Enhancing the resilience of vulnerable coastal communities in Sinoe County of Liberia

Part I: Project Information

GEF ID
10376

Project Type
FSP

Type of Trust Fund
LDCF

CBIT/NGI
- ☐ CBIT
- ☐ NGI

Project Title
Enhancing the resilience of vulnerable coastal communities in Sinoe County of Liberia

Countries
Liberia

Agency(ies)
UNDP

Other Executing Partner(s) **Executing Partner Type**

Other Executing Partner(s)

Environmental Protection Agency (EPA) Ministry of Agriculture (MoA), Forestry Development Authority, Ministry of Mines and Energy (MoME) and Ministry of Public Works and Construction

Executing Partner Type

Government

GEF Focal Area

Climate Change

Taxonomy

Transform policy and regulatory environments, Deploy innovative financial instruments, Influencing models, Climate resilience, Climate Change Adaptation, Climate Change, Focal Areas, Sea-level rise, SMEs, Private Sector, Financial intermediaries and market facilitators, Stakeholders, Communications, Awareness Raising, Beneficiaries, Gender Mainstreaming, Access to benefits and services, Gender Equality, Capacity Development, Gender results areas, Least Developed Countries, Strengthen institutional capacity and decision-making, Local Communities, Capacity, Knowledge and Research, Knowledge Exchange, Knowledge Generation

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 1

Duration

72 In Months

Agency Fee($)

848,580

Submission Date

3/19/2020

A. Indicative Focal/Non-Focal Area Elements

Programming Directions	Trust Fund	GEF Amount($)	Co-Fin Amount($)
CCA-1	LDCF	1,890,000	17,850,000
CCA-2	LDCF	7,042,420	35,850,000
	Total Project Cost ($)	**8,932,420**	**53,700,000**

B. Indicative Project description summary

Project Objective

To protect the assets and enhance livelihood diversification of Liberian coastal communities through the implementation of sea and river defence risk management approaches.

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
1: POLICY AND INSTITUTIONAL CAPACITY STRENGTHENING FOR CLIMATE CHANGE ADAPTATION PLANNING	Technical Assistance	Outcome 1: Capacity of all coastal counties' planning institutions to assess climate change risks and to consider into County Development Agendas strengthened	1.1: County level ICZM Plans prepared for all coastal counties to address climate hazard risks on infrastructure, livelihoods, health, and enable adaptation planning and monitoring, protection and maintenance of sea/river defence; 1.2: Identified climate-related risks and adaptation priorities are incorporated into Coastal County Development Agendas, and incorporated into county and national planning and budgeting processes. 1.3. Cross-sectoral climate change information and risk focal points and working groups established and trained for all coastal counties	LDCF	700,000	7,000,000

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
2. Innovation, technologies and climate information for coastal adaptation planning	Investment	Outcome 2: Innovative technologies to support coastal adaptation introduced, including response planning and communication mechanisms	2.1: Coastal flood and erosion early warning and risk management systems supported to provide climate information, products and services that meet the needs of end-users. 2.2: County level knowledge hubs to collect and disseminate lessons learned on Sea & River Defence information to support ICZM supported in all Coastal counties, based on Sinoe pilot. 2.3: Community Action Plans developed and implemented in all districts of Sinoe County*(informed by adaptation options developed under NAPs project, encouraging coastal communities to adopt new practices and adopt new livelihood opportunities to embrace new adaptation to sea-level rise risks)*. 2.4. Guidance manuals for integrated coastal adaptation practices developed and disseminated to all coastal and riverine counties.	LDCF	1,100,000	10,000,000

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
3. Solutions for reducing vulnerability to climate-induced sea level rise and coastal erosion	Investment	Outcome 3: Reduced vulnerability of Sinoe County coastal communities to climate-induced sea level rise impacts through hybrid solutions (nature based and engineering)	3.1. Viable solutions to address climate vulnerabilities in Sinoe County developed and designed using multi-criteria and processes for identifying, prioritizing and planning adaptation and resilience solutions, in consultation with local stakeholders. 3.2: Coastal and catchment level adaptation solutions implemented to improve resilience of communities the impacts of climate change in Sinoe County, targeting 80,000 beneficiaries and 20,000ha; 3.3. Best practices on adaptation solutions documented and disseminated to other coastal counties for adoption and scaling up including through the engagement of private sector.	LDCF	3,608,000	25,500,000

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
4. Livelihood diversification for climate resilience	Investment	Outcome 4: Gender-responsive options for climate-resilient income and livelihood diversification introduced to climate-vulnerable communities in coastal counties	4.1: Business identification, development and management training programmes designed and delivered to communities and Small Micro and Medium Enterprises in coastal counties targeting youths and women's groups targeting 70,000 beneficiaries. 4.2: Integrated Farming Systems, Fisheries and Compressed Stabilised Earth Blocks and their value chains – opportunities for coastal communities are created and implemented targeting 30,000 beneficiaries 4.3: Access to finance and technologies to develop livelihood and income diversification enterprises of coastal livelihoods and resources facilitated in collaboration with national and county financial institutions.	LDCF	3,099,100	8,000,000
				Sub Total ($)	**8,507,100**	**50,500,000**

Project Management Cost (PMC)			
	LDCF	425,320	3,200,000
	Sub Total($)	**425,320**	**3,200,000**
	Total Project Cost($)	**8,932,420**	**53,700,000**

C. Indicative sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Government	Government of Liberia	In-kind	Recurrent expenditures	10,000,000
GEF Agency		Grant	Investment mobilized	15,000,000
GEF Agency		In-kind	Recurrent expenditures	500,000
Others	West Africa Biodiversity and Climate Change Program (WBiCC)	Grant	Investment mobilized	28,000,000
GEF Agency	UNDP	Grant	Investment mobilized	200,000
			Total Project Cost($)	**53,700,000**

Describe how any "Investment Mobilized" was identified

The co-financing was identified through initial discussions within government agencies that will be implementing the project. Investment mobilized was identified by analyzing grant-funded activities in Liberia that make tangible contributions aligned to the objective of the project, through which the impact of the project will be enhanced. Preliminary discussions have been held with the institutions involved in these projects. Government recurrent expenditure was estimated based on the contributions that will be made by government institutions in the coastal counties in designing and implementing project activities. At the national level, the role of the staff from the EPA in coordinating the project, and the technical involvement of the Ministry of Agriculture, the Forestry Development Authority, the Ministry of Mines and Energy and the Ministry of Public Works were identified as in-kind contributions to the project. Investment mobilized was identified by considering additional funding through projects and programmes that have direct contributions to the management of coastal resources and addressing climate change risks in Liberia. The project will partner with Conservation International, who will bring in-kind contributions through their on-going work on coastal resources management in Liberia, including the management mangroves, that will contribute to ecosystem based adaptation solutions. The UNDP co-financing will used to support the project activities in a flexible manner whenever the GEF resources cannot be used. More detailed analyses and confirmations will be made during the PPG stage, where it is assumed that more sources of co-finance will be identified.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNDP	LDCF	Liberia	Climate Change	NA	8,932,420	848,580	9,781,000
				Total GEF Resources($)	**8,932,420**	**848,580**	**9,781,000**

E. Project Preparation Grant (PPG)

PPG Required

☐

PPG Amount ($)

200,000

PPG Agency Fee ($)

19,000

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNDP	LDCF	Liberia	Climate Change	NA	200,000	19,000	**219,000**
				Total Project Costs($)	**200,000**	**19,000**	**219,000**

Core Indicators

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female				
Male				
Total	0	0	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

provided as annex

Part II. Project Justification

1a. Project Description

1a. Project Description

1) Global environmental problem, root causes and barriers

The Republic of Liberia has a coastline that is 565 km long and claims an economic zone of 13 nautical miles and a territorial zone of three hundred and seventykm. About 90% of the coastline consists of a narrow sand beach 20- 25 meters wide, reaching 60-80 meters in some parts of southeastern Liberia, interspersed with lagoons. The coastal area consists of swamp-related vegetation, including mangroves forests and reeds that extend up to 25 miles inland. Mangroves provide important breeding and nursery areas for many West African marine species of fish, crab, shrimp and mollusks and hence deforestation of mangroves is having a direct impact on fish stock.

The country is faced with continued severe development challenges. Nearly 58% of Liberia's four million people live within 40 miles of the coast, which puts extensive pressure on coastal ecosystems for food, land, mineral extraction and other resources, resulting in habitat loss and degradation. Populations continue to grow, and new infrastructure (e.g. roads and housing), while desperately needed, will only add additional pressure and increase ecosystem degradation. Liberia is a least developed country that has recently emerged from an extended period of civil war. It has struggled through two civil wars, one from 1989-1996 and the second from 1999-2003. An estimated 64% of Liberians live below the poverty line, of whom 1.3 million live in extreme

poverty. Food insecurity affects 41% of the population and chronic malnutrition is high. Many people were displaced from their homes during the war and have only recently returned. The war had a devastating impact on the country's health and education systems and a large portion of the population is illiterate. The country has also been afflicted by the outbreak of the Ebola Virus disease. The economy, though recovering, is still unable to generate the large-scale employment opportunities essential for absorbing a large pool of unemployed and underemployed young men and women. The majority of the country's population is directly dependent on natural resources for their livelihoods.

Climate projections show a slight increase of total precipitation and a longer Sahelian rainy season (2–3 days per decade) with drier phases within. In a "business as usual" world, most countries in West Africa will have to cope with less predictable rainy seasons, generalized torrid, arid and semi-arid conditions, longer dry spells and more intense extreme precipitations resuting in flash floods. Such conditions can produce significant stresses on agricultural activities, water resources management, ecosystem services, urban areas planning and coastal processes. Liberia is vulnerable to the impacts of climate variability and change, such as warmer temperatures, changes in precipitation patterns, particularly, increases in the frequency of extreme rainfall events. These climate change impacts present challenges to the country's socio-economic development. The best estimate of the impact of future climate conditions on temperature is provided by the overall ensemble mean of 16 climate models across 3 emission scenarios which suggests that Monrovia will warm by 1.92°C by 2050 and 2.65°C by 2080 during the dry season (1.61°C by 2050 and 2.60°C by 2080 during the wet season). Regardless of emission scenario, the Atmosphere-Ocean Global Climate Models (AOGCMs) are quite consistent in predicting warmer conditions throughout in all of Liberia. Projected precipitation changes in Monrovia range from 36% decreases to 21% increases in wet season rainfall. The overall ensemble prediction across emission scenarios gives a slight increase in wet season rainfall of 1.54% by 2050 and 1.92% by 2080. The increased rainfall appears to occur mostly during the early months of the rainy season, beginning in the southeast in May and

extending west along the coast in June and July, implying more intense rainfall events (Stanturf et al. 2013). General trends of projected temperature and precipitation changes for 2050 and 2080 are into direction for a warmer and wetter climate in most of the country and especially in the coastal zone.

About 90% of Liberia's coastline consists of a narrow sand beach 20-30 meters wide, reaching 60-80 meters in some parts of eastern Liberia. Climate projections under Representative Concentration Pathway (RCP) 8.5 predict a sea-level rise (SLR) of 75 cm by 2100 along Liberia's coast, as well as an increase in the frequency of high-intensity storms resulting in an increased offshore significant wave height . The combined effect of these climate impacts will rapidly increase the rate of beach and coastal erosion, storm surge inundation and coastal/fluvial flooding in Sinoe County, threatening local populations and coastal infrastructure. The climate at Sinoe County is similar to most of southern Liberia, which is strongly influenced by the coastal zone which gives rise to wet and dry seasons. The long wet season usually runs from April to October and the dry season from October to April when ±90% of the rainfall occurs. Climate change will impact vulnerable coastal communities in Liberia through: i) degradation of the mangrove ecosystems on which their livelihoods and food security depend ; and ii) inundation of vital infrastructure such as boat-launch sites, dwellings and socio-economic spaces and amenities such as fish markets .

Present-day coastline of Liberia exhibits both accretional and erosional features also influenced by coastal rivers. The effects of climate change induced SLR alone (2.8 to 3.6mm/y from 1993 to 2010) may not be significant, however in combination with high tides (maximum astronomical high tide 1.38m), return period of high waves (2.95m for 50-year return period in rainy season), destructive energy of long distance originated swell waves and geological composition of the coastland (erosion prone sandy coast) makes.

The coastal hazards in Liberia can be generalized by change in two major aspects: change in water level and change in land area. The change in water level can be due to sea/wave action, local tidal variations, current patterns, flooding from rivers and/or combination of those. The change in land area can be due to erosion (or accretion) in the coastal area. These factors lead to a situation where the coastal area is prone to hazards like flooding and erosion. The coast is exposed and dominated, throughout the year, by consistent patterns of long period low to moderate energy swell waves originating from storms a long distance away in the Atlantic Ocean. Therefore, swell waves, with longer periods, can pack a lot more energy than locally generated waves .

The effects of climate change induced SLR, in combination with tides (mean high tide, 1.1m), return period of high waves (2.40, 2.60, 2.70, 2.95m for 1, 5, 10 and 50-year return period in rainy season respectively), destructive energy of long distance originated swell waves and geological composition of the coastland (erosion prone sand and soft sandstone sediments with occasional rock outcrops), makes Liberian coastal area highly vulnerable to climate change . This becomes a large issue for developed beaches that are less than 5 m from the ocean. While the up to 4-7 mm per year long term SLR in the middle Atlantic region of Liberia does not seem like much, a horizontal beach loss of 100 times this amount, each year, is significant on a long-term scale.

Also, the rate of erosion which is seen presently in Liberia cannot be solely attributed to SLR alone. It is a result of combined action of South Atlantic originated swell waves, longshore currents, tides, SLR but also due to contribution of anthropogenic factors (deforestation of coastal belt, sand mining, etc.). The main impacts of relative sea level rise on the Liberian coastal area are summarized in the table below.

Biophysical impacts of relative SLR	Other climate-related drivers	Other human drivers
Dryland losses due to erosion	Sediment supply, wave and storm climate	Activities altering sediment supply (e.g. sand mining, river dam building)

Dryland loss due to submergence	Wave and storm climate, morphological change, sediment supply	Sediment supply, flood management, morphological change, land claim
Wetland loss and change	Sediment supply, CO_2 fertilisation	Sediment supply, migration space, direct destruction
Increased flood damage through extreme sea level events (storm surges, tropical cyclones, etc.)	Wave and storm climate, morphological change, sediment supply	Sediment supply, flood management, morphological change, land claim
Seawater intrusion into surface waters (backwater effect)	Runoff	Catchment management and land use (e.g. sand mining and drenching)
Seawater intrusion into groundwater leading to rising water tables and impeded drainage	Precipitation	Land use, aquifer use

Liberian coastal area highly vulnerable to climate change. Coastal population growth adds additional pressure on coastal land by increasing the need for both economic activities and housing.

