



GEF

REQUEST FOR CEO ENDORSEMENT/APPROVAL

PROJECT TYPE: THE LEAST DEVELOPED COUNTRIES FUND FOR CLIMATE CHANGE (LDCF)

Submission Date: 28 October 2010

PART I: PROJECT INFORMATION

GEFSEC PROJECT ID: 3716

GEF AGENCY PROJECT ID:

COUNTRY: Sierra Leone

PROJECT TITLE: Integrating Adaptation to Climate Change into Agricultural Production and Food Security in Sierra Leone

GEF AGENCY: IFAD

OTHER EXECUTING PARTNER(S): Ministry of Lands, Country Planning and Environment; and Ministry of Agriculture, Forestry and Food Security

GEF FOCAL AREA: NA

Expected Calendar (mm/dd/yy)	
Milestones	Dates
Work Program (for FSP)	Nov 2010
Agency Approval Date	Dec 2010
Implementation Start	May 2011
Mid-term Review (if planned)	May 2013
Project Closing Date	May 2015

A. PROJECT FRAMEWORK

1. **Project Objective:** To lessen the impact of climate change on vulnerable rural communities, as well as on natural resources critical for sustaining agricultural production and increasing food security.

Project Components	Indicate whether Investment, TA, or STA ^b	Expected Outcomes	Expected Outputs	LDCF Financing ^a		Co-financing ^a		Total (\$) c = a+b
				(\$) a	%	(\$) b	%	
1. Sustainable development of inland valley swamps for rice / other food production	Inv and TA	Participatory mapping and monitoring of vulnerability in IVS	24 consultation sessions (8 in PY1, 8 in PY2 and 8 in PY3). 2 Local study tours (1 in PY2 and 1 in PY3). Procurement of equipment for participatory mapping (in year 1) Vulnerability mapping is undertaken in PY1 and integrated in the GIS/MIS of the RCPRP-PLUS by PY2. Equipment (GIS requirements, GPS etc) are procured in PY1	185,100	19	7 80,000	81	965,100
		Climate-resilient rice production systems	Support to 120 farms in 4 project districts (30 in PY1; 30 in PY2; 30 in PY3 and 30 in PY4) (indicator disaggregated by gender and age) Provision of agricultural equipment (small equipment and agricultural kits to the most vulnerable households): # per year (indicator disaggregated by gender and age) Tools produced Number of sessions and beneficiaries for the disseminations of Agricultural Met Data # of users (by gender and age) Rate of integration of Ag. Met data in decision at the community level	598,900	16	3,280,000	84	3,878,900

		Training for Local rice producers on best practices	<p>Field extension workers trained to deal with adaptation to climate change: 16 persons trained (4 per year for 4 years)</p> <p>Demonstration sites for training purposes at the village level (established in PY1 and PY2)</p> <p>120 training sessions to farmers (through FFS) – 60 in PY1 and 60 in PY3: number of trained farmers disaggregated by gender and age.</p> <p>Training tools and motorbikes provided – 2 motorbikes in PY1 and 2 in PY3</p>	224,800	18	958,000	82	1,182,800
2. Integrated water and natural resource management for adaptation	Inv and TA	Ecosystem-based adaptation in the uplands	<p>40 training sessions through VDCs (20 in PY1 and 20 in PY 3): participant's number disaggregated by gender and age</p> <p>40 management plans (integrating adaptation measures) produced by PY3 (20 in PY 1 and 20 by PY3)</p> <p>100 water harvesting sheds installed (20 in PY1; 30 in PY2; 20 in PY 3 and 30 in PY4)</p> <p>1500 roof water collected installed (200 in PY1; 500 in PY2; 500 in PY2 and 300 in PY4)</p> <p>100 small water storage tanks established (25 each year)</p> <p>Technical assistance provided as required</p> <p>60 SLWM demonstration plots promoted by farmers in two districts (indicator disaggregated by gender and age) over 30 ha (15 ha in PY2 and 15 ha in PY3)</p> <p>8 community forestry plans through VDCs (4 in PY1 and 4 in PY 2)</p> <p>8 awareness raising campaigns on slash and burn 4 in PY1 and 4 in PY 2 (# of participants disaggregated by gender and age)</p> <p>8 communities supported for the promotion of IGS for adaptation through the CFD mechanism (4 in PY3 and 4 in PY4). (# of beneficiaries disaggregated by gender and age)</p>	643,800	29	1,510,000	71	2,153,800
		Irrigation efficiency and drainage systems	<p>30 solar powered irrigation schemes provided (15 by PY 2 and 15 by PY 3).</p> <p>Local Technical assistance provided to farmers</p> <p>Drainage works and</p>	259,400		770,000		1,029,400

			maintenance conducted in 6 climate risky sites (3 Sites in year 2 and 3 sites in year 3)					
3. Capacity building and awareness raising on climate change at both institutional and local level	TA and Inv	Government personnel training	Advanced training achieved by two meteorologists (at post graduate level) by PY 3 6 metrological Department staff (technicians) trained on agro-climatology management of weather stations: 3 staff trained in PY 1 and 3 in PY 3 24 Met Dept and MAFFS staff complete the training (12 by PY 1 and 12 by PY3)	200,500	66	175,000	34	375,500
		Agriculture climatic data collection and analysis for decision making	15 automatic weather stations established and operational (4 in PY1 and 11 in PY 2) All rainfall stations instruments are provided by PY2 20 Rain gauges are set up and operational in selected sites (10 by PY2 and 10 by PY4)	177,400		86,000		263,400
		Knowledge and awareness on climate change at community level	10 Trainers trained to carry out capacity building workshops on adaptation (6 in PY 1 and 4 in PY2) 36 Community capacity building 8 control visits (4 per year over the last 2 years of project implementation) 4 training sessions for radio stations on capacity building for adaptation by PY1 Musical-based tools : 18 communities and 40 schools 36 community leaflet and posters campaigns are produced every year Radio campaigns on CC and adaptation are designed Support is provided to SLBC broadcasting costs PY1 4 community radios are able to provide agricultural and weather/climate information	129,800		310,000		439,800
4. Project management and M & E				225,100 (inclusive of ME cost of USD 77,300)	22	757,000	78	982,100
Total Project Costs				2,644,800		8,626,000		11,270,800

B. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT (expand the table line items as necessary)

<i>Name of Co-financier (source)</i>	<i>Classification</i>	<i>Type</i>	<i>Project</i>	<i>Amount</i>	<i>%*</i>
IFAD	Cash	50 % Grant and 50 % loan	RCPRP-PLUS	7,520,000	87.2
Government	In Kind	Guarantee	RCPRP-PLUS	766,000	8.9
Beneficiaries	In Kind	Guarantee	RCPRP-PLUS	340,000	3.9
Total Co-financing				8,626,000	100%

* Percentage of each co-financier's contribution at CEO endorsement to total co-financing.

C. CONFIRMED FINANCING PLAN SUMMARY FOR THE PROJECT (\$)

	Project Preparation Amount (a)	Project (b)	Total c = a + b	Agency Fee	<i>For comparison: LDCF Grant and Co-financing at PIF</i>
LDCF financing	100,000	2,644.800	2,744.800	274,480	2,644.800
Co-financing	109,828	8,626.000	8,735.828		2,775,000
Total	209,828	11,270.800	11,480.628	274,480	5,419.800

D. FOR MULTI AGENCIES/COUNTRIES (IN \$)¹ – NOT APPLICABLE

GEF Agency	Country Name	(in \$)		
		Project (a)	Agency Fee (b)²	Total (c) c=a+b
(select)				

E. PROJECT MANAGEMENT BUDGET/COST

<i>Cost Items</i>	<i>Total Estimated person weeks/months</i>	<i>LDCF (\$)</i>	<i>Co-financing (\$)</i>	<i>Project total (\$)</i>
<i>Local consultants*</i>	337 pm in total but only 144 pm on LDCF	98,400	132,100	230,500
<i>International consultants*</i>	0	0	150,000	150,000
<i>Vehicles (only one to be financed by LDCF)</i>		30,600	279,000	309,600
<i>Travel*</i>		18,800	25,000	43,800
Total	0	147,800	586,100	733,900

* Details to be provided in Annex C.

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

<i>Component</i>	<i>Estimated person months</i>	<i>LDCF(\$)</i>	<i>Co-financing (\$)</i>	<i>Project total (\$)</i>
<i>Local consultants*</i>	54	278,000	120,000	398,000
<i>International consultants*</i>	18	160,000	150,000	310,000
Total	72	438,000	270,000	708,000

* Details to be provided in Annex C.

G. DESCRIBE THE BUDGETED M&E PLAN:

The objective of Monitoring and Evaluation is to assist all project participants in assessing project performance and impact, with a view to maximizing both. A key component of a project's monitoring system is the continuous and periodic review and scrutiny by management of the implementation of project activities, to ensure that all required actions are proceeding according to plan. Evaluation is a

process for determining systematically and objectively the relevance, efficiency, effectiveness and impact of activities in light of their objectives.

The overall goal of the LDCF project is to reduce the vulnerability of the food supply system to the deleterious impacts of climate change through selected priority adaptation activities.

The main objective of the proposed IFAD/LDCF project will be to lessen the impact of climate change on vulnerable rural groups as well as on natural resources critical for sustaining agricultural production and increase food security. The IFAD/LDCF intervention will be linked to the Rehabilitation and Community Based Poverty Reduction Project (RCPRP-PLUS), which is an expanded programme of the RCPRP that IFAD is currently developing. The RCPRP-PLUS will add the districts Koinadugu and Kono to the current RCPRP districts (Kailahun and Kenema).

The LDCF project is consistent with GEF policies and strategies for LDCF and also in line with the IFAD-supported NAPA implementation proposal which has been developed in compliance with the principles of country ownership and drivenness.

A number of organisations in Sierra Leone are involved in monitoring and evaluation in different ways. In common with many countries, these organisations are undertaking efforts to establish or improve national monitoring, evaluation and assessment systems of project impacts. In line with the GEF/LDCF operational principles, the IFAD/LDCF M&E activities will be country driven and provide for consultation and participation. As a participatory country, GEF expects involved local institutions including Farmer Based Organizations (FBO's) to be fully consulted with, informed and briefed about the plans, implementation and the results of evaluation activities.

Members of staff of the executing ministries and co-operating ministries and institutions are expected to support evaluations by responding promptly and fully to requests for information relating to the activities of this project and for sharing relevant experiences. These secondary stakeholders have a particular responsibility in providing their views and perspectives. They will use monitoring and evaluations to assess progress, raise issues and confirm the achievement of results, to improve performance and learning.

The GEF and UNFCCC Focal Points will have a particular responsibility for the use of, follow-up to and action on project evaluation recommendations. The Focal Points will also play a key role in keeping stakeholders fully consulted with, informed on and involved in the plans, implementation and results of the project's M&E activities.

The IFAD/LDCF project M&E system will be made particularly effective as it will include participatory elements, ensuring that local communities (including project beneficiaries) and partners are involved in the process. This is designed to advance local stakeholder participation and assist them to take ownership of the activities and results of the project. A part of the participatory M&E will be devoted to women's focus groups, to ensure women's participation in programme activities, ascertain the extent of constraints faced, benefits gained, aspirations met and impact on women's status in the family, their involvement in community affairs and the climate-proofing of their agriculture.

The M&E system will optimize prospects for sustainability following the eventual termination of the IFAD/LDCF interventions, by using indicators which are straight forward to collect and/or have been identified as critical to track. The LDCF monitoring system will be fully integrated in the GIS/MIS system that the RCPRP-PLUS will be developing for the overall monitoring and evaluation of the implementation of that programme.

In line with GEF requirements, the IFAD/LDCF project will adopt criteria for its monitoring systems which are SMART (i.e. Specific, Measurable, Achievable and Attributable, Relevant and Realistic, Time-Bound, Timely, Trackable and Targeted). These are duly reflected in the project logical framework.

The specific tools, methods and indicators for measuring the project impacts will be further defined during the inception workshop, to ensure adequate stakeholder participation in the design of the impact monitoring framework. Where possible, all indicators should be measured annually, although cost constraints and availability of data will limit the frequency possible for some indicators.

Project Indicators: Well-defined sets of indicators have been defined. They will be used in this project for both project monitoring and evaluation. Inputs, process, outputs, and outcomes indicators for each component are defined to ensure adequate monitoring. (Please refer to the project log-frame for details)

Component 4: Project Management

The day to day monitoring of implementation progress will be the responsibility of the National Project Officer and the RCPRP National Project Manager, based on the project's annual work plan and its indicators. The NPM will inform IFAD/GEF of any delays and/or difficulties faced during implementation, in order that the appropriate support or corrective measures can be adopted in a timely and remedial fashion.

Periodic monitoring of implementation of progress will be done through supervision missions from IFAD and GEF through regular meetings with the NPM and NPO, the RCPRP Steering Committee, Stakeholders and Beneficiaries. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely manner to ensure smooth implementation of project activities.

REPORTING

Each implementing agency and implementing partner will be required to submit quarterly progress reports covering all their activities in connection with the project to the Project Officer. The NPM together with the NPO and IFAD-LDCF team will prepare comprehensive annual reports, incorporating all the quarterly reports in a format acceptable to IFAD. These annual reports will be submitted to the National Steering Committee for review and approval before transmission to IFAD and GEF. The content of the progress report will include key qualitative and quantitative information, a descriptive and analytical account of achievements relative to original targets and project impact. The reports will also highlight implementation problems and actions to be taken to remedy them and by whom. Annual reports will reflect cumulative progress against annual targets and reflect conformity with the project implementation schedule, compliance with legal requirements and reconciliation of expenditures.

INCEPTION REPORT

A project inception report will be prepared immediately after the inception workshop. It will include a detailed First Year / Annual work plan and budget divided in quarterly time frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This work plan will include the dates of specific field visits, support missions from IFAD and/or consultants as well as time frames for meetings for the National Steering Committee. The report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted twelve months timeframe.

The inception report will include a more detailed narrative on institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update on any changed external conditions that may affect project implementation. When finalized, the report will be circulated to project stakeholders who will be given a stipulated time in which to respond with comments and queries. Prior to the circulation of the report, the Steering Committee, MAFFS, MLCPE and IFAD will review the document.

QUARTERLY PROGRESS REPORTS

Each implementing agency and implementing partner will be required to submit quarterly progress reports covering all their activities in connection with the project outlining updates in project progress to the project office. The Project Officer will be responsible for the coordination of this effort and the consolidation of progress reports.

ANNUAL PROGRESS REPORTS

The NPO will prepare comprehensive annual reports incorporating all the quarterly reports in a format acceptable to IFAD. This annual reports will be submitted to the National Steering Committee for review and approval before transmission to IFAD/GEF. The content of the progress report will include key qualitative and quantitative information, a descriptive and analytical account of achievements relative to original targets and project impact. The reports will also highlight implementation problems and actions to be taken to remedy them and by whom. Annual reports will reflect cumulative progress against annual targets and reflect conformity with the project implementation schedule, compliance with legal requirements and reconciliation of expenditures.

TECHNICAL REPORTS

The inception report will also include a list of proposed technical reports that are expected to be prepared on key areas of activity during the course of the project with tentative due dates. This reports list will be kept up-dated and included in subsequent Annual Project Reports. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of activity within the project framework. These technical reports will represent, as appropriate the project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

PROJECT PUBLICATIONS

Project Publications will form a key method of crystallizing and disseminating the results and achievements of the project. These publications may be scientific on the activities and achievements of the projects, in the form of journal articles, multimedia publications, newsletters, bulletins etc. The publications can be based on technical reports depending upon the relevance, scientific worth etc. of these reports or may be summaries or compilations of series of Technical Reports and other research.

Carefully designed materials will be produced to reach specific potential beneficiary groups, including Inland Valley Swamp crop producers in the IFAD/LDCF project area and/or in the country at large. The project team will determine if any of the technical reports merit formal publication and will, in consultation with IFAD, the executing agencies and other relevant stakeholder groups, plan and produce these publications in a consistent and recognizable format.

EVALUATION

Impact evaluation approaches will be developed. Variation in beneficiary revenues, improved resilience of rice farming to climatic variability, improved farmers capacity in irrigation and water management , reduced slash and burn agriculture and improved public knowledge and awareness on climate change will be measured using baseline data from the baseline studies for each component and evaluation report at completion. Baseline studies on each component and completion reports will ensure that the required information is collected. Furthermore, household surveys will be carried out early in the project, around the mid-term review, and at completion which will be used to inform impact assessments. The M&E data will provide ready access to the project's activities and potential impacts through IFAD and other websites, periodic reports and radio programmes.

The Mid-Term Evaluation and the Mid-Term Review will be conducted as part of the one overall exercise to benefit from the economies of scale. The IFAD/LDCF project will be subjected to at least two independent external evaluations. The first will be an independent Mid-Term Review, two years after start-up. This will determine progress being made towards the achievement of outcomes and will identify course correction if needed, focusing on effectiveness, efficiency and timeliness of project implementation; highlight issues requiring decisions and actions; and present initial lessons learned about project design, implementation and management. The mid-term review will allow the PCU to make any modifications necessary to incorporate improvements or changes in the project activities for the remaining project period.

An independent Final Evaluation will take place at completion of the project period. The final Evaluation will focus on the same issues as in the mid-term review and any other issues that may have cropped up due to the mid-term review. The final Evaluation will also look at impact and sustainability of results, including contribution to capacity development and the achievement of global environmental goals.

M&E BUDGET

Project M&E is integrated in the overall Project Management Structure, the system will be managed as part of the MIS/GIS of the RCPRP-PLUS and will be directly co-financed through the baseline. The following table outlines M&E costing by activity (costs on the LDCF grant).

Table 1. M&E activities and indicative Budget

M&E Activity	Responsible Person(s) Institutions	BUDGET (US\$)			Total (\$)
		LDCF Funding	IFAD	GOSL and Benif.	
Baseline Survey	NPCU M&E Officer Procurement Officer PEMSD	8,800	15,000	1,500	25,300
Impact studies	NPCU M&E Officer Consultant	19,000	20,000	17,000	56,100
Mid-Term Review/External Evaluation	IFAD M&E Team Consultants	10,200	30,000	10,000	50,200
Final External Evaluation	-IFAD -GEF -Consultants	-	30,000	15,000	45,000
Terminal Reports	-NPCU -M&E Team	-	5,000	5,000	10,000
Dissemination of Project Information	NPCU M&E Team IFAD	-	10,000	10,000	20,000
External Audits	NPCU IFAD	39,300	13,000	1,500	53,800
Total Indicative Cost		77,300	123,000	60,000	260,300

PART II: PROJECT JUSTIFICATION

A. DESCRIBE THE PROJECT RATIONALE AND THE EXPECTED MEASURABLE ADAPTATION BENEFITS:

A1. Problem Statement

Sierra Leone faces an array of formidable environmental problems, including land degradation, deforestation, loss of biological diversity, pollution of fresh water resources and coastal area degradation which are a consequence of over-exploitation of the natural resources (soil, water and forest; mineral and marine resources. These pressures are exacerbated by the damage wrought during the civil war. Unchecked, the predicted population growth in Sierra Leone and its wider region (the Mano River Union, also ECOWAS) over the coming decades will put even greater stress on natural systems and increase water competition between urban and rural areas.

Among the primary causes of environmental degradation in Sierra Leone are: (a) clearing of natural forests for agriculture, particularly the extensive slash-and-burn farming practices; (b) the traditional slash and burn farming practices may be appropriate in flat areas with low population densities, however, with growing rural populations in recent years this practice is becoming unsustainable in Sierra Leone, as the bush fallow period is insufficient for the land to fully recover before the next cropping, resulting in progressively lowering of yields. It was estimated in the Initial National Communication (GoSL, 2006) that 600,000 hectares of forested lands (or 8% of total arable uplands) have been cleared for farming.

Slash and burn is now contrary to MAFFS policy – but in the current vacuum of knowledge of viable alternatives among farmers, enforcement is currently not appropriate.

Despite its rich endowment of natural resources, **Sierra Leone is ranked 180th of 182 countries on the UNDP's 2009 Human Development Index**. The human development and social indicators (*inter alia* literacy, primary school enrolments, life expectancy, maternal deaths, malnutrition and child mortality) are among the worst in the world. Notably, the overall adult literacy rate is 38.1 % (144th of 151 countries), while the female literacy rate is 26.8%. Life expectancy at birth is 41.8 years.

“Among other complex factors which have limited development, decades of poor governance and neglect of rural areas culminated in a **ten-year civil war** that finally ended in January 2002” (IFAD, 2003b). The hostilities began in 1991, when regional actors sought to control the diamond fields in Sierra Leone and the rest of the Mano River basin. The social and economic effects were devastating: 20,000 killed, thousands injured or maimed and thousands more suffering from post-traumatic stress. Over two million people were displaced, 500,000 of whom fled to neighbouring countries. A mass exodus of professionals and business people doubled Freetown’s population to perhaps two million and drained the outlying areas of trained human resources. Infrastructure, businesses and much of the housing stock are in ruins. The gross domestic product (GDP) per capita halved during the course of the war. In September 1998, the Government and the Revolutionary United Front agreed to peace-building actions that culminated in the demobilization of all combatants by 18 January 2002, when all parties to the conflict issued a Declaration of End of War.

