard 5: Displacement and Resettlement		
5.1	Would the Project potentially involve temporary or permanent and full or partial physical displacement?	No.
5.2	Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	No.
5.3	Is there a risk that the Project would lead to forced evictions?[84]	No.
5.4	Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	No.
Standard 6: Indigenous Peoples		
6.1	Are indigenous peoples present in the Project area (including Project area of influence)?	No.

[84] Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

6.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	No.
6.3	Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)? *If the answer to the screening question 6.3 is "yes" the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.*	No.
6.4	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	No.
6.5	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	No.
6.6	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	No.
6.7	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	No.
6.8	Would the Project potentially affect the physical and cultural survival of indigenous peoples?	No.
6.9	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	No.
Standard 7: Pollution Prevention and Resource Efficiency		
7.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	No.
7.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	No. Instead the project intends to support The National Tourism Board to a better management of the seaweed/sargassum in affected beaches as well as promote a policy of cleanness with a pilot and an innovative responsive strategy for beach protection against seaweed/sargassum invasion including clearing up of beaches, transformation/utilization of debris in the current polluted beaches along the coastal zone having women and youth as the key agents for the improvement of waste management techniques and creation of alternative livelihoods through waste collection, waste recycling.
7.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? *For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol*	No.
7.4	Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	No.
7.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	No.

Annex 11. GEF Tracking Tool (s) at baseline

See Excel sheet attached as an annex

Annex 12. Co-Financing Letters and Agreements

GOVERNMENT OF SIERRA LEONE
Environment Protection Agency - Sierra Leone
Office of the President
21 Old Railway Line, Brookfields, Freetown

21st April, 2017

Ref: EPA-SL/UNDP.GEF/CCP/CF/17

Mrs. Adriana Dinu
GEF Executive Coordinator
United Nations Development Programme
One United Nations Plaza
304 East 45th Street
FF Bldg., 10th Floor
New York, NY 10017

Dear Sir/Madam,

LETTER OF CO-FINANCING COMMITMENT

On behalf of the Government of Sierra Leone I wish to commit to co-financing the project entitled "Adapting to climate change induced coastal risks management in Sierra Leone" submitted to the GEF, LDC Fund.

Given the total amount of secured financing, it is our pleasure to express the commitment of the Government of Sierra Leone and to inform you that we are prepared to contribute about three percent (3%) of the total project amount as in-kind support to the project.

The implementing entity of the said project is UNDP and the Environment Protection Agency is the lead institution. This project is the kind of initiative that the Government of Sierra Leone strongly support especially as it significantly contributes to the aspirations of the Agenda for Prosperity. As clearly outlined in the project document, the project will create enormous positive impacts on climate change adaptation of the most affected coastal communities and strengthen adaptive capacity of our institutions.

Furthermore, the outputs and indicative activities proposed in the current project are in line with many of the country's sector strategic plans and programmes and more importantly our development agenda.

Thus, the Government of the Republic of Sierra Leone will provide in-kind support to cover expenses related to office space and the infrastructure required for the successful completion of the project, as well as the necessary administrative and technical support. As a commitment to ensure effective implementation of the project, additional staff will be employed full time at our institution for the whole of the project implementation. The EPA-SL on behalf of the Government of Sierra Leone wishes to hereby guarantee that our institution will provide financial support for the salary of the Project Coordinating team for

the entire duration of the project. Moreover, all the existing equipment within the institution, shared facilities and expertise will be available for the project.

By this written commitment, the Environment Protection Agency also guarantees that the additional staff to be recruited to manage the project, will be able to dedicate the time necessary for coordinating the project implementation and achievement of the project goals, in accordance with the provision on the institutional roles indicated in the project document.

Finally, the Government of Sierra Leone will directly contribute to the project funding with financial contribution in the amount of 3% of the project cost (i.e. total equivalent of 299, 250 USD).

We thank you and look forward to a successful implementation of the project.

Yours sincerely,

.....

Haddijatou Jallow (Mrs.)
Executive Chairperson

GOVERNMENT OF SIERRA LEONE
Environment Protection Agency - Sierra Leone
Office of the President
21 Old Railway Line, Brookfields, Freetown

Ref: GoSL/CAP-CF/50517/GEF 5th May 2017

Ms. Adriana Dinu
GEF Executive Coordinator
United Nations Development Programme
One United Nations Plaza
New York, NY 10017

Dear Madam,

Commitment of Co-financing for a full-sized GEF Adapting to Climate Change induced Coastal risks management project in Sierra Leone

In addition to the initial letter of commitment for in-kind co-financing by the Environment Protection Agency towards the project "*Adapting to Climate Change induced Coastal risks management in Sierra Leone*" in a letter referenced ***EPA-SL/UNDP.GEF/CCP/CF/17***, I write in my capacity as the Executive Chairperson of the Environment Protection Agency which is the responsible institution for the implementation of this project, to confirm the commitment of the Government of the Republic of Sierra Leone to provide co-financing support to the project.