About 17% of the coastal area is built-up area, under plantation or under some sort of agriculture - all three categories specifically having extremely low resilience. Similarly, great proportion, about 62%, of the coastal area is under some type of economically and biodiversity valuable forests and mangroves (with highly valuable ecosystem services) and thus raising the overall vulnerability of the coastal region to a medium range.

Liberia experiences continuous hazard danger coastal area with unfavourable geomorphology and exposure to unobstructed forces of Atlantic Ocean swell waves. Each of the coastal counties has a history of recurring natural hazards. Coastal districts towns are often exposed to flooding and erosion has already swept large number of houses through the years and along the entire coast of Liberia. Along with reviewing Liberia’s disaster profile, understanding

the management of risks at national and county level turn out to be obligatory. Recent natural climatic events in Liberia and the increased frequency and magnitude of hazards such as floods and sea erosion have given the impetus for a National Disaster Risk Management Policy for Liberia (2012) . This impetus is also driven by a need to reduce the risks related to these hazards as a result of high vulnerability from over fourteen years of war, poverty and low human and physical capacity. Additionally, the risk of economic, social and environmental losses is high, also given the high pressure on resources in areas with a high concentration of population. The coastal areas of Liberia are therefore particularly vulnerable to climate change and its effect on the coast is now becoming clearly evident. This vulnerability is increased where communities are located close to river flood hazard areas (river mouths, swamp areas or wetlands) in light of increasing precipitation predictions for the country coupled with poor land drainage strategies.

Already, Liberia has seen coastal features (including beaches, mangroves, swamps, river mouths and sandspits etc) beginning to change more dramatically and often in unpredictable ways.Mangrove forest and savannah related vegetation can extend up to km 25 inland and are often connected to the coast as part of catchments (streams/rivers etc) making the link between the sea and rivers in Loberia very strong in terms of ecosystem connectivity. Linked to this, many coastal livelihoods are increasingly threatened by coastal flooding and erosion, as well as catchment related flooding which, ehen combined with the reality of rising sea levels and increased storm frequency will inevitably increase these risks.

Almost 90 percent (%) of the national population is living at risk of flooding from the sea, river system, swampland and clogged drains. In fact, as stated within the National Disaster Risk Management Policy (2012), in 2007, floods affected over 22,000 people in Liberia with the majority or those affected living in the coastal zone or close to the mouths of rivers (estuary areas). More recently, and according to National Disaster Management Agency (NDMA), 2019 floods are reportedly affecting 8,000 people in three coastal counties (including Sinoe County) which increased to 60, 000 people in July 2019.

One of the most serious threats to the coastline and marine environment are solid waste, beach sand mining (unregulated sand mining is causing slight embayment of the shoreline due to localized recession) and beach erosion (causing shoreline recession in some cities such as Greenville in Sinoe County). The continuing pressures of high population densities, poor resource extraction techniques and rapid economic development in or near pristine and vulnerable areas, are further degrading natural coastal infrastructure. Added to these threats are climatic pressures, which have emerged as significant and real risks to the integrity and productivity of these coastal ecosystems. Given that many of the ecosystem services that coastal communities rely on also help them to adapt to climate change, it is important to promote resilient coastal ecosystems to reduce climate stresses, especially in countries with high biodiversity and ample vegetation options. There are currently no alternatives on offer to use other sources of sand (except for beach sand) to help the construction industry for coastal communities and to improve farming strateges that diversify crop rotationproduction, planting regimes and diversity of crop are offered.

Sinoe is one of Liberia's 15 counties, and has been identified as one of the coastal counties most affected by climate change, and thus an adaptation priority for government. Greenville is the capital of Sinoe County in south-eastern Liberia and is the economic hub of the area. It is situated adjacent to a lagoon near the Sinoe River and on the Atlantic Ocean. It is considered to be one of the major coastal cities in Liberia, and includes a number of businesses that are vulnerable to flooding and erosion. Sinoe County is a key focus of this PIF as it represents one of Liberia’s highly vulnerable counties, and its capital Greenville, has been identified as an important area to protect from sea level rise, together with Monrovia, Rivercess and Buchanan (EPA, 2005). The situation is worsened by the fact that Sinoe is one of the most remote counties, with limited State-run service provision and little non-governmental support. Located in the south east of the country, transport routes rely on unsealed road networks which are susceptible to the effects of flooding (through heavy seasonal rainfall). Emerging results from the vulnerability assessment being undertaken under

the GCF financed NAPs project are also showing the vulnerability of the coastal areas of Sinoe County, specifically Greenville where sea-level rise is already affecting communities and their assets.

Sinoe, unlike many other counties in Liberia, is undergoing significant social, economic and environmental changes. Palm oil and logging operations are increasing in the area. Wages and labour is considerably low in many villages of Sinoe County with some contribution from government civil service, artisanal mining and harvesting of redundant oil palm. Hunting also provides some limited form of economic activity in these villages involving mostly the men especially while the women mostly take part in harvesting of non timber forest products (NTFPs) although some men and women are flexible in terms of these activities. Hunting has been quite profitable for household consumption, as it has served as a source of meat to most of the families for a long time. The Sinoe County Development Agenda (CDA 2012) indicates that a large proportion of the people are still food insecure. One of the goals of the CDA is the rehabilitation of infrastructure and the rebuilding of systems to deliver basic services in order to create the conditions and linkages needed to achieve broad-based growth and poverty reduction. Meanwhile, the 2018 Land Rights Act formalizes customary land rights, allowing communities to enter into contracts with private sector for land and forest resources. This legal recognition and empowerment of customary land-owning communities have the potential to deliver sustainable development benefits including sustainable management of forest resources. At the same time, if managed poorly, it poses an inherent risk of large-scale resource degradation and/or destruction of natural resources (including coastal resources). This would not only have severe negative consequences for the environment, but more so for the communities that depend on them for a wide range of benefits.

Within domestic and regional markets, demand for fish is high because of current levels of food insecurity, the importance of fish as a source of animal protein and important micronutrients, and its potential availability/cost compared to other sources of animal protein (Sinoe County Development Agenda 2012). Another means of fishing carried reported in Sinoe County is application of toxic herbs into the streams during the dry season. These herbs are

thrown into the water and cause the fish to suffocate and emerge on the surface of the stream to breathe during which they are then caught. The most common fish species are tilapia, catfish and fresh water crabs (LFPI 2016).

The population of Sinoe County is heavily dependent upon local economies associated with agriculture, fishing and local construction (including sand mining) which are also affected by climate change, and also amplify the impacts of climate change. Whilst these sectors employ and involve males and females, the societal impacts can have significant ramifications for livelihood and family roles. Rice remains one of the most important economic crops, closely followed by cassava and plantain. As a consequence of a number of factors, including climate change, during the current cropping seasons, there appears to be a lack of seed rice, the implication of which manifesting itself in the migration of many male productive workers to alluvial gold mining areas within the county. Climate change also has impacts on infrastructure, limiting access to markets outside the county especially during the rainy season. For instance, while, there remains a potential for increased rice and cassava production, constraints including poor road infrastructure make the region inaccessible during the rainy season. The lack of alternative market opportunities is now being felt at the local level.

The coastal and marine environment surrounding Greenville is subject to several pressures including erosion, (illegal) sand mining, oil pollution, waste dumps, human settlement and the discharge of municipal wastewater due to the lack of proper water and sanitation facilities. Beach sand mining is one of the most serious threats to the coastline and marine environment in the county as nearly every coastal community practices sand mining primarily for the purpose of brick production. There are no estimates, however, regarding the actual amount of sand being removed. The removed sand “pits” along the coast (and within estuary areas) create slight embayments, which will naturally be filled as littoral drift moved sands are transported along the coast leading to exacerbated shoreline erosion (as net sediment transport volumes are reduced to “fill” these pits.

Liberia's National Biodiversity Strategy and Action Plan, articulates that Greenville, in particular, is experiencing coastal erosion due to uncontrolled exploitation of the natural resources and other human activities. These pressures are being exacerbated by climate change and in particular the increasing risk of increasing rainfall precipitation coupled with poor land management practices. One key issue that relates to flood risk from the coastal perspective is the pressures being exerted on natural buffers to address flood risk (from the sea) or to absorb flood pressures (conveyance from precipitation via the land). this can relate to the regenerative capacity of Liberia's mangrove ecosystems which is fast declining as a consequence of a number of factors including climate change (including erosion and sea level rise). In, for example, Greenville, primary mangrove forests have been replaced by secondary ones. Much of the mangrove destruction appears to concentrate along the edges of creeks which is closely linked to ease of access of mangrove woods for firewood and charcoal.

In addition to the above, coastal communities lack any incentivized scheme (unlike the approach being adopted within forest ecosystems) to help adapt against coastal and catchment degradation through fair and equitable distribution of benefits. Types of benefits being proposed within forest ecosystems include productive and non-productive, monetary and non-monetary and performance and input-based benefits. It is believed that in a similar vein, effective distribution of benefits, Liberia's coastal and rivers, could also be used to develop their potential to help with climate change adaptation, spurring sustainable economic development and empowering communities to live and work within functioning watersheds, estuaries and coastal areas.

Building on previous and on-going projects, particularly the GCF-funded project "Advance the NAPs process for medium term investment planning in climate-sensitive sectors (i.e. agriculture, energy, waste management, forestry and health) and coastal areas in Liberia" this project will localize climate change adaptation action and policy at the level in coastal counties, with a specific focus on Sinoe County. The project proposed is designed to move away from the "business-as-usual" model of adapting to climate change towards one that is more integrated, with a focus on Sinoe

County for a combination of naure based interventions, hard infrastructure, capacity, policy, knowledge and information and observational management systems that will benefit other coastal counties around the country on sea and river defence risk management and supporting climate adaptation livelihood opportunities. This change is needed as up to now, coastal erosion and flood risk in Liberia has been mostly addressed through the use of standard civil engineering measures (i.e. rockfill revetments and small structures made with timber and old tyres). These have worked to a large extent, with effectiveness related to the quality of design and construction. A new approach is now however required to resolve these new integrated problems associated with climate change. A combination of tools and approaches are presented within this LDCF project, combining "hybrid" intervention measures (a combination of nature-based, hard and non-structural interventions) with improved policy and regulatory setting, gender responsive livelihood opportunity setting and enhanced capacity development, training and outreach actions to help enhance coastal resilience to storm, coastal erosion and flooding risks whilst supporting a range of ecosystem service benefits. These tools shall be used in combination with landscape management and monitoring systems which provide the environmental and social benefits required to support livelihood security and build climate resilience.

The proposed LDCF project will therefore apply integration and innovation approaches to better address climate change risks through sea and river defence management in Liberia. It will also use data generated from, and implement the outcomes of the GCF-funded readiness project which is under implementation in Liberia. The GCF project will provide critical data on Liberia's coastal climate risks, hazards and vulnebaility as well as adaptation options for different coastal counties. The initiation and implementation of innovative adaptation solutions through sea and river defence planning, adoption of private sector new alternative business models linked to infrastructure techniques for integrated farming practices coupled with encouragement for community entrepreneurship will be considered in the project to reduce climate vulnerability and build resilience. Importantly, the approach shall seek to open the space for other entreprenerual initiatives that build climate resilience, especially those in other value chains such as fisheries, fuelwood, which will open up opportunities for womens involvement.

The project will focus on coastal communities within Sinoe County to support integrated coastal adaptation practices for a number of coastal settlements within the County though with the capacity for the project outcomes to benefit other coastal counties in Liberia, while building institutional capacities and policy mainstreaming for Integrated Coastal Zone Management across all coastal counties.The project will therefore seek to empower communities and institutions to better plan and implement coastal adaptation interventions in a deliberate and proactive manner, reducing reliance on the Government of Liberia (GoL) to help provide already scarce resources for climate change adaptation solutions. Building community self-reliance and by providing a community planning focus (with new livelihood alternatives) will enable them to tailor adaptation tools and technologies to their specific needs. It will also build the capacities of the administrations of other coastal counties to design and implement integrated coastal adaptation plans.

At the local level, new technologies in combination with traditional technologies will be promoted to ensure that productivity and sustainability of livelihoods are maintained. These adaptation actions and associated technologies or practices will build on the natural resilience and innovativeness of Liberian communities to build their self-reliance and capacity to continue the adaptive process iteratively. Such adaptation strategies such as coastal ecosystem based adaptation solutions, participatory sea and river defence planning approaches, climate-smart integrated farming systems, coastal protected area establishement and diversification of livelihood options are all in combination critical elements for a long-term adaptation solution in the context of risks and vulnerabilities of Sinoe County. The project shall also seek to learn and upscale some of the well-tested practicesthat is being undertaken to support community benefit-sharing mechanisms (CBSM) in forest ecosystems for the Production-Protection Approach project of IDH in Sinoe county (2017) which is based on best practices of operational CBSM in Liberia.

Finally, of major concern is the apparent lack of strategic delivery of a sustainable and strategic sea and river defence risk management approach policy to address these concerns. Coastal protection and sea defence structures are currently not planned with regard to their purpose, their outcome and importantly, their long term maintenance costs. Despite the professional efforts of the Ministry of Mines and Energy (MoME) and the Environment Protection Agency (EPA) to address the problems being faced, the approach to shore protection (at present) is reactionary and not anticipatory without long term national planning mechanisms in place.

