



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



**Food and Agriculture Organization
of the United Nations
Investment Centre Division**

GOVERNMENT OF THE REPUBLIC OF LIBERIA

SUPPORT TO NEPAD–CAADP IMPLEMENTATION

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Volume III of IV

BANKABLE INVESTMENT PROJECT PROFILE

Project for Sustainable Fisheries and Aquaculture Development

September 2006

LIBERIA: Support to NEPAD–CAADP Implementation

Volume I: National Medium–Term Investment Programme (NMTIP)

Bankable Investment Project Profiles (BIPPs)

Volume II: Project for Inland Swamp Rehabilitation and Development

Volume III: Project for Sustainable Fisheries and Aquaculture Development

**Volume IV: Project for Market–oriented Agroforestry and Tree Crop
Production Systems**

NEPAD–CAADP BANKABLE INVESTMENT PROJECT PROFILE

Country: Liberia

Sector of Activities: Fisheries

Proposed Project Name: **Project for Sustainable Fisheries and Aquaculture Development**

Project Location: **Artisan Fisheries:** Maryland, Grand Kru, Sinoe, Rivercees, Grand Bassa and Grand Cape Mount counties
Pilot Aquaculture: Lofa, Grand Gedeh and River Gee counties.

Duration of Project: 5 years (estimate)

Estimated Cost: Foreign Exchange US\$ 6,000,000
Local Cost..... US\$ 300,000
Total US\$ 6,300,000

Suggested Financing:

<i>Source</i>	<i>US\$ million</i>	<i>% of total</i>
<i>Government</i>	–	–
<i>Financing institution(s)</i>	6.3	100
<i>Beneficiaries</i>	–	–
<i>Total</i>	6.3	100

LIBERIA

NEPAD–CAADP Bankable Investment Project Profile

“Project for Sustainable Fisheries and Aquaculture Development”

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Currency Equivalents

(September 2006)

Local Currency	=	Liberian dollar (L\$)
US\$1.00	=	L\$59.50
L\$100	=	US\$1.68

Abbreviations

ACDB	Agricultural Development and Cooperative Bank
BNF	Bureau of National Fisheries
CBO	Community-based Organisation
CARI	Central Agriculture Research Institute
CCRF	Code of Conduct for Responsible Fisheries
EU	European Union
GDP	Gross Domestic Product
GOL	Government of Liberia
LCIP	Liberia Community Infrastructure Project
MRS	Monitoring and Regulatory System
NEPAD	New Partnership for Africa’s Development
PIU	Project Implementation Unit
USAID	United States Agency for International Development

I. PROJECT BACKGROUND

A. Overview

I.1. Fisheries is a key sector in the agricultural framework of Liberia as well as in the national economy. In 2002, fisheries contributed to 12% of agricultural GDP and 3.2% of the national GDP. Fisheries play a key role in the livelihoods of the coastal population, consisting of 15,000 to 20,000 families that use 2,500 boats approximately. The fisheries sector has vital roles in food security and economic growth nationally.

I.2. The National Medium–Term Investment Programme in Agriculture and Rural Development, prepared under the auspices of NEPAD during 2006, selected fisheries as one of the 10 national priorities, and retained a “Project to support sustainable fisheries and aquaculture development” as one of the three bankable investment projects that deserved a preference preparation. The profile of that project proposal is presented in the current document.

B. The Fisheries Sector

I.3. Liberia has a good potential for coastal fisheries. The country has an Atlantic coastline of 580 km and a continental shelf averaging about 34 km in width. This affords an area of about 20,000 km² of fishing ground, extending to 200 nautical miles into the deep sea. Liberia also courts with 1,810 km of rivers and low lands for fisheries exploitation. However, fishing activities, particularly artisan fisheries, declined dramatically during the civil war. Efforts to regain the strength of the sector are necessary to improve food security, employment and economic development in Liberia. The pre–war estimated sustainable yield of the continental shelf of Liberia was about 180,000 tonnes per year and 40,000 tonnes per year from freshwater. Annual catch between 1996 and 1999 ranged between 5,000 and 9,000 tonnes. The sector has thus a notable recovery potential.

I.4. Fisheries in Liberia comprises 3 sub–sectors: marine fisheries, inland fisheries and aquaculture. Artisan fisherpersons are the major actor in both the marine and inland sub–sectors, accounting for 80% of fish produced nation–wide. In addition, artisan fisheries ground the livelihoods of various thousands of households, mostly in coastal areas. Artisan fisheries therefore deserve a priority attention.

I.5. The **marine sub–sector** comprises both artisan and industrial fisheries. This sub–sector is more mechanized than the other sub–sectors, as it utilizes improved methods of fishing, equipment and gear. The industrial or trawl fisheries, which provide 17% employment for the sector, are practically mechanized and operated by foreign enterprises due to its huge capital requirements. The sector exploits the resources in the inshore and offshore waters, contributing about 60% of total fish landed in 2004. The most abundant species in the waters are *Engraulis encrasicolus*, *Sardinella aurita* and *Decapterus* spp., while the dominant species in the inshore and coastal waters are *Caranx* spp., *Ethmalosa fimbriata* and *Sardinella aurita*. The main oceanic pelagic resource is tuna and related species such as bonito and marlin, which appear off the coast between December and May. There is a small stock of shrimps but its value is comparatively high.