I am happy to advise you that through this letter, the Government of the Republic of Sierra Leone undertakes to provide in-kind support, to the value of USD 31,310,750.00 to this project to implement climate change adaptation and risk management activities as outlined in the project document.

We are making this commitment because we trust that this project will be helpful in mitigating and addressing climate change vulnerability issues within the coastal zones of the country. With the project focus and activities being consistent with key National Climate Change Adaptation strategies which also have the potential to promote the Agenda for Prosperity, this present us an opportunity to align the GEF project with ongoing programmes and projects.

As you are aware, the Government Blue print development agenda, the Agenda for Prosperity is being implemented within various sectors of Government with grants allocated to the various pillars. Apart from these, Government also has some other existing structures for which it sees this project as an opportunity to align activities for a successful climate change adaptation in the country.

Below are the areas of co-financing windows we have identified and wish to present this as our commitment in the tune of **31,310,750** USD, which covers specific areas of synergies.

No	Name of Co-financier	Amount (USD)	Areas of alignment with the Project
	Agenda for prosperity	4,150,000.00	Pillar 1 – Economic Diversification to Promote Inclusive Growth. Sub-sector 2. Fisheries. Sub-sector 3. Tourism: Promoting Local and International Tourism. Pillar 2. Managing Natural Resources.
	National Platform for Disaster risks reduction in Sierra Leone	27,160,750.00	National Disaster preparedness and Response fund which is setup by Government for addressing Climate change disaster/early warning and emergency response.

By this commitment, we are pleased to inform you that this co-financing will be spread over the duration of the project and will be mostly in kind support. While we look forward to doing our utmost to ensure this project meets the intended goals, Please accept Madam, the assurance of my highest consideration.

Yours sincerely,

.....

Haddijatou Jallow (Mrs.)
Executive Chairperson

United Nations Development Programme

Empowered lives.
Resilient nations.

2nd May 2017

Dear Adriana,

Letter of Co-Financing: GEF LDCF-Financed Project "Adapting to Climate Change Induced Coastal Risks in Sierra Leone"

We wish to confirm UNDP Sierra Leone Country Office's contribution to the above mentioned project, for a total amount of One Hundred and Ninety Thousand United State Dollars (US$ 190,000) should the GEF allocate Nine Million, Nine Hundred and Seventy Five Thousand United State Dollars (US$ 9,975,000). The co-finance will be spread across to cover the period of the project duration and be used to compliment the LDCF funds as outlined in the Project Document that has been submitted for approval, in line with the following project components:

Component 1: Generating sound scientific knowledge and access to information;
Component 2: Climate information "internalized" into coastal development policy and plans;
Component 3: Awareness and alternative, innovative activities to support adaptation in the coastal zone.

We look forward to the release of funds for the commencement of this project.

With kind regards,

Samuel Doe
Country Director
UNDP Sierra Leone

Adriana Dinu
Executive Coordinator
UNDP-Global Environmental Facility
Sustainable Development Cluster
Bureau for Policy and Programme Support
United Nations Development Programme
304 East 45th Street FF 914
New York, NY 10017, USA

Cc: Executive Chairperson
Environment Protection Agency
Sierra Leone (EPA-SL)

United Nations House, 55 Wilkinson Road, P.O. Box 1011, Freetown, Sierra Leone
VSAT: +31 20 5407 131, **Internet**: registry.sl@undp.org

Annex 13. UNDP Project Quality Assurance Report

PROJECT QA ASSESSMENT: DESIGN AND APPRAISAL

OVERALL PROJECT

EXEMPLARY (5) ◉◉◉◉◉	HIGHLY SATISFACTORY (4) ◉◉◉◉○	SATISFACTORY (3) ◉◉◉○○	NEEDS IMPROVEMENT (2) ◉◉○○○	INADEQUATE (1) ◉○○○○
At least four criteria are rated Exemplary, and all criteria are rated High or Exemplary.	All criteria are rated Satisfactory or higher, and at least four criteria are rated High or Exemplary. ✓	At least six criteria are rated Satisfactory or higher, and only one may be rated Needs Improvement. The SES criterion must be rated Satisfactory or above.	At least three criteria are rated Satisfactory or higher, and only four criteria may be rated Needs Improvement.	One or more criteria are rated Inadequate, or five or more criteria are rated Needs Improvement.

DECISION

- **APPROVE** – the project is of sufficient quality to continue as planned**.** Any management actions must be addressed in a timely manner.
- **APPROVE WITH QUALIFICATIONS** – the project has issues that must be addressed before the project document can be approved. Any management actions must be addressed in a timely manner.
- **DISAPPROVE** – the project has significant issues that should prevent the project from being approved as drafted.