The civil war had major social, economic and environmental implications. The effect of the war on the agricultural sector was particularly devastating. Many farms and rural areas were abandoned, as villages were burnt down and looted. Abandoned farms reverted to bush, while mangroves reclaimed considerable areas of lowland rice fields, tree crops were swallowed by the regrowth of forest. The infrastructure vital to the local agricultural systems (*inter alia* rice mills, water supply wheels, IVS systems, rice drying floors and stores, palm oil processing units, roads, market places, bridges) were destroyed. The national livestock herd was almost entirely destroyed.

Today, **rural poverty in Sierra Leone remains widespread and deep**. About 26% of the people are food-poor and cannot afford a basic diet, while 70% live below the poverty line. Poverty is directly linked to the problems faced by agricultural production and commercialization. Food insecurity is more pronounced in households headed by women than in those headed by men. At the same time, there is widespread regional disparity in the incidence of poverty, with rural areas, where two thirds of the population lives, being the hardest hit. The recent (2008) food crisis resulted in a 50% increase in price for rice (the country’s staple food), with far-reaching effects. Geographically, the eastern part of Sierra Leone is more severely affected than other parts of the country.

Uplands (Slash and Burn / Bush Fallow): The uplands account for 80% of arable land. The main farming practice is shifting subsistence-level cultivation (with progressively declining fallow periods¹, mainly due to population pressure on land) with mixed cropping being the common cropping pattern. The soils in the uplands are very variable, being highly leached and with low fertility status, resulting in significant differences in crop suitability. Farmers fell trees, clear undergrowth (“brush”) and burn a fresh plot each year. Rice is usually the main crop grown² in mixed stands with other crops such as cassava, maize, sorghum, sweet potatoes, millet, sesame, sesame and ground nuts. Uplands are not “formally” irrigated but “increasingly upland farmers without access to the lowlands resort to well digging” “use of previously excavated wells/boreholes, or construction or rehabilitation of temporary channels from nearby water sources such as small rivers, streams, springs as a viable alternative” (PPG study report).

Inland valley swamps (IVS): comprise 10% of the arable lands. Soils of the IVS are relatively more fertile and can support a much higher cropping density than those of the uplands. Typically farmers use the IVS for rice in the wet season followed in the dry season by groundnuts and/or sweet potato, cassava and maize. Vegetables including tomato, egg plant, lettuce and cabbage are grown, especially in areas around urban centres. Perennial IVS do not dry out and have a potential for double cropping with rice which is in some places already practiced. Seasonal IVS on the other hand allow for one rice crop and for a second group of crops grown on residual moisture. Rice is nursed in June and five to six weeks old seedlings are then transplanted in July and August after land has been brushed, cleared, dug and puddled using cutlasses and hoes. Improved practices such as the RARC/JICA package involve transplanting younger seedlings. Harvesting occurs from October to January depending on variety.

MAFFS and the NAPA (GoSL, 2008) strongly advocate that IVS farmers should take the opportunity to grow a second rice crop each year, however relatively few currently appear to follow this advice, if anything preferring to grow vegetables. During PPG field work, farmers recounted their fears over damage / loss of this second rice crop due to pests (specifically birds).

¹ In 1980, a nation-wide survey (FAO-UNDP Land Resources Survey) showed the country mean fallow period length to be 8.8 years with wide variations. PPG studies reported 3-8 years, noting that 10 is considered the minimum which ensures restoration of soils nutrients and organic matter.

² Rice is grown by more than 80% of the farmers and alone accounts for about 85% of the agriculture sector’s contribution to GDP.

Soil erosion in the upland fields: Sloping upland areas are subject to the regular decimation of vegetative protection (slashing), followed by burning due to the persistence of slash and burn practices, exposing the shallow and infertile soils to rapid degradation and erosion when exposed to the frequently intense rainfall, exacerbated further as furrows are often ploughed down-slope. [The estimated soil loss due to erosion varies from 14.0 to 109 tons/ha/year - depending on the soil type, slope, vegetation and land use.]

Increased sediment loads in lowland rivers: The loss of protective vegetation cover, combined with degradation of soil structure (notably porosity), particularly on the sloping uplands, resulting in increased overland flows is washing topsoil into rivers, reducing the water quality for communities and fisheries downstream.

In the past (prior to the civil war), Sierra Leone was a net exporter of a number of agricultural commodities including cocoa, coffee, ginger, palm kernels, piassava, rubber and rice. Largely due to persistent low yields, also infrastructure destruction during conflict and structural adjustments, Sierra Leone is a net importer of rice and some other food crops (GoSL, 2009d).

Loss of Biodiversity: Biodiversity and Protected Areas: Sierra Leone has some 938 known species of amphibians, birds, mammals and reptiles according to figures from the World Conservation Monitoring Centre. Of these, 0.4% are endemic and 2.9% are threatened. Sierra Leone is home to at least 2090 species of vascular plants, of which 3.5% are endemic. 2.0% of Sierra Leone is protected under IUCN categories I-V (Mongabay, 2010). On paper, 55 protected areas covered 4.5 percent of Sierra Leone as of 2003. The country has 2,090 known species of higher plants, 147 mammals, 626 birds, 67 reptiles, 35 amphibians, and 99 fish species.

The loss of biodiversity, especially due to deforestation, has been a cause for concern since early 1960s and subsistence agriculture based on the “slash and burn” culture is one of the major drivers of this problem whose threat is further reflected by various negative impacts such as global warming and climate change inter-alia. Squire (2001) summarized the impacts as follows: (a) Loss of unique habitats for wildlife within ecosystems; (b) loss of genetic resources and wild types for improving biotechnology; tissue culture, crossbreeding, genetic engineering, and pest control; (c) loss of plant resources with medicinal potential to combat diseases and improve human livelihoods.

Climate Change: Sierra Leone’s paper to UNFCCC COP 15 (GoSL, 2009e) does recognise that “deforestation and land degradation due to unsustainable agricultural practices and collection of fuel wood and charcoal for cooking have contributed to the problem of climate change”. However, “on the global scale, Sierra Leones’ contribution to global climate change is negligible” (ibid.). Nevertheless, “like all other African countries, it is likely to be disproportionately affected by the impacts of climate change due to limited adaptive capacity and widespread poverty” (ibid.).

The recent climate (1961-1990) of Sierra Leone has been an average annual rainfall of 2,746mm, varying from 3,659mm at Bonthe in the south to 2,618mm at Kabala in the North. The average temperature for the same period was 26.7°C. Changes in rainfall patterns and temperature are already being reported in Sierra Leone – and are likely to accelerate over coming years.

Climate data for the period 1961 to 1990 were used in the Initial National Communication (GoSL, 2006) as the baseline from which to construct the climate change scenarios for Sierra Leone³. The parameters used for the study included precipitation (rainfall), temperature, solar radiation and evaporation. The GCM, HADCM, UKTR, ECHAM models were used to develop the climate change scenarios for Sierra Leone (ibid.).

The average temperature for 1961-1990 (26.7°C) is expected to increase by about 7-9% by the year 2100, with some variations between model predictions (see Table 5).

³ Data from meteorological stations at; Lungi, Bonthe, Kabala, Njala and Bo.

Table 5: Projected Increase in Average Monthly Temperatures by 2100.

Recent and Scenario	Jan	Feb	March	April	May	June	July	August	September	October	November	December	Annual
1961-1990	26.2	27.5	28.0	27.9	27.1	27.0	25.2	25.1	25.5	27.8	26.1	26.3	26.7
HADC M2	28.7	30.1	30.5	30.6	30.2	29.7	27.6	27.4	27.8	30.0	28.5	28.8	29.2
UKTR	28.3	29.3	29.8	30.0	29.3	29.0	27.3	27.1	27.4	29.9	28.3	28.5	28.7
CSIRO-TR	28.1	29.5	29.9	29.8	28.9	28.8	27.0	26.8	27.1	29.5	27.9	28.3	28.5
ECHAM 4	28.6	29.8	30.3	30.1	29.3	29.0	27.1	26.9	27.3	29.7	28.3	28.7	28.8

Projection from the 1961-1990 using the ECHAM4 and HADCM2 models to 2100 show that rainfall amounts will remain similar to the 1961-1990 amounts, while the CSIRO-TR and UKTR models show a decrease in rainfall by about 3-10% from the baseline monthly and annual values.

The estimated average annual solar radiation received at the surface is about 6021 MJ/m²/year for the period 1961 to 1990. Based on projects using GCM outputs this is expected to decrease by 12% under the HADCM2, 9% under the UKTR, and 3% under the CSIRO-TR models but increase by 5% under the ECHAM4 model.

In Sierra Leone, based on the last reference MAGICC/SCENGEN models, CO₂ concentration of about 350 parts per million (ppm) was determined in 1990. The CO₂ concentration levels are expected to rise to about 580ppm by 2025 and about 700ppm by 2100.

Farmers' experience of the recent weather in Sierra Leone: One of the PPG study reports states that, "farmers, though unaware of the term 'climate change' per-se, are already feeling its impact and consciously adapting, in their own way, to the changes brought about by this very threatening phenomenon". All the PPG studies agree that the impacts of increasing weather variability, perhaps portents of climate change, are already being felt in Sierra Leone. The farmers recounted that they are experiencing unusual weather patterns (changed rainfall patterns with rain in the dry season and dry periods in the rainy season, also more intense rainfall - resulting in both more frequent severe floods and seasonal droughts; in the north, late onset of rains; decreasing overall rainfall totals; rising temperatures, particularly in the dry season; stronger winds including reports of local tornadoes; more intense thunderstorms; more frequent landslides).

In particular, subsistence crop production is highly vulnerable to the impacts of this increasing weather variability. Prolonged periods of dry days during the rainy season (July/September) were reported in the PPG studies to be affecting crop yields across much of the country. Heavy rains are also occurring in March (previously the height of the dry season) in districts including Kono, Kenema and Kailahun, limiting farmers "brushing" (weed clearing) and preventing them burning their upland fields, resulting either in weed expansion affecting yields or at worst catalysing abandonment of the fields. In Koinadugu, reported changes in rainfall patterns in recent years include late onset of the rains.

As reported in the Sierra Leone's National Adaptation Programme of Actions (GoSL, 2008) and widely observed elsewhere, it is poor communities which are and will suffer the most from the impacts of climate change, as floods destroy their crops and increased droughts cause water shortages. Climate change is acting as a "multiplier of threats".

Past and present practices for adaptation to climate change and climate variability (adapted from NAPA, GoSL, 2008): In the past and currently, people in rural areas rely on stream water and on shallow hand-dug wells for water. Climate change is already negatively affecting the availability of fresh water to communities. Rising temperatures in the dry season is decreasing stream flow and ground water recharge, making formerly perennial streams seasonal. Reduced annual average rainfall

but increasing intensity of rainfall are increasing run-off, exacerbating land degradation and resulting in more frequent flooding. The lack of surface water and declining levels of groundwater during the dry season is limiting the use of low lift pumps. Presently, wells are dug deeper during this season because of the low level of the water table. Very few people can afford water storage tanks in their homes.

Loss of Traditional Knowledge: Agrobiodiversity is the result of natural selection processes and the careful selection and inventive developments of farmers, herders and fishers over millennia. Agrobiodiversity is a vital sub-set of biodiversity. Many people's food and livelihood security depend on the sustained management of various biological resources that are important for food and agriculture. Agricultural biodiversity, also known as agrobiodiversity or the genetic resources for food and agriculture, includes: (a) Harvested crop varieties, livestock breeds, fish species and non domesticated (wild) resources within field, forest, rangeland including tree products, wild animals hunted for food and in aquatic ecosystems (e.g. wild fish); (b) Non-harvested species in production ecosystems that support food provision, including soil micro-biota, pollinators and other insects such as bees, butterflies, earthworms, greenflies; and (c) Non-harvested species in the wider environment that support food production ecosystems (agricultural, pastoral, forest and aquatic ecosystems).

The widespread decline in local knowledge of agrobiodiversity has been exacerbated in Sierra Leone due to the rebel war – which forced many thousands of people to leave their traditional lands.

Lack of knowledge of SLM (mulching, low / zero tillage, agro-forestry, use of manure and compost): Current land and land-use patterns present basic constraints to achieving growth and reducing poverty. First, is the nature of the soils, the upland soils - the most dominant, are generally ferrallitic, shallow and susceptible to low fertility with high aluminium contents. Without SLMs, farmers find yields decline rapidly, hence the preference for bush fallow systems. With shortening fallows (due to population pressure) soil fertility is progressively declining.

The remaining land types, with relatively better fertility status, are subjected to seasonal or permanent water logging, inadequate drainage and also have problems related to high iron and aluminium content. Farmers are reluctant to cultivate in the more fertile lowlands due to difficulties associated with tilling wet soils with their rudimentary implements and knowledge.

Sustainable soil fertility management with nitrogen fixing rotations, conservation agriculture/minimum tillage and targeted use of chemical inputs that are increasingly expensive are vital.

Less than two percent of arable land is irrigated despite the fact that irrigation permits higher value-added crop production - especially during the 6 month long dry season, reduces vulnerability to drought and climate change, also generally increasing productivity. Use of technologies for water conservation or drainage is low. The potential for irrigation remains largely unexploited.

Gender: A variety of studies indicate that there are gender differentiations in the agricultural sector in Sierra Leone. Women and men perform different farming activities, own or operate different crops and carry out different tasks in the field. For instance, while women are mostly engaged in crop farming and poultry, the men dominate livestock, hunting, forestry and fishing (Census, 2004). Within this gender division of labour, there are the so-called 'women's crops' (cassava groundnut, maize, potato and vegetables) and there are those other crops mostly grown by men (coffee, cacao and oil palm). Similarly, women are associated with the rearing of small ruminants (goats and sheep), gathering of fuelwood and inland fisheries, while the men are mostly known for cattle and pig rearing, logging for timber and marine fisheries. Women also play a significant role in the processing and distribution of fish products by handling, preserving, processing, storing and transporting fish. According to the 2004 census, there are more female farmers in Sierra Leone (52.2%) compared with male farmers (47.8%).

Yet women do not normally share direct benefits of additional income from their labour. In fact agricultural activities by status in the census report noted that men dominate the paid and self-employed category while women mostly belonged to the unpaid family workforce.

Meteorological System: The effects of the rebel war (1991 -2002) on the Meteorology Department were: (a) The capability of the Meteorological Department to cope with its schedule task of weather monitoring, data collection, data analysis ,dissemination to end-users and storage was greatly reduced; (b) All the stations were either totally or partially destroyed; (c) Some members of staff died during the war, others retired from the service while, others left the country; (d) Out of the 11 weather

stations in the country, only 4 are now operational but still below standard in terms of standard observation instruments and manpower; (e) The eight agro-met stations require total rehabilitation, particularly those at Njala, Rokupr, Kabala and Daru; and (f) the 35 rainfall stations no longer exist.

The department has a major problem with the age and qualifications profile of the staff. They have not been able to recruit young graduates to be the next generation of leaders and scientists. There is also an imminent problem with qualifications of forecasting staff. The current staff number only 48, of whom there are the following professional / technical staff: (a) Graduates: 3 Meteorologists (WMO Class I) and 1 Executive officer; (b) Non-graduates: 1 WMO Class II; 3 WMO Class III; 16 WMO Class IV; 3 Meteorological Attendants and 3 Instrument Technicians.

Currently with the limited staff and only four main stations, the department is only able to provide the minimum level of services in: (a) Aviation meteorological services and (b) Provision of data and services for related disciplines such as agriculture, marine, construction, hydrology, tourism, media, public etc. All of these are being accomplished against the backdrop of poor logistics and a restricted budget.

The present functioning meteorological stations at Lungi, Bo, Bonthe and Makeni are all below standard, due to lack of equipment. Former stations which require complete rehabilitation include those at Daru, Njala, Yele, Kabala, Freetown, Sefadu and Shenge.

A2. Project Strategy

“We can adapt to climate change and limit the harm. Or we can fail to adapt and risk much more severe consequences. How we respond to this challenge will shape the future in important ways” Leary et al (2007).

“In contrast to reducing emissions of the greenhouse gases that drive climate change, a policy that, in the parlance of economists, generates benefits that are substantially external, adaptation generates benefits that are largely internal. This means that the individuals, organizations, communities and countries that take action to adapt will capture for themselves most of the benefits of their actions, creating a strong incentive to adapt.” (ibid.)

“There are numerous obstacles that are found to impede adaptation in our case studies. Common obstacles include competing priorities that place demands on scarce resources, poverty that limits capacity to adapt, lack of knowledge, weak institutions, degraded natural resources, inadequate infrastructure, insufficient financial resources, distorted incentives and poor governance.” (ibid.)

“Climate hazards exact a heavy toll, impacting most strongly on the poor and acting as a drag on development. The toll is rising as climate change widens the gap between our exposures to risks and our efforts to manage them. Adaptation is place-based and requires place-specific strategies; involving the people persons at risk in the process of adaptation, increases the effectiveness of adaptation to climate change.” (ibid.)

The proposed project is designed to implement the agriculture and food security elements of the Sierra Leone NAPA. [In accordance with UNFCCC paragraph 15, of the UNFCCC summary decision 28/CP.7 the criteria below were applied in the Sierra Leone NAPA (GoSL, 2008) to the options that were identified during the consultative process in order to select the priority adaptation activities. These include a set of locally driven criteria as follows: (a) level or degree of adverse effects of climate change; (b) poverty or degree of adverse adaptive capacity; (c) synergy with other multilateral environmental agreements; (d) cost-effectiveness. These criteria for prioritization were considered in conjunction with the potential adverse impact of climate change (loss of life and livelihood; human health; food security and agriculture; water availability, quality and accessibility; essential infrastructure; cultural heritage; biological diversity; Land-use management and forestry; other environmental amenities; coastal zones and associated loss of land).] Based on the above criteria, the following priority adaptation activities/options were selected:

Agriculture Sector

- 1) Develop irrigation and land drainage system for agriculture;
- 2) Develop and implement agricultural land-use and land cover management;
- 3) Promote swamp land farming.

Meteorology Sector

- 1) Establishment on National Early Warning System;

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

The project will implement three agricultural sector-related activities, also the second and third meteorology activities.

This LDCF intervention will be articulated around four components: (i) sustainable development of climate resilient inland valley swamp; (ii) integrated water and natural resource management for adaptation; (iii) capacity building and awareness raising on climate change and (iv) project management and M&E.

The IFAD/LDCF project will work in the same districts of the country as the co-financing partner RCPRP-PLUS. Phase I of the RCPRP (2003-2011) (IFAD, 2003b) focussed activities in two districts of Eastern Province – Kono and Kailahun (see Figure 2 and Table 7). The selection was based on a number of criteria, including vulnerability, accessibility, agricultural potential, geographical spread and avoidance of overlap with other donor operations. [These two districts were hardest hit by the war (widespread destruction and mass displacement of the population), thus when Phase I was planned to provide the required strong external assistance to return to pre-war livelihood and production levels.] For RCPRP-PLUS and for the LDCF intervention, this will be extended (in 2012) to include the adjacent districts of Koinadugu (to the north) and Kenema (to the west) (Figure 2 and Table 7).

The proposed IFAD/LDCF operation is focusing on investment and impact on the ground; as such, the project will be carefully designed in view of an optimum level of investment that ensures maximum impact per LDCF dollar. The project will also work towards targeted capacity building and improving the necessary elements (i.e. data collection, impact mapping, and vulnerability assessment at key investment sites) to better focus the investment.

The project will use proven mechanisms for community participation, farmer field schools and other capacity building (for farmers, staff of the Meteorology Department and skilling youth), government's involvement and technology transfer, particularly regarding meteorological stations.

LDCF funding for Sierra Leone is designed to be catalytic for scaling-up adaptation to climate change using sustainable land and natural resources management including reducing use of bush fallow systems; improved water management in uplands and IVS; improving access to weather and climate information, through targeted technical and institutional capacity development and on-the ground activities (including demonstrations). The project will work with existing community structures such as the Farmers Business Organisations and Farmer Field Schools, which have already been strengthened in the RCPRP-PLUS project area will be used to promote for community-based activities.

Targeting: In line with IFAD's mandate and based on the knowledge that it is the poorest people in societies who will be most affected by the impacts of increasing weather variability, rising frequency of weather extremes and longer-term climate change, the target groups for IFAD/LDCF project activities will be smallholder farming households. The LDCF project will be fully aligned with the RCPRP-PLUS in terms of targeting and will strictly follow the targeting criteria for RCPRP-PLUS while focusing on the households and ecosystems most vulnerable to climate change.

In developing the targeting strategy for the project, as much information as possible was gathered on relative vulnerabilities in the four district areas via primary research and a number of secondary sources. Secondary sources currently available do not include any information on relative vulnerabilities on a sub-district level (e.g. the 54 chiefdoms, within which many more villages / communities) for the four target districts.

Ministry of Agriculture, Forests and Food Security together with Jameel Poverty Action Lab and Statistics Sierra Leone are currently carrying-out a national agricultural tracking survey (ATS) (see earlier details). The results of the ATS, which will be published by September 2010, could provide further information to support the project in its targeting approach as it will provide more specific information on community level vulnerability for each of the districts.

The LDCF project will particularly work with individual women farmers, groups of women and some men (much of the farming in Sierra Leone is the domain of women) living in the remotest areas, which are most prone to food insecurity as they have great difficulty accessing markets either after harvest to sell surplus, or when food is short. From a practical point of view however, until the RCPRP-PLUS or government improve feeder roads, certain areas may be practically impossible to work in. [For example in Koinadugu District, some chiefdoms take more than a day to reach by 4-wheel drive vehicle, about one day by motorcycle from Kabala.]

