United Nations Development Programme

Country: Liberia

PROJECT DOCUMENT[1]

Project Title:	Enhancing Resilience to Climate Change by Mainstreaming Adaption Concerns into Agricultural Sector Development in Liberia
UNDAF Outcome(s):	**Outcome 2:** Equitable socio-economic development

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: ***Sustainable Rural Development (at national/sub-national/community level)*** (Governance systems internalize they long-term sustainability of rural production into their core institutional systems)

UNDP Strategic Plan Secondary Outcome: ***Ecosystem-based adaptation***(Governance systems internalize the long-term sustainability of land based ecosystems good and services, including climate change mitigation and adaptation, into their core institutional systems)

Expected CP Outcome(s):

CP Pillar 1: Pro-poor economic development:

Component: Sustainable local economic recovery

Community-based recovery and development including food-security

Sustainable management of environment

Expected CPAP Output (s)

Output 9.1: Access to basic infrastructure facilities and sustainable livelihoods improved

Output 10.1: Climate change and renewable energy policies appropriate to Liberia developed and implementation begun

Output 10.2: Local capacities for environment and natural resources management strengthened through technical, logistic and policy support to national environment/NRM, biodiversity and land management institutions and initiatives

Output 10.3: Institutions and legal systems capacities for disaster risk management developed

Executing Entity/Implementing Partner: Ministry of Agriculture (MOA)

Implementing Entity/Responsible Partners: UNDP

[1] For UNDP-supported GEF-funded projects as this includes GEF-specific requirements

Brief Description:

According to current climatic variability and predicted climate change scenarios for Liberia, agriculture and farming are expected to be significantly undermined by: 1) rainfall patterns changes, shorter and more intensive rainy seasons and temperatures increases resulting in difficulties to identify the optimal time for crop planting, more pests, weeds, animal diseases; 2) reduction of soil moisture; 3) increase of flooding and salinity in coastal regions. As a result, the forecasted climate change may undermine national efforts to revitalize the agriculture sector and to increase food production. This is a direct threat to agricultural production and food security, and in turn a threat to development, peace and stability. In order to respond to these threats the Liberian NAPA has identified, as urgent priority interventions, to enhance resilience to increasing rainfall variability through the diversification of crop cultivation and small ruminants rearing; modifying the timing of crop cultivation in response to changing rainfall patterns; intercropping, irrigation and optimization of lowland/swamp farming practices; pest control, including fencing of farms against rodents, bird scare scrolls, regular weeding, and the use of echoing bells; and, maintaining fast growing nitrogen fixing tree species to improve soil fertility and using multiple-purpose tree species on farmlands to maintain forest cover.

However, the widespread introduction and adoption of the strategies to adapt to climate change, faces a series of barriers, including: insufficient knowledge and awareness amongst decision-makers and planners; the current agriculture policies have not taken climate change into account; low capacity of technical staff and extension agents; the lack of information needed by farmers, on climate change and impacts.

The LDCF Project will address the above barriers, thereby supporting the ongoing process to revitalize the agriculture sector, and ensure that adaptation to climate change is integrated into the revitalization process. Specific contributions toward the reduction of vulnerabilities to climate change will be achieved through the pursuit of specific outcomes including: (a) integrating concerns into relevant policies and planning processes at the state and national levels; (b) comprehensive capacity development for individuals in national agencies focusing on agriculture and in pilot counties, and farmers; (c) demonstration of risk reduction strategies and measures at pilot sites; (d) strengthening technical capacity to integrate climate change risk management into farmer level agricultural capacity; and (e) capturing and disseminating lessons learned to key stakeholders.

Program Period:	2011 - 2015
Atlas Award ID:	00062109
Project ID:	00079407
PIMS #	4439
Start date:	Sept. 2011
End Date	Sept. 2015
Management Arrangements	DEX
PAC Meeting Date	TBF

Total resources required	8,626,522
Total allocated resources:	8,626,522
Regular	2,381,400
• Other:	
○ GEF/LDCF	2,381,400
○ Other	200,000 (Cash, UNDP)
In-kind contributions	6,145,122
○ Government	5,100,000
○ FAO/AEDE	1,045,122

Agreed by (Government):

Date/Month/Year

Agreed by (Executing Entity/Implementing Partner):

Date/Month/Year

Agreed by (UNDP):

Date/Month/Year

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List of acronyms

ACC	Agriculture Coordinator Committee
AEDE	Agency for Economic Development and Empowerment
ASRP	Agriculture Sector Rehabilitation Project
BTOR	Back To Office Report
CARI	Central Agriculture Research Institute
CBOs	Community Based Organizations
CC	Climate Change
CCA	Climate Change Adaptation
CDA	County Development Agendas
CO	Country Office
CP	Country Program
CPA	Comprehensive Peace Agreement
CPAP	Country Program Action Plan
CPD	Country Programme Document
CRM	Climate Risk Management
CUC	Cuttington University College
DDRR	Disarmament, Demobilization, Rehabilitation and Reintegration
DFID	Department For International Development
EC	European Commission
ENSO	El Nino Southern Oscillation
EPA	Environmental Protection Agency
ERBM	Enhanced Results Based Management
ERC	Evaluation Resource Center
ERCC	Enhancing Resilience to Climate Change (project)
FAO	Food Agriculture Organization
FAOSTAT	Food Agriculture Organization – Statistics
FAPS	Food Agriculture Sector Vision
FDA	Forestry Development Authority
FSNTC	Food Security and Nutrition Technical Committee
GDP	Gross Domestic Products
GEF	Global Environmental facility
GHG	Greenhouse Gas
GMS	General Management Support
IDPs	internally displaced people
IPCC	Intergovernmental Panel on Climate Change
ISS	Implementation Support Services
ITCZ	Inter- Tropical Conversion Zone
LASIP	Liberia Agricultural sector Investment program
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LPMC	Liberia Produce Marketing Corporation
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MOA	Ministry of Agriculture
NAPA	National Adaptation Program of Action
NDRMC	National Disaster Risk Management Committee
NGO	Non-governmental Organization
NPRS	National Poverty Reduction Strategy
NTFP	Non Timber Forest Product
PAC	Project Appraisal Committee
PPG	Project Preparation Grants
PRA	Participatory Rural Appraisal
PRS	Poverty Reduction Strategy
RCI	Rubber Corporation of Liberia
RCUs	Regional County Unit
R-PP	Readiness Plan
RTA	Regional Technical Advisor
SBAA	Standard Basic Assistance Agreement
SCCF	Special Climate Change Fund
UNDAF	Nations Development Assistance Framework
UNDP	United nations Development Program

UNFCCC	United Nations Framework Convention on Climate Change
UNMIL	United Nations Military Mission in Liberia
USAID	United State Agency for International Development
USD	United State Dollar

I. Situation analysis

1.1 Context

1. While richly endowed with natural resources, notably iron ore, timber, diamonds and gold, Liberia's political instability and recent civil war caused destruction of livelihoods, infrastructure, productive capacity, migration of skilled manpower and large scale financial outflows. Today, this is a low-income country with a GDP of US$876 million (World Bank, 2009) and a population of nearly four million (World Bank 2009; from 3.5 million in the Demographic Household Survey, 1998). Fifty five to sixty percent of the population is between the ages of 15-35. In 2007, 63.8% of people were under the national poverty line of US$1 per day. Annual population growth is estimated at about 2.5%. Per capita income is around US$167 (2008 est.).Doubling this within ten years would require an average annual growth rate of close to 10% per annum. Therefore, rapid economic growth is a high priority for the government.

Figure 1. Map of Liberia, and location in Africa

2. During Liberia's 14-year civil war, 800,000 Liberians were displaced inside and outside the country and an estimated 270,000 people were killed. Thousands of women were sexually abused and the fabric of society was greatly undermined. Destruction to the nation's infrastructure and economy was immense. Efforts since the Comprehensive Peace Agreement (CPA) of 2003 served well in establishing security and supporting humanitarian interventions, although humanitarian assistance is still required in some areas. The challenges that remain are enormous. Major infrastructure rehabilitation is needed but is proceeding slowly, and economic recovery and livelihood opportunities are only now beginning to reach the population in the interior of the country. The most rudimentary basic social services are still not accessible to the majority of Liberians and poverty and food insecurity are pervasive.

3. More than 100,000 former combatants, of whom 12,000 were children, were disarmed and demobilized in the first phase of the national process of Disarmament, Demobilization, Rehabilitation and Reintegration (DDRR) in 2004. Another 700,000 internally displaced people (IDPs) and refugees have returned, often bringing with them new skills, ideas and expectations. However, there are limited job opportunities, infrastructure and social services in their communities and this presents a risk factor potentially leading to the return of violence.

4. By the end of the civil war in 2003, rule of law, political institutions and administrative agencies were virtually non-existent. The war resulted in extensive destruction of infrastructure (roads, housing,

industry, schools, plantations, etc.), institutions, as well as overexploitation of the country's natural resources and tradable commodities (timber, diamonds and gold). The vast majority of Liberians affected by the war were young people, and many were uprooted, internally displaced refugees or combatants.

5. The urban population comprises 48% (2010) with urbanization growing by 3.4% annually (2010-2015 estimate). This reflects a gender and age bias in which primarily young males migrate out of the countryside in search of wage employment opportunities, leaving an older generation on the land and many female-headed households. Most of the infrastructure and basic social services of Liberia are located in the capital, Monrovia, and other urban centers. The over-concentration of facilities and services in Monrovia, in particular, has led to the under-development of Liberia's rural areas.

6. Prior to the war, agriculture accounted for approximately 40% of GDP. In 2007 the GDP was US$725 million, of which agriculture accounted for 66%. In 2007 Liberia produced 144,000 tons of rice while demand was 322,000 tons, requiring the country to import198,000 tons. With 50% of the country's GDP deriving from agriculture, achieving the objective of doubling per-capita incomes within ten years would require an average annual growth rate of close to 10% per annum.

7. More realistically, the government's growth objective for the agricultural sector is 6%.[2]Agriculture and rural development are therefore central both to economic growth, poverty reduction and food security in Liberia. Strong and sustained growth in agriculture is particularly important since it can create employment for many low-skilled people, is a major engine of the rural and overall economy through its multiplier effects and because productivity gains in agriculture provide the foundation for successfully shifting workers to manufacturing and services.

8. Strong agricultural growth is achievable during the early stages of a country's reconstruction efforts, supported by the resettlement of displaced populations and the quick recovery of depressed agricultural production, in particular food crops. Experience in other post-conflict countries indicates that agricultural growth is a major factor in early economic recovery, reaching 4% two years after the end of conflict and accelerating to an average of nearly 8% in years three through five after the crisis, before settling down to about 4% in years 6 through 10, which is a more typical long-run growth rate for agriculture in most developing countries. The success and sustainability of Liberia's economic recovery require the full engagement of all key players in the rural economy – especially women. Women comprise over half of the agricultural labor force, the sector that employs most of the population, predominantly in smallholder agriculture, and about two-thirds of the labor force in trade and commerce.

9. According to the Liberia Agriculture Sector Investment Program, public financing of agriculture has fallen significantly short of government's stated commitment to developing the sector, and the budget share of the sector reached 2%only in the fiscal year 2006/2007. The Maputo Declaration, to which the government committed itself, implies a government commitment to a 10% budget target for agriculture: a sector that generated 176,326 jobs, 60% of employment in the formal sector in 2008, representing 60% of the GDP for that year[3]

1.1.1. Environment

10. Liberia is the only country in West Africa that lies completely within the moist forest zone of upper Guinea, a global biodiversity hotspot under intense pressure from current and historic land use practices. It is located on the Atlantic coast at latitudes of 4°C to 8°C. The south has an equatorial climate, experiencing rainfall throughout the year, but the northern regions are influenced by the West African Monsoon. Monthly rainfall in coastal Liberia in the wet season can exceed 1000mm. In the dry season, the dominant wind direction is reversed and the dry and dusty 'Harmattan' winds blow from the Sahara desert.

[2] From Liberia Agricultural sector Investment Program (LASIP) 2009.

[3] Same, annex Tables 2 and 3.

11. Originally completely forested, Liberia has only 50% of the original forest remaining and much of that is highly degraded with high value timber and wildlife cleared from the remaining forest (according to the figures of the national Forestry Development Authority, FDA). Less than 5% of the country is projected to be protected and effective protection of current parks is limited or non-existent. Other studies estimate that only 25% of the country still has broadleaved evergreen tree cover.[4]

12. In the past century Liberia developed an extensive export sector based on quality hardwoods and tree crops (cocoa, coffee, palm oil, bananas and rubber) of which rubber was by far the most important. According to FAOSTAT, 2% of the land area was in tree crop production in 2007, half of which was rubber. Much of the area under rubber has been abandoned and the government has plans to replace these with oil palm.

13. The country is rich in minerals including iron ore, diamonds and gold. Both gold and diamonds have historically been opencast mined or extracted from alluvial river beds with great environmental damage and these small-scale operations have lent themselves to the famous 'blood diamond' trade that was used to finance both the internal conflict as well as neighboring wars. The Liberian development model has been based upon the exploitation of its rich natural resources, particularly timber and minerals. The privatization of these resources by those able to capture the state apparatus has played a significant role in the conflicts of the region. The lack of government control of a resource such as diamonds has undermined national development. This privatization of a natural resource through control of the state reached its height during the Charles Taylor regime when the UN applied sanctions on the Liberian diamond trade, accusing the then president of using diamonds to finance conflicts in neighboring Sierra Leone.

14. Although endowed with abundant and diverse natural resources, Liberia has become susceptible to the adverse effects of global climate change with temperature increases and an increasingly erratic rainfall pattern, while floods or crop failures are already being experienced (NAPA). Dealing with such impacts requires measures that would minimize losses and take advantage of the opportunities presented – referred to as adaptation. Effective adaptation however, should be built upon and sustained by existing livelihoods and thus take into account existing knowledge and coping strategies at community levels.

15. The agro-ecosystem of Liberia contains four major zones: (1) the coastal plains, (2) the hilly zone, (3) mountains and plateau zones, and (4) the northern highland zone. Thirty percent of the land area is arable, while 2.5% is pastureland. Most of the upland soils are lateritic, acidic, infertile, and low in humus. The swamp is comparatively better in nutrients and humus; they are, however, waterlogged from May to October. The agricultural biodiversity of the nation historically encompassed a rich fauna and flora population which is characterized by domesticated plants (rice, for example) and animal species, soil micro-organisms, pollinators, pests, wild relatives of domesticated crops and animals, as well as plant and animal genetic materials including varieties, hybrids, and different types of germoplasm.

16. To date the dominant land-use practice remains slash and burn, the standard method used to open up the forest and plant and harvest a variety of crops on the same land. Sloping areas are looked for to ensure good drainage during heavy rains. This system is efficient when the land to people ratio is in favor of the land as the nutrients released from the burning provide instant inputs for the crops. Unfortunately after three seasons the land has lost all its nutrients and new land has to be found and cleared, and as populations grow, new ways of multi-cropping have to be found, ways that enable farmers to end slash and burn and migratory agriculture. This transition in the humid tropics is not easy and systems have to be adopted that mimic the original eco-system; they exist and are highly relevant to Liberia in the construction of climate change resilient farming systems.

17. The other land-use system that dominates many areas is plantation, especially rubber. This agro-industry was severely damaged by the armed conflict and is under reconstruction, especially the area

[4] See page 11 of Assessing the Vulnerability of Agriculture to Climate Change in Liberia.

influenced by Firestone. A majority of the plantations outside this region have deteriorated greatly due to so many years of neglect, and the government proposes to replace many areas with palm oil. However, that requires a high level of upfront investment. As capital is not available in the country, negotiations are underway with external investors. A new land-use strategy that is being prioritized by the government is the production of rice in the 'low lying' areas between the forests. These fill with water during the rainy season, forming swamps that lend themselves to paddy rice.

18. Recent quality information on the state of the environment is scarce and funds to carry out a forestry inventory are an urgent requirement if the country is to benefit from REDD. There is a high level of landscape degradation, especially around urban areas such as Monrovia. The soils of Liberia are nutrient poor and the removal of even a few components of the original forest can lead to its degradation. With its inheritance of willful ignorance of the viability of forest management systems, starting with the traditional ones, subsequent war and associated extraction of its most lucrative elements, the promotion of plantation systems and a scarcity of trained manpower, Liberia faces a great challenge if it is to turn around current non sustainable land-use practices, practices that leave it even more vulnerable to increased climatic instability.

1.1.2. Policy

The hierarchy of relevant policies is:

19. **The Poverty Reduction Strategy (PRS)**: is the present development agenda (2008–2011) and sets the overarching framework for all sector and cross-sector strategies of the Government of Liberia. The PRS will end soon, and the project may need to realign with a new PRS under a new government term – after elections later in 2011.

20. The four 'pillars' of the PRS are (i) Security, (ii) Economic Revitalization, (iii) Governance and Rule of Law, and (iv) Infrastructure and Basic Services. The PRIS outlines various strategies for the development of water, agriculture and energy, in collaboration with its many development partners. The central goal for agriculture during the PRS period is to revitalize the agricultural sector in order to contribute to inclusive and sustainable economic development and growth, and to provide food security and nutrition, and employment. In this regard, the government has earmarked three strategic objectives:

- More competitive, efficient and sustainable food and agriculture value chains and linkages to market;
- Strive to improve food security and nutrition, especially for vulnerable groups, including lactating women and children under five and
- Strengthen human and institutional capacity. Capacity-building is a key component in the PRS.

21. **County Development Agendas (CDA):** the local complement to the national PRS that is prepared through a series of District Development Consultation Meetings that utilized the Participatory Rural Appraisal (PRA) method. In this process, citizens identified the critical interventions in their own counties that are needed to move toward realizing the MDGs. CDAs list the specific projects identified for action at the District level (the administrative unit below counties).

22. **United Nations Development Assistance Framework (UNDAF):** Reflecting the PRS and the internationally-agreed Millennium Development Goals, Liberia and the United Nations system have embarked on their first UNDAF (2008-2012). The UNDAF emphasizes rapid acceleration of the pace of economic growth as the foundation for Liberia's poverty reduction and sustained development. It also promotes growth in the early years of recovery in an equitable and inclusive way, creating equal opportunities for all Liberians regardless of origin, ethnicity and gender or social/family background. It highlights that gender inequality in Liberia represents a major obstacle to poverty reduction and is a key constraint in sustainable economic growth. UNDAF also emphasizes the need for explicit strategies to ensure the inclusion of youth, who represent the majority of the population.

23. **The UNDP Country Program Action Plan (CPAP):**Addressing UNDAF Pillar 2 on equitable socio-economic development, the country program has one pillar on pro-poor economic development.

Programs on promoting food security and long-term environmental sustainability are being implemented under this pillar. Implementing community as well as policy level support programs are the key approaches to the delivery of the CPAP, and addressing climate change risks in the context of the CPAP are seen as critical for long-term sustainability. Building climate change resilience in sectors relevant to pro-poor economic development, including for food security and agriculture, are key strategies addressed by UNDP Liberia.

24. **The Food and Agriculture Sector Vision (FAPS) and Investment Program (LASIP):** The integrated policy document (FAPS) elaborates from the PRS with specific policies and strategies that will revitalize and strengthen the agriculture sector, of which water and energy are integral components. The priority investment projects identified by LASIP reflect an aligning of national objectives within the strategic framework developed by African leaders through CAADP, which aims to restore agricultural growth, develop rural economies and enhance food security. The three national priority areas identified through LASIP are: food and nutrition security; promotion of competitive value chains and market linkages and institutional development. This document talks of risk management but nowhere does it deal with the implications of climate change.

25. **National Adaptation Program of Action:** Liberia has prepared a NAPA targeting *Vulnerable Groups in Urgent Need of Adaptation Activities*, among those whose livelihoods consist of farming. Major adaptation activities and needs that were identified during stakeholder consultations for the NAPA are:

- Carrying out the timing of crop cultivation in response to changing patterns of rainfall;
- Intercropping, irrigation, and the optimization of lowland/swamp farming practices;
- Pest control including fencing of farms against rodents, bird scare scrolls, regular weeding, and the use of high echoing bells and
- Maintaining fast growing nitrogen fixing tree species to improve soil fertility and using multiple-purpose tree species on farmlands to maintain forest cover.

26. There is limited national scope for mitigation**: Liberia is a REDD country**. The Government of Liberia is now developing a **Readiness Plan (R-PP)** and is currently undergoing consultation to develop a list of priority issues that should be addressed in the R-PP. Though the REDD program is intended to help reduce deforestation and degradation as well as carbon emissions, the role of the forest and its various products for the livelihoods of the rural population is not well understood or addressed by agencies external to the community. This implies that, to be meaningful, the reduction of carbon emissions has to be based on a deliberate pro-poor development strategy.

1.1.3. Institutional Context

27. In general, institutional capacity remains extremely weak. Most government institutions became dysfunctional during the war because of lack of qualified staff, lack of resources and lack of financing. The condition of these institutions was further exacerbated by high levels of corruption. In the post-war period, difficulty in attracting professionals, progressive reduction of donor funding, lack of clear mandates and, to some degree, a weakly shared national vision constrain performance. A very weak judicial system lacks the capacity to adjudicate matters in a timely manner.

28. Weak property rights, poverty and insecurity create conditions for unsustainable exploitation of natural resources. Diverse land tenure systems cause disputes and constrain investments in agriculture such as soil conservation methods. Central to the war was conflict over land and natural resource rights. In public consultations on the PRS (i.e., in the post-war period), Liberians cited land and property disputes as major causes of conflicts. While key sector reforms have been introduced in the post-conflict period, there is still more work to be done with respect to land policy reform, land dispute resolution, legal recognition of customary rights and the promotion of community forestry development. Land disputes continue to make up the majority of cases in statutory courts (USAID). A land commission is currently preparing a strategy document for the government in which, for the first time in Liberia, customary land use rights are to be recognized as well as those of women. The number of outstanding issues that have to be resolved and the potential conflicts arising from current investment strategies makes the work of

this commission important and its policy recommendations need to be followed through as soon as possible, so that land conflicts can have a framework for resolution that recognizes historical rights and uses.

29. Over the years the Ministry of Agriculture has promoted swamp rice cultivation in order to ensure self sufficiency in rice production. The Ministry, in a bid to develop more technical capacities, is in the process of reestablishing the Central Agriculture Research Institute (CARI) in Bong County to cater to the need to improve agricultural yields. However, CARI, was severely damaged by the war, and is yet to be rehabilitated due to financial constraints. Training is, therefore, at somewhat of a standstill. Another important program being implemented by the Ministry of Agriculture is paddy rice production. The program aims to provide farmers with skills in paddy rice production to engender higher yields and reduce rice imports.

30. The Ministry of Lands, Mines and Energy is responsible for land management and the environment. It houses a national database, which is shared with the Ministry of Agriculture and the Forestry Development Authority to measure progress in desertification and drought matters[5].

1.1.4. Decentralization, Local Government, and Forms of Social Capital

31. Administratively, Liberia is divided into fifteen counties, which are subdivided into districts run by Chiefdoms and clan systems. The most important local level organizational entity is the Chiefdom, headed by a Paramount Chief, who is the traditional leader of the people. The Paramount Chief is elected by a chiefdom council and is normally appointed for life, receives a government salary and has authority to enforce laws. The Office of the Paramount Chief is an intersection between traditional society and the modern form of government. The Chiefs are the custodians of the community's land. The political and financial decentralized system of government that existed at independence was progressively dismantled, culminating in a highly centralized regime that did away with local government. The concentration of power and resources in Monrovia, the capital of the country, disenfranchised and deprived the rural population of infrastructure, education and health care, while taxing them through overvalued exchange rates and the state marketing board. To devolve power, government is committed to the formulation of a new local governance framework.

32. A decentralized system of local government is being established with re-oriented roles and responsibilities. The aim is to make these systems more responsive to Liberia's present situation. The new local government arrangements is currently in place and is clarifying powers to be devolved to the County Councils and fiscal arrangements between County Councils, Town Councils and Chiefdoms, and Central Government. The Chiefdom and village administration have a mandate to maintain law and order and to collect taxes in the Chiefdom. Their consent is fundamental for any development activities to succeed. They have proven particularly useful where coordination and mobilization is required at the Chiefdom level, for example in infrastructural development (roads, wells, stores) and in confirming the local residence of potential beneficiaries.

33. The composition of Chiefdoms – especially in terms of gender imbalance – is notably inappropriate for implementing development activities of a social or technical nature. Women's representation in the chiefdom council is limited but by no means prohibited. Although gender imbalances are gradually changing, women remain virtually invisible in chiefdom and higher-level decision making bodies.

34. Chiefdom and Village Development Committees (CDCs and VDCs) are a continuation of the older Chiefdom Committees, which oversaw development needs and activities and were dismantled during the centralization process. In some communities, new committees were formed with civil leaders instead of the earlier government/traditional chieftain administration. Such civil leaders could be a local teacher, nurse, midwife, retired government worker, field extension workers, church leader etc. NGOs have, in

[5] NCSA Liberia.

some districts, actively encouraged the establishment and training of these community development committees at the chiefdom and village level. Their role is to mobilize local resources and labor for self-help activities that have a common interest e.g. maintenance of physical infrastructure, and the establishment of a health centre. Within the agricultural sector, CDCs and VDCs have largely played the role of identifying the location of common infrastructure such as roads, bridge, stores, as well as to mobilize local resources in their establishment and maintenance.

35. Community Based Organizations (CBOs) are grassroots organizations composed of local members and leadership (in the Liberian context, farmers' associations and cooperatives are, apparently, not considered as CBOs). CBOs perform activities similar to those of NGOs, but with more limited objectives and mandates and in general have a lower capacity to operate development programs. However, they have the advantage of remaining in the community after project assistance comes to an end, thus increasing the social capital of the communities. Their area of operation ranges anywhere from one village to two chiefdoms and they, like NGOs, work in a wide selection of development sectors, including agriculture. CBOs are registered with the different line ministries, depending on the type of technical support they require. Those working in the agricultural sector are registered under MOA.CBOs usually implement development activities at the grassroots level on behalf of NGOs and other supporting partners.

36. Activities of cooperative societies vary and may occur in a number of areas, including savings and credit, cocoa and coffee marketing, fishing, rice marketing and cassava marketing. The savings and credit societies operate on a system where members save small amounts on a regular basis and when the group savings reach a certain level, small loans are made to members. Formally, farmers' cooperatives are a separate movement from the farmers' associations. In practice however, the two seem intertwined, with clusters of farmer groups and associations, and in particular women farmer groups and associations, forming district level cooperatives.

1.2 Threats and root causes

1.2.1. Climate change context

37. The climate of Liberia can be summarized as follows[6]; annual rainfall is approximately 1,700mm in the north and in excess of 4500mm in the south and along the coast. It falls mainly between May and November (80-95% of the total annually level). The rainfall season is largely controlled by the movement of the tropical rain belt also known as the Inter-Tropical Conversion Zone (ITCZ) which oscillates between the northern and southern tropics over the course of the year. When the ITCZ, is in its northern position, the dominant wind direction in regions south of the ITCZ is south-westerly, blowing moist air from the Atlantic onto the continent. This pattern is referred to as the West African Monsoon, and causes exceptionally high rainfall on the coastline of West Africa during the wet season. During the winter, the dominant wind direction is reversed, the dry and dusty Harmattan winds blow from the Sahara desert. The southern most parts of Liberia, closest to the equator, receive rainfall throughout the year.

