CHAPTER 4

DEVELOPMENT STRATEGIES AND PROGRAMS

Chapter 4 Development Strategies and Programs

4.1 Development Framework

4.1.1 Target Year

The economic diversification strategy of the Gabonese Government mainly involves the forestry, water and fishery sectors. The Forest, Fishery and Environment Sector Programme (PSFE), with the objective of sustainable management of the forests, fishery and environmental resources, was formulated in the year 2000 to 2004 as a framework for the assistance of various donors. Within the structure of this Programme, the DGPA has a five-year programme (2006-2010): the Programme for Support to the Fishery and Aquaculture Sector (PSPA) based on financing from the African Development Bank (AfDB). Moreover, the present Master Plan of Integrated Small-Scale Fishery and Inland Aquaculture in the Gabonese Republic (PDDI) should be finalized in March of 2009. Consequently, taking the state of progress of the PSPA and its contents into consideration, the Master Plan designs the development for a period of ten years after the execution of the PSPA (target year: 2020).

4.1.2 Development Objectives

The resolving of the development issues mentioned in the Chapter 2.2 is strongly tied to the Growth and Poverty Reduction Strategic Paper (GPRSP) and the PSFE. The table here below indicates the relation in development objectives between this Master Plan and GPRSP and PSFP.

Table 4.1 Correlation between the Development Objectives of the PDDI and the Similar Development Projects

Development Measures	Development Issues in Small-scale Fishery and Inland Aquaculture					
	Poverty of the fishers	Delay in the fishers's organization	No preparation of the management system of fishery resources	Lack of support services	Delay in preparation of infrastructure	Insufficient supply of fish products
1. DSCRP						
Promotion of growth for the poor	◎					◎
Arranging of infrastructure					◎	○
Improvement of access to public services		◎		◎		○
Improvement in the management of public affairs	○			○	○	○
2. PSFE						
Sustainable development of the forests	○					○
Sustainable development of fishery resources			◎			○
Protection of biodiversity and the broadening of the reserves			○			
Development of products and environmental services			○			
Reinforcement of the organization		○	○	◎	○	○
Development Objectives of the PDDI	i) Increase in the income level of the small-scale fishers and fish farms. ii) Stable supply of fishing products in the country and to neighbouring countries. iii) Sustainable management of fishing activities and fishing resources.					

Notes: ◎: Strong correlation with Governmental policy: ○ Correlation

The objective of the PDDI is to establish a system for the increase in overall sustainable production in the

area of small-scale fishery and inland aquaculture within ten years by the year 2020, thereby allowing for the long term to: i) increase in the income level of the small-scale fishers and fish farms, ii) stable supply of fish products not only in Gabon but also in the neighbouring countries in order to assure food security. However, in order not to fall into an excessive increase in the production in the future, iii) sustainable management of fishery activities and fishery resources is also an indispensable objective. Concrete indicators of each objective are shown here below:

i) Increase in the income level of small-scale fishers and fish farms

Reduce the percentage fish farmers living below the poverty line (29,000 Cfa francs per person per month) before the year 2020. Considering one of the Millennium Objectives for Development "reduce by half the poverty rate before the year 2015", the actual reduction targets are set as follows:

- Coastal fishery: 50.1% to > less than 25%
- Lagoon fishery: 49.4% to > less than 25%
- Inland fishery (throughout the territory): 63% to > less than 30%

ii) Stable supply of fishery products in the country and to the neighbouring countries in order to guarantee food security

Increase fish production by around 5,000 tons in order to meet the demand of domestic fish products by the year 2020. Moreover, increase production by about 10,000 tons in order to meet export demand for neighbouring countries. (Target values are set at the lower limits of anticipated demand of fish products (volume of fish consumed per year per person = 20 kg, total replacement of fish product imports)).

iii) Sustainable management of fishery activities and fishery resources

The objectives to be reached by the year 2020 shall be as follows:

- Establish a shared system of surveillance of the three nautical miles off the coast (joint surveillance system of the government and the inhabitants);
- Establish an autonomous management system by each fishers' association for local fishery activities (at least two sites);
- Establish regulations for fishing methods and fishing equipment in the inland fishing zones.

4.2 Development Strategies

As shown in the Chapter 2.2, the development objectives of this Master Plan have three pillars, namely, i) sustainable utilization of fishery activities and resources, ii) Improvement of income levels of small-scale fishers and aquaculture farmers, and iii) stable supply of fishery products not only to Gabon but also to neighboring countries based on the Food Security. Gabon has rich fishery resources, but those are under-developed, because of its small population and insufficient government support services. Furthermore, Gabon is a natural and mining resources-based country, but the majority of farmers/fishers are spending the life under poverty line resulting in the large difference of income levels by regions. In consideration of these characteristics of Gabon, the following three main strategies to meet and attain each development objectives mentioned above were set forth:

[Strategy-1] Sustainable management of fishery resources and strengthening of conservation system for resources and habitats (Strategy for the sustainable utilization of fishery activities and resources)

A sustainable management system for fishery activities and fishery resources shall be built, so as to ensure the sustainable use of the resources. Although there remain abundant fishery resources in Gabon, the human resources for their development and use are limited (small population with low technical training level). Until the present, the use of the resources has been done based on a free access principle, but since the population is very small in the present situation, there has been no visible damage to resources. However, in addition to the frequent illegal fishing of industrial fishing boats in the coastal zone, illegal fishing

equipment is also used in small-scale fishery, and the influence upon the resources should be feared in the future. Through the installation and management of artificial reefs in the coastal waters, the coastal fishing grounds for artisanal fishery will be protected and conserved. Moreover, in order to fulfil the role as fishery product provider not only for the domestic market in Gabon for achieving self-sufficiency in fishery food production but also for Central Africa, through the training of Gabonese fishers (inland fishery), in case of need, it is possible to increase the production by a joint development with the foreign fishers or with neighbouring countries (ocean fishery). Whereas the pressure for such development is being reinforced, we must without further delay establish and set up a management system (framework) adapted to the sustainable use of the resources.

[Strategy-2] Strengthening of organizational and legal flames and capacities of fishery-related personnel (Strategy for improvement of income levels of small-scale fishers and aquaculture farmers)

2-1 Establish small-scale fishery and aquaculture in all zones by supplying support services centred upon the fishery community centres and aquaculture stations

Gabon has a small population, 70% of which is concentrated in the surroundings of the capital Libreville. Consequently, in the rural zones, small-sized villages are scattered here and there and the inhabitants who can cover their food self-sufficiency by hunting and collection activities have a tendency to lose their interest in development. For this reason, there are hardly any development activities being carried out in the villages or local organizations, and when the organizations try to develop activities, we can observe the lack of experience and appropriate adaptation. Within this context, the development of fishery shall first of all be developed under the guidance of the Government and centred on the community fishery centres and fish farm stations, and the collective activities shall be encouraged little by little through various actions.