Long term preferred solution:

The main hazards that climate change The preferred solution to the above-mentioned climate hazards is to bulid long term resilience in coastal Liberia through an integrated approach that involves integration of climate change risks into planning and budgeting, diversifying livelihoods in coastal counties, adopting and financing climate resilient business practices and protecting communities and assets affected by climate hazards such as coastal erosion and flooding. Given the extent of the Liberian coastal zone, an ideal solution would be to create county level and national frameworks that enable and promote investments by a wide variety of actors in the public and private sectors while attending to the immediate needs of the most vulnerable communities. Given the prioritization of Sinoe county among the different counties, the preferred solution is to: i) protect highly exposed and vulnerable areas of Sinoe County coastline from accelerated coastal erosion, flooding and SLR through the establishment of low impact “hybrid” solutions that embrce the importance of both coastal, estuarine and fluvial systems and associated communities; ii) implement climate-responsive planning through adopting an integrated planning approach in Liberia’s coastal counties; and iii) secure the livelihoods of vulnerable communities who rely on the coastal and riverine areas through the provision of livelihood alternatives that enable them to adapt to climate change and build their resilience (including resource efficient enterprises and technologies such as Compressed Earth Block Stabilisation (CSEB), value chain enhancements,) and through the more effective use of farmlands (Integrated Farming Systems). Due to the complexity

of the coastal system (ecological and socio-economic linkages) continuous monitoring, involving affected stakeholders, including local communities, of the short and long term climatic, socio-economic and environmental changes taking place to inform planning is also part of the preferred solution. These will be accomplished by working with public and private sector actors in business and finance (including SMMEs).

A Sea and River Defence Management (SRDM) approach is proposed to support an Integrated Coasatl Zone Management (ICZM) framework at County level. The adoption of a SRDM approach: i) promotes and facilitates the integration of a variety of stakeholders and stakeholder interests; ii) combines climate change adaptation, and ecosystem-based adaptation (EbA), in particular, as a fundamental concept of SRDM approach; iii) prioritizes proactive planning based on reliable knowledge; and iv) co-governance of coastal ecosystems is well-aligned with the philosophy of both SRDM and ICZM. Securing the livelihoods of communities who rely on the healthy and functioning coastal and estuarine/river ecosystems is a particularly important aspect of the preferred solution for adapting to climate change in the coastal zones of Liberia. To this end, sustainable livelihood alternatives need to be presented to support the healthy and resilient functioning of coastal lands, wetlands/swamps and rivers. An effective response to the above-mentioned threats should be driven by climate-resilient SRDM that strengthens the resilience of coastal and estuarine/fluvial ecosystems to the impacts of climate change-induced SLR.

A focus on locally relevant solutions and capacity building at the County and sub-County level is preferred especially in locations far removed from the main capitals and where communication and logistics are more limited. Investments at the local level are more sustainable and have greater impact as they are more accessible to the most vulnerable communities.

Barriers

There is significant potential to promote and implement an ecosystem focused "hybrid" approaches to address climate-induced coastal and flood risk management in Liberia. However, if this is to be implemented effectively, several barriers must be addressed to maximise the opportunities it provides. These include barriers constraining prioritisation; cross-sectoral integration and effective spatial planning; access to finance; sufficient quantitative data to support private sector engagement; capacity building and peer learning. There is also a need to promote and strengthen partnerships, especially with coastal communities and marginalised groupings such as women and children. These barriers currently stand in the way of climate change adaptation in Liberia's coastal counties. A summary of the key barriers facing Liberia are presented below.

Barrier #1: Lack of data and awareness on sea and river defence risks within Sinoe County and other coastal counties

The trends and implications of current and future climate change risks on the coast are not well understood by decision makers and within communities, in part due to the lack of modern technology to help inform decision makers on early warning issues related to flood and coastal erosion observations. The technical understanding of climate change and its impacts are currently limited to a few experts though specifically, coastal communities are largely unaware of the additional risks that climate change (especially from rivers) poses to their livelihoods, which includes the exacerbation of flooding and coastal erosion. The responses of individuals to climate stress and to climate change adaptation is largely shaped by the traditional knowledge base and what is seen as appropriate behaviour. There is also a shortage of information and data, in particular with regards to coastal processes, SLR, meteorological conditions, flash flood impacts, swamp/wetland hydrodynamics and climate change. Detailed vulnerability assessment work is lacking regarding the joint probability of coastal inundation, erosion and precipitation focused flood risks. Linked to this, long term national human resource capacity and awareness enhanced for sea and river defence risk management and climate

adaptation is very weak with focused early warning and risk management systems lacking to support the future monitoring and management of coastal, estuarine and river ecosystems and how they are affected by climate change.

Barrier#2: Gaps in national and local policy and planning to embrace integrated coastal resilience

Policy enforcement remains weak and regularity authorities such the Environmental Protection Agency (EPA) of Liberia seldom have adequate human and financial resources necessary to address all the challenges posed by climate change. There is a lack of specific policies, that enable the monitoring, protection and maintenance of coastal and riverine defence . There is also a paucity of integrated decision making on climate adaptation and hence missing from being inculcated within development plans for all coastal counties in Liberia (County Development Agendas). Coastal and riverine ecosystems are still largely absent from specific integrated climate change adaptation response measures which now need to be more fully embraced, understood and integrated into national, County and sectoral policies. The advancement of national climate adaptation, disaster risk, biodiversity and sustainable sea and river related strategies, plus the revision of countries' Nationally Determined Contributions (NDCs) in 2020, are important opportunities to demonstrate how coastal and fluvial ecosystem based management can be included within official climate change response policies.

Barrier #3: Limited capacities in scientific, engineering and knowledge systems to support the design and implementation sea and river defence management for effective climate change adaptation in coastal counties

There is genereally very low training and capacity to identify, plan, design and implement or hybrid intervention measures to support claimte change adaptation that consider engineering and nature-based solutions in Liberia, and this gap is worse at County level. Knowledge and capacity is therefore required to help identify climate related risks that

are associated with coastal and fluvial systems. There are a lack of communication mechanisms in place to help convey new information on climate risks (such as the use of innovative climate information systems, technologies) and from this, improved understanding of ecosystem services and their value to coastal communities and stakeholders, which is currently lacking, needs improvement through supporting a national “knowledge hub” that is designed and established through other initiatives, and supported including by the GCF NAPs project to collect and disseminate lessons learned on climate change adaptation techniques and sea & river defence information to help support the future delivery of ICZM in Liberia. A national ICZM office has been set up to coordinate the several other initiatives in Liberia.

Barrier # 4: Limited institutional capacity and coordination for mainstreaming climate change adaptation and planning in government ministries and at the local level

An important barrier lies in the current sectoral approach to coastal management, whereby each agency thinks and acts independently, which is also transmitted to climate change adaptation. For example, there are several agencies collecting data but there is no combined database or management system which can be used to provide support to local vulnerable coastal communities. Moreover, there is little joint planning across sectors and the efforts of agencies to combine resources that focus on climate change adaptation . There is limited capacity regarding the integrated planning between different sectors in government at the local level which leads to duplication of efforts and poor delivery. More effort is therefore needed to help facilitate or support integrated sea and river management related approaches at the local level under the banner of a Natinal Integrated Coastal Zone Management (ICZM) policy as currently no Guidance Manuals exist on integrated coastal management practices for district staff in Sinoe County. In addition, Coastal Community Adaptation Action Plans (that involve participatory integrated coastal resource mapping and community based ecosystem monitoring practices) are not developed in any districts of Sinoe County (or other coastal counties) that encourage coastal communities to better adopt new livelihood practice opportunities which embrace new flood and erosion risk adaptation strategies.

Barrier #5: Limited access to financing for sustainable sea and river defence management

Currently there is significant investment in the protection of inland ecosystems in Liberia, especially terrestrial forests targeted for avoided deforestation activities. However, little attention is being given to sustainable interventions that address climate change risks within parts of a coastal catchment area and the introduction of coastal measures that are needed to advocate and promote climate change adaptation solutions that are more cost effective and sustainable in the long term. Investments directly focused on conserving coastal resources remain inadequate, often relying on short term grants provided by private foundations and government aid agencies that cannot be sustained in the long term. There is also limited opportunity for private sector investment in coastal management and hence climate change adaptation solutions.

Barrier # 6: Limited access by local communities and local institutions to training opportunities on effective coastal adaptation practices in Sinoe County

At present, there are few initiatives, either through the GoL or elsewhere, to conduct training activities that support the implementation of sustainable coastal adaptation measures. Most of the communities and local institutions do not have access to such initiatives. In particular, there are few training programmes on climate resilient sea and river defence good practices that are appropriate for implementation within Liberia's coastal or river ecosystems. In addition, there are limited opportunities available for training on how to mainstream climate change adaptation activities into decision making and coastal planning, at the county level.

Barrier #7: Limited Access to options and local finance credit for Low Income Coastal Communties to diversify income and build resilience to climate change

Knowledge of alternative income generating opportunities, designed to help adapt to climate change, remains poor for coastal communities. In addition, businesses and investors are unaware of the necessary adaptive measures that could be adopted to help mitigate business risks (to help maximise business opportunities in sectors such as agriculture, industry and fisheries) that are presented by climate change. No alternatives are offered to use other sources of sand to help the construction industry for coastal communities (as opposed to beach sands) and improve farming strateges that diversify crop production, planting regimes and diversity of crop are offered. There is limited "value chain" training programmes on climate resilient diversified employment opportunities for coastal communities that (amongst others) with a focus on targeting youths and women's groups.

Improved access to financing mechanisms and enterprises to help build resilience and adaptive capacity are lacking to help entrepreneurs to help set up and use new technologies (within the agriculture, fisheries and energy value chains) to help communities adapt to climate change. There is a high risk associated with financing small scale, semi-formal enterprises. There is also a high cost associated with lending to small-scale players in remote areas. Women especially find it difficult to access finance due to their lack of collateral. Business viability as a result of limited access to high value markets and high costs, fragmented operations that do not meet market volumes, variable standards and others all limit access to finance as they are not recognized as a homogenous group by financiers. This barrier limits their ability to embark on market based adaptation solutions that diversify their livelihoods away from those most vulnerable to climate change.

In view of these barriers, the proposed project will provide the framework for mainstreaming climate change adaptation into integrated coastal and riverine defence planning at the local level in Liberia's coastal counties, and the implementation of hybrid interventions (nature based and/or engineering solutions). It will also facilitate capacity building and learning across the coastal counties of Liberia. This will be undertaken through upscaling and promoting community-based adaptive practices that have already been implemented under the previous UNDP-LDCF project entitled "Enhancing Resilience to Climate Change by Mainstreaming Adaption Concerns into Agricultural Sector Development in Liberia" and to extend certain aspects of that project to Sinoe County. It will also implement, at the local level (County and sub-County) the outcomes of Liberia's adaptation options being developed under the NAPs project. This LDCF funded project will focus more in Sea and River Defence Risk Management adaptation planning and measures, encouraging new science and knowledge to direct policy decision making in a participatory manner and through the provision of livelihood opportunities through the adoption of, for example, Integrated Farming Systems and new climate-resilient livelihoods, business alternatives to sand mining through the creation of new concrete earth block production practices which helps to mitigate against the impacts that this activity cause along the coastal zone of Liberia. Details of the livelihood options and value chain improvement activities will be elaborated during the PPG stage. The project will introduce new evidence based coastal and riverine defence interventions that focus on delivering (adaptation technologies and practices) within specified localities around Sinoe County . The proposed project strategically shall use successful and proven "hybrid"interventions and apply them to benefit coastal communities and the private sector.

In the areas of climate-resilient livelihood diversification and enterprise development, the project will work with financial institutiosn to facilitate access to finance by business enterprises, and promote investments in climate-resilient opportunities that ensure the resilience of infrastructure and livelihoods. The project will work with micro-finance institutuions active in Liberia to create opportunities and expand their market reach in climate-vulnerable communities. Building on UNDP's recent work on micro-finance, the project will link trained entreprenuers and SMMEs to

affordable financing instutions, including micro-finance institutions and development banks in Liberia. On the finance supply side, the project will provide technical assistance to MFIs to integrate climate risk, access affordable credit and identify opportunities to work with SMMEs. Technical assistance measures will facilitate MFIs to have a better understanding of climate risk variables in their credit methodology. This will improve financial risk management to increase understanding of the market and thereby increase the incentive to serve it. Preliminary consultations with MFI institutions in Liberia such as Access Bank shows that they provide finance to small scale entities in sectos such as agriculture and fisheries, but do not factor in climate risks, which is likely to be the case for several other finance instituions. The project will therefore work with these instituions to both serve SMMEs under the project, and also to facilitate systemic change across the financial service sector by supporting MFIs as well as addressing their constraints for working with SMMEs through dialogue with the financial sector regulatory institutions. Solutions such as guarantees and low cost credit to MFIs will be pursued among other potential solutions. This approach will address the entire climate finance value chain, from beneficiary enterprises through finance instituions to the regulatory agencies at national level. The project will also learn from other initiatives that provide solutions for Microfinance Institutions (MFIs) and their clients to increase their capacity to manage climate information and risks, while promoting climate change adaptation. One such initiative is the Microfinance for Ecosystem-based Adaptation project (https://unepmeba.org/) which seeks to provide vulnerable rural and peri-urban populations with access to microfinance products and services that allow them to invest in activities that improve their income, increase their climate resilience and allow them to sustainably use ecosystems and their services.

2) Baseline scenario

Baseline projects

There are several baseline initiatives that the proposed project will build on and closely coordinate with to effectively achieve its results, building climate resilience into these initiatives. The projects outlined below are potential co-financing projects for the proposed project.

World Bank Forest Sector Project	2016-2020	37.5 Million	Government of Norway/ World Bank	The project will focus on the expansion of the protected area network and the establishment of community forests. Focus will be placed on institutional capacity of key government agencies including Forest Development Administration (FDA), EPA, ministry of Agriculture (MOA) and Liberia Institute of Statistics and Geo- Information Services (LISGIS). The project will also strengthen the regional offices and support structures of all of these institutions.
The Liberia Conservation Trust	2016-Ongoing	$2 million initial endowment investment With aim to grow over time	CI/Government of Liberia	Conservation international (CI) is supporting the government of Liberia to set up and endow a conservation trust which seeks to provide long term sustainable financing to protected area management as well as the supporting community development actions around key conservation areas. This fund has the potential to support the long-term financing of conservation agreements, and also provides the mechanism though which PES could be channeled.
West Africa Biodiversity and Climate Change (WA-BiCC)	2015 - 2020	48.9 Million	USAID	WA-BiCC will address both direct and indirect drivers of natural resource degradation to improve livelihood and natural ecosystems across the region. The project will work with partners the community, national and regional levels to strengthen policies and systems that will improve natural resource management and the health and resilience of selected coastal and upland forest ecosystems. CI is already collaborating with WA-BiCC on coastal mangrove conservation and will look to ensure coordination of project activities moving forward.