38. The seasonal rainfall across Liberia varies considerably on inter-annual and inter-decadal time scales, due to the impact of the variations in the movement and intensity of the ITCZ, and also the variation in the El Niño Southern Oscillation (ENSO). El Niño events are associated with drier conditions in West Africa.

39. The wet season in Liberia is more active than the dry season. It is characterized by monsoon, squall lines, African waves, cumulus convection and other local influences. Climate variations during this period are also due to the low and high level easterly jet streams, as well as the intensity of the Hadley meridional circulation (Krishnamurti, 1979). The displacement of the Hadley Cell is closely related to the sun's north-south movement with regards to the equator, while the low and high level jet streams are associated with the position of the bar clinic (Kpaeyeh, 1984). These factors contribute to the

[6] UNDP Climate Change Country Profiles (http://country profiles.geog.ox.ac.uk)

displacement and intensity of the ITCZ over Liberia. The characteristic changes in the ITCZ induce significant changes in the climate; however, the quantitative details of these systems are not known.

40. Mean annual temperature has increased by 0.8^0from1960–2003[7], and at an average rate of 0.18^0c per decade. There are insufficient daily data available to determine the trends in daily temperature extremes for all season in Liberia. Available data from satellite, however, indicate that despite the observed increases in mean temperature, there is no significant increase in the frequency of `hot` days. Data do indicate significantly increasing trends in the frequency of hot nights[8].

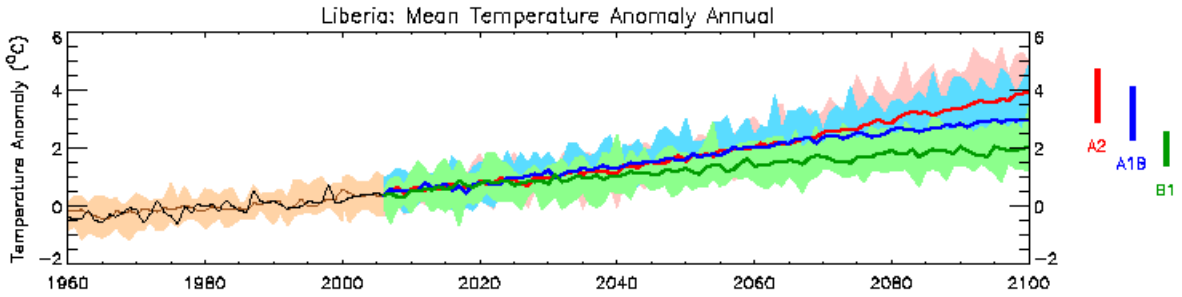

Figure 2: Past and projected mean temperatures for Liberia up to 2011. *Source:* UNDP Climate Change Country Profiles

41. The average number of cold nights per year has decreased by 18 (4.8% of days). This rate of decrease is most rapid in March-April-May (MAM) when the average number of cold MAM nights has decreased by 2.7 nights per month (8.6% of MAM nights) over this period.

42. According to Liberia NAPA[9] and the climate scenario obtained during the design of the first National Communication project, different climatic changes have been expected for the different ecological region of Liberia. In urban and coastal Liberia, warming is expected to range anywhere from an average rate of 0.18^0c to 2^0c (sensitivity of 1.5^0C) by 2100.

43. Temperature

- Annually, projections indicate that 'hot' days will occur on 24-65% of days by the 2060s, and 29-65% of days by the 2090s.Days considered 'hot' by current climate standards for their season may increase most rapidly in JAS, but the range between model projections is large, occurring on 46-99% of days of the season by the 2090s.
- Hot` day or hot night is defined by the temperature exceeded on 10% of days or nights in the current climate of that region and season. Cold days or cold nights are defined as the temperature below which 10% of days or nights are recorded in the current climate of that region or season.
- Nights that are considered hot for the annual climate of 1990-99 are projected to occur on 37-89% of nights by the 2060s and 49-97% of nights by the 2090s.

[7] `Hot` day or hot night is defined by the temperature exceeded on 10% of days or nights in current climate of that region and season. Cold days or `cold` nights are defined as the temperature below which 10% of days or nights are recorded in the current climate of that region or season.

[8] Source: UNDP Climate Change Country Profiles (http://country_profiles.geog.ox.ac.uk)

[9] Liberia National Adaptation Program for Action (NAPA report 2008)

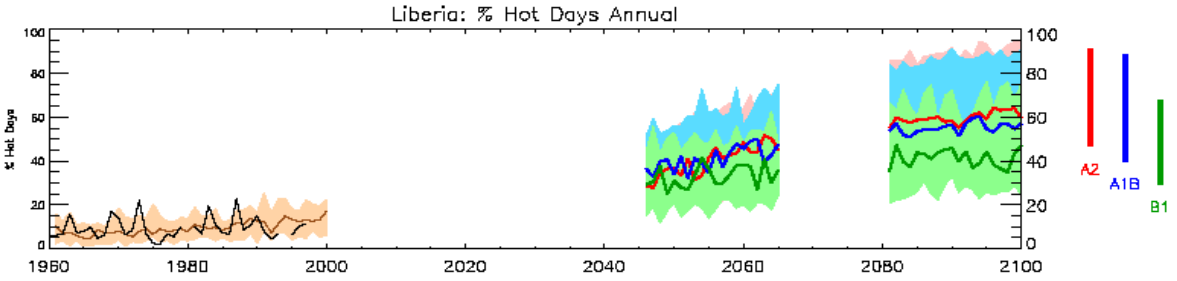

Figure 3: Past and projected percentage of hot days for Liberia up to 2011. *Source:* UNDP Climate Change Country Profiles

44. Precipitation

- Projections of mean annual rainfall averaged over the country from different models in the ensemble project show a wide range of changes in precipitation for Liberia, but tend towards overall increases, particularly in JAS and OND. Rainfall in JAS is projected to change by -15 to + 23% by the 2090s, and +32% in OND.
- The proportion of total annual rainfall that falls in heavy events is projected to increase. Seasonally, this varies between tendencies to decrease in JFM and to increases in JAS and OND.
- 1 and 5 day rainfall maxima in projections all tend towards increases, particularly in JAS. The range of changes in projection from the model ensemble covers both increases and decreases in all seasons.

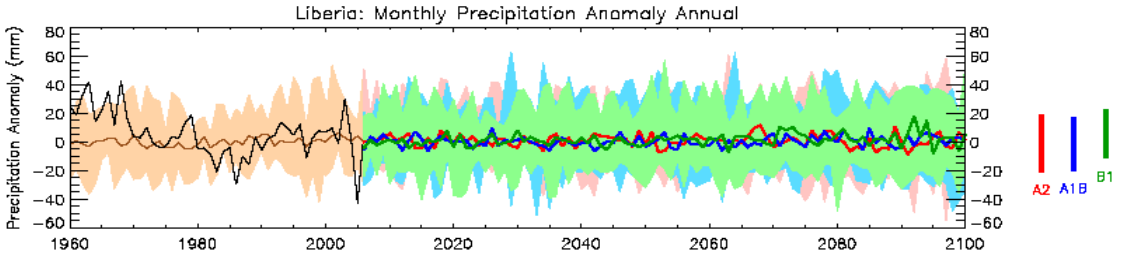

Figure 4: Past and projected monthly precipitation for Liberia up to 2011. *Source:* UNDP Climate Change Country Profiles (http://country_ profiles.geog.ox.ac.uk)

45. Regional Climate Change

- Model simulation of precipitation changes for the Sahelian and Guinea Coast regions of Africa are strongly divergent and most models fail to reproduce realistic inter-annual and inter-decadal rainfall variability in the Sahel in twentieth century simulations. There is insufficient understanding of the processes causing tropical rainfall to allow a prediction of the direction of change with any certainty. IPCC identifies this as an area requiring future research to understand the variety of model responses in this region (Christensen et al, 2007).
- Model simulation shows wide divergence in projected changes in the amplitude of future El Niño events as the West African climate can be strongly influenced by ENSO, thus contributing to uncertainty in climate projections for this region[10].

[10]UNDP Climate change Country Profiles- Liberia (C. McSweeney, M. New and G. Lizcano), School of Geography and Environment, University of Oxford. Tyndall Centre for Climate Change Research.

1.2.2. Future climate projections

46. With regards to temperature, recent trends show that the mean annual temperature across Liberia has increased by 0.8°C between 1960 and 2006, an average rate of 0.18°C per decade. There is insufficient data available to determine recent trends in daily temperature extremes. Available data, however, suggests that the annual average number of 'hot' nights per year in Liberia has increased by 57 (an increase of 15.7%) between 1960 and 2003. There are no officially observed increases in hot day mean temperatures, nor significant increases in the frequency of hot days. There are no reliable national data for rainfall patterns and recent changes. Similar geographical areas in Nigeria have exhibited declining rainfall in recent decades, although figures are not precise.

47. During preparation of the National Adaptation Program of Action (NAPA) and the ongoing First National Communication, several future climate change scenarios were developed using MAGICC/SCENGEN software. Four General Circulation Models (GCM) were examined[11]. The results showed great diversity in the predictions and no firm conclusions can be made. However the preliminary results are consistent with results from other countries and for West Africa in general.

48. The NAPA's preliminary results indicate that average projected rainfall under climate change conditions will sharply increase from baseline conditions. Results of some models show an average rainfall increase of about 684mm/month during the rainy season. Moreover temperatures are expected to rise significantly relative to baseline condition. By 2050 warming ranges from 29°Cto 32°Care forecast during August, and from to 33°C to 43°C during January. Severe heat-waves are suggested by these models. These findings are consistent with findings in neighboring countries.

49. A more practical OXFAM study based on field case studies concludes that Liberia is now experiencing increasing climate-related events such as floods, erratic rainfall, intensive tropical storms, shifts in temperature, reduced soil moisture, heat waves etc. (Topor, 2009). The impacts and losses caused by these occurrences are soaring due to poverty and weak institutional capacities, that leave already vulnerable communities with little ability to prepare for, cope with or recuperate from these natural episodes. The need to respond to these changes is now urgent, as climate change-related hazards are emerging more rapidly than before and are expected to increase as green house gas emission increases globally[12].

50. Climatic risks pose a serious challenge to Liberia's emerging development priorities i.e. in agriculture, forestry, fisheries and public health.

51. In terms of agriculture, major climate-related risks are related to seasonal changes of rainfall and an increase in rainfall during critical moments in the growing season leading to reduced crop yields.. Farmers find it difficult to determine the optimal planting season; traditional crops are threatened by an increasingly unstable rainfall regime which facilitates increased pest and disease problems.. Although in many parts of Liberia, rain-fed farmers have devised numerous kinds of coping strategies to deal with agricultural production in the face of climatic variability, in the light of the changes in climatic patterns in recent decades, many of these strategies are no longer proving to be effective. There are indications that some areas in Liberia may benefit from the changed climatic conditions and could become more suitable for the use of some crops, however, the adaptive capacities of farmers will still need to be strengthened to allow them to adjust.

52. The types of climate change impacts most likely to be felt in the agriculture sector include: Changes in the location of optimal growing areas for given crops, resulting in the shift of cropping zones; changes in crop yields; *changes in the type, location, and intensity of pests and diseases.*

[11] Namely the GISS (Gord and Institution of Space Science) model; Geophysical Fluid Dynamics Laboratory transient (GFDL model); Canadian Climate Centre (CCCM) model; and the UK MET.

[12] See executive summary of the VOSIED study for OXFAM titled 'Climate Adaptations in Liberia; Addressing the needs of Vulnerable Communities'.

53. As a consequence of one or more of the above factors there will be:

- Changes in the mix of crops grown and hence in the type of farming, and rural land use;
- Changes in production, farm income, and rural employment;
- Changes in rural income, contribution to national GDP, and agricultural export earnings.

54. There are still large tracts of forested areas in Liberia, however these are threatened by a combination of unsustainable practices, which are greatly compounded by the climate change challenge. Under more difficult conditions for agricultural production, slash and burn practices will expand and threaten the remaining forest areas.

55. Although not yet conclusive, studies indicate that both the inland and marine fisheries sectors in Liberia are vulnerable to projected climatic changes. Although an increase in precipitation may lead to improved conditions for fisheries development in the future, no specific studies that could reliably indicate risks and potential are currently available.

56. In the health sector, the correlation between projected future temperature and precipitation patterns and malaria, cholera, dysentery, giardiasis, amebiasis and typhoid fever – diseases that afflict thousands throughout the country – has been established. While the NAPA consultation process confirmed that malaria is of highest concern, the other diseases are also seen to play significant roles.

57. The following section expands in some detail on the key vulnerabilities of sectors directly related to this project brief.

1.2.3. The Vulnerability of Liberia

58. There are a number of root causes making Liberia particularly vulnerable to the projected climate change (CC) risks. These include dependency on subsistence agriculture, non climate change proofed land use practices, focus on low-land rice development and vulnerable biodiversity and ecosystem functions and are analyzed in the following:

Dependency on subsistence agriculture, (highly vulnerable to climate change)

59. The country is heavily dependent on subsistence agriculture, with just 15% of the population in formal employment[13]. Agriculture will be affected heavily by CC. Crop livelihoods are closely tied to dependable rainfall. Recent changes in rainfall patterns have increased the vulnerability of farmers as it is becoming increasingly difficult to identify the optimal time to plant crops, thus reducing yields. In particular, the North-west and Central Regions of Liberia have experienced lower cereal crop yields relative to baseline conditions due to reduced soil moisture. Rainfall changes have also resulted in more problems with pests, weeds, and animal diseases.

60. Liberia is a country the size of England, but with an annual Gross National Income equivalent to just US$167 per person. Liberia represents a post-conflict environment, with society recovering from the challenges of a 14-year civil war, and now faced with the potentially devastating effects of climate change. Farmers are aware that the weather is no longer reliable but may not know the causes of this. Government has little capacity relating to climate change; land use planning is incipient, information dissemination is limited and few major planning and public sector investments take account of climate change. More important than the lack of national expertise on climate change, and lack of infrastructure for data collection and monitoring, are the low levels of formal education in a population that is trying to recover what is essentially a subsistence economy after extensive armed conflict. Institutions which collected data prior to the war were destroyed, losing the relevant equipment and data.

61. In many parts of Liberia, rainfall-dependent farmers have devised numerous kinds of coping strategies to deal with agricultural production in the face of climatic variability. With the advent of changes in climatic patterns in recent decades, many of these strategies are no longer proving to be

[13] http://www.state.gov/r/pa/ei/bgn/6618.htm

effective. Subsistence farmers are typically among the least able to cope with climate-related shocks primarily due to a combination of extreme poverty levels and limited household income-generating activities. Changing rainfall patterns will adversely affect urban and rural communities Not only will farming become more difficult, but municipal water supply and electricity production (based on hydro resources) – will be threatened. Ordinary Liberians will also suffer from frequent occurrence of vector and water-borne diseases that will probably increase because of water shortages. Changes will also cause loss of crops and livestock herds. These factors, together with other specific non-climatic factors contribute to increased vulnerability of local communities as climate instability grows. It must be noted that land degradation is prevalent throughout the country – a situation that greatly exacerbates the climate risks.

62. Climate change and agriculture are interrelated processes; if one malfunctions, it has direct consequences for the other. Unusual changes in temperature and rainfall pattern would have negative result on agricultural productivity, affecting livestock, crops and fiber. On the other hand, agriculture has many unexploited possibilities to minimize emission of greenhouse gases (GHGs) through reduced deforestation, better land-use planning and state of the art agricultural practices that do not deplete or damage resources but link production to conservation. Other initiatives include the promotion of farming systems that support diverse production using watershed approaches, cross-community collaboration for resource protection and natural disaster mitigation.

63. Most agricultural production in the project sites is rain-fed. Over 90% of the farmers depend on rainfall to sustain their crops (FAOSTAT), which is unpredictable at best. As climate change makes it more difficult to predict weather patterns and enable crop planning at appropriate times, communities practicing subsistence farming are expected to be at greatest risk. Another concern is soil degradation. Degraded soils cannot adequately capture what little water is available. However, frequent flooding as a result of heavy and erratic precipitation will also affect agricultural production in terms of erosion leading to soil degradation. At the same time, more erratic weather patterns will affect the reliability of water sources for irrigation and livestock. In some communities where flooding is experienced, climate change will also lead to a higher incidence of vector-borne diseases, such as malaria, schistosomiasis and dengue as well as pests affecting production[14].

64. Considering that crop yields depend on soil moisture, transpiration and heat stress, some of the expected climate change impacts include shifts in the land area suitable for agriculture and a decrease in the growing seasons and yield potential. Poverty and its related vulnerabilities will increase due to failure of agricultural activities leading to loss of livelihoods and food shortages. Other vulnerabilities, although not limited to the following, include:

- Water scarcity and inefficient water; less availability and quality of water and food supply will lead to malnutrition, disease, famine and increased mortalities. Children in particular could become malnourished and become more susceptible to illness.
- Reduced livestock production and loss of livestock because of disease and parasites will likely increase.
- Crop damage caused by increased rainfall or unpredictable distribution and intensity of rainfall is anticipated.
- Crop damage and failure will result in lack of seeds for the next planting season, leading to hunger.
- Reduced crop yields due to disease, pests, soil degradation, and lack of water for irrigation will lead to household income losses and greater poverty.
- Education levels could deteriorate for children who may be too ill to attend school, or are needed at home for agricultural labor, to collect water or firewood or care for sick family members.
- Social unrest due to hunger and conflicts over water and other natural resources are likely to increase, leading to increased violence especially against women and other vulnerable people.

[14]PPG report 3:Scoping papers: expected CC risk and impacts on agricultural sector & products.

Current land use, agricultural production and livelihoods systems, with a focus on low-land rice development (not climate change proofed)

65. The total land area in Liberia is 9.8 million ha, of which 4.6 million ha have been classified as arable (46%; FAOSTAT). Liberia has a dual land system of formal and customary land tenure. The formal land law primarily deals with land that is considered private property and is held under a deed system. All other land in the interior is considered public land and largely used by rural inhabitants, mainly under customary land tenure, which is not formally codified. As a consequence, land tenure arrangements have historically worked in favor of the elite and to the disadvantage of marginalized groups. A 2003 law made inheritance of land by women legally the same under the two systems; however the application of the law remains incomplete. The deeds registration system is in disarray, and many records have been scattered, damaged, or destroyed, which creates opportunity for fraud and malpractice in land transactions.

66. The rural farmers of Liberia have a multiple-cropping strategy. Given that historically the Guinean forest has been a rich source of varied foodstuffs from bush meat to herbs, until recently the rural population of Liberia had a diversified natural resource use strategy that historically provided them with a rich and varied diet. More recently these livelihood strategies have been undermined by over exploitation of the forests, widespread promotion of plantation agriculture and 20 years of violence.

67. There is no cadastre and effective and reliable land information system in Liberia. Confusion over boundaries exists due to haphazard surveying and incomplete recording of redistricting over the years. The lack of a unified land registry means that no single record system exists whereby one can verify the accuracy of land titles, tenure rights of respective inhabitants and land boundaries. Lack of security over land tenure limits the propensity to develop or improve land – and encourages unsustainable use of resources.

68. Rice is the preferred grain of Liberia although a greater volume of cassava is consumed. The guinea region is one of the zones of origin of rice so it has been cultivated in Liberia for at least two thousand years. Traditionally rice has been a rain fed crop in a slash and burn cycle with other crops in the forest. Attempts to grow rice in lowland regions using paddy systems in the eighties ended with the descent into violence and reduction of investment in market orientated agriculture.

69. Today rice production covers the most acreage of any agricultural activity, covering 160 thousand ha of Liberia in 2007 (next closest is rubber plantations, at 125 thousand ha; FAOSTAT). The following table shows harvested areas from different production zones.[15]

Table 1. Harvested areas from different production zones in Liberia's counties in 2007.

Production zone	Harvested area (% total harvested area)
Nimba	25.71
Bong	21.39
Lofa	12.47
Grad Bassa	8.50
Cape Mount	5.09

[15]Source for stats and figure is FAO http://www.fao.org/docrep/005/y4347e/y4347e12.htm

Grand Gedeh	4.88
Marghibi	4.81
Bomi	4.11
Sinoe	3.69
Montserrado	3.21
Maryland	2.93
Grand Kru	1.60
Rivercess	1.60

70. Upland rice is grown as a mono-crop or mixed with other food crops using slash-and-burn shifting cultivation methods and with little or no application of chemical fertilizer and other agro-chemicals. Upland rice requires shifting fields to other areas after each harvest. Despite heavy government and donor promotion, rural people have shown they are not willing to abandon upland slash and burn agricultural practices even where more intensive lowland rice farming has been accepted. Upland rice is preferred by most people for food, as it is considered tastier and more nutritious than lowland rice.

71. Environmentally, most of the upland soils are lateritic, acidic, infertile, and low in humus. The swamp soils are comparatively higher in nutrients and humus, but are waterlogged from May to October. Economically/developmentally, the upland rice production approach is for subsistence, while the lowland approach is sporadic, mainly supplemental cash cropping. In the latter case it is seen by farmers as a source of cash income, not a core activity (a safety net, not stepping stone or route out of poverty). IFPRI[16] has undertaken a first analysis of the climate change vulnerability of the agriculture sector. While this work is still in progress, first indicative research results show that there will be both positive and negative impacts on rain fed rice production in Liberia. Further more conclusive results from the study are forthcoming.

72. Government, through the Ministry of Agriculture, is promoting lowland (swamp) rice production and both IFAD and the ADB have approved major investments in support of that strategy. In neither the investment documents reviewed by the mission nor in discussions with the Ministry was any interest indicated in supporting the upland (migratory) farming system, although it is the dominant system. In the field the farmers indicated that; 1) they will not give up their upland farms for lowland farms for various reasons that are not documented, 2) their willingness to carry out lowland farming depends to a great extent on the availability of finance, inputs and market and 3) they did not see the need to abandon their upland plots even as they accepted the challenge of growing swampland rice.

73. The impacts of climate change, increasing instability of the weather as well as pests, disease and weeds, implies the need for a strategy of diversity and spreading risk that needs to be supported. The upland farming system has evolved over thousands of years and should not be discarded without consideration. That it needs to adapt to new conditions is not in question but neither should it be ignored or denigrated by the authorities. What is clear is that upland farmers are not sufficiently convinced by the lowland alternative to abandon slash and burn or adopt the government priority without ongoing incentives.

74. The Liberian government has prioritized the rehabilitation of swamps, especially those with damaged or abandoned rice fields, noting that lowland farms have the potential to yield up to 80-90% more rice than upland ones. Still, lowland rice is a relatively new development and is supported by the government and heavily promoted through donor subsidies. Rice crops are grown in rain fed lowland rice

[16] This information comes from a pre-draft version that is not ready for citation.

fields depending on the water supply situation. A number of rice varieties have been released for cultivation in temporary swamps. The irrigation *potential* is estimated at 600,000 ha, consisting mainly of freshwater swamps. Currently only 2,100 ha are equipped for irrigation, but the area actually under irrigation at any one time is much less than 300 ha, with an average of 237 ha farmed according to AFDB[17].

75. Women primarily cultivate small fields (from few hundred to few thousand square meters) of lowland rice. Use of this land is seen as a route to security and diversity. However, high health risks (malaria, bilharzias and dengue) are present, and all but the poorest people are reluctant to work these lands. Use of the lowlands is not only aimed at higher yields, but also to minimize deforestation and soil erosion.

76. According to FAO[18] there are several constraints to sustainable rice production in Liberia. Major reasons include:

- The preferred varieties are integral to the predominant upland cultivation;
- Yields tend to be low due to drought stresses, poor soil fertility, soil erosion on upland slopes as well as Blast and weed competition;
- In the swamps there are problems of poor drainage and iron toxicity in undeveloped swamps;
- Since the war, inputs such as seeds, fertilizer and credit have remained inadequate and irregular;
- Lack of small farm equipment especially for post harvest operations;
- Lack of a well-defined rice policy;
- Poor road networks and marketing systems;
- Weak research and extension support;
- The country is still recovering from war;
- Sustainable rice production would depend greatly on the formulation of appropriate policy. The improvement and development of lowland rice with improved water control would be essential.

77. Even the swamp areas have much poorer soils than the export areas of Asia (736 - 815 kg/ha when the Mekong delta produces three harvests a year of over 4,000 kg/ha per harvest) but it is feasible to expect, with sustainable low external inputs, to be able to achieve an average of 3,000 kg/ha a year from two harvests a year. It could be argued that even under the best of conditions, Liberian farmers cannot compete with Asia. However, it should be borne in mind that the rich lowland rice areas of Asia are the most vulnerable to sea level rise. Thus a medium to long-term food security strategy requires a stable rice production system that can feed the population of Liberia. The current swamp rice push needs a more detailed analysis and strategy if it is to become viable over the longer run.

78. From rice production figures from neighboring countries (Ghana) stabilized upland rice production can be expected to average 1.5 tons per hectare with the right type of supporting mechanisms (inputs, extension, post harvest support and the right price). So from 150,000 hectares of upland rice 225,000 tons can be produced. It is calculated that there are 600,000 hectares of swampland suitable for rice production. Only 40,000 hectares (7%) of that area can produce 200,000 tons of rice with two crop cycles per year of 2.5 tons each per hectare (again a standard yield for swampland rice growing in other Guinean forest regions). It is therefore feasible for the ministry to set a target of 425,000 tons of rice a year, 30% more than demand in 2007 from the two systems, with moderate productivity and limited external inputs,. Productivity that year was an average of 0.74 tons of rice per hectare on an upland shifting farm and 0.85 tons in swamplands. Lowland swamp rice production is a government target[19] and to reach 200,000 tons it would need an extension team of 40 professionals and 400 extension officers who could be farm leaders or technical school graduates to work with 20,000 farmers and their families.

[17] AFDB Supports Liberia Agriculture Sector Rehabilitation Project/ African Development Bank Project 2010 report.

[18] Personal communication: Ian Cherrett and John Emmanuel Paivay.

[19] See National Investment Brief of December 2009, LASIP Report 2009, Agriculture Sector Rehabilitation Project of ADB 2009 and The Agricultural Sector rehabilitation Project of IFAD 2009.

The targeted yields are reachable through sustainable cultural practices with a minimum of external inputs. The key issue to achieving self sufficiency in the basic grain of Liberia is knowledge transfer not external inputs.

