



GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

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Dear LDCF/SCCF Council Member,

I am writing to notify you that we have today posted on GEF's website at www.TheGEF.org, a Project Identification Form (PIF) for a full-sized project proposal from UNDP entitled :***Liberia: Strengthening Liberia's Capability to Provide Climate Information and Services to Enhance Climate Resilient Development and Adaptation to Climate Change.***, for funding under the Least Developed Countries Fund (LDCF). This PIF has been posted for Council approval by mail. Council Members are invited to review the PIF and to submit their comments (in Word file) to the GEF Secretariat's program coordination registry at gcoordination@TheGEF.org by July 18, 2012.

Following the streamlined procedures for processing LDCF proposals and the new project cycle, Council members are invited to approve the following decision:

*The LDCF/SCCF Council reviewed the PIF entitled **Liberia: Strengthening Liberia's Capability to Provide Climate Information and Services to Enhance Climate Resilient Development and Adaptation to Climate Change** posted on June 19, 2012 and approves it on a no objection basis subject to the comments submitted to the Secretariat by July 18, 2012.*

In accordance with this decision, if the Secretariat has not heard from you in writing by July 18, 2012 we will assume that you approve the PIF. Council members will receive a copy of the draft final project document that will be submitted for CEO endorsement.

Sincerely,

Copy to: Alternates, GEF Agencies, STAP, Trustee



PROJECT IDENTIFICATION FORM (PIF)
PROJECT TYPE: Full-sized Project
TYPE OF TRUST FUND: GEF Trust Fund

PART I: PROJECT IDENTIFICATION

Project Title:	Strengthening Liberia's capability to provide climate information and services to enhance climate resilient development and adaptation to climate change.		
Country(ies):	Liberia	GEF Project ID:	4950
GEF Agency(ies):	UNDP	GEF Agency Project ID:	4858
Other Executing Partner(s):	Environmental Protection Agency, Ministry of Land, Mines and Energy.	Submission Date:	
GEF Focal Area (s):	Climate Change	Project Duration (months):	48 months
Name of parent program: For SFM/REDD+ <input type="checkbox"/>		Agency Fee (\$):	673,000

A. FOCAL AREA STRATEGY FRAMEWORK:

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Indicative grant amount (\$)	Indicative co-financing (\$)
CCA-2	Outcome 2.1 Increased knowledge and understanding of climate variability and change-induced risks at country level and in targeted vulnerable areas	Output 2.1.1 Risk and vulnerability assessments conducted and updated Output 2.1.2 Systems in place to disseminate timely risk information	LDCF	3,415,000	14,000,000
CCA-2	Outcome 2.2 Strengthened adaptive capacity to reduce risks to climate-induced economic losses	Output 2.2.1 Adaptive capacity of national and regional centers and networks strengthened to rapidly respond to extreme weather events	LDCF	3,000,000	13,100,000
Sub-total				6,415,000	27,100,000
Project management cost				315,000	1,328,289
Total project cost				6,730,000	28,428,289

B. PROJECT FRAMEWORK

Project Objective: To strengthen Liberia's climate-related monitoring capabilities, early warning systems and available information for responding to climate shocks and planning adaptation to climate change.						
Project Component	Grant type	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative co-financing (\$)
Improving the climate monitoring network, archiving databases, access to satellite environmental products and ability to issue forecasts	INV	1. Increased capacity of hydro-meteorological services and associated networks to monitor and predict extreme weather, climate-related hazards and climate trends.	1.1. Installation of hydro-meteorological weather and flow gauge stations in critical areas across the country with communications and (centralised) archiving technologies at the Meteorology division and Hydrological service. (\$1,415,000)	LDCF	3,415,000	8,200,000
	TA		1.2 Technical capacity of staff in Meteorology division developed to produce daily to seasonal, seasonal to annual, annual to multi-decadal, climate forecasts, using numerical weather prediction models, seasonal prediction models and internationally produced forecasts. (\$300,000)			
	INV		1.3 Installation of satellite receivers and other infrastructure (e.g. Radar etc.) for monitoring and assessing the changing state of the environment and the impact of current and future climate on key environmental variables for planning food security, water and land management. (\$1,200,000)			
	TA		1.4 Staff in Ministry of Land, Mines and Energy (encompassing Meteorology and Hydrology) trained in the use of climate monitoring equipment, tailored forecasts of climate hazards and use of satellite monitoring for assessing crop production, water resources, wildfires etc. (\$500,000)			
Establishment of an early warning system for the dissemination and communication of extreme weather warnings, seasonal outlooks and increased risks due to climate	INV	2. Climate, environmental and socioeconomic data are tailored and combined to produce appropriate information which can be communicated to government entities and communities to enable informed decision making.	2.1 Systems and communication with the National Disaster Relief Commission are enabled to use the forecasts (from 1.2), environmental monitoring data (from 1.3), tailored forecasts (from 1.4) and current vulnerability assessments, to forecast where climate induced risks are high. (\$900,000)	LDCF	2,250,000	15,650,000
			2.2 Communication channels for issuing warnings (through both governmental and non-governmental agencies) are enabled (e.g. radio, mobile phones, television etc), as well as the procedures and legal basis for the issuing of warnings. (\$700,000)			

change.			2.3. Three applications of the early warning system (e.g. coastal, agriculture, floods, health etc) are identified and outputs from 2.1 and 2.2 are tested for their effectiveness. (\$650,000)			
Strengthening of institutional capacities to develop policies and strategies that are sensitive to climate change	TA	3. Government, private sector and communities are aware of the major risks associated with climate change, and consider them when formulating development policies and strategies	<p>3.1 Regional climate change scenarios are developed for Liberia and used to enable the identification of 'hotspots' where climate change is expected to have high biophysical impacts.</p> <p>3.2 Adaptation options for the most vulnerable communities and livelihoods are made aware to communities in light of projected climate change and current vulnerabilities.</p> <p>3.3 A system for inter-ministerial dialogue on incorporating climate change considerations into government policies is established as well as a mechanism for discussing public and private financing of the EWS system.</p> <p>3.4 Engagement of the private sector to develop paid-for services through the early warning system and climate change adaptation options.</p>	LDCF	750,000	3,250,000
Sub-total					6,415,000	27,100,000
Project management cost					315,000	1,328,289
Total project costs					6,730,000	28,428,289

C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
National Government	Government of Liberia	Grant	14,880,000
Bilateral cooperation	Government of Norway	Grant	5,380,000
Multilateral cooperation	The Global Fund to Fight AIDS, Tuberculosis and Malaria	Grant	6,662,543
Multilateral cooperation	World Meteorological Organsiation	In-kind	39,000
GEF Agency	UNDP	Grant	1,466,746
National Government	Government of Liberia funding for Meterology division and National Disaster Relief Commission.	In-kind	To be determined
Total Co-financing			28,428,289

D. GEF RESOURCES REQUESTED BY AGENCY, FOCAL AREAS AND COUNTRY

GEF AGENCY	TYPE OF TRUST FUND	FOCAL AREA	Country name/Global	Project amount (a)	Agency Fee (b)	Total c=a+b
UNDP	LDCF	Climate Change	Liberia	6,730,000	673,000	7,403,000
Total GEF Resources				6,730,000	673,000	7,403,000

PART II: PROJECT JUSTIFICATION

A. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

A.1.1 The GEF focal area strategies:

1. This project is fully in line with LDCF/SCCF focal area objective 2 “Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level”. Related expected outcomes include strengthening national hydro-meteorological capacities to provide information which can be used to reduce the risk of climate-induced economic losses, as well as increasing the knowledge and understanding of current climate variability and change-induced risks at both the country level and for targeted vulnerable areas.

A.1.2. For projects funded from LDCF/SCCF: the LDCF/SCCF eligibility criteria and priorities:

2. The Republic of Liberia ratified the UNFCCC in 2002. It also ratified the Kyoto Protocol in the same year. Liberia submitted its NAPA in 2008 and is entitled to benefit from the LDC Fund for the implementation of priority measures identified in its NAPA. The proposed project is based on the NAPA ‘second top priority’ project, identified as “Improving Monitoring of Climate Change with the objective of generating reliable hydro-meteorological data and improving the measurement of climatic parameters”. In implementing priority interventions identified in Liberia’s NAPA, the project is consistent with the Conference of Parties (COP-9) and also satisfies criteria outlined in UNFCCC Decision 7/CP.7 and GEF/C.28/18.