2-2 Upgrade the production capacities and administrative capacities of those engaging in fishery-aquaculture related field, through the strengthening of education, training and extension services.

The leaders and technical staff within the fishery administration will be trained, so as to establish the appropriate staffing and budgetary systems and to provide the producers (fishers, aquaculture farmers) with support services (technical guidance, financial assistance, etc.). In addition, the logistic and communication system among regional fisheries offices and fishery surveillance stations will be improved, so as to fulfill the extension service to agricultural and fishing villages.

[Strategy-3] Increase and diversification of national production and improvement of valorization of fishery products (Strategy for stable supply of fishery products)

3-1 Promote the development of unexploited resources through improved fishing techniques and aquaculture.

Although Gabon has ample resources, since it exports only raw materials, and depends upon imports for manufactured products, prices are high, especially the cost of energy. For this reason, production costs such as the cost of fuel and materials have gone up dramatically, and in many cases, development plans for producing domestic products have become unprofitable and abandoned. Within this context, for fishery development in the future, it will be necessary to reduce costs and improve efficiency. It will be necessary to utilize unexploited resources, and do so at a lower cost. We will also have to reinforce technical development to reduce the waste in production costs in aquaculture. For example, introduce durable diesel engines which last much longer and use cheaper fuel compared to the gasoline engines. We will also have to set up fixed nets which require small cost for operatoion, and develop ecological fish farms that do not use expensive fish feed.

3-2 Improve the quality of fishery products by setting up the infrastructure for fish distribution and by developing fish processing technology.

Gabon has abundant fishery resources, but the distribution infrastructures for fresh and frozen fish are not well established at the production place. Fish which could be sold at higher prices if it were distributed as fresh fish are processed into dried or smoked fish which fetch lower prices at the markets, thereby bearing

financial losses. In addition, since access to the consumer markets is difficult, the cost of transportation has gone up dramatically. Distribution infrastructure in the main production centres must be upgraded, and transportation of fishery products to the main consumer places such as Libreville should be done at a low cost. In addition, processing methods and techniques of fish caught in large quantities must be developed to promote the value addition (valorisation) of fishery resources.

4.3 Development Programs and Priority Projects

4.3.1 Basic Orientation for the Formulation of Development Programs

The basic orientation for the formulation of development programs here below has been defined by taking into consideration the particularities of Gabon (small population, limited human resources, limited industries and markets) and contents and scope which shall not present a heavy burden for the DGPA – the responsible executing agency.

(1) For the application of the programs, the increase in the DGPA personnel shall not be a premise, and we shall depend rather upon capacity building of the present employees and their rational assignment. Various adjustments shall be made so that the activities of the personnel of the provincial inspection office do not overlap with the departmental and provincial levels, at the same time that we shall encourage decentralisation.

(2) The functions of the community centres for the small-scale fishers and the aquaculture stations shall be reinforced as bases for technical development, technical mentorship and teaching extension activities. However, the production facilities in the area of ice making, freezing, processing, distribution, machine repairs, production of aquaculture fingerlings, shall gradually be transferred to the private sector (privatization) and managed on the basis of financial autonomy.

(3) The inter-regional collaboration shall be encouraged for the capacity building of the concerned agents, as well as for technical research and development by using as much as possible concerned existing establishments, human resources and former results of neighbouring African countries.

(4) For production projects aiming to exploit the fishing resources and increase food production, private investments shall be actively sought and collaboration requested.

4.3.2 Composition of Development Programs

Based on the above-mentioned strategies, the following priority programs are formulated. Each program is composed with the several identified projects (components).

[Strategy-1] Sustainable management of fishery resources and Strengthening of conservation system for resources and habitats

It is necessary to take, at the same time, not only the scientific approach such as related research and development (R & D) and fishery data collection and analysis, but also the socio-economic approach such as participatory resources management and diversification of income sources, so as to promote sustainable fishery resources management and environmental conservation. In this context, the following three programs are set forth:

Program-1: Fishery and aquaculture research

The fishery research includes collection and analysis of the basic data necessary for evaluating the appropriateness of sustainable resources management and environmental conservation. The aquaculture research includes experiments on appropriate culture species, feeds and culture methods as well as the development of technologies useful for improvement of aquaculture farm management. The research on

fish processing includes the experiments and product development of new fishery value-added products so as to promote the participation of medium and small-scale enterprises. The program is comprised of the following 7 components:

1-1. Evaluation of fishery resources
1-2. Strengthening of fishery research methods
1-3. Setting-up of fishing grounds information system
1-4. Identification of appropriate aquaculture target species
1-5. Environmental impact assessment
1-6. Development of fish processing technology
1-7. Construction of Central-West African Fishery Research Center (both marine and inland)

Program-2: Participatory improvement of fishing grounds

This program is aimed to conduct by participatory method (collaborative work between fishers and administration), 1) collection and analysis of basic data (fish body length and weight, fish catch, fishing efforts, etc.), 2) drafting and formulation of concrete measures for resources management, and 3) surveillance of coastal fishing grounds. Furthermore, the alternative livelihood activities will be also conducted to disperse the fishing efforts on specific species and areas. The program is comprised of the following 4 components:

2-1. Planning for improvement of fishing grounds and utilization of resources
2-2. Participatory resources management
2-3. Fishery and aquaculture development in the secondary production zones
2-4. Mariculture Development

Program-3: Improvement of national fisheries statistics

In parallel with the construction of fish landing centers, this program is aimed to increase the number of data collecting points and to improve the collecting methods and accuracy, that are the basic requirements for fishery statistics. By doing so, the division responsible for data collection analysis will be refreshed and its staff's capacity will be improved. The program is comprised of the following 2 components:

3-1. Setting-up of statistic data collection and analysis system
3-2. Reeducation and strengthening of respective organizations

[Strategy-2] Strengthening of legal and institutional flames and capacities of fishery-related personnel

About 3/4 of total fish production are gained by small-scale fishers. While the most of fishes caught by industrial fishery are for export use, small-scale fishery and aquaculture take the important roles in terms of fish supply to national people. In this aspect, it is necessary to support small-scale fishery and aquaculture in stabilization and effectuation of the production activities, through the improvement of related infrastructure, capacity building of technical personnel, strengthening of technical and financial supports, and raising of production incentives by lawful and institutional reform. To realize this matter, the following four programs are set forth:

Program-4: Establishment of fishery and aquaculture related infrastructures

The fishery and aquaculture related infrastructures are improved in order to support small-scale fishers, fish buyers and inland aquaculture farmers in their production activities. The program is comprised of the following 3 components:

4-1. Construction of small-scale fishery support centers
(CCPAP, CCPAL, CAPAL, CMPA, fishery products quality and sanitary inspection center, etc.)
4-2. Construction of aquaculture centers/stations (under PSPA)
4-3. Improvement of fish landing facilities (under PSPA)

Program-5: Capacity building of fishery-related personnel

In both marine and inland fisheries, necessary inputs (technical extension services, credits, social environment, etc) are provided to small-scale fishers, aquaculture farmers and fish distributors/processors. The program is comprised of the following 3 components:

5-1. Setting-up of sustainable fishery financing mechanism and commercialization
5-2. Institutional training and strengthening
5-3. Improved access to public services in social education and sanitation

Program-6: Capacity building of fishery and aquaculture administration

Aiming at sustainable management and utilization of rich fishery resources and improvement of support services to fishery related persons, the DGPA, administration and supervising agency for fishery and aquaculture, is strengthened in its functions and its personnel are upgraded in their capacity. The program is comprised of the following 3 components:

6-1. Building of decentralized administration structures
6-2. Creation, reeducation and training of technical staff
6-3. Institutional Restructuring
(Setting-up of fishing ground improvement and fisheries research department)

Program-7: Legal Institutional Reform

For execution and observance of the present Fisheries Act, the rules and regulations to be accompanied thereto are formulated and the existing regulations are reviewed and revised in consideration of local characteristics. The program is comprised of the following 2 components:

7-1. Elaboration of rules and regulations to execute the Fisheries Act
7-2. Revision of existing regulations

[Strategy-3] Increase and diversification of national fish production and improvement of valorization of fishery products

In Gabon where the fishery resources still remain underdeveloped, it is possible to increase the fishery production through sustainable development and utilization of those resources. The following two programs are set forth, in order to ensure the increase and diversification of fishery products on sustainable levels both in economic and scientific aspects and to effectively utilize those resources by valorization of the products, taking into consideration of food security in Gabon and its neighboring countries.

Program-8: Increase and diversification of production

For stable supply of fishery products to Gabonese and the people in neighboring countries, the fishery resources within Gaban are exploited and utilized on sustainable manner, aiming at increase and diversification of production. The program is comprised of the following 3 components:

8-1. Development of coastal small-scale fishery (motorization with inboard engines and semi-industrialization for both pelagic and demersal fisheries)
8-2. Diversification of production techniques (fixed net fishery, etc.)
8-3. Increase of aquaculture production and its diversification (freshwater fish culture in net cage, etc.)

Program-9: Increase of value-addition to fishery products

The developments in fish processing and fresh fish distribution system are promoted and the quality and hygienic standards for fishery products are improved in order to supply the hygienic and various fishery products to meet the consumer's demand. By doing so, it is expected to improve the income of fishing villages and villagers. The program is comprised of the following 4 components:

9-1. Promotion of fish processing
9-2. Improvement of fish distribution network and diversification of markets
9-3. Setting forth of hygienic standards for fishery products on international level
9-4. Movement of "One Village, one product"

4.3.3 Implementation Schedule of Programs

The implementation schedule of each program is planned as shown in the following table.

Table 4.2 Implementation Schedule of Development Programs

Strategy	Programs	Components	Calendar Years											
			09	10	11	12	13	14	15	16	17	18	19	20
Sustainable management of fishery resources and Strengthening of conservation system for resources and habitats	Fishery and aquaculture research	Evaluation of fishery resources				■	■	■	■	■	■	■	■	■
		Strengthening of fishery research methods	■	■	■									
		Fishing grounds information system				■	■	■	■	■	■	■	■	■
		Acclimatization of aquaculture target species	■	■	■	■	■							
		Environmental impact assessment				■	■	■	■	■	■	■	■	■
		Development of fish processing technology	■	■	■									
		Construction of Central-West African Fishery Research								■	■	■	■	■
	Participatory Improvement of Fishing Grounds	Planning for improvement of fishing grounds and utilization of resources			■	■	■							
		Participatory resources management			■	■	■							
		Fishery and aquaculture development in the secondary production zones								■	■	■	■	■
		Development of mariculture			■	■	■	■	■					
	Improvement of national fisheries statistics	Statistic data collection and analysis system	■	■	■	■	■	■	■	■	■	■		
		Refreshing and strengthening of respective organization	■	■	■	■	■	■	■	■	■	■	■	■
Strengthening of organizational and legal flames and capacities of fishery-related personnel	Establishment of fishery and aquaculture related infrastructures	Construction of small-scale fishery support centers	■	■	■	■	■							
		Construction of aquaculture centers/stations	■	■	■									
		Improvement of fish landing facilities	■	■	■	■								
	Capacity building of fishery-related personnel	Sustainable fishery financing mechanism and commercialization	■	■	■	■	■	■	■	■	■	■		
		Training and strengthening of organizations	■	■	■	■	■	■	■	■	■	■	■	■
		Development of social education, sanitation, and access to public services			■	■	■	■	■	■				
	Capacity building of fishery and aquaculture administration	Building of structures for decentralized administration	■	■	■	■	■	■	■	■	■	■	■	■
		Skill-up, reeducation and training of technical staff	■	■	■	■	■	■	■	■	■	■	■	■
		Restructuring of organization						■	■	■	■	■	■	■
	Strengthening of rules and regulations	Formulation of rules and regulations to Fisheries Act	■	■	■	■	■							
		Revision of existing regulations	■	■	■	■	■							
Increase and diversification of national production and improvement of valorization of fishery products	Increase and diversification of production	Development of coastal small-scale fishery			■	■		■	■	■	■			
		Diversification of production techniques			■	■	■		■	■	■			
		Increase of aquaculture production and its diversification			■	■	■	■	■					
	Increase of value-add to fishery products	Promotion of fish processing			■	■	■	■	■	■	■	■	■	■
		Improvement of fish distribution network and markets diversification			■	■	■							
		Hygienic standards for fishery products on international level			■	■	■							
		Movement of “One Village, one product”								■	■	■	■	■

4.3.4 Formulation of Priority Projects

To most effectively implement the above programs, one or several projects (components) are packaged into priority projects as shown in the following table. Although there is some components remained not being selected as priority project, these components are also deemed as the important and indispensable factors for achieving the targets of Master Plan.