I.6. About 60% of the total domestic fish catch is produced by the artisan (mostly marine) fishers. The catch of the industrial fishery was about 470 tons in 1971 and increased steadily to about 3,000 tons in 1978. After 1980, the industrial finfish catch and the finfish imported by Liberian fishing companies has fluctuated between 4,500 tons and 9,000 tons respectively. The industrial shrimp fishery expanded rapidly in the 1970s: the annual catch increased from 400 tons in 1969 to about

1,700 tons in 1978. The industrial fleet, which began in the mid-1950s, also targets the shrimp resources located on the Shebro grounds, which borders and extends into Sierra Leonean waters. There is one fisheries landing peer, situated at Monrovia, for industrial trawlers, and 39 landing sites for artisan fisheries distributed along the coast.

Demersal	Pelagic	Shrimps	Total
2,500–15,000	20,000–41,000	1,000–2,000	23,500–76,000

Source: Bureau of National Fisheries, 1999.

I.7. The *inland fishery sub-sector* is highly undeveloped and essentially operated by artisans (both males and females), using traditional gears and traps. Though there is no comprehensive data on its performance, it is believed to contribute about 25% of the fish consumed by rural dwellers inland. The estimated sustainable yield of freshwater (inland fisheries) is 40,000 tonnes/year.

I.8. The *aquaculture sub-sector*, which began in the mid 1970s, remains underdeveloped. The sub-sector utilizes simple technology with subsistence earthen ponds. Three main species (*Oreochromis niloticus*, *Heterobranchus* spp. and *Tilapia zilli*) are cultured either in a poly- or mono-culture system. There are about 3,135 fish farmers distributed throughout the country, with a total area of 21 ha. Pre-war production levels were around 35 tons, which declined to 22 tons in 2000 to rise again up to 39 tons in 2005. The potential yield of aquaculture is about 100–200 tons annually. This potential can be reached through the expansion of production facilities, improvements in hatchery and pond management, and availability of improved supplementary feed.

I.9. The total production of fisheries is summarized in Table 2 below.

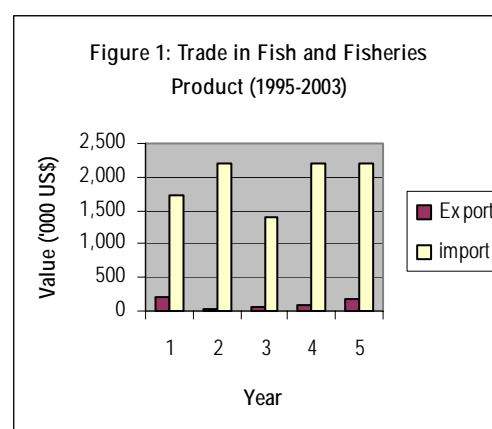
Year	Artisan	Industrial	Aquaculture	Total
1995	3,460	1,675	–	5,135
1996	2,036	1,104	–	3,140
1997	2,519	2,061	–	4,580
1998	3,757	3,071	–	6,830
1999	7,078	4,394	–	11,471
2000	7,742	5,314	22	13,078

Source: Bureau of National Fisheries (1999), UNDP (2000) & FAO (2005)

I.10. Available data on fish export is unreliable as trade is usually carried out on sea, thus depriving government of maximum benefits from the fish trade. Nearly all crustaceans are processed and frozen for export abroad. The Government of Liberia encourages the reservation of finfish for the domestic market, but small quantities are exported. Most industrial facilities are adequately equipped to produce export quality shrimp and seafood. In addition, these companies import large quantities of whole frozen fish (Source: FAO, 2001).

Year	Export (metric tonnes)	Value ('000 US\$)	Import (metric tonnes)	Value ('000 US\$)
1995	91	211	2,196	1,730
1996	2	3	2,540	2,419
1997	2	18	2,547	2,199
1998	3	11	2,560	1,426
1999	8	64	2,523	1,412
2000	32	49	3,770	2,766
2001	69	85	1,904	2,215
2002	151	80	1,150	1,401
2003	83	178	2,624	2,206

Source: FAO Fishery Information Data and statistics Unit, 2005



C. Past Experiences and Lessons Learnt

I.11. Attempts at reviving fisheries occurred during and just after the war through emergency projects. Many of them were supported by FAO and occasionally by bilateral donors, but these were only limited interventions. There still remains large-scale needs in terms of provision of basic equipment for artisan fishing organizations, training, and facilities for processing and marketing fish products. In addition, the country should develop national capacities to carry out effective planning for sustainable industrial and artisan fisheries, and to monitor fishing volumes for sustainability purposes.