3. The project focus is aligned with the scope of expected interventions as articulated in the LDCF programming paper and decision 5/CP.9. As climate impacts fall disproportionately on the poor, the project recognizes the links between adaptation and poverty reduction (GEF/C.28/18, 1(b), 29).

Compliance with program and LDC Fund policies:

4. The project complies with the urgent needs identified in the NAPA, all of which are relevant for supporting the national development goals of achieving MDGs 1, 3, 6 and 7. The project is also aligned with the framework of the Poverty Reduction Strategy Paper (PRSP) I, which calls for sustaining the environment for the present generation and at the same time not compromising the ability of future generations to meet their own needs, and for which the central goal is to revitalize the main economic sectors of the country, notably agriculture, fisheries and primary industries, in order to contribute to inclusive and sustainable economic development and growth, and to provide food security and nutrition, as well as employment.

Financing:

5. The project is designed to accommodate the additional adaptation costs of priority actions identified in the NAPA and builds on several other projects and programs. The co-funding for this project is also within the stated guidelines, with more than \$11m in prospective co-funding. The relevance of the co-financing to the proposed LDCF project is outlined below and will be further elaborated after the project preparation phase is concluded.

Institutional Synergy and Coordination:

6. The project outcomes are closely aligned and coordinated with efforts already underway in Liberia to promote development which is resilient to climate change at the national and local levels, including two other LDCF projects whose foci are the 1st (Integrated Cropping/ Livestock Farming) and 3rd (Coastal Defense System for the cities of Buchanan and Monrovia) NAPA identified priority activities. It is focused on strengthening the capacity to monitor climate change, generate reliable hydro-meteorological

information (including forecasts) and to be able to combine this information with other environmental and socio-economic data to improve science-based decision-making for early warning and adaptation planning. Given this focus, the Environmental Protection Agency will lead and coordinate with the Ministry of Land, Mines and Energy, and in partnership with other sector Ministries, especially Ministry of Agriculture and Livestock, Ministry of Water Resources and Ministry of Planning. Sub national authorities, parliamentarians, civil society (women and youth associations, NGOs, media, farmers' associations) and the private sector will all be important stakeholders of the project and will be provided with adequate space to contribute. Details of the institutional arrangements will be spelt out during the PPG phase.

Monitoring and Evaluation:

7. The implementation of the project's activities will reflect UNDP monitoring and evaluation standards and procedures, in line with the requirements of the LDCF. Details for monitoring and evaluation will be articulated during the project development phase.

A.2. National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NIPs, PRSPs, NPFE, etc.:

8. The overarching goal of the project is to safeguard hard won gains, resulting from ongoing and planned development efforts, from expected climate change impacts, and especially to reduce the vulnerability of local communities to increasing climate change induced risks. This goal is consistent with, and underpinned by, a number of important policies and strategies governing Liberia's national development and its specific responses to climate change. It is consistent with the National Environmental Policy, which calls for the sustainable management of Liberia's environment and natural resources, the National Reconstruction Development Plan (NRDP), and Liberia's targets with respect to the Millennium Development Goals. The proposed project is also consistent with the Liberian Poverty Reduction Strategy (2008-2011) which focuses on the reconstruction and the strengthening of the production potential of agriculture, fisheries, and forestry, some of the sectors whose adaptive capacity the project will help strengthen by providing information that can be used to plan and adapt to changes in climate.

B. PROJECT OVERVIEW:

B.1. DESCRIBE THE BASELINE PROJECT AND THE PROBLEM THAT IT SEEKS TO ADDRESS:

Problem

9. Fourteen years of civil war and decades of low investment in infrastructure have left the Liberian hydro-meteorological services with very little capacity to monitor, forecast, archive, analyse and communicate environmental information related to climate and water, including the impact of extreme climate events and disasters. This situation undermines efforts across a range of sectors to understand, quantify and plan for historical and current climate fluctuations, as well as develop tools to help plan adaptation to future climate changes. This is particularly important given that many of the key economic sectors in Liberia, namely agriculture, fisheries, forestry and energy are highly vulnerable to climate variability and change, yet little is known on how climate is already changing within the region, nor how it may be expected to change in the future.

10. Efforts to remedy this situation will therefore have positive consequences for the local economy. The proposed project aims to address these deficiencies by implementing the rollout of new infrastructure for monitoring current climate and extremes, as well as building capacity to use this information for

communicating climate-related risks, and improve planning and decision-making in key economic sectors.

11. The following outlines briefly how climate affects the different sectors (NAPA, 2008) and where the proposed project can usefully support climate sensitive short and long-term planning. In line with the NAPA, the proposed project will necessarily provide targeted support to the agriculture sectors. However, it is possible that the scope of the interventions will benefit other sectors such as health, as well as coastal management. These details will be exemplified during the PPG phase and outlined in the project document that is submitted for CEO endorsement.

12. Agriculture: Agriculture contributes approximately 60% of Liberian GDP and over 90% of farmers depend on rainfall (FAOSTAT).

- Recent changes in rainfall patterns¹ have made it increasingly difficult to identify the optimal time to plant crops which hampers crop planning. Climate change is likely to exacerbate this problem;
- Traditional crops are threatened by an increasingly unstable rainfall regime which facilitates pest and disease problems;
- Many coping strategies which rely on previous experiences of climate are no longer proving to be effective;
- The northwest and central regions have experienced lower cereal crop yields due to plant diseases, agricultural pests, soil degradation, and lack of water for irrigation.

Agriculture is clearly an important climate-dependent sector which affects the economy and people's livelihoods. The ongoing LDCF financed project "*Enhancing Resilience to Climate Change by Mainstreaming Adaption Concerns into Agricultural Sector Development in Liberia*" and the LASIP programme are addressing many of these concerns. However without credible short-term climate forecasts and long-term climate projections for planning, the scaling up of efforts will be constrained.

13. Forestry: The natural forests of Liberia cover 4.8 million hectares and managed plantations a further 10,000 hectares (FDA, 2000).

- Longer periods of rain lead to slower tree growth and may lead to the death of certain tree species;
- Higher temperatures facilitate the spread of forest pests, such as the pine caterpillar, and increased temperatures impede the growth of certain plant and tree species.

Knowledge of the current climate, suitable areas for cultivation and how they may be changing is limited by the sparse observational network. Satellite observations of land use and wildfires have the potential to aid planning and emergency responses (when threatening communities) but are not incorporated into an effective early warning strategy. As forests take several years to mature long term (multi-year to multi-decadal) projections are also useful for long-term planning. However, the available fine resolution climate projections for Liberia are limited by both the observational network and local-regional capacity to generate such scenarios.

14. Coastal management and fisheries: Over 20,000 workers nationwide earn their livelihoods from fishing activities and fish represent the main source of animal protein in the typical Liberian diet.

- Lack of data on water temperatures, rainfall, river outflow and coastal ocean dynamics currently limits understanding the vulnerability of fisheries;
- Changing water temperatures and rainfall patterns may be adversely affecting fish stocks of some species;

¹ Hot nights have increased by 15.7% between 1960 and 2003 and mean annual rainfall has on average decreased since 1960 (<http://country-profiles.geog.ox.ac.uk/>). It is noteworthy that many aspects of climate change, particularly changes in extremes, were not able to be calculated due to a lack of weather data for the country. Consequently these changes only provide an overview of changes for regions where data was available.

- Accurate wind and wave forecasts for the coastal zones are either not available or not routinely communicated to users e.g. fishing vessels.

Whilst there are internationally available wind, wave and temperature forecasts for the globe, these do not account for subtleties of the Liberian coastline so efforts to produce locally applicable forecasts are warranted. The ongoing LDCF financed project “Enhancing Resilience of vulnerable coastal areas to climate change risks in Liberia” includes components to both set up an early warning system for the coast and develop future projections of sea level rise..

15. *Public Health:* Changes in rainfall and temperature patterns are expected to lead to increased infections of water-borne diseases e.g. cholera, dysentery, giardiasis, amebiasis, typhoid fever, and malaria.

- Malaria is the number one cause of in-patient deaths (42%)² and poses the most significant threat to public health, particularly among infants, pregnant mothers and their unborn children.
- Increases in temperature combined with poor hygienic practices, a scarcity of safe drinking water, limited public health facilities and flooding, will likely increase infection rates.