In the field of small-scale fishery and inland aquaculture of Gabon, some relevant projects such as PSPA, OFCF and PASA are currently under implementation, so that it is important to consider the linkage with these on-going projects and then to show the urgently required and executable projects. Therefore, in this Master Plan, it is presented in the form of priority projects composed by several components identified in each development program, so as to implement at the earliest time.

The details of each priority project are shown in the Chapter 4.4.

Table 4.3 Composition of Priority Projects

Strategy	Programs	Components	Priority Projects													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sustainable management of fishery resources and Strengthening of conservation system for resources and habitats	Fishery and aquaculture research	Evaluation of fishery resources							①							
		Strengthening of fishery research methods									① ② ③					
		Fishing grounds information system					②			①						
		Acclimatization of aquaculture target species									①					
		Environmental impact assessment														
		Development of fish processing technology													① ②	
		Construction of Central-West African Fishery Research														
	Participatory Improvement of Fishing Grounds	Planning for improvement of fishing grounds and utilization of resources					②			②						
		Participatory resources management							③							
		Fishery and aquaculture development in the secondary production zones			② ⑤											
		Development of mariculture									④					
	Improvement of national fisheries statistics	Statistic data collection and analysis system	① ②						①					①		
		Refreshing and strengthening of respective organization														②
Strengthening of organizational and legal flames and capacities of fishery-related personnel	Establishment of fishery and aquaculture related infrastructures	Construction of small-scale fishery support centers												①	③	②
		Construction of aquaculture centers/stations									① ② ③	①	① ②			
		Improvement of fish landing facilities												①		
	Capacity building of fishery-related personnel	Sustainable fishery financing mechanism and commercialization	① ②	②					②							
		Training and strengthening of organizations		①	① ③ ④							② ③	① ②			②
		Development of social education, sanitation, and access to public services						① ② ③								
	Capacity building of fishery and aquaculture administration	Building of structures for decentralized administration														③
		Skill-up, reeducation and training of technical staff														① ②
		Restructuring of organization														

	Strengthening of rules and regulations	Formulation of rules and regulations to Fisheries Act							③	①						
		Revision of existing regulations							③	①						
Increase and diversification of national production and improvement of valorization of fishery products	Increase and diversification of production	Development of coastal small-scale fishery					① ②									
		Diversification of production techniques				①			②							
		Increase of aquaculture production and its diversification										② ③	① ②			
	Increase of value-add to fishery products	Promotion of fish processing													① ②	
		Improvement of fish distribution network and markets diversification		③										③		
		Hygienic standards for fishery products on international level												②	③	
		Movement of "One Village, one product"			⑥											

Priority projects: (1) Financing of Small-scale Fishery, (2) Strengthening of Fisher's Organisations, (3) Diverification of Income Sources, (4) Development of Set-Net Fishing, (5) Modernisation of Fishing Boats, (6) Improvement of Fishing Village Environment, (7) Participative Management of Fishery Resources, (8) Management of Coastal Fishing Ground, (9) Development of Aquaculture Technique, (10) Improvement of Capacities of Fry / Fingerling Production, (11) Aquaculture Extension, (12) Improvement of Fresh Fish Distribution System, (13) Valorisation and Improvement of the Quality of Fishery Products, (14) Capacity Building of Fisheries-Related Organizations
The numbers indicated in the above-table are linked to the component numbers indicated in the Figure 2.4.

4.3.5 Correlation with the results of the Pilot Projects

The fourteen development projects created in Chapter 2 are correlated with the results and lessons drawn from the pilot projects carried out as indicated in the table here below. They are considered to be pertinent in terms of the priority projects proposed in the Master Plan.

Table 4.4 Correlation between the priority projects and the pilot projects carried out

Priority Projects	Correlation with the results of the pilot projects
(1) Project for Financing of Small-scale Fishery	◎ (MC)
(2) Project for Strengthening of Fisher's Organisations	○ (MC)
(3) Project for Diverification of Income Sources	○ (MC/GR)
(4) Project for Development of Set-Net Fishing	◎ (FF)
(5) Project for Modernisation of Fishing Boats	◎ (PD)
(6) Project for Improvement of Fishing Village Environment	△
(7) Project for Participative Management of Fishery Resources	◎ (GR)
(8) Project for Management of Coastal Fishing Ground	○ (GR)
(9) Project for Development of Aquaculture Technique	○ (PI/PC)
(10) Project for Improvement of Capacities of Fry / Fingerling Production	○ (PI)
(11) Project for Aquaculture Extension	◎ (PI/PC)
(12) Project for Improvement of Fresh Fish Distribution System	△
(13) Project for Valorisation and Improvement of the Quality of Fishery Products	◎ (VS)
(14) Project for Capacity Building of Fisheries-Related Organizations	△

(Observations)

◎ : Project which will develop and extend the activities realised in the pilot projects

○ : Project which shall be carried out based on the results and lessons drawn from the pilot projects

△ : Project which is not directly related to the pilot projects, but which will contribute to the training of human resources or organisation of the facilities.

Abbreviations (FF : project introducing Set-net Fishing, PD : Development Project for coastal fishing, MC : Micro-Credit project, PI : project for Integrated Fish Farming, PC : Fish Farming project using Cages, VS : project for the Valorisation of Sans-nom, GR : project for Participative Management of fishing resources)

4.3.6 Correlation with Approaches for Development

The correlation between the approaches of development problems and the priority projects is indicated in the table here below.