Vulnerable biodiversity and ecosystem functions and the threats they face

79. These functions will be directly impacted by escalating temperatures and changes in precipitation that are likely to increase extinction rates and reduce species diversity. Many livelihoods in study areas are supported by drawing on the natural environment and associated ecosystem goods and services including firewood, charcoal, forest products as well as wild plants for medicinal use and food. Coupled with land use change and unsustainable development practices such as excessive timber harvesting and shifting cultivation, climate change impacts are likely to impair ecosystem functions and thus diminish ecosystem benefits to humans in the study areas. Some specific areas will include:

- Loss of navigability of rivers and canals affecting fishing, especially in Grand Gedeh;
- Poor soil health - food production will definitely lag because soils will be low in nutrients and organic matter, and have poor water holding capacity. Until these conditions are reversed, soils in many parts of Liberia, including the target communities, will continue to degrade and the food situation will deteriorate. This leads to environmental destruction as farmers in depleted areas move into forests and other natural areas in search of more fertile land for farming;
- Deforestation and unsustainable land use such as land clearance, including burning of forest and shrubs for farming purposes and charcoal production, will cause loss of biodiversity, land degradation, soil erosion and desertification in study locations.

80. The natural ecology of Liberia is Guinean forest. The ecosystem has been devastated over the past hundred years with the extraction first of timber and its replacement with plantations. Traditional land-use practices were in harmony with the forest when the population was low, however as it grows, the forest balance is upset. With the spread of guns, wildlife for bush meat has been devastated and the biodiversity of the forest reduced. The dynamics of the tropical rainforest are such that the vegetation itself provides the nutrients necessary for its health. The degradation of such forests leads to reduced soil fertility as the underlying soils are acidic and heavy in aluminum and iron. The productivity of these degraded landscapes is much lower than the original forest without the consistent addition of expensive external inputs. Recovery is slow and complicated. Historically the forest was an important source of micro nutrients, oil, meat, housing, fire, utensils, herbs and many other products. Its degradation directly affects the nutritional status of women and children for whom micro-nutrients are the key to healthy development.

81. Charcoal production is an important rural activity in much of the country (considering the need for both income and household energy) but the extensive use of charcoal can also be problematic. Currently it plays a role in deforestation, but well managed forests and agro-forestry systems can cover rural firewood needs. For urban demand it becomes worthwhile to produce charcoal from land dedicated to charcoal timber production. Problems of deforestation begin when production is for commercial markets and there are preferences for specific species. Charcoal can be the basis for intensive forest farming (see bio-char or terra preta) but again much more needs to be done in Liberia to understand the social dynamics of charcoal production and how it relates to current livelihood strategies before designing intervention strategies.

82. Slash and burn can be a land-use strategy if the balance between people and forest enables full forest recovery from the intervention. Recent research indicates that clearings are an important element in forest ecology[20]. As the number of rural farms grows, the time frame for leaving land fallow shortens and there is no longer time for full recovery of the forest. This then leads to a process of accelerating resource degradation and as the environment degrades the farming systems lose their productivity. The end result is best exemplified by the current situation of Haiti. Extended slash and burn and especially

[20]Personal communication from Professor M.S. Swaminathan.

the associated secondary growth is a poor replacement for the original forest and is the beginning of a cycle of degradation in which the productivity of the soil rapidly declines. Cleared land is also very susceptible to soil erosion especially from heavy storms associated with the onset of the rainy season and once lost, the top soil is very difficult to replace. The rivers of the forest are the first indicators of such changes especially when chemicals are also introduced into the agricultural cycle. Flow becomes irregular with silting leading to drying out in the dry season and flooding in the wet. The fish and shrimp populations also rapidly decline, reducing the dietary options of the local population.

83. A switch to swampland farming also carries its risks especially when it is part of a strategy to introduce high yield hybrid varieties that need fertilizers, herbicides, insecticides and irrigation systems. All these inputs, as well as the associated machinery, have to be imported. They require farmers experienced in this type of farming, and rates of return sufficiently high to make them economically viable. Such farmers scarcely exist in Liberia and given the end of cheap fossil fuel, these farming models are becoming increasingly unprofitable This is even more complicated in Liberia given that the swamp areas are not necessarily more fertile and their soils need to be tested. In Liberia there is no capacity to test soils. These regions need to produce at least two harvests a year and to be able to do that successfully with minimum environmental damage, requires extensive training and intensive extension support at least in the beginning. Pest and disease management will also need to be an integral part of a rice strategy and not just for the plants. The farmers of Quakpagai told the team that many people refused to work on the paddy because of health risks. Others demand protective clothing if they are to work with paddy rice. There are sustainable options but the introduction of new farming techniques, if they are to be sustainable, requires validation at the local level and an intensive process of technical support by qualified persons who are available on demand and live close to the farming sites.

84. Historically the predominant land-use systems were multi-cropping and multifunctional and therefore sustainable, as such systems required little in the way of external inputs. Especially when situated close to the forest these systems are highly resistant to pests and diseases. The integration of legumes whether as crops (beans) or tree species also helps maintain soil fertility. The introduction of temperate farming practices to such ecologies is very problematic and pests and diseases spiral out of control, requiring more and more chemicals and leading to ecological breakdown. Climate change only aggravates these problems. All research shows that sustainable farming systems are agro-ecological systems (see *Special report of the UN Rapporteur on Food Security*[21]), especially in the humid tropics and for family farming systems. Unfortunately Liberia has few trained personnel in this sector and those there are have limited resources to carry out their work. This situation occurs in a cultural context where traditional farming systems were disparaged and therefore little studied and a current investment climate where the rural solution is seen to be offered by plantations and mono-cultural farming of a few select crops.

Table 2: There are three key foundations to livelihoods of rural farmers in Liberia – forests, low and upland farming. All of these are critically threatened already, and climate change impacts will pose additional challenges.

Resource	**Description**
Forests	The forest area has halved in the past fifty years and the remnants have either been turned into reserves or auctioned off. The areas now available to the rural population are degraded; bush meat is scarce and other forest resources much scarcer than in the past. The rehabilitation of degraded forest areas will be key to a sustainable development path in Liberia.
Farming systems: upland	The predominant farming system, shifting slash and burn, is not sustainable as the pressure on the reduced forests grows. Land migration has to end if natural resource planning is to take place. That means the development of alternative farming strategies that permit the maintenance of the multi-cropping system that is the basis of national food production. This option is a form of agro-forestry, one adapted to the humid forest ecosystem. Such options exist in various countries

[21] http://www.srfood.org/images/stories/pdf/officialreports/20110308_a-hrc-16-49_agroecology_en.pdf

with similar ecosystems and their advantages are increasingly being recognized These options have to be reviewed and validated in the Liberian context by the rural peasantry with support from the scientific community within and without Liberia. The importance of these agro-forestry systems is their resilience to the major impacts of climate change and their capacity to mitigate the impact of extremes of drought and floods. Their biodiversity moderates the threat of disease and pests and the permanent soil cover and presence of trees moderates the impact of temperature rises, in particular protecting the macro fauna of the soil. They are also the most efficient systems for absorbing CO_2 and their large scale adoption would enable Liberia to negotiate environmental services with the G16.

Farming systems: lowland The swamp lands of Liberia are claimed to be 600,000 hectares. To meet the current demand for rice requires only a tenth of that land. Thus there is much logic in the government strategy but historically this initiative has not been very successful. For it to work much needs to be done to identify the elements essential to a sustainable rice-growing strategy that is profitable, environmentally friendly and not harmful to human health. It is urgent that the process of swampland rice production be followed in the field so that an understanding is developed of how to build a viable and sustainable model within the context of climate change. It is also important to understand why farmers see these land-use systems as complementary but a strategy of managing diverse system options in a context of vulnerability and risk is generally a very wise strategy. Criticism of this strategy practised by rural farmers should be suspended until the advantages and disadvantages of these options are better understood, considering increasingly unstable weather patterns.

Other Vulnerabilities

85. Traditional farming practices (shifting cultivation), timber extraction, firewood collection and charcoal production are major causes of greenhouse gas emission in the atmosphere in the three communities assessed, and possibly other parts of Liberia. Currently 95% of Liberia's energy comes from biomass (firewood, charcoal, and palm oil) (Goanue, 2008). It is also important to make it clear that climate change impacts are felt differently across the country as a whole. This is obvious in the coastal and inland areas, for example flooding of lowland areas as observed in Baltimore, and the decline in rainfall experienced in the hinterland in Zleh Town.

86. There are many complex relationships between changes in the climate, the environment and the impact these have on people and their livelihoods, especially in the study areas. However, few of these relationships are fully understood and even fewer have been explored in any detail. It is important to remember that global environmental change, climate change, vulnerability and sustainability sciences are all fairly new fields of research and so many more questions than answers exist, particularly when it comes to conclusive statements on cause and effect relationships.

87. It must also be noted that vulnerable people, with lower capacities in the three communities are in weaker positions than those with stronger capacities to withstand the impacts of climate change as they are being experienced. People in these groups include: 1) women (widows and pregnant women), 2) children, 3) the elderly and people with disabilities, 4) people living with HIV and AIDS, and people who are ill, 5) people who are poorer and disenfranchised – people oppressed or in abusive relationships.

1.3 Long-term solutions and barriers

88. The ultimate long-term solution would be to develop and implement a national strategy for addressing climate change risks in Liberia’s agriculture, rural development and food security sectors.

Such a national strategy would be built on ongoing practical local level adaptation learning, and a specific effort of improving and updating existing and newly emerging sectoral policy instruments, including programmes, to include climate risk and management considerations. One major part of the strategy would address the need to integrate long-term climate resilient planning and management techniques into the current low-land rice development drive and to help local people build more resilient livelihoods through diversification and integration of up-land and low-land production, and forest resource use. However, a number of barriers exist to reaching that solution.

1.3.1. Key barriers

Difficulty to react to uncertainty of climate risk

89. Climate change is a hard issue to address and manage: (1) effects may take a long time to be felt (2) it is still not clear what they will be, and (3) therefore the best way to manage them cannot be predicted with any precision. Above all there is a complex interrelationship with the impacts of environmental destruction because of human action that leaves many societies vulnerable to the slightest change in weather regimes.

90. The increase in variability and unpredictability of global climate will have impacts across the world. In West Africa, rainfall patterns will be disrupted and temperatures will increase, but the detail of these effects cannot be accurately predicted and the effects of climate change on the Guinean ecosystem are similarly poorly understood. Liberia needs to formulate and start to implement responses to the likely future global changes in climate.

Limited scientific and management capacities and a general lack of knowledge of climate-related issues

91. There is a limited human capacity for management or science relating to climate change. This is a key problem with many areas of government in developing countries. Without strong leadership, good decision-making, and capable technical staff – management of agriculture and recovery from effects of CC will remain an illusion. However, there is now a rapidly increasing support from external donors for CC-related initiatives. The National Adaptation Programs of Action (NAPA) series of reviews is an excellent and important first step.

92. This reality of climate change is particularly serious for Liberia given the fragility of a country that is emerging from over 20 years of conflict with a destroyed infrastructure and the majority of its population reduced to subsistence farming. Unless the country can feed itself and construct a future for its youth, violence will return and the first issue that must be addressed is the capacity of Liberia to feed itself. There are many ex-combatants without adequate employment and a burgeoning youth population is drifting towards the urban areas, especially young males.

Poor responsiveness and adaptability of agriculture sector at all levels

93. The predominance of traditional farming reflects a lack of capital and proven viable alternatives. There is also a shortage of household labor, in particular young males. This, plus the shortage of cash and credit facilities limits the possibility of hiring labor while the low productivity of current farming practices makes capitalization, in particular the use of machinery very risky. Rural areas of Liberia are poor, and even relatively low-cost new approaches require an investment. This implies an associated financial risk. This risk precludes many rural people from being able or willing to attempt new practices. It also needs to be borne in mind that all new measures or practices need to be adapted to local conditions and that for each new measure farmers require new skills. To change this dynamic requires both the development of more viable and sustainable farming systems and a national strategy for educating and training farmers. These programs also need to be accompanied by the building of market structures that facilitate both local consumption as well as the integration of a national market and associated infrastructure.

94. The market structure of the country, whether local or national, faces serious challenges due to poor infrastructure and communications – roads, storage facilities, and market structures – that makes it difficult for farmers to sell their products in distant markets, to store them for long periods, to take

advantage of higher prices in the hungry season, or simply to retain their production for food security or as a consumption-smoothing strategy. Lack of basic information on market opportunities and price levels in various markets limits transparency, prevents competition among smallholders, and limits the degree of market integration whether local, national or even international. Lack of marketing support services, finance, and business training for farmers, especially women farmers, for whom training programs have not taken into account their special needs. This is a great constraint on economic growth impeding the expansion of production and markets. This is increasingly important as food systems evolve and more stringent quality standards are required in value chains.

95. Lack of access to agricultural production inputs and technology limits farmers' ability to increase crop productivity. This is reflected in part by absence of finance mechanisms in the rural areas and especially the resources available, for agricultural producers, are extremely limited. This is a reflection of the low levels of efficiency of the traditional farming systems and many of the plantations and tree crops promoted in the past as well as the irrelevance of standard financing mechanisms to those of limited resources. Some NGOs have promoted savings and loan clubs and other participatory financial systems. There is a need for a national strategy to that end.

Lack of capacity of technical staff and extension personnel

96. The capacity of government is limited especially for the provision of technical support. There is a shortage of qualified persons and outreach of these departments is often limited by logistical or financial constraints. Even if government were to raise expenditures in this sector to the target figure it would still fall short of needs and so it is incumbent on government to build alliances with other sectors, starting with farmers themselves through their organizations, as well as with NGOs.

97. Armed conflict and social instability lead to the emigration of the already limited trained manpower of Liberia. Few have returned as the institutional infrastructure they need for job satisfaction is still in its early stages. Thus there are few scientists capable of working on the challenges of current land use practices. Middle level personnel have not been trained in a systems approach or in participatory methodologies. These are provided mainly by NGOs and even then in a haphazard manner. The Ministry of Agriculture is only now reconstructing itself and with its restricted budget has a very limited capacity for outreach.

Policy framework not yet responsive to climate change risks

98. Policy and legal frameworks are being set in place but their implementation and enforcement faces a series of limitations. A key issue, land rights, is being tackled by a Land Commission, which is proposing to recognize traditional land rights for the first time in the history of Liberia. Without this development, investment will run into serious problems and the land issue will generate even more problems and conflict. In this area it has been argued that the lack of access to land by young men has been an important factor in past armed conflicts and so needs to be taken into account by new policies. The limited capacity of the formal legal system also highlights the need to decentralize land-use rights and planning so that conflicts can be dealt with at a local level, as most are local.

Lack of coordination of climate change responses

99. As a recent study of OXFAM has pointed out, the EPA, FDA, NDRMC and some nongovernmental organization are engaging in climate change activities separately**.** Effective coordination among government, international agencies and NGOs remains the number one challenge. The problem now is how best to increase effective coordination for information sharing by coordinating data gathering initiatives in order to avoid duplication and make sure that relevant information/data are used to inform and influence decision and actions at the policy and community levels.

1.3.2. Solution: potential elements for a National Climate Change Strategy

100. A robust technical capacity and sound institutional mechanism capable of establishing a link between the scientific climate change modeling research community and farmers is essential to induce the use of climate change modeling results in a farmer's needs-oriented way. Weather forecast

information is useful in planning, reacting and responding to hazards just before or after their occurrence. The lack of capacity for climate forecasting makes it very difficult to inform farmers about the probability of variations in the average seasonal rainfall. This constrains the scope for risk/opportunity management in agriculture. Long-lead climate forecasts are needed to make strategic decisions well in advance, reducing the impact of dry and wet spells and associated secondary impacts. This challenge needs to be addressed. One opportunity that exists would be accessing funding by NGOs and central government to close this gap.

101. In order to make adaptation work, institutional capacity building and strengthening of organizational networks across all levels and sectors is a basic precondition. Since adaptation to climate change is a new field of work in Liberia, institutional responsibilities are not yet well defined. There is a need to carefully integrate top-down and bottom-up perspectives and capacities, and to establish 'functional coordination' mechanisms between various agency activities, planning, communication, and operations at field level. Furthermore, it is crucial to better link and factor-in adaptation to other on-going development activities, and to determine clear roles, i.e. who should do what in order to make community based adaptation effective.

102. Despite existing comprehensive frameworks and many policies, Liberia is still challenged by poverty, illiteracy, disease etc. Therefore, stakeholders should coordinate their focus on building capacity of government agencies to integrate climate change in development planning, designing infrastructure, land and coastal zone management planning and institutions, agriculture, water and emergency response. It should also integrate civil society and community participation. Designing policy related to climate change should be specifically geared towards removing vulnerability at community level with an emphasis on poverty reduction and food security; and be prioritized, well coordinated and implemented.

103. This requires a variety of policy initiatives at various levels starting with legislative support for a more integrated approach to the issues of land and natural resource rights and recognition of the country's farming culture in which upland agriculture will not be abandoned for lowland agriculture. The adoption of lowland agriculture is perceived as a risk diversification strategy by farmers. The administration needs to incorporate lesson learning into long term planning and it is urgent that it prioritizes not just the work of the Ministry of Agriculture and institutions such as CARI but also a strong meteorological service that can serve rural communities in its budget. It is recognized that this is not a short term strategy and requires national mechanisms that build on the work of the land commission through regional land-use planning that builds on community organization to ensure a development dialogue between the centre and the rural periphery.

104. Developing a coordinated response among donors is also necessary to avoid duplication of efforts and attend to addressing urgent needs in holistic ways rather than in an ad-hoc manner. There is poor coordination within and between civil society, NGOs and government. Leadership from within governments would be desirable, particularly between ministries and departments and between government and other stakeholders including NGOs, civil society and other organizations including the private sector.

105. Improving coordination at the local level is also important and can be linked to community based adaptation. The language of participation is used by various stakeholders, but there is little evidence of its application in the field beyond a nominal superficial level. Based on the experience of disaster risk reduction community based groups, there is important potential for supporting community based activities for adaptation with multiple benefits, such as poverty reduction and risk management. In fact a demand-side driven development process starts with a community organization which needs to be an integral part of building CC resilience. Much work needs to be done to institutionalize this approach in Liberia as it is a determinant to the implementation of sustainable adaptation and enhanced collaboration between groups based in the capital with communities in the rural areas.

106. Building on these existing risk reduction strategies, for example encouraging the use of sustainable agriculture techniques to improve food security during dry as well as excessively wet periods, would improve soil management practices and give small-scale farmers access to both organic and

mineral fertilizers, along with information about their efficient and environmentally safe use. This is adaptation in itself. It is also important that a long-term perspective is adopted in order to understand how the risks being addressed are likely to change and thus whether the current strategies are appropriate and sufficiently robust. Strategies that address a longer time scale, beyond just preparing for the next planting seasons, are necessary to build long-term resilience to climate change in the study areas and Liberia as a whole.

107. This requires an understanding of the nature and logic of current rural livelihood systems. It is understood that in the past such work was undertaken, but the long duration of the armed conflict not only lost much of that understanding, it created new rural realities. Studies of current livelihood strategies and above all farming and natural resource management/extraction practices are urgent. Not only is there an ongoing process of degradation of the original ecosystem but even more importantly, of the knowledge of that system. This knowledge does not have status among the young and it must be rescued where possible and revalued economically, culturally and environmentally. Until these practices are systematized it is not known what resource or practice is relevant to the adoption of land-use changes that can ensure resilience and sustainability to tackle the threats, environmental and otherwise, that the farming systems of Liberia face.

108. Although there are a lot of valuable local practices and indigenous knowledge among the farmers relevant to climate risk management in the communities assessed, some of which are outlined above, it is necessary to assess the real value of these practices in the context of managing future risks and promote their dissemination and integrate them with value-added knowledge that may not be locally available. The involvement of the local research institutions would provide insight into this as well as a range of issues related to climate adaptation, and designing management alternatives is imperative.

109. Vulnerability to climate change is a function not only of exposure sensitivity to threat but also baseline adaptive capacity. The following table, from the agriculture sector rehabilitation project (ASRP) identifies the rural groups most vulnerable to climate change and therefore the priorities for at least the field-based components of the project.

Table 3: Rural Groups most vulnerable to climate change

Typology	Poverty Levels And Causes	Coping Actions	Priority Needs / Responses
Women and women headed households	The majority are very poor. Some of the households where the men are working outside the home receive some remittance income. However, many do not have access to remittance income. In either case, women have to undertake a disproportionate share of the farm labor but have limited access to new technology, improved inputs, farm tools, credit and markets. Generally, their literacy levels are very low.	Engage in a variety of income generating activities such as poultry/small ruminant rearing, producing and selling of fruits and vegetables, low-tech processing and selling of roots and tubers (mostly cassava) products	Access to training in improved farming techniques, provision of agriculture inputs, and market linkages to supplement family income. The livelihood strategies of female-headed households should be evaluated on the basis of which priorities for farming systems, adjusted to their specific needs, will be validated with women farmers on their plots.
Small-scale farmers	The majority are poor. They lack access to inputs and support services; They have limited profitable investment opportunities; They lack funds and knowledge to diversify production and to increase soil fertility for sustainable higher yield level. Education levels are very low.	They work with traditional farming practices, including slash and burn. They are engaged in subsistence agriculture and do not have incentive or means to grow above subsistence. They borrow mainly from friends and neighbours.	Improved seed and planting materials and other farm inputs; short- and medium-term loans for annual farming; technical training. Knowledge of farm management The livelihood strategies of small-scale farmers should be evaluated on the basis of which priorities for farming systems, adjusted to their specific needs,

Typology	Poverty Levels And Causes	Coping Actions	Priority Needs / Responses
			will be validated with farm leaders on their plots and a model for sustainable extension will be validated.

110. Once key vulnerabilities are identified, it is important to explore appropriate adaptation strategies. Although some might appear appropriate from a technical perspective, it is important that they are also assessed in terms of their socio-cultural applicability and sustainability. Often existing local actions can be used as a starting point from which to develop other strategies that might help deal with future climate change. In some cases, existing strategies might not be appropriate and new ones will be needed, but these should be developed in consultation with a range of local stakeholders. Types of responses might include improving early warning systems, enhancing development of drought tolerant crops, training communities on post-harvest methods and processing and improving access to markets and credit.

111. To this end work on the upland multi-cropping farming system needs to be prioritized. It is currently highly stigmatized because it is a traditional farming system based on slash and burn techniques. The possibility of this system becoming the base for a new more sustainable agro-forestry system has not been contemplated in Liberia but other countries have discovered that shifting agriculture can be stabilized as can their productivity in combination with the building of what are known as analog agro-ecological systems. The potential of this focus is not recognized in Liberia and this project has to start turning the situation around. A good description of the potential of this focus is described by the UN Rapporteur[22] on the right to food.

112. Discussions with rural people rapidly lead to an understanding that upland farming will not be abandoned in a hurry even where swamp farming of rice is feasible and acceptable. This historically successful multi-cropping system is the basis of the rural culture and therefore requires a strategy of adaption not elimination. The key to any change is the need to stabilize the system so that it stops being migratory and requires a multi-cropping strategy that retains the fertility of the soil. It is feasible and there are historical and modern stable farming systems for rainforests. The validation of viable, stable farming systems for the Guinea region of Liberia is urgent, as it then becomes the basis for land use planning and thus the recuperation of the forest and the validation of sustainable management of the rainforest and its resources by the local communities.

113. This does not imply abandoning lowland farming and the development of more intensive systems that take advantage of the water resources of the swampy bottom lands found throughout the country. This alternative should not be seen as the salvation of Liberian food security, at least not yet. The idea was developed thirty years ago and then abandoned; there is a need to understand why. One reason could be that as it is a market orientated system it collapsed with the collapse of the markets as a result of conflict, but another could be that it did not prove to be very sustainable because of the poor quality of the soils. Both these arguments were made to the mission. There could be other reasons. The current strategy needs to be accompanied by monitoring mechanisms that enable real time feedback on the progress of the experience and its implications for the construction of a market oriented sustainable smallholder agriculture.

114. A key crop in this strategy is rice. Rice is a native grain and it is important that the government promotes a rice seed policy to ensure the survival of all the traditional varieties known. This becomes even more important with a policy of promoting hybrids for the swamp areas. Again the adaption of practices from other regions of the world that allow small farmers to reduce their costs, depend less on external inputs, increase and maintain yields at the same time as minimizing environmental impact, is

[22] Report submitted by the Special Rapporteur on the right to food, Olivier de Schutter to the General Assembly on the 20th of December 2010.

urgent. There is the need for an institutional framework for this and CARI is an ideal place for setting up a team of specialists who can work with farmers on these issues.

115. It is recommended that Liberia investigates the potential of introducing a System of Rice Intensification SRI) - an approach to rice production that is raising the productivity of land, labor, water, and capital invested in small farmer irrigated rice production. There are costs involved with SRI adoption, particularly increased labour from farmers during their initial learning phase; and there are some conditions where the methods will be inappropriate or impractical, e.g., where there is little water control and flooding creates anaerobic soil conditions. But with skill and confidence as well as innovation, SRI can become labor-saving over time, saving water (by 25-50%) and seed (by 80-90%), reducing costs (by 10-20%), and raising paddy output at least 25-50%,and often 50-100% and sometimes even more. This sounds too good to be true, of course; but the productivity of SRI methods has been validated in 28 countries, from China to Cuba, Peru to Philippines as well as Gambia to Zambia. This an opportune moment for Liberia as the introduction of this spreading farming system lends itself to the consolidation of a sustainable rice farming system in the swamp lands. The introduction and validation of this approach will be an important element in the site work of the project.

116. In Liberia, women are major players in the agricultural sector, where they constitute the majority of small-holder producers and the agricultural labor force in general. Women produce some 60% of agricultural products, carry out 80% of trading activities in rural areas, and play a vital role in linking rural and urban markets through their informal networks. Despite this important involvement in agriculture, they represent a tiny fraction of participants in the formal sector. They also have less access to productive inputs than men, including land, skills training, basic tools and technology (PRS).

117. Identifying gender differentiation and vulnerability is significant when developing adaptation approaches in priority communities and Liberia as whole. This is particularly important, as at first glance it is clear that women and men undertake different activities that make women particularly vulnerable to low rainfall and water scarcity, for example during these times women have to collect water and firewood from further afield.

118. Women are integral to rural economies both within the farming systems and in food processing and marketing. The importance of their role is not recognized in the institutional framework of the country. In the agriculture sector, it is estimated that in Liberia, women contribute 36% of the total labor in rice and cassava production. Men provide most of the labor for clearing and preparing the land while women do most (80%) of the weeding, harvesting and processing of the crop. Men and women have clearly defined economic roles and the available data of the 2006 CFSNS are summarized in the table below:

Table 4: Gender differentiation of roles in agriculture, 2006 (Source: 2006 CFSNS and 2007 CAAS Cross-Cutting Issues Report)

	Income generation	Production of food crops	Labour in rice and cassava production	Cash crop income	Agricultural workforce	Total agricultural production	Labour force for food crop production	Agro-processing	Marketing and trading of agricultural produce in the country
Men and women	33%	57%		49%					
Men only	33%	6%	64%	22%			35%	25%	
Women only	16%	8%	36%	5%	53%	60%	43%	50%	80%
Women with the support of children	5%								
All household members	13%								

119. Despite their significant role in the agricultural sector, the 2006 CFSNS shows that on an individual basis, women have less access than men to land, control over it, and land tenure security, resulting in less ability to invest in agriculture and expand beyond subsistence level – 33% of men have access to land, as opposed to 16% of women. Only 10% of women actually own land that they cultivate (compared to 44% of men). One of the main arguments used by community leaders not to grant women access to land results from the traditional division of labor in agriculture. Men are responsible for clearing and felling the land at the beginning of the agricultural cycle, which is carried out in groups through communal arrangements (called Kuu). The inability of female-headed households to contribute labor to the Kuu restricts their ability to farm. . Replacing shifting agriculture with stable agro-forestry systems will eliminate this problem.