Appropriate and sustained sectoral policies, strategies and programmes are required to ensure firstly that **women's** practical needs are met and secondly that their strategic needs are mainstreamed into agriculture.

Youth mainstreaming in development planning in Sierra Leone is a relatively new phenomenon which emerged in the processes leading to the preparation of the National Youth Policy (2003) and the 2005 Poverty Reduction Strategy Paper (PRSP). In 2003, the government launched the Sierra Leone National Youth Policy. The policy is anchored in the twin notion of youth empowerment and the creation of responsible citizens. Empowerment in a post-conflict context involves privileging and mainstreaming youth related activities in the overall process of national reconstruction.

Labour issues: The labour problem in bush fallow / slash and burn cultivation will be mitigated to a significant degree as more permanent cultivation approaches (as proposed in this project) are demonstrated and widely implemented in upland areas. It is not appropriate to advocate use of tractors on the IVS schemes in the project districts, as they are small in area and access / bridges would be required over irrigation / drainage channels. Small hand and mechanized tools are more appropriate.

A3. Full Project Description

PROJECT GOAL

The overall project goal is to reduce the vulnerability of the food supply system to the deleterious impacts of climate change.

PROJECT OBJECTIVES

To lessen the impact of climate change on vulnerable rural communities, as well as on natural resources critical for sustaining agricultural production and increasing food security.

The IFAD/LDCF project will complement the activities undertaken under Phase I of the RCPRP and those planned for RCPRP-PLUS. The LDCF components are fully embedded in the RCPRP-PLUS in a synergetic manner that would ensure that the LDCF funding is covering additional costs associated with the adaptation needs that were identified in the NAPA and further discussed at all levels (national, provincial and grass-roots) during the PPG phase. This LDCF intervention will be articulated around four components: (1) sustainable development of climate resilient inland valley swamp; (2) integrated water and natural resource management for adaptation; (3) capacity building and awareness raising on climate change and (4) project management and M&E. Project duration is 4 years starting in 2011.

PROJECT COMPONENTS

Component 1: Sustainable development of climate resilient inland valley (LDCF: \$ 1,008.800 – Co-financing \$5,018.000)

The inland valley swamps are estimated to cover an area of about 690,000 ha in Sierra Leone, occurring in all geographical regions of the country. Their hydrological characteristics (many are perennial swamps) favour the production of rice both in the rainy and dry seasons and have the potential for sustainable agricultural production, with availability of water and better soil fertility than the uplands. It is estimated that rice yields in the inland valley swamps could reach 2.3t/ha.

Typically, farmers who have access to developed IVS use this for rice growing in the wet season. In seasonal IVS, farmers who have adequate labour follow this in the dry season by growing groundnuts and/or sweet potato, cassava and maize on residual moisture. Vegetables including tomato, egg plant, lettuce and cabbage are grown, especially in areas around urban centres – although there are serious

issues around appropriate cold storage (cost of building and lack of reliable power supply) and transportation (poor roads and dilapidated vehicles) of such cash crops. Generally, rural communities themselves do not currently eat vegetables. Perennial IVS do not dry out and have a potential for double cropping with rice which is in some places already practiced (again the major limitation to double cropping reported during the PPG is pressure on labour, was women traditionally undertake this work).

Despite the huge potential for IVS development in Sierra Leone, this remains relatively untapped. Only 12-15% of IVS in the country are utilized for crop production. The main reasons offered include the initial high cost and labour inputs required for their development as well as the favourable habitats for pests, also animal and human diseases in these ecological systems.

As climate change impact is already beginning to exacerbate existing food insecurity, the main objective of this component is to ensure rice productivity in the long-term in IVS, despite increasing climatic variability, which without adaptation under BAU may reduce the already relatively low production. The component will increase the resilience of production – developing 120 ha of IVS to particularly demonstrate that these systems can be climate-proofed, thus no longer affected by changing rainfall patterns, including flooding and periodic dry spells in the normally wet season. This will marginally increase the total area in each district under lowland rice cultivation, but particularly assure higher and more reliable crop yields through: (a) participatory mapping and monitoring of vulnerability in IVS (b) promotion of climate-resilient rice production systems and (c) provision of participatory training for local rice producers. In more detail, this component will include three sub-components:

Outcome 1.1: Participatory mapping and monitoring of vulnerability in IVS (LDCF: \$ 185,100 – Co-financing: \$780,000)

This outcome will focus on the characterisation and monitoring of vulnerability of IVS cropping systems (particularly for rice) to the impacts of climate change on agro-ecosystems and food security. The assessments will be undertaken in a participatory manner with the local communities and will feed into the overall project M&E system to ensure that climate change impacts are integrated and assessed throughout the project implementation. More importantly, this outcome will also ensure that the local stakeholders are able to integrate the climate variability in the decision making process at the grass-root level. Mapping will be conducted in sites with non-permanent water resources.

Output 1.1.1: Participatory mapping of vulnerability of rice production areas, also encompassing surrounding ecosystems, upon which the livelihoods of IVS farmers are based (including NWFPs). This output covers consultations with local communities in order to characterise the vulnerability hotspots in a participatory manner. This will include participatory consultation sessions with local communities in the four project districts (using pre-existing and / or project-catalysed FFSs, VDCs and NRM committees, depending on which is locally appropriate). This output includes three activities: (a) 24 consultation sessions with the local communities (b) 2 local study tours and (c) purchase of required equipment to undertake participatory mapping at the local level. The implementation of this output will benefit from existing tools such as the participatory mapping that was developed by IFAD through IMI funding and other relevant and practical tools for vulnerability mapping at the community level.

The vulnerability mapping exercise will be integrated in the Geographic Information System GIS/MIS system of the RCPRP-PLUS: The objective is to ensure that the outputs of vulnerability mapping are duly used in the decision making process at all levels. This will ensure that the information is captured in the integrated GIS/MIS system that the RCPRP-PLUS will establish to generate up-to-date data on Project performance, performance of implementing partners/service providers and impact achieved. The MIS will include the Project Monitoring and Evaluation (M&E) System and be based on a GIS and as such this will be a good entry point as a dynamic tool to map vulnerability through the implementation of the project.

Outcome 1.2: Climate-resilient rice production systems (LDCF: \$ 598,900 – Co-financing:\$ 3,280,000)

Farmers have always selected their planting materials based on the prevailing agro-ecological conditions they face, on preferred palatable attributes and on their food security strategies. They have selected, developed and adapted a wide array of low yielding varieties for IVS. Several higher yielding varieties have been developed by RRRS (now Rokupr Agricultural Research Centre) but which require fertilizers to perform well. In general, farmer's preferential choice of rice includes farmers' own sativa or glaberrima selections, RRRS sativa, and international sativa and WARDA inter-specifics. Farmers' own choice of international germplasm is common, demonstrating that innovation is relevant to the farmer's interest. However, farmers are very selective; they are ready to try innovations but adopt only what is relevant and responds best to their specific needs.

Day length is the interval between sun rise and sun set and the time the centre of the sun is 6° below the horizon. There are no clear effects of climate change on day length and solar radiation, but these components of climate are of consequence in the consideration of adaptation strategies. Rice is generally a short – day plant and sensitive to photo period – flowering and thus setting seed a set number of days after planting. With delayed onset of rains, farmers are being forced to plant rice late in parts of the country – thus it has a shorter growing period before flowering, which greatly reduces yields - as a direct consequence of climate change. The local glaberrima rice is highly photosensitive.

This outcome will work, through consultations with farmers and targeted investments to demonstrate and promote climate resilient cropping models (mainly rice production) in IVSs. It will particularly focus on the provision of tools and inputs to farmers as incentives to try to shift to more resilient cropping models in the IVSs. It will exclusively cover additional and unconventional farming models that are not covered by the baseline investment (RCPRP-PLUS) in the IVSs. It will also target a key aspect to adaptation of rice production systems in the IVS which is related to quality of seeds and the rice seeds foundation to help local farmers better adopt through desirable varieties. Particular support will be provided to the RARC to undertake field testing at RAR. The outcome will be achieved through two outputs:

Output 1.2.1: Climate resilient cropping models promoted in IVS: The development of the cropping models will be undertaken in a participatory manner and incentives will be provided to farmers that are willing to adopt these cropping models: activities to achieve this output will involve technical assistance to help local farmers design their resilient cropping models. Agricultural inputs (seeds of climate resilient varieties, nutrients, integrated pest management and support to irrigation systems) will be provided to 120 farms in four districts at the rate of 30 farms per year. Agricultural equipments (such as small farming tools and kits will be also provided to the poorest and most vulnerable farmers.

Output 1.2.2: Dissemination of Agricultural Met Data: The project will support the country in generating and processing agricultural Met data (most of the Met stations were destroyed during the war). To ensure that this exercise has a practical added-value in terms of adaptation at the grassroots and the farm level, the output will support the dissemination of the Agricultural Met data in a way that could be used by local stakeholders and farmers. This will significantly help farmers and project stakeholders in the decision-making process and will enable them to integrate new variables in the daily decisions they make on cropping and land and water management. The project will help in disseminating this information in easy language. The output will involve activities to generate a user-friendly tool to disseminate the agricultural meteorological data to local farmers.

Outcome 1.3: Training for local rice producers on best practices (LDCF: \$ 224,800 – Co-financing: \$958,000)

The RCPRP-PLUS will reach 15 percent of the producer households of the particular commodity (lowland rice and tree crops) and of the actual production area. The RCPRP-PLUS will include (i) village level farmer field and life schools (FFLS) leading to the establishment and strengthening of Farmer Based Organisations (FBOs). The FFLS is expected to cover production technology, processing, marketing and key life skills (i.e. health, nutrition and functional literacy); (ii) creation of a system of Agriculture Business Centres (ABCs) owned by FBOs and backstopped by MAFFS

extension, research and business development services; (iii) producer owned companies at district or chiefdom level for bulk processing of rice and cassava; and (iv) social protection activities such as food for work, food for training and school or home gardens. The LDCF will complement this effort, using the same entry points at the community level to provide participatory learning and training for local rice producers through the FFS (as described in Reij and Water-Bayer, 2001, also Gallagher et al, undated). The training will include models on integration, cropping and management of resilient varieties and water management for adaptation at the farm level. Outreach for this outcome will build-up gradually. The additionality of the LDCF financing will be translated through output 1.3.1.

Output 1.3.1: Training to farmers on resilient crop varieties: This will involve RRRS staff working with farmers to select, grow and multiply rice varieties which are better adapted to changing weather patterns, notably day length / photoperiod insensitive varieties, which make it feasible for the farmer to plant rice at any time in the year in response to changing weather (e.g. delaying planting where rains start late), without great changes in the duration of growth which reduces yields in photoperiod sensitive varieties. If farmers are agreeable to test them, the activities under this output will also include testing the feasibility of using ratooning rice varieties – which reduce labour demands.

This output will include four activities: (a) support to field extension workers (the LDCF funding will provide additional resources to include the climate change adaptation in the support that extension workers provide to farmers through the support of the RCPRP-PLUS). Support will be provided to 16 extension service workers at the rate of 4 per year over project duration; (b) establishment of demonstration sites for training purposes at the village level; (c) 120 training sessions to farmers (through the FFS) these will be gradually reached (60 sessions in year 1 and 60 sessions in year 4) and (d) technical backstopping to further support farmers and field extension workers in the training sessions. Training tools and motorbikes will be provided to the field extension workers.

Component 2: Integrated water and natural resource management for adaptation (LDCF: \$ 903,200 – Co-financing:\$ 2,280.000)

The rationale for this component relies on the recognition that integrated management of natural resources can reduce the impacts of climate change on agricultural production, food security and also ensure sustainable natural resource use... as water resources are “considerably (...) sensitive to climate change” (IPCC, 2001).

Climate change is predicted to influence not only the precipitation amounts, but also their spatial/temporal distribution. In turn, this will affect both natural and agricultural ecosystems. Agricultural production in Sierra Leone is mainly rainfed and thus is particularly vulnerable to increasing climatic variability and climate change. The NAPA of Sierra Leone emphasizes that food security problems, exacerbated by climate change, can be minimized if adequate irrigation systems are installed in the uplands. The PPG studies revealed that uplands are not currently irrigated, as farmers clear and cultivate “new” plots each year as part of the slash and burn or bush fallow system – but that the impacts of climate change are having severe impacts on the sustainability of these systems - particularly causing problems in land preparation. In view of the fact that MAFFS policy is to reduce slash and burn practices – and as SLWM is vital for climate proofing, the project will work with farmers through FFSs (see FAO, 2006 and Gallagher et al, undated), developing plots to demonstrate that it is possible to use the range of SLWM approaches to sustain cropping on single plots in the uplands.

The aim of the approach will be to enable land users to assess the degradation status of their local natural resources (soils, vegetation, water, etc), understand the interaction of the natural resource base and climate variability and prepare their own land use plans. The local plans will take increasing climate variability into account. This component will specifically support ecosystem-based adaptation in the uplands by coupling the local planning exercise with physical investments in soil and water conservation (on a pilot basis) and the promotion of sustainable land management practices (including conservation agriculture) in Koinadugu, Kenema, Kaliahun and Kono. The aim will be to create demonstration plots for sustainable agriculture, thereby restoring, sustaining and enhancing the productive capacity and protective functions of the upland forest resources – adapting their agricultural systems to the effects of climate change, obviating the need for slash and burn and ensuring yields from the diversity of upland crops which the RCPRP-PLUS will be promoting on a

larger scale. This component includes two Outcomes: (a) ecosystem-based adaptation in the uplands and (b) irrigation efficiency (in both uplands and IVS) and drainage systems (in IVS).

Outcome 2.1: Ecosystem-based adaptation in the uplands (LDCF: \$ 643,800 – Co-financing: \$ 1,510,000).

This outcome will complement the work of the RCPRP-PLUS by promoting ecosystem-based approaches for adaptation in production landscapes. The RCPRP will promote tree planting and permanent cropping in the uplands to reduce poverty and diversify income. The LDCF financing will support the additional investment needs to further integrate the adaptation aspects in these activities (SLWM approaches) and to strengthen resilience of the proposed technical packages. The LDCF efforts will combine activities that provide support to community-based adaptation planning with direct investment on soil and water conservation, sustainable land management and the promotion of NWFP for adaptation purposes on a pilot basis in the uplands (using pre-existing and / or project-catalysed FFSs, VDCs and NRM committees, depending on which is locally appropriate). This outcome entails four outputs: (a) pilot community-based adaptation plans using NRM; (b) rainwater harvesting in the uplands; (c) sustainable land management and erosion control; (d) promotion of pilot NWFP in the uplands.

Output 2.2.1: Pilot community-based adaptation plans using NRM: Using the existing and new FFSs and with the help of project-trained facilitators⁴ (*inter alia* from MAFFS Extension Division and MoLCPE), groups of land users (ideally in micro-catchments) will benefit from local participatory training and support to establish local community NRM plans. These plans will be developed with the larger context of the RCPRP-PLUS project in perspective, but focussing on the objective of the LDCF component to integrate adaptation into the plans. Local communities will learn how to consider climate variability and how to integrate adaptation needs in their NRM plans. (This Output links with Output 1.1.1). The output will include two activities: (a) local planning training: and this will be conducted through 40 village development committees (VDCs) on a gradual basis (20 in year 1 and 20 in year 3); (b) the LDCF funding will provide logistical support to the baseline investment to deal with the additional costs associated with the integration of climate dimension and adaptation in the local plans.

Output 2.2.2: Rainwater harvesting in the uplands - rainwater harvesting and conservation in the uplands are significant and relevant activities to help farmers sustain production in periods in which the rainfall calendar changes (dry periods are already occurring in the normal wet season) – and in some places may sustain a second crop during the dry season. Some upland farmers resort to constructing or rehabilitating channels from nearby water sources such as small rivers, streams and springs, currently with very limited practical and management skills or financial support. The project will provide advice on design and construction of more permanent systems to provide reliable water supplies for crops in demonstration plots.

The LDCF will promote small-scale rainwater harvesting systems, collecting rainwater from higher ground, also (where appropriate) roof water collectors and provide water storage facilities. This output involves 4 activities: (a) 100 rainwater harvesting installations (sheds); (b) 1500 roof water-collectors (locally produced); (c) 100 small water storage tanks. Local technical assistance will be provided to beneficiaries through the LDCF funding to select sites and establish the equipment.

Output 2.2.3: Land management and erosion control: Following the planning phase (Output 2.2.1) and with the continued support of trained facilitators (*inter alia* from MAFFS Extension Division, groups of land users will develop farm plots, demonstrating (alongside traditionally managed plots) that a combination of SLWMs can be used to sustain cropping over successive growing seasons – obviating the need to slash and burn and increasing production systems and livelihoods resilience to climate variability while generating co-benefits in terms of erosion control. The range of SLWM approaches will include agronomic measures which improve soil cover (green manures), enhance soil organic matter content (application of crop residues, compost and manure), soil surface protection

⁴ As required, short awareness raising and refresher training will be provided by the project on SLWM for climate change adaptation in agriculture

(low / zero tillage and conservation agriculture); vegetative measures (reseeded trees, live fences, grass strips, support to agro-forestry activities and multi-storey cropping, home gardens, crop rotations including legumes). Structural measures could be also envisaged in appropriate sites (small terraces, bunds, banks, small dams and ditches). Farmers will acquire this knowledge will be developed through FFS approaches, with group of farmers getting together in one or more of their own fields to learn about their crops and things that affect them. They will learn this new approach to farming better by observing, analysing and trying out new ideas on their own fields.

These measures enhance rainwater infiltration and storage, improve soil fertility and reduce erosion. This output will specifically support the promotion of SLM demonstration plots in Koinadugu, Kenema, Kaliahun and Kono to support SLM and water management activities as mentioned above. LDCF will support the RCPRP-PLUS by testing more sustainable and viable production models in the uplands which could contribute to better adaptation to climate change at two levels: (i) income generating activities and (ii) food security. This output includes one main activity: promotion of 60 SLWM demonstration plots (of 0.5 ha each) in the four districts (30 ha in total).

Output 2.2.4: Promotion of pilot NWFP: increased emphasis on the contribution of NWFPs offers an important adaptation measure in the uplands and will support the efforts of the government in promoting alternatives to slash and burn, which has over generations led to wide-scale deforestation and land degradation across Sierra Leone. The project will adopt a phased approach by which community management plans are developed through the VDCs (in most venerable sites) to define a management plan of NWFPs that ensures sustainable use of forest resources while securing an income for the community. This effort will be coupled with awareness raising campaigns on slash and burn and its negative impacts on the natural resource base and people livelihoods (focusing on the further vulnerability to climate change).

In addition, RCPRP-PLUS will create a Community Development Fund (CDF) that can be accessed by communities to support them in addressing issues that they consider be affecting their livelihoods. The objectives of the CDF will include support to the implementation of projects at community levels and will facilitate the processes of ownership and management of CDD projects upon completion. The target groups would be the marginalised, vulnerable and deprived communities. It is planned to award 1-3 micro-projects to each Ward. The average cost per project will be approx. USD 10,000. Only those projects which will benefit the communities and which are prioritised in the District Development Plan will be funded. The RCPRP-PLUS will facilitate this process through the VDCs to prepare Village Development Plans which will be consolidated to constitute the Ward Development Plans.

The LDCF funding will join this effort and build on the planning exercise by adding an adaptation aspect to the CDF through support to requests for micro-projects that deal with NWFP as income generating activities for adaptation purposes (e.g. bee-keeping – which is already being promoted elsewhere in the country and acts as a disincentive to burn forests). This output has 3 activities: (a) development of 8 community forests management plans through VDCs (4 in year one and 4 in year 2); (b) conduct awareness raising campaigns on slash and burn in the eight communities and (c) support 8 communities in the promotion of IGS for adaptation through the CDF mechanism.

The project will adopt a demand-driven approach in promoting NWFPs as an income generating activity (contributing to resilience and better adaptation abilities). However, possible NWFPs that could be promoted include honey production, medicinal plants, snails, mushrooms etc (these will be further developed in a participatory manner within the context of the VDC plans and their integration in the CDF).

Outcome 2.2: Irrigation efficiency and drainage systems (LDCF: \$ 259,400 – Co-financing:\$770,000)

Supplementary irrigation schemes are key adaptation measures in both IVS and uplands, which will help farmers sustain production in periods in which the rainfall calendar changes – and in some seasonal IVS may sustain a second crop during the dry season. . However, the current use of technologies for water conservation or drainage is low despite the high potential for continuous cropping.

RCPRP-PLUS is supporting planning and supervision of small-scale irrigation rehabilitation. The approach is based on the active participation of the beneficiaries in its design, implementation and monitoring.

The swamps, mostly of a size of 10-30 ha, will be managed by FBOs. The project will provide support to effective group formation, irrigation management and crop cultivation using the FFS approach. The LDCF funding will support the RCPRP-PLUS on the irrigation-related activities in the lowlands through two outputs: (a) promotion of innovative and efficient irrigation systems and (b) works and maintenance in drainage channels in climate risk-prone areas.