Table 4.5 Correlation between the priority projects and approaches for development

Priority Projects \ Approaches for Development	Increase in the income of farmers-fishers			Training –Reinforcing of Fisher's Organisations		Establishment of a fishing resources management system			Improvement in the System of support services				Stable Supply of fishing products		
	i) Promotion of an integrated agricultural management	ii) Improvement in the awareness of farms for exploitation	iii) Extension of inexpensive production techniques	i) Promotion of organisation	ii) Organisation and management of the facilities for the fishers's	i) Joint Surveillance System of the 3-mile coastal zone	ii) Autonomous Limitation of fishing activities by the fishers	iii) Supplying of replacement income sources by the government	i) Management and use of micro-credit	ii) Review of the system of small-scale fishing and fish farming	iii) Establishment of an effective extension system of techniques	iv) Technical Development and reinforcing of young fish	i) Promotion of the enlarging of the fisheries	ii) Supply of inexpensive seafood products	iii) Promotion of role of private sector
(1) Project for Financing of Small-scale Fishery		○		○					○						
(2) Project for Strengthening of Fisher's Organisations		○		○											
(3) Project for Diverification of Income Sources	○	○		○	○			○	○						
(4) Project for Development of Set-Net Fishing			○							○					
(5) Project for Modernisation of Fishing Boats			○							○			○		○
(6) Project for Improvement of Fishing Village Environment					○										
(7) Project for Participative Management of Fishery Resources	○	○		○			○	○	○				○		
(8) Project for Management of Coastal Fishing Ground						○	○			○			○		
(9) Project for Development of Aquaculture Technique												○			
(10) Project for Improvement of Capacities of Fry / Fingerling Production												○			
(11) Project for Aquaculture Extension	○		○						○		○				
(12) Project for Improvement of Fresh Fish Distribution System					○									○	○
(13) Project for Valorisation and Improvement of the Quality of Fishery Products												○		○	○
(14) Project for Capacity Building of Fisheries-Related Organizations											○				

4.3.7 Priority Provinces for the Application of the Projects

Here are the priority provinces to carry out each priority project.

Table 4.6 Priority provinces and cities

Priority provinces and cities / Priority Projects	Integrated development zone		Coastal Fisheries Development Zone		Inland Fishery Development Zone		Inland Aquaculture Development Zone			
	Libreville	Estuaire	Ogooué-Maritime	Nyanga	Moyen-Ogooué	Ogooué-Ivindo	Woleu-Ntem	Ogooué-Lolo	Haut-Ogooué	Ngounie
(1) Project for Financing of Small-scale Fishery		◎	◎	◎	◎	○	◎	○	○	○
(2) Project for Strengthening of Fisher's Organisations		◎	◎	◎	◎	○	◎	○	○	○
(3) Project for Diverification of Income Sources		○	◎	○	◎	○	◎	○	○	○
(4) Project for Development of Set-Net Fishing		◎	◎							
(5) Project for Modernisation of Fishing Boats		◎	◎	◎						
(6) Project for Improvement of Fishing Village Environment		○	○	○	○					
(7) Project for Participative Management of Fishery Resources		◎	◎	◎	◎					
(8) Project for Management of Coastal Fishing Ground		◎	◎	◎						
(9) Project for Development of Aquaculture Technique	◎	○		○						
(10) Project for Improvement of Capacities of Fry / Fingerling Production		○		◎			◎	◎		○
(11) Project for Aquaculture Extension				◎	◎	◎	◎	◎		○
(12) Project for Improvement of Fresh Fish Distribution System	◎	◎	◎	◎	◎	◎				
(13) Project for Valorisation and Improvement of the Quality of Fishery Products	◎				◎					
(14) Project for Capacity Building of Fisheries-Related Organizations	◎	○	○	○	○	○	○	○	○	○

◎: Core area, ○: Target areas, : Focused production area

4.4 Contents of Priority Projects

4.4.1. Project for Financing of Small-scale Fishery

1. Outline of the Project

(1) Abstract

Small-scale fishers have difficulties receiving loans from banks, because they don't have enough assets. When they buy fishing gears or equipments, they have to borrow funds from their relatives / friends, neighbors, or middlemen. Because their relatives / friends don't have enough funds on hands as well, most small-scale fishers always have difficulties collecting sufficient money to buy fishing gears and equipments. Although small-scale fishers can get loans from middlemen who regularly purchase their captured fishes, they have to repay at high interest or with high commission. They can purchase new fishing gears and equipments by those loans; however, it is difficult to earn enough profits for their lives.

In order to improve the financial situation, it is dispensable to establish a fisheries financial system, which supports small-scale fishers who need a large sum of money. As a fisheries financial system targeting small-scale fishers, it is necessary to establish two type loan schemes; 'Micro-credit' which mainly supports the purchase of fishing gears, and 'Long-term Loan' which supports the purchase of high-priced equipments, such as FRP boats and out-board engines. 'Fund Management Committees' composed of DGPA officials and local fishers representatives take in charge of managing those financial systems.

(2) Target Areas

All areas of Gabon are targeted in the project. In order to raise the development effect of the project, the following provinces and districts where fishery sector is a main income source should be prioritized to implement the project.

- Coastal fishery: Estuaire, Ogooue-Maritime, Nyanga (Mayumba)
- Lagoon fishery: Ogooue-Maritime, Nyanga (Haute-Banio)
- Inland fishery: Moyen-Ogooue, Woleu-Ntem

(3) Target Groups

The target groups of the project are groups or families of small-scale fishers, who have difficulty making loans with banks. Mainly, Gabonese fishers engaging in lagoon / inland fisheries are targeted. Foreign fishers engaging in coastal fisheries are also added in the target group. 100 groups will be selected as target groups all around the country. One group should be composed of more than 2 to 3 local fishers. It is preferable that about 5 fishers compose one group.

Referring criteria below, it is desirable that active fishing communities are selected as the project site;

- The fishers' groups and associations have existed as management organization for financial project;
- The fishers have started some fisheries activities jointly, such as joint sale and purchase, fish processing, and etc.
- The fishers can transport and sell captured / processed fish to consumption areas (their village is near a town, they have a transport means such as a boat, and etc.)

Moreover, the fishers groups, who will receive credit in project sites, should satisfy the following conditions to confirm their credibility;

- The persons who have been registered as fishers to DGPA,
- The persons who are full-time fishers (they have mainly earned their incomes from fishing activities)

(4) Period
12 years from 2009

2. Objectives and Relevance

A. Micro-credit

(1) Objective

The micro-credit system is established as a support program to small-scale fishers, and the credit funds are properly managed to purchase necessary gears and equipments for their fishing activities.

(2) Relevance

Because there is not a credit system to support small-scale fishers, it causes a serious problem that fishers cannot prepare sufficient fund to purchase new fishing gears and equipments. In order to engage in fishing activity continuously in rural areas, the smooth procurement and renewal of fishing gears are necessary. Therefore, the micro-credit system will be established for small-scale fishers as a support program implemented by DGPA.

(3) Outcome to be achieved

- Fishers' groups are formed for managing micro-credit in 100 communities,
- Fishers' groups repay the credit by a regulated period at over 90 %,
- Fishers' groups can record and calculate their daily fishing production.

B. Long-term loan

(1) Objective

The fishers' groups, which is organized for sustaining the micro-credit system, can earn enough profit from joint activities such as joint sale, joint purchase, fish processing, and etc..