120. Women farmers lack access to value-adding opportunities and technologies – processing, packaging, storage, transportation – and to market information and opportunities. The importance of their role in the production chain is recognized at the informal level, but their lack of presence in local governance and organizational structures means that their role and potential tends to be overlooked. Their knowledge of the forest and its products such as medicinal and edible plants also lacks recognition. The integration of women into the more formal structures of knowledge management and decision making is imperative. Women also experience difficulties concerning access to improved inputs and farm technologies: 13% of male-headed farm households have access to improved and hybrid seeds compared to only 8% of women-headed households. At the same time it is women who manage traditional seed varieties as well as vegetative materials and so play a key role in the selection and conservation of seeds Existing information reveals that extension workers tend to focus exclusively on male farmers for crop support services and the introduction and management of seeds.

121. The women's literacy rate is still only half that of men (38% of women are literate compared to 71% of men). The lack of entrepreneurial skills represents a severe handicap to developing agricultural activities, and women's low participation in decision making persists in Liberia despite recent improvements following the last elections. This is particularly determined by traditional structures and starts at the local level with communities being traditionally dominated by male chiefs and elders while women are excluded from community decision making processes. According to the 2007 Small Scale Gender and Agriculture Survey (SSGAS), women are not expected 'to attend village meetings when they are not called' (pers.com.). However, changes are occurring slowly and the reconstruction phase is opening new opportunities for women's participation in decision-making bodies. Still, there are few women in the higher formal education system in areas relevant to rural development.

122. Women are vulnerable economically and socially because most of them depend on agriculture. Women's perspectives have to be carefully considered in all adaptation strategies as they have important roles to play in understanding the social dynamic. Women can play a critical role in either hindering or promoting vital climate change mitigation and adaptation initiatives relating to energy consumption, deforestation, burning of vegetation, population growth and policy making. Particularly during disaster response they play an important role in the recovery process. For this reason, it is critical to incorporate gender specific activities at the community level.

123. Key to improving the productivity of farmers is the provision of extension services; their current provision is extremely limited because of an aging, outdated, and underfunded extension system with very poor coverage and limited ability to reach farmers effectively. The prevalence of high illiteracy rates especially among women makes it difficult to reach rural people through conventional communication channels. This requires a rethinking of extension based on participatory processes in which Ministry personnel act as resource persons and not transmitters of hand me down, out of date and contextually inappropriate messages from government. Farmers' associations and cooperatives as well as NGOs are key to the success of such a system, as without constructing alliances no actor has the resources to reach even 5% of the farming community.

124. Clearly the adaptation of farming systems is not enough. Reconstruction of markets and incorporation of farmers into them, and adding value to raw materials and commodities in the

communities via local agro-industries are all part of a policy to add value to the rural community. It increases their efficiency and raises living standards at the same time as recovering the natural resource base, which is an integral part of any policy aiming at building resilience to climate change. For example, soil temperature is critical to plant growth and maximizing coverage via mulching systems has been shown to keep temperatures down. Ploughing and other forms of removing soil cover have been shown to expose the macro fauna of the soil to enormous stress, rapidly reducing its productive potential. Agro-forestry systems promise to stabilize temperatures for plants and hence counteract temperature rise.

125. A final warning: it should be noted that adaptation to climate change is a location-specific issue. There will be no 'one fits all' solutions anywhere in Liberia. Decentralized ways of working are needed, within the framework of coherent national policies. For example, project demonstrations of mini-ponds show that it is a good adaptation practice for a farmer who is operating on clay soil such as in Zleh Town, but might not be suitable for farmers who are operating on the sandy soils in Kpor. Special attention is required to develop location-specific adaptation options to manage future anticipated risks considering bio-physical, socio-economic and socio-cultural factors.

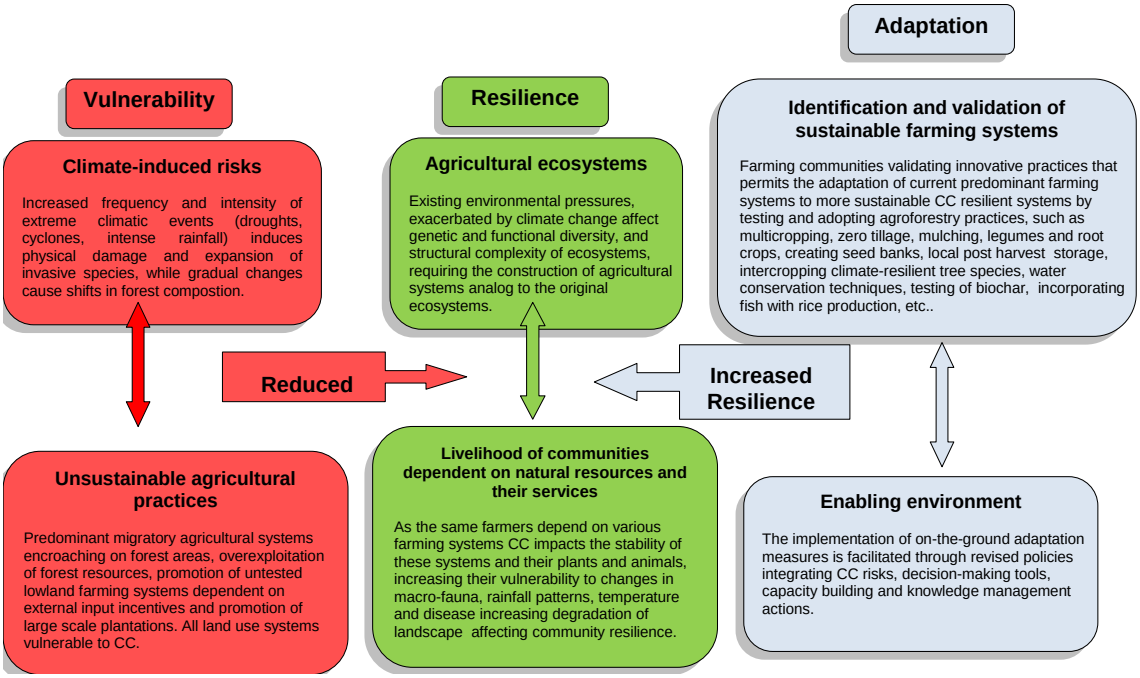

Figure 5: Linkages between vulnerability, resilience and adaptation options in the agriculture, rural development nd food security sectors in Liberia, developed as the basis for this project.

1.4 Stakeholder and baseline analysis

1.4.1 Stakeholder overview

Liberian Government level

126. Key strategies for adaptation outlined in the NAPA include capacity building to integrate climate change in development planning, designing infrastructure, land and coastal zone management, awareness raising through the dissemination of climate change. Adaptation information, particularly for vulnerable communities such as farmers and coastal settlements are also an integral part. At the project level, several high priority initiatives aimed at reducing the vulnerability of local communities and increase climatic variability were identified through a participatory process. These initiatives included integrated

cropping/livestock farming with the objective of diversifying crop farming through the cultivation of soybeans, lowland rice and rearing small ruminants and improved monitoring of climate change with the objective of generating reliable hydro-meteorological data (NAPA, 2008).

127. Despite existing policy, there are strong indications, especially from NGOs, that the EPA and other related government agencies need to go beyond policy formation to actual implementation. They need to take a strong lead in addressing climate change and provide a coherent cross-sectoral plan that can form the basis for collaboration and ensure that activities obtain wider coverage. The NGOs' Coalition for Liberia, has criticized the EPA for not being proactive. For example, the NAPA process was completed in 2008 with its passage into law by the lower house, but the EPA has no national campaigns to make the public aware of its activities on climate issues, least of all the implementation of projects outlined in the NAPA. It is not putting enough effort into educating and facilitating disaster risk reduction and climate adaptations at the community level.

128. Interviews found little in-depth understanding about climate change within the general population in the three communities and among stakeholders in Monrovia. There is no government program at county or community levels to create public awareness of the adverse effects of climate change. Farmers have no access to technology and presently lack infrastructure such as roads, weather forecasts, and agricultural research and extension services to adequately adapt.

International Agencies and donor community in Liberia

129. United Nations agencies and multilateral donors including the World Bank, EC, USAID, DFID and others maintain an active presence in Liberia and play influential roles in determining national priorities and mechanisms for their implementation in Liberia's post war reconstruction. The issue of climate change is now high on the international agenda. There is intense pressure on western governments to tackle climate change, largely within the conditions set by peripheral bodies, especially those with funding that needs to be channeled into these activities. But weak institutional capacity faced by Liberia is making funding for the implementation of the NAPA difficult. International agencies and the donor community in Liberia have not yet prioritized climate change adaption and have not channeled most of their funds for this purpose. Meanwhile, inadequate funding both at the national and international levels threatens to limit the level of implementation of key measures identified in Liberia's NAPA.

130. In addition, programs funded by the World Bank, EC, USAID, DFID and United Nations agencies have emphasized environment impact assessments, but many are not holding their implementing agencies accountable for integrating climate change adaptation into the design and implementation of these programs.

Non-Government Organizations

131. There is a large national and international NGO existence in Liberia that plays a significant role in lobbying the government and international donors. Many work at community levels, supporting those who fall through their safety nets. Most international NGOs like Oxfam work in partnerships with local NGOs that implement specific projects. Unfortunately, Liberia's NGO community lacks sound institutional mechanisms capable of establishing links between and promoting scientific climate change modeling research and farmers in a needs-oriented way. Most local NGOs are set up as development or relief organizations and have very little expertise in disaster risk reduction in term of climate adaptations.

132. Integrating the fairly new concepts associated with climate adaptation is challenging for local organizations. The dynamics of disaster risks are poorly understood in Liberia as a result of lack of information. Moreover, structural innovations within local organizations as well as skills to prompt attitudinal changes do not exist. National research institutions do not effectively translate climate change modeling to provide medium and long term agricultural impacts. There is also a lack of capacity to transform concrete adaptation options relevant to farmers' current thinking and needs; while applying a 'language' and communication strategy that farmers can understand easily.

133. Many NGOs in Liberia are donor driven and have limited coverage, only serving pockets of the population in certain counties. Most NGOs do not fully understand the issues of climate change, nor how to factor disaster risk reduction into their work. As a result, they do not initiate projects related directly to climate change issues. However, there is a need for a clear message on what climate change means for Liberia. This will enable communities and organizations to better understand cause-and-effect relationships that in turn justify a shift in approach, focus and programming in Liberia. National and local institutions need capacity in order to factor disaster risk reduction into their work. They also need to advocate government to put in place the regulatory, political, and informational framework necessary to deal with integrating adaptation to climate change into national action (NAPA, 2008).

Communities, Community Based Organizations and Individuals

134. The most common form of collective action in Liberian villages is in labor groups, commonly referred to as work-gangs, comprising 5-25 individuals (male, female or mixed). Work gangs are based on intra-household agreement to carry out farming tasks on a rotational basis. This form of collective work is reported to be more efficient than individual work or an equivalent number of casual workers, because such groups tend to specialize in certain tasks, becoming skilled especially in heavy and time consuming tasks on farms, such as land clearing and preparation. The members also have a tendency to compete with each other on who does the work fastest and with most skill. A group will work for its members, or their families, in rotation. Cash raised by the group is kept intact until the end of an agreed period, generally the end of a farming year when it is divided equally. In other cases, the revenue accrued from labor or other group activities is accumulated to be used as a social fund or as a source of credit for members. The development of reciprocal work-gangs or groups reflects the institutionalization of strategies to cope with labor bottlenecks for activities which are not only time consuming but also have a distinct gender division of labor.

135. The women's labor groups, where they exist, do traditional farming activities such as weeding, harvesting and threshing. However, much of their interest is in communally produced crops for cash sales, where either they share the money or go into a commercial venture together. Most women's groups have only one or two literate members, usually the Secretary and/or the Treasurer. Another form of informal group, most common among women, is the *osusu*, a traditional rotational savings form of association, usually made up of people from a similar social and economic status. The *osusu* saving system enables participants to receive substantial amounts of money to meet heavy commitments or investments either in agriculture (e.g. groundnuts, vegetable production or poultry) or non-agricultural production (e.g. soap production or *gara* type dye making). Each group member agrees to put a stipulated amount of savings into a pool at set intervals. This is collected and in turn disbursed to one member of the group.

136. There is an average of 2-4 farmers' groups of 20 to 25 members each per village, and clusters of 7 to 20 such farmers' groups form farmers' associations, with 200-400 members each, and about 7-10 farmers' associations per chiefdom. Farmers' groups are dominated in numbers by women's groups. The main activities of the farmers' associations at the grass-roots level are cooperation in the cultivation, production, harvesting and marketing of crops. However, one association may choose to limit itself only to one function. The associations are also the contact points for input and service delivery, e.g. seeds or extension advice. MOA uses the associations as a mechanism to supply inputs and services to farmers.

137. Activities of cooperative societies vary and may be in a number of areas, including: savings and credit, cocoa and coffee marketing, fishing, rice marketing and cassava marketing. The savings and credit societies operate on a system where members save small amounts on a regular basis and when the group savings reach a certain level, small loans are made to members. Successful repayment makes the members eligible for increased amounts in the next round of loans and so on. The most successful cooperative societies are the women-only societies operating savings and credit schemes. These follow the *osusu* system. Formally, farmers' cooperatives are a separate movement from the farmers' associations, in practice however the two seem intertwined, with clusters of farmer groups and associations, and in particular women's farmer groups and associations forming district level

cooperatives. This is for instance the case in the project districts in the North-West, where some women's' farmer groups organized in associations are reported to form a district level cooperative.

138. Field work identified that there is a high level of awareness at both community and national levels of the various challenges that need to be faced in terms of poverty, disaster risk and environmental change. People spoke of having experienced observable changes in the climate.

139. Communities and individuals are undertaking various strategies to cope with these realities. In Grand Gedeh for example, this includes: planting crops earlier or later, depending on shift in rainfall patterns; engaging in small businesses; resorting to crime and prostitution, and migration. It is however, difficult to determine to what extent these activities haven arisen because of anthropogenic climate change over and above natural climate variability and other environmental and socio-economic stressors. Very few people refer to these activities as climate adaptation strategies although they articulate the connections between these activities and various forms of environmental change very clearly, which is equally important in supporting community-based adaptation.

140. There is a clear need for the Liberian government and NGOs to support and pilot specifically designed climate change projects that will develop methodology to better understand 1.) how results of climate change impact assessments such as this and different climate change scenarios can be translated into location-specific livelihood adaptation practices; 2.) how such options can be tested and implemented in a participatory way with community members and farmers; 3.) how to feed back results to researchers and policy makers in agriculture and the climate change 'community of practice', in order to facilitate replication of successful cases and avoid maladaptations. 4.) how to initiate and facilitate field testing of livelihood adaptation strategies with farmers to better respond to disaster and climate risks, improved long-lead climate forecasting, and responses to future climate change projections in agriculture. Most adaptation activities were or are observed to have been undertaken in response to changes that have been experienced and not in response to warnings and guidance that have been issued based on lesson learned or climate predictions.

Table5: Stakeholder groups and potential role during the project stage.

Stakeholder groups	**Description or example**	**Potential role during the project**
Responsible national Government, Ministries, and Agencies	EPA, MOA, FDA, CARI, other line ministries and related organizations and institutions	Generally, these stakeholder groups will support project implementation. They will also mainstream climate change into their policies and strategy plans. They can also benefit from capacity development under the project.
Ministry of Agriculture (MOA)	National line ministry responsible for agriculture, rural development and food security policy in Liberia.	Overall implementing partner in the field. Coordinates project implementation with UNDP.
Central Agriculture Research Institute (CARI)	Liberia's national agriculture research institute under MOA. Has the potential to develop a specific research framework for CC adaptation as well as being an important partner for the field component of the project.	Collaborate in relevant climate change adaptation on-site learning with farmers. Serve as an information and documentation hub and provide specific services such as building a seed bank, providing soil testing facilities, etc. Centre for building scientific and social knowledge of rural land use systems.
CARE	Major NGO that has a conservation agriculture project in Bong County with a complementary focus to this proposal.	Key field executing partner in Bong County.
Environmental Protection Agency (EPA)	CC FP and related CC projects. Coordinator of NAPA.	Part of project steering body. Important for replication of project results, communication, knowledge management and sustainability aspects.
Private Sectors	Agriculture companies, agricultural financial institutions, small enterprises	These Stakeholder groups will generally support project implementation. They will also mainstream

	in the agricultural sector, Community Based Organizations (CBOs) and Non Governmental Organizations (NGOs) in the agricultural sector.	climate change into their policies and strategy plans. Provide credit system, which can be linked to building the capacity of small enterprises, can possibly benefit from capacity development. Facilitate the introduction of technologies.
County Governments	MIA, County Governments, County Superintendants, district level, Clan level communities and family households.	These stakeholder groups will support the project implementation at the county, district and community levels. They will provide co-financing to the project. They will also mainstream climate change agricultural adaptation into county development plan. Farmers will be able to tolerate or perhaps take advantage of mild or moderate climate change through various adaptation measures, including switching among crops and livestock species, or between crops and livestock. They can also benefit from capacity development under the project.
NGOs and CBOs	Local, National, international (e.g. agricultural institutions, farmers' associations involved in the CC adaptation within the agricultural sectors etc.	These agencies already support and implement related activities at some project sites. They can provide co-financing, knowledge transfer, organizational support and training as well as general partnership support to project implementation.
Local Communities	Farmers' cooperatives, petty traders, house-owners, etc. Sometimes organized through traditional organizational methods, or women's' groups, youth groups, etc.	They are the direct target beneficiaries of the project. They would benefit from organizational support, participating in processes, having their role as knowledge managers recognized and promoted, attending workshops to build their capacity, and from any livelihood revenue schemes.
Gender based stakeholders.	To mainstream gender into climate change adaptation.	They are affected differently by the impacts of climate change vulnerability. They can benefit from capacity development under the project. There are also age differences that also need to be understood better for specific age strategies to be initiated. Project will make every effort to contribute to national efforts to improve the status of women and improve gender balance.
Research Institutions	Research organizations such as bio-meteorological institutions, Firestone research institute, hydro-meteorological unit, agro-meteorological units, universities/colleges of agricultural institutions etc.	They will provide the basic support in gathering and analyzing weather data and diffusing climate advice to key local stakeholders. Ultimately, they may provide early warning systems, publication of agro-met. and phonological bulletins (decadal, monthly or weekly) and bio-met. information for poultry, and on different breeds etc. They will also benefit from capacity building under the project.
Local Cooperatives	Farmers' cooperative systems exist, to share burdens in terms of workload, debt and access to markets. This is the case in the demonstration areas.	Introducing new knowledge, they can also benefit from capacity development under the project. Their capacity will be developed through the project.
International organizations	UNDP Country office and other UN agencies, UNMIL, FAO, GEF Focal point, other Multilateral agencies.	Guide the project and ensure it is well implemented, and benefits from best international knowledge and practices.

Consultations during PPG phase

141. Detailed consultations were conducted during the PPG phase of this project. A summary report of the field consultations and the stakeholders interviewed is included in the Annex.

1.4.2 An introduction to project sites

142. Two counties Grand Gedeh and Bong were selected as demonstration sites within this project, as they illustrate the diversity of the country and the issues outlined in the preceding sections. More specifically it is proposed to work in two districts; Garbazon of Grand Gedeh and Panta of Bong. There is a lack of normal base-line information for this type of field work in Liberia. The conflict years have also left a very different context in the post war rural reality. It is this context that has not been studied adequately and therefore is a priority for the field work of this proposal.

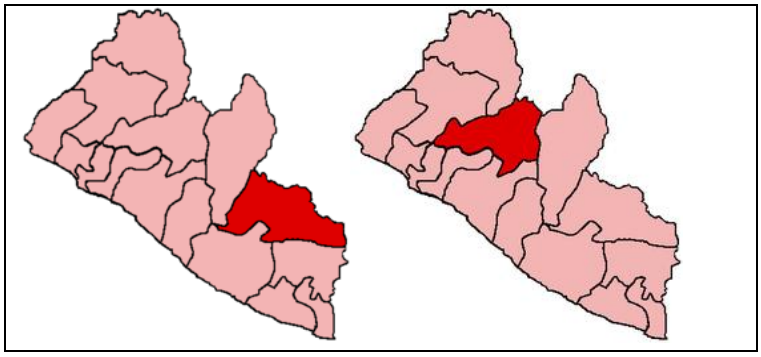

Figure 6: Location of the two counties in which the demonstration sites are situated, namely Grand Gedeh and Bong.

Grand Gedeh

143. Grand Gedeh is the third largest county in Liberia, and with 126,146 people, its ninth most populous county. It has many natural resources, especially a large virgin forest that has not been touched for years by logging companies. The high level of forest cover means that the county is capable of producing many kinds of food crops, and the streams and rivers are filled with various fish species. The county is also known to be rich in deposits of gold, iron ore and many other minerals that have not been widely exploited. All of these factors make the county attractive for development. However, inadequate and non-existent basic infrastructure hobbles the quality of life. Historically, this was one of the most neglected counties, and this was a main contributing factor to the civil crisis.

144. The people of Grand Gedeh were intensely involved in agriculture prior to the spread of the civil war, and sold rice and other agricultural products to other counties. Farming cooperatives sold their products to the marketing board, the Liberia Produce Marketing Corporation (LPMC). Today, farm production is performing well below its potential. Once productive cocoa and coffee farms are in need of rehabilitation, and although seed and tool distribution has been carried out by humanitarian agencies, various factors constrain production, mostly related to farmers' lack of access to capital. In 2005, the farming community in Grand Gedeh County cultivated the following food crops: rice (93% of farmers), cassava (35%), sweet potatoes/eddoes (3%), plantain/banana (12%), corn (5%) and other vegetables (3%). Some 26% of farmers were growing cash crops in 2005. The most important cash crop grown in the county in 2005 was cocoa (72% of cash crop producers). This was followed by plantain/banana (38%), coffee (13%) rubber (4%), palm nuts/oil (4%), coconuts (2%) and pineapple (2%).

145. In Gbarzon District, significant investment initiatives have taken place recently: 'Promoting Food Security in Southeastern Liberia through Commercial Rice Value Chain Development (2010–2011),' (EC and OXFAM), Liberia's Climate Change Adaptation for Agriculture 'Enhancing Resilience to Climate Change by Mainstreaming Adaptation Concerns into Agricultural Sector Development in Liberia (ERCC)', and ongoing programs by AEDE and CARE and the Agriculture Sector Rehabilitation Project (ASRP). Rice fields here are relatively well developed and require less rehabilitation. It is thus proposed that the

component team be based in Zleh Town, the central point of Gbarzon District, with 40,100 inhabitants and all the key land-use systems of Liberia within easy reach: plantations, lowland rice, upland migratory and forest use. The existence of farmers' organizations, especially the co-operative is another advantage, as understanding the nature and functioning of farmers' cooperatives is another important part of the field work.

146. Zleh Town[23], about 365 km from the capital Monrovia, is inhabited by the Kran ethnic group with an estimated population of 3,500 people (residents of the town) who are predominantly hunters and farmers. It also has several satellite villages. Agricultural production including rice farming (both lowland and upland rice cultivation), oil palm production, hunting, and harvesting of non timber forest products (NTFP) are the major livelihoods activities. Vegetable, root and tuber production as well as livestock farming are also practiced, but not on a large scale.

147. The people of Zleh Town are aware of the decreasing rainfall pattern. All interviewees noted the observed changes in the frequency and intensity of these events, though with some variation in the length of the cycles. Local groups have noted that they have had to change their crops cycles to adapt to the changing rainfall by planting fast maturing varieties or delaying planting.

148. A decreased and unpredictable rainfall pattern is being experienced in Zleh Town. This is affecting the availability and quality of water resulting in poor soil health, poor harvests and crop failures. For example, members of the AMENU Cooperative, an Oxfam funded lowland rice project, reported having low water for cultivation from October–April resulting in low production. It has also limited them to one planting cycle per year, leading to food insecurity. Farmer are also experiencing crop damage and failure as a result of increasing pest populations, soil degradation and lack of water for irrigation. Climate change, especially unpredictable distribution of rainfall, is the prime suspect for these disasters.

149. James Boimah, a 64 year old farmer in Poul Town, a satellite community near Zleh Town, and member of the AMENU Farmers Cooperative Society has been farming in the region for the past 45 years. He stated: 'Rainfall is less frequent and less intense than before Climate Adaptation in Liberia - Addressing the Needs of Vulnerable Communities. We in this community begin cultivation at the end of the dry season when the rain begins to fall. We plant our crops after the first or second rain in the month of March, and sometimes in April. After the first rain, the rain falls periodically till the month of June. This amount of rainfall within the period before June is needed for the optimum performance of many crops. Because of the change in rainfall pattern, farmers who plant after the first or second rain run into huge losses when the rains are delayed beyond the usual time because of changes in the climatic pattern we are now experiencing. Sometimes our crops get destroyed causing huge economic loss.'

150. Adaptation practices already observed:

- *Delayed planting and crop rotation* – water scarcity and inefficient water use has become a major problem for farmers in Zleh Town, leading to poor soil health which is also directly linked to poor harvests. As a result, farmers are now delaying planting to ensure that the rain will be sufficient. They are also rotating crops to maintain soil quality and in some cases are changing from highland to lowland cultivation. However, many expressed concern that crops like cassava, peppers and bitter ball do not grow in the swamp, which is a constraining factor.
- *Planting fast maturing crops* – many farmers are planting fast maturing crops varieties such as the one month okra, four month rice etc. Unfortunately, few farmers in Zleh Town have access to new, improved varieties of local food crops capable of producing abundant harvests in often harsh conditions. Marketing is also a growing problem for many farmers and leads to income loss.
- *Irrigation* – only few farmers have access to irrigation and have to resort to the irrigated field owned by the AMENU Cooperative, which is being gradually rehabilitated by Oxfam. However,

[23]The detailed description for this site is derived from the study, Climate Adaptations in Liberia; addressing the needs of Vulnerable Communities VOSIED on behalf of OXFAM in 2009.

irrigation alone seems an expensive undertaking. Therefore, while needed for improved food production, irrigation might pose additional financial burdens on the already poor farmers.

- *Weeding, fencing of farms against rodents* – Many farmers fence their farms against rodents and pests while women engage in extensive weeding. However, increased pest outbreaks not only reduce crop yields, but also add to the number of hours and resources women have to invest in pest control, especially weeding.

Photos 1 & 2: Low land rice cultivation in Zleh currently supported by OXFAM.