I.12. Attempts at reviving the fisheries’ sector began with the project “Emergency Assistance to the Artisan Fishery Sector” in 1995, providing fishing gears, equipment, outboard engines, spare parts and technical support in 8 counties. In 1997, FAO provided further support to the sector under the project “Emergency Assistance to Artisan Fishery and Reintegration of former Combatants into the Inland and Marine Fishery Sectors”. In total, both interventions catered to 3,800 beneficiaries, including some 700 ex-combatants and 1,000 fish mongers. Emergency provision of fishing inputs were insufficient due to the number of fishers returning to their communities as security increased. In 2004, additional 1,975 beneficiaries from 3 counties benefited from input distribution and training through the FAO emergency assistance programme “Emergency Support to the Rehabilitation of Artisan Fisheries Sector”. During this intervention, 20 fish smoke kilns were constructed in selected communities of the three counties, helping to reduce post harvest losses. At present, an on-going initiative of FAO (OSRO/LIR/504/IRE) assists the rehabilitation of the artisan fisheries sector in Maryland and Grand Kru counties, expecting to benefit some 2,000 fishers and fish mongers with inputs and training.

I.13. Aquaculture development began in the 1950s at the Central Agriculture Research Institute (CARI). By 1989, more than 900 fish ponds had been developed throughout the country and stocked with fingerlings. Over the past three decades, aquaculture has developed to become the fastest growing food production sector in the world. Its potential contribution to local food security and livelihoods can be very significant, especially in remote and resource poor areas. The European Union supported, from 1999 to 2002, the rehabilitation and development of 3 fish hatcheries, and imported brood stocks of *Oreochromis niloticus* for multiplication and on-ward distribution to farmers. The project rehabilitated and developed ponds in 6 counties, with some 380 farmers benefiting from pond construction material, training and extension services. The EU support to aquaculture rehabilitation in southeastern Liberia continued through “Action Contre la Faim” in 2004. Other sources of support for aquaculture rehabilitation have been through Diakonie Emergency Aide (Germany) in Lofa, Africare-

Liberia, USAID (through LCIP) in Bong and Nimba counties, and Samaritan Purse in Bong county. Current initiatives are being implemented by German Agro Action in the Southeast and by FAO through its project OSRO/LIR/001/01/99 that intends to benefit former combatants in Lofa, Bong and Grand Gedeh counties through providing training and pond construction materials.

I.14. From interviews and observations made during the recent assessment for preparing this project profile, coupled with a review of various projects and assessment reports, the lessons learned can be summarized as follows:

- Fishers are anxious to improve their catch through group initiatives rather than individual efforts. In fact, many of them are getting themselves organized into small groups to improve their fishing efficiency and better access external support. Groups of about 10-15 persons are certainly more successful as they are able to carry and use larger gear, manage better their hauls, and use efficiently any support. Women are more receptive to group activity and joint ownership of project benefits than men.
- Fishers would improve their activity with training in basic business and management skills.
- Fishing has a notable seasonal dimension. Therefore, fishers are often engaged in other activities during the ‘off-seasons’ in order to earn a living.
- Fish farmers have difficulties feeding their ponds due to competition for the same feed ingredient, which are also utilized by humans as food. In addition, pond sites that are isolated from other activities of the farmer tend to be forgotten and less maintained.
- The size and location of fish processing units (kilns) must be adjusted with the population of processors, catch level, local market and landing site. Location must be decided by the fishers and processors who are the major beneficiaries, and not the community leaders who would often politicize it and render it useless.

D. Constraints and Key Sector Issues

I.15. The *institutional framework* for the management of the fisheries resources is the Bureau of National Fisheries (BNF), within the Ministry of Agriculture. BNF was established through an act of legislation in 1956. The regulatory policies are to ensure sustainable exploitation and utilization of the resource. However, enforcement of regulations to ensure compliance remains an uphill task for a BNF that is ruined by war, ill-equipped and deprived of trained and qualified personnel.

I.16. *Fishing inputs* (fishing nets, lines, outboard engines and other equipment) are in short supply on the local market, and are usually not affordable by the small-scaled fishermen. Apart from the private sector, which supplies fishing inputs at unaffordable cost to fishers, donor agencies have provided funding for the provision of inputs to artisan fishing communities. In view of the urgent need to deploy adequate inputs to revive the sector, particularly among artisan and poor fishing organisation, projects should still consider the provision of, or subsidize such materials. In addition, fish processing and storage facilities for artisan communities are also needed.

I.17. *Processing and marketing* need substantial support since the destruction of the fish processing facilities owned by the Mesurado Fishing Company, there are no processing facilities in the country at the moment. Fish is marketed fresh, frozen (from industrial companies) or smoked dry (from artisan communities).

I.18. **Monitoring, control and surveillance** are urgently needed. By mandate, the BNF is the agency of government responsible for the development and management of the national fisheries of Liberia. However, the role of BNF has been limited to licensing control, while surveillance was done by the National Coast Guard Service, which carried out regular patrols of the territorial waters. The BNF lacks the capacity to monitor the fish resources. Catch data is often inaccurate, and BNF personnel lack the ability to analyze and interpret it into useful management tools. The Code of Conduct for Responsible Fisheries (CCRF) could become the working tool for the management and development of fisheries in Liberia.