The predictability of disease outbreaks depend on several climate and non-climatic factors. Of those mentioned above cholera can be monitored/predicted by being related to zooplankton blooms seen in remotely sensed imagery, and malaria is predictable (through monitoring of rainfall and temperature) where it is seasonal in nature. The latter would have direct benefits for the National Malaria Control Programme (NMCP) and the UNDP GoAL WASH water and sanitation programme would clearly benefit from the former. The introduction of climate forecasts, satellite and climate observation capabilities, will therefore benefit these programmes and the state of public health in Liberia, by forewarning where and when environmental conditions are suitable for disease outbreaks.

Underlying causes

16. In Liberia, the National Meteorological and Hydrological Service (NMHS) were severely disrupted for many years due to civil unrest that caused destruction of meteorological infrastructure, facilities and the loss of important meteorological data and information³. As a result, the NMHS does not have the capability of providing the weather and climate information products and services necessary for science-based decision making such as:

- estimating hazard risks and vulnerabilities for e.g. floodplains and agricultural land etc;
- development of an early warning system for droughts, floods and storms;
- decision making in weather and climate-sensitive economic activities such as agriculture, forestry and construction;
- coastal zone management, including fisheries;
- conducting feasibility studies for major developments (e.g. highways, dams, bridges);
- analysing climate change risks and developing adaptation strategies.

17. The current weather, climate, and environmental observation infrastructure and capacity in Liberia is typically sparse and unconnected, rendering the GoL and the NMHS increasingly unable to understand and help its population and its different economic sectors to respond to both changes in long-term average climate as well as the impacts of extreme weather and seasonal droughts. Such data and infrastructure include:

- meteorological observation (from synoptic and agro-meteorological stations);
- streamflow measurements for rivers from hydrological gauges;
- satellite imagery receiving equipment (e.g. through EUMETSAT projects);

² National Malaria Control Program (NMCP) 2006

³ Before the war it is estimated that Liberia had 47 hydro-metric stations (NAPA, 2008).

- reliable internet access to international forecast centres and databases;
- computer infrastructure for archiving and accessing data;
- Database/GIS software for combining and analysing data, as well as access to information products through data portals etc;
- Established communication channels for dissemination of early warnings.

18. A further cause, beyond the access to country-specific data and infrastructure, is a lack of trained personnel who are capable of maintaining an observational network, generating information for specific sectors, as well as interpreting the data in ways that non-technical stakeholders can understand. This human capacity is required to:

- Replace components of the observing networks when they fail;
- Manage and run any forecast models;
- Understand how users interpret data and design information packages that address these needs;
- Be able to combine, manipulate and overlay different data to identify areas at risk.

19. In particular, these latter information products are needed by the other two LDCF projects focusing on agriculture and coastal development e.g. tailored forecasts for agriculture (producing crop-specific forecasts) and wind/wave/surge forecasts for coastal zone management.

Long-term solution and barriers to achieving it:

20. Liberia's hydro meteorological monitoring capacities remain non-existent due to the civil war. To allow Liberia to better manage severe weather related disasters, food security and agricultural production, scarce and dwindling water resources and make its socioeconomic development process less vulnerable to climate-related risks it is essential to:

- enhance capacity of hydro-meteorological services and networks for predicting climatic events and associated risks;
- develop a more effective, efficient and targeted delivery of climate information including early warnings;
- support improved and timely preparedness and response to forecast climate-related risks and vulnerabilities.

21. These objectives require developing in-country robust weather and climate observation, forecasting, and nowcasting infrastructure, which can be rapidly deployed, is relatively easy to maintain, and simple to use. Such a weather and climate monitoring system can provide Liberia with the capacity necessary to develop: (i) an early warning system for severe weather; (ii) real-time weather and hydrological monitoring; (iii) weather forecasting capabilities (Numerical Weather Prediction); (iv) agro-meteorological information and services (including integrated crop and pest management); (v) applications related to building and management of infrastructure; (vi) land, air and maritime transport management; (vii) integrated water resources management; (viii) coastal zone and land management; and (ix) planning and policy making processes.

22. However, there are significant policy, institutional, individual, financial, technological and informational barriers that prevent the desired situation from emerging. These barriers include:

23. *Lack of weather and climate monitoring infrastructure:* Prior to the war, Liberia had forty-seven hydrometric stations throughout the country to monitor meteorological and hydrological parameters. These facilities were severely affected during the period of civil unrest that lasted from 1989 to 2003. Most of the established observation stations and other facilities were destroyed and important weather data was lost. Since the end of the civil war, the hydro-meteorological monitoring capacity is extremely low and no recorded data for the recent period exists, except for Roberts International Airport and the

Firestone Rubber Plantations Company. According to WMO⁴ (as of March 2010) whilst an automatic weather station measures wind and pressure at the airport, the temperature and dew point sensors are not working. There are manually operated temperature and rainfall sensors, a non-working EUMETSAT satellite receiver and a message processing system used for communicating weather warnings for aviation. None of this equipment is suitable for developing the information and services noted earlier and there are no current data for areas other than the airport.

24. *Limited knowledge and capacity to effectively predict climate change events and assess potential impacts:* The scientific and technical capabilities required to effectively identify hazards and forecast their potential impacts on vulnerable communities in Liberia is currently weak. At the Division of Meteorology, there are only three meteorologists, two meteorological technicians and three support staff. At Roberts International Airport, there are five meteorological technicians and a manager. Some of these personnel have no formal training in meteorology and the capacity to maintain a modern network of weather stations, as well as the communications, computer and database infrastructure required to deliver and archive meteorological observations, is low. Currently no services exist to provide weather and climate information to support agriculture, hydrology, transport, coastal and disaster management.

25. *Lack of coordination of hydro-meteorology activities:* Hydro-meteorology activities in Liberia are fragmented among several institutions without a coordinating body. The Environmental Protection Agency, Ministry of Planning, Ministry of Agriculture, Liberia Maritime Agency, Roberts International Airport, Forestry Development Authority, Ministry of Lands Mines and Energy, Ministry of Transport, Ministry of Internal Affairs are all implementing hydro-meteorological activities without consulting among themselves and planning coordination. Furthermore, there is not yet a National Meteorological Agency (NMA) which should be the principal authority in the Republic of Liberia for monitoring the state of Liberian weather and climate, as well as to coordinate and supervise all meteorological and climatological related activities. The Act creating the NMA has been elaborated but is waiting to be signed (ratified) by the government.

26. *No systematic forecasting of climate hazards, analysis of risks and timely dissemination of warnings and climate risk information:* Communication and data processing facilities for meteorological data and derived products are currently not available due to a lack of observing stations, computers and telecommunications equipment. Furthermore, weather and climate forecasts are not regularly produced within Liberia, nor do they take conditions specific to Liberia into consideration (e.g. combining climate hazard information with information on vulnerability or the environment). Besides a lack of climate risk forecasts, there are no formal or official channels for the dissemination of these forecasts, associated warnings or strategies that may be employed to mitigate any impacts. This limits the usefulness of warnings and forecasts to communities.

27. *Lack of environmental databases for assessing the risks posed by climate variability and change:* The absence of a national environmental database reduces the potential to use weather and climate information for decision-making in different sectors that make up the Liberian economy. These include planning and investment decisions related to urban and rural development, infrastructure, health, transport, agriculture and water resources. Additionally, the only satellite receiving station for environmental monitoring is at the Central Agricultural Research Institute (CARI) in Bong County, which was installed as part of the African Monitoring of the Environment for Sustainable Development (AMESD) project. In order to understand the risks posed by extreme climate variability and change, a consistent and comprehensive environmental database is needed.

⁴ Development plan for the Liberia Meteorological agency (2010-2015). WMO fact finding mission to Liberia. March 2010.

Baseline Project(s) that the project will build on:

Title: Strengthening of the Water Resources and Power Sectors

Co-financing: US\$5,380,000

28. This project supports the Ministry of Lands, Mines and Energy (MLME), through funding by the Norwegian Water Resources and Energy Directorate (NVE), to develop a monitoring and management system for water and electricity resources in Liberia. A significant component involves building institutional capacity, as well as a legal framework within the water and energy sectors, for hydrology, rural and renewable energy. A project document was finalized in 2010 on the request of MLME, outlining the various activities to be included in a 5-year institutional cooperation between NVE and MLME. Thereafter an institutional agreement between MLME and NVE was signed during 2010. The focus is on assistance to monitoring and management of water and energy resources, with special attention to institutional strengthening. This includes a programme for installing meteorological and hydrological monitoring equipment, as well as the databases and archiving infrastructure.