RATING CRITERIA

STRATEGIC

1. Does the project's Theory of Change specify how it will contribute to higher level change? (Select the option from 1-3 that best reflects the project): • **3:** The project has a theory of change with explicit assumptions and clear change pathway describing how the project will contribute to outcome level change as specified in the programme/CPD, backed by credible evidence of what works effectively in this context. The project document clearly describes why the project's strategy is the best approach at this point in time. • **2:** The project has a theory of change. It has an explicit change pathway that explains how the project intends to contribute to outcome-level change and why the project strategy is the best approach at this point in time, but is backed by limited evidence. • **1:** The project does not have a theory of change, but the project document may describe in generic terms how the project will contribute to development results, without specifying the key assumptions. It does not make an explicit link to the programme/CPD's theory of change. *Note: Management Action or strong management justification must be given for a score of 1	**3** 2 1 **Evidence** See ProDoc
2. Is the project aligned with the thematic focus of the UNDP Strategic Plan? (select the option from 1-3 that best reflects the project): • **3:** The project responds to one of the three areas of development work[85] as specified in the Strategic Plan; it addresses at least one of the proposed new and emerging areas[86]; an issues-based analysis has been incorporated into the project design; and the project's RRF includes all the relevant SP output indicators. *(all must be true to select this option)* • **2:** The project responds to one of the three areas of development work[1] as specified in the Strategic Plan. The project's RRF includes at least one SP output indicator, if relevant. *(both must be true to select this option)* • **1:** While the project may respond to one of the three areas of development work[1] as specified in the Strategic Plan, it is based on a sectoral approach without addressing the complexity of the development issue. None of the relevant SP indicators are included in the RRF. This answer is also selected if the project does not respond to any of the three areas of development work in the Strategic Plan.	**3** 2 1 **Evidence** The project supports UNDP Strategic Plan Outcome 3: Resilience-building.

RELEVANT

3. Does the project have strategies to effectively identify, engage and ensure the meaningful participation of targeted groups/geographic areas with a priority focus on the excluded and marginalized? (select the option from 1-3 that best reflects this project): • **3:** The target groups/geographic areas are appropriately specified, prioritising the excluded and/or marginalised. Beneficiaries will be identified through a rigorous process based on evidence (if applicable.)The project has an explicit strategy to identify, engage and ensure the meaningful participation of specified target groups/geographic areas throughout the project, including through monitoring and decision-making (such as representation on the project board) *(all must be true to select this option)* • **2:** The target groups/geographic areas are appropriately specified, prioritising the excluded and/or marginalised. The project document states how beneficiaries will be identified, engaged and how meaningful participation will be ensured throughout the project. *(both must be true to select this option)* • **1:** The target groups/geographic areas are not specified, or do not prioritize excluded and/or marginalised populations. The project does not have a written strategy to identify or engage or ensure the meaningful participation of the target groups/geographic areas throughout the project. *Note: Management Action must be taken for a score of 1, or select not applicable.	**3** 2 1 *Select (all) targeted groups: (drop-down)* **Evidence** See section 2.4.2 in the Prodoc
	3 2 1

[85] 1. Sustainable development pathways; 2. Inclusive and effective democratic governance; 3. Resilience building

[86] sustainable production technologies, access to modern energy services and energy efficiency, natural resources management, extractive industries, urbanization, citizen security, social protection, and risk management for resilience

PROJECT QA ASSESSMENT: DESIGN AND APPRAISAL

4. Have knowledge, good practices, and past lessons learned of UNDP and others informed the project design? (select the option from 1-3 that best reflects this project):

- **3:** Knowledge and lessons learned (gained e.g. through peer assist sessions) backed by credible evidence from evaluation, corporate policies/strategies, and monitoring have been explicitly used, with appropriate referencing, to develop the project's theory of change and justify the approach used by the project over alternatives.
- **2:** The project design mentions knowledge and lessons learned backed by evidence/sources, which inform the project's theory of change but have not been used/are not sufficient to justify the approach selected over alternatives.
- **1:** There is only scant or no mention of knowledge and lessons learned informing the project design. Any references that are made are not backed by evidence.

*Note: Management Action or strong management justification must be given for a score of 1

Evidence

Extensive desk reviews, site visits and interviews have been conducted during the formulation to inform the design of the project

5. Does the project use gender analysis in the project design and does the project respond to this gender analysis with concrete measures to address gender inequities and empower women? (select the option from 1-3 that best reflects this project):

- **3:** A participatory gender analysis on the project has been conducted. This analysis reflects on the different needs, roles and access to/control over resources of women and men, and it is fully integrated into the project document. The project establishes concrete priorities to address gender inequalities in its strategy. The results framework includes outputs and activities that specifically respond to this gender analysis, with indicators that measure and monitor results contributing to gender equality. *(all must be true to select this option)*
- **2:** A gender analysis on the project has been conducted. This analysis reflects on the different needs, roles and access to/control over resources of women and men. Gender concerns are integrated in the development challenge and strategy sections of the project document. The results framework includes outputs and activities that specifically respond to this gender analysis, with indicators that measure and monitor results contributing to gender equality. *(all must be true to select this option)*
- **1:** The project design may or may not mention information and/or data on the differential impact of the project's development situation on gender relations, women and men, but the constraints have not been clearly identified and interventions have not been considered.