Farmers will be encouraged to participate in these water management systems, to ensure they are capable of maintaining them. Furthermore, the LDCF will also train groups of youths in the skills required in water management – which they can subsequently use as the foundation of businesses – thereby providing a means of scaling-up cc adaptation (e.g. providing their services to women's groups, who may lack the physical strength to carry-out this manual labour).

Output 2.2.1: Innovative irrigation systems - in supporting the RCPRP-PLUS interventions on irrigation schemes (training etc), the LDCF will further consolidate this crucial activity for adaptation to climate change. The additional activities that the LDCF Fund will bring on irrigation will be on the promotion of innovative and efficient irrigation systems which used solar power. This output consists of two activities a) the provision of 30 solar powdered irrigation schemes (to participating FFS / FBOs not individual farmers)⁵ and b) the provision of local technical assistance to establish and monitor these investments.

Output 2.2.2: Drainage systems - development and improvement of drainage systems was identified in the NAPA of Sierra Leone as a key adaptation measure in the agricultural sector. The project will support the interventions of the RCPRP-PLUS (which includes support for training and capacity building for better irrigation and drainage) by adding an investment intervention on a small-scale basis in key vulnerable sites. These interventions will cover works and maintenance of drainage in critical sites that will be identified in participatory fashion with local communities. The LDCF funding will provide further support for the monitoring of drainage systems in vulnerable areas and their impact on food security and to ensure that these systems are regularly monitored. This output includes two activities: (a) works and maintenance in 6 drainage sites in climate-risky areas (these will be identified with the mapping exercise as in output 1.1.1). 3 sites will be targeted in year 2 and 3 in year 3; (b) monitoring of drainage systems in vulnerable areas through provision of local technical assistance for monitoring and technical backstopping.

Component 3: Capacity building and awareness raising of climate change at institutional and local level (LDCF: \$ 507,700 – Co-financing: \$ 571,000).

The component on capacity building and awareness raising of climate change has been designed to increase the capacity and understanding of government stakeholders and beneficiaries to address climate change. More specifically, this component entails three Outcomes: (a) capacity building to government professionals, particularly in the Meteorological Department and the Ministry of Agriculture, Forestry & Food Security (MAFFS); (b) support for collection and analysis of weather data for decision making by endowing the country with automatic weather stations and equipment for the collection of rainfall data and its dissemination for agricultural planning and activities; and (c) awareness to the general public on climate change adaptation targeting in particular women, youths and children at the community level (see IIED, 2009). The overall objectives of the capacity building efforts are to ensure that local stakeholders (at the grassroots level) will become able to integrate climate change as a new dimension to consider in securing livelihoods and food. The training will provide local stakeholders and communities with the required planning, decision-making and monitoring skills in a manner that allows them to become more resilient to climate change impacts on their production systems and their livelihoods at large. The capacity building efforts would also target

⁵ Should it be decided that the option of solar pumps is not workable in particular situations, farmers will be assisted to obtain low-cost treadle or rope pumps See either <http://www.ideorg.org/OurResults/SuccessStories/Mosi.aspx> or http://practicalaction.org.uk/practicalanswers/product_info.php?products_id=198

the meteorology-related services to re-establish them and make them provide adequate climatic data to support the decision making processes at all levels.

At Government level, the capability of the Meteorological Department to fulfil its mandate and related tasks of weather monitoring, data collection, data analysis, dissemination to end-users and storage was greatly affected by the recent rebel war (1992-2002). Some members of staff died during the war, others retired from the service while, others left the country; all the stations were either totally or partially destroyed; out of the 11 synoptic weather stations in the country, only 4 are now operational but still below standard in terms of standard observation instruments and manpower. The lack of coherent national weather data and natural disasters records is a barrier to effective adoption of adaptation responses. In light of the mentioned circumstances, the LDCF-funded activities will address capacity building and weather data collection gaps at the national and institutional level investing in both human resources and equipments.

At the same time, awareness of the effects of climate change on the local natural resource base and on the likelihood of natural hazards is very limited and in places virtually non-existent. People perceive weather-related phenomena as supernaturally determined. Awareness raising and capacity building activities at the community level are important to ensure that when meteorological information is produced, it is well utilised by local communities. The proposed activities will target in particular women, as they play a major role in subsistence food production and are particularly vulnerable due to the existence of non-climate stress factors.

The majority of the population comprises remote, illiterate communities without access to electricity. Aside from extended social networks, the most important source of connectedness and information is the radio. The majority of the rural population has access to a radio and regularly listens to community radio that represents trusted sources of information for local communities. During fieldwork in the project formulation, evidence was collected that community radio is an invaluable resource for farmers helping them in planning activities, knowledge exchange and information gathering. For this reason, radio represent a main tool for carrying out the awareness raising activities proposed in the project. Building their capacity on climate change adaptation is therefore taken into account to ensure an effective role of radios in climate information dissemination. In addition, musical and visual tools (songs and theatrical play) will be promoted to increase awareness on climate change among the rural population.

Outcome 3.1: Government personnel training (LDCF: \$ 200,500 – Co-financing: \$175,000)

The training at government level will produce two outputs: (a) Output 3.1.1 on additional training on agro-meteorology to different categories of personnel (forecasters, observers and instrument technicians) in the Meteorological Department and (b) output 3.1.2 for training on Statistics in Applied Climatology to staff at the Meteorological Department and the MAFFS to support better decision-making on climate change.

Output 3.1.1: The additional training for staff in the Meteorological Department aims to improve their capacity to assess the spatial distribution of vulnerability to climate change (drought, flooding, etc.) and impact on food insecurity as well as understanding the determining factors of vulnerability in support of climate change responses design and planning. The training will target two groups: meteorologists and meteorological technicians. In simple terms, the first group is graduate-level forecasters, climatologists, and researchers. Meteorological technicians are observers, technical support, software support, production support.

Based on the needs identified in the NAPA and the in-depth assessment of the capacity of the Meteorology Department conducted during the PPG, LDCF-funding will provide support to two meteorologists to complete a training course (at post-graduate level) on: (i) computer-based agro-meteorological applications and desktop publishing for the production of Climate and Agro-meteorological Support and Warning Bulletins for primary producers and decision-makers and (ii) agro-meteorological programs and methodologies.

Meteorological technicians (particularly field staff and observers for rainfall stations) will be also trained through courses at regional training centres on: (i) definition of agro-meteorology and its importance, climate impact and variability, etc. (ii) relation between climate change, agricultural production and food insecurity (negative impacts, etc.) (iii) improved/established and functional meteorological stations in each targeted districts and institutions; (iv) type of modern weather measurement and observation equipment relevant to agriculture. As specific activities related to this output: (i) two (2) existing or newly recruited staff in the Meteorological Department (meteorologists) successfully complete a post-graduate training course on agro-climatology (one meteorologist in the first year of project implementation and one in the third year of project implementation) and (ii) six (6) existing or new Meteorological Department staff (technicians) successfully complete training course on agro-climatology, well-functioning weather stations and type of modern weather measurement and observation equipment relevant to agriculture (three staff will be trained in the first year and three in the second year of the project implementation)

Output 3.1.2: Another group of Government staff at both the Meteorological Department and the MAFFS will be supported to undertake on-line training on “Statistics in Applied Climatology”. The training course will give participants the skills to use historical datasets effectively to produce relevant, tailored activities that, in turn, enable end-users to make better decisions. As the course materials and downloads are available on CD, the on-line activity will be limited to taking part in the discussion forums and to submit assignments. The e-learning course usually takes place over a period of about three months and is designed as a part-time activity to be taken in the participant's normal workplace. This makes it cost-effective, and also accessible to those who may not have the time to attend a residential training course. As an activity, a total of 24 Meteorological Department and MAFFS staff will complete an e-learning course to enhance climate-related decision-making capacity (12 staff is trained in the first year and 12 in the third year of project implementation).

A start-up training session will be also held at each meteorological stations when they have been set-up/re-habilitated, to explain the purpose, functioning, need for security and outputs from the system. This training is intended for district officials, any host organisations and information user groups (inter alia representatives of local FFSs, FBOs, NGOs, traditional and modern leaders, local radio station staff). This is particularly important, as it will help build-up local understanding of the importance and need to assure security for the station. This activity consists in 15 start-up training sessions to be held in conjunction with inauguration of new/rehabilitated meteorological stations (4 sessions take place in the first year and 11 in the second year of project implementation).

Outcome 3.2: Agriculture climatic data collection and analysis for decision making (LDCF: \$ 177,400 – Co-financing: \$86,000)

According to the assessments undertaken during the project formulation, the existing eight agro - meteorological stations require total rehabilitation, particularly those at N’jala, Rokupr, Kabala and Daru. Also, rainfall stations no longer exist and the present functioning of meteorological stations is below standard, due to lack of equipment. In response to these needs, the LDCF-funded project will produce two main outputs: (a) Output 3.2.1: Provision of automatic weather stations and (b) Output 3.2.2: Provision of rainfall stations instruments

Output3.2.1: Recognizing that accurate weather and climate information is critical for agriculture, it is proposed that fifteen modern automatic weather measurement and observation stations are provided to monitor weather across Sierra Leone. As a specific activity to achieve this project output, four (4) stations will be purchased and set-up during the first year of the project implementation, while the remaining eleven (11) stations will be purchased and set-up in the second year. The stations will be established in adequate sites where there are no land tenure issues. The project will not purchase land for the establishment of the weather stations.

Output 3.2.2: It is widely accepted that spatial variability of rainfall is much higher than that of other meteorological parameters. Therefore, in developing a meteorological network it is vital to supplement with information from the small number of weather stations with data collected from a much larger number of rainfall measuring stations. The activity of this output is that 20 rain gauges

will be set-up and operational on appropriately selected sites (recommended during PPG studies) across the project districts.

Outcome 3.3: Knowledge and awareness on climate change at community level (LDCF: \$ 129,800 – Co-financing: \$310,000)

This outcome focuses on increasing public knowledge and awareness on climate change, paying attention to its link to agriculture, biodiversity and land degradation. The proposed activities are highly diverse, as the LDCF alternative promotes a range of approaches to reach the whole population of the target districts, including particularly the most vulnerable – many of whom are illiterate.

The outcome will be achieved through two different outputs: (a) Outputs 3.3.1: Capacity building on climate change adaptation for communities and radio stations; and (b) Output 3.3.2: Awareness raising campaigns based on different tools - radio, songs, theatre, poster and leaflet, community performance.

Output 3.3.1: Capacity building activities will target communities and radio stations. With regard to training communities, a first step will be to train trainers in Participatory Community Hazard, Vulnerability and Capacity Analysis, Community Based Adaptation to Climate Change and Livelihoods Analysis. The 10 trainers will be experienced participatory development and community mobilisation facilitators. They will be then responsible for conducting community workshops of the duration of 2 days each using participatory techniques to involve the participants (10 per session to allow active participation) The following material will be provided to each Village Target Group to carry out the community capacity building workshops

With the aim to ensure that the LDCF alternative will support dissemination to the rural population of weather, climate change and SLWM information including weather forecasts, targeted training to community radio stations will be carried out. In the four target districts, the majority of the population is remote, illiterate communities without access to electricity. Apart from mobile phone networks, their only source of connectedness and information from the outside world is radio. The majority of the rural population has access to a radio receiver and regularly listens to Community Radio (Primary research, Foundation Hirondelle 2008).

There is currently one viable community radio station in each of the target districts. All of these will be targeted for the capacity building campaign, namely:

- Kailahun District: Radio Moa
- Kenema District: Eastern Radio
- Koinadugu District: Radio Bintumani
- Kono District: Eastern Radio

One training session for each district will be held during the first year of project implementation and will entail: (i) sustainable revenue management processes; (ii) marketing of weather information services and (iii) agriculture and climate change adaptation related programming. As a result of the LDCF support, the four community radios will be trained to sustainably service communities with agricultural and weather information and programmes.

The specific activities related to this project output are the following: (a) Ten (10) trainers are trained to carry out community capacity building workshop on adaptation (Six trainers trained in the first year and four during the second year of project implementation); (b) Thirty-six (36) community capacity building workshops undertaken benefiting 360 women, youths and heads of vulnerable farming households, including FBO and CBO representatives throughout the 4 target districts (the capacity building sessions will take place during the second and third years of project implementation involving nine (9) communities each year); (c) Eight (8) control visits are undertaken (4 Control visits per year will be done over the last 2 years of project implementation) and (d) Four (4) training sessions for radio station capacity building completed to sustainably service communities (radio stations capacity building activities will take place at the beginning of the project)

Output 3.3.2: Awareness raising campaigns will be conducted utilizing a differentiated set of communication tools. During the first year of implementation, the project will develop a climate change adaptation song (jingle)⁶ that will be performed live in villages and schools in vulnerable chiefdoms in each target district. Two awareness raising facilitators will participate in the song tours and will engage the school students and teachers in interactive exercises. Leaflets and posters in local languages will be produced and distributed in each village and school by the touring group. The main activity to achieve this output is that a musical-based tools campaign is carried out for sensitization in 18 communities and 40 schools are actively involved in participatory awareness raising. The song will be produced in the first year of the project and performing tours will take place in the second and third years of implementation. Also, 36 community leaflet and poster campaigns will be produced every year.

Using the enhanced capabilities of the radio stations to widen awareness of climate change, during its second year the project will start a radio-based awareness raising campaign to be continued every year. Radio stations will be endowed with basic equipment based on a sound needs assessment and support will be provided to each radio station for broadcasting. As an activity, a radio broadcast awareness campaign will be successfully undertaken through: (i) provision of broadcasting and operational equipment to the radio stations; (ii) design of the campaign; (iii) support to SLBC broadcasting costs. In this way four (4) Community Radios are equipped to function and provide agricultural and weather information and districts are sensitised on climate change adaptation systematically⁷.

The LDCF alternative will also support the development of a touring theatrical group. A short drama play will be designed at the beginning of the project, featuring three actors and capturing the key messages of the campaign and satirising some of the barriers and gaps to Community Based Adaptation to climate change. The play will be performed during the campaigns targeting nine districts in the first two years of the project implementation. As an activity, 18 community theatrical awareness raising tools will be implemented.

Final community events will be organized during the last two years of project implementation to highlight the wider LDCF project achievements. Presentations by CTGs will be arranged at central chiefdom locations and so will reach out to entire vulnerable chiefdoms. In this way communities will have an opportunity to present to each other their communities' specific vulnerabilities and strengths and ways in which they planned for stronger resilience in the face of climate change. The specific project activity is: eight (8) community presentation events will be supported.

Component 4: Project management and M&E (LDCF: \$ 225,100 – Co-financing \$ 757,000)

Project Management and M&E functions will be fully co-ordinated and integrated within the management structure of the RCPRP-PLUS, with a joint planning process and sequencing. The LDCF project will be managed as part of the RCPRP-PLUS components touching in a mainstreamed nature across all supported activities of the baseline to cover the additional costs that are associated with adaptation to climate change. The same approach to M&E will be adopted but the LDCF will have its own log-frame/indicators and reporting systems as per GEF/LDCF requirements.

The IFAD/LDCF project M&E system will be made particularly effective as it will include participatory elements, ensuring that local communities (including project beneficiaries) and partners are involved in the process. This is designed to advance local stakeholder participation and assist them to take ownership of the activities and results of the project. A part of the participatory M&E will be devoted to women's focus groups, to ascertain the extent of women's participation in programme activities, constraints faced, benefits gained, aspirations met and impact on women's status in the family, their involvement in community affairs and the climate-proofing of their agriculture.

⁶ IFAD's past experience in the country demonstrated the benefits of this approach with a CD of IFAD / RCPRP music for local broadcasting – as many young people only listen to music on radio

⁷ Broadcasting costs and the design of radio campaigns will be supported throughout project implementation; the equipment will be provided during the second year

The M&E system will optimize prospects for sustainability following the eventual termination of the IFAD/LDCF interventions, by using indicators that are straight forward to collect and/or have been identified as critical to track.

In 2006, a National Project Coordination Unit (NPCU) was established for the implementation of the ongoing IFAD projects (RCPRP, RFCIP) with the objective of creating synergies between the two projects, implementing them as a programme, and reducing the cost of project management. In 2009, two District Project Coordination Units were established in Kono and Kailahun, respectively, sharing responsibilities for both districts among themselves. The RCPRP PLUS will be managed by the same NPCU.

The role of the NPCU will be overall planning, coordination, supervision and monitoring, while most activities in the field will be carried out by Implementing Partners (contractors, NGOs, CBOs and government agencies) on the basis of performance-based contracts and MOUs.

The NPCU will be strengthened in the areas of agricultural economy/enterprise development, capacity building/institutional development, communication, accounting and procurement. Additional personnel to be recruited: Agricultural Economist/Enterprise development specialist, Communication specialist, Capacity Building/Institutional Development Specialist, Financial Accountant, Procurement Assistant.

An LDCF component officer (CO) that will be responsible for the supervision of the implementation of LDCF project component will be recruited. S/he will be working under the overall supervision of the coordinator of the RCPEP-PLUS in a fully integrated manner within the RCPRP-PLUS personnel. The project will also recruit a clerk and a driver to provide the necessary administrative and logistical support to the CO. An element of the LDCF funding will be dedicated to the purchase one vehicle, to facilitate the coordination of the LDCF field work.

A4. Expected Measurable Adaptation Benefits

The adaptation benefits from the IFAD/LDCF intervention will principally be achieved through a reduction in the vulnerability to increasing weather variability and climate change of small-scale farmers, vitally reducing the risk that climate change will exacerbate existing food insecurity by:

- climate-proofing agricultural operations in the IVS, compared to the business as usual (BAU) development scenario, by ensuring the sustainability of yields of at least one rice crop (using, for example, non photoperiod sensitive varieties, to allow flexibility in planting dates, yet maintaining yields); also sustainably augmenting the typical single rice crop with a reliable second crop of either rice or appropriate alternative crop (diversification benefits), depending on local conditions – including encouraging beneficial rotations and other SLWM technologies to maintain / augment soil fertility without the need for costly inputs;
- climate-proofing agricultural operations in the uplands, where under the BAU many farmers are considering abandoning agriculture as their traditional practices (slash and burn) are becoming impractical due to changing rainfall patterns. The project will demonstrate and disseminate SLWM approaches to enable farmers to sustainably cultivate settled plots in the uplands, which by obviating the need for slash and burn will also reduce labour requirements (which are in short supply in rural Sierra Leone) and enable farmers to continue cultivating their preferred diverse range of food crops.

The project will thereby demonstrate innovations which can be scaled-up in other agricultural development efforts in Sierra Leone (and elsewhere) to ensure their long-term sustainability. Activities will also contribute to the recovery of upland forests, for provision of NWFPs, tree crops and wider ecosystem service benefits.

The project will also: (i) enhance the complementarities of between autonomous adaptation and planned adaptation, to further offset the adverse effects of human-induced climate change on agriculture by working with farmers, mainly through FFSs using participatory action research to link traditional innovations with current knowledge of SLWMs; (ii) raise the awareness of farmers to the

causes, implications and opportunities they have to ameliorate the effects of increasing weather variability and climate change, including encouraging them to keep crop / weather calendars to track the impacts of changing weather and their changing practices on crop yields; (iii) reduce post harvest crop losses, which are being exacerbated by changing weather patterns (notably problems drying and storing rice crops), which under the BAU further increases the risk of food insecurity.

Through the re-establishment of a functioning wide-scale network of operational meteorological stations in Sierra Leone, the project will: (i) improve observation and monitoring of weather and climate, thus enable scientist to better assess the impacts of its increasing variability on agriculture; (ii) provide a weather forecasting / agro-meteorology service, which will be disseminated to farmers using rural radio stations and (iii) provide an early warning system of extreme events for wider national benefit.

B. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL/REGIONAL PRIORITIES/PLANS:

The project will contribute to the President's recent declaration "that agricultural development is his Government's top priority" made during the 2008 World Food Celebrations in Magburaka, Northern Sierra Leone.

Ministry of Agriculture, Forestry & Food Security

The Ministry of Agriculture, Forestry & Food Security (MAFFS) is the main institution responsible for promoting development and for regulating the agricultural sector. MAFFS is developing a new vision with efficient service delivery mechanisms: "Make agriculture the 'engine' for socio-economic growth and development" to which the LDCF is in complete accord and will contribute (see details **in bold** below).

To address the many challenges of the agricultural sector, the Government plans to focus on:

- Increasing agricultural productivity (intensification and diversification): The use of agricultural machinery such as tractors, power tillers and harvesters will be intensified, as will the establishment of supply chains for inputs such as fertilizers, pesticides and **high yielding seed varieties such as NERICA and Roks**. In addition, **irrigation facilities will be increased to expand the cropping cycle year round and to raise production levels**. Agro-processing marketing and distribution will be enhanced. To **increase food self sufficiency, farmers will be encouraged to increase the cultivation of food crops such as cassava, sweet potatoes, water yam, coco yam and maize**.
- Promoting commercial agriculture through private sector participation: Commercial agriculture will be promoted by creating an enabling environment that is attractive for the private sector to invest. Post harvest storage facilities will be provided in the form of storage, drying floors, rice mills, threshers, animal feed mills and abattoirs. Access to rural credit will be improved through establishment of community banks and financial services associations. Feeder roads and community markets will be rehabilitated and or constructed to facilitate movement of goods to market places. Farmer-based organizations are to be reformed and trained in order to build their capacity to engage in commercial agriculture.
- Improving agricultural research and **extension delivery systems**: National Agricultural Research and Extension policies, strategies and programmes are to be formulated. Implementation of these will improve the quality of extension services provided to farmers and therefore allow them to improve their productivity. **Information, education and communication strategy is also to be developed and implemented**. Research and extension will promote appropriate technologies for packaging, handling, processing, and storage quality and capacity, even at the village level.
- Promoting efficient and effective sector resource management systems: The National Agricultural Development Plan promotes the establishment of a database for agricultural statistics as well as creating a sector coordination mechanism. This will strengthen sector policy formulation, planning, monitoring and evaluation, also resource management.