151. In Zleh Town (Grand Gedeh County), the AMENU Farmers Cooperative Society is the key beneficiary of a EU emergency project implemented by AEDE. In 2008/2009, AEDE expendedUS$204,548.47 (Funded by Oxfam GB-Liberia) to develop 504 acres of lowland. 150 tons of rice was produced. The project procured three motor bikes, 4000 kg of seed rice, constructed six dams, conducted governance training and paid for labour. The rice fields, in the case of Zleh Town, already existed and needed brushing and some rehabilitation.

152. Under the project 'Promoting Food Security in South-eastern Liberia through Commercial Rice Value Chain Development (2010 – 2011),' EC and OXFAM provided US$1,068,030.55, with which the following activities were carried out:

- Construction of a rice milling center;
- One warehouse constructed;
- Purchase of 2 rice mills, 2 threshers, 4 power tillers;
- One major bridge plus 12 culverts, 18 dams, several irrigation structures constructed;
- Training conducted (financial management) and farmers provided with seeds, tools and fertilizers;

With further assistance from OXFAM, AEDE is expected to help Zleh Town farmers to develop 1,500 acres of lowland rice farm in 2011.

Bong

153. Before the war, Bong County enjoyed a vibrant socio-economic life, attracting the most investment in the country. The civil conflict was particularly cruel to Bong County, parts of which were contested by multiple militias over fourteen years, resulting in massive loss of life and egregious human rights abuses, especially perpetrated against women and girls. The major tribe in Bong County is the Kpelleh Tribe who speak the Kpelleh dialect. Usually, many of the different tribes that settle in Bong County also learn to speak the Kpelleh dialect. Bong County served for a time as the capital of would-be president Charles Taylor's 'Greater Liberia' and the area possibly provided the majority of children and young women who were forced to join the various fighting forces. Public infrastructure and private property were looted or destroyed. Bong County is still one of the richest in Liberia, possessing natural resources such as gold, diamonds, iron ore and timber. Many investments and development initiatives of national importance have been undertaken in Bong County, including the establishment of the Central

Agriculture Research Institute (CARI), the Rubber Corporation of Liberia (RCI), and Cuttington University College (CUC).

154. Bong County is situated in the Mountain and Plateau zones, where citizens traditionally grow rice, cassava, maize, oil palm, cocoa, coffee, rubber and sugar cane. The county produces most of Liberia's upland and lowland rice. Citrus and cereal crops are also cultivated in the county. The potential for these crops is quite high compared to the current output. CARI was completely destroyed during the war, and basic and applied research activities are gearing up slowly. Research–extension–farmer linkages have not yet taken root, but plans are being created to push through with these participatory linkages in the coming years. The government intends to base the MOA's extension officers for the county at CARI to support research–extension–linkages for service delivery to the county's farmers. Currently, CARI is supported by five NGOs to implement extension services through a MoU between them. These partners are Concern Worldwide, Danish Refugee Council (DRC), German Agro Action (WHH), Action against Hunger, and Solidarities.

Table 6: Manpower of MoA (Bong County) and CARI (Suakoko, Bong County) Source: Care 2009

Agency	**No. of technical staff**	**No. of support staff**	**No. of extension staff**	**Staff with BS/BA or lower**	**Staff with graduate degrees**
MOA (Bong County)	2	1	1	Not available	Not available
CARI	11 plus the Director General	15 Research assistants	Not yet in implementation	11 (BS degrees)	1 Ph.D; 1 MSc.

155. As stated in the PRS, realizing this agricultural potential is one of the keys to reducing poverty. Like other counties in Liberia, Bong County is going through a seemingly unending food crisis, in spite of its great domestic agricultural potential. The agricultural sector at present consists almost entirely of traditional smallholder farms and household gardens, and consumers in the county have long been accustomed to depending on imported rice and other staples, in spite of the fact that these crops can be readily grown in Liberia. The main constraints to increased production reported by farmers are related to a lack of capital for seeds (46%), tools (40%), and other inputs (cash 30%, fertilizer & pest control 29%, household labor 23%).

156. The constraints to agricultural growth are many. Chief among them is a lack of capital for purchase of the various inputs that are missing locally. Because of a lack of access to credit and savings mechanisms there is little possibility for the community to increase production. In spite of the constraints, agriculture is a major component of economic revitalization and poverty alleviation in Bong County.

157. CARE has been identified as a key partner in Bong and specifically Panta District. This reflects the fact that they are piloting Conservation Agriculture (CA) farming in Bong County[24], and specifically in Panta District.[25]CARE operates in three districts in Bong County – Suakoko District, Panta District (where AEDE operated and where the Quakpagai farmers who received some assistance from WFP are located) and Kpai District (adjacent to Panta). The table below shows the location and extent of CA operations in Bong County.

[24] This is a three-year program ending this year (2011), however a proposal for continuation has already been submitted for consideration of the Howard G. Buffett Foundation Revitalizing Communities through Conservation Agriculture (Bong County, Liberia); A Proposal to the Howard G. Buffett Foundation; January 12, 2009 (Contact: Chris Palusky, cpalusky@care.org)

[25]The NGOs AEDE (supported by OXFAM) and CARE operate in Bong County. The following accounts were obtained from reports from the two organizations.

Table 7: Adoption of Conservation Agriculture (CA)[26]

District	Area planted (ha)	Use of CA tools (by farmers)	Crops planted	Qty harvested (weight in kg)	# of persons	Non FFS member	Female	Male
Suakoko	4	46	Vegetables	1,202	46	0	23	23
Panta	27.12	13	Cassava & vegetables		13	1	1	12
Kpai	14	21	Vegetables	n/a	n/a	1	7	14

The objective of CARE is to improve crop yields and soil fertility through smallholder adoption of Conservation Agriculture techniques. CARE's project is considered important because of its linkage with climate change adaptation.

158. Two of the three CARE demonstration sites visited by the project farmers showed very small (<0.5 acre) plots, on which rice was not one of the demonstration crops. This was only the first year for these sites and the steps taken to apply sustainable farming techniques were still limited. Work on rice has not yet begun. The last plot visited was in a swamp, and crops in many areas were performing poorly, probably because of poor drainage. However, a sizeable increase in soil organic matter content could be seen from the feel and color of the top soil layer. Almost no returns were obtained from the peanut crop. The damage observed was said to have been caused by rats. Nonetheless, the work of CARE in Panta County should be supported, recognizing that the short two year period they have been working with CA is very limited and given the complications of introducing this approach to humid climates. A much more systematic approach is required and their proximity to CARI means that the project team can support them from Grand Gedeh together with CARI thus ensuring an adequate support and follow up mechanism.

159. Within Panta District, Quakpagai Village hosts a local farmers' association involved in low-land rice cultivation, part of a UN family joint food security intervention, supported by UNDP and they also receive food aid from WFP. Local food production i.e. through lowland rice cultivation has been promoted through emergency support, and a diversification of a more holistic farming system in terms of building climate change resilience would be opportune. Farmers in Quakpagai, informed the project team that they cultivated 6.5 ha of swamp from which they harvested about 250 bags of rice (50kg/bag). They would like to increase the farm size to 69 ha in the coming season and their membership from 84 to 221.There are other farming groups in the Panta community that have developed sizeable acreages in the lowland. Farmer's rice assistance program is generally centered on lowland rice. At the same time they made clear their intention to continue with their upland farms, and the farm visited had six varieties of fruit and nut trees although the only one being used was the palm oil.

[26] Information from CARE International in Liberia, Progress Report for Year 2

Photos 3 & 4: Coping mechanisms such as stocking seeding material of traditional rice varieties and diversification (here cashew and pineapple) already exist at a farm at Quakpagai village. The cashew nuts are not eaten as the local farmers do not know how to process them.

Photos 5 & 6: Community members discuss joint lowland rice interventions at Quakpagai village, supported by the UN joint food security project of which UNDP has been one partner.

II. STRATEGY

2.1 Project rationale and policy conformity

LDCF conformity

161. The Republic of Liberia ratified the UNFCCC in 2002 and is classified among the non-Annex 1 parties. It also ratified the Kyoto Protocol in the same year, thus pledging political and practical commitment in the direction of sustainable development, while creating conditions to benefit from opportunities in this framework. Thus, following the example of Least Developed Country (LDC) Parties to this Convention, Liberia has developed and submitted its NAPA and is entitled to benefit from the LDC Fund for the implementation of priority measures identified in its NAPA. Furthermore, Liberia's NAPA top priorities comply with the LDCF eligibility criteria.

162. The Liberian NAPA (2008) identified eight high priority projects, of which a ranking exercise identified the 'top priority' project as 'Enhancing resilience to increasing rainfall variability through the diversification of crop cultivation and small ruminants rearing (agriculture)'. This proposed LDCF project directly responds to this priority.

163. The proposed project has been prepared fully in line with guidance provided by GEF and the LDCF Trust Fund. The project follows the guidance from 'Programming Paper for Funding the Implementation of NAPAs under the LDC Trust Fund (GEF/LDCF 2006).

164. Firstly, in line with GEF/LDCF (2006), this project was identified and conceived through the participatory NAPA process in Liberia. Moreover, it was designed to be consistent with, and supportive of, national development strategies, as expressed in the PRSP and related documents. It is aligned with the UNDAF and CP, as outlined in detail in Section 1.1.2 above.

165. Secondly, the project addresses the urgent and immediate activities identified in the NAPA, and is in line with the priority sectors identified in GEF/LDFC (2006) on a global basis. Notably, this project focuses on urgently needed adaptive capacities in the agricultural sector and addresses priorities identified in both the agricultural and food security sectors. It builds local community adaptation capacities and strengthens county and national government services to be able to address adaptation in a well informed and knowledgeable way. The systemic capacity to address adaptation in Liberia is strengthened through targeted interventions at the policy, planning and budgeting levels.

166. Thirdly, this project is designed to address critical policy gaps in terms of the predominant upland shifting agricultural system and ensuring a sustainable lowland rice production system that currently make local communities and the agricultural and food security sectors more vulnerable to anticipated climate change risks.

Overall GEF Conformity

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

- Sustainability: the project has been designed to have a sustainable impact, at village and at national level. See section on sustainability below for more details;
- Monitoring and evaluation: the project is accompanied by an effective and resourced M&E framework, that will enable ongoing adaptive management of the project, ensuring that lessons are learnt, management decisions are taken based on relevant and up-to-date information, and regular progress reports are available for concerned parties;

- Replicability: great attention has been paid in the project design to ensure that lessons are replicable, and that the necessary replication mechanisms are in place. See section below on replicability for more details;
- Stakeholder involvement: following on from the NAPA process, the design of this project was effectively participatory. Moreover, the design of the project ensures the appropriate involvement of stakeholders in project implementation and monitoring.

2.2 Country ownership: country eligibility and country drivenness

168. This project fully reflects the priority measures identified by the Republic of Liberia's NAPA, and will contribute to the country's development and achievement of critical MDGs. Agriculture, the main livelihood activity and one of the driving forces of Liberia's economy, is a leading priority for the government.

169. This is Liberia's second LDCFs proposal and is identified as top NAPA priority. The profile of the priority was described as follows. **Overall objectives:** The primary objective of the project is to reduce vulnerability of farmers to climate change by diversifying crop farming through the cultivation of soybeans, lowland rice and small ruminant rearing. The major **goals** of the project include (1) to reduce to a considerable extent the impacts of extreme effects of weather on farm productivity; (2) to encourage and promote the diversification of sustainable agricultural productivity; (3) to increase the food production level of farm families. **Expected results** include (1) rural communities' capacities strengthened; (2) increase in sustainable livestock and crop production; (3) poverty levels at both national and household levels reduced; (4) farmers' income increased due to diversifying agricultural production; (5) malnutrition levels among rural communities reduced.

170. The proposed LDCF project design has been closely aligned with these expectations and in consultation with a wide range of stakeholders (see Section 1.4).

2.3 Design principles and strategic considerations

171. Design principles and strategic considerations include:

- A strong existing baseline especially at demonstration sites as key criterion for intervention planning;
- The development of integrated up- and lowland development to build long-term climate risk resilient communities;
- Tangible local level demonstrations to develop visible and practical adaptation learning;
- Up-scaling adaptation learning through integration into future policy making and into capacity building initiatives. This is particularly important as Liberia is moving from a post-conflict into a long-term sustainable development mode.

172. This requires a much greater in-depth understanding of the logic of current land use practices. Little has been done over the past 25 years to fully comprehend the various factors at play, be they ecological, social or economic. Therefore the project needs to develop a comprehensive database and analysis of livelihood, farming practices/land use system and indigenous knowledge of participating communities. This should occur through a participatory approach starting with the inception phase. It will take time, as mapping of farming systems requires at least one farming cycle and at least a further year's follow up. Documenting indigenous knowledge systems and livelihoods strategies requires similar and even longer time periods if real understanding is to be achieved.

173. UNDP's comparative advantage in designing and supporting this LDCF project is particularly strong because of the Program's long-term involvement in setting the development agenda of the country. As part of the UNDP's CPAP, programs on promoting food security and long-term environmental sustainability are being implemented. Building climate change resilience in sectors relevant to pro-poor economic development, including for food security and agriculture, are key strategies addressed by UNDP Liberia.

174. UNDP has strong mandates and capacities to develop national capacities for integrating climate change risks/opportunities into social equity, economic growth and environmental protection issues at all levels of development decision making. Integrating climate change risks into sustainable management of environment and natural resources and into Poverty Reduction Strategies, key national development frameworks and sector strategies is the key business of UNDP in Liberia as set out in the CPAP.

175. At the heart of UNDP's capacity building approach is the promotion of innovative and alternative climate resilient land practices and livelihoods, and developing the capacity of local government, community and indigenous groups to manage climate change risks – all major components of this proposal.

2.4 Project objective, outcomes and outputs/activities

176. The **project objective** is '*to increase resilience of poor, agriculturally-dependent communities and decrease vulnerability of agricultural sector to climate change in Liberia*.' This objective is to be achieved through three components with associated main outcomes and strategically planned outputs with supporting activities, outlined in the following.

COMPONENT 1: CAPACITY DEVELOPMENT

OUTCOME 1: STRENGTHENED INSTITUTIONAL AND INDIVIDUAL CAPACITY TO PLAN AND MANAGE CLIMATE CHANGE IN THE AGRICULTURAL SECTOR IN LIBERIA

Baseline:

177. Armed conflict and social instability led to the emigration of the limited trained manpower of Liberia. Few have returned as the institutional infrastructure they need for job satisfaction is still in its early stages. Thus there are few scientists capable of working on the challenges of current land use practices; there are no facilities for taking soil samples for example. Mid-level personnel have not been trained with a systems approach or in participatory methodologies. These are provided mainly by NGOs and even then in a haphazard manner. The Ministry of Agriculture is only now reconstructing itself and with its limited budget has a very limited capacity for outreach. Climate change management capacities at individual, institutional and systemic levels – either as a stand alone or mainstream approach, are currently not systematically strengthened.

178. As a post-conflict country, Liberia has focused its recent development efforts on enhancing national security, revitalizing the economy, strengthening governance and rule of law, and rehabilitating infrastructure and delivering basic social services – the four pillars of Liberia's PRS. Investments in the agricultural sector have been impressive – mostly with a view to building national food security. Support from a multitude of donors has included the UN joint program on food security, of which UNDP has been a significant partner. However, building climate change resilience in the sector has not been a focus of any such investments to date.

179. UNDP is coordinating the implementation of a GEF LDFC project on coastal erosion, the first NAPA priority addressed in the country context. Oxfam has made an initial effort to initiate capacity support

efforts in terms of CC. Cuttington University's agriculture school has started to integrate climate change modules into their ongoing modules – mostly through a mainstreaming approach. The NAPA process provided some initial stakeholders with exposure to climate change issues and thinking, but no systematic approach to climate change analysis, risk assessment and adaptation planning is in place. There is no clear guidance – and lessons learned – on how climate resilience can be achieved in the agricultural, rural development and food security sectors in Liberia. In fact there are many assertions and myths circulating, and evidence-based decision making is largely absent.

180. If capacities are not strengthened to attend to climate change challenges in the sectors, it is very likely that maladaptive practices in agriculture, rural development and food security will remain prevalent – making the sectors and the people depending on them for their daily livelihoods and incomes extremely vulnerable. Notable many decision makers in the sector are men, and it is seen to be critical to promote a more gender balanced technical capacity relating to climate change specifically, as climate change will affect women and men differently. It is asserted that having gender diverse technical capacities in place will help address gender specific concerns on all levels.

181. Additionally, national development and relevant sectoral policies are currently not addressing climate change risks posed to Liberia. Worryingly, several agricultural investment policies seem to lay the foundation for maladaptive practices, exposing rural Liberians who directly depend on subsistence agriculture for their daily livelihoods to future risks and making them particularly vulnerable. For example the large-scale drive towards developing lowland rice cultivation throughout most counties, at least as a stand-alone livelihood strategy, seems very risky. In addition, the continued degradation of ecosystems e.g., through uncontrolled slash and burn practices renders communities extremely vulnerable to future climate shocks. Even larger-scale commercial agricultural projects and investments may be ill advised to react on policies that have not undergone some rigorous 'climate change proofing' – or the adjustment of investments in line with projected climate change risks. Numerous donor-supported investments – which have been mostly driven as emergency and post-conflict responses up to now, would benefit from building climate change resilience into them as a key consideration for future programming. UNDP has a comparative advantage to spearhead such a policy shift among donors as well as national decision makers, with a specific climate risk and environmental management for sustainability focus in the institutions' work plan.

182. In terms of related financial baselines, a diversity of multi-lateral and bi-lateral donors is active in Liberia, as well as numerous private and church-based charities. Much of the support focuses on the relief and reconstruction activities outlined in Liberia's Results Focused Transitional Framework. The majority of interventions are still geared to emergency assistance and post-war recovery. However, measures targeting the medium and long term are now becoming more prominent, including in the agricultural sector – with a focus on improving food security. Most of the interventions listed below have a lowland rice cultivation development component or focus.

183. UNDP is playing a major role in supporting capacity development in Liberia, including that relevant to the agricultural sector. UNDP currently provides around $60 million annually in grants[27], including for Liberia Decentralisation and Local Development; Community Based Recovery and Development; Micro-Finance – Improved Access by Women to Financial Services in Rural Areas; Support to Youth Employment and Empowerment; Disaster Risk Reduction Programme and Centre Songhai Liberia Initiative (a promising agricultural production/marketing experiment). On a national level, baseline support for the enhancement of agricultural sector capacities include, but are not restricted to the following: The UN-Joint Food security program (US$ 3.1 Mio and the EU – food facility support (US$ 1,6 Mio)[28] were rolled out up to now and have greatly contributed to supporting national capacities in the agricultural sector in post-war Liberia. The Liberia Integrated Assistance Programme (LIAP) funded by USAID totaled

[27]These come from diverse sources, including UNDP's own funds, from UNCDF, from a range of bilateral donors (e.g. SIDA, DANIDA) and others (eg. EU).

[28] EU's Contribution to Strengthening the Government of Liberia and UN Joint Response to Food Crises through UNDP. Progress Report (June 2009 – July 2010)

to about US$ 20 Mio with 12,505 MT of commodities for monetization and 5,248 MT of materials for distribution coming out of that support, which aimed to reduce food insecurity of rural households in 24 districts including in Bong between 2007 and 2010. In addition to training in food production and nutrition, the program conducts rehabilitation of damaged community infrastructure including markets. The Agriculture for Children's Empowerment Project (ACE) funded by USAID (US$ 2.7 Mio) aims to improve child welfare using economic growth activities. ACE's main entry points into the communities are schools and agricultural input service providers. ACE project is linked to this proposed project, as improved education for children helps improve families' skills and capacity in agricultural production. FAO is implementing numerous relevant agricultural sector development projects throughout Liberia with an overall portfolio of US$ 10 Mio[29]. Notably some investments under the Food Security through Commercialization of Agriculture (FSCA) (US$ 1.5 Mio) will be implemented as co-financing contribution under Component 2 of this project. A significant intervention by government is the Agriculture Sector Rehabilitation Project (ASRP) currently under implementation. The total investment of the various donors (e.g. ADF, IFAD) is about US$ 26.7 million). The overall goal of the project is to contribute to food security and poverty reduction. Its specific objective is to increase the income of smallholder farmers and rural entrepreneurs including women, on a sustainable basis.

184. Capacity building relative to climate change is slowly coming onto the development agenda, responding to critical sustainability needs. Liberia's Environmental Protection Agency (EPA) coordinates the climate change program in Liberia, and has coordinated the NAPA. The GEF sponsored 'Enhancing Resilience of Vulnerable Coastal Areas to Climate Change Risks in Liberia' project has a capacity building component at the national and county levels. About US$ 3.3 million are allocated to this capacity building. EPA, together with UNDP is coordinating an Investment and Financial Flows (I&FF) assessment of adaptation in the agricultural sector. This project is primarily linked to national capacity development on climate change adaptation and comes with an investment of approximately US$ 40,000. The Forestry Development Agency coordinates the REDD program (US$ 200,000) and is supporting climate change capacity development. Specific support to Cuttington University, through Oxfam and IFPRI, and the UNDP 'Boots on the Ground' programme, all related specifically to building national climate change capacity are not costed individually, but make significant baseline contributions to this project. UNDP is also facilitating another GEF funded project under the Sustainable Land Management focal area, entitled 'Mainstreaming and Capacity Building for Sustainable Land Management.' This project aims at creating an enabling environment for sustainable land management through mainstreaming and developing capacities for sustainable agriculture through a broad-based participatory process. The roughly US$ 1 million investment is being implemented by the EPA and the University of Liberia.

185. A critical mass of climate risk management capacity is being systematically built at the local, regional and national levels, through an integrated project design. Gender sensitive and women empowering approaches to capacity building are encouraged and supported specifically.

186. Technical staff of the MOA, the Land Commission and other relevant national government institutions, national and international NGOs working in the sectors, as well as technical experts at academic institutions in Liberia has the skills to plan and develop climate change resilience sector policies and programs, and to engage in evidence-based decision making leading to climate change resilient programming. An active and cutting-edge climate change research community is being established, and agricultural research agendas take climate change into consideration – and develop critical knowledge needed in Liberia for taking responsible local-level actions.

187. A strong baseline analysis to understand the agro-ecological, livelihoods, forest management, organization and training context more thoroughly will be in place and ongoing, laying the foundation for evidence-based planning. A more detailed formulation of any subsequent land-use intervention strategy will benefit from such a baseline. It will also provide the evidence base for the detailed planning of relevant land-use intervention strategies (in Component 2) for three systems: forest, upland shifting agriculture and lowland rice farming. The baseline analysis will be carried out with selected farmers

[29] Information obtained from FAO fact sheet, FAO/Liberia (tel. #+2316553891)

identified during the inception stage, and representative of the communities' priorities. The baseline analysis is being carried out with key partners such as CARE, CARI, the University of Cuttington and others – and also serves as a capacity development opportunity. Based on on-the-ground piloting and testing (Component 2), sustainable climate change risk management practices are being developed for the sector, and suitable adaptation action and strategies are being developed. Project partners including regional extension officers will have the capacity to work with and advise local communities on climate change risks and opportunities – and facilitate local level adaptation responses.

Adaptation alternative:

188. In the adaptation alternative, it is recognized that policy shifts are firstly dependent on relevant and reliable information, and secondly on a dedicated policy dialogue that effectively conveys the relevant messages to the policy makers – and are integrated into critical policy processes. A key result is the effective mainstreaming of climate change risk and adaptation actions throughout existing and newly developed agricultural policies in Liberia.

189. As such, it is envisaged that newly forming national development policies such as the upcoming second NPRS will mainstream climate change risks into its design, as well as planning of local poverty reduction actions. Existing sectoral policies will be reviewed taking cutting edge climate change knowledge and local and national level adaptation learning into consideration. Based on the dedicated local level adaptation learning demonstrations in Grand Gedeh and Bong county, valuable lessons learned for building climate resilient communities and economies will be absorbed into national decision making. The lowland rice development drive will be reviewed in the context of a diversified livelihoods approach, including agro-ecological and conservation-agriculture principles to rural development. Viable alternatives to low-return slash and burn practices will be developed and promoted.

190. As adaptation learning will probably continue far beyond the scope of the LDCF intervention, the principles of adaptive learning and policy making will be ingrained into ongoing and revolving policy making processes, i.e. through the mainstreaming of relevant climate change risk management principles.

Costs component 1

Baseline investment: US$31,000,000 (partially also counted for component 2 where county specific)
Co-financing: US$ 600,000
GEF allocation: US$ 687,800

Output 1.1: CRM and adaptation capacity in the agriculture sector developed of key technical stakeholders in the ministry technical departments, in parastatals, NGOs and in research institutes (especially those responsible for preparing policies and plans and for overseeing investments)

191. Climate change research, risk management and adaptation are all still concepts rarely discussed among technical stakeholder in the agricultural, rural development and food security sectors. With post-conflict priorities focusing on basic service delivery and reconstruction, limited investments have been made so far in Liberia in addressing climate change. However, there is a strong demand for knowledge and skills development revolving around climate change in land production systems, and it is realized that climate change poses real threats to local livelihoods, current development models and the future economic growth of Liberia.

The systematic identification of human resource requirements of the various institutions involved and the availability of these resources in-country is required. Profiles for the key technical stakeholders need to be developed. A program will be set up that will a) train those in key positions with other relevant skills but

whose knowledge of the specific aspects of climate change relevant to their work is weak, b) develop a program of training relevant personnel lacking in the posts in government, with scholarships, where necessary, c) develop a program of updating the existing professional pool about international advances in the subject relevant to the Liberian context, via internet, guest visitors and other mechanisms, d) the capacities of the research organizations such as bio-meteorological institutions, Firestone research institute, hydro-meteorological unit, agro-meteorological units, universities/colleges of agricultural institutions and the local and decentralized institutions to gather and analyze weather and climate data, to identify the most relevant institutions and develop a strategy to strengthen their technical and financial capacities to provide farmers and other key stakeholders with climate information and advices for climate resilient agriculture.

192. Key trainees to be targeted are the technical staffs of the four departments of the MOA, staffs of other governmental and paragovernmental organizations such as EPA and FDA, and those of major NGOs active in the agriculture and food security sectors, including OXFAM, CARE, AEDE. Senior teaching staff of the tertiary education centers will be targeted by the trainings as well. Technical advisors of donor programmes and cooperation partners will be also included on a individual basis.

193. A suite is suggested of specifically designed and targeted interventions strengthening the technical capacities pertaining to climate risk management in Liberia. Such interventions must be built from the community level with a participatory demand-driven approach based on learning-by-doing and reflecting the rationale of this specific LDCF project intervention.

Indicative activities:

1.1.1 Develop a Climate Change Management (CCM) capacity development plan for technical stakeholders in the agricultural sector, giving specific consideration to women representation.

1.1.2 Based on the vulnerability assessments and lessons learned under Component 2, develop specific climate risk management strategies for the various actors in the sector, with a special focus on women.

1.1.3 Establish a plan of action for the implementation of knowledge transfer strategies on climate change risk management at various levels, including educational institutions, government functionaries, local leaders, communities.