*Note: Management Action or strong management justification must be given for a score of 1

3 | 2 | 1

Evidence

See section 2.4.3 in the Prodoc. A gender expert has been recruited for the formulation of the Prodoc and visited the project sites to conduct a participatory gender analysis

6. Does UNDP have a clear advantage to engage in the role envisioned by the project vis-à-vis national partners, other development partners, and other actors? (select from options 1-3 that best reflects this project):

- **3:** An analysis has been conducted on the role of other partners in the area where the project intends to work, and credible evidence supports the proposed engagement of UNDP and partners through the project. It is clear how results achieved by relevant partners will contribute to outcome level change complementing the project's intended results. If relevant, options for south-south and triangular cooperation have been considered, as appropriate. *(all must be true to select this option)*
- **2:** Some analysis has been conducted on the role of other partners where the project intends to work, and relatively limited evidence supports the proposed engagement of and division of labour between UNDP and partners through the project. Options for south-south and triangular cooperation may not have not been fully developed during project design, even if relevant opportunities have been identified.
- **1:** No clear analysis has been conducted on the role of other partners in the area that the project intends to work, and relatively limited evidence supports the proposed engagement of UNDP and partners through the project. There is risk that the project overlaps and/or does not coordinate with partners' interventions in this area. Options for south-south and triangular cooperation have not been considered, despite its potential relevance.

*Note: Management Action or strong management justification must be given for a score of 1

3 | 2 | 1

Evidence

Cooperation has been considered during the formulation of the project, both with national and international partners (see sections 2.4.1 and 2.4.4)

SOCIAL & ENVIRONMENTAL STANDARDS

7. Does the project seek to further the realization of human rights using a human rights based approach? (select from options 1-3 that best reflects this project):

- **3:** Credible evidence that the project aims to further the realization of human rights, upholding the relevant international and national laws and standards in the area of the project. Any potential adverse impacts on enjoyment of human rights were rigorously identified and assessed as relevant, with appropriate mitigation and management measures incorporated into project design and budget. *(all must be true to select this option)*
- **2:** Some evidence that the project aims to further the realization of human rights. Potential adverse impacts on enjoyment of human rights were identified and assessed as relevant, and appropriate mitigation and management measures incorporated into the project design and budget.
- **1:** No evidence that the project aims to further the realization of human rights. Limited or no evidence that potential adverse impacts on enjoyment of human rights were considered.

*Note: Management action or strong management justification must be given for a score of 1

3 | 2 | 1

Evidence

Possible risks linked to human rights have been considered during the formulation through an SESP but no risk was identified

8. Did the project consider potential environmental opportunities and adverse impacts, applying a precautionary approach? (select from options 1-3 that best reflects this project):

- **3:** Credible evidence that opportunities to enhance environmental sustainability and integrate poverty-environment linkages were fully considered as relevant, and integrated in project strategy and design. Credible evidence that potential adverse environmental impacts have been identified and rigorously assessed with appropriate management and mitigation measures incorporated into project design and budget. *(all must be true to select this option)*.
- **2:** No evidence that opportunities to strengthen environmental sustainability and poverty-environment linkages were considered. Credible evidence that potential adverse environmental impacts have been identified and

3 | 2 | 1

Evidence

A strong analysis of the baseline and specialized expert have helped identifying

PROJECT QA ASSESSMENT: DESIGN AND APPRAISAL

assessed, if relevant, and appropriate management and mitigation measures incorporated into project design and budget. • **1:** No evidence that opportunities to strengthen environmental sustainability and poverty-environment linkages were considered. Limited or no evidence that potential adverse environmental impacts were adequately considered. *Note: Management action or strong management justification must be given for a score of 1	environmental opportunities and adverse impacts
9. Has the Social and Environmental Screening Procedure (SESP) been conducted to identify potential social and environmental impacts and risks? The SESP is not required for projects in which UNDP is Administrative Agent only and/or projects comprised solely of reports, coordination of events, trainings, workshops, meetings, conferences and/or communication materials and information dissemination. [if yes, upload the completed checklist. If SESP is not required, provide the reason for the exemption in the evidence section.]	**Yes** / No See Annex 10 of ProDoc