The Economics of Ecosystems and Biodiversity (TEEB) study in Liberia	2014 - 2016	120,000	European- Commission	TEEB has executed a bilateral agreement with the European Commission entitled Reflecting the Value of Ecosystems and Biodiversity in policymaking. As part of this agreement, the TEEB approach is being applied in five pilot countries including Liberia. The TEEB study aims to reduce the pressures and treats on coastal mangroves by mainstreaming the value of biodiversity and ecosystem services into coastal and marine planning policies. CI is already collaborating with UNEP and the Environmental Protection Agency on ne TEEB through the GEF 5 Mangrove project.
Reclaiming Liberia's Beaches and Waterways	2014-ongoing	1.5 million/year	Liberia Maritime Authority	This project is currently raising awareness of the importance of coastal and mangrove areas, providing jobs for beach cleanup, and supporting small community developments such as latrines. The proposed project will build on the current investments providing additional job and livelihood creation as well as awareness specifically targeting biodiversity conservation.
Conservation Agreements in Liberia	Ongoing		Conservation International	

UNDP Programme Support	On-going	$60 million annually	UNDP	UNDP is playing a major role in supporting national development. UNDP currently provides around in grants[1][1]. UNDP has several programmes relevant to coastal area development. The most pertinent of these include: § Liberia Decentralisation and Local Development; § Community Based Recovery and Development; § Micro-Finance – Improved Access by Women to Financial Services in Rural Areas; § Disaster Risk Reduction Programme; § Centre Songhai Liberia Initiative. These projects support local and national development. They complement and support the decentralisation process and help empower local communities. The aims of these projects will have the direct effect of *building resilience* of coastal communities to climate change. However, they need to integrate disposition that will allow the Sinoe County government and communities to take in charge the emerging issues of climate induced coastal erosion.

Advance NAPs proceses in Liberia (UNDP)	2017-2020	$2.3 million	Green Climate Fund (GCF)	The project to "Advance the NAPs process for medium term investment planning in climate sensitive sectors (i.e. agriculture, energy, waste management, forestry and health) and coastal areas in Liberia" is supporting the Government of Liberia to advance its National Adaptation Planning process in climate sensitive sectors, with a specific focus on the following areas: (i) Strengthening institutional frameworks and coordination for implementation of the NAPs process; (ii) Expansion of the knowledge base for scaling up adaptation; (iii) Building capacity for mainstreaming climate change adaptation into planning, and budgeting processes and systems; (iv) Formulation of financing mechanisms for scaling up adaptation (including public, private, national and international). The proposed LDCF project will build on the capacities built at national level for mainstreaming, and takes this to the county level. It will also build on the climate risk and vulnerability studies being undertaken by the project and the proposed broad adaptation options for coastal areas and use them as the basis for developing more specific interventions in the project areas. It will also draw on the broas financing mechanisms that the project is identifying for Liberia and apply them in specific contexts. This approach will avoid duplicating the efforts already undertaken by this project, but rather build on its basis, enabling the LDCF project to focus on the specific interventions being proposed here, leading to greated impact.

GCF Readiness and Preparatory Support - Liberia	2017-2019	$300,000	Green Climate Fund (GCF)	The project hast two main thrusts on which the LDCF project will build. The first is the strengthening of the capacity of the NDA to undertake coordination of climate change activities in Liberia, including cross-sectoral coordination as well as stakeholder engagement. The second component is to develop the country's programme of work in the area of climate change, which also includes identifying the country's priorities, potential projects, trainings of stakeholders, and identifying opportunities for engaging with non-government stakeholders such as private sector. While most of the work under this project is at national level, it has set the base for engagement with stakeholders, who are already primed on the priorities of the country. Together with the capacity built in the NDA to coordinate other actors, the LDCF project will use that capacity to ensure strong engagement at the subnational level and across different actors. The capacity built at the national level will be localized at the county level, linking the climate change focal points at the county level to the focal points at the national level.

Alternative scenario

A new way of delivering effective sustainable adaptation to climate change will be pursued through this project to help protect assests and enhance livelihood diversification of Liberian coastal communities through the implementation of sea and river defence risk management approaches. Any coastal interventions or investments need to recognize the linkages between coastal and inland social and ecological systems. They also need be supported by a coherent and improved policy, institutional and regulatory enabling framework that will enable a paradigm shift to be achieved towards the sustainable adoption of sustianable sea and river defence management practices and investments that are more consistent with the threats from SLR and other climate change impacts. This will help to leverage additional sources of finance and remove the main barriers for the private sector involvement in the management of the climate change risks for coastal communities in Sinoe County. The multiplier effect of the investment through the project will be generated through facilitating development of resilience-building enterprises along coastal value chains, involvement of the private sector and cross-County learning and capacity building based on the interventions in Sinoe, as well as contributions to the national ICZM. Sustainable financing solutions to support adaptation to climate change will be applied, working with the financial institutions to ensure that development investments in the coastal counties contribute to resilience building, and engaging micro-finance institutions for adaptation. The national level ICZM framework will be localized at the county level, with the value addition of this effort being to build resilience in such plans.

The alternative scenario consists of 4 inter-linked components that address the observed barriers in coastal Liberia, with an emphasis of Sinoe County as the hotspot for coastal protection while contributing to the GEF 7 LDCF programming objectives. It is designed to support the implementation of engineering and natural ecosystem as well as livelhihood solutions to strengthen climate resilience for coastal communities and economic assets and activities to the effects of climate change. The project shall introduce new innovative approaches to help strengthen institutional capacity of key Government Agencies to better assess climate change risks and to integrate them into national and county development policies and plans. It shall also introduce new and accessible technologies and innovations to support coastal adaptation, response planning and communication mechanisms in Sinoe County which in the process shall reduce the vulnerability of Sinoe Country coastal communities to sea level rise through nature based interventions. Embedded within the delivery approach shall include the introduction of gender-responsive options for income and livelihood diversification that shall be transferred to local communities in to support long term coastal adaptation and resilience for current and future generations.

The above outcomes shall be achieved through the adoption of a new Sea and River Defence Management Strategy. The actual adaptation interventions will be supported by capacity building, policy and planning support through the production of Coastal Community Action Plans and Community based coastal ecosystem monitoring programmes in Sinoe County, with such planning capacity and development of County Coastal Management Plans being implemented in all the other coastal counties of Liberia. The implementation of adaptation solutions shall be introduced to minimise saline water intrusion within coastal hinterland landscapes in combination towardsproviding new livelihood enhancement strategies. These interventions shall contribute towards strengthening farming communities in the coastal zone of Sinoe County to help provide alternative approaches and strategies to address the impacts of climate change facing them. In addition, the proposed interventions shall be designed to support and enhance ecosystem service delivery for beach, sand dune and wetland (mangrove) ecosystems.

Importantly, project sustainability will be achieved by bestowing ownership of the project and its activities to government and County authorities and ensuring wider participation by different stakeholders who will continue operating in the project areas beyond GEF funding, including local NGOs. The project management structures will therefore be designed to ensure ownership even after project funding, by using as much as possible existing institutional structures rather than creating new ones that solely serve this project. To ensure continuity, project activities will be aligned to existing plans and programmes so that they are part of long term strategies that will continue after the project. In the same way, community and farmer level solutions will be aligned with the needs of the beneficiaries so that they are part of the community and household livelihood strategies.

The project will also promote learning and scaling up of the innovations brought about by this project, especially on linking adaptation solutions and enterprises with the financial service sector, in non-coastal counties of Liberia. By working with partners such as WABICC (West Africa Biodiversity and Climate Change) with presence in Liberia and West Africa, the project will promote successful approaches that this project will introduce.

Component 1: Policy and institutional capacity strengthening for climate change adaptation planning

Outcome 1: Capacity of all coastal counties' planning institutions to assess climate change risks and to consider into County Development Agendas strengthened

This component shall address Barrier 2 "Inadequate legislation and gaps in national policy to embrace coastal ecosystem resilience" by focusing on enhancing institutional capacity of county and sub-county (district) focused institutions to better assess climate change risks and to support the revision of existing ICZM policies (already prepared and endorsed) to enable the monitoring, protection and maintenance of sea/river defence risk management and coastal adaptation principles into the development policies and plans of coastal counties (new county development agendas are due to be formulated). These shall represent a core aspect of the National Integrated Coastal Management Plan that is being proposed through the use of GCF funding. This Plan shall help to identify the most appropriate locations and types of interventions required for vulnerable coastal locations (supported by new data from Component 2 which in turn shall help identify the type of interventions proposed in Component 3). This component will take the ICZM approach to all the coastal counties of Liberia and ensuring that it is mainstreamed at county level. Building on the work done by the NAPs project whose institutional capacity building focussed on national level sectoral institutions, this LDCF project will focus on the county and sub-county levels where planning and implementation capacity is most needed to address climate change risks. The LDCF project will also use the opportunity presented by the need to develop new County Development Agendas as the current ones have expired. This is an opportunity to integrate climate change risks and the principles of ICZM.

Specific activities shall therefore include creation of policy and planning mechanisms (regulations etc) to help strengthen the ability of Liberia's Coastal Counties to mainstream the implementation, monitoring, protection and maintenance of sea/river defence interventions. Other activities include the incorporation of new district vulnerability maps that identify climate change risks and hazards on coastal infrastructure, livelihoods, human health and to prioritize and plan adaptation and resilience strengthening. These will be integrated into County and district specific development plans plus supporting human resource capacity and awareness programmes developed for local groups to understand how to enhance sea and river defence risk management standards, protocols and indicators set and mainstreamed to support the monitoring and management of coastal ecosystems through implementable actions that improve early warning systems and embrace international standards for vulnerability and climate risk management (ISO14090). These build on the indicator sets developed by other projects, with the LCDF project focusing on downscaling them to the local level. The activities will support and implement the priorities identified by the GCF-funded NAPs project, The LDCF project will avoid duplicating these efforts, but will make use of its outputs for greater resource and time efficiency.

Broader systemic impacts will be realized through improved human resource capacity and awareness enhanced for sea and river defence risk management and climate related risks at the county and sub-county levels. This shall include County cross-sectoral climate change information and risk focal points and working groups established and trained (including capacity within local institutions) in all coastal counties, and the inclusion of private sector representatives in capacity building and awareness activities so that climate change risks and adaptation measures are included in their business strategies and investment plans, as well as highlighting the business opportunities available through climate change adaptation. This builds on the work done by the NAPs project that targeted only sectoral officials mostly at the national level and in selected counties. Specific attention shall be placed on delivering participatory monitoring, livelihood options to help demonstrate that women will be significant beneficiaries in the project. Specific activities shall therefore include creation of policy and planning mechanisms (regulations etc) to help strengthen the ability to mainstream the implementation, monitoring, protection and

maintenance of sea/river defence interventions proposed within coastal counties. Other activities include the incorporation of new coastal vulnerability maps that identify coastal risks into County and city specific development plans plus supporting human resource capacity and awareness programmes developed for local groups to understand how to enhance sea and river defence risk management standards, protocols and indicators set and mainstreamed to support the monitoring and management of coastal ecosystems to the risks of climate change impacts through implementable actions that improve early warning systems and embrace international standards for vulnerability and climate risk management (ISO14090).

This component will be realized through the following outputs:

1.1: County level ICZM Plans prepared for all coastal counties to address climate hazard risks on infrastructure, livelihoods, health, and enable adaptation planning and monitoring, protection and maintenance of sea/river defence;

1.2: Identified climate related risks and adaptation priorities are incorporated into Coastal County Development Agendas, and and incorporated into county and national planning and budgeting processes.

1.3. Cross-sectoral climate change information and risk focal points and working groups established and trained for all coastal counties

Component 2: Innovation, technologies and climate information for coastal adaptation planning

Outcome 2: Innovative technologies to support coastal adaptation introduced, including response planning and communication mechanisms

The component shall address Barrier 1 “Lack of data and awareness on sea and river defence risks within Sinoe County” by focusing on improving coastal adaptation planning, response and communication mechanisms through an improved understanding of coastal ecosystem services and their value to communities and stakeholders. Support shall be provided to the establishment of a county level knowledge hub that shall be used to collect and disseminate lessons learned on Sea & River Defence information to support ICZM delivery. This mirrors the national level platform set up within the Environmental Protection Agency, and will the production and application of information that meets the needs of end users, including fisherfork, farmers and those in the fish trading system. This shall also seek to make use of, and improve the existing climate and coastal wave observation technologies to inform the response mechanisms. The PPG phase will determine the adequacy of the exisiting observation systems, their functionality and the needs of the users.

Coastal flood and erosion early warning and risk management systems shall be strengthened and implemented to support the monitoring and management of coastal ecosystems. From this, a county knowledge hub shall be formulated to collect and disseminate lessons learned on Sea & River Defence information to support ICZM delivery supported.

Critically, this project will support the packaging of climate and risk information to inform the end users. The information will also support the development of community action plans discussed below.

A series of individual Coastal Community Action Plans shall be developed and implemented in all districts of Sinoe County (encouraging coastal communities adopt and communicated (as part of the knowledge hub) new practices and adopt new livelihood opportunities to embrace new adaptation to sea level rise risks). The Action Plans will be informed by the adaptation options that are being generated from the NAPs project. While the NAPs project focuses on the coastal options for the entire county, this project will take these and adapt them at the sub-county level. A series of Guidance Manuals shall be produced to support integrated coastal management practices which shall be developed and disseminated to district staff in Sinoe County (addressing Barrier 4 “Limited institutional capacity and coordination in government ministries”) and other coastal counties. These Guidance Manuals will be informed by experiences from the earlier outputs under this outcome.

It shall focus on strengthening existing or support towards developing coastal flooding and erosion designed new early warning systems with simultaneous alerting systems to reach vulnerable population effectively and to support the monitoring and management of coastal ecosystems to help decision makers better address climate change impacts. The LDCF contribution will also seek to focus on providing participatory integrated coastal adaptation guidance manuals for integrated climate-resilient coastal management practices which shall be disseminated to district staff in all coastal counties (e.g.: to help re-define building codes for riparian forest or coastal wetlands’ infrastructure to climate-proof infrastructure and support agricultural development which may include the future need for sea walls, groins, and breakwaters (addressing Barrier 5 “Limited access to financing for sustainable sea and river defence management”). At the county level, this will build on the baseline information and analyses done by the NAPs project, with this LDCF project adopting a participatory approach that enables County and Districy officials as well as communities to be part of the process. This is a continuous process whose output contributes to the knowledge hub, and also to the development and review of Community and County Action Plans.