Title: Liberia Agriculture Sector Investment Program (LASIP)

Co-financing: US\$14,880,000 (This is based on the national budget for two components [Food and Nutrition Security: US\$5,760,000 & Institutional Development: US\$9,120,000] for three years. Funds sourced from donors are significantly more if they materialize.)

29. As part of the Comprehensive African Agricultural Development Programme (CAADP), Liberia has developed the Liberia Agriculture Sector Investment Program (LASIP) as a vehicle to direct investment and funding into the agricultural sector of Liberia. This is currently funded through expanding budgets for the Ministry of Agriculture. Two components are aligned with the objectives of this proposal: *Food and nutrition security*, which aims to achieve the goal of the National Food Security and Nutrition Strategy that was developed to ensure that all Liberians have reliable access to the food they need and are able to utilize that food to live active and healthy lives. Increasing food production is critical, as is making it accessible to all including the most vulnerable segments of the population, improving its utilization and enabling systems for coordination and information management. *Institutional development*, The Central Agricultural Research Institute was virtually destroyed by the war, but the institute is now painfully reinventing its programs and rehabilitating its infrastructure. Small farmers live largely in isolated villages with little or no facilities to receive updated information on agriculture and rural development. Agricultural extension services (nongovernmental organizations, private extension, etc.) will be developed and expanded.

Title: MetAgri (Roving seminars on Weather, Climate and farmers)

Co-financing: US\$39,000

30. Funded by the World Meteorological Organisation (WMO) and implemented jointly by UN Food and Agriculture Organisation (FAO) and WMO, the MetAgri training and capacity building programme is implementing a series of seminars to make farmers become more self-reliant in dealing with weather and climate issues that affect agricultural production on their farms and to increase the interaction between the farmers and the NMHS. The overall goal of these seminars is to secure farmer self reliance, through helping them better informed about effective weather and climate risk management by sustainable use of natural resources for agricultural production.

Title: Building National and Local Capacities for Disaster Risks Management in Liberia

Co-financing: US\$940,000

31. With funding from UNDP Bureau for Crisis Prevention and Recovery (BCPR) and the GoL, the project seeks to strengthen the capacity of GoL to prepare for and respond to disaster. The project implements its activities through the Environmental Protection Agency (EPA) and the National Disaster Relief Commission (NDRC). The four main outcomes are: Enhanced capacity of national institutions in disaster risk management, Disaster risk issues integrated into national plans and policies, National database on disaster losses established and functioning, Gender-focused Disaster preparedness and emergency response practices developed. Databases of disaster losses and hazard mapping have been undertaken, on which the current project can build. In particular, the project notes: “the urgent need to rebuild the hydro-meteorological stations and activate the PUMA Project. In the absence of modern weather forecasting tools, there is need to sharpen and strengthen traditional early warning and communication systems”.

Title: GoAL WASH project to support water supply and sanitation

Co-financing: US\$526,746

32. Funded partly by SIDA and the Basque Government the Governance Advocacy and Leadership for Water, Sanitation and Hygiene (GoAL WASH) is a UNDP program that aims to accelerate achievement of the water and sanitation MDGs through strategically targeted interventions that strengthen governance of the water and sanitation sectors at appropriate levels. The project supports capacity building initiatives of the Government of Liberia by ensuring that the Water Supply and Sanitation Commission (WSSC) becomes operational. This entails securing effective budgetary and other financial support for this body, advising on staffing and assisting with external recruitment with national counterparts as necessary, installing a work plan with prioritized outputs, assisting in the establishment of a coherent programme of data collection for the sector, working with other public sector and civil society organizations to raise the national awareness of the need for safe drinking water and sanitation, and reviewing the scope and mandate of the WSSC.

Title: National malaria control and prevention programme

Co-financing: US\$6,662,543

33. Partly funded through the UNDP managed Global Fund for AIDS, Tuberculosis and Malaria (GFATM), the aim of the National malaria control and prevention project is to bring the most effective malaria control and prevention to Liberia by introducing new efficacious drug therapies, including making available combination therapies to trained health staff, and preventative measures targeting vulnerable groups such as pregnant women and children less than five years of age. The objectives of the project are to increase access of drugs and treatment at health facilities and community levels, including IDP camps; increase the use of intermittent preventative treatment (IPT) among pregnant women; increase coverage and use of personal protective measures including Indoor Residual Spraying; increase awareness and practice of malaria control and prevention in the community; and increase effective and efficient coordination and utilization of available resources.

34. Details of additional baseline co-financing through Government of Liberia funding for the Meteorology division, National Disaster Relief Commission and other initiatives receiving early warnings will be determined during the PPG phase and outlined in the documents submitted for CEO endorsement.

B.2. Incremental/Additional cost reasoning: DESCRIBE THE INCREMENTAL (GEF TRUST FUND) AND THE ASSOCIATED Global environmental benefits TO BE DELIVERED BY THE PROJECT:

35. The project seeks to establish a functional network of climate monitoring stations and associated infrastructure (satellite and radar monitoring equipment, as well as data processing facilities) as a basis for understanding climate change and building an early warning system to increase resilience to climate-related shocks (Component 1). It further recognizes that the translation of climate and other environmental information into useful, actionable warning messages requires systems and processes that incorporate an understanding of socio-economic vulnerabilities to identify where risks are high (Component 2). It is also necessary that messages are communicated in interpretable formats and through easily received mediums (Component 2). If these systems are to help inform adaptation decisions under future climate conditions then data from the EWS needs to be used to better understand future conditions, and the potential benefits, costs and risks need to be assessed by both governmental and private stakeholders (Component 3).

Component 1: *Improving the climate monitoring network, archiving databases, access to satellite environmental products and ability to issue forecasts*

36. This component is intended to alleviate a number of infrastructural and human resources deficiencies that are impeding effective and efficient collection of relevant weather and climate-related information (including data from satellites), the monitoring and tracking of climate change, the processing of collected data and information for risk analyses, all of which are needed for formulating early warning messages and assessing adaptation options in Liberia.

Baseline

37. There are only 2 functioning weather stations in Liberia, only one of which (Robert's international airport) is providing accessible up-to-date data - the other provides measurements of only winds, rainfall and visibility. Similarly, there are no functioning hydrological stations providing up-to-date information on streamflow or water levels in Liberia's rivers. The project "Strengthening of the Water Resources and Power Sectors", funded by the Norwegian Water Resources and Energy Directorate (NVE) will install 8 water level measuring stations, 15 rain gauges and 3-5 automatic weather stations (AWS), starting in the beginning of 2012. These equipment and infrastructure will provide a base from which to develop a comprehensive network of observing stations. However, they are insufficient for monitoring the range of climates and weather hazards experienced in Liberia (particularly rainfall-related hazards and differences between inland and coastal areas). The small number of AWS also restricts the ability to monitor large areas in real time and efforts are required to expand the number of AWS, either using GPRS (mobile data coverage) or satellite technologies. The former may be cost effective if GPRS coverage either exists or can be expanded as part of this project (this will need to be assessed as part of the project preparation phase).

38. There is currently no functioning link between the Meteorology division and the Global Telecommunication System (GTS), through which NHMS worldwide normally report observations. Complicating this situation there are only 15 employed meteorologists throughout the GoL and they are spread across geographical sites and institutions, fulfill different roles and have different levels of technical expertise. Consequently, there is little technical capacity to make short-term forecasts (daily to seasonal) which focus on Liberia. Forecasts from other international centres can be used at a coarser spatial scale, but this is hampered by unreliable internet connections which restrict the amount of data that can be downloaded. This and a lack of both infrastructure and technical expertise for processing data restrict the analysis and tailoring of this information for use within different sectors and by different

communities. Additionally there is currently little capacity to use climate change models, or downscale them to the Liberian territory, to inform discussions and decisions related to future adaptation options.

39. Some sectors e.g. forestry and agriculture, would benefit from satellite monitoring of e.g. vegetation and wildfires, which is currently unavailable. There exists a non-functioning EUMETSAT satellite receiving station at Robert's international airport and a functioning receiver at CARI in Bong county (approx 100km away, though the capabilities of this station are currently unknown). Consequently the Meteorology division and other government ministries do not have access to real time satellite monitoring of the current state of the environment in Liberia.