(2) Relevance

Because fishers usually transport captured fish, make processing products and purchase fishing gears individually or in family, their economic and labor burdens are quite large. The income generation activities in fishing communities are strongly dependent on voluntary effort of particular leaders; so, these activities are often stopped after the leaders have left the communities. The micro-credit can support the fishers' purchase of materials of fishing gears; but it cannot support the purchase of high-valued equipments, such as FRP bouts, out-board engines, and processing machines. In order to improve fishers' incomes and activities in rural areas, the capacity of fishers' groups organized by the micro-credit program should be more strengthened. Therefore, the financial and technical support is essential for fishers' groups to make / manage their joint activities of income generation by themselves.

(3) Outcome to be achieved

- Fishers' groups / associations start their joint activities for income generation in 100 communities,
- Fishers' groups / associations can hire one young full-time staff by income generation by their joint activities,
- Fishers' groups / association can save a part of the profit of their joint activities as social funds for their communities.

3. Project Contents and Activities

(1) Micro-credit

At the first stage, DGPA procures / provides fishing gear's materials for fishers' groups and the fishers' groups return the purchase cost of the materials to DGPA. Unfortunately, most fishers have not experienced to receive and manage credit yet. For that reason, if the credit is offered to fishers in cash, it possibly happens that they spend it for other purposes. If fishers have properly understood the credit system and reimbursement rule on their experience, the fishers' groups will receive the credit in cash, and purchase their fishing materials by themselves.

The fishers' groups, which hope to receive credits, have to prepare their members list and material list, and obtain quotations of their material cost from local stores or dealers. After the fishers' groups submit those

documents to DGPA, DGPA checks the financial credibility of each of them, and estimates the proper amount of credit. In micro-credit, it is too difficult to request local fishers to prepare their securities. Therefore, it is important to verify the condition of each fisher's group carefully for the smooth repayment. If necessary, DGPA officials should visit fishers' groups to discuss their smooth repayment.

It is better that the amount of credit should be corresponded with the number of fishers in each group. According to the characteristics of micro-credit, the amount of monthly repayment should be less than one thirds (1/3) of a monthly fisheries income. Moreover, total amount of credit should be set up, so as to be repaid completely within 6 to 12 months, to revolve the credit smoothly at high rate and reduce repayment burden of fishers' groups.

After purchasing the fishing gear's materials such as nets, ropes, floaters, sinkers, the fishers need a certain time to assemble their fishing gears. In the assembling period, fishers cannot utilize these fishing materials for their fishing activities. So, the preparatory period of fishing gears is considered as a grace period for credit repayment and isn't counted in their repayment period. The necessary dates of this preparatory period should be decided with discussion with fishers' groups. According to the size of prepared fishing gears, the suitable length of dates should be properly decided, for example, 30 – 45 days for coastal fisheries, and 15 – 20 days for inland / lagoon fisheries.

For fishers can repay a credit to the DGPA offices and Fisheries Center every month without any serious delays, they have to understand their revenues and expenditures of fishing activities by themselves. Therefore, in addition to the establishment of credit service, the DGPA provincial / inspection offices should introduce the recording of daily fishing activities and management, such as fishing effort, fish catch quantity, revenues and expenditures, etc. In each project area, the DGPA should open an account at a bank or a postal office to save / maintain the repaid money from fishers. Any money cannot be withdrawn from the account without all permissions / signatures of a DGPA director in charge of loan schemes, a chief officer of the DGPA provincial office or inspection office, and representatives of fishers' groups.

In the case that fishers' groups smoothly repay / revolve their credit funds at higher rate in a certain villages and areas, a 'Community Fund Management Committee' is established to revolve / maintain their micro-credit funds in each village or area. Under the supervision of DGPA provincial office and inspection office, fishers' representatives take responsibility to manage the fund for them. On the contrary, in the areas where it is too difficult to repay / revolve credit funds, the 'Central Fund Management Committee' placed in the DGPA main office should recover all credited money from fishers in those areas, and stop introducing any other funds for those areas. All recovered funds will be utilized as initial fund for other project areas.

For fishers' groups effectively operate their credit funds, it is important to procure / purchase fishing gears and equipments at proper prices and distribution routes. However, in remote rural areas, it is too difficult for fishers to procure fishing gears by themselves, because their villages are so far from towns and there is not any dealer and store which sell fishing gears. To solve those procurement difficulties, the DGPA has to make effort to establish proper procurement routes for each remote area, by supporting to order fishing gears to the stores located in the capital city, and promoting to sell them in remote areas with cooperation of local stores.