The expected outputs of the this component are:
2.1: Coastal flood and erosion early warning and risk management systems supported to provide climate information, products and services that meet the needs of end-users.

2.2: County level knowledge hubs to collect and disseminate lessons learned on Sea & River Defence information to support ICZM supported in all Coastal counties, based on Sinoe pilot.

2.3: Community Action Plans developed and implemented in all districts of Sinoe County(informed by adaptation options developed under NAPs project, encouraging coastal communities to adopt new practices and adopt new livelihood opportunities to embrace new adaptation to sea level rise risks).

2.4. Guidance manuals for integrated coastal adaptation practices developed and disseminated to all coastal and riverine counties.

Component 3: Solutions for reducing vulnerability to climate-induced sea level rise and coastal erosion

Outcome 3: Reduced vulnerability of Sinoe County coastal communities to climate-induced sea level rise impacts through hybrid solutions (nature based and engineering)

This Component shall support the design and implementation of sea and river defence management by focusing specifically on introducing hybrid (nature based and engineering) interventions to help reduce livelihood vulnerability to sea level rise that address climate hazards and their impacts. This shall be achieved through the introduction of a range of nature based and supporting innovative interventions along coastal or river/wetland/swamp locations in Sinoe County to help improve resilience of coastal communities specific intervention approaches shall be identified during the PPG phase, building on the NAPs project). Efforts to implement hybrid infrastructure interventions, combining soft and hard approaches, designed to reduce storm surge, coastal flooding, beach erosion and other climate impacts that be encouraged. Interventions shall include a clear feasibility mapping exercise of vulnerable assets, livelihoods and ecosystems to climate change-induced sea level rise in Sinoe County, based on earlier projects. Information from the NAPs and other projects will be refined and used together with expert knowledge and community consultations to identify and prioritise hotspots for intervention. . Building on the options being identified in the NAPs project, a range of specific intervention options, including nature based and engineering solutions will be considered and selected using multi criteria approaches (including effectiveness, impact, cost, political viability, durability over time, maintence). The criteria will be developed through a combination of expert analyses and stakeholder engagement processes, ensuring that the adaptation and resilience solutions address climate change problems.

Appropriate Sea & River Defence interventions shall then be designed and implemented (in a gender sensitive manner through the engagement of communities, including womens groups) to improve resilience of coastal communities to sea level rise in Sinoe County benefitting at least 50,000 beneficiaries over 5,000 hectares within the Sinoe County. Following construction, an implementable community based coastal ecosystem based monitoring programme shall be set up with supporting operations plan. Best practices on nature-based and engineering solutions shall be documented and transferred to other coastal counties for adoption. The documentation of thee practices will include issues such as suitability for different conditions, effectiveness in addressing specific impacts, costs, sustainability among other considerations. Finally, models for private sector-driven adaptation solutions shall be developed and piloted in Sinoe County. This follows continuous engagement with private sector entities in Sinoe county during the implementation of this project.

The following outputs will result from the implementation of this component of the project:
3.1. Viable solutions to address climate vulnerabilities in Sinoe County developed and designed using multi-criteria and processes for identifying, prioritizing and planning adaptation and resilience solutions, in consultation with local stakeholders.

3.2: Coastal and catchment level adaptation solutions implemented to improve resilience of communities the impacts of climate change in Sinoe County, targeting 80,000 beneficiaries and 20,000ha;

3.3. Best practices on adaptation solutions documented and disseminated to other coastal counties for adoption and scaling up including through the engagement of private sector.

Component 4: Livelihood diversification for climate resilience

Outcome 4: Gender-responsive options for climate-resilient income and livelihood diversification introduced to climate-vulnerable communities in coastal counties

Given the impact of climate change on livelihoods, and their low adaptive capacity, this Component shall focus on the introduction of opportunities that diversify the livelihoods of local coastal communities vulnerable to climate change, with a specific focus on women and youths (training, financing and diversified employment opportunities) to help support long term coastal adaptation efforts. This shall be achieved through the identification, introduction and implementation of Sustainable livelihood opportunities for coastal communities (linked to Integrated Farming Systems, Fisheries and Compressed Stabilised Earth Blocks – CSEB industries) as well as facilitating access to micro-finance loans to help set up specific businesses. These approaches are being applied in other coastal adaptation initiatives in Africa, including in Gambia and Sierra Leaone. They will adapted to address the specific climate change impacts facing Liberia through a process of risk and vulnerability assessment (building on the NAPs project) and County and Community level adaptation planning. The opportunities for value addition and improved marketing on products will be pursued along the value chains of these products and systems. Specific attention shall be placed on delivering participatory monitoring, livelihood options to help demonstrate that women will be significant beneficiaries in the project. Training programmes programmes that help especially youths and women's groups to identify, initiate and sustain business enterprises shall be developed and implemented as a key aspet of this Component. Access to finance to support enterprises shall also be included facilitated, including working with formal financial institutions as well as any existing community-run financial insitutions and savings schemes. The project will facilitate and broker match-making between adaptation entrepreneurs with national and local finance institutions and investors in Liberia, while building the capacity of these entrepreneurs in the areas of business management, product quality, aggregation and other standards that facilitate access to higher value markets and improve their business viability. Strategies for reducing the risks attached to community level enterprises will be identified and addressed in collaboration with national development banks, micro-finance institutions, impact investors and funds. At PPG stage, a private sector/finance expert will be engaged to support this component of the project. This component will build on UNDP's existing work on Access to Finance, which has been focusing on micro-finance with a special emphasis on rural women. The partnerships already created, linkages and experiences will be used in this project with a focus on climate change adaptation. It will also build on the AfDB's support to Libeira on microfinance, which has seen the emergence of microfinance institutions such as Access Bank, who this project will engage and link with the enterprise activities in this component, with a focus on climate-resilient activities. Working with these institutions will not only facilitate sustainability, but scalability as they operate in different areas of the country. The project will build the capacity of financing and insurance sector to integrate climate change information and risks into their programmes and policies, and facilitate their reach to the SMMEs and individual consumers of micro-finance and insurance products for climate change adaptation. At the policy level, the project will engage with financial regulators in Liberia, and providers of credit to MFIs to advocate for concessionary lines of credit for them to be able to finance adaptation at affordable rates. Adoptions of successful initiatives from other countries, such as the UNEP/GIZ project, Microfinance for Ecosystem Based Adaptation (MEBA) will be explored in order to widen the envelope of adaptation finace in Liberia.

Finally, technologies shall be developed to help with the improved and more efficient use and value addition of coastal resources (along the fisheries and energy value chains such as for the efficient fish drying technologies and improved cookstoves to reduce demand etc). To ensure that these initiatives are relevant to local needs and are sustainable, they will be developed together with the beneficiaries as well as the relevant County and District insitutions, such as those responsible for local economic development. With specific regard to possible indicative activities for both IFS and CSEB opportunities may include the following:

a) Consultations with the Ministry of Works and Agriculture to determine the appropriateness of the CSEB and IFS technologies to communicate how CSEB and IFS could be adopted .
b) Construction of a CSEB /IFS Production and Training Centers (e.g: to both manufacture (for example) CSEBs plus also to act as a training centre to help increase the awareness and understanding of the benefits (both economic and environmental) of promoting the construction of CSEBs).
c)Work with the GoL relevant institutions to draw up an industry standard and code of conduct that reflects best practices in CSEB and IFS production opportinities.

The resultant outputs from the implementation of this component are:
4.1: Business identification, development and management training programmes designed and delivered to communities and Small Micro and Medium Enterprises (SMMEs) in coastal counties targeting youths and women's groups targeting 70,000 beneficiaries.

4.2: Integrated Farming Systems, Fisheries and Compressed Stabilised Earth Blocks and their value chains –opportunities for coastal communities are created and implemented targeting 30,000 beneficiaries

4.3: Access to finance and technologies to develop livelihood and income diversification enterprises of coastal livelihoods and resources facilitated in collaboration with national and county financial institutions.

3) Additional cost reasoning and co-financing

The GEF-supported alternative scenario will address coastal vulnerability issues for coastal communities in a number of coastal counties (including Sinoe County) that have not been covered by previous projects. The intention is that support the benefits of transferring knowledge and information on sea and river defence management issues to a number of coastal counties to help in the update of existing County Development Agendas (CDAs) to support the development of Liberia's regional diversification agenda. Many of the coastal communities being targeted (in Sinoe County and beyond) represent some of the most rural and vulnerable coastal communities in the country and without additional GEF LDCF funding, their vulnerability issues will remain largely unaddressed. A range of constraints limits the scaling up of past successes and experiences on its own in other Counties of Liberia. This include specific local vulnerability challenges which require different approaches, subsistence nature of communities to implement new solutions on

their own and limited capacity and integration across government institutions to scale up solutions. The project will adopt integration approaches, apply innovation in planning and technology solutions and engage local institutions, community entrepreneurs, private sector companies, and global institutions more systematically to create a multiplier effect for the new LDCF investment.

The detailed additional cost reasoning is provided below.

Strengthened regional and local institutional and technical capacity development for coordination and coastal mainstreamingof hybrid approaches that integrate different approaches to adaptation

Hybrid approaches consider and employ combinations of engineersing solutions and Ecosystem-based adaptation (EbA)to reflect the integrated nature of coastal zones. EbA provides multiple benefits for Sinoe County and the populations it supports, but will be considered together with other approaches and taking into account the geographical and socio-economic contenxt of coastal Liberia. Despite a number of demonstrably successful EbA cases (internationally), current practice still focuses on planning and implementing 'grey' infrastructure solutions in isolation. It is critical that cities explore the multiple opportunities that exist for mainstreaming and implementation of EbA. The project seeks to create a paradigm shift in thinking by contributing towards the following:

- Supporting efforts to promote effective integration of EbA governance and management in local government by encouraging appropriate regulatory and legislative frameworks to be established (Component 1). This will be supported by long-term planning, adequate resources and enabling tools, processes and systems being in place.
- Encouraging the development of effective institutional arrangements and partnerships, both within departments and across institutions within Sinoe County, to support better coordination and collaboration. This will enable the strategic use of the limited resources available within various institutions.
- Obtaining buy-in from public and private sector practitioners, stakeholders and communities, the socio-economic benefits of EbA ensuring it is better communicated through simple language and a clear message.
- Encouraging innovative sources of finance are explored, supported by effective project packaging and marketing that explores and highlights the multi-faceted benefits of coastal hybrid approaches to adaptation.

At present, institutional capacities for co-ordinating coastal sea and river defence management for adaptation, climate resilient planning and investment at the national, and County level in Liberia remains inadequate for addressing coastal related risks that are exacerbated by climate change. Under a business as usual scenario, programmes and initiatives for promoting adaptation actions will continue to be ineffective when compared to potential benefits to be gained from integrating coastal adaptation into development planning. National and sub-national institutions as well as Sinoe County planners would remain unable to ensure climate-smart development planning that would contribute to climate resilience of urban and rural communities in coastal Liberia. Ongoing efforts will also remain inadequate in addressing gender-specific vulnerabilities to climate change, leaving women at risk to climate-related disasters and other climate change impacts.

Strengthened county and sub-county institutional and technical capacity development for sea and river defence management planning for climate change adaptation

With LDCF intervention, institutional capacities for supporting sea and river defence risk management and adaptation will be strengthened. The proposed project will support the development of gender-sensitive tools for decision-making on the integration of sea and river defence risk adaptation into planning processes. This will be complemented by training on the application of these tools to inform gender-responsive adaptation planning. Planners at the National, County and local levels will be supported to formulate Sea and River Defence Risk Management Plans that incorporate climate information and explicitly outline adaptation options to address coastal development risks. This outcome will thus strengthen the enabling environment for sea and river defence risk management adaptation measures (that embrace coastal EbA together with engineering and behavioural solutions) into development planning and budgeting processes to support the building of adaptive capacity at all levels. The project interventions will have a specific focus on gender-responsive adaptation measures, taking into account the differentiated vulnerabilities of men and women to climate change impacts. Sea and River Defence Risk Management Plans (SRDRMP) will thus focus specifically on building the climate resilience of women through providing targeted and gender-specific adaptation benefits. At the forefront of the SRDRMP will be the promotion of "resilience for the following reasons:

- To be resilient is to be able to respond to, recover or quickly repair from damage or hardship. In this regard, the concept of resilience recognises external physical and natural pressures. It is important to recognise that coastal processes are natural and will occur independently of human actions. The concept of resilience establishes a management approach that is directed at how people respond to these coastal processes.
- The concept of resilience recognises the importance of human behaviour and management. The philosophy behind this approach is that communities need to be responsible for their own actions and how these actions increase/decrease hazard risk. The concept of resilience recognises that hazards cannot be eliminated and as a result, it is recommended for adoption in Liberia under the SRDRMP, as it acknowledges that particularly in the Liberian context, there is always hazard risk. Hence, in a number of cases, management approaches will need to be focused on risk minimization and preparedness, rather than avoidance or elimination. The concept also avoids any suggestion of bias towards a particular management approach, such as sole reliance on ecosystem approaches or physical protection works (seawalls etc).

The success of the SRDRMP will require the development of individual District's Sea & River Defence Infrastructure Management Plans (SRDIMP's) within the overall planning framework of the existing or new planning which need to consider sustainable land use, within a formal land-use planning mechanism. This would provide the policy and development standards for implementation of a new development approval process. Sinoe County is proposed as being the initial pilot Country to produce a SRDIMP. To ensure overall success, it is important that the SRDRM process seeks to include tools to help integrate and mainstream land use planning and other "soft" river and coastal defence systems so that climate resilience strategies and livelihood opportunities are embeeded into the overall approach. The use of land use planning and development standards (to be piloted in Sinoe Country) is proposed as being a more sustainable strategy to help address the issues of illegal coastal reclamation, wetland destruction and sand mining that continues to take place along the Liberian coast.