1.1.4 Set up a Monrovia-based think tank on CRM and adaptation (including a self financing scheme that make the institution sustainable) n the agricultural sector for key stakeholders (government, non-government and donors), facilitating knowledge exchange among the various interest groups, and learning and up-scaling from the demonstrations.

1.1.5 Support relevant (on-site) climate change management research by organizations, institutions and individuals through small research grants.

1.1.6 Develop a strategy to strengthen the technical and financial capacities of the most appropriate private and public local institutions including the NGOs and CBOs to provide farmers and other key stakeholders with climate information and advices for climate resilient agriculture.

1.1.7 Develop a website on climate change learning: for this purpose, the project will support end-users surveys and hire developers to design a cutting edge and modern climate change adaptation website for Liberia with a focus on the agricultural sector. The knowledge management website will be linked to the websites of all relevant institutions including EPA, FDA, UNDP and the climate change secretariat for example.

1.1.8 Make website maintenance and updating with key information a key task of a staff member and ensure that regular follow-up is guaranteed.

Output 1.2: In two counties, county planners and extension workers have the technical capacity to support communities on climate change, by providing advice on climate change impacts on agriculture and on alternative approaches and measures.

Regional technical staffs have extremely limited opportunity for professional updating, and usually find it difficult to address newly emerging technical issues and practices into their ongoing work. In Grand Gedeh and Bong counties, where the selected demonstration sites under Outcome 2 are situated, decentralized MOA staff and also county administration agricultural officers are in need of specific learning opportunities to enable them to take evidence-based decisions and to facilitate meaningful local level adaptation action. To match the needed climate change support in these 2 counties, the capacity development plan for county level technical stakeholders in the agricultural sector will be designed in taking in account the results on the baseline assessment that will be carry out in the output 2.1. These training programs will, thus, build capacities of technical staff to support farmers to face to the specific climate risks identified during the vulnerability assessment.

Indicative activities:

1.2.1 Include county level staff in implementation arrangements for site-level initiatives to facilitate hands-on learning with the project team.

1.2.2 Develop a CCM capacity development plan for county level technical stakeholders in the agricultural sector. Link to Output 1.1 and specifically address needs and target group profiles for county level staff identified during the baseline assessment planned in the output 2.1.

1.2.3 Implement county-level CCM capacity development plan on climate risk management, in particular focusing on building the capacity of key actors especially field staff, i.e. extension workers, NGOs, community leaders including those from women's organizations and leading farmers.

1.2.4 Make climate change learning materials accessible to key actors using the newly established climate change web portal. Cater for those who do not have web access by printing hard copies or distributing CD-ROMs with the learning materials.

Output 1.3: Liberian tertiary education system adapted to produce technicians, engineers and scientists knowledgeable about adapting to climate change

194. A long-term strategy to capacity building is to integrate relevant learning modules into the curricular and teaching practices of tertiary education institutions. The Agriculture Department of the University near Monrovia, the agricultural technical and Cuttington University in Bong County annually produce the graduates that will find employment in public and private sectors as well as future farmers' leaders. It is seen to be a strategic entry point to assist these institutions to mainstream climate change risk management meaningfully into their curricula or even to develop specific climate change modules.

195. Students and teaching personnel will be recruited to carry out on-farm research relevant to the key adaptation issues identified at the various demonstration sites in Grand Gedeh and Bong counties. They will work closely with researchers at CARI and with MOA county staff.

Indicative activities:

1.3.1 Support tertiary education institutions in the development of technical support that is responsive to the adaptation strategies identified in the demonstration projects.

1.3.2 Facilitate on-site analysis of the effectiveness of adaptation measures with local level community participation – and outputs that directly benefit local level application.

1.3.3 Establish a network of climate change practitioners and support knowledge sharing and communication on managing climate change risks at the farm level.

1.3.4 Establish an incentive system to encourage sharing of best practices on assessing climate change risk management practices.

1.3.5 Once identified and validated, new technologies, approaches and associated organizational activities will be promoted through an integrated medium strategy.

Output 1.4: Raised awareness of national leaders to the threat of climate change to agriculture (e.g. MOA leaders, related Ministries and agencies, the Climate Change Committee, Cabinet, Food Security and Nutrition Technical Committee [FSNTC], Agriculture Coordinator Committee [ACC]).

196. The work that is being conducted i.e. under Component 2 of the project – the in-depth study of farmers' experiences and responses to increasing climate instability and its impacts – must be documented, systematized and edited into visual and written material for key national actors. Overall the role of the existing land-use systems must be documented and such local knowledge must be communicated to relevant decision makers. The demonstration sites for validating farming systems options should be developed as centers for visits and discussion of decision makers with farmers, so that lesson learning is incorporated directly into policy making. The new knowledge of the dynamics of climate change and its implications for Liberia should be disseminated among decision makers in regular meetings and workshops. All these activities are to be coordinated by the management team of the project according to a plan of work approved by the project Board made up of representatives of the key ministries and representatives of civil society.

Indicative activities:

1.4.1 Develop a detailed knowledge management and communication strategy addressing all intended project outcomes (e.g. website incorporated into MOA's and other related ministries' and agencies' websites).

1.4.2 Document the local level lessons learned in a systematic manner and develop the validation site capacity to function as local level learning laboratories (linked to Outcome 2).

1. 1.4.3 Implement specific policy outreach activities such as technical seminars, field visits, policy dialogues and regular technical briefing papers for specific target groups.
2. 1.4.4 Specifically link project lessons learned to the international peer community through attending conferences, presenting papers and linking to the Adaptation Learning mechanism, amongst others. Implement strategy and track impacts.

Output 1.5: Climate change and adaptation mainstreamed into LASIP and other key agricultural policy initiatives (e.g. Land Policy Reform, Enhanced Land Husbandry drive under LASIP)

197. On the basis of the lessons learned from the project, agricultural policies will be reviewed and updated to incorporate climate change resilience building components. The think tank established under Output 1.1 will guide such policy dialogue. Partners in government, the private sector, national and international NGOs and the donor community will engage in critical climate change policy discussions and reviews.

198. The new PRS will clearly include climate change resilient programming and future interventions of the donor community will be climate sensitive to ensure long-term sustainability of investments in the agricultural, rural development and food security sectors. It is important not only to concentrate efforts on sustainability of future projects, but also to promote the sustainability of existing projects, e.g. by following-up on the EC food facility project being implemented by AEDE.

Indicative activities:

1.5.1 Formally identify and catalogue policy opportunities (such as the upcoming PRS update striving for Liberia to become a Middle Income Country by 2030), reviews of agricultural sectoral policy but also of donor investment proposals for mainstreaming climate change resilience building opportunities (based on project findings).

1.5.2 Together with key stakeholders (MOA, EPA, others), develop joint strategies of mainstreaming climate change concerns into future policy development.

1.5.3 If appropriate, develop climate change mainstreaming tools, integrating lessons from the project intervention.

1.5.4 As part of project review, track and analyze policy impacts.

COMPONENT 2: ENHANCING RESILIENCE TO CLIMATE CHANGE BY MAINSTREAMING ADAPTION CONCERNS INTO AGRICULTURAL SECTOR DEVELOPMENT IN LIBERIA

OUTCOME 2: INNOVATIVE, SUSTAINABLE, SOCIALLY APPROPRIATE ADAPTIVE MEASURES PILOTED AT THE COMMUNITY LEVEL

Baseline

199. Liberia historically had a dual rural economy: a modern agricultural sector, mainly tree crops especially rubber, and a subsistence slash and burn farming system that produced the basic foodstuffs for the population. From the beginning these two systems have been in conflict. An urban elite promoted a policy of privatization and state ownership of the land and trees, leasing their exploitation in the form of concessions. As the USA Property Rights and Resource Governance paper points out, 'This policy has permitted the state to grant concessions for vast tracts of customary land. It has also contributed to conflict, as indigenous communities lost their food and livelihood source and an important lynchpin of their cultural heritage.' The same document also points out that '…central to the war was conflict over land and natural resource rights…'.[30] The government has recognized the importance of these issues, and set up a National Land Commission (2009) to draft a new framework for land rights and the return of ownership of land and forest resources to the community. Community-based natural resource management systems are being promoted by the Commission.

200. Over the past years, significant investments have been made in the agricultural sector. The government is pursuing a policy of promoting lowland rice production in a drive to secure national food security (see above). Major investments and pending proposals by organizations such as the UN-family, the EU, IFAD and ADB are focused on lowland rice production. A full production chain, starting with infrastructure investments on site for rice production, capacity development of local farmers groups, development of a market for the produce, setting up of processing infrastructure, seed facilities and transportation lines, is being set up by a concerted and largely well coordinated donor support effort.

201. Notably the lowland rice development effort is being pursued as a sole focus. However, field investigations and community interviews during the PPG phase of this project clearly identified that farmers largely apply a dual farming strategy. The so-called upland farming, which can be described as a migratory slash and burn system, produces 'upland' rice varieties which are preferred by the rural population, as well as other key food crops such as cassava, bananas, groundnuts, root crops, pepper, maize, beans and so forth. The lowland rice production priority of the government is not rejected but is seen as a complementary activity, the scale of which depends on the level of government and donor

[30]See USAID Country Profile of Liberia – Land tenure and Property Rights Profile.

investment; inputs, finance, transport and crop prices. Lowland farming is mainly conducted as a cash income alternative earned from project remittances and rice sales, and not to produce preferred local food. Lowland rice production is highly dependent on subsidized external inputs such as fertilizers, chemicals and fuel.

202. Very limited formal information on characteristics, functions and dynamics of these farming systems exist to date. OXFAM and CARE have conducted some relevant and site specific studies throughout Liberia and especially at the proposed project 'sites'. FAO has only just started to develop some foundations for farming systems research, as they have so far focused their support in the context of post-conflict food security. Although some anthropological studies on tribal use of forests existed prior to the war, post-war work on forest access and resources seems to be very limited if they exist at all. Information on upland slash and burn, although still the most significant farming system, is extremely limited, especially information on cropping cycles and their yields. Systematic information on the successes of the lowland rice interventions in swamps is absent or inaccessible. Most information seems to be anecdotal, and partially captured by local communities in terms of planting inputs and harvest yields.

203. The upland farming practices bring with them numerous sustainability concerns, notably an uncontrolled cutting and burning of primary forests, often leading to long-term land degradation. Increasing population pressure throughout Liberia exacerbates the pressure on the limited upland farming areas and poses serious environmental threats. Several conservation NGOs are working on sustainable forest management projects, and Conservation International (CI), the World Wide Fund for Nature (WWF) and IUCN, amongst others, have projects in place that aim to improve and better direct the current slash and burn threats to the forests.

204. Climate change impacts are considered to be affecting local farming and lowland rice production already. Farmers reported that the seasonal rainfall patterns had already changed and that they have already started to adapt their traditional farming practices. They find that lowland rice production is more vulnerable to climatic variations, and their own traditional seed supplies do sometimes produce more reliable harvests. OXFAM conducted some initial research relating partially to the climate change risk of lowland farming in particular, and agricultural systems more broadly in Liberia. IFPRI is currently undertaking a research project which aims to map the suitability of various crops, including lowland rice, under existing regional climate change projections for Liberia. Although this research is not yet citable, it is clear that adverse impacts are expected. This information, linked to local perceptions, indicates that more diversified agricultural strategies must be pursued to build climate change resilience amongst local farming communities and the agricultural sector per se.

205. Although there are currently no specific local level climate change adaptation interventions ongoing in the agricultural sector in Liberia, it was found that the baseline situation in Panta District (Bong County) and in Gbarzon District (Grand Gedeh) is favorable to start building and piloting this important increment. Both districts are characterized by having well-established farmers' organizations in place and major NGOs as well as the UN are already cooperating in agricultural development projects at these sites. In Gbarzon a local cooperative, which is involved in lowland rice production as well as in an oil plantation, was established more than a decade ago, and is supported by the EU through OXFAM. In Panta CARE has being promoting conservation agriculture for the past two seasons and the district is relatively close to CARI with its agricultural scientific manpower. Additionally the UN Joint Program invested in this district, promoting local food security over the past years. Major advancements in terms of baseline agricultural development have been made at these sites since the end of the war, and local communities are mobilized and motivated to improve their own capacity – including for climate change resilience.

206. In terms of financial baseline, the investments in the agricultural sector described under Component 1 apply. More specifically, investments at the demonstration sites include the following for Bong and Grand Gedeh Counties:

207. ***Bong (Panta District):*** The UN Joint program has made significant investments in Bong county. In Panta district lowland rice development has been supported by the program and specifically by FAO to an

approximate baseline investment of US$ 1.5 Mio. Additionally, the World Food Program (WPF) initiated the Purchase for Progress (P4P) Scheme (with a budget of over US$1 million for purchases in three counties, including Bong) in the same area. P4P is a partnership of WFP, the Bill & Melinda Gates Foundation, the Howard G. Buffet Foundation, the Government of Liberia and UNDP. The WFP is buying locally produced rice, an initiative to transform the way WFP purchases food in developing countries, giving small-scale farmers access to markets and the opportunity to sell their surplus at competitive prices. The rice is being milled locally and distributed to local beneficiaries of feeding programs. If surpluses can be generated by the local rice farmers these may even be used elsewhere for WFP's interventions in the future. The cumulative support to farmers in Panta district is not available currently, however, the baseline interventions are very visible and the local communities are actively involved in lowland rice cultivation development.

208. The Agency for Economic Development and Empowerment (AEDE), a Liberian NGO, supported the Panta Farmers Multi-purpose Cooperative Society in Panta District between 2008 and 2010[31]. US$174,000 (funded by USADF) were invested to develop 150 acres of lowland, to conduct training in governance and financial management, and to construct a warehouse and one office building. Additionally 12,600 seedlings for 210 acres of oil palm were financed. The FAO further invested in the development of vegetable production. AEDE provided training and seeds to farmers.

209. Additionally, CARE International operates in three districts in Bong County, namely in Suakoko, Kpai and Panta Districts, piloting conservation agriculture (CA) techniques as a way of improving crop yields and soil fertility with smallholder farmers. Over the past three years, CARE has invested US$ 1.2 Mio in Bong for CA – a sizeable baseline investment concerning possible adaptation techniques on site.

210. The Government of Liberia is investing into the county through its national budget, and specific allocations to the agriculture and food security sectors are made. However, during the project preparation no final financial figures could be solicited and "cleared" by MOA.

211. ***Grand Gedeh (Gbarzon District):*** OXFAM, with the financial support from the EU Emergency project, implemented food production support interventions in Liberia for US$3 million. The Agency for Economic Development and Empowerment (AEDE), a Liberian NGO, worked together with OXFAM to support the rehabilitation and development of lowland rice infrastructure, building of new processing infrastructure, as well as purchasing of seeding material. Capacity support has also been provided in the form of training relating to lowland agriculture. Overall approximately US$1,3 Mio were spent in the district between 2008 and 2011.

212. In Zleh Town, Gbarzon District, the so-called AMENU Farmers Cooperative Society is the key beneficiary has been a key beneficiary with an investment of more than US$204,000 made into lowland rice development (AEDE through OXFAM). Over 500 acres of lowland were rehabilitated (irrigation infrastructure built previously was in place) for rice production, and approximately 150 tons of rice were produced during 2009/10. The project procured three motor bikes, 4000 kg of seed rice, constructed six dams, conducted governance training and paid for labor. Under the project 'Promoting food security in south-eastern Liberia through commercial rice value chain development (2010–2011)' additional US$1 million were availed to construct a rice milling center, a warehouse, one office building, as well as irrigation and paddy rice infrastructure were financed. Tools were bought and specific capacity building activities took place on site.

213. FAO has supported the district in rice cultivation in the past, and will continue its support through the Food Security through Commercialization of Agriculture (FSCA) project on the site in the form of co-financing.

214. As for Bong county the Government of Liberia is investing into agriculture and food security in Grand Gedeh, however no final budgetary allocations could be provided during the PPG phase.

[31] Information on expenditure received from AEDE Management (thru: +2316527159 or

Adaptation alternative:

215. In the adaptation alternative a systematic local level adaptation strategy is being piloted in two districts in Liberia, namely Panta District (Bong County) and in Gbarzon District (Grand Gedeh). Based on an initial farming systems baseline analysis, an integrated land-use and livelihood strategy is being supported that helps local farmers build critically needed climate change resilience.

216. It must be recognized and understood that climate change is a location-specific issue. There will be no 'one fits all' solution anywhere in Liberia. Decentralized ways of working are needed, within the framework of coherent national policies. For example, project demonstrations such as mini-ponds show that it is a good adaptation practice for farmers operating on clay soil such as in Zleh Town, but might not be suitable for farmers operating on sandy soil like in Kpor. Specific attention is required to develop location-specific adaptation options to manage future anticipated risks taking into consideration bio-physical, socio-economic and socio-cultural issues.

217. Furthermore it is critical that the local farmers are the key drivers of the adaptation strategy, indentifying their own local solutions. The 'project sites' refer to areas where established farmers' organizations operate. Farming families that are recognizable 'leaders' in farming practice and innovation and who are interested in external support for improving the viability of their farming systems are sought as partners. It is essential though that these 'leaders' remain in control of the changes on the farm. Bottom-up farmers' action is promoted, building buy-in and ownership, as well as promoting traditional knowledge inputs and innovation that are workable on site.

218. Instead of promoting single technical 'adaptation technologies', the locally developed adaptation strategies are developed as a holistic 'livelihoods strategy', which incorporates traditional multiple land and resource uses in the upland and lowland farming systems.

219. From the initial field consultations at the project 'sites', various proposals for potential adaptation ideas are indicated under 'potential for change' in Table 8.

Table 8: Liberian land use systems framework and climate change risk and adaptation context.

SYSTEM	BRIEF DESCRIPTION	ENVIRONMENTAL IMPACT	POTENTIAL FOR CHANGE	CC IMPLICATIONS
FOREST EXTRACTION	Millenarian, bush meat, plants, insects, mushrooms and honey based on intimate knowledge of forest life. Also source of charcoal for urban consumption.	Sustainable when population levels are low and technology unsophisticated. Population growth and weapons plus conflict have emptied the forests of Liberia of bush meat. Knowledge of plants and other sources of food, drink, medicine, oils etc. lessening as older generations die and youth lose interest.	Potential productivity of forest is high but requires clarification of rights over the commons and consensus over its sustainable management. Key is recovery of forest knowledge systems and technical assistance to systematize, register and give value to this knowledge.	Maintenance of forest and forest quality key to rainfall and temperature moderation. Conservation of biodiversity and its knowledge system. Maximizes capacity of Liberian forest to capture CO_2. Charcoal production also contributes to CO_2 contamination but depends on production system as can also contribute to absorption depending on use.
MIXED MIGRATORY	Again a traditional system adjusted to the problem of forest soil infertility, shifting slash and burn, multiple crops on sloping land for good drainage.	Again sustainable when land population ratios favor land. With change in the balance forest has little time to grow back and is now associated with widespread degradation. A multiple cropping system which helps to reduce fertility loss, control pests and	This is the most important farming system of Liberia and to be able to conserve the forest, produce the nation's food and enable land-use planning, slash and burn has to be replaced by a stable forest farming system. There are various experiences in agro-ecological farming for	Agro-ecological systems allow for forest recovery, control of soil erosion, retention of water, absorption of heavy rains, maximizing biodiversity of cultivated species as well as the ecosystem and stabilizing food production, reducing the need for external inputs and

		disease, ensure resilience to climate and other factors while ensuring a more varied diet.	tropical rainforests and their adaptation to the Liberian reality should be the first priority of the country.	production costs and environmental vulnerabilities. It is also the most efficient system for CO_2 absorption.
SWAMP RICE	Not a traditional farming system. Being promoted as a solution to low levels of rice production. Can have two harvests a year with a third dry land crop such as groundnuts or another species of legume.	Low lying areas in the forest that fill with water in the rainy season. Government promoting them as areas for commercial rice production. This has been tried before; it requires external inputs, market mechanisms and technical support.	Sustainability of system not clear, farmers do not abandon upland farms or crop varieties (including rice species native to the region). Commercial rice production is seen as an added value system so continuity dependent on maintenance of support structures and markets for products. Also disease problems associated with system (malaria, bilharzia, dengue) and wading in paddy not attractive to younger men.	Rice is a climate problem especially when stover is burnt, being a major contributor to methane contamination. Successful lowland rice production implies a more industrialized form of farming with use of fertilizers, herbicides and insecticides all with great potential environmental damage. This type of monoculture is also an ideal environment for loss of control of pests and disease. The most relevant alternative option is the introduction of SRI.
GARDEN	Fruit trees and vegetables traditionally grown round the homestead.	Fruits, vegetables, chickens and goats are often part of the area around the village and homesteads but few families have turned this practice into something more productive.	Intensive farming of small plots integrating animals into the system are very efficient and offer an excellent source of micronutrients and protein. This farming system based on charcoal making, predominated in the Amazon in the past and is known as TERRA PRETA.	Charcoal making to produce biochar is a technology that absorbs CO_2 and allows for the building of viable gardens and multicropping plots enhancing the food security of the rural population hence reducing pressure on the forests.
PLANTATION	The major commercial farming system based on tree crops such as rubber, cacao, coffee and palms for oil.	Over a hundred years old; started and still dominated by Firestone for rubber production. Productivity collapsed during the armed conflict and recovery is a priority of government, which is also promoting foreign investment in oil palm production.	Limited change for the model, highly susceptible to disease, both oil palm and bananas are facing serious disease threats in various parts of the world. When that happens chemical abuse is standard.	Absorption of CO_2 but loss of biodiversity and generally not sustainable in the long run.

220. The adaptation alternative in the agricultural sector requires the incorporation of an agro-ecosystem resilience approach. As to successfully deal with the impacts of climate change, current farming practices have to change. To achieve that, the country has to continue feeding itself and even increase yields, especially in areas where it is not self sufficient such as rice. At the same time it needs to ensure that the predominant farming systems transit to more sustainable environmentally friendly systems.

221. A critical aspect of the adaptation alternative is that the specific roles of women, youths and vulnerable people are considered and built upon. It is critical that disadvantaged individuals are not further deprived but are empowered by adaptation measures to build more sustainable livelihoods for themselves. Women, for example, clearly play an important role in agriculture and manage key aspects such as seeds, herbs, harvesting and commercialization, but that role is often not visible and is undervalued, given their marginalization from leadership roles and institutional decision making. To begin with, the role of women in seed selection and conservation, both very important for managing climate risks in agriculture, are not recognized. Any seed program will have to start with rural women. Specific integration of gender aspects and considerations in developing the local adaptation strategies is important.

222. A strong network and an alliance of service providers that work with the communities should be established and capacitated to undertake and facilitate local level adaptation action. NGOs, local government, research institutions, training institutions and above all the Ministry of Agriculture need to collaborate, to be able to translate field learning into a national policy framework.

Costs component 2

Baseline investment: parts of US$ 32,000,000 (where county specific; see component 1)
additionally:
Bong demonstration: US$ 3,000,000
Grand Gedeh demonstration: US$ 1,500,000
Co-financing: US$ 4,872,000
GEF allocation: US$ 1,516,600

Output 2.1: A baseline analysis of current livelihood and natural resource use strategies and their vulnerabilities to climate change undertaken at two 'demonstration sites' and community adaptation strategies and plans in place.

223. Although strong baseline activities are in place at the two selected 'demonstration sites', (1) Panta District (Bong County) and (2) Gbarzon District (Grand Gedeh), no detailed systematic analysis of existing livelihood and natural resource strategies has been undertaken to date. During the PPG phase some initial information was gathered to inform project design. Key information on the prevailing agro-ecological systems – the present farming systems, and the role of women and men – has not been documented. It is further unclear how the existing forest resources are being use, managed and governed. This is not unexpected given that government priority since peace was signed has prioritized the rehabilitation of agriculture and especially swampland rice production. At the same time the rehabilitation of the pre-war institutions that carried out farming systems work in the past, specifically CARI, has been slow. Few experienced personnel have returned and a new generation is only now beginning to return from post graduate studies. The priority of rehabilitation has also driven NGO priorities and only in 2010 did CARE begin work on agro-ecology systems.

224. To create a base line that enables agro-ecological interventions be demand and not supply driven requires a process of participatory monitoring of at least one year's farming cycle this was just not possible with the time constraints facing the project preparation phase. Normally a base line can be built on existing information but in this case this is just not available given the destruction of historical records, the displacement of experienced personnel and the prioritization of rehabilitation by all actors in the sector. National personnel with experience in this type of work was not to be found, CARE is using regional consultants to help set up their initiative, hence the need to contract international personnel and the prioritizing of knowledge transfer and training.

225. In the light of this national context it has been identified as necessary, in collaboration with the existing project interventions of OXFAM, CARE, various UN-agencies and other potential partners, a detailed analysis of livelihood and land use systems of participating communities at the 'sites' will be undertaken. An in-depth understanding of how information is disseminated at the local level and who the key drivers are of the successful adoption of the new validated land-use practices. International best practice on farming systems research should be applied (e.g. FAO).

226. Participatory discussions and assessments of the local climate change risks, potential impacts on local livelihoods and natural resources systems as well as potential adaptation interventions including the type of climatic information needed and the appropriate channels to deliver this information must be conducted. Localized adaptation strategies and plans will be developed, focusing on an integrated approach to upland and lowland farming at the 'sites'.

Indicative activities:

2.1.1 Undertake gender specific livelihoods assessments in pre-selected demonstration 'districts' and identify and agree to partnerships.
2.1.2 Identify, analyze and document the prevailing natural resource use strategies (e.g. forest resources, shifting agriculture and swamp rice).
2.1.3 Analyze the institutional arrangements of the communities at both the informal and formal levels.
2.1.4 Formulate vulnerability assessment for the selected partner communities and identify the climate information and advisory support these communities will need to reduce their vulnerability to climate change.

Output 2.2: Local community-based adaptation strategies and plans implemented: At least four adaptation and locally adapted innovations enhancing resilience to climate change tested at demonstration sites.

227. Based on the vulnerability assessment made in the output 2.1, the local community adaptation strategies and adaptation plans developed for the demonstration sites, and in association with project partners already operating on site (i.e. OXFAM, CARE, various UN-agencies), new adaptation innovations will be demonstrated and tested interactively. Each site will have a support network (i.e. project team, agricultural extension services, NGOs operating at site, specialists from CADI). The design of the intervention will be based on cutting edge farmers' action learning principles, and lesson learned will be documented together with the local farmers. Balanced gender representation is required to ensure that gender vulnerabilities, roles and needs are fully considered and addressed.

228. Existing coping mechanisms will be identified with the local farmers and documented. A priority of this process is the identification and documentation of traditional farming systems and existing adaptations made by farmers in response to existing climate risks and climatic changes. Such existing coping mechanisms can potentially be formalized and promoted as adaptive measures suitable to the local frame conditions in many rural areas in Liberia.