Additionality

40. Currently there is very little infrastructure for monitoring the weather, hydrology and environment in Liberia, largely a consequence of 14 years of civil war. This restricts the ability of the Meteorological and Hydrological services to identify areas, sectors and communities where climate and environmental hazards are potentially dangerous.

41. Through this component, the LDCF will support activities to address these deficiencies, including:

- The rehabilitation of existing infrastructure and the installation of new structures, including automated weather and hydrological stations (building on the network established by the NVE funded project);
- Higher capacity data processing and storage equipment as required;
- Satellite receiver and processing facilities and training in the use of these data for environmental monitoring (either rehabilitating the existing EUMETSAT facilities or installing new ones, depending on requirements established during the project preparation phase);
- Access to international forecasts on daily to seasonal timescales, as well as training and capacity building to generate Liberia-specific forecasts.

42. The programme will be designed to be suitable and cost effective given current infrastructure/technology, the availability of spares, skills to maintain the technology and availability of funds beyond the lifetime of the proposed project. For example, it may be sensible to improve internet access (potentially through satellite bandwidth if affordable long term) and establish primary high value databases offshore, with access through web-based portals etc (with additional benefits including access to other data sources). This limits reliability of the main data sources on local infrastructure (including electricity supply) and capacity to maintain the infrastructure. Any such databases can be migrated locally or a mirror may be maintained locally, with the offshore database as a backup. The design of this infrastructural setup will be investigated as part of the project preparation phase and reflected in the design of the project at the time of requesting CEO Endorsement.

43. Climate monitoring equipment, including both meteorological and hydrological stations will be installed at locations identified as part of the project preparation phase. Preference will be given to low cost, but reliable, solutions (within GoL requirements) which allow LDCF funds to purchase enough units to cover major agro-ecological zones, watersheds and coastal areas. The exact number will depend both on the need for coverage (in addition to those already being installed through the NVE project) and the purchasing of equipment spares to ensure sustainability during and after the project. If GPRS mobile data feeds are not available then satellite modems will be used to cover remote areas and the costs of telemetry/data feeds budgeted for.

44. The ideal configuration for providing satellite monitoring facilities will also be assessed during the project preparation phase, based on identified needs across different government ministries and the requirements of the Early Warning System (EWS) during its scoping phase. There are many sources of data on the internet but these may not provide information as frequently as required or as close to real time as is needed. Ongoing relationships with EUMETSAT and AMESD will be promoted and advanced as these activities can provide direct access to satellite imagery on a more frequent basis. The installation

of new or rehabilitated satellite receiving and processing equipment will be necessary for this to move forward.

45. Daily forecasts for the globe are made at a variety of centres worldwide, though at a relatively coarse spatial resolution (at best 60 km × 60 km). The use of these forecasts should be assessed as a starting point for future efforts, which include the installation of and training in the use of numerical weather prediction models which are focused on Liberia. The basis for deciding the relative merit of each approach should be partly determined by the intended use of these forecasts e.g. extreme rainfall/flood prediction, agricultural impacts, coastal wind/waves or fire prediction etc. However, the use of numerical weather prediction models provides other long term benefits, such as building human capacity to both make more detailed forecasts in the future and to adapt these forecasts for the Liberian context.

46. Currently there are no skilled personnel able to make seasonal forecasts. This situation is partly due to the lack of available weather observations mentioned earlier, as these observations are needed to calibrate/train most seasonal prediction models. It is also due to a lack of training and access to appropriate seasonal forecast models. A programme for preparing seasonal forecasts will therefore be instituted, based on a thorough scoping of available training programmes, including both regional and international networks and institutions such as the African Centre of Meteorological Applications for Development (ACMAD), AGRHYMET, West Africa climate outlook forum (PRESAO), European Centre for Medium-range Weather Forecasts (ECMWF) and the International Research Institute for science and society (IRI).

47. LDCF funds will be used to train staff from both the Meteorological and Hydrological services, within the Ministry of Land, Mines and Energy on the use of these technologies (climate monitoring, climate forecasting and satellite environmental monitoring), as the extent to which these technologies are useful will depend on the human resources available to undertake each activity. A comprehensive assessment of needs based on identified capacities will be undertaken during project preparation, as well as the design and implementation of a program for strengthening capacity of current staff and recruitment of required additional staff (with specialized skills) at local, regional and national levels. This assessment will take care to identify the future costs associated with any hiring and make sure they are sustainable beyond the lifetime of this project.

Component 2: *Establishment of an early warning system for the dissemination and communication of extreme weather warnings, seasonal outlooks and increased risks due to climate change.*

48. This component will assimilate the hydro-meteorological and satellite-derived information produced through component 1, as well as other socio-economic information into a system where datasets can be combined to assess current and forecast climate risks. The aim is to develop a suite of information packages that convey early warning messages in ways that capture the interest and attention of specific and targeted stakeholders. Effective channels of communication (including mobile phones, radio and video) will be identified and tested for different products and users and application of these early warnings will be piloted at selected sites. Feedback from user communities and lessons from pilot activities will be used to improve and develop the packages for early warning.

Baseline

49. The capacity to synthesise different data on environment, climate and socio-economic vulnerabilities is extremely limited in Liberia, due to a lack of data, computer hardware and software, as well as the skills to use these. The UNDP Bureau for Crisis Prevention and Recovery (BCPR) has, in collaboration with the National Disaster Relief Commission (NDRC), implemented a disaster risk management project since 2008 which has started a process of collecting information on disaster related losses from communities, as well as archiving these estimates at regional (county) centres. This information and communication between national and regional offices and communities are essential for a functioning

early warning system and suggest the NDRC may be a suitable institution through which early warnings can be communicated.

50. Several projects also deal with impacts and resilience building in particular sectors, including the LASIP and LDCF project (agriculture), UNDP GoAL WASH (water and sanitation), the National malaria control programme (health) and the Guinea Current Large Marine Ecosystem (GCLME) and LDCF projects (coastal management). Whilst these activities have built up useful knowledge and data for different components of an environmental and early warning system, they remain disaggregated activities with little integration or attempts to pull them together (along with hydro-meteorological and other data) into a coherent system which can be used at the national level for communicating warnings or as the basis of disaster relief efforts. The lack of such a system further restricts the potential to use knowledge of future climate (from future projections) to identify areas that may be at risk from climate change.

51. It is important that communication channels are available for disseminating early warning messages. Whilst the LASIP programme is not specifically implementing an early warning system, it is helping to build extension services and renew agricultural education and training, both of which can help understand how to communicate climate-related warnings and messages to agriculture. Furthermore, FAO with the support of WMO is training farmers and agricultural extension officers on how to interpret and use climate information via the MetAgri project. Both of these programmes can provide useful channels for communicating early warning messages to the agriculture sector. Additionally, the LDCF agriculture project is working in districts in two counties where they are demonstrating measures for improving resilience in local agriculture. These sites would be used for piloting early warning messages, as well as testing how climate projections should be used for making decisions related to future adaptation. Currently no crop models or tailored climate forecasts for agriculture are being used to understand the impact of climate on local agriculture and the mapping/monitoring of crop health/vegetation using satellite sensors is not combined with other information related to food security (food prices, access to markets) to identify communities most at risk.

52. The UNDP GoAL WASH project is examining ways in which resilience can be promoted within the public health system, focusing on the impacts water has on both sanitation and disease. Mapping hot spots where the impact of water is high will be part of this project and this offers a direct link to climate information and early warning, as well as suggesting sites for installing meteorological monitoring equipment as part of this proposed project. Further health forecasting activities will include the use of satellite monitoring to identify algal blooms that are associated with cholera outbreaks, and surface water sources that provide breeding grounds for malaria transmitting mosquitoes.

53. Coastal management is very important for Liberia, where the coastal population is poor and all social indicators – e.g. access to health and education – are very low. The LDCF coastal project is promoting low-cost adaptation measures to sea level rise and increased storm surges, as well as instigating a monitoring of local conditions, including management of climate related databases. Three pilot sites have been selected and these may offer the chance to test early warnings developed for the coastal zone, using wind/wave and current models that could be developed through this proposed project. However, the effectiveness and ability to generate useful warnings will be assessed during the PPG phase and taken into consideration in the design of the project. Details will be outlined in the project document that is submitted for CEO endorsement.