Leveraging financing and investments from other sources

The benefits will go beyond specific interventions that will be funded within the timeframe of the project, but will establish and strengthen adaptive livelihood systems and value chains that will continue operating afterwards. By establishing and facilitating linkages between local adaptive alternative livelihoods and enterprises, the project will enable resources additional to the LDCF to be deployed by especially microfinance institutions to support adaptation while addressing wider development issues in the country. The private sector in Sinoe County will also be engaged in the design of solutions to address the climate risks identified in the GCF NAPs project, and opportunities for their investment will be explored. These include those in the large fisheries industry, hospitality and tourism industry among others.

Localized coastal zone management planning

By supporting localized, climate risk-informed intergrated coastal zone management plans in all coastal Counties, the project will enable enable the national ICZM Framework to be implemented, which will reduce dependence on nationally-driven interventions. By linking this to the County budgeting processes, more public resources will be leveraged and channeled towards climate change adaptation at the local level.

4) Adaptation benefits

The proposed project is aligned with the following outcomes of the GEF focal area objectives:

CCA-1: Reduce vulnerability and increase resilience through innovation and technology transfer for climate change adaptation. The proposed project will support adoption and upscaling of international best practices as well as local knowledge concerning climate-smart technologies (see Output 4.1). In addition, it will provide training sea and river defence risk management and engineering coastal EbA schemes (Output 1.3). It will also diversify the livelihood options of beneficiaries that will build their adaptive assets (Outputs 4.1 and 4.2). Using the sea and river defence risk management approach, the project will support building of the natural coastal assets key to adaptation (Outputs 3.3, 3.4).

CCA-2: Mainstream climate change adaptation and resilience for systemic impact. The proposed project will promote the use of tools and methodologies for planning and implementing adaption measures (see Output 1.1) as well as ensuring that climate change adaptation is integrated into local plans and programs (see Output 1.2). It will also conduct training-of-trainers on the use of innovative coastal adaptation technologies to enhance technical capacity for implementation of adaptation measures (see Output 1.3). In addition, the project will train local communities and institutions in the creation and implementation of coastal community action plans (Output 2.3) and to develop viable alternative livelihood options (Outputs 4.1, 4.2 and 4.3).

5) Innovation and sustainability

Supporting ICZM Policy – the role of Sea and River Defence Risk Management

An updated approach, as part of the National ICZM framework (funded using GCF funds) is proposed as an innovative approach to incorporate a Sea and River Defence Risk Management (SRDRM) into national ICZM processes. The SRDRM will outline the visions, goals, policies and objectives for management of sea and river defence and asset infrastructure in Liberia. The philosophy of the SRDRM is to prepare a simple and concise support initiative to the national ICZM policy that sets the scene for the management of infrastructure along the Liberian coastal zone that embraces river and wetland management. Figure 2 demonstrates the innovative approach towards adopting the SRDRM approach for the GoL that considers jointly rivers and sea defences within the delivery of a new ICZM framework for Liberia.

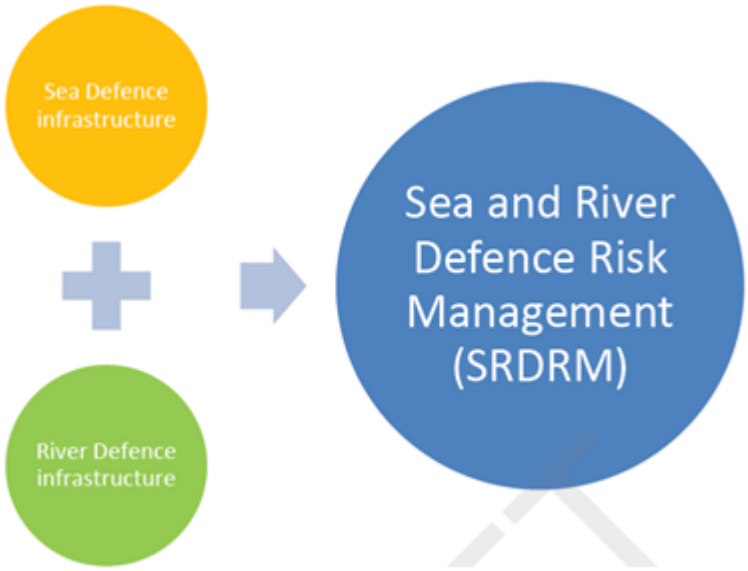


FIGURE 2 CONCEPTUAL OVERVIEW OF SRDRM

A Sea and River Defence Investment Management Plan (SRDIMP) for Sinoe County is proposed as an important Key Performance Indicator (KPI) which should be prepared as part of the GoL's new approach towards implementing ICZM. The aim of the SRDIMP is to help MoME, EPA, MoA and Forestry Division to show a transparent process towards

setting priority intervention measures which are auditable and based on sound and sustainable engineering best practice. They are also the key communication tool for coastal communities (in Sinoe County) to help convey coastal hazards and from this to improve coastal resilience for local communities by identifying implementable actions and solutions.

Community support to achieve coastal resilience is proposed (as part of the SRDIMP process) may include supporting the set up to 'locally managed coastal protected areas' or LMCPAs. LMCPAs put people at the center, its the fishers themselves who are making the management decisions, based on their needs, their priorities, and their traditional ecological knowledge. LMCPAs have proven to be a cost-effective, scaleable, resilient and more socially acceptable alternative to more traditional 'top down' methods of marine resource management. They have also shown promise as a means to safeguard food security, address coastal poverty, and help coastal communities to adapt to climate change.

New Innovation Technologies

New innovative technologies are hereby proposed within the wider project outcome to support to vulnerable coastal communities' include the following:

1) Participatory monitoring of coastal and river ecosystems:

Assessment of coastal and river ecosystem services (ES) is essential to understand and manage the contribution of these ecosystems to the well-being of local communities. They are the primary beneficiaries but their experience, knowledge, and information are frequently ignored in ES valuation assessment and mapping. In this study, a participatory resource mapping (PRM) approach is to be applied using local knowledge and experience to analyze geo-referenced information on a range of ES. Local coastal and river communities in Sinoe County shall be involved from the inception phase to assist in method selection, application, evaluation, and verification. This "inclusive participatory ES mapping" is proposed to be conducted in a number of coastal villages with participants representing different community elements involved in the mapping processes that are to be proposed. They shall help to create historical maps of their villages and for them to then describe the subsequent environmental changes being witnessed. The mapping exercise shall also document different coastal resources that are utilized by communities and identified key areas, such as harvesting zones, biodiversity hotspots, erosion zones, different fishing and agricultural grounds, and newly rehabilitated areas. The maps shall be designed to reveal that integrating PRM and indigenous geo-referenced information can elicit past and contemporary information on (changes in) ecosystem service availability and use. It is intended that the approach to be adopted can be used as a model to support local and regional decision-making processes and to enhance community-based sea and river defence management in other coastal counties in Liberia in the future.

This activity will be participatory, and the active involvement of the relevant government staff will be crucial. The project will also train the officers and stakeholders to delineate coastal erosion and flood risk boundaries in field using high accuracy GPS devices as well as on data processing on GIS software such as ArcGIS or Quantum GIS.

2) Construction of integrated farming systems (IFS) for villages within Sinoe County:

Over the years, coastal communities are experiencing impacts to agricultural products through the lost of crops as a consequence of salt intrusion from both associated rivers or from increasing coastal erosion (a greater percentage of farm performance is being lost to salt). The need for bringing more land under rice cultivation is needed for a number of coastal communities where the community is largely on upland cultivation and vegetable gardening.

It is proposed within this PIF that appropriate locations are sought to develop a "IFS" concept within villages in Sinoe County. The concept of "IFS" as a set of integrated activities is reminiscent of projects elsewhere that promote integrated aquaculture where small livestock keeping is related to (for example) garden (vegetable and salad crops) and then to integrate fish ponds and fish-farming interventions. This is important as there is strong potential for storage and preservation of vegetables and fruits, such as peppers, okra, grains, tomatoes, banana, mangoes, oranges, and pineapples, which are in demand all year round. Leading sub-sectors in Liberia also include production and processing of oil palm, cocoa, and Liberia's staple foods, rice and cassava.

Fish remains an important protein source throughout Liberia, and in high demand in the market, offering good prospects for investment. This concept has gained resonance in many West African communities (e.g. in Gambian coastal communities) especially where competition for fish stocks increases. There are also niche market opportunities for the production and marketing of unpolished or "country" rice; opportunities also exist for vegetable drying and storage that would allow for sales in all seasons. Other opportunities include private financing in the agriculture value chain, including development financing, microfinance, business development, and cross-cutting areas such as agro-inputs, agro-logistics, packaging, storage and aggregators.

Importantly, and as part of the SDRM approach, efforts to construct sustainable "dykes" to prevent saline intrusion along the coast will help coastal communities to start cultivating rice in areas that had become degraded by salinisation and attempt to move again towards self-sufficiency in rice. It is therefore proposed within this PIF that innovative IFS approaches may be piloted within Sinoe County through the construction of suitably located dyke (embankments) or to construct a new structures along river systems to prevent salt intrusion or coastal storm flood inundation. This approach contributes to the paradigm shift innovation by better embracing an improved integrated ecosystem service approach towards the management of coastal lowland ecosystems that may require mangrove planting to help mitigate against salt intrusion (subject to the results of ongoing vulnerability assessment mapping findings – GCF funds (2019)). Figure 3 demonstrates a similar approach adopted in Gambia.

FIGURE 3: EXAMPLE OF IFS ALONG THE NORTH BANK OF THE RIVER GAMBIA, GAMBIA.

3) Innovative Block Making for the Constrution Sector:

This PIF is also designed to support the GoL to promote economic alternatives to using beach sand for specific construction purposes. In addition, river-sand mining in active river channels is the primary source of sand and gravel in Liberia. Beach-sandmining is now prohibited, although it was commonly undertaken along the Liberian coastline in the past (Hasselmann and Wiles, 1988). The government now has a policy of encouraging river-sand mining as an alternative (MAC-Africa, 2015).

Enhancing public awareness (and to disseminate results from Outputs 2 and 3 in an improved way) to inform coastal and river communities and policy makers in Sinoe County on practical livelihood alternatives to promote the use of CSEB practices is therefore proposed to be introduced in Liberia to help mitigate the risk of unregulated sand mining taking place in Sinoe County (and beyond). Examples of the blocks being produced in the Gambia (Sandele Lodge) are presented in Figure 4.

FIGURE 4: CSEBS PRODUCED AT SANDELE LODGE

The use of CSEB will have significant benefits on the reduction of erosion due to historic (and present day) localised sand-mining activities in Sinoe County. By introducing an alternative construction technology to cement, that uses only a minimal amount of sand for its production, CSEB will reduce the pressure on sand resources in the coastal zone within Sinoe County. Another major environmental benefit of CSEB use is that much less cement is required in the country therefore reducing the important pollution caused by cement production activities. The early impact of the use of CSEBs in relation to sand mining in Liberia will always be a low use technology until it becomes known and more people are trained to use it. However, the impact of CSEB technology can be greater than expected because not only less sand is used to make blocks but, as already mentioned, a much smaller proportion of cement is used as well. The reduced use of cement often results in a reduction in carbon emissions, transport costs to contractors and money leaving the country to pay for imported goods.

Currently, sand and cement blocks (S&CBs) are mosty comprised of a 25% cement and 75% sand mix. As CSEBs are made essentially with 80% earth, beach sand is only added when the clay/silt content of the earth is too high (even in this situation, no more than 10% of sand is usually required). Whereas a trip to gather beach sand may prove quite expensive, the cost of using and transporting earth is often minimal, especially when earth is available at the construction site or from within a disused quarry. It is proposed that resources are made available for the future widespread use of CSEB technology in Liberia in compliance with national standards. GEF resources will be therefore be used to reduce any uncertainties relating to some deep-seated prejudices that already exist about their use which may have to be overcome for this technology to be introduced and accepted as a mainstream product. For example, reference to “earth blocks” is frequently associated to “mud blocks” and how they are not adapted to the changing climate – in particular increased occurrence and intensity of floods. More detail is presented in Annex C.

Financing innovation

Moving beyond one-off interventions where external resources are brought in to implement time-bound activities, the project will embed climate change adaptation in the financial services sector to support financing of climate-resilient activities. The project will engage with micro-finance institutions and insurance providers to finance adaptation, while providing beneficiaries, especially SMMEs with opportunities to access affordable finance. Financing of ecosystem-based adaptation that is being pursued in other regions will also be introduced in Liberia.

Sustainability

The project activities will be embedded in the national and local level planning framework of Liberia such that the interventions will not stand in isolation. At the national level, the strengthened capacity for climate change coordination at the EPA, and the climate change working groups established by past initiatives form the anchor of the project. In this set-up, this project is one of the several exisiting and pipeline projects that Liberia has set up, and will be managed and tracked towards the targets of the national adaptation plan. At the local level, the project will be anchored in the County Development Agenda and planning frameworks. These are now due for revision during the life of this project, forming an opportunity to embed climate change adaptation and financing in these agendas.

By working with the financial services sector, the activities of the project, especially livelihood diversification and enterprises are part of an on-going economic and business development agenda that will be sustained beyond the project. This also creates an opportunity for scaling up as the private sector institutions operating in the value chains promoted by this project expand their opportunities in other areas. This will go beyond coastal counties as the tools developed and the financial services sector work are implemented in non-coastal counties.

Beyond Liberia, the project will also have the opportunity to influence uptake of new technologies and financing strategies to other countries in the region. Through partnerships with actors such as WABICC that operate in neighborig coastal countries such as Sierra Leone, the project will have an influence on their approaches to financing adaptation. The knowledge management aspect of this project will also have a regional dimension to facilitate this dimension, in partnership with others actors.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

The project sites will be located in coastal counties of Liberia, with a key focus on Sinoe County, possibly including diret interventions or support to communities within Greenville, Kie Town, Kranbi, Bank Town, Bafu Bay Town, Klofueh, Chom Town and Nankano (see Figure. 6 below – red dots denote place locations). Specific site location will be determined during the project preparation phase. A national map of Liberia showing the location of coastal counties is shown below.

Figure 5 Location of main settlements, counties and transport infrastructure in Liberia (from Gunn et al 2018[1]) and Proposed Intervention sites for the Project (PPG to determine exact locations).

[1] Gunn, A,g et al (2018) "A review of the mineral potential of Liberia", Ore Geology Reviews 101 pp413-431.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Indigenous Peoples and Local Communities Yes

Civil Society Organizations Yes

Private Sector Entities Yes

If none of the above,please explain why:

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement.