II. PROJECT AREA

II.1. The project will support both artisan fisheries and pilot aquaculture initiatives, in different areas. The project sites for supporting **artisan fisheries** are the coastal areas of the following 6 counties: Maryland, Grand Kru, Sinoe, Rivercess, Grand Bassa and Grand Cape Mount. The project sites for **pilot aquaculture** development are inland valley swamps in the following 3 counties: Lofa, Grand Gedeh and River Gee.

II.2. The coast of Liberia, of about 580 km of length, is populated by many fishing communities whose livelihood relies on artisan fisheries. In the inland counties, there are many swamp valleys that are natural drainages characterized by slight gradients towards the lower end. In general, Liberia is one of the African countries with the highest amount of renewable water resources per inhabitant: more than 71,000 m³/year. The irrigation potential of the country is estimated at 600,000 ha, consisting mainly of freshwater swamps (FAO, 2005).

III. PROJECT RATIONALE

III.1. The national fisheries management and development policy aims at enhancing the contribution of fisheries to the national economy. The nutritional and socio-economic roles of fisheries in Liberia are also notable and deserve recognition.

III.2. The fisheries sector employs currently about 20,000 people. There is a clear recovery of the sector after the war; in 1995–1998, the fisheries sector seemed to employ only 5,000 people (World Resources Institute, 2004). The sector is critical in the nutrition and income of countless coastal communities, aside from having an important food security role nationally.

III.3. Most development reports, including the “Country Situation Review of the Agriculture Sector” (1999) and the “Draft Policy Measures for Support to Post-Harvest Activities for Food Security and Poverty Alleviation in Liberia” (2002), emphasize the critical importance of the sector in food security and economic development, and highlight the urgent need to rehabilitate it. Lack of basic fishing equipment, training, credit opportunities, fish processing equipment and facilities, and institutional support are widespread.

III.4. Aquaculture is a fast growing sector in food production in the world, and has a good potential to contributing to local food security and livelihoods. It constitutes a relevant source for protein in inland areas in Liberia, where livestock production is absent, bush meat causes degradation of natural areas and food insecurity is high.

III.5. In summary, providing support for the sustainable development of the artisan fisheries and aquaculture sectors will improve the livelihoods and food security of many rural people, and improve nutrition and economic dynamism nationally.

IV. PROJECT OBJECTIVES

IV.1. The *overall objective* of the project is to enhance the nutrition and economic roles of artisan fisheries in the country.

IV.2. The project has the following *specific objectives*:

- to support the rehabilitation and development of artisan fisheries;
- to launch pilot experiences in aquaculture in inland valleys;
- to strengthen the technical, organizational and marketing capacities of artisan fisherpersons and fish processors/marketers; and
- to strengthen the national institutional capacities for monitoring and supporting the fisheries sector.

V. PROJECT DESCRIPTION

V.1. The project has *four components*:

- Support to artisan fisheries development
- Pilot aquaculture initiatives
- Enhancing national capacities for sustainable fisheries
- Project management

V.2. The four components will be implemented concurrently, during a period of about *five years*, but at different locations.

Component 1: Support to artisan fisheries development

V.3. The goal of this component is to restore artisan fishing activities, so to increase fish production levels by fishing communities along the coast of Liberia. The component would be implemented in the following coastal counties: Maryland, Grand Kru, Sinoe, Rivercess, Grand Bassa and Grand Cape Mount. Under this component, the project would finance fishing equipment (including outboard motors when justified) and training to 3,643 beneficiaries, who include fishers, fish mongers and fish processors. This component will directly or indirectly benefit some 22,000 people. Vulnerable population groups would benefit from the project, including returnees, young ex-combatants and poor women. This component is directly linked to CAADP Pillar 5 (Increasing Food Supply and Reducing Hunger) and is complementary linked to CAADP Pillars 3 and 4.

V.4. *Selection of beneficiaries.* The project will be implemented through fishing groups. Accordingly, the project will first carry out assessments, in the selected counties, for the identification

and selection of beneficiary groups for the distribution of inputs and/or construction of fish smoking units (kilns). The criteria for selecting beneficiary groups will include: (i) community organization and productivity; (ii) willingness to work together in achieving community development objectives; and (iii) willingness to adopt new fishing technologies and gears that would promote sustainable exploitation of the resource. The women groups that process and market fish products will be among the priority beneficiaries.

County	Number of fishing communities	Number of fisherpersons	Number of processors & mongers	Number of landing sites	Proposed number of beneficiaries
Maryland	8	176	208	5	384
Grand Kru	35	674	770	6	1,444
Sinoe	30	332	295	5	627
Rivercess	12	285	93	3	378
Grand Bassa	18	192	300	6	492
Cape Mount	13	183	135	6	318
Total	116	1,842	1,801	31	3,643

Sources: Assessment reports, FAO project reports, and interviews with local NGOs and fishing communities, among others.