MANAGEMENT & MONITORING

10. Does the project have a strong results framework? (select from options 1-3 that best reflects this project): • **3:** The project's selection of outputs and activities are at an appropriate level and relate in a clear way to the project's theory of change. Outputs are accompanied by SMART, results-oriented indicators that measure all of the key expected changes identified in the theory of change, each with credible data sources, and populated baselines and targets, including gender sensitive, sex-disaggregated indicators where appropriate. *(all must be true to select this option)* • **2:** The project's selection of outputs and activities are at an appropriate level, but may not cover all aspects of the project's theory of change. Outputs are accompanied by SMART, results-oriented indicators, but baselines, targets and data sources may not yet be fully specified. Some use of gender sensitive, sex-disaggregated indicators, as appropriate. *(all must be true to select this option)* • **1:** The results framework does not meet all of the conditions specified in selection "2" above. This includes: the project's selection of outputs and activities are not at an appropriate level and do not relate in a clear way to the project's theory of change; outputs are not accompanied by SMART, results-oriented indicators that measure the expected change, and have not been populated with baselines and targets; data sources are not specified, and/or no gender sensitive, sex-disaggregation of indicators. *Note: Management Action or strong management justification must be given for a score of 1	**3** / 2 1 **Evidence** See section VI - project result framework
11. Is there a comprehensive and costed M&E plan in place with specified data collection sources and methods to support evidence-based management, monitoring and evaluation of the project?	**Yes (3)** / No (1)
12. Is the project's governance mechanism clearly defined in the project document, including planned composition of the project board? (select from options 1-3 that best reflects this project): • **3:** The project's governance mechanism is fully defined in the project composition. Individuals have been specified for each position in the governance mechanism (especially all members of the project board.) Project Board members have agreed on their roles and responsibilities as specified in the terms of reference. The ToR of the project board has been attached to the project document. *(all must be true to select this option)*. • **2:** The project's governance mechanism is defined in the project document; specific institutions are noted as holding key governance roles, but individuals may not have been specified yet. The prodoc lists the most important responsibilities of the project board, project director/manager and quality assurance roles. *(all must be true to select this option)* • **1:** The project's governance mechanism is loosely defined in the project document, only mentioning key roles that will need to be filled at a later date. No information on the responsibilities of key positions in the governance mechanism is provided. *Note: Management Action or strong management justification must be given for a score of 1	**3** / 2 1 **Evidence** See project document (Section VIII & Annex 9)
13. Have the project risks been identified with clear plans stated to manage and mitigate each risks? (select from options 1-3 that best reflects this project): • **3:** Project risks related to the achievement of results are fully described in the project risk log, based on comprehensive analysis drawing on the theory of change, Social and Environmental Standards and screening, situation analysis, capacity assessments and other analysis. Clear and complete plan in place to manage and mitigate each risk. *(both must be true to select this option)* • **2:** Project risks related to the achievement of results identified in the initial project risk log with mitigation measures identified for each risk. • **1:** Some risks may be identified in the initial project risk log, but no evidence of analysis and no clear risk mitigation measures identified. This option is also selected if risks are not clearly identified and no initial risk log is included with the project document. *Note: Management Action must be taken for a score of 1	**3** / 2 1 **Evidence** See Annex 1 – Risks Analysis of ProDoc

EFFICIENT

14. Have specific measures for ensuring cost-efficient use of resources been explicitly mentioned as part of the project design? This can include: i) using the theory of change analysis to explore different options of achieving the maximum results with the resources available; ii) using a portfolio management approach to improve cost effectiveness through synergies with other interventions; iii) through joint operations (e.g., monitoring or procurement) with other partners.	**Yes (3)** / No (1)