The involvement of policy makers and multiple stakeholders with distinct roles and responsibilities is integral to the success of a multi-focal approach. During the National Dialogue, both government and civil society shall be involved in refining the focus of the project, leading to a revised set of project components, as required during the PPG stage. To this end, the proposed project will be designed and implemented using a participatory approach that targets all stakeholders at the national and local levels to inform the design of the project, get their buy-in and their roles in implementation. A structured approach will be adopted where initially, detailed mapping of all stakeholders will be undertaken,

followed by a stakeholder engagement plan for the PPG. This will also include the validation for all major activities. During the PPG phase, representatives of government ministries, civil society, NGOs, local communities, universities and the private sector will be consulted. Inputs from these stakeholders will be incorporated into the design and validated during a national consultation workshop to ensure the project responds to the particular needs of its beneficiaries.

To ensure that the project is tailored to local needs and project activities will be designed accordingly to local requirements. County government institutions, including local leadership (political and traditional) and community based organizations, will be engaged during the PPG phase to design the project. During the consultations, meetings for different stakeholder groups will be held, especially for those who are not catered for or cannot participate in existing fora.

The main stakeholders in the project are local communities within Sinoe County that are proposed to be targeted under this project. The traditional knowledge and specific priorities of the beneficiaries will be solicited during the PPG phase as well as during project implementation, and their views integrated into the proposed interventions. Particular groups to be consulted during the PPG phase will include inter alia: i) smallholder farmers and agro-pastoralists; ii) women, particularly in female-headed households; iii) local enterprises, cooperatives and business associations; iv) youth; and v) vulnerable coastal communities.

The same approach used in the design of the project will also be used in project implementation, where the focus will be on bestowing ownership of project activities with local communities, and ensuring that project technical personnel work closely with local institutions and local leadership. Decisions will be made through structures that involve project beneficiaries to ensure they meet their needs.

In addition to stakeholders in Liberia, the project will also engage global stakeholders operating in the areas that the project focuses on, with the objective of providing a global knowledge benchmark for the project and also to use these as partners and platforms for knowledge generation and dissemination. The project will also engage other stakeholders such as the Global Center on Adaptation, Global Resilience Partnership, InsuResilience, African Risk Capacity, Africa Adaptation Initiative, the African Development Bank's Adaptation Benefits Mechanism and initiatives such as the West Africa Biodiversity and Climate Change. The engagement with these stakeholders will vary from simply sharing information to practical partnerships. During the PPG phase, these stakeholders will be informed about the project, while specific partnerships will be implemented during project implementation. Community members will make inputs into the design of the actual project activities, while partners with institutions such as NGOs with experience working with local communities will be sought for implementation.

Stakeholder consultation during the PPG phase will be expected to provide information that supports all outcomes as well as identifying the roles of different stakeholders during implementation. A detailed stakeholder engagement plan will be developed during the PPG phase, while a consultation plan for the PPG stage itself will be developed and implemented. Overall, the objective of the consultation plan is to provide a framework to guide and promote two-way engagement between the key implementing partners. The main stakeholders are outlined below in Table 3, however additional stakeholders will be included during the PPG phase.

TABLE 3: STAKEHOLDERS PROPOSED WITHIN THE PROJECT

Stakeholder Group	***Decription or Example***	***Indicative roles and responsibilities***
Responsible national Government, Ministries, and Agencies	MLME, EPA, MoA and Ministry of Public Works	These Stakeholder groups will support project implementation. They provide co- financing to the project. They will also mainstream sea and river defence management principles into their policies and strategies. They can also benefit from Capacity development under the project.
National Government, Ministries, and Agencies	MGD, MPEA/ (MFinDevPlang), FDA, Ministry Agriculture and research.	These Stakeholder groups will support project implementation. They provide co- financing to the project. They will also mainstream sea and river defence management principles into their policies and strategies. They can also benefit from Capacity development under the project.
County Governments	MIA, Sinoe County Government and Superintendents, District officials, Municipalities	These Stakeholder groups will support project implementation. They provide co- financing to the project. They will also mainstream sea and river defence management principles into their policies and strategies. They can also benefit from Capacity development under the project.
National NGOS	SCNL, FACE, Association of Environmental Lawyers, IUCN, etc	These agencies are already supporting and implementing related activities at some project sites. They can provide co-financing and general partnership support to project implementation.
Local Communities	Fishermen, fisherwomen, petit traders, faremers, house-owners, etc. Sometimes organised through traditional organizational methods, or women groups, youth groups, etc	They are direct beneficiaries of the project. They would benefit from awareness raising campaigns, workshops building their capacity, and from any livelihood revenue schemes. Many will learn how to prepare and construct coastal defence measures
Gender based stakeholders	To mainstream gender into Climate change adaptation.	They are affected differently by the impacts of sea and river defence vulnerability. They can benefit from capacity development under the project. Project will make every effort to contribute to national efforts to improve the status of women and improve gender balance.
Meteorological units	Airport authority, Hydro – meteorological department, Agrometeorological department, and meteorological research units.	They provide the basic support to gathering and analysing climate data and diffusing climate advice to key local stakeholders. Ultimately, they may provide early warning systems. They also benefit from capacity building under the project
Socio-economic groups (direct beneficiaries)	Port authorities, Hotel Management etc. They	They can provide opportunity for employment in coastal towns/villages – which builds coastal resilience.
Research institutions	Central Agricultural Research institution (CARI), Liberia institution for Biomedical Research (LIBR), Construction research groups etc.	These institutions may be involved in research activities, linking natural resource management and bcoastal EbA principle with climate change issues. Their capacity will be developed through the project.

International organisations	UNMIL, UNDP Country office and other UN agencies, GEF Focal point, other Multilateral agencies.	Guide the project and ensure it is well implemented, and benefits from best international knowledge and practices.
Private sector actors	Construction/brick entrepreneurs, private sector actors in value chains such as fishing and energy, real estate and hospitality sectors, financial services sector, including microfinance and insurance sector.	They shall provide the economic and financial sustainability options by providing micro-finnance and employment opportunities.

3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

In order to ensure that gender considerations are taken into account, specific efforts will be made to consult with women's groups and representatives at the various consultation workshops planned during the PPG phase of the proposed project. Vulnerability and risk assessments – particularly of households run by women – will be completed to prepare a baseline and to capture the differentiated roles, needs and priorities of women and men in relation to the project objectives.

The proposed LDCF project will support more equitable decision-making through an increased involvement from local natural resource governance structures . In addition, project activities include the promotion of more efficient and climate-resilient practices that are sensitive to the needs and roles of women in agriculture . This involvement can result in building a solid platform for engaging with district service providers such as the woreda councils. During the PPG phase, preparations for livelihood diversification plans and climate change adaptation options specifically for Liberia will be adapted in a gender responsive manner. This gender-responsive manner will assist in identifying the climate risks, vulnerabilities, roles, needs, priorities and opportunities of all stakeholders within the identified communities, including both women and men. Such gender-responsive assessments encourage an equitable approach from the outset.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes

closing gender gaps in access to and control over natural resources; Yes

improving women's participation and decision-making; and/or Yes

generating socio-economic benefits or services for women. Yes

Will the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Will there be private sector engagement in the project?

Yes

Please briefly explain the rationale behind your answer.

LDCF funds will help developing targeted private sector capacity support in Sinoe County. In addition to generating the support of county leaders and movers, LDCF funds will empower the staff and units that are responsible for supporting communities in the fight against climate change, it will develop dedicated databases, it will develop engineers and a private sector capable of designing and implementing low-cost, low-tech EbA intervention measures. The project shall also seek to engage with the private sector for the construction works, support in structural design, including construction material provision as required. The Sinoe County and associated City Corporation of Greenville may also request resources to perform maintenance on sea and river defence structure (hybrid EbA srtucures) plus possible private sector management of any rehabilitated coastal land (trees planted on the site etc).

Key private sector involvement is proposed with regard to the initiation of CSEB pilot industry development. The CSEB approach is not new in West Africa. In Gambia, for example, there are 3 CSEB private producers in the country (see Annex C). One is Earthworks Construction (G) Limited (hereafter "Earthworks") which is an established construction company that works almost exclusively with CSEBs and was the first company to employ this technology in The Gambia in 2005. Earthworks have championed this technology at Sandele Eco-Retreat and Learning Centre ('Sandele") which was constructed using CSEBs. A separate Earth Bulders Association was recently set up as a not for profit organisation to help promote the industry within local communities. Sandele's proprietors purchased a single Aurum Press 3000 from Aureka, an Indian company. So much interest was expressed in the technology that Earthworks was registered as a company in 2007. Earthworks now owns 5 machines, which gives them the capacity to currently construct a 3-bedroom low cost show house at Tujering in collaboration with the Ministry of Social Security and Housing Finance and an inclusion centre for disabled children for Disability Africa at Gunjur. The Gambian Association of Construction Contractors and Consultants (GACCON) commissioned Earthworks in 2012 to provide training for 65 block makers, masons and engineers with funds provided by the World Bank. This was a very successful programme and GACCON representatives expressed satisfaction with

the training that was provided. With the success of this initiative, the CSEB technology is slowly being recognized and introduced by a small number of entrepreneurs; and local architects communicated their willingness to recommend the technology to their clients.

The Ministry of Public Works in Liberia is responsible for regulating building construction works in the country and one of its key objectives is the carrying out of research and promotion on the use of local building materials as alternative means to the construction of houses in Liberia. Effective collaboration with the Ministry (along with the Association of Construction Contractors (ALCC), the Chamber of Architects (LCA), the Engineering Society of Liberia (ESOL), the Chamber of Commerce (LCC)) shall need to be undertaken in trying to achieve this Output to avoid overlapping or duplication of efforts. The Ministry also has legislative instruments that need to be taken into account to ensure national compliance is attained. This specific activity / task therefore ensure that the construction of any alternative industry shall be in line with the Ministry's objectives with regards to building and material standards currently in place within Liberia.

5. Risks

Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)

Description of risk	***Degree***	***Mitigation measures/comment***
Severe drought or other extreme weather events occurring during the project implementation and affecting the project targeted communities.	High	The project interventions are designed to address the effects of increasing climate variability, such extreme weather events could negate project benefits. The choice of interventions, including infrastructure, will focus on climate-resilient interventions, including their design, which will be informed by future climate scenarios. Project activities such as consultations, field activities and meetings will be timed not to coincide with seasons of extreme events such as hurricanes and heavy rains. Provision will also be made in the schedule and workplans to allow for weather-related interruptions so that the project remains on schedule even with these events. In addition, the PPG phase will be used to compile an inventory of potential hazards with information provided by local communities and climate experts.
Low human and institutional capacity, especially at County level	Medium	The proposed LDCF project has a strong capacity building and training component, designed to promote effectiveness and sustainability at the County level.

Delay in project implementation	Medium	The PPG phase will support the regional administration to design capacity building programmes. Delays in projects often relate to capacity issues, which will be mitigated against.
Limited awareness and engagement with community leaders and local-level development practitioners leads to demonstration activities failing to influence climate-planning processes at local and regional levels	Low	Awareness raising and engagement will commence during the PPG phase and will continue throughout project implementation. This will focus on the importance of mainstreaming adaptation planning into development agendas of local communities and in relevant government administrations at Sinoe County level. Awareness raising will focus on risks posed by coastal EbA and Sea and River Defence priorities. In addition, information dissemination through regular publication of project newsletters and other media (e.g. videos for community screenings) will enhance awareness raising and engagement at the community level.
Political or security complications in project sites limit implementation of project activities	Low	There is strong commitment from the GoL, which limits these risks to the proposed LDCF project.
Poor co-ordination in project implementation	Low	Project management arrangements will be made explicit during the PPG phase. To ensure coordination is effective, the proposed LDCF project will competitively recruit one project manager, County and local community-level site officers, finance experts and one coastal expert.
Limited capacity of EPA to effectively engage and coordinate and effectively integrate District and County planning and investments in national adaptation processes	Low	The project will continue strengthening the coordination capacity of EPA, while also building the capacity of other sectors such as Agriculture, Fisheries, Mines and and Energy to be involved in the integration process. County level capacity will also be built so that the the process of adaptation planning is driven from the bottom. Specifically, the county adaptation focal points will be capacitated to contribute to national adaptation planning as well.
Low response by financial institutions to invest in adaptation and resilience-oriented projects leading to reduced access to finance	Medium	The project will engage the private sector and finance institutions from the beginning, and will work with them to identify solutions that address climate change while providing business and investment opportunities for the sector. The project will also prioritize climate-resilient solutions that are in line with the current focus on the private sector. It will also identify policy-related risks and barriers that may prevent private sector involvement and work with government to find solutions to these risks and barriers.

6. Coordination

Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

A number of other ongoing and completed initiatives are of particular relevance to the proposed LDCF project.

Institutional structure of the project

The project will be implemented following UNDP's national implementation modality, according to the Standard Basic Assistance Agreement between UNDP and the Government of Liberia, and the Country Programme.

The Implementing Partner (IP) for this project is Environmental Protection Agency (EPA), with the technical involvement of Ministry of Mines and Energy and Ministry of Agriculture as responsible parties for specific technical activities.. The Implementing Partner is responsible and accountable for managing this project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources.

The institutional structure comprises of the following:

National Project Steering Committee: Project implementation will be overseen by the Project Board herein refer to as the National Steering Committee (NPSC), responsible for making management decisions for a project in particular when guidance is required by the Project Manager. The NPSC will be comprised of individuals representing the institutions at the national and County levels.

The Project Management Unit (PMU) will be responsible for running the project on a day-to-day basis on behalf of the Implementing Partner and within the constraints laid down by the NSC. The PMU will be hosted within the Environmental Protection Agency. It will comprise of the Project Manager, Deputy Project Manager, M&E Officer, Finance and Administration Officer and other support staff.

The Project Assurance: UNDP provides a three – tier supervision, oversight and quality assurance role –involving UNDP staff in Country Offices and at regional and headquarters levels. Project Assurance must be totally independent of the Project Management function. The quality assurance role supports the Project Board and Project Management Unit by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed.

This proposed institutional structure will be validated during the PPG phase in consultation with all lead agencies.