Additionality

54. Through this component the LDCF will support the collection and analysis of climate, environmental and socio-economic data required to develop a coherent system of information, sectoral analyses and institutional processes, which can be used as the basis for issuing early warnings. This will require several procedures, including:

- assimilating all data related to socio-economic vulnerabilities e.g. locations of rural farming communities, road, bridges, distance from markets, isolation from other communities etc. (links to ongoing work through the BCPR project);
- assessing physical risks e.g. water holding capacity of soils, floodplain mapping etc. (links to BCPR and LASIP);
- the refinement of climate hazard information for different sectors and areas (to be determined through consultation with all the baseline projects). This may involve running sectoral models e.g. crop models for agriculture, oceanographic/wave models for the coast and water resource or flood modelling for hydrology;
- the development of early warning messages, based on the reliability of the information (including acknowledged errors in data and forecasts), calculated sectoral risks and feedback from the users of such warnings (links to Component 1, LASIP, MetAgri, National malaria control programme, both ongoing LDCF projects and UNDP GoAL WASH);
- ensuring that there is a clear mandate for issuing early warning messages;
- developing communication channels through both governmental and non-governmental organizations;
- piloting the early warning system at representative sites and communities.

55. The project preparation phase will determine the most relevant tools and information required for an informed decision making process at the national, regional and local levels, as well as the type of climate and socio economic information required (and whether they are available) to develop these tools. It will be important to build on any previous work undertaken by NDRC and BCPR, so as not to repeat these efforts. The institutional setting for this work should also be determined as part of the project preparation phase – whilst an information system will incorporate climate data and products it does not have to reside at the Meteorological division (though there may be advantages to this). If there is already capacity to utilize such a system at NDRC and they are responsible for communicating warnings then it makes sense to house such a system there.

56. Several pilot communities or users of the early warning information will be identified during the project preparation phase and care will be taken to pick a representative cross-section of sectors, communities and locations. Priority will be given to those communities where a need for early warning products already exists, with a clear idea of how these products will be used for decision making. In this regard it may be advantageous to link with existing projects and training. For example, the MetAgri, LASIP and LDCF agriculture projects could be used to identify suitable pilots for agriculture, whereas the LDCF coastal project pilot sites may be used for testing coastal early warnings and the UNDP GoAL WASH could aid in identifying water-related hotspots for health. All these pilot sites will be candidates for installing new monitoring equipment as part of outcome 1. If not feasible, other priority sites or pilot activities may be decided based on the accuracy and ability to generate forecasts, as well as the need to service vulnerable communities.

57. Further work will identify the most appropriate and effective channels of communication to the targeted sectors and areas. This can include (but not be restricted to): email, radio (broadcasts in local languages), television, video (educational material may be developed with direct support of communities), mobile phones (text messaging) and the establishment of a website for the dissemination of products and publically available information. It will also be necessary to establish a mechanism to receive and evaluate feedback, from the users of such communications, on the effectiveness and appropriateness of these communications as well as the usefulness of the early warning information. This will involve direct communications via workshops or other appropriate fora, as well as feedback through NGOs, email etc.

58. These developments will allow testing of appropriate risk communication strategies with the selected pilot users/communities as well as providing the opportunity for awareness raising and training on climate change and climate-related risks. It will be necessary to understand the constraints, opportunities,

successes and failures of the early warning system and to propose recommendations for the improvement and the sustainability of the system, as well as the development of a strategy for the implementation of these recommendations.

Component 3: *Strengthening of institutional capacities to develop policies and strategies that are sensitive to climate change*

59. This component will strengthen the ability of the GoL to assess the impacts of climate change and engage in discussions within government and with the private sector regarding cost effective adaptation options that improve livelihoods and safeguard communities. Information from the EWS will be used as a basis for discussing vulnerabilities to climate change and long-term the climate data garnered through the EWS will be used to better understand the likely changes and impacts. Furthermore, the long-term sustainability of the EWS will be promoted through engagement with the private sector and government, which will seek to identify paid-for services for different sectors (e.g. transport, shipping and insurance), which in turn will maintain and sustain the EWS.

Baseline

60. There is a consensus that current national policy instruments do not adequately integrate climate change across the range of development plans and processes in a coherent manner; starting with the Liberia PRSP which captures government desires to achieve the millennium development goals, through to the development and implementation of medium term strategic plans which operationalise this vision, to the various sectoral policies (Agriculture, Energy, Health, Transport). Integrating climate change into these policy instruments will be instrumental to achieving the MDGs, yet it is hindered by a set of factors, including:

- uncertainty in large scale projected changes in climate for the Liberian region;
- the expected impacts of climate change on different sectors and communities are unknown;
- the effectiveness of different adaptation options are not always understood within a Liberian context;
- a lack of dialogue and coordinating efforts between different policy making entities;
- limited engagement of the private sector.

61. Currently there are no easily accessible climate projections which can be applied to a small territory such as Liberia (though it may be possible to source downscaled projections from regional centres such as ACMAD), which hinders the development and discussion of potential adaptation options. It is not currently clear how or if other sectors will need to consider adapting in the near future or how resilient they may currently be to expected changes in climate.

62. The impacts of climate change in each sector are also difficult to predict due to both incomplete knowledge regarding the current state of the environment, the effect of climate on vulnerable populations and uncertainty in predicting what the future climate will be.

63. Current activities regarding climate change adaptation, policy and strategies are limited at the national level to those undertaken by the National Climate Change Secretariat (NCCS) or in preparation for the Initial National Communication. Additional activities through the two other LDCF funded projects focus on reducing vulnerability and institutional capacity building in their particular sector. The project preparation phase will assess whether there are other relevant baseline projects that are unknown at this stage.

Additionality

64. Strengthening of climate monitoring and dissemination of the information generated through components 1 and 2 will serve as a foundation for climate change integration into national development planning, by providing a means by which scenarios of climate change can be translated into impacts

which Liberians experience now, as well as providing a basis for adapting by examining the effectiveness of current resilience building measures to current climate hazards. To achieve this it will be necessary to incorporate current state of the art climate scenarios for Liberia, including downscaled climate and vulnerability data if available, within the information system used for early warning. This will allow the identification of hotspots of climate change, where increases in climate hazards and/or vulnerability occur. The project will develop tools to allow decision makers the ability to change scenarios, compare with other regions and identify currently effective resilience building activities etc. In this way these tools will be used for exploring a set of possible scenarios/futures.

65. The above system will be used by decision makers, technical staff from relevant institutions, NGOs and farmers to explore how stakeholders can manage climate related risks. Consultations will then take place with pilot communities and users to discuss options for managing these risks and to assess whether the system is capable of providing useful information to support adaptation decision making. Identified options will need to be screened to ensure compatibility with national development (PRSP) and sectoral policy documents such as the National Integrated Water Resources Management Policy, the National Gender Policy Strategic Framework and Plan 2010-2015, the Back to the County Agriculture Initiative, Land and Forest Management policy etc. (relevant policies will depend on the sector). Recommendations to revise the relevant policies, strategies and the related budgets can be proposed through the Inter-ministerial communication mechanism (see below).

66. Through the creation of an inter-Ministerial communication mechanism in conjunction with other on-going projects support will be provided for climate change integration into national planning. The creation of a communication mechanism such as an ad-hoc working group with representatives from relevant sectoral ministries (e.g. agriculture, planning and economic affairs, finance and the climate change unit within the EPA), in conjunction with other ongoing projects (e.g. LDCF projects for coastal areas management and the enhancing of adaptive capacity in the agricultural sector) will enable a platform to develop new climate sensitive policies. One objective of this group would be to identify climate sensitive sectoral and/or environmental regulatory frameworks, as well as report and coordinate ongoing climate change related activities. A second objective of this process will be to engage government to ensure the medium to long term sustainability of the Meteorology division, Hydrological service and NDRC. Whilst the project cannot influence budgetary decisions, it will need to understand how investments in infrastructure and human skills will be maintained in the future, through government support beyond the lifetime of the project. This aspect will be clarified (in terms of current budget allocations and financial flows) during the PPG phase.

67. This component will also seek public sector engagement through creation of a consultative forum, with major private sector partners and delivery of information including a set of key messages and training to private sector partners. Under this output, the project will: (i) establish a consultative forum with major private sector partners to identify their needs and the possibility of providing paid for services; (ii) develop a mechanism for private sector participation in the financing of the early warning system. Such financial sustainability will allow the country to afford the cost of maintenance and upgrading of the system as well as the updating of knowledge and skills of the most relevant staffs after the project life. This activity will coordinate with the inter-ministerial dialogue (output 3.3) to ensure that generated revenue will be used for this purpose and that together with government the total funding is sufficient to maintain these services. During the PPG phase a list of potential private sector clients will be developed in order to establish the potential demand for these services.