PROJECT QA ASSESSMENT: DESIGN AND APPRAISAL

15. Are explicit plans in place to ensure the project links up with other relevant on-going projects and initiatives, whether led by UNDP, national or other partners, to achieve more efficient results (including, for example, through sharing resources or coordinating delivery?)	**Yes (3)**	No (1)
16. Is the budget justified and supported with valid estimates? • **3:** The project's budget is at the activity level with funding sources, and is specified for the duration of the project period in a multi-year budget. Costs are supported with valid estimates using benchmarks from similar projects or activities. Cost implications from inflation and foreign exchange exposure have been estimated and incorporated in the budget. • **2:** The project's budget is at the activity level with funding sources, when possible, and is specified for the duration of the project in a multi-year budget. Costs are supported with valid estimates based on prevailing rates. • **1:** The project's budget is not specified at the activity level, and/or may not be captured in a multi-year budget.	**3**	2 1 **Evidence** See Budget Section of ProDoc
17. Is the Country Office fully recovering the costs involved with project implementation? • **3:** The budget fully covers all project costs that are attributable to the project, including programme management and development effectiveness services related to strategic country programme planning, quality assurance, pipeline development, policy advocacy services, finance, procurement, human resources, administration, issuance of contracts, security, travel, assets, general services, information and communications based on full costing in accordance with prevailing UNDP policies (i.e., UPL, LPL.) • **2:** The budget covers significant project costs that are attributable to the project based on prevailing UNDP policies (i.e., UPL, LPL) as relevant. • **1:** The budget does not adequately cover project costs that are attributable to the project, and UNDP is cross-subsidizing the project. *Note: Management Action must be given for a score of 1. The budget must be revised to fully reflect the costs of implementation before the project commences.	**3**	2 1 **Evidence** The project will be implemented under DIM
EFFECTIVE		
18. Is the chosen implementation modality most appropriate? (select from options 1-3 that best reflects this project): • **3:** The required implementing partner assessments (capacity assessment, HACT micro assessment) have been conducted, and there is evidence that options for implementation modalities have been thoroughly considered. There is a strong justification for choosing the selected modality, based on the development context. *(both must be true to select this option)* • **2:** The required implementing partner assessments (capacity assessment, HACT micro assessment) have been conducted and the implementation modality chosen is consistent with the results of the assessments. • **1:** The required assessments have not been conducted, but there may be evidence that options for implementation modalities have been considered. *Note: Management Action or strong management justification must be given for a score of 1	**3**	2 1 **Evidence** The CO has been authorized for a DIM blanket authorization due to the low capacity of the Government. In that context, DIM was considered appropriate.
19. Have targeted groups, prioritizing marginalized and excluded populations that will be affected by the project, been engaged in the design of the project in a way that addresses any underlying causes of exclusion and discrimination? • 3: Credible evidence that all targeted groups, prioritising marginalized and excluded populations that will be involved in or affected by the project, have been actively engaged in the design of the project. Their views, rights and any constraints have been analysed and incorporated into the root cause analysis of the theory of change which seeks to address any underlying causes of exclusion and discrimination and the selection of project interventions. • 2: Some evidence that key targeted groups, prioritising marginalized and excluded populations that will be involved in the project, have been engaged in the design of the project. Some evidence that their views, rights and any constraints have been analysed and incorporated into the root cause analysis of the theory of change and the selection of project interventions. • 1: No evidence of engagement with marginalized and excluded populations that will be involved in the project during project design. No evidence that the views, rights and constraints of populations have been incorporated into the project.	**3**	2 1 **Evidence** See the Stakeholder Consultation Section of ProDoc
20. Does the project conduct regular monitoring activities, have explicit plans for evaluation, and include other lesson learning (e.g. through After Action Reviews or Lessons Learned Workshops), timed to inform course corrections if needed during project implementation?	**Yes (3)**	No (1)
21. The gender marker for all project outputs are scored at GEN2 or GEN3, indicating that gender has been fully mainstreamed into all project outputs at a minimum. *Note: Management Action or strong management justification must be given for a score of "no"	**Yes (3)**	No (1) **Evidence** See ProDoc
	3	2 1

PROJECT QA ASSESSMENT: DESIGN AND APPRAISAL

22. Is there a realistic multi-year work plan and budget to ensure outputs are delivered on time and within allotted resources? (select from options 1-3 that best reflects this project): • **3:** The project has a realistic work plan & budget covering the duration of the project *at the activity* level to ensure outputs are delivered on time and within the allotted resources. • **2:** The project has a work plan & budget covering the duration of the project at the output level. • **1:** The project does not yet have a work plan & budget covering the duration of the project.	**Evidence** See budget and workplan ProDoc

SUSTAINABILITY & NATIONAL OWNERSHIP

23. Have national partners led, or proactively engaged in, the design of the project? (select from options 1-3 that best reflects this project): • **3:** National partners have full ownership of the project and led the process of the development of the project jointly with UNDP. • **2:** The project has been developed by UNDP in close consultation with national partners. • **1:** The project has been developed by UNDP with limited or no engagement with national partners.	**3**	2 1 **Evidence** See stakeholder consultations in the Prodoc
24. Are key institutions and systems identified, and is there a strategy for strengthening specific/ comprehensive capacities based on capacity assessments conducted? (select from options 0-4 that best reflects this project): • **3:** The project has a comprehensive strategy for strengthening specific capacities of national institutions based on a systematic and detailed capacity assessment that has been completed. This strategy includes an approach to regularly monitor national capacities using clear indicators and rigorous methods of data collection, and adjust the strategy to strengthen national capacities accordingly. • **2.5:** A capacity assessment has been completed. The project document has identified activities that will be undertaken to strengthen capacity of national institutions, but these activities are not part of a comprehensive strategy to monitor and strengthen national capacities. • **2:** A capacity assessment is planned after the start of the project. There are plans to develop a strategy to strengthen specific capacities of national institutions based on the results of the capacity assessment. • **1.5:** There is mention in the project document of capacities of national institutions to be strengthened through the project, but no capacity assessments or specific strategy development are planned. • **1:** Capacity assessments have not been carried out and are not foreseen. There is no strategy for strengthening specific capacities of national institutions.	**3** 2 1 **Evidence**	2.5 1.5 The activities planned under the project include capacity building for key institutions and are based on a capacity assessment
25. Is there is a clear strategy embedded in the project specifying how the project will use national systems (i.e., procurement, monitoring, evaluations, etc.,) to the extent possible?	**Yes (3)**	No (1)
26. Is there a clear transition arrangement/ phase-out plan developed with key stakeholders in order to sustain or scale up results (including resource mobilisation strategy)?	**Yes (3)**	No (1)