V.5. **Training.** Training for both fisherpersons and fish processors is essential. Based on past experiences and new needs, training is proposed in the following domains: (a) gear repairs and maintenance, (b) sustainable practices, (c) small-scale business management, (d) fish processing practices; and (e) organizational and financial management for CBOs. An average of two community trainers will be identified in each of the 116 beneficiary communities and given a proper formation in various domains, as needed. In consequence, the project will create a pool of 232 trainers who will be in charge of training the planned 3,643 beneficiaries (which include fishers, fish mongers and processors) in their various communities. Most of the trainees will be prepared in sustainable fishing practices. In addition, a selected group of community members will be identified and trained in boat construction, boat maintenance and repair of outboard engines. A number of fish processors and mongers will be trained in improved methods of fish processing and preservation, as well as in small scale business and marketing.

V.6. **Fishing inputs.** The project will provide fishing inputs for about 200 beneficiary fishing groups. This equipment will include nets of various mesh sizes, ropes, floats and outboard motors. The aim is to restore the working and productive capabilities of artisan fishing groups.

V.7. **Construction of fish smoking units and storage.** The project will finance, in line with past interventions, a number of smoke houses (kilns) in beneficiary communities, using skilled labour force from the communities. It is estimated to construct 116 smoke houses over a 4-year period. The design and dimensions of such smoke houses will be determined by community members and according to production levels.

V.8. **Micro-credit.** A revolving loan scheme will be set up through the Agricultural Development and Cooperative Bank (ACDB), in order to assist fisherpersons increasing their production capacities and expanding their businesses. The loan scheme will typically not exceed US\$1,500 per fishing group and US\$200 per individual fish processor. It is expected that credit will benefit 200 fishing groups and 2,000 fish processors and mongers. The criteria for selection will include: (i) group organizational strength, (ii) credible and transparent account/book keeping system, and (iii) good and consistent production levels.

V.9. **Promoting the use of larger canoes by local fishers.** About 24 people (4 persons per county) will be trained in boat building and maintenance. A consultant will be hired to conduct this specialized training. Upon completion of the training, the 24 trainers will be equipped to return to their communities and establish boat building workshops, for maintenance and further training purposes. The workshops will be managed by local fishers associations under the supervision of the Bureau of National Fisheries.

V.10. **Provision of fish storage and preservation facilities.** The project will finance fish storage and preservation facilities in strategic locations to minimize post-harvest loses and enhance hygienic levels. About 8 cold stores (6 tons) will be established in selected communities. Fisher groups will be sensitized and encouraged to carry cold boxes with ice, fitted onto their canoes, to help preserve their catch prior to landing. The cold stores will be managed by a committee of fishers and processors associations. Beneficiary communities for cold storages will be selected based on their level of production, community organizational strength, market access and location. Some 30,000 fish mongers and processors are expected to benefit.

Table 5. Summary of planned outputs under Component 1

Activities	Outputs
Selection of beneficiaries	200 groups (in 116 communities) selected
Training	232 fishers and processors prepared as community trainers; 3,643 fishers & processors receive training from peers
Fishing inputs	200 groups receive assorted inputs
Construction of fish smoking units (kilns)	116 kilns constructed
Canoe use	24 fishers trained in boat building & maintenance; 6 canoe workshops established
Storage and preservation facilities	8 mini-cold storages established

Component 2: Pilot aquaculture initiatives

V.11. The objective of this component is to bring 50 ha of swamps into aquaculture production through the provision of materials, tools, fingerlings and training. That include about 10 ha of ponds to be rehabilitated and 40 ha of new ponds to be built. In addition, 3 hatchery and a research facility will be rehabilitated. This component is expected to benefit around 1,000 inland fish-farmers in about 100 communities in the targeted counties (Lofa, Grand Gedeh and River Gee). About 6,000 people will benefit directly or indirectly, including many young people, women, ex-combatants and returnee farmers. This component is directly linked to CAADP’s Pillar 5 and complementary to Pillars 1, 3 and 4.

Table 6: Ponds proposed for rehabilitation and construction

County	Total population	Targeted beneficiaries	Rehabilitation (ha)	Development (ha)	Total (ha)
Lofa	276,347	500	7.2	17.8	25
Grand Gedeh	101,099	300	2.5	12.5	15
River Gee	63,809	200	0.6	9.4	10
Total	441,255	1,000	10.3	39.7	50

V.12. **Survey and selection of sites.** The project will conduct surveys in each county to verify swamp location, soil and water regimes, and beneficiaries’ status so to make a final selection for project implementation. The surveys will serve also to determine the magnitude of development work to be accomplished. The rehabilitation/development work is expected to involve land preparation, construction of dams and water control structures as well as fish pond bunds. The criteria to be considered for selecting new swamps for development will include soil quality, water regimes, swamp

size, land tenure, vegetation, and community engagement and organization. A total of 100 sites for around 50 ha will be selected.