Indicative activities:

2.2.1 Identify local coping mechanisms already in place, and document them in detail.
2.2.2 Implement key adaptive measures from the local adaptation strategies and actions plans; set up testing and adaptation of innovations to local circumstances.
2.2.3 Based on various in-depth analyses, farmers develop local adaptation strategies and plans with the support of project staff and extension services.
2.2.4 Based on various in-depth analyses, farmers develop local adaptation strategies and plans with the support of project staff and extension services. In response to the vulnerability assessment made in the output 2.1, these plans and strategies will identify, through the active participation of communities, the appropriate adaptation measures, the climate information the farmers need. These plans will include a strategy for conveying the needed climate and weather information to the key stakeholders and advices, using the appropriate channels identified thanks to the output 1.1. Furthermore, the results and experience generated from this exercise will be documented and codified under the form of a guidelines book, usable after the project, by extension staff and farmers communities, for the participatory design and implementation of climate vulnerability appraisal and adaptation strategies including provision of relevant climatic information for a climate sound decision making.

Box 1: Potential adaptation measures appropriate to Panta and Gbarzon District sites (based on initial field consultations)

Building climate change resilience for lowland rice:

- System of Rice Intensification (SRI) introduced in the two sites via farmer to farmer validation methodologies including the useUse of legumes in rice cycle to help maintain fertility and reduce labor time needed for weeding (mucuna).
- Testing of the adaptability of local fish species to accompany the rice in the paddies as is done in various Asian countries (control of mosquitoes that carry malaria and dengue).
- Incorporation of stover into small animal husbandry systems as opposed to burning, after animal use can be returned to the land and enriched for improving soil cover and fertility.

Building climate change resilience for upland shifting agriculture:**lowland rice:**

- Use of legumes in crop cycle, especially with maize, to help maintain fertility and reduce labour time needed for weeding (mucuna).
- Support to a national program of identification and management of rice seed varieties starting with the women of the pilot communities as the prelude to a national seed project.
- Major focus is on experimenting with alternatives to slash and burn; for example introducing conservation agriculture to reduce need for rotation. Elimination of burning; mulching; incorporating national leguminous trees; intercropping; use of small ruminants; seed selection and broadcasting practices reviewed and alternatives experimented with.
- Communal seed beds for maintenance of all varieties of key crops used on the individual plots.
- Other examples:

Some general other:

- Experiment with biochar as an option for community gardens.
- With support from regional actors, pilot experiences of the semi-domestication of previously wild bush meat species such as cane rats, deer and grass cutters.
- Disseminate post-harvest experiences in drying (solar) and storage of grains and roots at the level of the household and community.

Output 2.3: County agriculture plans in Bong and Grand Gedeh account for potential climate risks and incorporate building of climate change resilience as a key component.

229. Understanding and learning generated from the practical field interventions at the demonstration sites will inspire country level agricultural and development plans to incorporate climate change considerations in the future. By including extension officers into the field teams and by conducting specific capacity development actions under Outcome 1 at the country level, sufficient buy-in, knowledge and interest is generated to up-scale the demonstration approaches and lessons learned.

Indicative activities:

2.3.1 Integrate extension officers into field teams; negotiate for time allocations in their work plans to be active partners in the project. If necessary, make budgetary allocations for their participation in terms of transport etc.

2.3.2 Project representative to participate in county-level planning processes to support the incorporation and mainstreaming of climate information and lessons learned on climate risk management and adaptation.

2.3.3 Organize site visits by relevant county representatives, as well as from other interested communities.

2.3.4 A series of investment proposals in support of both the farm systems identified and defined by the project as well as for the key crops and crop combinations identified by the field work carried out with support by this project.

Output 2.4: Agricultural policies and donor investments are guided by adaptation learning at demonstration sites and integrate a land-use and livelihood strategy that helps local farmers build critically needed climate change resilience

230. Partially addressed under Outcomes 1, the specific climate change adaptation lessons learned from the demonstration sites will be incorporated fully into the ongoing agricultural and rural development projects. Further knowledge and understanding will be applied to similar interventions at other sites including in other counties. Future programming will be guided by the findings.

231. It is essential to fully document and utilize the information and lessons learnt from the local level to be able to utilise such information for policy making and capacity building at county and national level. This output specifically aims to ensure that local level issues are adequately communicated "upwards" to the national elve, where most policy decisions are being made. Thsi is a critical element especially in a country like Liberia, where bottom-up, evidence based decision and policy making is just in a re-establishment phase. Directly after the war many "emergency" responses were conducted top down, and structures and channels for bottom up and participatory approaches are just being (re-)established. Government policies as well as donor investments are only now starting to become more strategic in nature, moving beyond the emergency response.

232. This output will make a significant contribution to ensure that adaptation learning – a new and novel effort – will be adequately documented and channelled "upwards' to inform national level policy decisions.

Indicative activities

2.4.1 Incorporation of a climate change adaptation knowledge management website into MOA website: for this purpose, the project will support end-users surveys and hire developers to design a cutting edge and modern climate change adaptation website for Liberia with a focus on the agricultural sector. The knowledge management website will be linked to the websites of all relevant institutions including EPA, FDA, UNDP and the climate change secretariat for example.

2.4.2
Document the adaptation learning from the local level and ensure that such information is made available and fed into the work under outcome 1, especially output 1.1. In particular provide information for websites, the national think tank on climate risk management. This activity is linked to output 1.1, however specifically focuses on articulating and promoting the lessons learnt and concerns from the demonstration sites.

2.4.3 Produce a series of briefing papers for policy makers on adaptation best practices in the agricultural sector national program for dissemination to key decision-makers and develop a strategy for making relevant learning materials on the web accessible to end users without internet access.

2.4.4 Conduct specific policy-maker roundtable events that discuss the key findings from the demonstration sites and make tangible policy contributions.

2.5 Key indicators, risks and assumptions

233. The proposed project indicator framework follows the GEF-5 Adaptation Monitoring and Assessment Tool (AMAT) and is aligned with the UNDP M&E Framework for Adaptation. Objective level indicators and outcome level indicators are specified according to the UNDP nomenclature of Results Based Management (RBM). The project design further foresees the development of more specific M&E tools, especially at the local implementation level. Participatory local level M&E can be a powerful management and communication tool, especially tracking and demonstrating project results at the demonstration sites.

It is foreseen that a more detailed M&E project framework is developed during the project inception phase for national management purposes.

234. An overall project M&E plan has been devised and is included in the respective section of the project document below. It foresees the regular progress reporting, a well as audits, a mid-term evaluation and an end of project evaluation.

235. Assumptions underlying the project design include that:

- Implementation or the participatory farmers-action research at the demonstration sites and part of the project implementation arrangement will be designed with the farmers through competent facilitators.
- Up-scaling and replication of effective adaptation measures will take place at the demonstration sites through a well designed integration of adaptation learning into ongoing policy formulation and reviews.
- Sufficient adaptation capacities will be built during the project to ensure sustainability of project activities beyond the projects' time horizon.
- An enabling environment is created that supports the integrated sustainable livelihoods approach to resource uses in forests, and up-and lowland farming areas (e.g. introduction of forest rights to communities).

236. A complete Risk Log is included in Annex 1 of the project document. It includes risks identified in the PIF (see below) as well as newly identified risks. Additional barriers are included in the Barrier section above and are generally represented by the risks specified below. Most risks are organizational or strategic in nature, and mainly relate to relatively low current institutional and individual capacities of the public service structure in terms of adaptation. In summary, the following key risks were identified:

- Unavailability of requisite human resources and data (PIF);
- Insufficient institutional support and political commitment (PIF);
- Non-compliance by primary proponents for the successful implementation of this project (PIF);
- Stakeholder relations (PPG);
- Natural disaster: unusual and catastrophic climatic events during project implementation (PPG).

237. Mitigation measures for each risk are specified in the Risk Log (Annex 1), and have been systematically addressed in the project design.

2.6 Financial modality

238. Liberia is a post-conflict LDC, moving towards a long-term sustainability agenda. The GEF LDCF resources will be provided as a grant.

2.7 Cost-effectiveness

239. Liberia is a country that is still very dependent on donor funds. Investments in the agriculture and food security sectors are significant, with well over US$ 30 Mio spent over the past three years throughout the country by bilateral and multi-lateral donors alone. It is clear that most investments relevant to the sectors are associated with these donor interventions. Consequently, it is a cost-effective and strategic approach to work in the adaptation additionality into relevant policies including donor investments. This is mostly planned to take place through the work under component 1 of the project design.

240. Activities have been developed according to the most cost-effective scenarios in order to achieve results. The low level of baseline in certain respects, due to past conflict, as well as the sheer size of the country has in some cases justified investments at a higher cost. The project preparation phase provided some time to undergo a cost-benefit analysis of certain activities, particularly as regards investment activities, as well as an inventory and a valuation of the development baseline relevant to this project. Activities have been budgeted so as to achieve the maximum level of impact (as related to the project objective of reducing vulnerability) in relation to their cost.

241. Additionally, using the well established baselines at the two selected demonstration sites cuts local development investments, which are not directly LDCF related. Strategically, climate change adaptation additionality actions have been identified in the design that build on the existing work and systematically work on a local level adaptation strategy. The strengthening of the information base under component 2 may initially seem baseline related, however, it is anticipated that a strategic investment into improving the knowledge base of the local farming and livelihoods systems is an integral part of step-by-step adaptation planning – with the local farmers. In the longterm this investment is considered strategic as it builds ownership and local adaptive capacities. As such the design of component 2 is considered cost effective.

242. Starting work in districts that have not previously been part of sector specific investments will require significant inputs in terms of financial and human resources, and provides a high cost scenario. Building on the investments made on side by the Government of Liberia, various donors and particularly through NGOs such as AEDE, Oxfam and CARE provides a strong starting point for adaptation action. Investments by the UN family on site through the UN Joint programme on food security add the institutional linkages that make the climate change investment strategic and cost effective.

243. Mainstreaming of knowledge management activities thorough the two technical outcomes of the project makes the linkages of establishing and documenting knowledge and ensuring that such knowledge does inform future decision and policy making explicit. Ensuring that adaption learning is absorbed by the country's key decision makers at all levels and that the GEF intervention contributes to a move forward in terms of CRM is a key strategic programming element realted to cost-effectivness – and sustainability.

2.8 Sustainability

244. The project addresses key national development priorities spelled out in the PRS, the UNDAF as well as identified and specified through the participatory and bottom-up NAPA process. The project has strong government support as well as buy-in at the county and demonstration site level. Consequently, a strong indicative commitment to carry out project activities and to up-scale and mainstream adaptation learning into long-term policies, plans, and national budgets is given. As the project interventions at the demonstration site level are needs driven and will be implemented in a participatory manner, applying state-of-the-art farmers' action learning, a high level of sustainability and absorption of adaptive capacity is also foreseen.

245. Capacity building is a key to the approach of the design. Government institutions will be strengthened to be able to deal with climate change risk and adaptation needs. Especially MOA. CARI and the local Universities, as well as county level staff and authorities in Grand Gedeh and Bong will be better positioned to emerge as competent authorities on adaptation in the agricultural and food security context.

246. The target group specific capacity building outputs formulated under Outcome 1, with the specifically tailored strategic activities first designing a CRM capacity development strategy and then systematically implementing it, will help build sustainability. Creating a critical mass of adaptation practitioners and individual policy makers that are engaging in a dialogue on climate change issues will help elevate

adaptation – not only in the agricultural sector. The output creates 'seeds' for post-project adaptation action in Liberia.

247. Although 'demonstrations' are often viewed negatively, the strategic and intensified focus on creating practical adaptation learning on the ground brings forth the type of understanding and knowledge that is needed to weave a storyline for adaptation action. Putting in a concerted effort of addressing climate change risks with local farmers, piloting adaptation options and using the demonstration site as a 'laboratory for learning' including for extension officers, will form the foundation for sustainability of (1) the proposed adaptation action on the ground and (2) addressing climate change risks and adaptation sustainability throughout the policy framework. This is consecutively addressed in Outputs 2.1 to 2.3 and the underpinning project activities.

248. Effective and well designed knowledge management in itself does create sustainability – and most effective use and application of generated learning on all levels. Making the strategic cross linkages to the capacity building components of this proposal, the knowledge management outputs directly link to creating and supporting the long-term capacities for climate risk and adaptation management in Liberia.

2.9 Replicability

249. The design principles outlined in Section 2.3 are specifically set out to foster replicability through up-scaling of adaptation learning and mainstreaming into policy processes.

III. PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Program Outcome as defined in CPAP or CPD: **Expected CP Outcome(s):CP Pillar 1:** Pro-poor economic development: **Component:** Sustainable local economic recovery Community-based recovery and development incl. food-security and b. Sustainable management of environment					
Country Program Outcome Indicators: *There are no targets and indicators formulated for the food security outcome in the UNDP CPAP.*					
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. <u>Promote climate change adaptation</u> OR 4. Expanding access to environmental and energy services for the poor.					
Applicable GEF Strategic Objective and Program: Adaptation to Climate Change: Objective 1: Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global level and Objective 2: Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level					
Applicable GEF Expected Outcomes: Outcome 2.2: Strengthened adaptive capacity to reduce risks to climate-induced economic losses; and Outcome 1.3: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas					
Applicable GEF Outcome Indicators: (following AMAT tool) Indicator 1.3.1: Households and communities have more secure access to livelihood assets. Indicator 2.2.1: No. and type of targeted institutions with increased adaptive capacity to reduce risks of and responses to climate variability.					
	Indicator	**Baseline**	**Targets** **End of Project**	**Source of verification**	**Risks and Assumptions**
Project Objective[32] *To increase resilience of poor, agricultural-dependent communities and decrease vulnerability of agricultural sector to climate change in Liberia.* **(equivalent to output in ATLAS)**	% change in projected food production in target areas given existing and projected climate change (AMAT indicator 1.2.8)	Upland: Not currently measured Lowland:% tons/year of low-land rice - site specific information *Baselines to be established during inception*	Upland & lowland: Formal tracking system established to cover diversified food commodities Lowland: 10% average annual increase of rice production due to cultivation of traditional rice varieties as 'adaptation option' **Application beyond demonstration sites due to policy up-scaling actions**	Local level assessments at demonstration sites (Questionnaire based appraisal - CBA) APRs/PIR	Unusual and catastrophic climatic events during project implementation Unavailability of requisite human resources and data Insufficient institutional support and political commitment Non-compliance by primary proponents for the successful implementation of this project Stakeholder relations
Outcome 1[33]**:** Strengthened institutional and individual capacity to plan and manage climate change in the agriculture	No. of staff trained on technical adaptation themes(AMAT indicator 2.2.1.1)	Technical staff: 0 County level staff: 0 University students: 0	Technical staff: 60 (30 Men and 30 Women) County level staff: 30 (10 in each county) (10 women and 10 men) University students: 100 (50 women and	Course/training/ professional updating event lists of participants APRs/PIR	Unavailability of requisite human resources and data Insufficient institutional support and political commitment

[32] *Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR*

[33] *All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.*

sector in Liberia. **(equivalent to activity in ATLAS)**		**Type and level:** No budget allocations	50 men) **(to be disaggregated by theme and by gender)** **Type and level:** **Budget allocations included in:** PRSII Agriculture policy (LASIP) Low-land rice production support programs	Policy reviews as part of APRs/PIR	Stakeholder relations Unavailability of requisite human resources and data Insufficient institutional support and political commitment Non-compliance by primary proponents for the successful implementation of this project Stakeholder relations
Outcome 2: Innovative, sustainable, socially appropriate adaptive measures piloted at the community level. **(equivalent to activity in ATLAS)**	% of targeted households that have adopted resilient livelihoods under existing and projected climate change (AMAT indicator 1.3.1.1)	Type and level: 0 (aside already exiting local coping mechanism) No. of targeted households to be confirmed for each of the three demonstration site during inception of local level activities.0% of targeted households is the baseline.	Type and level: at least 4 different innovations at each demonstration site **(including the formal identification of locally existing coping strategies which are furthered and formalized as local adaptation measures)** 80% of targeted households have adopted resilient livelihoods at demonstration sites.	Local level assessments at demonstration sites (Questionnaire based appraisal - CBA) APRs/PIR	Unavailability of requisite human resources and data Stakeholder relations

IV. TOTAL BUDGET AND WORKPLAN

Award ID:	00062109	Project ID(s):	00079407
Award Title:	PIMS 4439 LDCF CC-A FSP: Liberia Agriculture		
Business Unit:	LBR10		
Project Title:	Liberia - Enhancing Resilience to Climate Change by Mainstreaming Adaption Concerns into Agricultural Sector Development in Liberia		
PIMS no.	PIMS 4439		
Implementing Partner (Executing Agency)	MOA/UNDP		

GEF Outcome/Atlas Activity	**Responsible Party/ Implementing Agent**	**Fund ID**	**Donor Name**	**Atlas Budgetary Account Code**	**ATLAS Budget Description**	**Amount Year 1 (USD)**	**Amount Year 2 (USD)**	**Amount Year 3 (USD)**	**Amount Year 4 (USD)**	**Total (USD)**	**See Budget Note:**
OUTCOME 1: Strengthened	**UNDP/DEX**	**62160**	**GEF (LDCF)**	71200	International Consultants	$36,000	$36,000	$36,000	$,36,000	$144,000	a

				71300	Local Consultants	$18,000	$18,000	$18,000	$18,000	$72,000	b
				71400	Contractual Services	$10,000	$5,000	$4,000	$4,000	$23,000	c
				71600	Travel	$15,000	$15,000	$15,000	$15,000	$60,000	d
				72200	Equipment and Furniture	$37,800	$11,000	$9,000	$6,000	$63,800	e
				72300	Materials and Goods	$30,000	$25,000	$25,000	20,000	$100,000	f
				72500	Supplies	$5,000	$5,000	$5,000	$5,000	$20,000	g
				72600	Grants	$35,000	$30,000	$20,000	$20,000	$105,000	h
				74100	Professional Services	$15,000	$15,000	$15,000	$15,000	$60,000	i
				74200	Audio-visual and Print Production Costs	$10,000	$10,000	$10,000	$10,000	$40,000	j
					sub-total GEF	**$211,800**	**$170,000**	**$157,000**	**$149,000**	**$687,800**	
		04000	**UNDP**	72200	Equipment and Furniture	$47,200	$0	$0	$0	$47,200	k
					Sub-total UNDP	**$47,200**	**$0**	**$0**	**$0**	**$47,200**	
					Total Outcome 1	**$259,000**	**$170,000**	**$157,000**	**$149,000**	**$735,000**	
OUTCOME 2: Innovative,	**UNDP/DEX**	**62160**	**GEF LDCF**	71200	International Consultants	$108,000	$108,000	$108,000	$108,000	$432,00	l

				71300	Local Consultants	$92,400	$92,400	$92,400	$92,400	$369,600	m
				71400	Contractual Services	$25,000	$2,000	$2,000	$2,000	$31,000	n
				71600	Travel	$50,000	$50,000	$50,000	$50,000	$200,000	o
				72200	Equipment and Furniture	$140,000	$10,000	$10,000	$10,000	$170,000	p
				72300	Materials and Goods	$20,000	$20,000	$20,000	$20,000	$80,000	q
				72500	Supplies	$15,000	$15,000	$15,000	$15,000	$60,000	r
				73300	Rental & Maintenance of IT equipment	$5,000	$5,000	$5,000	$5,000	$20,000	z s
				74100	Professional Services	$21,000	$21,000	$26,000	$26,000	$94,000	t
				74200	Audio-visual and Print Production Costs	$10,000	$10,000	$20,000	$20,000	$60,000	u
					sub-total GEF	**$486,400**	**$333,400**	**$348,400**	**$348,400**	**$1,516,600**	
		04000	**UNDP**	74100	Professional Services	$10,000	$10,000	$20,000	$1,000	$50,000	
				72200	Equipment and Furniture	$5.000	$10.000	$10.000	$5.000	$30.000	
					Sub-total UNDP	**$15.000**	**$20.000**	**$30.000**	**$15.000**	$80.000	
					Total Outcome 2	**$501,400**	**$353,400**	**$378,400**	**$363,400**	**$1,596,600**	
OUTCOME 3: MONITORING, LEARNING, ADAPTIVE FEEDBACK & EVALUATION (as per the results framework and M&E Plan and Budget)	**UNDP/DEX**	**62160**	**GEF LDCF**	75100	Facilitation & Admin (M&E)	$8,000	$38,000	$3,000	$48,000	$97,000	v
					sub-total GEF	**$8,000**	**$38,000**	**$3,000**	**$48,000**	**$97,000**	
		04000	**UNDP**	75100	Facilitation & Admin (M&E)	**$5,000**	**$5,000**	**$5,000**	**$5,000**	**$20,000**	
					Sub-total UNDP	**$5,000**	**$5,000**	**$5,000**	**$5,000**	**$20,000**	
					Total Outcome 4	**$13,000**	**$43,000**	**$8,000**	**$53,000**	**$117,000**	
PROJECT MANAGEMENT		**62160**	**GEF LDCF**	71600	Travel	$8,000	$9,000	$9,000	$9,000	$35,000	x

				72200	Equipment and Furniture	$10,000	$5,000	$5,000	$5,000	$25,000	y
				72500	Supplies	$5,000	$5,000	$5,000	$5,000	$20,000	z
					sub-total	**$23,000**	**$19,000**	**$19,000**	**$19,000**	**$80,000**	
			UNDP	71300	Local Consultants	$13,200	$13,200	$13,200	$13,200	$52,800	aa
					sub-total	**$13,200**	**$13,200**	**$13,200**	**$13,200**	**$52,800**	
					Total Management	**$36,200**	**$32,200**	**$32,200**	**$32,200**	**$132,800**	
PROJECT TOTAL						**$789,600**	**$573,600**	**$540,600**	**$577,600**	**$2,481,400**	

Summary of Funds:[34]

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Total
GEF	$729,200	$560,400	$526,800	$564,400	$2,381,400
UNDP	$80,400	$38,200	$48,200	$33,200	$200,000
Government of Liberia	$1,300,000	$1,300,000	$1,300,000	$1,200,000	$5,100,000
FAO	$50,000	$30,000	$30,000	$25,490	$135,490
AEDE	$250,000	$250,000	$210,000	$199,632	$909,632
TOTAL	$ 2,409,600	$ 2,178,600	$ 2,115,000	$ 2,022,722	$ 8,726,522

Budget notes 6345122

Budget note	Description
a	Experts to support outcome 1: 1 capacity development & institutional expert
b	Fees for local consultant to manage outcome 1 and provide technical inputs (PM); 1 Driver
c	Consultancies for CRM CD plan; implementation of trainings
d	Transportation to demonstration sites and partners; training field visits
e	Computers, office equipment, two vehicle
f	Communication and training materials, Stationery and consumables; office supplies and materials
g	Stationery and consumables; office supplies and materials
h	Research grants to stakeholders and Incentive based grant system
i	Consultative meetings; think tank meetings; national and country level
j	Communication and training materials
k	Experts to support outcome 2: 1 agroforestry expert, 1 livelihoods expert, 1 rice expert, 1 institutional expert
l	Fees for local consultant to manage outcome 2 and provide technical inputs (PM); PMU support staff; county level staff in Bong and Grand Gedeh (2 field officers per site; 2 drivers)

[34] Summary table should include all financing of all kinds: GEF financing, co-financing, cash, in-kind, etc...

m	Field assessment consultancies (to be conducted with project staff) and Website development and updating; editor
n	Transportation to and at demonstration sites
o	Computer, office equipment, one vehicle for each county level team; materials for adaptation interventions
p	Field implements, farmers support, training aides for each county level team
q	Stationery and consumables; office supplies and materials (for each county level team)
r	Consultative meetings with communities; think tank meetings; all country level and Webportal development and maintenance (hardware)
s	Consultative meetings; workshops, events on lessons learned etc.
t	PMU support staff (Comms officer) and Communication and training materials
u	M&E expert (part-time)
v	Inception meeting, annual audits, Mid-term evaluation, End-term evaluation
x	PMU (other than already included across outcomes); Admin & Finance
y	Visit of demonstration sites and partners
z	Office equipment
aa	Stationery and consumables; office supplies and materials

V. MANAGEMENT ARRANGEMENTS

250. The project will be implemented by the UNDP under its Direct Execution (DEX) Modality. The project is a four year intervention expected to run from September 2011 to September 2015. The implementing partner for this project in Liberia is MOA, which shall oversee project implementation and will subcontract whenever necessary and within the legal framework of UNDP and the Government of Liberia. The project will potentially be implemented in close collaboration with an international NGO working with project stakeholders and partners especially at the demonstration sites.

251. The project will be executed by UNDP. This means that UNDP will have full responsibility under the DEX modality to ensure accountability, transparency, timely implementation, management and achievement of results. This also means that all aspects of the project will be implemented in line with UNDP's rules and regulations. Through its Energy and Environment Project, UNDP will work closely with the implementing agency, the MOA, during the implementation of the project. UNDP will be responsible for providing certified accounts to the donor on all expenditures conducted under these project .

251.The **Project Board** is responsible for making management decisions for a project in particular when guidance is required by the Project Manager. The Project Board plays a critical role in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual WorkPlan, the Project Board can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

252. In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP Project Manager.

253. Potential members of the Project Board are reviewed and recommended for approval during the PAC meeting. Representatives of other stakeholders can be included in the Board as appropriate. The Board contains three distinct roles, including: (1) **An Executive**: the individual representing the project ownership to chair the group, which will be the MOA. (2) The **Senior Supplier**: individual or group representing the interests of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project. In the case of this project this will be UNDP. (3) The **Senior Beneficiary**: individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries. This is the Ministry of Planning and Economic Affairs, on behalf of the Government of Liberia.

254. The **Project Assurance** role supports the Project Board Executive by carrying out objective and independent project oversight and monitoring functions. The Project Manager and Project Assurance roles should never be held by the same individual for the same project. UNDP fulfils the Project Assurance role.

255. On request by the various stakeholders consulted during the PPG phase, a **Project Steering Committee** fulfilling the functions of a **Technical Support Mechanism** will be established. The MOA or EPA would potentially chair this committee (or take turns). The Project Manager or the Technical Project Coordinator will serve as Secretary to the SC. The composition of the SC will be inclusive of public and

private sector representatives, representatives of research institutions, University, NGOs and civil society, as well as interested donors; where appropriate members of the National Climate Change Committee will be part of the SC. As the management of the project is overall overseen by the Project Board, the functions of the SC will be mostly technical and management oriented. The **Technical Support Mechanism** will form a national community of CCA practitioners, providing a technical pool of expertise that will support project implementation and a platform for technical discussion.

256. **Project Manager**: The Project Manager has the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. IN the case of the Liberia project the Project Manager will be the Deputy Minister of Technical Services of MOA or his delegate.

257. **Project Support – Project Implementation Unit**: The Project Support role provides project administration, management and technical support to the Project Manager as required by the needs of the individual project or Project Manager. Three distinct staff members are currently foreseen in the structure. Considering the generally low human resource capacity it is envisaged that a Technical Project Coordinator, who will most likely be an international Chief Technical Advisor, supports the Project Manager at MOA. Additionally One M&E and Communications expert (same person with adequate skills or two persons part-time) will be hired to support the important communication and outreach work. A full-time Finance and Admin Manager will be hired.