Annex 14. DPC Calculation Table

Support services	Schedule for the provision of the support services	Cost to UNDP of providing such support services (where appropriate)			Amount and method of reimbursement of UNDP (where appropriate)	Remark
		Unit Price in USD	Quantity	Total		
Payment process (Including setting up vendors)	Throughout project implementation when applicable	28.20	260.00	7,332.00	UNDP will directly charge the project upon receipt of request of services from the Implementing Partner (IP)	52/year
Recruitment of Project Staff (excluding staff benefits/payroll management)		975.45	4.00	3,901.80		4 staff members
Staff HR Benefits Admin (issuance and termination of contract)		198.81	8.00	1,590.48		Twice during the project implementation (at the beginning and at the end of the contract for each of the four staff)
Recurring Personnel Management (Payroll, leave etc.)		921.63	60.00	55,297.80		3/year per staff member
Procurement of Consultants		350.88	45.00	15,789.60		9/year
Visa Support		112.40	34.00	3,821.60		34 IC missions
Rent of conference room including PC, Projector, LCD wide screen and sound system audio		100.00	50.00	5,000.00		10 meetings per year
Accreditation/vehicle registration		120.14	2.00	240.28		2 vehicles
Water taxi pick up/drop off with UN car arrival/departure (outside working hours)		46.67	68.00	3,173.56		34 IC missions
Travel Facilitation (Including authorisations & settlements)		32.75	160.00	5,240,00		32/year
F10 settlement		31.58	160,00	5,052.80		32/year
Procurement Simple (low value)		143.81	74.00	10,641.94		14/year

Procurement Complex		729.80	45.00	32,841.00		
Total				**149,922.86**		

Annex 15. References

1. Chong, P. W. (1987), Proposed management and integrated utilization of mangrove resources in Sierra Leone. FAO /Ministry of Agriculture, Natural Resources and Forestry. FO: DP / SIL / 84 /
2. Environment Protection Agency (2015). Sierra Leone State of the Marine Environment report 2015. Freetown, Sierra Leone.
3. Global Environment Facility (GEF) and United Nations Development Programme (UNDP). Sierra Leone Second National Communication, December 2012. 245p.
4. Johnson, R. G. (2006): Coastal Erosion Issues in Sierra Leone Adaptation, planning and implementation relating to the Sierra Leone coastal zone. UNFCCC African Regional Workshop on Adaptation. Accra. Ghana 21 to 23 September, 2006. 16pp
5. JUANA BLYDEN BHONOPHA. 2016. Gender Analysis for the Development of a GEF-LDCF Project on Climate Change Adaptation and Coastal Zone Management in Sierra Leone. Draft Report. PPG gender field assessment study. Freetown. August. 2016.
6. Ministry of Transport and Aviation, 2007.National Adaptation Programme of Action. Final Draft. 108p
7. IPCC (2007b) Summary for Policymakers. In Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. (eds. Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignor, M. and Miller, H.L.). Cambridge University Press, Cambridge.
8. Seisay, M.B.D. (2006). Defining a Strategy for Fisheries Sector Support in Sierra Leone. Report for the DFID mission. Fisheries of Sierra Leone, Annual Report.
9. Sellu Mawundu & Konrad Thorisson. 2011. ARTISANAL FISHERIES STATISTICS IN SIERRA LEONE, COLLECTION METHODS, ANALYSIS AND PRESENTATION. Final Project 2011. United Nations University. Fisheries Training Programme. Iceland.
10. The Sierra Leone 2015 Population and Housing Census (PHC). SIERRA LEONE 2015 POPULATION AND HOUSING CENSUS. PROVISIONAL RESULTS. Department of Statistics of Sierra Leone. March 2016.
11. The World Bank. http://www.tradingeconomics.com/sierra-leone/population-female-percent-of-total-wb-data.html

Websites:

1. https://www.cia.gov/library/publications/the-world-factbook/graphics/locator/afr/sl_large_locator.gif
2. https://www.cia.gov/library/publications/the-world-factbook/geos/sl.html
3. http://www.sl.undp.org/content/sierraleone/en/home/countryinfo/,
4. http://www.odinafrica.org/products/sea-level-data-collection.html and http://sealevel.odinafrica.org/
5. http://www.etoncorp.com/en/productdisplay/frx3-american-red-cross
6. http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/
7. https://www.thegef.org/gef/policies_guidelines
8. http://www.sl.undp.org/content/sierraleone/en/home/countryinfo/
9. http://gen.ecovillage.org/en/projects/561/all
10. http://mfmr.gov.sl/index.php/recentnews/104-slafu-commemorates-world-fishers-day.
11. http://www.tradingeconomics.com/sierra-leone/population-female-percent-of-total-wb-data.htm

United Nations Development Programme

Project Document template for nationally implemented projects financed by the GEF/LDCF/SCCF Trust Funds