- Mainstream cross-cutting issues in agriculture: Workshops and sensitization campaigns will be held in order to educate farmers about important issues such as **gender, youth employment**, farmer health (including HIV/AIDS) and **environmental sustainability**.

New areas which are currently being explored by the Ministry of Agriculture, Forestry and Food Security and the Ministry of Energy and Water Resources are payments for ecosystems/environmental services (PES), through an initiative of the FAO to **help adaptation to climate change and also reduced emissions from deforestation and land degradation and reduced emissions from deforestation and forest degradation and other forest related activities (REDD/REDD⁺)**.

Small-holder Commercialization Scheme (Source: GoSL, 2010)

The overall goal of the NSADP is to **reduce rural poverty and household food insecurity on a sustainable basis**, and to strengthen the national economy, with the following key performance indicators:

- Increased agriculture sector growth from its current estimate of 4% to 7.7% per annum by 2015 (SAM Analysis, 2009)
- Increased incomes of farming households by 10%.
- Increased household food security by 25%

The Smallholder Commercialization Scheme (SCS) of the NSADP is expected to contribute significantly to the achievement of these indicators through an increase in total production, processing, sales and exports of selected commodities by smallholder farmers, through the partnership with medium and large scale farmers and agriculture sector actors. However, this is at risk due to climate change – the LDCF will demonstrate that appropriate development (adaptation) can enable farmers in Sierra Leone to maintain and increase their crop yields, which are being placed in jeopardy due to changing weather patterns.

Smallholder farmers are expected to make efficient use of the acquired know-how, the infrastructure and services provided under this and the other sub-programmes and to use the improved business environment to their advantage.

Smallholder farmers are required to organise themselves sustainably in **Farmer Based Organisations (FBO)**, establish Agricultural Business Centres (ABCs) and district networks to organise input supply, value addition, processing, storage, packaging and marketing. They will intensify and diversify agricultural production, **gradually move to permanent farming systems and increase productivity** and the marketable output of raw and processed agricultural, **non-timber**, forestry and fisheries and marine products. It is expected that after 3 years of existence at least 50% of the FBOs, ABCs and District networks will be economically viable and sustainable.

The activities of the SCS are designed to ensure increased access and participation of smallholder farmers in the sector through well-designed empowerment processes – to which the LDCF will contribute, raising awareness and helping farmers adapt to climate change.

Land and Water Development Department (of MAFFS)

The Land and Water Development Division (LWDD) has a mandate to **create an enabling environment for increased food production through sustainable development and utilization of land and water resources** by conducting field surveys to collect, analyse and store adequate and reliable data on land, water and climate resources in Sierra Leone.

The LWDD has the following functions: **IVS development, capacity building, climate data collection and monitoring**, water resources data collection and monitoring, promoting investment and agricultural commercialization, IVS data collection for a data bank and future investment schemes, and enhancing effective resource management.

The department's key activities include: **swamp identification, selection, survey, design and rehabilitation; training on surveying, designing, rehabilitation and IVS inventorisation**; installation of gauges in rivers and collection of data on discharge; inspection visits to potential irrigable areas; visits to, and supervision of, field activities inter-alia.

The activities of the LWDD are subject to “various constraints and challenges” (PPG report) – mainly limitations on human, technical and financial capacity. The LDCF will ensure adequate resourcing for these activities in the four project districts.

There are clear synergies between aims of the project and those of the *Ministry of Lands, Country Planning and the Environment (MLCPE)*. MLCPE is the lead institution that was established to serve as the main body for the implementation of environmental policy, including the sustainable management of land resources in Sierra Leone. MLCPE is also in charge of overall land administration in the country. The overall policy objectives of the ministry include the enhancement of balanced land administration, use, planning management and development control. It also performs the general role of administration of real estate, territorial inventory (cadastre) and visualization geographical territorial information (geodesy and cartography).

Slash and Burn: There is no strict and enforced government or local policies on slash and burn agriculture – although it is widely recognised across the country and internationally that the highly degraded nature of the forests which cover most of the country is a result of this traditional practice. MAFFS and others are working to encourage farmers to move their cultivation into the swamps, allowing tree crop growing to resume in the uplands – this would fortuitously also allow forests to recover. The LDCF project will discourage slash and burn and innovatively (in Sierra Leone) ensure that farmers can continue to cultivate their “supermarket” (a diverse range) of crops in uplands through SLWM on single plots, for example following the experience in Brazil (Landers, 2007) using conservation agriculture (CA) or integrated crop-livestock zero tillage (ICLZT) on former tropical forests.

National Sustainable Agriculture Development Programme (NSADP) and the AU / NEPAD Comprehensive Africa Agricultural Development Programme (CAADP) Compact

The LDCF project will contribute to the National Sustainable Agriculture Development Plan (NSADP) (GoSL, 2009d), which provides the broad framework for putting the objectives of the Government’s Agenda for Change (Sierra Leone’s Second Generation PRSP) into action. The NSADP provides the roadmap for moving agriculture, forestry and fisheries forward to both address Sierra Leone’s growing needs due to population growth and to create additional income to the national economy. In a wider context, the NSADP serves as the CAADP Compact (Comprehensive Africa Agriculture Development Programme) under the African Union’s New Partnership for Africa’s Development (AU/NEPAD) activities to assist countries and development partners to share a common vision for development.

The NSADP is a government initiative to organize, attract and coordinate investments in the sector and has been formulated by the Government of Sierra Leone’s MAFFS to provide short, medium and long-term investment programmes in the agriculture sector (GoSL, 2009d). The programme hopes to ensure economic growth and increased revenues to households, firms and the state so that basic services (health, education, etc.) will be provided to the population. Clearly, the implementation of the agriculture-related aspects of the NAPA (which is the aim of the LDCF project) is vital to avoid reductions in farming household incomes due to the effects of climate change.

In aligning with the CAADP, the country will fulfil the Maputo pledge of allocating at least 10% of the national budget to the sector and then seek to achieve an annual growth rate of 6% in agriculture.

A primary goal of the NSADP will be to contribute to the creation of employment and to **reduce foreign exchange spending on import items that can be produced competitively locally, while increasing traditional and new exports to achieve an overall positive agriculture sector trade balance.**

The Agenda for Change, Sierra Leone’s Second Poverty Reduction Strategy Paper

The Agenda for Change, Sierra Leone’s Second Poverty Reduction Strategy Paper (GoSL, 2009a), places **top priority** on energy, infrastructure and **agriculture for national development** efforts up to 2012.

In greater detail, the clear set of objectives to achieve the vision of the Agenda for Change (GoSL, 2009a) includes:

- A. ***Increasing agricultural productivity*** (intensification and diversification), in particular among the rural poor smallholders, who constitute the poorest segment of society, through a variety of support measures along the entire agricultural value chain, from pre-planting to marketing. This will include: the use of agricultural equipment; the establishment of supply chains for inputs such as fertilizers, integrated pest management and high yielding seed varieties; irrigation facilities; and the enhancement of agro-processing marketing and distribution.

- B. *Promoting commercial agriculture* through private sector participation: Commercial agriculture will be promoted by creating an enabling environment that is attractive for the private sector to invest. Post harvest storage facilities will be facilitated in the form of storage, drying floors, rice mills, threshers, animal feed mills and abattoirs through loans and cost-sharing arrangements. Access to rural credit will be improved through establishment of community banks and financial services associations. Feeder roads and community markets will be rehabilitated and or constructed to facilitate movement of goods to market places. Farmer-based organizations are to be reformed and trained in order to build their capacity to engage in commercial agriculture and link to the market economy.
- C. ***Improving agricultural research and extension delivery systems:*** National Agricultural Research and Extension policies, strategies and programmes are to be formulated within one year. Implementation of these will improve the quality of extension services provided to farmers and therefore allow them to improve their productivity.
- D. ***Promoting efficient and effective sector resource management systems:*** including the establishment of a database for agricultural statistics as well as creating a sector coordination mechanism, in order to strengthen sector policy formulation, planning, monitoring and evaluation, and resource management.
- E. ***Mainstream cross-cutting issues in agriculture:*** Workshops and sensitization campaigns will be held in order to educate farmers about important issues such as self-sufficiency (e.g. no dependency), gender, youth employment, farmer health (including HIV/AIDS) and environmental sustainability.
- F. ***Managing and exploiting Sierra Leone's fishery and marine resources:*** In the areas of fisheries, the Government will focus on providing adequate surveillance capabilities, facilitate the lifting of the ban on fish exports to EU markets, improve the infrastructure and support services for commercial fishing, provide adequate extension support for artisanal fishermen and strengthening the capacity of the Ministry of Marine Resources.
- G. ***Managing and exploiting Sierra Leone's forestry resources:*** The government recognises the importance of conserving the now depleted forests of Sierra Leone. The forest plays a significant role in regulating the water cycle, the climate and providing a source of livelihood for the people from the timber and non-timber forest products. The forests are key to the country's productivity and production in Sierra Leone, also contributes to the country's cultural diversity and heritage, while serving spiritual and religious values, and provides ecotourism sites and medicinal herbs.
- H. In the area of *transport*, the Agenda indicates that the Government will develop and implement projects that focus on the rehabilitation of 2,055 kilometres of feeder roads and of 160 kilometres of roads in major provincial towns. This will be coordinated to ensure that the agriculturally productive regions have the feeder roads that will enable farmers to market their produce in a timely manner and increase their income through significant reduction in post-harvest losses.

The LDCF will make significant contributions to Sections A,C,D,E and G.

National Rice Development Strategy (NRDS)

A **National Rice Development Strategy (NRDS)** is being prepared by national partners under the Coalition for Africa Rice Development (CARD) which is led by international development partners. The LDCF will raise awareness of the likely impacts of climate change on rice production in Sierra Leone – and demonstrate opportunities to climate-proof production in both IVS and upland agro-ecologies.

Forestry Sector Policies

The need for a broader forest policy related to land use and agriculture was recognized in the 1986 Green Revolution Programme, which identified the forestry's roles as:-

- To conserve and develop forest areas so as to protect the soil and water resources and maintain micro-climate stability for a sustainable agricultural production programme.
- To employ forest vegetation to replenish soil fertility on a sustainable basis.
- To increase significantly the production of forest products which contribute directly to food supply and also benefit the rural population in cash terms.

- Forest policy, by the nature of the resource involved, is necessarily long term, but to make such policy effective requires the identification and funding of short term priorities associated with long term development benefits. The main short term priorities are:
- Conservation of the forest estate, by instituting sound silvi-cultural management (including control of forestry logging and protection).
- Development of pilot programme in improved agro-forestry cropping systems.
- Development of pilot firewood plantations.
- To manage and sustain a comprehensive research programme to provide sound technical basis for improved agro-forestry systems, to work on fuel-wood species and other species important to the national economy.
- Develop a database for forest areas to allow the planning of management systems
- Assistance to and coordination of other agencies working in these priority areas.

The LDCF will bring major benefits to the forests and land users of Sierra Leone, demonstrating that there are sustainable ways to grow crops in uplands without the need for slash and burn agriculture – allowing the potentially bountiful forests and tree crop areas to be restored.

Meteorology Department (of the *Ministry of Transport and Aviation*)

The Sierra Leone Meteorological Department is responsible for:

- Ensuring the safety and general welfare of citizens through the timely provision of Weather and Climatological Services;
- Contributing to the socio economic (including agricultural, marine, etc) development of the country;
- Ensuring maintenance of the quality of the nation's environment;
- Honoring international obligations;
- Carrying-out climate change related activities e.g. CDM, CCS, REDD, NCs, etc.
- Collecting and collating historical meteorological and climatological data for record and research proposals.

Timely and cost effective provision of Meteorological services contributes to:

- Safety and well being of citizen and their protection against severe weather situation and devastation from natural disasters;
- Provision of reliable climatic data to facilitate project design for agricultural planning and implementation, water supply systems, infrastructure, tourism etc.

However, the effects of the civil war on Meteorology Department were enormous, including destruction of many of the meteorology stations, and loss of staff. Although Government are well aware of the importance of met. data to the national economy (more widely than the current focus on aviation meteorology), the department has a major problem with the age and qualifications profile of the staff. The staff number only 48, of whom there are only 4 graduates and 26 technical staff, many of whom urgently require additional training to provide the necessary weather forecasting and met. recording services of a modern Met. Department. Currently, the department cannot afford to re-establish the meteorological network which existed before the civil war. There is currently no capacity within the department to provide a weather forecasting / agro-meteorological information to “customers” in Sierra Leone. The LDCF will fulfil many of these requirements, in synergy with activities of WMO, UNDP and others.

The Wider Environment

“Environmental management in Sierra Leone has evolved as series of fragmented institutions over the years both at the national and regional levels; the present institutional framework has proved inadequate as a result of the absence of appropriate structures that will enhance the communication and application of policy issues by the Government” (GoSL, 2009a). “There is also the institutional problem, where several entities interface over environmental management and it is sometimes very difficult to see the synergies and inter-relationships of these institutions. In order to ensure environmental sustainability, as outlined in the MDG 7, Sierra Leone will take steps to address the following:

- Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.
- Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss.
- Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation.

- By 2020, to have achieved a significant improvement in the lives of at least 1 million slum dwellers⁸.

A key challenge to reducing poverty in Sierra Leone is to **strengthen the linkages between poverty reduction and management of the environment**. In the medium term, the Government is focusing on **land degradation, deforestation and biodiversity loss**, mined-out lands, urban degradation, and pollution and erosion from road construction and urbanisation.

Ministry of Lands, Country Planning and Environment

The Government of Sierra Leone (GoSL 2009c), through the Ministry of Lands, Country Planning and Environment (MoLCPE), has for the last two years implemented various initiatives to reform land management in Sierra Leone. Measures taken include revitalizing land information and registration systems, streamlining land administration procedures, reviewing land laws, MoLCPE organizational reforms and various training initiatives.

The Ministry of Land and Country Planning and the Environment is facilitating the formulation of a comprehensive national land policy document, including an implementation strategy and a reformed legal framework. The policy process will entail collaboration and consultations with representatives of all types of land users and stakeholders within and outside government, based on a **common national vision of the desired forms of land tenure and land management system rooted in transparent, accountable and participatory approaches**. The envisioned policy will enhance **security of land tenure for all Sierra Leoneans** and foreign investors, and improve the efficacy of land administration at all levels of society (see detail in Annex 11 of the full project brief).

The proposed land reform strategy is to improve upon and strengthen existing land administration systems and land laws, particularly by recognizing and working with the differentiated land tenure categories in the Western Area and the provinces, which also varied sub-regional features, depending on their diverse circumstances and resource endowments.

The LDCF will actively support this work, as issues of land tenure are critically important to the success of scaling-up SLWM.

Disaster Management Department

With the recent increase in the frequent of extreme weather events, the country has correctly identified dealing with the impacts as a way forward and established the Disaster Management Department in the Office of National Security (GoSL, 2009e). The Department has prepared key policy documents for Disaster Preparedness and Response and Provincial and District Disaster Management Committees have been set up.

The LDCF support for the Meteorology Department will enable the department to contribute vital and timely early warning information to the Disaster Management Department.

C. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH LDCF ELIGIBILITY CRITERIA AND PRIORITIES:

In-line with the LDCF criteria for project proposal, the IFAD-supported NAPA implementation proposal has been developed in compliance with the principles of country ownership and drivenness. Extensive consultations have been made with the Government to ensure that these principles were respected. Also, the activities supported through this project have been identified as priorities in the Sierra Leone's NAPA. Therefore, the project proposal fully responds to national priorities. Furthermore, GEF and LDCF criteria for project design and financing have been respected. Project management costs represent 10% of total LDCF budget requested and co-financing ratio fulfils LDCF criteria. Finally, the project has been developed in coordination with other ongoing activities (see section below).

LDCF Added Value Compared to the BAU Scenario: Sierra Leone has abundant arable land and reasonable access to land of several agro-ecologies suitable for wide variety of crops, also abundant water resources and political commitment for investment in the sectors. In the past, the country had favourable climatic conditions. Given the importance of agriculture in the national economy, economic growth and poverty reduction in Sierra Leone will only be sustained through developments

⁸ PRSP II states 100 million – this is assessed to be incorrect and 1 million used here

in the agricultural sector (GoSL 2009, also World Bank, 2007). The Government of Sierra Leone with the support of a wide range of partners is working on a wide range of programmes and agricultural development projects. However, the development path, also national and local food security are being put in jeopardy, as currently the very vulnerable subsistence farmers are unable to adapt to the impacts of climate change, which are already being felt across the country. None of the other on-going and planned programmes and projects addresses the effects of changing weather and climate on Sierra Leone's rice-based agriculture. Effectively, climate change is acting as "multiplier" of existing threats to sustainable development. National development and progress towards food security could be stalled unless the proposals outlined in the Sierra Leone NAPA and elaborated in this proposal to climate proof agriculture, including developing early warning and raising awareness, are implemented.

Sustainable land and water management (SLWM) is a deliberate human process through which land users can adapt (and also mitigate) the effects of climate change on their agricultural practices. It requires land users, individually and/or collectively, to care for and manage their land resources (soils, water, vegetation and wildlife) in ways that will enable them to obtain an optimum range of products of social and economic value to themselves, while preserving, restoring and/or enhancing their productive capacity for both present and future generations. SLWM involves a holistic approach to improved land management that aims to ensure productive and healthy ecosystems by integrating social, economic, physical and biological needs and values.

The successful promotion of SLM therefore requires an understanding of: (a) the natural resource characteristics of individual agro-ecosystems; (b) the socio-economic characteristics of the land users (population numbers, household composition, cultural beliefs, livelihood strategies, income/poverty levels, vulnerability, education levels etc); (c) the environmental functions and services provided to society by healthy ecosystems (watershed protection, maintenance of soil fertility, carbon sequestration, micro-climate amelioration, bio-diversity preservation etc); and (d) the constraints to and the opportunities for, rural communities to sustainably utilise the natural resources of their local ecosystems to meet their welfare and livelihood needs (e.g. for food, water, fuel, shelter, medicine, income, recreation).

The SLM approach recognizes that people (the human resources) and the natural resources on which they depend, directly or indirectly, are inextricably linked. Rather than treating each in isolation, all ecosystem elements should therefore be considered together, in order to obtain multiple ecological and socio-economic benefits. For land users this means combining the indigenous resource management knowledge of their families and communities, with new information obtained from outside sources. For planners, advisers and researchers this requires the integration of both natural and social sciences disciplines. SLM involves problem solving by combining knowledge from a diversity of disciplines (e.g. soil science, ecology, animal husbandry, agronomy, sociology and economics). Such an inter-disciplinary approach provides the key to better understanding the natural properties of ecosystems (and society's dependence on them), and the social, economic and political factors that contribute to their disturbance.

Effective SLM requires multi-stakeholder partnerships to bring together indigenous and scientific knowledge (inter alia FFSs, FBOs, NGOs). A multi-sectoral approach is essential as no one institution has all the disciplinary experts required to help those who directly use the land to solve the multi-dimensional problems. This requires coordination and cooperation between different government sectoral agencies (at the national, district, chiefdom and village levels), especially those responsible for agriculture, livestock, forestry, land and water resources, environment, science and technology, finance and planning.

The LDCF funding will complement the government and community level capacity building and field level agricultural development activities of RCPRP-PLUS, by ensuring that village level land use planning and recommended crop and livestock management practices conform to the concepts and principles of SLWM. The LDCF component has been designed to very much complement the RCPRP-PLUS activities, and will therefore be undertaken in parallel so as to capture the synergy of objectives and economies of implementation. LDCF funds will support capacity building amongst the participating community and government advisory support service providers, with the particular focus on building the skills and expertise required to undertake community-based land use planning. The LDCF support will facilitate the identification and implementation of locally appropriate SLWM practices to help land users adapt to climate change – to maintain their food security. It will particularly seek to build the capacity of the rural poor and marginal groups to identify locally

appropriate SLWM technologies and approaches, for replication and up-scaling that will not only provide them with sustainable and profitable livelihoods.

The four project districts of eastern Sierra Leone (Kono, Koinadugu, Kailahun and Kenema) are an area where the LDCF project can successfully intervene using multiple approaches to help land users adapt to the impacts of climate change – which are already being reported (during PPG studies), making their rice-based farming systems in IVS and uplands more resilient to the various current and predicted future impacts of changing rainfall patterns and rising temperatures. The key entry points for project will be SLWM, including improved irrigation and drainage systems. The project will also encourage farmers to maintain a diversity of crops on their land – which is widely accepted as a key adaptation to increasing weather variability and climate change, as it reduces the risk of food insecurity.

Agricultural productivity and the conservation of natural resources (particularly upland forests and tree crop areas) will be improved, leading to climate-proofed food security, which will improve economic and social stability.