258. Project implementation will be supported by **implementation teams** under the three outcomes of the project design. The teams will include county level staff of MOA as well as relevant representatives of the county administration as relevant. It is envisaged to select an international NGO to spearhead especially the implementation of activities under outcome 2 with local partners at the demonstration sites. It is critical that this outreach and participatory farmers action research and adaptation action is implemented under best available international practice to be effective. At the time of project preparation initial consultations with Oxfam have taken place, as Oxfam has demonstrated their capacity to carry out a project of this nature in Liberia and has already been part of the baseline activities especially in Grand Gedeh. Although conclusive arrangements will only be finalized once the project is approved, it is likely that the team will be based in Grand Gedeh working closely with the communities in Gbarzon District. They would also coordinate with, and support the work of, Care in Panta District in Bong County, in conjunction with CARI. To this end they would have two field vehicles and be expected to spend 75% of their time in the field (25% with Oxfam). The other 25% will be spent in Monrovia with the other component managers of the full project as well as holding workshops and producing documents and communications materials for the dissemination of their work.

VI. MONITORING FRAMEWORK AND EVALUATION

259. The project will be monitored through the following M& E activities. The M& E budget is provided in the table below. The M&E framework set out in the Project Results Framework in part III of this project document is aligned with the AMAT and UNDP M&E frameworks.

260. Project start: A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan**.**

261. **The Inceptio**n Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

b) Based on the project results framework and the relevant GEF Tracking Tool, in this case the LDCF related AMAT set out in the Project Results Framework in section III of this project document, and finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.

c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.

d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.

e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

262. An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

263. **Quarterly:**

- Progress made shall be monitored in the UNDP Enhanced Results Based Managment Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS.Risks become critical when the impact and probability are high.Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

264. **Annually:** Annual Project Review/Project Implementation Reports (APR/PIR):This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July).The APR/PIR combines both UNDP and GEF reporting requirements.

The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

265. **Periodic Monitoring through site visits:** UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

266. **Mid-term of project cycle:** The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (insert date).The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Centre (ERC).The relevant GEF Focal Area Tracking Tools (in this case LDFC AMAT as set out in the Project Results Framework in section III of this project document) will also be completed during the mid-term evaluation cycle.

267. **End of Project:** An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place).The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

268. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

269. The relevant GEF Focal Area Tracking Tools (in this case LDFC AMAT as set out in the Project Results Framework in section III of this project document) will also be completed during the final evaluation.

270. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved.It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

271. **Learning and knowledge sharing:** Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

272. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

M& E workplan and budget

Type of M&E activity	**Responsible Parties**	**Budget US$** *Excluding project team staff time*	**Time frame**
Inception Workshop and Report	▪ Project Manager (MOA) ▪ PIU ▪ UNDP CO, UNDP GEF	Indicative cost: 10,000	Within first two months of project start up
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. ▪ PIU, esp. M&E expert	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager (MOA) ▪ PIU, esp. M&E expert ▪ Implementation teams	To be determined as part of the Annual Work Plan's preparation. Indicative cost is 20,000	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager (MOA) ▪ PIU ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly
Mid-term Evaluation	▪ Project manager (MOA) ▪ PIU ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: 30,000	At the mid-point of project implementation.
Final Evaluation	▪ Project manager (MOA) ▪ PIU ▪ UNDP CO	Indicative cost : 45,000	At least three months before the end of project implementation

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
	▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)		
Project Terminal Report	▪ Project manager ▪ PIU ▪ UNDP CO	None	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project manager (MOA) ▪ PIU	Indicative cost per year: 3,000 (12,000 total)	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 117,000 (+/- 5% of total GEF budget)	

VII. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA [or other appropriate governing agreement] and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;

b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

ANNEXES

- Annex 1: Risk Log
- Annex 2. TOR of key staff
- Annex 3. Stakeholder consultations during PPG phase
- Annex 4. Summary of reports from PPG phase

Annex 1: Risk Log

Project Title: Liberia: Enhancing Resilience to Climate Change by Mainstreaming Adaption Concerns into Agricultural Sector Development in Liberia	Award ID: 00062109	Date: July 2011

#	Description	Date Identified	Type	Impact & Probability (1-5)	Countermeasures / Mngt response	Owner	Submitted, updated by	Last Update	Status
1	Unavailability of requisite human resources and data	April 2010 (PIF)	Organisational	I=5 P=4	The issue of the unavailability of requisite human resources will be mitigated by recruitment of international consultants or even an NGO who will work closely with Liberian counterparts and by targeted capacity building activities. This approach is supported by the government and utilized in other UNDP programs. Exit strategies will prevail, and all outside consultants will be tasked with building domestic capacity.	MOA, UNDP			
2	Insufficient institutional support and political commitments	April 2010 (PIF)	Political and Organisational	I=3 P=3	The proposed project is strongly supported by the Government of Liberia and other key stakeholders and development partners. The project team, in conjunction with UNDP, will therefore take advantage of this opportunity to seek substantial support from the Government and forge strong partnership with other development partners. Direct linkages to existing and planned baseline development activities implemented by government, securing of the necessary co-financing, as well as local buy-in will also minimize this risk. However, elections are up in the later part of 2011, and it is difficult to foresee if new government arrangements may affect the project.	MOA, UNDP			
3	Non-compliance by primary proponents for the successful	April 2010 (PIF)	Strategic	I=4 P=2	Ensuring that the project is designed and implemented in a participatory and inclusive manner, following established UNDP procedures, will	MOA, UNDP			

	implementation of this project				mitigate the risk. The PPG phase included significant consultations with a variety of stakeholders and suggests partnership arrangements for the implementation of the project. Since the activities correspond to the urgent needs as expressed by the primary proponents, the risk of non-compliance should be reduced				
4	Stakeholder relations	April 2011	Strategic	I=4 P=2	The PPG phase suggested that the project be implemented under a partnership arrangement between government, UNDP and competent NGOs/institutions/ individual experts (national and international). This established commitment to a partnership approach to implementation should build the foundation for a good success for project implementation.	MOA, UNDP			
5	Natural disaster: Unusual and catastrophic climatic events during project implementation	April 2011	Environmental	I=4 P=2	Unusually difficult climatic circumstances could threaten the demonstration projects. Although the overall mitigation strategy is to diversify agricultural production and build climate resilient eco-agricultural systems, major natural disasters could hamper the local level demonstrations. As the project intervention is planned over a four years time period annual variations should be accounted for.	MOA, UNDP			

Types of Risks

Environmental	Financial	Organizational	Political	Operational	Regulatory	Strategic	Other
Natural Disasters: storms, flooding, earthquakes	EXTERNAL economic factors: interest rates, exchange rate fluctuation, inflation	Institutional Arrangements	Corruption	Complex Design (size: larger/multi-country project; technical complexity; innovativeness, multiple funding sources)	New unexpected regulations, policies	Partnerships failing to deliver	Other risks that do not fit in an of the other categories
Pollution incidents	INTERNAL:	Institutional/ Execution Capacity	Government Commitment	Project Management	Critical policies or legislation fails to pass or progress in the legislative process	Strategic Vision, Planning and Communication	Might refer to socioeconomic factors such as: population pressures; encroachment – illegal invasions; poaching/illegal hunting or fishing
Social and Cultural	Co-financing difficulties	Implementation arrangements	Political Will	Human Error/Incompetence		Leadership and Management	Poor response to gender equity efforts
Security/Safety	Use of financing mechanisms	Country Office Capacity (specific elements limiting CO capacity)	Political Instability	Infrastructure Failure		Program Alignment	
Economic	Funding (Financial Resources)	Governance	Change in Government	Safety being compromised		Competition	
	Reserve Adequacy	Culture, Code of Conduct and Ethics	Armed Conflict and Instability	Poor monitoring and evaluation		Stakeholder Relations	
	Currency	Accountability and Compensation	Adverse Public opinion/media intervention	Delivery		Reputation	
	Receivables	Succession Planning and Talent Management		Program Management		UN Coordination	
	Accounting/Financial Reporting	Human resources Processes and Procedures		Process Efficiency		UN Reform	
	Budget Allocation and Management			Internal Controls			
	Cash Management/Reconciliation			Internal and External Fraud			
	Pricing/Cost Recovery			Compliance and Legal			
				Procurement			
				Technology			
				Physical Assets			

Annex 2. TOR of key staff

a. Project Coordinator/Chief Technical Advisor

b. M&E expert & Communications specialist

c. Finance and Admin staff

d. Agro-ecological expert (Yr 1)

e. Livelihoods expert (Yr 1)

f. Humid tropical forest specialist (Yr 1)

g. Organizational, training and communications specialist (Yr 1)

a. **Project Coordinator/ Chief Technical Advisor**

- Reports to Project Manager at MOA
- Plan the activities of the project and monitor progress against the initial quality criteria.
- Mobilize goods and services to initiative activities, including drafting TORs and work specifications;
- Monitor events as determined in the Project Monitoring Schedule Plan, and update the plan as required;
- Manage requests for the provision of financial resources by UNDP, using advance of funds, direct payments, or reimbursement using the FACE (Fund Authorization and Certificate of Expenditures);
- Monitor financial resources and accounting to ensure accuracy and reliability of financial reports;
- Responsible for preparing and submitting financial reports to UNDP on a quarterly basis;
- Manage and monitor the project risks initially identified, submit new risks to the Project Board via the Project Manager for consideration and decision on possible actions if required; update the status of these risks by maintaining the Project Risks Log;
- Be responsible for managing issues and requests for change by maintaining an Issues Log;
- Prepare the Project Progress Report (progress against planned activities, update on Risks and Issues, expenditures) and submit the report to the Project Board and Project Assurance;
- Prepare the Annual Review Report, and submit the report to the Project Board and the Outcome Board;
- Annual Performance Report (APR)/Project Implementation Review (PIR)
- Prepare the AWP for the following year, as well as Quarterly Plans if required;
- Update the Atlas Project Management module if external access is made available.

b. M&E and Communications Expert *(one full time position or two part time positions)*

- Provide technical expertise and guidance to all project components, and support the Project Coordinator in the coordination of the implementation of planned activities under the LDCF project as stipulated in the project document/work plan
- Specifically responsible for the technical input into the development of a M&E framework and its implementation and follow-up with all relevant stakeholders at national, county and demonstration site level, in line with the project results framework in section III of the project document and in line with the GEF tracking tool for LDFC project AMAT and GEF M&E guidance
- Be responsible for the communication work under all project components;
- Be responsible for the dissemination of project lessons through the Adaptation Learning Mechanism (ALM)
- Develop guidelines for the documentation and codification of lessons learned, best practices, and experiences that did not work.
- Systematically e.g. through the M&E component and special studies, document lessons learned.
- Develop a 'plan' for the type of knowledge to be generated, and how, including a dissemination plan.
- Develop specifically targeted learning materials for specific Liberian target groups (mainly those in Components 1 and 2) and disseminate according to dissemination plan.
- Share knowledge with international community e.g. through UNDP Adaptation Learning Mechanism (ALM).

- Ensure that technical contracts meet the highest standards; provide input into development of Terms of Reference for sub-contracts, assist with selection process, recommend best candidates and approaches, provide technical peer function to sub-contractors; provide training and backstopping were necessary
- Provide technical inputs into the work of the Steering Committee, and other relevant institutions implicated in the project management and implementation arrangements
- Give input into the development of technical activities under the various project outcomes
- Serve in a mentoring and back stopping function to project staff, as relevant
- Undertake regular reporting in line with project management guidelines.

c. Finance and Admin Manager

- Set up and maintain project files
- Collect project related information data
- Update plans
- Administer Project Board, SC and other relevant meetings
- Administer project revision control
- Establish document control procedures
- Compile, copy and distribute all project reports
- Responsible for the financial management tasks under the responsibility of the Project Coordinator
- Provide support in the use of Atlas for monitoring and reporting
- Review technical reports
- Monitor technical activities carried out by responsible parties

Field-based team (Grand Gedeh)

The team required in particular for Component 2 in year 1 of the project would be composed of;

Agro-ecological expert (Yr 1)

- Jointly with the communities identify and analyse the present farming systems, both with women and men and if necessary through special meetings with women to ensure a gender sensitive approach and planning.
- Enter into negotiations with the community and identified farm leaders in a series of on farm validations of possible responses to the problems identified and prioritized between them.

Qualifications:

- Academic formation is extensive experience with agro-forestry systems in the humid tropics in Africa and elsewhere
- Experience withSystem of Rice Intensification (SRI) , preferably in a humid tropical forest ecosystem.
- Demonstrated capacity to systematize experiences and to work with rural farming communities.

Livelihoods expert (Yr 1)

- Through a participatory approach, develop a detailed analysis of livelihood and land use systems of participating communities with the communities themselves.

Qualifications:

- Extensive experience of livelihoods work in rural areas of Africa.
- Demonstrated ability to work with rural farmers, both women and men,

- Proven quality of work through documentation that demonstrates not just the capacity to construct livelihoods systems but to do so in a participatory manner
- Demonstrates a deep understanding of how livelihood systems work and how external interventions can help them be more resilient.

Humid tropical forest specialist (Yr 1)

- Jointly with community leaders, a program of systematising forest resources used by villagers including a plant inventory. It must be clear from the beginning, with formal due procedure, that this knowledge is the property of the community or person who exercises it.

Qualifications:

- Ecologist with extensive knowledge of the Guinean forest and forest communities.
- Track record of carrying out forest use inventories and/or working with communities in the management of community forests and their species.

Organizational, training and communications specialist (Yr 1)

- Experiences with the local farmers and participating NGOs and support structures and results disseminated according to impact and relevance at a wider level.
- As part of the program of knowledge dissemination, organize farmer to farmer extension systems with farmer interchange and visits between them as well as radio programs.
- Monitoring and documentation of experiences.

Qualifications:

- Livelihoods experience as well as working with communities and the construction of participatory governance at the local and provincial level.
- Experience with community savings and loans initiatives as well as the promotion of women's organizations and participation.
- Does not have to be a communications expert but needs to have a track record of working with local radio and other media in rural areas.

It is recognized that the specific qualities described for each post might not be found in the candidates that apply. What is important is that amongst the team the various skills are present and that the team leader is the person with the most experience of leading multidisciplinary field teams and has a holistic understanding of rural sustainability in the humid tropics.

It is not likely that this team will be found in Liberia but Liberians with the above profiles should be looked for first. Where not available then a search in the Guinean region should be undertaken. It will obviously be expensive to bring expertise from out of the country but that might be necessary. If from out of country then the team must have as a key element in their contract and work schedule the formation of Liberians who can continue this work after being trained. This type of training is done in the field not the classroom and it would be best that the Liberian team is placed institutionally from the beginning. They should be field based so either CARI or Cuttington University would be ideal as then there would also be an institutional base for future training and transfer of the participatory methodologies basic to the development of resilient farming systems that can both feed Liberia and recover the country's major ecosystem.

Annex 3. Stakeholder consultations during PPG phase

1. Fact finding consultations and kick-off of PPG phase (November 2010)

Short description: Initial consultations took place in the second week of November 2010, when the international consultant Dr. Juliane Zeidler came for the first project preparatory mission, together with Mr. Tom Twinning-ward, the Regional Technical Advisor at UNDP responsible for the project. The team participated in the inception workshop of the GEF/LDCF coastal project and specific stakeholders were consulted in the margins of that meeting. Strategic face-to-face meeting were held with the EPA, MOA, FDA, University of Liberia, FAO, several UNDP internal resource people especially related to the UN Joint Programme, and NGOs such as Conservation International, OXFAM, AEDE.

Purpose/objectives: Initial PPG inception and setting up of team; first fact finding and stakeholder consultations.

Key findings/outputs: The key outputs from the kick-off were a detailed team workplan for the PPG phase with specific guidance for the local team, as well as effective fact finding and resources collection for the actual design phase.

2. Project design workshop (March 2011)

Short description: Based on the work of the local team in the interim phase, a visualised and well facilitated design workshop with key representatives from the agriculture sector and the CC community was conducted. The workshop aimed to solicit specific views on the focus of the design and specifically guide the side selection for the demonstration sites – and the field visit by the project team. An international agriculture expert, Mr. lan Cherrett, and the local team were part of the meeting.

Purpose/objectives: Solicit sector stakeholder inputs into the draft design of the project, based on the foundation work undertaken during the interim phase by the project team.

Key findings/outputs: Detailed proposals for all three project component and the implementation arrangements of the project. A set of detailed workshop minutes are available.

3. Field consultation March (Grand Gedeh, Bong, Margibi)

Short description: Based on the deliberations at the design workshop, three counties were suggested for the location of demonstration sites, namely Grand Gedeh. Bong and Margibi). The team of national and international consultants, led by the Assistant Minister of MOA (Technical Services), Mr. Chea B. Garley, visited all three counties and their administrations including the county level offices of MOA. Based on the selection criteria for sites, i.e. a strong baseline investment in place and low-land rice cultivation a key livelihood strategy, specific districts and communities were identified and scoping exercises for the project design were undertaken with local stakeholders.

Purpose/objectives: Identification of demonstration sites and assessment of baseline situation.

Key findings/outputs: A detailed description of the proposed demonstration sites was prepared, as well as transcripts of the consultations. Consent for collaboration was solicited from all sites. The baseline was weakest in Margibi.

4. Field consultation May 2011

Short description: A follow-up field consultation with Ian Cherrett took place in April 2011. All identified suitable demonstration sites from the previous field mission were visited and initial assessments of livelihoods and farming systems were undertaken with the local stakeholders.

Purpose/objectives: Confirmation of demonstration sites; development of baseline; inputs into project design.

Key findings/outputs: The key recommendation from this field assessment was that only two demonstration sites should be included in the design and consequently Margibi was excluded – based on a number of criteria.Additionally views on the project design were collected from the local level stakeholders particularly important to component 2 of the project. Commitment from the demonstration sites and implementation partners to implement this here proposed intervention was solicited. A detailed field trip report is available.

5. Verification workshop May

Short description: Following the additional field consultations, as well as the ongoing project document drafting process, a verification workshop on the first full project document and design was conducted in early May. The draft prodoc was made available to all workshop participants for their comments. Specific feedback on the draft prodoc was subsequently incorporated into the finalization of the brief.

Purpose/objectives: Verification of the draft project design, including the project strategy, implementation arrangement etc.

Key findings/outputs: Strong interest in the project was visible amongst the participants. Very concrete suggestions for text changes were made.

NAME	INSTITUTIONS
Benjamin Karmorh	EPA- Climate Change Focal Point
Dr. Anyaa Vohiri	EPA- Executive Director
Bernice A. Paye	National Climate Change Secretariat/ Admin. Coordinator.
John Emmanuel Paivay	FAO / National Project Coordinator EC Food Facility.
Dr. Moses Zinnah	MOA /Program Management Unit
Osama Tall	MOA / Assistant Minister for Planning
Richelieu Mitchell	MOA/ Deputy Minister for Regional Development Research and Extension.
Chea B. Garley	MOA/ Assistant Minister / Technical Services
Abu S. Konneh	MOA/ Technical Services
Augustus Fahnbulleh	MOA/ Quarantine & Environment/ Technical
Gertie K. Sulunteh	MOA/ Program Officer / DRDRE/ Extension
Maxwell Jouvor	MOA/EAC / Central Agriculture Research Institute (CARI)
Johnson Mortor	MOA / CARI
Dr. Roland Massaquio	Dean/ Agriculture College/ University of Liberia
Molly Medscole	Chairman / Agronomy Department Agriculture of College/ University of Liberia.
Leroy Cegbe	Professor/ Agriculture of College / University of Liberia
Joseph G. Musah	Chairman /General Agriculture College of Agriculture, University of Liberia.

Ms Chantelle	OXFAM Liberia
Mr. Ortello Brandy	Land Commission of Liberia
Daniel F. Barclay	Professor / Agronomy Department Agriculture of College / University of Liberia.
Quaqua Mulbah	CARI/ Agronomist
John Newman	CARI / Agronomist
Jophm Momo	CARI / Program Officer / Special Project
Levi Paye	Bong County/ Panta/Kpaii District (LEAD Farmer)
Alice Kallon	CARE/Agriculture Extension Officer/ Bong County
Julius Tiatun	CARE/ Agriculture Extension Officer
Galah Toto	Oxfam/ Livelihood Programme Officer / E-mail
Mr. France Wreh	Liberia Institute Geo- Information Service (LIGIS) / Deputy Minister / General Statistics
Andy Tugbah	LIGIS/ GIS Lab.
Parry Brown	CARE International Office/ Admin- Manager
	AEDE Office/ Admin. Manager
Joseph K. Boiwu	FAO
Benjamin Karmorh	EPA
Sidiki A.Quisia	MPEA
Anthony J. Taplah	Agri. College University/Lib.
Francis N. Mwah	MOA
John Brownell	AEDE
John Newmah	CARI
D. Abugarshall Kai	CARI
Seklau E. Wiles	MOA
Noorie E. Dudley	CARE
George O. Anderson	GCAEAG
Ophelia Darlos	FDA
J. Samuel A. Weeks SR..	FDA
Henry Khonyoungwa	CARE
Bernice A. Paye	NCCS-MOS
Yevewao Z. Subah	MOA
Moses P. Roberts	FDA
Grand Gedeh County	
Joe Kyne	Commissioner / Zleh Town/ Borkey Township
Zean L. Sayee	MIA / Agriculture Extension Coordinator
Alex Koso	Youth Leader / AMENU Cooperative Association
Orethea Dennis	Women Leader/ AMENU
Alfred M. Tarlue	City Major / Zleh Town / Township
Bestman Junior	Zleh Town
Jackson Choloe	Cooperative Farm Manager.
John B. Yarkpa	FOA/ Employee Zleh Town / Borkey Township
Jalarwo Karr	MOA / District Agriculture Officer.
Bong County	
Monica K. Houore	MOA / County Agriculture Coordinator

Rev. Momoh Sylvester FOH, JP	Dean/ College of Agriculture / Cuttington University College (CUC)
Philip Ndalomh	Chairman / Agriculture Department /CUC
Mark D. Dowee	Youth for the Development of Bong County
Peter Gborkollie	Quakpaga Cooperative / Garmu Communities
Kensuah Botokee	Quakpaga Cooperative / Garmu Communities
Eric Daio	Quakpaga Cooperative / Garmu Communities
Otis Paliwoe	Quakpaga Cooperative / Garmu Communities
Francis Paliwoe	Quakpaga Cooperative / Garmu Communities
Dr. Abugarshall Kai	Deputy Director General/ Central Agriculture Research Institute (CARI)
Margibi County	
Willie F. Cooper	MOA / County Agriculture Coordinator (CAC)
Emmanuel D. Freeman	MOA/ District Agriculture Officer
Augustine F. Moore	Fish pond Farmer/ 06770100
Aydia Flomo	Garlin Cooperative Association / Secretary

Annex 4. Summary of reports from PPG phase

The following key reports were produced as part of the PPG phase, based on detailed TORs developed during the first inception of the PPG phase/work planning:

PPG report 1: Institutional mapping and stakeholder analysis

- Foundation for consultations
- Stakeholder engagement plan
- Foundation of implementation arrangements

PPG report 2: Agro-meteorology centre concept: End user needs, possible mechanisms, piloting opportunities

PPG report 3: Scoping papers: expected CC risk and impacts on agricultural sector & products (i.e. rice, oil palm, rubber, selected vegetables, livestock)

PPG report 4: Cost analysis based on risk/impacts papers

PPG report 5: Policy review component

PPG report 6: Site consultations and local level planning (county and site level)

- Vulnerability assessments
- Site descriptions
- Participatory planning

SIGNATURE PAGE

Country: Liberia

United Nations Development Programme

Country: Liberia

PROJECT DOCUMENT[35]

Project Title:	Enhancing Resilience to Climate Change by Mainstreaming Adaption Concerns into Agricultural Sector Development in Liberia
UNDAF Outcome(s):	**Outcome 2:** Equitable socio-economic development

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: ***Sustainable Rural Development (at national/sub-national/community level)*** (Governance systems internalize they long-term sustainability of rural production into their core institutional systems)

UNDP Strategic Plan Secondary Outcome: ***Ecosystem-based adaptation*** (Governance systems internalize the long-term sustainability of land based ecosystems good and services, including climate change mitigation and adaptation, into their core institutional systems)

Expected CP Outcome(s):

CP Pillar 1: Pro-poor economic development:

Component: Sustainable local economic recovery

Community-based recovery and development including food-security

Sustainable management of environment

Expected CPAP Output (s)

Output 9.1: Access to basic infrastructure facilities and sustainable livelihoods improved

Output 10.1: Climate change and renewable energy policies appropriate to Liberia developed and implementation begun

Output 10.2: Local capacities for environment and natural resources management strengthened through technical, logistic and policy support to national environment/NRM, biodiversity and land management institutions and initiatives

Output 10.3: Institutions and legal systems capacities for disaster risk management developed

Executing Entity/Implementing Partner: Ministry of Agriculture (MOA)

Implementing Entity/Responsible Partners: UNDP

[35] For UNDP-supported GEF-funded projects as this includes GEF-specific requirements

Brief Description

Liberia is a post-conflict LDC searching for more sustainable development pathways. Preparing for the impacts of projected climate risks is one strategy to secure the future productivity of the agriculture and food security sectors. This proposed project proposes to build a critical mass of climate risk management capacity at the local, regional and national levels. While interventions under Outcome 1 will focus on strengthening individual, institutional and systemic adaptation capacities in key institutions, Outcome 2 focuses on a systematic approach to knowledge management – the two outcomes are closely interrelated, ensuring absorption of adaptation learning generated under the various project components into future policy development and review, i.e. the next generation of the RRS and sector specific policy directives. Outcome 2 serves to generate practical local level lessons learned through hands-on adaptation learning. This will take place in a participatory manner with local farming communities at two demonstration sites in two counties, namely Grand Gedegh and Bong. Enhancing agricultural viability through the validation of climate resilient practices, i.e. eco-agriculture, agro-forestry, and diversification of production systems, contributes to building climate change resilient communities. Low-land rice production, promoted on a large-scale throughout Liberia through high level policy directives may be a risky investment if not linked to integrated up-land farming systems. Currently, local farmers seem to practice a dual livelihood strategy of low-land and up-land farming, which, at this moment, seems to be poorly directed with major negative environmental impacts and limited sustainability promise.

Program Period:	2011 - 2015
Atlas Award ID:	00062109
Project ID:	00079407
PIMS #	4439
Start date:	Sept. 2011
End Date	Sept. 2015
Management Arrangements	DEX
PAC Meeting Date	TBF

Total resources required		8,626,522
Total allocated resources:		8,626,522
Regular		2,381,400
• Other:		
○	GEF/LDCF	2,381,400
○	Other	200,000 (Cash, UNDP)
In-kind contributions		6,145,122
○	Government	5,100,000
○	FAO/AEDE	1,045,122

Agreed by (Government):

Date/Month/Year

Agreed by (Executing Entity/Implementing Partner):

Date/Month/Year

Agreed by (UNDP):

Date/Month/Year