V.13. ***Training of aquaculture technicians.*** There are a number of aquaculture technicians or practitioners that already received training in basic aquaculture techniques and practices under various past initiatives. These practitioners will be identified and, if interested in engaging again in aquaculture support, they will be given refresher training. These technicians, about 100 in total, will later become responsible for the training of around 20 farmers/site. In addition, a selected number of aquaculture extension officers will be trained at the onset of the project. They will be responsible for the training of field technicians under the supervision of the national consultant on aquaculture, and will coordinate and supervise field training and productive activities of fish farmers.

V.14. ***Pond rehabilitation and development.*** Fish ponds will be rehabilitated and developed using simple technologies. Gravity-fed irrigation systems will be developed to sustain annual aquaculture production. The intervention will require 3,500 man-day per ha of labour, will engage in fish farming an estimated 1,000 farmers and will benefit in employment and food terms around 6,000 people, including returnees and the youth. Fish ponds will average a size of 400m² and will be developed under a community-led approach. Pond construction will require soil excavation, movement and compaction, following specified designs. All bunds will have a minimum width of 3 meters and a minimum height of 1.3 meters. This will ensure a minimum water depth of 1 meter in the pond for stocking. Ponds will have a 1–2 % bottom slope and a bund slope of a ratio at least 1/1/1 for slope/crest/slope.

V.15. ***Provision of pond tools and materials.*** Beneficiary communities will be supplied with pond construction tools and materials, including wheelbarrows, shovels, tools for site preparation and PVC material. Fingerlings and fertilizers (on a loan basis) will also be provided for farmers' ponds when completed. Fertilizer inputs are necessary for improving primary productivity in fish ponds, which will result in increased food availability for fish growth. A semi-intensive culture system will be encouraged initially until supplementary feed is available.

V.16. ***Intensification.*** Research will be financed to facilitate the use of indigenous fish species for aquaculture and the use of local species of tilapia and catfish. Exotic species will be excluded due to the adverse environmental impacts experienced already in some rivers. There is also need to develop or adopt technologies that are cost effective and will ensure maximum benefits and profits.

V.17. ***Establishment of a feed mill.*** The project will finance a complete hammer mill with pellet mill, to be located at a centrally located area, preferably at CARI, where livestock feed (mainly fish and poultry) will be produced for distribution nationwide. Supplementary feeding is a major constraint to sustainable aquaculture development. The facility will also be used, by the research institute, for developing new feed formulae for enhancing livestock production. The facility will also provide a market outlet for maize producer, as it will constitute a major feed ingredient. The brewery waste and by-catch of the shrimp industry will also be utilized. The by-products of other agriculture sectors, such as oil cakes from palm kernel, coconut and ground nut, and rice bran will be utilized as feed ingredient. However, micronutrients and other ingredients which can not be sourced locally will have to be imported. A number of technicians will be trained to operate and maintain the mill. The mill will be self sustaining as feed produced will be sold to both poultry and fish farmers.

V.18. ***Provision of micro credit facility.*** Micro-credit facilities will be provided to farmers in cash or in inputs (fingerling, feed, fertilizer) in order to improve their production capacities. The loan program is thought to be revolving, and 100 farmer groups are expected to benefit from it. The criteria

for loan selection will include: (i) adequate level of production, (ii) consistency in farming and record, and (iii) transparent and credible record system.

Table 7: Expected outputs from Component 2

Activity	Output
Site survey and selection	100 communities (or sites) selected and an average of 12 ponds identified in each (total = 1,200 ponds)
Training of aquaculture technicians/practitioners	24 aquaculture extension officers and 100 field technicians trained
Pond rehabilitation and/or development	50 ha (around 1,200 ponds of 400 m ² each) developed
Provision of pond construction tool & material	3,000 assorted tools & materials provided to about 100 groups
Fish farmer training	1,000 fish farmers trained
Stocking of Ponds	0.5 million fingerlings stocked
Provision of fertilizer	About 30 tones of fertilizer supplied to fish farmers
Establishment of a feed mill	1 complete feed mill established

Component 3: Enhancing national capacities for sustainable fisheries

V.19. The objective of this component is to improve the institutional capacity of the BNF in order to improve its ability and efficiency to monitoring and managing the fisheries resources. This component will be implemented concurrently with the components 1 and 2. It is linked to CAADP’s Pillar 4.

V.20. **Rehabilitation of the BNF headquarters and fisheries research facilities.** The BNF office facility will be rehabilitated, equipped and provided with a biology laboratory. It will be used as the command centre of the project implementation committee, and for the monitoring, regulation and control of fishery activities. The facility will also be responsible for the coordination between fisheries research and extension, and for all fisheries related activities within the country. In addition, 3 fish hatcheries at Douyee town, Gbegbedu and Klay will be rehabilitated to ensure the adequate supply of fingerlings for the stocking of farmers’ ponds. Production and office/training facilities will be rehabilitated using youth, ex-combatants and women as personnel to provide labour. Fish transport and office equipment will be supplied to the hatcheries. The Hatcheries will be used both as farmer training centres, and for research and extension. The fisheries research facilities at CARI will be rehabilitated to initiate the development of indigenous species for culture. Required equipment and logistics, including office and laboratory equipment, data collection material, vehicles and motor bikes to support research and extension, will be acquired to enhance the BNF operation and performance.