UNDP Support Services anticipated during project implementation

In the early stages of preparing this PIF, discussions were held between UNDP and the Government of Liberia on the anticipated support to the implementation of the project. This was in the context of the mutual interests of UNDP and Government to continue building the capacity of IPs to fully take charge of project implementation while UNDP plays the oversight role. In these consultations, consideration was made of the current situation in Liberia, experiences from past and existing initiatives and capacity building processes underway. The outcome of these engagements was the Government indicating the need for UNDP support during project implementation while building the capacities of government partners. It was recognized that over the past years, UNDP support to government has led to increased capacity, but support will still be needed to ensure effective and efficient implementation of this project. Capacity building and transfer will be embedded in the implementation of this project.

The following are the indicative areas of support that UNDP will provide in project implementation:

- Identification and recruitment of the project personnel
- Identification and recruitment of the project consultants
- Identification and facilitation of training activities, conferences, and workshops
- Procurement of services and equipment, and disposal/sale of equipment
- Provision of progress reports and cost reimbursed in providing such services
    - Payments, disbursements and other financial transactions
    - Travel authorizations, visa requests, ticketing, and travel arrangements
    - Shipment, custom clearance, vehicle registration, and accreditation

At the PPG stage, the Direct Project Costs (DPC) associated with this support will be estimated at actual or transaction based cost (UPL/LPL) and based on the procurement plan.

Based on the understanding that execution and oversight roles of UNDP need to be separated, the PPG stage will explore, together with the IP, different options for supporting the areas of support listed above that do not necessarily involve UNDP. These options, which may include government itself, NGOs or private players, will be assessed on the basis of a number of criteria to reach an arrangement that will work for the project with minimum risks. Any issues and limitations identified will be communicated and discussed with the Government and the GEF early in the PPG process.

Past initiatives

The project will coordinate closely with ongoing initiatives as well as public, private and local community stakeholders that are – or have been – involved in the design and implementation of the ongoing initiatives listed in Table 1. Some specific past projects include the following:

- United States Agency for International Development (USAID) and USDA Forest Service International Programs, (2013), *Liberia Climate Change Assessment*.

- United States Agency for International Development (USAID), (2014), *Mapping the Exposure of Socioeconomic and Natural Systems of West Africa to Coastal Climate Stressors* (African and Latin American Resilience to Climate Change (ARCC))

- Metria and Geoville, (2016), *Liberia Land Cover and Forest Mapping for the Readiness Preparation Activities of the Forestry Development Authority*:

- Habitat for Humanity International/ Liberia Country Program, (2017), *Community Hazards, Risk and Vulnerability Assessment Report*.

On-going initiatives

- Climate vulnerability and risk assessment for the coastal zone of Liberia (2019), Green Cliamte Fund project. Specific 2 year sub-project entitled "*To advance the National Adaptation Plans (NAP) process for medium-term investment planning in climate-sensitive sectors and coastal areas in Liberia".* The supporting Climate Change Risk Assessment Study (when completed) will produce (by the end of 2019) climate change hazards and vulnerability maps (Risk Assessment Maps) of the Liberia's coastal area.

- GEF Project ID 5712 Improve Sustainability of Mangrove Forests and Coastal Mangrove Areas in Liberia through Protection, Planning and Livelihood Creation- as a Building Block Towards Liberia's Marine and Coastal Protected Areas.

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assesments under relevant conventions

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

The GoL considers the management of coastal risks and the impacts of climate change to be a high priority, as evident from the development of several national policies and plans. The proposed LDCF project's is consistent with the plans and policies described below.

The **Pro-poor Agenda for Prosperity and Development** (PAPD, 2018-2023) is Liberia's five-year National Development Plan which underpins strategies and plans across multiple sectors of government. The project contributes to three of the four pillars of the PAPD, namely: i) 'Power to the People' by contributing to lifelong environmental education and reducing gender inequalities; ii) 'Economy and Jobs' by enhancing the resilience of climate-sensitive livelihoods; and iii) 'Governance and Transparency' by building the capacity of the GoL for county level ICZM.

The **National Policy and Response Strategy on Climate Change** (2018) is the central policy underpinning Liberia's response to climate change and serves as the basis for all future adaptation and mitigation planning. It identifies the sectors most vulnerable to climate change impacts and names five enabling pillars to support the safeguarding of these sectors. The project will contribute to four of these pillars, specifically cross-sectoral coordination, capacity-building, integrated planning and the development of infrastructure.

The proposed LDCF project is aligned with Liberia's **National Adaptation Programme of Action** NAPA. The GoL developed the NAPA in accordance with the requirements outlined in the UNFCCC COP 7. The **National Adaptation Plan of Action** (NAPA; 2006) emphasises addressing coastal erosion as a critical national adaption priority. Along with addressing coastal erosion in vulnerable areas of the country, the project further aligns with Liberia's NAPA by supporting: i) improved county level planning capacity in government institutions for incorporating climate change considerations; and ii) the dissemination of information to improve climate change knowledge at local and national levels.

Liberia's **Climate Change Gender Action Plan** (CCGAP; 2012) prioritises the mainstreaming of gender equality into national climate change policies, programmes and interventions. The project contributes to one of the CCGAP's six priority areas for gender mainstreaming, namely the improvement of gender mainstreaming within coastal areas. This will be achieved by: i) protecting vulnerable communities and assets; ii) incorporating gender considerations into coastal zone management; and iii) increasing participation of women in decision-making at community and institutional levels.

The **Initial National Communication** (INC) to the UNFCCC (2013), provides a broad overview on the projected climate impacts on Liberia and an indication of the country's current GHG inventory. The adaptation priorities in the INC focus on the need to adapt to the impacts of projected SLR and increasingly frequent extreme climate events. The project is aligned with the approach recommend by the INC for reducing coastal impacts of climate change, including through the implementation of coastal protection and management measures in Sinoe County.

Liberia's statement of its **Intended Nationally Determined Contribution** (INDC; 2015) identifies adaptation actions focusing on reducing the impacts of climate change on seven critical sectors, including agriculture, energy, health, forestry, coastal zones, fisheries and infrastructure — conditional on the provision of international financial assistance and aid. The project will align with one of the three adaptation priorities identified under the INDC.

The **Sustainable Development Goals** (SDGs) build on the Millennium Development Goals (MDGs) and are underpinned by an array of issues that address the root causes of poverty and the need for development on a global scale. There are 17 SDGs with varying focuses including hunger, gender inequality and access to water. The proposed LDCF project aligns with the SDGs, in particular with SDG number's: 1) poverty; 5) gender equality; 11) sustainable cities and communities; and 13) climate action.

8. Knowledge Management

Outline the Knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

Knowledge management under this project will target actors across all coastal counties and enable solutions to be scaled out across the country. Horizontal and vertical linkages will be used to ensure the lessons from the local level inform the national level, while using national level actors to support lessons from specific counties to other counties. facilitate will be facilitated across all coastal counties to enable lessons learnt in different counties to be scaled up.

The knowledge management strategy for the proposed project includes a component focused specifically on collating and disseminating knowledge on community-based coastal adaptation practices to address increasing community vulnerability to climate change (see Component 1). Knowledge management activities to be implemented under this component include documentation of lessons learned and best practices to promote replication and upscaling, a Sinoe County "knowledge centre" to facilitate knowledge sharing and exchange of best practices between villages within the County and awareness-raising campaigns (in Component 3). This will support dissemination of lessons learned and best practices from the baseline projects and from the project itself amongst project stakeholders, including partner agencies, government ministries, civil society, NGOs and local communities.

Supporting activities proposed within this PIF to develop knowledge management in Liberia include specific activities to develop sea and river defence management focused guidance manuals to help both public and private sector actors on climate change adaptation delivery, the dissemination of best practices on interventions under Outcomes 3 and 4 to to all coastal counties for subsequent upscaling and mainstreaming. Knowledge management will also include climate resilient alternative livelihoods, value chains as well as successful business development, financing instruments and adaptation-oriented MSME investment practices. This learning will also involve private sector actors to ensure that they contribute to the learning and also to widen participation uptake in the private sector. Lessons learnt from this project will also be shared globally through GoL and UNDP networks and platforms that are focused on participatory and community focused coastal adaptation interventions.

The project will collaborate with actors working in the West Africa region, including WABICC to facilitate wider dissemination and uptake of the innovations that the project introduces in Liberia. This will go beyond just dissemination of knowledge products, but will also include facilitating these entities to integrate financing approaches in their programmes.

Finally, training and capacity building conducted through the project will incorporate lessons learned from the CSEB and IFS approaches and the Sinoe County SRDIMP and other national initiatives as well as international best practices. This will contribute not only to improved implementation of interventions during the course of the project, but will also inform replication and upscaling of project activities.

5b. Environmental and Social Safeguard (ESS) Risks

Provide preliminary information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE

Types and Level of identified or anticipated risks (Select all applicable)

Risk	PIF	CEO Endorsement/Approval	MTR	TE
- (MS1) Climate Change and Disaster				
- (MS1) Disadvantaged or Vulnerable Individuals or Groups				
- (MS1) Disability Inclusion				
- (MS1) Adverse Gender-related Impact				
- (MS3) Biodiversity Conservation and the Sustainable Management of Living Natural Resources				
- (MS4) Restrictions on Land Use and Involuntary Resettlement				
- (MS5) Indigenous Peoples				
- (MS6) Cultural Heritage				

Risk	PIF	CEO Endorsement/Approval	MTR	TE
- (MS7) Resource Efficiency and Pollution Prevention				
- (MS8) Labor and Working Conditions				
- (MS9) Community Health Safety and Security				

Measures to address identified risks and impacts

Provide informationi on any preliminary measures to address identified risks and impacts during project/program design

Supporting Documents

Upload any supporting documents, such as ESS screening reports, assessment reports, management plans (or equivalent).

For "High" or "Substantial" risk project, management plan must be submitted

Title	Submitted

Part III: Approval/Endorsement By GEF Operational Focal Point(S) And Gef Agency(ies)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).

Name	Position	Ministry	Date
Benjanmin S. Karmorh	GEF Operational Focal Point	ENVIRONMENTAL PROTECTION AGENCY	9/18/2019

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place

Annex A: Greenville Coastal Erosion Findings

Inception Report (2019)Findings – GCF Project (Vladimir Kalinski2019)

- According to residents, erosion at the southern tip of Mississippi St. started in 80's, and with much faster rates after 2014;
- a number of houses have been eroded;
- Part of the most southernly tip of the peninsula has been subject toa partial rock armour revetment project in 2017, however, this level of protection is not satisfactory;
- The peninsula that was extending southwards is now submerged under relatively shallow water.
- Interviewee relocated in 2013 due to erosion/ flooding;
- Interviewee had house demolished by water in May 2019. Each year from 2015 to 2019, she noticed the water advancing;

Coastal Volatility Assessment at Greenville (McCue 2019)

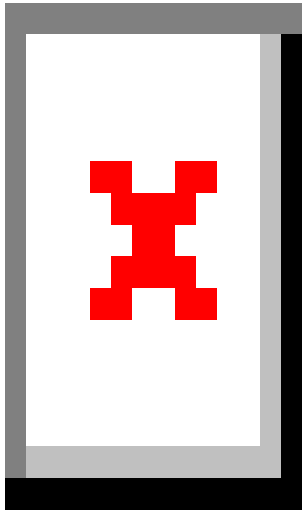
The following work has been undertaken by McCue (2019) as part of the technical assessment required to support the Theory of Change (ToC) presented in Annex A of this PIF. A rapid coastal evolutionary change assessment (using Google Earth technology) was undertaken in August 2019. The following images are used to help inform the strategy for the PIF. A focus on Greenville city only is provided.

2012

2013

2014/15

2018



It can be seen that the length of the protecting sand spit of land, to the south of Greenville has since been eroded away. In 2012, it measured at approximately 621m and gradually declined to around 586m in 2014/15. There is insufficient Google Earth satellite imagery for the years 2016 and 2017 to determine quantifiable analysis, though in 2018, the section of land in Greenville had been completely flooded, leaving communities adjacent to the now flooded land vulnerable to increased sea level rise and storm surge.

Analysis of the Coastal Land Opposite the Greenville Spit

2012

In 2012, there was approximately 16 dwellings along the beachfront (see in between the red lines), that were protected by the spit. In 2018, following the spits erosion, these dwellings have now become increasingly vulnerable to increased likelihood of flooding and the associated beach has experienced significant erosion as a consequence of the spits erosion.

In 2018, there were approximately 10 dwellings along the beachfront in between the red boundary lines. According to the Sinoe County Artisanal Fishing Association (SCAFA), in 2015, erosion has destroyed more than 25 shelters of artisanal fishermen, rendering 400 people homeless in Greenville[1].

2018

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[1] https://allafrica.com/stories/201510140992.html

Adaptation Response Options at Greenville

The adoption of a hard engineering scheme alone at Greenville is deemed inappropriate due to the volatility of the beach environment in the area. Instead, the adoption of a a hybrid option that embraces a combination of a soft and hard interventions, including EbA) may prove to be the most suitable strategy. In the absence of specific information from the Coastal Vulnerability Mapping project (from the ongoing GCF funded NAPs project), no specific intervention detail can be proposed. However, some possible soft techniques to be considered together with hard engineering solutions are listed below for consideration during the PPG Phase of this project.

Pilot Project Technique	Location	Project Outcome
Wetland "land reclamation" management system	Within Sinoe County	Output 3.2 Low cost infrastructure to protect up to 1,500 ha of vulnerable rice growing / vegetable areas from the effects of sea-level rise and salt water intrusion
Foreshore nourishment scheme using dredged material	Greenville	Output 3.1 Low cost infrastructure to protect properties in Greenville. Sediment recycling ("sand engine") strategy, using maintenance dredge material from Greenville Port (or Buchanan Port) should sediment quality be approprite. The initiative would seek to emrace a "hybrid" solution by using dredged materal in tandem with engineering structures (groynes/breakwaters) to artificially re-built the Greenville spit feature (possibly using Use of geotextile "breakwaters" to encourage sediment accretion in Greenville).
Arresting coastal erosion for the fishing sector – river training using geotextile bags.	Greenville	Hard coastal protection infrastructure measures (beach stabilization, river training groynes, revetment system or wall) are designed, constructed with additional redundancy against sea level rise and climate induced erosion to help support "transport to market" for the Greenville and neighbouring village fishery communities.
Mangrove/swamp regeneration programme	Sinoe County	Up to 1000 ha of mangroves forests withinand lower river regions restored and maintained through mangrove management plans and regeneration to withstand climate-induced pressures in coastal areas