Awareness raising and action research will help land users to adopt alternatives to current practices, which will improve land cover (above ground biomass), soils (including below ground biomass, nutrient status and structure), water and nutrient cycling, to reduce biomass losses and enhance the system's diversification and resilience. The project will raise awareness and capacity among local land users in climate change impacts and adaptation through co-learning.

At the national level, the LDCF alternative will also support and strengthen Sierra Leone's Meteorology Department, with the rehabilitation / construction of 15 meteorology stations across the country (with a focus on the eastern area) (see Annex 8 of the project brief) and staff training to enable them to better fulfill their professional roles, including the ability to better monitor and prepare weather forecasts, also increased understanding of climate change.

In the immediate future, a single forecasting unit will suffice, therefore each met. station will require an a solar panel or generator for power supply. The main forecast office will collect data from all the out stations, analyse them and, using satellite data and models supplied by AMESD, issue forecasts to various end users through local and national radio stations – also in future perhaps by mobile phone. [In future, the Meteorology Department plan to have forecasting centers at the Provincial Headquarter towns of Bo, Kenema and Makeni and a central forecasting office at Tower Hill in Freetown.] (source - PPG report).

The project must ensure that the philosophy of the Meteorological Department changes to one of a service culture – through ensuring that users / beneficiaries of the weather and particularly agrometeorological information demand a reliable service. This will ensure sustainability of the service.

Given the nature of Component 3 of the project, it is proposed that equipment for at least 4 stations is purchased soon after project start-up (in PY1) as a “pilot phase” and these stations rehabilitated / established under the supervision of an international consultant (with local counterparts, who will assume the role in the main installation phase). Thereafter, all the remainder of the equipment could be bought (in PY2) and stored until it can be installed across the country, to minimize future rises in cost and opportunities to buy in bulk at lower per unit rate. Alongside the vital staff training (and hopefully also recruitment of additional professional staff by GoSL), this will enable the Department to assume its proper role as a provider of reliable, regular weather forecasting and early warning information to farmers (inter alia via local radio) and others in the community.

D. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

Community-based Poverty Reduction Project (RCPRP)

The IFAD/LDCF project will complement the activities undertaken under Phase I of the RCPRP and those planned for RCPRP-PLUS. The LDCF components are fully embedded in the RCPRP-PLUS in a synergetic manner which will ensure that the LDCF funding is covering additional costs associated with the adaptation needs that were identified in the NAPA and further discussed at all levels (national, provincial and grass-roots) during the PPG phase.

The objective of RCPRP-PLUS is to restore basic food production capacity to satisfy people's food needs. Notably, the RCPRP-PLUS supports small-scale crop and livestock farmers by providing basic

agricultural packages including seeds, tools and livestock – rehabilitating rural infrastructure. This compliments and strengthens the IFAD past and ongoing operations in the country. The project RCPRP currently works in two districts: Kono and Kailahun.

Under a BAU scenario, development activities are carried out without considering the additional costs incurred due to the impacts of climate change. In particular, the project does not seem to consider that agricultural production is expected to be reduced by increasing climate variability. This implies the need to expand the scope of the activities under the BAU scenario, which otherwise risk to be insufficient. Also, climate change calls for better understanding the phenomenon and its impact in order to undertake appropriate adaptation measures. Improving data collection is also important. The costs to support these activities are not reflected in the design of the RCPRP.

Most of the activities in the RCPRP-PLUS offer an entry point for LDCF intervention in support of the Sierra Leone's NAPA implementation, as many of them are complementary with the NAPA priorities. Indeed, the activities in the baseline focus on: (i) introducing productivity, increasing technologies and production systems; (ii) promoting sustainable land management and soil fertility improvement; (iii) expansion of inland valley swamps; (iv) strengthening of farmer-based organisations (FBOs).

Under the BAU, the Meteorology Department only has staff at five sites (Freetown, Lungi, Bo, Bothe and Makeni) – none in the project area. Only the latter four sites are operational, but have limited sets of equipment / IT (see Annex 7 of the project brief) and are unable to provide any weather forecasting services (apart from for Lung International airport). UNDP have funds to help the Met. Department purchase some equipment and digitise old paper met. records currently held in the Freetown office in 2010, but are not able to support the staff training.

As the IFAD/LDCF project will be a blended project, fully integrated into the IFAD supported “Rehabilitation and Community-based Poverty Reduction Programme-PLUS (RCPRP-PLUS)” and co-financed by IFAD, it will benefit from sharing with it resources and structures. This partnership will undoubtedly boost the cost-effectiveness of both interventions, notably as there will be a common management structure and a linked M&E framework. Other benefits expected are improved coordination and communication, the application of common procurement and supervision procedures (reducing costs); also the implementation of complementary project interventions in the four project districts. Furthermore, lessons learnt in work of RCPRP have and will continue to be integrated in the course of project implementation.

Regular communication and coordination with the other donor agencies working in Sierra Leone have already been established – and linkages with the following programmes and projects to take advantage of synergies and minimise overlaps:

New Partnership for Africa's Development (NEPAD)'s “Comprehensive Africa Agriculture Development Programme” (CAADP)

In pulling Africa out of the current agricultural stagnation and food crisis, the CAADP makes targeted investment in four key pillars that are expected to make the most rapid impact in the transformation of African agriculture. These include: (i) expansion of the area under sustainable land management and reliable water control systems; (ii) improvement of rural infrastructures and trade-related capacities for improved market access; (iii) enhancement of food supplies and reduction of hunger including emphasis on emergencies and disasters that require food and agricultural responses; (iv) development of agricultural research, technological dissemination and adoption to sustain long-term productivity growth. The project will contribute to all four pillars of CAADP. The LUSIP-GEF will contribute to (i), (ii) and (iv) of the CAADP pillars.

IFAD NERICA Programme

The programme “Enhancing smallholder access to NERICA seed for alleviating rural poverty in Western and Central Africa”, implemented by the Africa Rice Centre (WARDA) with a grant from IFAD.

Other GEF Projects

Besides the contribution for the preparation of the Initial National Communication and the NAPA, currently there are no other GEF projects specifically addressing adaptation to climate change in Sierra Leone.

National Capacity Self-Assessment for the Global Environment (GEF Agency UNEP, ID 2145, Multi Focal Area)

The Fouta Djallon Highlands Integrated Resources Management Project (GEF Agency UNEP, ID 1431, Focal Area Land Degradation) includes Sierra Leone, but not the area of the proposed IFAD project.

UNDP

The LDCF project has synergy with the Capacity Building for Sustainable Land Management Project, although working in different geographical areas of the country. The RCPRP NPM will ensure good communications are established with the UNDP project, particularly to share lessons learnt.

The LDCF project will also work in collaboration with a UNDP initiative which is assisting young people in rural areas to develop businesses. This will encourage groups of youths to train in IVS rehabilitation / development (alongside farmers in FFS), then sell their services in an entrepreneurial way to other farmers (e.g. groups of women who may not be able to undertake the heavy physical labour of IVS development themselves).

UNDP have some funds to be spent in 2010 and intend to use these to support the Meteorology Department. The Project designer has met with the Principal Technical Adviser of UNDP and discussed how the LDCF / IFAD project and UNDP can work in synergy - and have outline agreement that the LDCF will support rehabilitation of some of the planned national network of met. stations, along with staff training, while UNDP will support digitisation of old paper met. records and supplement the LDCF / IFAD funds to enable all the proposed sites (see Annex 13 of the project brief) to be established.

FAO's main in-country programmes (including FFS approaches) (from FAO, 2010)

Inland Valley Swamp Inventories

Between January and May 2010, a national IVS expert trained about 90 participants in Northern, Sothorn and Western Regions – a further course is planned in Eastern Region. The trainees are from the following divisions/units of the Ministry of Agriculture, Forestry and Food Security (MAFFS): Land and Water Development Division (LWDD), Crops, also Monitoring and Evaluation (M & E).

The theoretical aspects of the course included: background of the agricultural sector, GOSL policy, contribution to the national economy; lowland potential, constraints and opportunities for increased productivity; need for IVS inventories, factors to be considered in IVS inventories; introduction, detailed discussion and revision of checklist by both resource persons and participants; reading a topographic map.

The practical part of the workshop was carried out in an inland valley swamp within the training venue, which was in the compound of the district agriculture office. The following aspects were covered:

1. Use of an upland auger and a lowland auger for sampling soils, recognizing and describing soil textures
2. Use of a Global Positioning System (GPS) receiver to measure and map the area of a swamp
3. Locating points of interest in an IVS using a GPS receiver
4. Measuring depth of water levels in dug out water wells
5. Provision of detailed step-by-step guidelines on the operation and use of the GPS receiver.

Special Programme for Food Security

FAO has been assisting Sierra Leone in the field of food security since 2001. FAO provided technical support to the formulation of a National Programme Document that outlines the Special Programme for Food Security strategy in the country. The preparatory phase consisted of a community-based extension and capacity-building programme. District coordinators undertook pilot field schools on rice, vegetables, tree crops and marketing in 48 sites with over 1,000 farmers.

National Programme for Food Security

Sierra Leone launched its National Programme for Food Security, called Operation Feed the Nation, in 2002. It has been implemented as an umbrella programme through the Ministry of Agriculture, Forestry and Food Security with additional technical and financial support from FAO, other UN agencies and several countries.

The goal of the programme is to mobilize communities, targeting about 200,000 families, to achieve household food security and contribute to national economic growth. It is a community empowerment

initiative using the Farmer Field Schools approach. The programme is an important component of the Poverty Reduction Strategy Paper that aims to improve productivity of the agriculture sector through building farmer skills and organizations and re-establishing community spirit and trust.

Food Security through Commercialization of Agriculture (FSCA) Project

The FAO/Government of Italy-supported FSCA project will support the establishment and strengthening of sustainable FBOs and from which both the RCPRP and the IFAD/LDCF project could benefit in the area of capacity building of farmer-based organizations.

Development of a Sustainable Seed Programme

The second phase of the FAO/Government of Germany-assisted project Development of a Sustainable Seed Programme in Sierra Leone, which coordinates efforts to increase capacity for seed production and processing and widespread dissemination.

USAID

Until the end of FY 2008, USAID supported improved local governance through the Strengthening Democratic Governance project. The project broadened community-based political participation and enhanced the effectiveness of newly-formed local government bodies through a variety of mutually-reinforcing activities in four Districts, namely, Kono, Koinadagu, Kailahun, and Kenema (the same group as proposed for this LDCF project). These activities are being continued from FY 2009 through the new PAGE Project (Promoting Agriculture, Governance and Environment).

USAID equips communities, particularly women and youth, with the information and skills they need to participate in decision-making, monitor government performance, and take on corruption. USAID provided training and mentoring programs for newly-elected local leaders and traditional Chiefs. Communities also benefited from hands-on training in priority setting, resource mobilization, budgeting, advocacy and monitoring. USAID also established four Regional Information and Community Centers, one in each district, which provide space for public meetings and host resource libraries stocked with a wide variety of information materials covering issues of local interest from governance to agriculture and the environment.

USAID has helped communities and ward committees work together to identify development priorities and formulate community development plans called Community Participatory Plans for Governance. To help support these plans, USAID provided matching grants to 12 communities that were able to mobilize community resources or obtain support from their district council. These interventions have led to greater interaction, information flow, and trust among communities and their ward committees and district councils. As a result, local government bodies are becoming more responsive and effective in providing services to their communities.

JICA

JICA are developing Phase II of a Technical Co-operation Rice Development Project for Kambia District (with plans to up-scale to the entire country after the 3 year pilot). This follows Phase I, in which technical packages were formulated for both rice and vegetable production with SLARI (Rokupr). Phase II will elaborate the rice package for wide-scale use in extension, using their partners MAFFS Kambia.

Notably, Phase I included adapting a rice calendar, originally developed by SLARI (Rokupr) into a simple calendar for farmers to record their agricultural practices, principally to reduce delay in transplanting, which is thought to significantly contribute to which the current low yields. The calendar is being used “fairly successfully”.

The main target is to raise yields (currently averaging 1 tonne/ha) towards 2 or more tonnes/ha. The proposals for Phase II of the JICA project include only limited water control through the construction of mini bunds. The project will use “model farmers” to demonstrate approaches for others.

World Food Programme

The WFP “second-generation” country programme (2008 – 2010) is transitional, recognizing that the Government is moving from an emergency footing and is unable to provide the human and budgetary resources or leadership required to carry out the country programme. This is synchronized with the United Nations Development Assistance Framework (2008–2010) on which it is based, supporting the national effort to improve health and education.

The programme is building the capacity of government institutions and district counterparts with a view to promoting government and community ownership.

WFP have been using Food-for-Work approaches to rehabilitate IVS, although their experience has been that people participate in the activities, receive the food, but then do not continue work in the IVS (source – WFP Rep, April 2010). The LDCF project will ensure that the lessons learnt by WFP in this area are taken onboard when implementing the LDCF activities, particularly that messages in the FFSs ensure that farmers understand how maintenance is vital for IVS cultivation.

World Meteorological Office

A major funding stream from Spain, managed by WMO and AEMet Spain, which has set up the Forum of Directors of the West African Meteorological and Hydrological Services <http://www.afrimet.org/index.htm>. One of the main project themes is EMERMET, which aims to development of capacities of a number of countries emerging from conflict and natural disasters - see <http://www.afrimet.org/activities.htm>. This aims to do a comprehensive programme of technical and human capacity building for Guinea-Bissau, Liberia and Sierra-Leone. The programme was organising a detailed evaluation and programme planning exercise for Sierra Leone, but following exchanges with the PPG studies, their work will now be developed to compliment this LDCF proposal.

UK Meteorological Office

A commercial contract was recently carried out by the UK Met. Office to do an environmental impact and climate change study for a major civil engineering and mining proposal. As part of this work, the UK Met. Office collected data from a variety of sources, including the Sierra Leone Met. Dept. and the colonial-era archives held at the Met Office. A selection of this data has been digitised, and this digitised data is now available to return to the Sierra Leone Met. Dept. Over the next few months, the Met Office will set up a project to use this digitised data along with other sequences to populate a climatology database using a PC-based climate data management system, and then to provide this to the Sierra Leone Met. Dept. as a ready-made system, along with on-site training to help them to continue to exploit it.

Africa Monitoring of the Environment for Sustainable Development (AMESD)

The objective of AMESD is to provide all African nations with the resources they need to manage their environment more effectively and ensure long-term sustainable development in the region. Most importantly, AMESD aims to improve the lives and prospects of the 350 million disadvantaged people in Africa currently enduring poverty and hardship, and whose livelihoods depend heavily on their environment (see Annex 14 of the project brief for full details).

The European Organisation for the Exploitation of Meteorological Satellites⁹ (EUMETSAT) plays a key role. EUMETSAT's role, as the organisation responsible for Europe's operational meteorological satellites, is fundamental to the successful implementation of AMESD. It encompasses:

- Continuous supply of its satellite data and products free of charge via the EUMETCast dissemination system
- Providing AMESD with support in the maintenance and upgrading of receiving stations and equipment
- Continuing its training programmes for African National Meteorological and Hydrological Services personnel, in close coordination with the AMESD training activities
- Providing managerial support to the committee in charge of supervising the project
- Offering, through its biennial African User Forum, an opportunity for the African user community to meet, discuss and exchange information and ideas about AMESD and EUMETSAT data and products.

AMESD in the ECOWAS region

Environmental indicators related to the four following topics will be developed in the framework of the ECOWAS THEMA (thematic actions):

- Monitoring vegetation growth to evaluate cropland and rangeland productivity;
- Determination of areas affected by droughts;
- Localization and monitoring of small surface water bodies;
- Localization of bush fires and estimation of size of burned areas.

⁹ The main purpose of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) is to deliver weather and climate-related satellite data, images and products– 24 hours a day, 365 days a year. This information is supplied to the National Meteorological Services of the organisation's in Europe, as well as other users world-wide. EUMETSAT is an international organisation and was founded in 1986.

In addition to the delivery of these indicators the following results are expected:

- Setting up of a historical database, at AGRHYMET, of products useful for drawing up indexes and indicators of environmental follow-up;
- Increased availability of information products for environmental follow-up in the ECOWAS region through the installation of EUMETCast stations;
- Increased awareness among decision-makers in ECOWAS countries of the use of data and products derived from Earth observation for environmental follow-up;
- Improved capacities of regional and national institutions working in the sector of environment monitoring through training programmes;
- Assessment of the impact of the THEMA actions with regard to the availability of information products and their use in decision-making in the environmental field.

Activities of the LDCF will compliment and benefit from the AMESD activities in Sierra Leone – particularly benefiting from the installation of a satellite receiver system for weather forecasting / environmental monitoring in Freetown, crop productivity monitoring, increased awareness of decision makers, regional training programmes and information products – as they become available.

E. DESCRIBE ADDITIONAL COST REASONING:

Sierra Leone has abundant arable land and reasonable access to land of several agro-ecologies suitable for wide variety of crops, also abundant water resources and political commitment for investment in the sectors. In the past, the country had favourable climatic conditions. Given the importance of agriculture in the national economy, economic growth and poverty reduction in Sierra Leone will only be sustained through developments in the agricultural sector (GoSL 2009, also World Bank, 2007). The Government of Sierra Leone with the support of a wide range of partners is working on a wide range of programmes and agricultural development projects. However, the development path, also national and local food security are being put in jeopardy, as currently the very vulnerable subsistence farmers are unable to adapt to the impacts of climate change, which are already being felt across the country. None of the other on-going and planned programmes and projects addresses the effects of changing weather and climate on Sierra Leone's rice-based agriculture. Effectively, climate change is acting as "multiplier" of existing threats to sustainable development. National development and progress towards food security could be stalled unless the proposals outlined in the Sierra Leone NAPA and elaborated in this proposal to climate proof agriculture, including developing early warning and raising awareness, are implemented.

The core focus of this project is to use sustainable land and water management (SLWM) techniques and approaches to enable farmers to adapt their agricultural systems to cope with the impacts of climate change on their traditional practices.

Sustainable land and water management (SLWM) is a deliberate human process through which land users can adapt (and also mitigate) the effects of climate change on their agricultural practices. It requires land users, individually and/or collectively, to care for and manage their land resources (soils, water, vegetation and wildlife) in ways that will enable them to obtain an optimum range of products of social and economic value to themselves, while preserving, restoring and/or enhancing their productive capacity for both present and future generations. SLWM involves a holistic approach to improved land management that aims to ensure productive and healthy ecosystems by integrating social, economic, physical and biological needs and values.

The successful promotion of SLWM therefore requires an understanding of:

- The natural resource characteristics of individual agro-ecosystems;
- The socio-economic characteristics of the land users (population numbers, household composition, cultural beliefs, livelihood strategies, income/poverty levels, vulnerability, education levels etc);
- The environmental functions and services provided to society by healthy ecosystems (watershed protection, maintenance of soil fertility, carbon sequestration, micro-climate amelioration, bio-diversity preservation etc); and
- The constraints to and the opportunities for, rural communities to sustainably utilise the natural resources of their local ecosystems to meet their welfare and livelihood needs (e.g. for food, water, fuel, shelter, medicine, income, recreation).

The SLWM approach recognizes that people (the human resources) and the natural resources on which they depend, directly or indirectly, are inextricably linked. Rather than treating each in isolation, all ecosystem elements should therefore be considered together, in order to obtain multiple ecological and socio-economic benefits. For land users this means combining the indigenous resource management knowledge of their families and communities, with new information obtained from outside sources. For planners, advisers and researchers this requires the integration of both natural and social sciences disciplines. SLWM involves problem solving by combining knowledge from a diversity of disciplines (e.g. soil science, ecology, animal husbandry, agronomy, sociology and economics). Such an inter-disciplinary approach provides the key to better understanding the natural properties of ecosystems (and society's dependence on them), and the social, economic and political factors that contribute to their disturbance.

Effective SLWM requires multi-stakeholder partnerships to bring together indigenous and scientific knowledge (*inter alia* FFSs, FBOs, NGOs). A multi-sectoral approach is essential as no one institution has all the disciplinary experts required to help those who directly use the land to solve the multi-dimensional problems. This requires coordination and cooperation between different government sectoral agencies (at the national, district, chiefdom and village levels), especially those responsible for agriculture, livestock, forestry, land and water resources, environment, science and technology, finance and planning.

The LDCF funding will complement the government and community level capacity building and field level agricultural development activities of RCPRP, by ensuring that village level land use planning and recommended crop and livestock management practices conform to the concepts and principles of SLWM. The LDCF component has been designed to complement the RCPRP activities, and will therefore be undertaken in parallel so as to capture the synergy of objectives and economies of implementation. LDCF funds will support capacity building amongst the participating community and government advisory support service providers, with the particular focus on building the skills and expertise required to undertake community-based land use planning. The LDCF support will facilitate the identification and implementation of locally appropriate SLWM practices to help land users adapt to climate change – to maintain their food security. It will particularly seek to build the capacity of the rural poor and marginal groups to identify locally appropriate SLWM technologies and approaches, for replication and up-scaling that will not only provide them with sustainable and profitable livelihoods.

The four project districts of eastern Sierra Leone (Kono, Koinadugu, Kailahun and Kenema) are an area where the LDCF project can successfully intervene using multiple approaches to help land users adapt to the impacts of climate change – which are already being reported (during PPG studies), making their rice-based farming systems in IVS and uplands more resilient to the various current and predicted future impacts of changing rainfall patterns and rising temperatures. The key entry points for project will be SLWM, including improved irrigation and drainage systems. The project will also encourage farmers to maintain a diversity of crops on their land – which is widely accepted as a key adaptation to increasing weather variability and climate change, as it reduces the risk of food insecurity.