V.21. **Research and training.** Personnel of the BNF will be selected for training in the areas of fish biology, fisheries statistics and management, fish health, monitoring and fisheries economics among others. The training will improve staff performance, build staff confidence to carry out research, and make data collection and analysis more efficient and reliable.

V.22. **Strengthening legal capacity.** A new fisheries monitoring and regulatory law will be drafted and enacted into law, thus strengthening the management capability of the BNF. The regulatory law will be circulated among the various stakeholders of the fisheries sector so as to create adequate awareness for its enforcement. A Fisheries Management Plan will also be developed in line with the GOL agricultural development policy. Adequate attention will be placed to the conflicts between the artisan and industrial sub-sectors, which often result in considerable losses of fishing gear, material and revenue by artisan fisherpersons. Liberia’s fisheries law shall ensure a reserve to artisan fisheries of 3 nautical miles zone inshore for its sole exploitation. This law will be further strengthened and enforced to protect and sustain artisan fishing activities.

V.23. **Monitoring and Regulatory System (MRS).** A Monitoring and Regulatory System will be set up, with the participation of artisan fisher groups, to monitor the activities of industrial vessels fishing in Liberian territorial waters. A team of fisherpersons will be trained and equipped with hand compasses (GPS) and communication means to monitor and report industrial vessels intruding into artisan fishing areas. In addition, fisheries’ monitoring agents will be trained and regularly assigned aboard industrial trawlers to monitor their activities while conducting some basic biological sampling and recording catch surveys. Finally, a central communication unit will be set up at the headquarters of the BNF to coordinate information and help enforcing fisheries law and regulations.

Table 8: Schedule of main activities under Component 3

Activity	Years				
	1	2	3	4	5
Rehabilitation of BNF office, aquaculture research & hatchery facilities	X	X			
Set-up Monitoring and Regulatory System (MRS)	X	X			
Provision of micro-credit		X	X	X	X
Up-grade the skills of aquaculture and fisheries technicians & staff	X	X	X	X	X
Train additional staff to M.Sc. level		X	X		
Enhancing legal capacity	X	X			
Demarcation of fishing areas	X	X			
Strengthening farmers associations		X	X	X	X
Monitoring of fisheries activity	X	X	X	X	X

Component 4: Project management

V.24. The Project Implementation Unit will be established under the auspices of the Bureau of National Fisheries (BNF). BNF was established in the Ministry of Agriculture in 1956 as a result of a legislative enactment. It is organized into four units: Statistics, Marine fisheries, Aquaculture & Inland fisheries, and Research.

V.25. For Project implementation, the following staff will be required:

- Project manager;
- Artisan fisheries specialist;
- Aquaculture specialist;
- Financial controller;
- Surveyor (specialized in soil and fringe surveys).

V.26. The project will occasionally rely on short-term technical assistance for the effective implementation of certain activities, particularly as follows:

- one expert in feed technology (3 months);
- one expert in boat building (6 months);
- one consultant mechanical Engineer, for outboard motors (1.5 months).

V.27. Project activities will be run largely by fishers’ associations. The Guinean experience using artisan fishers for monitoring and surveillance of the fishing grounds has proved effective in curbing encroachment into artisan areas by industrial vessels.

V.28. A detailed Monitoring and Evaluation Plan will be developed by the project implementation committee in collaboration with the Ministry of Agriculture and donor representatives. Closed monitoring of project activities will be continuous throughout the duration of the project. However, it is expected that there will be annual evaluation of project performance.

VI. INDICATIVE COSTS

VI.1. A preliminary costing for the project is summarized in Table 9 below.

Components	Cost (US\$)
1. Support to artisan fisheries development	2,100,000
2. Pilot aquaculture initiatives	1,100,000
3. Enhancing national capacities for sustainable fisheries	2,000,000
4. Project management	800,000
Total base costs	6,000,000
Contingencies (5%)	300,000
Total cost	6,300,000

VI.2. Detailed cost estimates for main project interventions are compiled in Table 10 below.