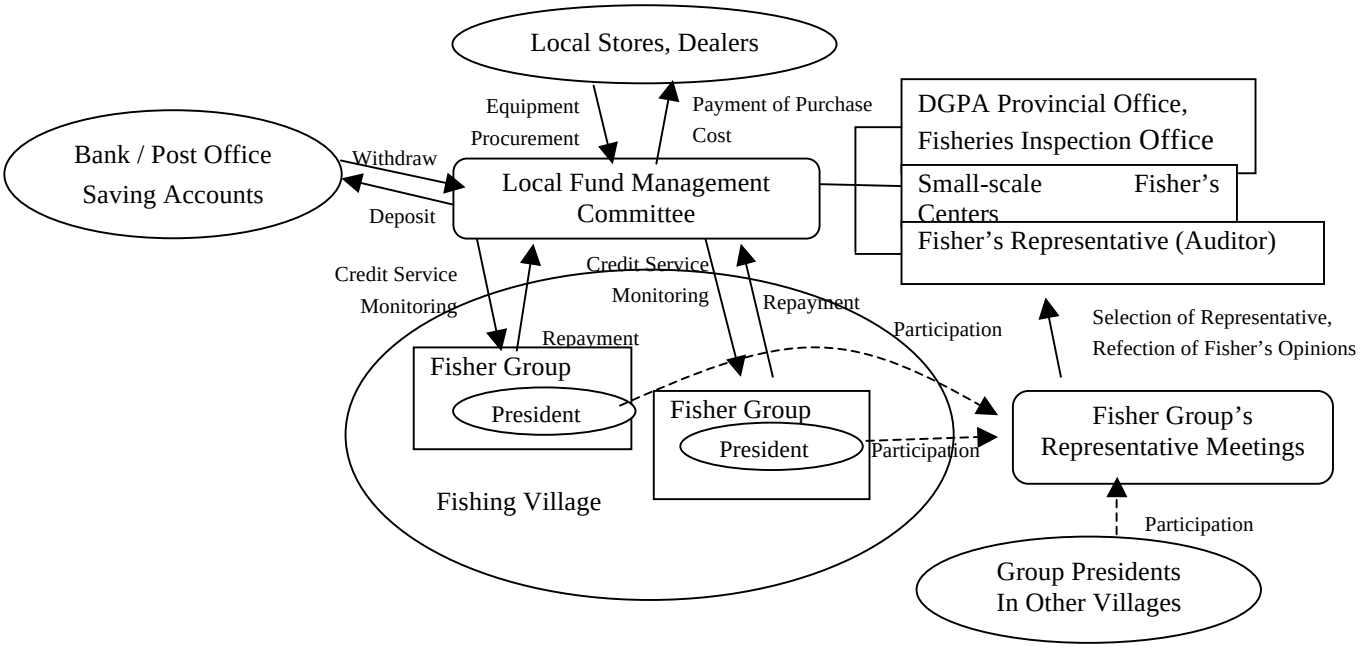

Figure 4.1 Management structure of micro-credit program
(In the case that a local fund management committee coordinates fishing villages in district and province)

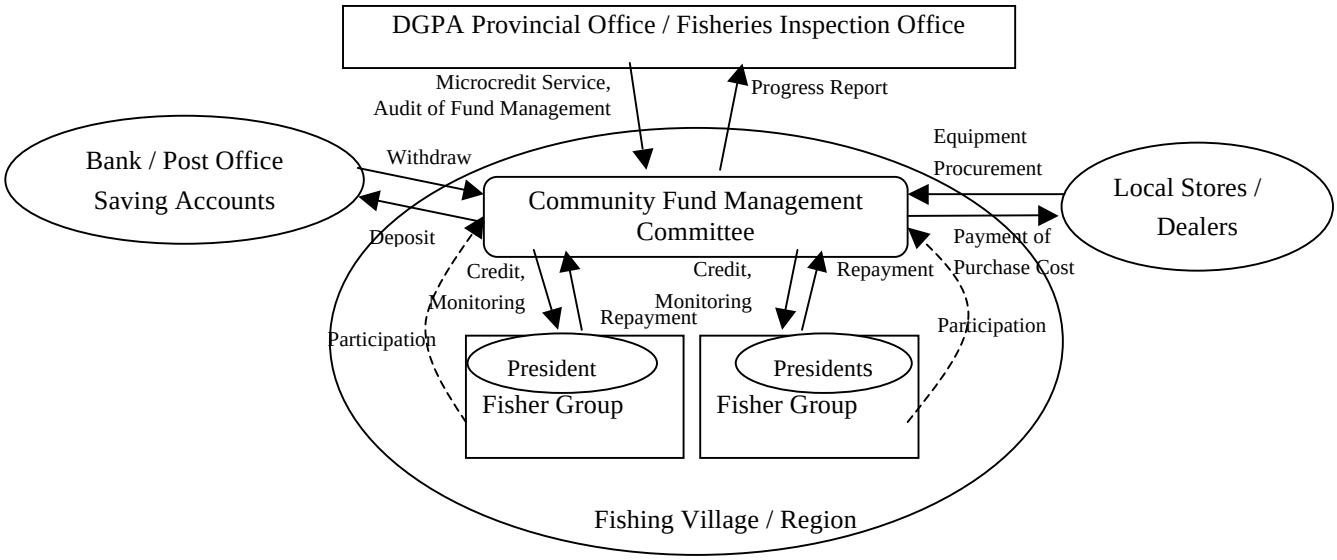

Figure 4.2 Management structure of micro-credit program
(In the case that fishers in villages and regions (district, ward) voluntarily conduct fund management)

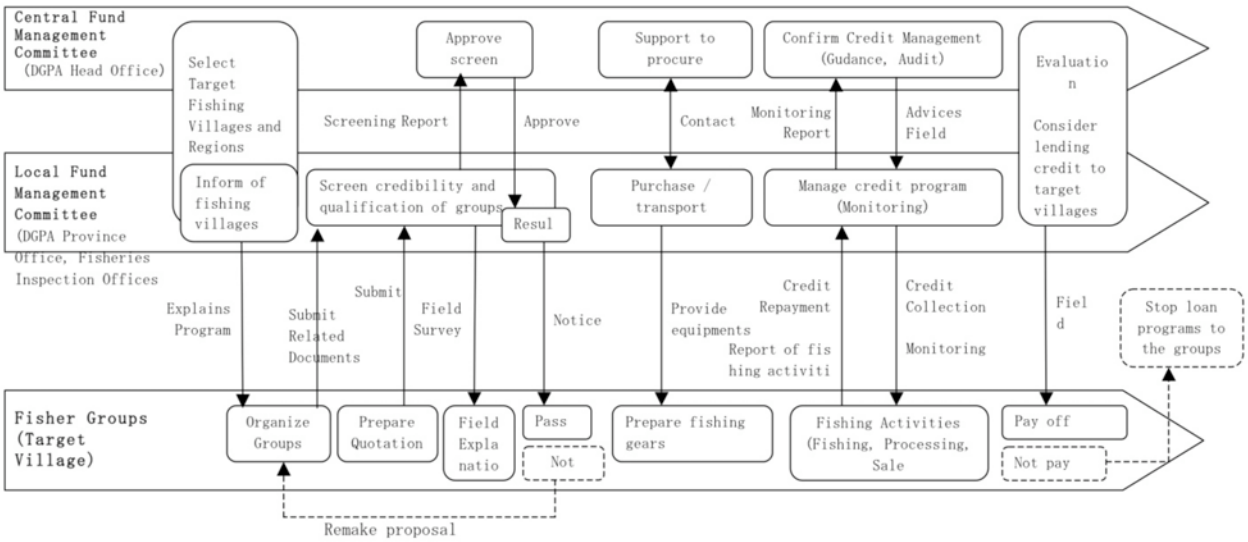

Figure 4.3 Flowchart of micro-credit programs with relationship in main related offices

(2) Long-term loan program

The target groups for the long-term loan program have to be selected among the fishing communities, which have achieved high revolving rates in the micro-credit program and obtained the capacities of fund management. Every fisher's group, which hopes to get a long-term loan, should cooperate with other groups in a same area and organize a larger fisher's association as 'Community Fund Management Committee'.

The fisher's association makes a proposal of cooperative activity plan at village / regional level, and submits it to the Central Fund Management Committee (CFMC) belonging to the DGPA head office. The CFMC examines the contents of submitted proposals and investigate the planned sites directly to verify relevance and effectiveness of their loan repayment plans. After approving the proposals through the screening process, the DGPA lends loan to the fisher's association as its capital fund.