Agricultural productivity and the conservation of natural resources (particularly upland forests and tree crop areas) will be improved, leading to climate-proofed food security, which will improve economic and social stability.

Awareness raising and action research will help land users to adopt alternatives to current practices, which will improve land cover (above ground biomass), soils (including below ground biomass, nutrient status and structure), water and nutrient cycling, to reduce biomass losses and enhance the system's diversification and resilience. The project will raise awareness and capacity among local land users in climate change impacts and adaptation through co-learning.

At the national level, the LDCF alternative will also support and strengthen Sierra Leone's Meteorology Department, with the rehabilitation / construction of 15 meteorology stations across the country (with a focus on the eastern area) (see Annex 13 of the project brief) and staff training to enable them to better fulfill their professional roles, including the ability to better monitor and prepare weather forecasts, also increased understanding of climate change.

In the immediate future, a single forecasting unit will suffice, therefore each met. station will require a solar panel or generator for power supply to relay data to the forecasting unit. The main forecast office will collect data from all the out stations, analyse them and, using satellite data and models

supplied by AMESD (see Annex 4 of the project brief), issue forecasts to various end users through local and national radio stations – also in future perhaps by mobile phone. [In future, the Meteorology Department plan to have forecasting centers at the Provincial Headquarter towns of Bo, Kenema and Makeni and a central forecasting office at Tower Hill in Freetown.] (source - PPG report).

The project must ensure that the philosophy of the Meteorological Department changes to one of a service culture – through ensuring that users / beneficiaries of the weather and particularly agrometeorological information demand a reliable service. This will ensure sustainability of the service.

The project includes vital training for existing (and hopefully also new) staff in the Meteorology Department. This improved human resource capacity, in combination with restored technical capacity, will enable the Department to assume it's proper role as a provider of reliable, regular weather forecasting and early warning information.

The project includes training and development of the capacity of the rural radio stations which serve the four project districts, to enable them to broadcast regular weather forecasts and related vital agrometeorology information to farmers, advising on how land users should adapt their agronomic practices (e.g. planting dates) to changing weather patterns.

F. INDICATE THE RISK THAT MIGHT PREVENT THE PROJECT OBJECTIVE(S) FROM BEING ACHIEVED AND OUTLINE RISK MITIGATION MEASURES:

The NAPA of Sierra Leone recognises the limited capacity of both professionals at the national level and community level to understand and assess climate change impact. For this reason, capacity building and training will be a key success factor and will be promoted to overcome this risk. The NAPA also indicates that isolation and remoteness of people in the rural areas is an additional constraint, which could impede the full involvement of the local communities in the project activities. However, the blended nature of the project, benefiting of the activities undertaken in the RCPRP-PLUS with its good outreach, should reduce this risk and ensure adequate participation rate. This should be also ensured by the strong participatory philosophy of the baseline activities.

Project design has taken into account the strong commitment by the GoSL at the national level, and by the local stakeholders, to undertake adaptation measures and implement the NAPA priorities through concrete investments. The implementation of the project will be undertaken through community-based approaches that address local cultural, socioeconomic and ecological concerns. In this regard the project will be implemented as an integral component of the RCPRP-PLUS to which authorities have also demonstrated their full commitment to implementing its components in effective manner.

The project will significantly depend on the strength and commitment of local stakeholders at the village and community level that are identified as the key participants. The project will ensure that these organizations are mobilized and empowered with sufficient commitment, finances, jurisdictions, and backstopping to enable them to provide the leadership, guidance, and entrepreneurship necessary to implement and manage the planned initiatives within the project.

The project is providing incentives for farmers to engage in various activities that target climate change adaptation at: (i) a capacity building and awareness level and (ii) at the investment level. This will provide a comprehensive approach to couple the activities of the RCPRP-PLUS and the LDCF intervention to guarantee a buy-in by the local communities. For example, the support to income generating activities for adaptation through their integration in the CDF is a good opportunity to deduce such risks and increase impact by adopting a win-win strategy that helps vulnerable groups to adapt to climate change while increasing their income. Risks assumptions and suggested mitigation measures are reflected in the table below.

Table 19: Risks assessment and potential mitigation measures

Risks	Risk rating*	Risk mitigation measures
On-ground implementation slowdown by bureaucratic constraints	M	Use of the project participatory approach associated with sufficient institutional strengthening provided under the project and the RCPRP-PLUS will allow adequate remedial measures to this risk
Decentralization policies not effective	M	Sufficient institutional strengthening, policy statement on roles and responsibilities of local authorities and communities as well as technical backstopping to securing communities engagement is targeted through many project activities.
Insufficient staffing for backstopping	M	In addition to the line ministries departments and services, the project will involve national institutions and local service providers for backstopping. Furthermore the baseline investment (RCPRP-PLUS is investing in capacity building and technical backstopping and this will provide further support to local government institutions and communities in particular). The NAPA funding will also support the extension services to empower them for dealing with climate change adaptation.
Inadequate staffing for backstopping	L	Climate change adaptation is a fairly new topic and will require very specific expertise that may not be available in the local market. However, available funding will not allow for the procurement of such expertise at the international costs. Nevertheless, the project will put efforts into comprehensive training/recycling program for technical staff that will be responsible for implementation to ensure that the project strategy and its objectives are fully integrated by the local project implementers.
Land tenure issues impact on implementation of project activities and sustainability of achievements. The primary constraint on making lands available for cultivation is the tenure insecurity of the customary landowning families—not the insecurity of tenants or strangers, although the latter is connected to the former. Tenure insecurity by landowning families results in an extreme reluctance to allocate lands to others in a secure way, due to a fear that ‘others’ may make claims. Insecurity also results in a reluctance to disconnect improvements made to land by tenants or strangers—including even occupation of the same land for a number of years—with the perception that these improvements are forms of claim, and therefore represent a real threat to customary ownership	M	<p>The Project will pay a particular attention to land tenure security and issues in the vulnerability mapping efforts as well as in the design and the implementation of the management/adaptation plans. The awareness raising efforts will also focus on land tenure as a key factor for adaptation to climate change. The land tenure issue that may be connected with the establishment of the Met stations will be handled by the Government. The project will not be involved in any land issues regarding the sites for the implementation of the Met stations – the Government will secure these sites at no cost for the project.</p> <p>Sensitization workshops have been held (and will be held) to ensure the participation of all concerned partners.</p>

Insufficient application of targeting procedures	L	Targeting will be aligned with IFAD's targeting policy and the targeting approach of the RCPRP-PLUS. Effective monitoring and evaluation procedures will be established to ensure that targeting is adequate. All LDCF targeting-related indicators will be segregated by gender and age.
Overall risk rating	M	
* Risk rating – H (high risk), S (Substantial risk), M (Moderate risk), and L (low risk). Risks refer to the possibility that assumptions, defined in the logical framework may not hold		

G. EXPLAIN HOW COST-EFFECTIVENESS IS REFLECTED IN THE PROJECT DESIGN:

As the IFAD/LDCF project will be a blended project, fully integrated into the IFAD supported “Rehabilitation and Community-based Poverty Reduction Programme-PLUS (RCPRP-PLUS)” and co-financed by IFAD, it will benefit from sharing with its resources and structures. This partnership will undoubtedly boost the cost-effectiveness of both interventions, notably as there will be a common management structure and a linked M&E framework. Other benefits expected are improved coordination and communication, the application of common procurement and supervision procedures (reducing costs); also the implementation of complementary project interventions in the four project districts. Furthermore, lessons learnt in work of RCPRP have and will continue to be integrated in the course of project implementation.

The proposed IFAD/LDCF operation is focusing on investment and impact on the ground; as such, the project will be carefully designed in view of an optimum level of investment that ensures maximum impact per LDCF dollar. The project will also work towards targeted capacity building and improving the necessary elements (i.e. data collection, impact mapping, and vulnerability assessment at key investment sites) to better focus the investment.

The project will use proven mechanisms for community participation, farmer field schools and other capacity building (for farmers, staff of the Meteorology Department and skilling youth), government's involvement and technology transfer, particularly regarding meteorological stations.

LDCF funding for Sierra Leone is designed to be catalytic for scaling-up adaptation to climate change using sustainable land and natural resources management including reducing use of bush fallow systems; improved water management in uplands and IVS; improving access to weather and climate information, through targeted technical and institutional capacity development and on-the ground activities (including demonstrations). The project will work with existing community structures such as the Farmers Business Organisations and Farmer Field Schools, which have already been strengthened in the RCPRP-PLUS project area will be used to promote for community-based activities.

Regular communication and coordination with the other donor agencies working in Sierra Leone have already been established, to ensure that there are no overlaps of activities and to take advantage of possible beneficial synergies.

PART III: INSTITUTIONAL COORDINATION AND SUPPORT

A. PROJECT IMPLEMENTATION ARRANGEMENT:

The LDCF project will be fully integrated to be implemented within the institutional arrangements of the RCPRP-PLUS. RCPRP PLUS interventions will focus on district level implementation support and the LDCF will be managed at the NPCU level as part of the RCPRP-PLUS. Coordination of the implementation and monitoring of the LDCF components will be ensured by a dedicated PO at (and under the supervision of the overall RCPRP-PLUS coordinator) at the NPCU level.

National Project Coordination Unit (NPCU): The role of the NPCU will be overall coordination, supervision and monitoring, while most activities in the field will be carried out by Implementing Partners (contractors, NGOs, CBOs and government agencies) on the basis of performance-based contracts and MOUs. The main responsibilities of the NPCU will include: (i) Ensuring harmonisation

of approaches and activities of the various interventions in the Districts; (ii) preparing the AWPBs; (iii) operating the management information system, M&E and reporting systems; (iv) contracting out, on a competitive basis, the implementation of various project activities to implementing partners, service providers and technical assistance experts; (v) monitoring the progress of project activities and evaluating the performance of the different contractors; (vi) coordinating and consolidating periodical reports from implementing units and implementing partners; (vii) providing logistical, administrative and technical backstopping to implementing partners and district level implementing agencies; (viii) serving as the secretariat to the National Steering Committee and keeping MAFFS and other government partners informed on a regular basis on project progress and any relevant issues; (ix) establishing and maintaining linkages with all relevant government ministries, donor institutions and service providers; (x) carrying out financial management and procurement of goods and services; (xi) reporting regularly to the funding agencies and to the government; and (xii) disseminating information about the Project's rationale, concept, content and progress to the concerned stakeholders and all interested parties.

The **Project Steering Committee** will be the same as the National Steering Committee for the RCPRP/RFCIP. The LDCF project will have the same SC but **will call upon its membership to include Government officials from the Meteorological Department and the UNFCCC Focal Point for the Government of Sierra Leone**. Annual Review and Planning Workshops will be conducted at national and district levels as a basis for preparing Annual Work Programmes and Budgets (AWPBs). Progress Reports will be generated periodically by the MIS. At district level, the already existing District Steering Committees will be the entry point of the LDCF project implementation as they will be responsible for the RCPRP-PLUS.

The **National Country Programme Management Team (CPMT)**: This team was put in place by MAFFS to guide IFAD in the development of its portfolio in Sierra Leone. It will also play a crucial role in Project monitoring and evaluation and this will also cover the implementation of the LDCF project. In recognition of the fact that the IFAD portfolio is entirely implemented by MAFFS and managed by one NPCU, it is envisaged to merge the National Steering Committee with the CPMT, in order to avoid duplication and increase harmonisation.

The LDCF will be under direct supervision by IFAD and fully integrated in the supervision arrangements for the RCPRP-PLUS. The LDCF project will be supervised as a component of the RCPRP-PLUS. A separate project account will be established for the LDCF Funds and IFAD will establish a separate Financial Agreement with the Government for the LDCF grant. The flow of funds will follow the modalities of the RCPRP-PLUS.

PART IV: EXPLAIN THE ALIGNMENT OF PROJECT DESIGN WITH THE ORIGINAL PIF:

The Full Project Document has been developed from the PIF, reflecting the detailed information gathered and research during the PPG.

The project design remains closely aligned to that presented in the PIF – with three main project components. A number of the Outcomes have been refined to take account of the detailed information collected during the PPG studies.

Component 1 has been widened in scope to include not only rice, but other food crops and the output of at least 2 crops of rice secured per year omitted. The PPG studies revealed that a range of external factors mean that a second rice crop is not optimum use of resources. In some areas, labour shortages preclude growing a second rice crop – this is mainly women's work and they have many other tasks. In other areas, where little rice is grown as a second crop, pest pressures mean that the few farmers willing are likely to lose large proportions of their crop, therefore it is not economically viable.

As the RCPRP and RCPRP-PLUS will be using a MIS/GIS, this will also be used in the LDCF/

Component 2 has been better defined, to meet local needs. Firstly, community-based plans for SLWM will be prepared using participatory approaches to raise awareness of the win-win benefits of SLWM

in the uplands and ensure activities are well-planned. Secondly, the Output on increased water use efficiency for irrigation in uplands has been omitted – as no irrigation systems currently exists in the uplands – which are slash and burn / bush fallow systems.

The component includes development of rainwater harvesting, to collect the copious rainfall in the long rainy season – for use as supplementary irrigation of crops during the increasingly frequent and often devastating period of dry weather in the traditional rainy season.

The Outcome to expand the area under agricultural production has been revised; as it is clear nationally (e.g. MAFFS) and more widely that the focus should be to concentrate the area under cultivation to relatively small sustainable plots (using SML technologies) and allow forests to regenerate, providing tree crops and also NWFPs.

Component 3 remains human and technical capacity building, including training of Met. Department staff in weather forecasting and both Met and MAFFS staff in agrometeorology. This will include university post-graduate training for Met staff and use of on-line training in agrometeorology, as these are considered superior to that proposed in the PIF, also aspects of the training proposed in the PIF are no-longer available.

Component 4 is project management, including M & E – which are more fully described than in the PIF.

Total project budget differs from the PPG figures. The total cost of the Project has been estimated at US\$ 11,270.800 over a four year period, and comprises an LDCF Funding of US\$ 2.644.800 and an estimated co-financing value of US\$ 8,626.000.

Investment corresponds to largest share across the project components. Component 1: Sustainable development of climate resilient inland valley constitutes the core of the project costs and accounts for US\$ 6.026,800 (52 % of total project costs). Component 2: Integrated water and Natural Resource Management for adaptation accounts for US\$ 3,191.000 (28 % of total project costs). Component 3: Capacity building and awareness raising of climate change at institutional and local level amounts to a total allocation of 1,070.900 (9.5 % of total project costs) and Component 4: Project management and M&E amounts to US\$ 982,100 (9 % of total project costs). LDCF allocations and co-financing by component and sub-component are reflected in the financing table.

PART V: AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with LDCF policies and procedures and meets the LDCF criteria for project endorsement.					
Agency Coordinator, Agency name	Signature	Date	Project Contact Person	Telephone	Email Address
Mr. Kevin Cleaver Associate VP, Programs PMD, IFAD		28 October 2010	Naoufel Telahigue , Program Manager, PMD, IFAD	+39 0654592572	n.telahigue@ifad.org

ANNEX A: PROJECT RESULTS FRAMEWORK

Hierarchy of Objectives	Key Performance Indicators	Means of Verification	Assumptions and Risks
LDCF Goal Reduce the vulnerability of the food supply system to the deleterious impacts of climate change	Contributions to the NAPA objectives (All 6 Options for the Agricultural Sector – Table 6, p28; contribution to Options1and 2, also Options 3,4and 5 for the Meteorology Sector – Table 10, p31 in GoSL, 2008) Increase resilience of key agricultural production systems to climate change impacts in Sierra Leone	Project M & E system Local and national assessments of food security mid term and project completion	Political and economic stability in Sierra Leone.
LDCF Objective To lessen the impact of climate change on vulnerable rural communities, as well as on natural resources critical for sustaining agricultural production and increasing food security.	5 types of climate resilient agricultural practices introduced to promote food security Climate resilient income sources for vulnerable households promoted in 8 communities At least 70 % of supported beneficiaries report ability to maintain or increase food production in the event of harsh climatic conditions	Project M & E system Progress reports Mid-term and final project evaluations	Strong commitments to address negative impacts of climate change on food security in Government, concerned Ministries and at district councils in Sierra Leone.
Output	Activity and Key Indicators	Means of Verification	Assumptions and Risks
1. Sustainable development of inland valley swamps for rice / other food crop production			
Outcome 1.1 : Participatory mapping and monitoring of vulnerability to climate change/ Contributes to CCA-2			

1.1.1: Participatory mapping and vulnerability of rice production areas and Integration of the GIS/MIS system in the RCPRP-PLUS	<p>24 consultation sessions (8 in PY1, 8 in PY2 and 8 in PY3).</p> <p>2 Local study tours (1 in PY2 and 1 in PY3).</p> <p>Procurement of equipment for participatory mapping (in year 1)</p> <p>Vulnerability mapping is undertaken in PY1 and integrated in the GIS/MIS of the RCPRP-PLUS by PY2.</p> <p>Equipment (GIS requirements, GPS etc) are procured in PY1</p> <p>Risk and vulnerability assessment conducted by PY2</p> <p>70 % of supported beneficiaries reporting increased resilience of crops to climatic variability in mapped area by PY4</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p> <p>Maps produced</p>	<p>Awareness grows among stakeholders of drought and CC as challenges to successful SLM / food security strategies.</p> <p>Full involvement of local farmers and communities enthusiastic and unrestricted.</p> <p>Linkage of local farmers with SLARI and LWDD.</p> <p>Availability of good expertise</p> <p>Easy access to remote sites</p>
Outcome 1.2: Climate-resilient rice production systems / Contributes to CCA-1			
1.2.1: Climate resilient cropping models promoted in IVS	<p>Support to 120 farms in 4 project districts (30 in PY1; 30 in PY2; 30 in PY3 and 30 in PY4) (indicator disaggregated by gender and age)</p> <p>Provision of agricultural equipment: # per year</p> <p>% of crops that survive climatic shocks by PY4</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	<p>Full involvement of local farmers and communities enthusiastic and unrestricted.</p> <p>Linkage of local farmers with SLARI and LWDD</p>
1.2.2: Dissemination of Agricultural Met Data (time bound with Outcome 3.2.1 below)	<p>Tools produced</p> <p>Number of sessions and beneficiaries for the disseminations of Agricultural Met Data # of users (by gender and age)</p> <p>Rate of integration of Ag. Met data in decision at the community level</p> <p>% increase in # of secured crops in</p>	<p>Dissemination tools</p> <p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	

	communities that use agricultural met data for crop-related decision making.		
Outcome 1.3: Training for Local rice producers on best adaptation practices / Contributes to CCA-2			
1.3.1: Training to farmers on resilient crop varieties	Field extension workers trained to deal with adaptation to climate change: 16 persons trained (4 per year for 4 years) Demonstration sites for training purposes (established in PY1 and PY2) 120 training sessions to farmers– 60 in PY1 and 60 in PY3.	Project M & E system Progress reports Mid-term and final project evaluations	Full involvement of local farmers and communities enthusiastic and unrestricted. Linkage of local farmers with SLARI and LWDD
2. Integrated Water and Natural Resource Management for Adaptation			
Outcome 2.1 Ecosystem-based adaptation in the uplands/ Contributes to CCA-1			
2.1.1: Pilot community-based plans for NRM (integrating adaptation measures)	40 training sessions through VDCs (20 in PY1 and 20 in PY 3) 40 NRM plans integrating adaptation measures produced by PY3 (20 in PY 1 and 20 by PY3)	Project M & E system Progress reports Mid-term and final project evaluations	Full involvement of local farmers and communities enthusiastic and unrestricted.
2.1.2: Water harvesting in the uplands	100 water harvesting sheds installed (20 in PY1; 30 in PY2; 20 in PY 3 and 30 in PY4) 1500 roof water collected installed (200 in PY1; 500 in PY2; 500 in PY2 and 300 in PY4) 100 small water storage tanks established (25 each year) % decrease in water vulnerability during the dry season (average of 70 % by PY4)	Project M & E system Progress reports Mid-term and final project evaluations	Local uptake Good maintenance

2.1.3: Land management and erosion control	<p>60 SLWM demonstration plots promoted by farmers (indicator disaggregated by gender and age) in four districts over 30 ha (15 ha in PY2 and 15 ha in PY3)</p> <p>5 types of climate resilient agricultural practices introduced to reduce food shortages</p> <p>Increase in crop diversification rate by season (At least 50 % increase by PY4)</p> <p>At least 70 % of beneficiaries reporting reduced impact of unusual climate events on their crops</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	<p>Local stakeholders appreciate “win-win” potential of SLWM approaches to adapt to impacts of climate change.</p> <p>Involvement of local stakeholders and communities enthusiastic and unrestricted.</p> <p>Linkage of local farmers with SLARI and LWDD.</p>
2.1.4: Promotion of Pilot NWFP Schemes	<p>8 community forestry plans (4 in PY1 and 4 in PY 2)</p> <p>8 awareness raising campaigns on slash and burn (4 in PY1 and 4 in PY 2) 8 communities supported for the promotion of IGA for adaptation through the CFD mechanism (4 in PY3 and 4 in PY4).</p> <p>50 % (in 8 communities) of targeted population with sustained climate-resilient livelihoods</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	<p>Full involvement of local farmers and communities enthusiastic and unrestricted.</p> <p>Demand for IGS for adaptation through the CDF mechanism</p> <p>Effective planning exercise</p>
Outcome 2.2 Irrigation efficiency and drainage systems/ Contributes to CCA-1			
2.2.1: Innovative irrigation systems	<p>30 solar powered irrigation schemes provided (15 by PY 2 and 15 by PY 3).</p> <p>Local technical assistance provided to farmers</p> <p>20 % increase in access to irrigation water</p> <p>% decrease in crop failures and food shortage in the targeted sites by PY 4 (60 % by PY4)</p>		<p>Interest from farmers to switch to solar powered irrigation</p> <p>Interested farmers to co-share the running cost of the solar systems</p> <p>Quality of the technical assistance</p> <p>Good maintenance practices from farmers</p>