Item	Unit	Quantity	Unit Cost (US\$)	Total Cost (US\$)
Component 1. Support to Artisan Fisheries				
Assessment & selection of beneficiaries	days	60	60	3,600
Training of fishers & processors	sessions	1,000	200	200,000
Provision of fishing inputs		1	600,000	600,000
Construction of smoke kilns	unit	116	3,500	406,000
Training in boat building (24 trainers, including tool kits, training material, feeding, transportation)	training groups	24	1,500	36,000
Setting up of boat building & maintenance workshop	unit	6	7,000	42,000
Specialised support consultants	months	6	6,000	36,000
Provision of mini-cold storages (8 units)	unit	8	15,000	120,000
Component 2. Support to Aquaculture Development				
Site survey and selection (18 person-day per year)	person-day	90	60	5,400
Training of aquaculture technicians	training days	40	150	6,000
Pond rehabilitation & development (3,500 person-day/ha x 50ha)	person-day	175,000	2	350,000
Provision of pond construction tools & material	kit	50	3,000	150,000
Farmer equipment(boots, rain coats, tape lines)	kit	50	650	32,500
Farmer training				200,000
Pond stocking (0.5 million fingerlings)	pieces	500,000	0.1	50,000
Establishment of a feed mill	unit	1	150,000	150,000
Power saw & operation for feed mill	unit	50	2,200	110,000
Provision of Fertilizer (50 ha @ 10 bags/ha)	bag (50 kg)	500	35	17,500
Component 3. Enhancing National Capacities				
Training for technicians and extensionists of the fisheries/aquaculture sector	training events	20	15,000	300,000
Strengthening legal capacity		1	15,000	15,000
Set up a monitoring and regulatory system	system	1	250,000	250,000
Intensify fisheries and aquaculture research		1	150,000	150,000
Strengthening capacities for fishing and fish processors' associations	events	30	3,000	90,000
Rehabilitation of fisheries research facility	unit	1	75,000	75,000
Rehabilitation of hatchery facilities	unit	3	50,000	150,000

VII. PROPOSED SOURCES OF FINANCING

VII.1. The successful implementation of this project depends on the availability of finance. Due to the incapacity of the government to finance the agriculture sector at the moment, funding will be mainly sourced from donor agencies and bilateral partners that are currently engaged in supporting the agricultural sector.

VII.2. Main development agencies engaged in the agriculture sector and potential sources of financing include:

- the World Bank;
- the European Union (EU);
- the International Fund for Agriculture Development (IFAD);
- the Government of the Federal Republic of Germany;
- the United States Agency for International Development (USAID);
- the African Development Bank (ADB);
- the Government of the People’s Republic of China;
- the Swedish International Development Agency (SIDA);
- the Islamic Development Bank (IDB);
- the Danish International Development Agency (DANIDA).

VIII. PROJECT BENEFITS

VIII.1. The main benefits expected from the Project are as follows:

- increased employment for artisan fisherpersons and employees in the fisheries sector, including ex-combatants, returnees, women and youth;
- increased income and employment for women engaged in fish trade;
- improved livelihoods in coastal communities;
- pilot experiences and lessons learnt on inland aquaculture;
- increased protein availability and nutrition for the Liberian population; and
- increased national capacities to plan and monitor sustainable fisheries.

VIII.2. The main project beneficiaries would be:

- poor rural households who will have increased access to fish protein;
- employment and income for over 3,500 households engaged in artisan fishing, fish processing or working as fish mongers;
- about 1,000 fish farming families, which will have increased production yields and income sources,
- the government, with greater capacity to monitor fishing and augment revenues.

IX. IMPLEMENTATION ARRANGEMENTS

IX.1. The project would be implemented by a Project Implementation Unit (PIU), under the auspices of the BNF and the supervision of the Ministry of Agriculture. Appropriate staff would be recruited for management, technical support and financial/implementation monitoring. The PIU would develop detailed annual work plans and budgets, as well as a Monitoring and Evaluation Plan.

IX.2. The Project foresees a substantial amount of training at all levels: technical staff of the ministry and the BNF, extension workers, researchers and fisherpersons that will act as community leaders in the domain.

IX.3. The Project should envision a micro-credit scheme, or provide support to beneficiaries to access micro-credit, so that activities become sustainable and a genuine entrepreneurial spirit is widely developed in the artisan fisheries domain.

X. ISSUES AND PROPOSED ACTIONS

X.1. ***Monitoring, surveillance and enforcement.*** The monitoring of the fishing grounds, the conduct of surveillance and the enforcement of fishery regulation in the Liberian coastal waters are critical issues to ensure the sustainability of the sector and of the livelihoods of artisan fishing communities. Artisan fisherpersons are constantly losing their means of livelihood due to the growing expansion and impact of industrial vessels that interfere with their artisan fishing activity: nets and gears are destroyed, canoes are damaged, and use of illegal mesh and non-sustainable fishing practices have resulted in reduced catch by artisan fisherpersons. There is thus a serious need for a monitoring, control and surveillance system to track the activities of industrial vessels, and to enforce fisheries regulation. Component 3 of the Project aims at responding to this critical challenge.

X.2. ***Environmental dimensions.*** The environmental impact of fishing, including that of artisan fishing, will be considered throughout the project. Fishing gear to be distributed will have to comply with approved mesh regulations to avoid growth over-fishing. In the case of aquaculture, ponds will be developed in inland valley swamps that are already managed in traditional ways, and will exclude natural sites. Furthermore, the designing and implementation of aquaculture initiatives will consider water management and chemical product use, among other key environmental impacts.

X.3. ***Credit.*** Availability and access of micro-credit opportunities is critical for the continued impact of the project and to widen the livelihood and development options of fishing communities. The project should provide advocacy for micro-credit schemes that suit fishing communities, and should provide training support to beneficiaries to access and manage credits.

Annex: List of References

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