Project title: Adapting to climate change induced coastal risks management in Sierra Leone		
Country: Sierra Leone	**Executing Entity/Implementing Partner:** UNDP	**Management Arrangements:** Direct Implementation Modality (DIM)
UNDAF Outcome: Outcome 1: By 2018, targeted Government institutions, the private sector, and local communities manage natural resources in a more equitable and sustainable way Outcome 2: By 2018, targeted communities demonstrate decreased vulnerability and increased resilience to natural and man-made disasters		
UNDP Strategic Plan Output: Output 1.3: Solutions developed at national and sub-national levels for sustainable management of natural resources, ecosystem services, chemicals and waste. Output 1.4: Scaled up action on climate change adaptation and mitigation cross sectors which is funded and implemented. Output 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy) Output 2.5: Legal and regulatory frameworks, policies and institutions enabled to ensure the conservation, sustainable use, and access and benefit sharing of natural resources, biodiversity and ecosystems, in line with international conventions and national legislation.		
UNDP Social and Environmental Screening Category: Low	**UNDP Gender Marker:** GEN2	
Atlas Project ID/Award ID number: 00102451	**Atlas Output ID/Project ID number:** 00104509	
UNDP-GEF PIMS ID number: 5178	**GEF ID number:** 5902	
Planned start date: April 2018	**Planned end date:** March 2023	
LPAC date: 18th January, 2018		

Brief project description:

The coastal zone of Sierra Leone is highly vulnerable to the increased frequency and severity of coastal erosion, flooding and storm surges which severely impact social wellbeing (health), livelihood security (and water resources) and major economic sectors such as fishing, tourism, water resources and agriculture. Coastal communities are already experiencing considerable repercussions of these impacts, notably on their livelihoods with reduced fishing productivity, ecosystem degradation and low farming outputs. The limited accessibility of climate-related data limits the ability of decision-makers to make informed planning and policy decisions for the coast (in particular marine and sea parameters databases such as wave height, wave period, wind speed and direction), and to take any clear strategic actions to remedy these negative effects. This indequate lack of knowledge is contributing towards undermining social and economic development, particularly under a changing climate.

Through this proposal, the Government of Sierra Leone (GoSL) is seeking funding from the Least Developed Countries Fund (LDCF) to implement a Full-Size Project (FSP) along the coastal zone, in six different pilot sites (Conakry Dee, Lakka, Hamilton, Tombo, Shenge and Turtle Island). The objective of this project, implemented by UNDP in collaboration with the Environmental Protection Agency (EPA SL), the Ministry of Fisheries and Marine Resources (MFMR) and the Institute of Marine Biology and Oceanography (USL-IMBO and the National Tourist Board (NTB) is designed to *"Strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods"*. The project focuses on five of the national priorities presented in Sierra Leone's National Adaptation Programme of Action (NAPA) submitted to the United Nations Framework Convention on Climate Change (UNFCCC), namely priorities interventions nº 2, 4, 14, 16 and 17.

Barriers need to be overcome in order to achieve the project objective. These include: (i) the limited accessibility and use of data and information relevant to understanding coastal related climate risks, (ii) inadequate institutional and policy capacities for Integrated Coastal Zone Management (ICZM), (iii) limited awareness programmes on coastal related climate risk and human activities along the coast; (iv) Inadequate resources and financial constraints and (v) the need to introduce climate resilient livelihood options and approaches to address the climate risk facing coastal communities. The project's approach to be adopted will deliver three complimentary outcomes to address these barriers in a coherent and holistic manner. It shall also contribute to the improvement of Sierra Leone's ability to systematically manage coastal risks in the face of a changing climate.

The activities under Outcome 1 focus on enhancing the availability of high quality climate risk information that is critical for development decision-making in the coastal zone. Under Outcome 2, a series of appropriate protection measures shall be designed along with supporting policy/legal tools and integrated coordination mechanisms to improve or support the implementation of policy to help deal with current and long-term coastal challenges;Finally, Outcome 3 will promote public awareness and promote climate resilient alternatives to sand mining for better adhesion of policy makers and communities on adaptation.

FINANCING PLAN	
LDCF	9,975,000 USD
UNDP TRAC resources	190,000 USD
Cash co-financing to be administered by UNDP	N/A
(1) Total Budget administered by UNDP	**10,165,000 USD**
PARALLEL CO-FINANCING *(all other co-financing that is not cash co-financing administered by UNDP)*	

Government	31,610,000 USD
(2) Total co-financing	**31,610,000 USD**
(3) Grand-Total Project Financing (1)+(2)	**41,775,000 USD**

SIGNATURES		
Signature: print name below Hadadi John Tello	**Agreed by Government** EPA	**Date/Month/Year:** 25/4/2018
Signature: print name below Samuel Doe	**Agreed by UNDP**	**Date/Month/Year:** 25-04-2018