2.2.2: Improvement of drainage systems in climate risky sites	<p>Drainage works and maintenance conducted in 6 climate risky sites (3 sites in year 2 and 3 sites in year 3)</p> <p>Resilient investment measures to prevent economic losses introduced in the six sites</p> <p>40 % decrease in crop failure and food shortage in the 6 managed sites by PY 2 and PY3)</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	<p>Access to sites</p> <p>Participation and engagement of local communities</p>
3. Integrated Water and Natural Resource Management for Adaptation			
<i>Outcome 3.1 Government personnel training/ Contributes to CCA-2</i>			
3.1.1: Training to staff of the meteorological Department	Advanced training achieved by two meteorologists (at post graduate level) by PY 3 6 metrological Department staff (technicians) trained on agro-climatology management of weather stations: 3 staff trained in PY 1 and 3 in PY 3	<p>Educational records and university certificates</p> <p>Project progress s reports</p>	<p>Commitment and co-operation of Department of Meteorology staff</p> <p>Suitable staff in service</p> <p>Availability of staff to spend 1 year abroad studying</p>
3.1.2: On-line training to government staff	24 Met Dept and MAFFS staff completed the training (12 by PY 1 and 12 by PY3)		MAFFS, MoLCPE and farmers demand weather /Agro-meteorology information from Met. Dept to ensure development of service culture
<i>Outcome 3.2 Agriculture climatic data collection and analysis for decision making / Contributes to CCA-2</i>			
3.2.1 Establishment of modern weather measurement and observation stations	<p>15 automatic weather stations established and operational (4 in PY1 and 11 in PY 2)</p> <p>All rainfall stations instruments are provided by PY2</p>	<p>Met department reports</p> <p>Quality of Data</p> <p>Project progress reports</p>	<p>Government allocate appropriate land for sites</p> <p>Security of sites imperative</p>
3.2.2: Rain gauge I network re-established	20 rain gauges are set up and operational in selected sites (10 by PY2 and 10 by PY4)	<p>Met department reports</p> <p>Quality of data</p> <p>Project progress</p>	<p>Security of sites</p> <p>Maintenance and control</p>

		reports	
Outcome 3.3 Knowledge and awareness on climate change at community level / Contributes to CCA-2			
3.3.1: Capacity building activities on adaptation to CC for local communities and radio stations	<p>10 Trainers trained to carry out capacity building workshops on adaptation (6 in PY 1 and 4 in PY2)</p> <p>36 Community capacity building workshops (9 per year) undertaken to benefit 360 women, youth and heads of vulnerable households</p> <p>8 control visits (4 per year over the last 2 years of project implementation)</p> <p>4 training sessions for radio stations on capacity building for adaptation by PY1</p> <p>40 % decrease in food shortage in targeted communities by PY4</p> <p>At least 80 % of targeted groups are aware of climate change and its implications on their livelihoods (by PY3)</p> <p>80 % of population covered by adequate risk reduction measures, disaggregated by gender</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	<p>Misconception or lack of understanding of the meaning of, international support for and urgency of adaptation to climate change at all levels.</p> <p>People perceive the weather as supernaturally determined so even good meteorological information may not be well utilised.</p>
3.3.2: Awareness raising campaigns on climate change and adaptation at the local level	<p>Musical-based tools in 18 communities and 40 schools (song to be produced in PY1 and tours in PY2 and PY3)</p> <p>36 community leaflet and posters campaigns annually</p> <p>Radio campaigns on CC and adaptation are designed</p> <p>Support provided to SLBC in PY1</p> <p>4 community radios able to provide agricultural and weather/cc information (4 by PY 2)</p> <p>Relevant threat information disseminated to</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	<p>Misconception or lack of understanding of the meaning of, international support for and urgency of adaptation to climate change at all levels.</p> <p>People perceive the weather as supernaturally determined so even good meteorological information may not be well utilised.</p> <p>Radio programs are designed to capture attention of local community in local language</p>

	<p>stakeholders on timely basis</p> <p>At least 80 % of targeted groups are aware of climate change and its implications on their livelihoods (by PY3)</p>		
4. Project Management and M&E			
Project Management	<p>LDCF component management officer, clerk and driver are recruited in a timely manner</p> <p>Project vehicle is purchased in PY 1</p> <p>Project progress and day to day management is able to ensure an effective implementation of the LDCF-supported activities</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	<p>LDCF component management officer has relevant expertise (good understanding of adaptation issues)</p> <p>Efficient administrative processes</p>
Project M&E	<p>LDCF M&E requirements are fully met</p> <p>Project M&E system is fully aligned with the RCPRP-PLUS (including the GIS/MIS)</p> <p>Good quality progress reports are produced</p>	<p>Project M & E system</p> <p>Progress reports</p> <p>Mid-term and final project evaluations</p>	<p>Data is captured and recorded regularly</p> <p>Good flow o exchange with MIS of RCPRP-PLUS</p> <p>Timely evaluations and reports</p>

Comments by Germany – Frank Fass-Metz (01/10/08)

1. The project “seems overly ambitious” for a single project – “it is suggested to reduce the number of priorities to allow for a clearer focus.
2. “The LCDP contribution is largely oriented towards activities under an ongoing IFAD supported project (RADEP)”. “This is not the task of the LCDP”. “It is therefore suggested to compliment RADEP activities where appropriate, but keep the focus on a limited set of NAPA priorities and focus on specific adaptation approaches.”
3. “For Components one and three, the achievements do not seem sufficiently ambitious based on the allocated resources.”
4. “The project’s “objectives and components have to be revised”.

Response by the Project Formulation Team Leader

1. The results of the PPG studies have helped to more closely focus the project activities to those which will contribute to climate change adaptation – notably:
 - encouraging non photoperiod-sensitive rice varieties in Component 1;
 - discouraging slash and burn and encouraging development of upland plots for continuous cultivation using a range of SLWM technologies in Component 2;
 - re-establishing the network of meteorological stations (destroyed in the rebel war) , training Met Dept staff in monitoring and forecasting weather – and ensuring this information reaches farmers to help them adapt their practices to the impacts of climate change – which jeopardize even the current low levels of crop production in Component 3.
2. The RADEP project has now been cancelled and the project will be co-financed by the RCPRP-PLUS. The RCPRP is a development oriented project and has little, if any focus on Climate Change. The LCDP component will work in a complementary fashion with the RCPRP-PLUS, ensuring that the already deleterious effects of CC noted during the PPG studies (reduction in crop yields in IVS and uplands, also catalysing abandonment of uplands) are fully recognised and land users are helped to adapt (with awareness raising, training and establishment of demonstration IVS and uplands plots using SLWM technologies). The design phases of both the LCDP and the new baseline (RCPRP-PLUS) has offered greater opportunities for synergies and harmonization. Project activities were closely analyzed to avoid any duplications and to ensure that the LCDP funding is adding and adaptation value to the development scenario.
3. The better-defined Outcomes and Outputs of Components 1, 2 and 3 are now not only ambitious but also represent good value for money as they link to the RCPRP-PLUS activities and Outcomes.
4. As described above, this has been duly completed.

ANNEX C: CONSULTANTS TO BE HIRED FOR THE LDCF PROJECT

<i>Position Titles</i>	<i>\$/ person months*</i>	<i>Estimated person months**</i>	<i>Tasks to be performed</i>
For Project Management			
Local			
LDCF Project Officer (NPO)	1,600	48	S/he will to manage and coordinate the implementation of IFAD LDCF project activities on the ground, contributing to the overall achievement of the project's stated objectives and realising its anticipated outcomes and outputs. Working in close collaboration with the RCPRP-PLUS staff.
LDCF Project Clerk	200	48	Provide admin support to ensure the smooth operation of the LDCF activities
LDCF Project driver	250	48	Drive project vehicle to facilitate smooth operation of LDCF component
Justification for Travel, if any: Travel in project area for Project Officer (including from and to Freetown).			
For Technical Assistance			
Local			
Agronomist / extension	5042	14	Promotion of climate resilient crops in IVS
Irrigation engineer	5042	12	Co-ordinate and advise farmers in the development of 30 solar-powered irrigation schemes (Outcome 2.2.1)
Drainage engineer	5042	9	Advise and assist farmers to improve drainage at 6 sites at increased risk of flooding due to climate change (Outcome 2.2.2)
Capacity building on adaptation	5042	13	Training trainers in capacity building on adaptation (Outcome 3.3.1)
Capacity building on adaptation to CC for local radio stations	6000	6	Training trainers in capacity building for local radio stations (Outcome 3.3.1)
International			
Meteorologist	9050	4	To oversee setting-up of automatic weather stations and rain gauges – and undertake in-service training for local staff (Sub-component 3.2)
SLWM planning	9050	4	Advise, facilitate with farmers and undertake in-service training of staff on ecosystem-based adaptation in the uplands (Component 2)
Mapping Expert	9020	5	Co-ordinate and facilitate vulnerability mapping with farmers in the field and add information to GIS (Outcome 1.1.2)
Climate resilience in IVS	8500	5	Advise and facilitate with farmers and provide technical inputs to implement and monitor project activities for promoting climate resilience (rice production systems in particular) in the IVS.
Justification for Travel, if any: Extensive travel in project area for local consultant (including from and to Freetown). International travel for both international consultants (2 visits for SLWM consultant), local travel around project districts for SLWM consultant and across whole country for Met. consultant. Equipment is limited to one vehicle. The vehicle will be used to provide the additional need for logistics to assist the LDCF team in reaching and coordinating the project activities across the 4 districts.			

ANNEX D: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS

A. EXPLAIN IF THE PPG OBJECTIVE HAS BEEN ACHIEVED THROUGH THE PPG ACTIVITIES UNDERTAKEN.

The objective of the Project Preparatory Grant was to develop a high-quality proposal, in coordination with the Government of Sierra Leone and other stakeholders, the activities required (document review, completion of technical studies, field work and farmer consultations) and providing the necessary inputs and support to formulate the project. The Project Formulation Team Leader led a team of 6 local consultants on two missions to the country (including intensive field work), focusing on the project districts and undertaking participatory meetings with farmers to verify the main issues and acceptable activities. Visits were also made to the SLARI rice research station & HQ, relevant Ministries, other donors, NGOs and most of the potential sites for meteorological stations. The objective has therefore been achieved and a technical proposal which addresses the identified priority issues prepared.

The objectives of the PPG have been achieved in a very cost-effective manner. The PPG consultations with all stakeholders were intensive and positive and the final version of the document was shared with the national stakeholders prior to this submission.

One major change, between the PIF and the Project Document / Request for CEO Endorsement has been that the co-financing project has changed from the proposed IFAD-supported RADEP, as this project is no longer to go ahead. Instead, the LDCF will be co-financed by the recently approved extension of the current IFAD RCPRP – the RCPRP-PLUS. However, this has been a positive change. In fact the new baseline project was designed at the same time of the implementation of the PPG – this had offered a good opportunity to harmonize both designs and to ensure the additionally nature of the LDCF operation. Higher co-financing is now available to support this LDCF project and the risk of institutional vacuum is mitigated as the RCPRP-PLUS and the LDCF component will run simultaneously. The initial PIF objectives, components and scope have not changed. The document is full aligned with the NAPA priorities.

B. DESCRIBE FINDINGS THAT MIGHT AFFECT THE PROJECT DESIGN OR ANY CONCERNS ON PROJECT IMPLEMENTATION, IF ANY.

Component 3 of the project involves the installation of automatic weather stations on plots of ground at 15 sites in Sierra Leone. In most cases, this will involve the re-establishment of sites used as meteorological stations, which were destroyed in the rebel war. The Project Formulation Team Leader received verbal assurance that this land will be provided by Government, at no cost to the project. The project will not pay for land purchasing to install the weather stations – land will be part of the government contributions.

The project design was finalized without any other major concerns. At this stage there are no findings or indications that may affect the project implementation.

**C. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES AND THEIR
IMPLEMENTATION STATUS IN THE TABLE BELOW:**

<i>Project Preparation Activities Approved</i>	<i>Implementation status</i>	<i>Amount Approved</i>	<i>Amount Spent To- date</i>	<i>Amount Committed</i>	<i>Uncommitte d Amount*</i>	<i>Co-financing</i>
Technical assessment of climate change impact on current agricultural production system in SL. Particular focus on rice production and food security.	Completed	57,094	45,961	3,875	7,258	24,028
Climate Change vulnerability assessment of existing farming and irrigation systems.	Completed	12,493	11,190	0	1,303	9,700
Capacity building and awareness needs.	Completed	5,600	5,066	0	534	9,000
Assessment of climate monitoring needs.	Completed	13,613	13,593	0	20	10,000
Planning and designing M&E systems.	Completed	5,600	5,436	0	164	9,200
Economic and financial analysis	Completed	3,600	3,424	0	176	7,500
Contingencies	Completed	2,000	0	0	2,000	2,700
Stakeholder consultations	Completed	0	0	0	0	15,000
PPG management	Ongoing	0	0	0	0	22,700
Total		100000	84670	3875	11455	109,828

* Uncommitted amount of \$ 11,455 should be returned to the LDCF Trust Fund. This will be done as soon as the last commitment is expensed.

Annex E. Additionality of the LDCF Component and Complementarities between the RCPRP-PLUS and the LDCF Component.

LDCF Component	Cost Category	Expected outcomes	"Additionality"	Adaptation Benefits
Component 1: Sustainable Development of climate resilient inland Valley	Baseline	Corresponding activities from the baseline will provide support to smallholder farmers to access irrigation, technical skills and access to markets. It will support agricultural development and commercialization. RCPEP-PLUS will promote inland valley swamps. The project will also support the installation of 80 boreholes for irrigation of non-perennial IVS. The baseline will also support young farmers in obtaining long-term leases for rice and tree crop productions. Feeder roads and trunk roads will be rehabilitated and maintained. Rice mills and oil mills will be installed	Costs associated with "climate-proofing" of production systems in the IVS will be additional. Furthermore, the mapping exercise that will ensure better integration of climate aspects in the overall GIS/MIS system of the baseline will add/mainstream the CC aspects into the development aspects. Promotion of pilot productions systems that could catalyze resilient cropping patterns is considered as an additional measure to increase resilience. LDCF will not support training for irrigation and drainage (This is taken by the baseline) – The LDCF will cover physical investment in climate risky area where support to irrigation and drainage is key to face climate change impacts.	<ul style="list-style-type: none"> - Promotion of resilient cropping patters - Food security - Integration of climate change adaptation in monitoring and information management systems - Resilient IVS (NAPA priority)

LDCF Component	Cost Category	Expected outcomes	"Additionality"	Adaptation Benefits
	LDCF	<p>The LDCF funding will support the baseline effort by incorporating a participatory mapping of the vulnerability of rice production areas to climate change. This will be integrated in the MIS/GIS of the RCPRP-PLUS and will be used for decision making process. The project will support 120 farms to design and integrate resilient cropping system on a pilot basis. It will also disseminate Agricultural Met data to help decision-makers integrate the climate factors in decisions regarding planning and cropping in the project area. The LDCF project will further support the collection of such data through component 3.</p> <p>The LDCF funding will provide support to irrigation through investment in solar powered irrigation schemes (the LDCF funding will not cover training on irrigation as this is covered by the RCPRP-PLUS). Support to drainage systems will be limited to drainage works in climate risky areas only. The LDCF funding will target 6 climate risky drainage areas.</p>		

LDCF Component	Cost Category	Expected outcomes	"Additionality"	Adaptation Benefits
Component 2: Integrated water and NRM for adaptation	Baseline	The RCPRP-PLUS will support smallholder tree cop plantations and training farmers through the FFLS on the best management practices. Feeder roads and trunk roads will be rehabilitated and maintained. Rice mills and oil mills will be installed. The baseline will support the establishment of Agricultural Business Centers (ABCs) and promotion of local initiative through the Community Development Fund. This will entail the promotion of 106 micro-projects.	The RCPRP-PLUS covers the investment requirements to promote business models for smallholder tree crop plantations and the promotion of ABC. The LDCF will bring the adaptation additional element by improving the resilience of these efforts and business models. The LDCF will be additional in the fashion it targets slash and burn and NRM at large trying to target win-win-win options that ensure sustainability, increased income and better adaptation to climate change. This is typically reflected in the NWFPs activity that aims at reducing slash and burn, increase income and uses IGAs as an adaptation manner. This win-win-win adaptation solution is fully integrated in the development efforts of the RCPRP-PLUS through the CDF.	<ul style="list-style-type: none"> - Climate-proofing of farming practices in the uplands and promotion of sustainable land and water management as well as income generating activities for adaptation. - Adaptation benefits will accrue from diversification and better use and management of NRM - Improved local capacity and community based planning for adaptation will bring additional adaptation benefits in short and long runs.

LDCF Component	Cost Category	Expected outcomes	"Additionality"	Adaptation Benefits
	LDCF	<p>To increase resilience of ecosystems and livelihoods, the project will support natural resource management. LDCF funding will target the uplands by promoting water harvesting (harvesting sheds, roof water collection and small water storage facilities). In terms of sustainable practices, the LDCF will cover a pilot of 60 SLM demonstration plots that will complement the efforts of the RCPEP-PLUS (in its efforts to promote tree crop plantation in particular). The 60 SLM plots will demonstrate co-benefits in terms of adaptation and sustainable management of land (i.e. conservation agriculture, soil and water conservation etc). The LDCF funding will complement the efforts of the RCPRP-PLUS by adding an adaptation dimension in the CDF through the promotion of NWFPs as income generating activities (to both increase income and reduce slash and burn practices in the uplands). This adds an important adaptation dimension to the development scenario.</p>		

LDCF Component	Cost Category	Expected outcomes	"Additionality"	Adaptation Benefits
Component 3: Capacity building and awareness raising for climate change adaptation at institutional and local levels	Baseline	RCPRP-PLUS will provide support to local communities and rural poor to increase their level of participation in the management of local decentralized institutions. Strengthening the local institutions (logistics to local councils, training of LC personnel on management, financial, accounting and M&E skills). It will promote the establishment of a coordination mechanism and database on development interventions. 50 WDC offices and 530 bikes will be provided to WDC members and all WDCs will be trained. The baseline will train and recruit MAFFS personnel relevant for project activities. Training and coaching will be also provided to ABCs and agribusinesses support.	<ul style="list-style-type: none"> - Targeted capacity building efforts to mainstream climate change adaptation for food security in the extension work as well as in the planning and decision making processes - Additional CC adaptation awareness raising and sensitization campaigns at the grassroots level (through participatory approach and community engagement using the rural radio and other innovative tools) - Technical capacity building for Met department and MAFFS staff on agro-metrology and integration of climatic variables in the decision making processes (in relation to cropping and food security) is an additional investment that will not be covered by the baseline. 	<ul style="list-style-type: none"> - Re-establishing the country's capacity to generate and use accurate agro-metrological data - Awareness of climate change and its impacts at all levels (government officials, extension services and local communities) - Ability to plan and integrate climate change adaptation measures in local planning - Strengthening the decision-making process at the local level to integrate climate change considerations.

LDCF Component	Cost Category	Expected outcomes	"Additionality"	Adaptation Benefits
	LDCF	<p>The LDCF will provide training to local rice producers on best adaptation practices. This will entail support to field extension workers (they will be trained through the LDCF on how to integrate and deal with climate change adaptation in terms of planning and implementation/monitoring). The LDCF operation will train 16 persons over 4 years. LDCF will cover training sessions through the VDCs on community based adaptation (including the development of 40 management plans integrating adaptation measures). It will develop 8 community forestry plans through the VDCs and raise awareness on the slash and burn practices and their impacts on communities' ability to cope with the increasing impacts of climate change. LDCF will also provide support to capacity building activities on adaptation to CC for local communities and radio stations and promote the CC awareness raising efforts at the grassroots level (Radio campaigns, musical-based tools etc)</p> <p>The Project will provide advanced training for two meteorologists and 6 meteorological technicians on agro-climatology and management of weather stations. Also the LDCF funding will cover the cost of training of 24 Met Department and MAFFs staff on agro-climatology aspects. The LDCF will establish 15 automatic weather stations and needed equipments to improve the country's ability to record climate/met data.</p>		
Component 4: Project Management and M&E	Baseline	<p>The baseline will cover the establishment of the NPCU and the DPCUs. It will be responsible for the overall program coordination and implementation (including logistical support). The main M&E function will be undertaken through the establishment of an M&E system (entailing a GIS and a MIS)</p>	Integrating climate aspects in the overall project management and monitoring.	<ul style="list-style-type: none"> - Make the baseline intervention climate smart - Decision-making processes (at all level) in based on accurate data and integrates climate change elements.