B.3. DESCRIBE THE SOCIOECONOMIC BENEFITS TO BE DELIVERED BY THE PROJECT AT THE NATIONAL AND LOCAL LEVELS, INCLUDING CONSIDERATION OF GENDER DIMENSIONS, AND HOW THESE WILL SUPPORT THE ACHIEVEMENT OF GLOBAL ENVIRONMENT BENEFITS. AS A BACKGROUND INFORMATION, READ [Mainstreaming Gender at the GEF.](#)

68. The project is expected to deliver benefits at both the national and local levels. The installation of weather observation and computer infrastructure will benefit both the NHMS staff (through training and technological advancement) and others sharing the buildings where they are based (either at the airport or in other ministries such as Land, mines and energy where hydrological measurements are archived). Another national institution that will benefit from this endeavour will be NDRC, through strengthening of its computer databases, access to information and ability to communicate with other regions. One important benefit will be the improved coordination between government departments and the sharing of information, which can lead to improved products and services. It is then possible that these institutions can start marketing such information and products (satellite monitoring and climate forecast products in particular) to private entities who will pay for the services.

69. At the local level early warnings and climate hazard mapping, disseminated correctly and acted on appropriately, can provide economic benefits through reducing losses of agricultural produce, infrastructure (roads and bridges) and disruption to peoples livelihoods. This has further knock-on effects on people's health and wellbeing and thus affects communities and social structures. Communities at the pilot sites will immediately benefit through warnings related to agriculture, coastal management, water and flood management, wildfires etc. This total population benefiting from these developments has the potential to grow hugely if the warnings extend to a reasonable percentage of the total population (4 million) e.g. through a mobile phone relay or similar system. Many of the beneficiaries will be women (who comprise 54% of the workforce), especially within the agriculture sector where they make up the majority of smallholder farmers, produce as much as 60% of products, carry out 80% of trading activities, yet are most vulnerable to food insecurity. There may also be other benefits to developing the communication systems associated with early warnings - for instance radios can also be used for arranging medical evacuations.

70. Perhaps the largest economic benefits are associated with improved transport planning, especially shipping which will take advantage of improved forecasts of winds and waves, and aviation which can take advantage of improved local forecasts over Liberian airspace. These and commercial agriculture likely represent some of the largest private clients for early warning services and tailored forecasts. Together with satellite imagery used for land-use planning and monitoring these can provide environmental benefits, including monitoring of illegal logging which has global consequences in terms of deforestation and the global carbon budget.

B.4. INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS THAT MIGHT PREVENT THE PROJECT OBJECTIVES FROM BEING ACHIEVED, AND IF POSSIBLE, PROPOSE MEASURES THAT ADDRESS THESE RISKS

Risk	Level	Mitigation
Unavailability of requisite human resources and data	High	The issue of the unavailability of requisite human resources will be mitigated by recruitment of international consultants who will work closely with Liberian counterparts and by targeted capacity building activities. Training activities of local personnel will also be part of all aspects of the work and the Liberian government will be encouraged to expand the staff base if it is weak in particular areas.
Local IT and telecommunications infrastructure weak e.g. international bandwidth and local mobile telecommunications networks	Medium	Cost-effective solutions for each particular situation will be used e.g. satellite and/or radio communications. Where feasible automatic weather and hydrological stations reporting over the mobile telecoms network will be preferred.
Insufficient institutional support and political commitments (e.g. establishing the Meteorological agency)	Medium	<p>The proposed project is strongly supported by the Government of Liberia and other key stakeholders and development partners. The project, in conjunction with UNDP, will therefore take advantage of this opportunity to seek substantial support from the Government and forge strong partnership with other development partners. Direct linkages to existing and planned baseline development activities implemented by government, securing of the necessary co-financing, as well as local buy-in will also minimize this risk. It will also be important to establish buy in from all government departments early as the project will utilize data and information from a wide range of departments.</p> <p>As part of output 3.3 and starting with the PPG phase, the project will engage relevant ministries (including the ministry of Land, Mines and Water) to establish the current baseline financing of the Meteorology division, Hydrological service and NDRC. Increased budgets for additional staff and equipment (including maintenance etc.), developed through this project, will be estimated and a plan for financing developed in collaboration with government (including potential revenues from private clients).</p>
Work progresses in a compartmentalized fashion and there is little integration e.g. government departments refuse to share data and information	Medium	This risk is always present in a project such as this. By ensuring that capacity is built across a range of departments and implementing ‘quick win’ measures early (developing products based on internationally available data), these issues can be mitigated.
Non-compliance by primary proponents for the successful implementation of this project	Medium	Ensuring that the project is designed and implemented in a participatory and inclusive manner, following established UNDP procedures, will mitigate the risk. Since the activities correspond to the urgent needs as expressed by the primary proponents the risk of non-compliance should be reduced
Climate shock occurring during the design and implementation phase of the project	Low to medium	There may be some delays as more urgent priorities may need to be addressed by some of the stakeholders but it is unlikely that this will derail the project.

71. Additional project risks will be further identified during the preparatory phase, and a comprehensive risk analysis and risk management strategy will be prepared upon submission for CEO endorsement

B.5. IDENTIFY KEY STAKEHOLDERS INVOLVED IN THE PROJECT INCLUDING THE PRIVATE SECTOR, CIVIL SOCIETY ORGANIZATIONS, LOCAL AND INDIGENOUS COMMUNITIES, AND THEIR RESPECTIVE ROLES, AS APPLICABLE:

Stakeholder	Relevant roles
Ministry of Agriculture	Ministry of Agriculture will be able to use the project's climatological and satellite land-monitoring products to help plan agricultural development, as well as early warnings to identify potential interventions such as food aid etc.
Liberia Civil Aviation Authority	The Civil Aviation Authority will be able to use the weather forecast, which is a product of this project, to help direct air traffic into and out of the Liberia airspace to improve air traffic safety.
Environmental Protection Agency of Liberia(EPA)	EPA will be able to use products of this project (e.g., observations of environmental conditions such as water quality) to plan environmental projects as well as inform negotiations with UNFCCC.
Forestry Development Authority	The Forestry Development Authority will be able to use products of this project (e.g., satellite monitoring of land use) to plan forestry plantations, identify regions which may become more suitable in the future and identify suitable tree species..
Ministry of Lands, Mines and Energy	The Ministry of Lands, Mines and Energy will be able to use products of this project: <ul style="list-style-type: none"> • Climatological database and forecasts for siting wind energy and planning hydroelectric power • Satellite land use monitoring for land use planning
National Investment Commission (NIC)	NIC will be able to use this project's climatological products to assess weather-hazard related risks in locations when planning developments.
Liberia Maritime Authority(LMA)	LMA will be able use the project's weather forecast products to help improve safety in maritime operations.
Meteorological service.	The met service will be able to use the project's weather forecast products to issue early warning for weather hazards such as floods, capacity building of meteorologists (including developing future climate projections), develop services which can be used for generating income.
Ministry of Planning and Economics Affairs	All the project's products (e.g., weather and climate products, hazard early warning, satellite land-monitoring, socioeconomic databases) will help the Liberia government to conduct long-term planning to reduce the impacts of weather hazards and climate change.
National Oil Company of Liberia(NOCAL)	NOCAL will be able use the project's weather forecast products to help improve safety in offshore drilling operations, plan for extreme weather and reduce losses due to interrupted drilling.
Ministry of Transport	Ministry of Transport will be able use the project's <ul style="list-style-type: none"> • Weather forecast products to help improve safety in land, air, and sea transportation • Climatological products for assessing weather-hazard risks for planning highway constructions
Food and Agriculture Organization	FAO will be able to use the project's climatological and satellite land-monitoring products to help plan agricultural projects and training, as well as identify where current vulnerabilities are high.
UNDP	All of the project's products (e.g., weather and climate products, hazard early warning, satellite land-monitoring, socioeconomic databases) will help the UNDP plan actions to reduce the impacts of climate change.
Action Against Climate Change	All of the project products (e.g., weather and climate products, hazard early warning, satellite land-monitoring, socioeconomic databases) will help the Liberia government to plan actions to reduce the impacts of climate change.
Local communities	All of the project products (e.g., weather and climate products, hazard early warning, satellite land-monitoring, socioeconomic databases) will help local communities to plan actions to reduce the impacts of climate change.

B.6. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

72. The project will elaborate on the current efforts of the NHMS (MetAgri project supported by the World Meteorological Organisation) and the National Disaster Relief Commission (supported by the UNDP Bureau of Crisis Prevention and Recovery). Additionally the project will closely collaborate with and build on the baseline of the following national initiatives:

- The government is currently mobilizing \$278 million from a range of development partners to implement LASIP. Under LASIP, one of the most important and relevant initiatives is the Government and UN's "*Joint Programme on Food Security & Nutrition*", which has two specific components (i) Emergency Preparedness and Response (EPR) in Support of Government's Strategic Priorities, and (ii) Medium Term Support to the Poverty Reduction Strategy. It will be crucial to understand how the early warning system can be developed to improve emergency preparedness in the agriculture sector. Similarly the information required for long term adaptation planning will need to be assessed;
- The LDCF project "Enhancing Resilience of vulnerable coastal areas to climate change risks in Liberia" whose objective is to reduce vulnerability and build resilience of local communities and socio-economic sectors to the additional threats of climate change in Liberia's low-elevation coastal zones. Whilst the project concentrates on reducing vulnerability in the coastal zone there is an information gathering component which monitors sea level rise and areas at risk. However, this is currently not receiving forecast information which could be used for *ex-ante* early warning and preparation. The proposed project would provide this information;
- The LDCF project "Enhancing Resilience to Climate Change by Mainstreaming Adaption Concerns into Agricultural Sector Development in Liberia" whose objective is to increase resilience of poor, agricultural-dependent communities and decrease vulnerability of agricultural sector to climate change in Liberia. Districts within two counties (Bong and Grand Gedeh) have been selected as demonstration sites, and increased resilience measures, including supporting extension officers, are being implemented. However, no early warning information related to climate forecasts or monitoring is used – this would be provided through extension officers by this project. Additionally this project would provide higher resolution scenarios of future climate for adaptation planning.

73. During the preparatory phase, consultations will be held with all organizations/initiatives of relevance to the proposed intervention. Partnership modalities will be explored and a full stakeholder involvement plan will be developed, outlining the detailed arrangements for involving partners and sharing of responsibilities based on partners' respective comparative advantages.

C. DESCRIBE THE GEF AGENCY'S COMPARATIVE ADVANTAGE TO IMPLEMENT THIS PROJECT:

C.1. INDICATE THE CO-FINANCING AMOUNT THE GEF AGENCY IS BRINGING TO THE PROJECT:

74. UNDP is bringing a total of USD 1,466,746 to the project based on a contribution of USD 940,000 from the Building National and Local Capacities for Disaster Risks Management in Liberia project and USD 526,746 from the Governance Advocacy and Leadership for Water, Sanitation and Hygiene project.

C.2. HOW DOES THE PROJECT FIT INTO THE GEF AGENCY'S PROGRAM (REFLECTED IN DOCUMENTS SUCH AS UNDAF, CAS, ETC.) AND STAFF CAPACITY IN THE COUNTRY TO FOLLOW UP PROJECT IMPLEMENTATION:

75. The project is in line with the Government of Liberia PRS 3 (expected to be launched in July 2012) and UNDAF 2013-2017 which are: 1) Governance and Public Institutions; 2) Peace, Security and the Rule of Law; 3) Sustainable Economic Transformation; 4) Human Development. It is also in line with three of the five pillars of the Government of Liberia PRS3: i) Peace, Security, and Rule of Law; ii) Sustainable Economic Transformation; iii) Human Development; iv) Inclusive Governance and Public Institutions; v) Cross-cutting Issues and Linkages among Outcomes.

76. Activities and results that will be developed under this project are also fully consistent with the UNDAF outcome 2.1 "Improved sustainable Natural Resource Utilization and food security", 2.2 "Improved access to sustainable livelihoods opportunities in an innovative and competitive private sector", and UNDAF outcome 2.3 "Improved access to sustainable basic infrastructure". The UNDAF 2013-2017 has yet to be finalized and signed. Should any changes occur they will be addressed through evaluations or board meetings or both.

77. UNDP's comparative advantage in implementing this project is underpinned by its Country Programme Document for the current and new cycle (2013-2017) and our energy and environment program strategy which aims to mainstream environment and disaster prevention measures into national and local development policies, strategies and plans and our overarching role of capacity development.

78. Public service reform and institutional building is one of UNDP's flagship programming areas. The proposed capacity development activities in all three components of the LDCF project will benefit from UNDP's overarching and strategic role in this area, helping to ensure that related outcomes are sustainable in the long-term.

79. Since 2009, UNDP has been helping to finance the development of Liberia's national disaster management framework, leading to the development of policy and legal structures, as well as a national implementation framework based on regional and local disaster management bodies. UNDP has specific experience of climate change risks in coastal areas through its GEF-financed pilot project titled "Enhancing Resilience of Vulnerable Coastal Areas to Climate Change Risks In Liberia". This project is piloting a series of strategies for promoting coastal resilience to climate change in three counties, including techniques for the rehabilitation of degraded mangroves, and training in integrated coastal management. Through this project, the UNDP will support coastal communities around Lake Piso to conserve mangrove vegetation and to construct energy efficient ovens for drying fish. This experience will support the implementation of components 2 and 3 of the proposed LDCF project by providing examples of early warning applications and climate change adaptation options for the coastal zone.

80. UNDP also has considerable in-country experience in the organization and management of public works programme, particularly using labour intensive approaches. UNDP has collaborated with the Ministry of Public Works and other UN agencies to implement several road rehabilitation programmes to open up roads that were closed during the period of the civil conflict. At the moment UNDP is helping to mobilise and train young men and women, providing them with the necessary skills to broaden their opportunities and livelihoods strategies under the Government of Liberia Youth Empowerment program.

81. Moreover, UNDP's energy and environment programme is helping to strengthen both national and decentralized capacities for environmental management through ongoing support to the Environmental Protection Agency, the Ministry of Agriculture, Ministry of Lands, Mines and Energy and the Forestry Development Authority. One element of this support relates to how climate change is impacting on the national economy more broadly and how to develop both adaptation and mitigation strategies that take into account both risks and opportunities. This is an important area of dialogue with the national government that positions UNDP well with regard to key strategic bodies, such as the National Climate Change Secretariat (NCCS), helping to ensure that LDCF resources are programmed and implemented in

line with key opinion leaders. This experience is important for successfully promoting the inter-ministerial dialogue as part of component 3.

82. The programme will engage the Pro-poor Economic Growth practice area and the Democratic Governance practice area. The CO Environment and Energy unit currently has a Programme Specialist (with a strong environment/natural resource management background), National Climate Change Policy Advisor (with a strong environment and climate change negotiation background) and a Programme Associate who work as a team to coordinate and support energy and environment initiatives. The Democratic Governance practice area has one Programme Analyst and one Programme Associate with a strong experience in policy mainstreaming, institutional capacity building and gender equality.

83. Finally, other UNDP GEF-financed projects in the country (including LDCF financed ones such as “Enhancing resilience to climate change by mainstreaming adaptation concerns into agricultural sector development in Liberia”) have complementary objectives which will benefit from the proposed project. Additionally there are other UNDP GEF-financed projects within the region with similar objectives, which means that there is substantial in-house technical expertise within UNDP that can be brought to bear to support the Government with the project as outlined above. UNDP country office operations are supported by regional advisory capacity based in the UNDP Regional Centre in Pretoria. UNDP has dedicated Regional Technical Advisers focusing on supporting adaptation programming and implementation in a range of technical areas relevant to this project including capacity development, coastal zone management, disaster management, infrastructure development, and ecosystem based adaptation. Our network of global Senior Technical Advisers provide additional technical oversight and leadership helping to ensure that programmes on the ground achieve maximum policy impact.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

NAME	POSITION	MINISTRY	DATE (MM/DD/YYYY)
Anyaa Vohiri	Executive director	Environmental Protection Agency, Liberia	04/03/2012

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for project identification and preparation.					
Agency Coordinator, Agency name	Signature	Date	Project Contact Person	Telephone	Email Address
Yannick Glemarec Executive Coordinator, UNDP/GEF		May 18, 2012	Mark Tadross Technical Advisor Gr-LECRDS	+27 21 6502884	mark.tadross@undp.org