The interest of this long-term loan should be set at low level (monthly 2 – 3 %), and the loan should be totally repaid within 3 – 5 years. Basically, the long-term loan is only utilized for purchasing fishing gears and equipments (out-board engines, FRP boats, processing machines, and etc.), but not for preparing operational costs (fuel cost, personnel payment, and etc.). Therefore, it is a pre-condition of the long-term loan for a fishers' association to collect investment from local fishers and prepare its operational cost voluntarily. Because of large amount of the long-term loan, the fishers' association directly deposits its repaid money to a bank account opened by Fund Management Committee.

When a fisher's association requests a technical support to carry out its cooperative program, beside the loan scheme, DGPA should give a chance for it to obtain technical and management trainings for fish distribution and processing. The DGPA bears the implemental costs of these trainings, but the fisher's association prepares the cost for them to receive the training (textbook, accommodation, meals, etc.). Once a year, CFMC members visit actual program sites to inspect the accounting condition of the cooperative program jointly with the fisher's association.

In the long-term loan, because of a large amount of loan in comparison to micro-credit scheme, the following items should be added to the loan condition; 1) a fisher's association puts up the members' lands and houses as security and 2) a fisher's association prepares sureties. When it is regarded that a fisher's association is too difficult to repay loan continuously anymore, CFMC should seize the security assets immediately and request the sureties to repay its remained loan to recover its debts as much as possible.

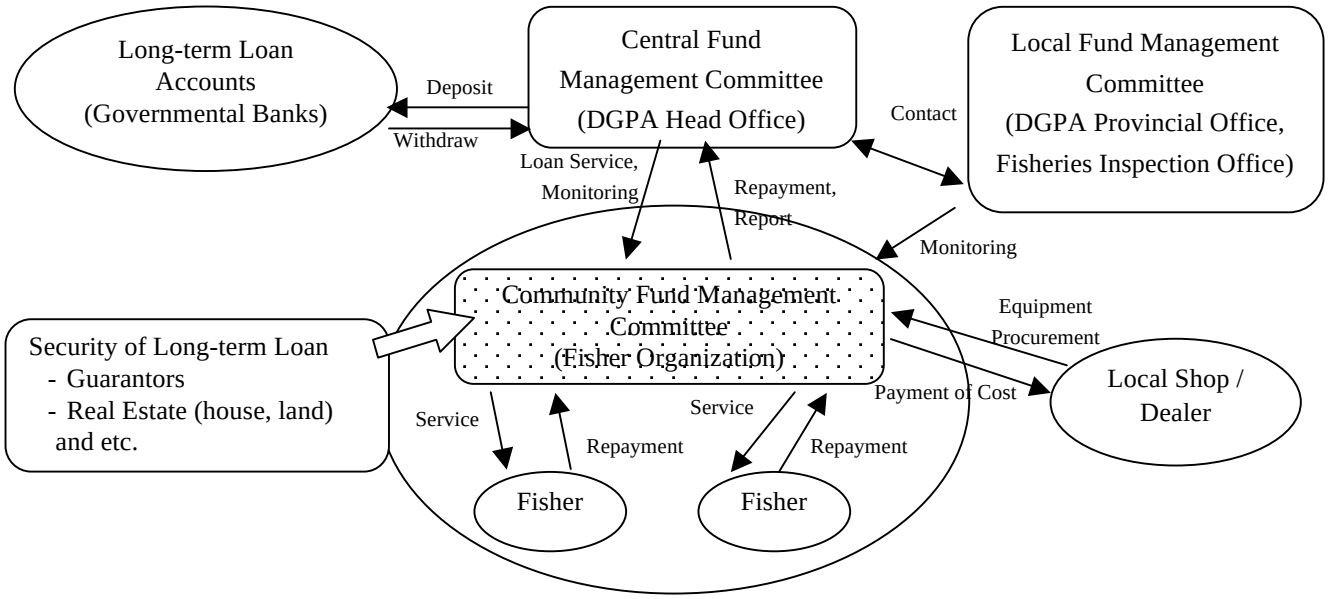

Figure 4.4 Management structure of long-term programs

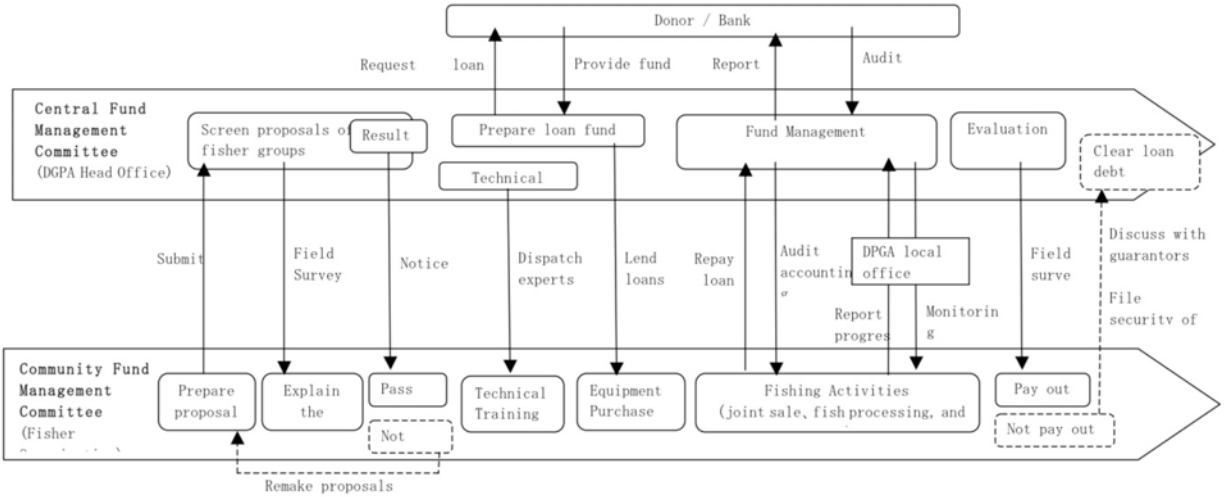

Figure 4.5 Flowchart of long-term loan programs with relationship in main related offices

4. Equipment Plan

Equipments	Quantity	Specification	Note
Boats with outboard engines	3 boats (Omboue, Mayumba, Lambarene, each 1 boat)	FRP boats, 40 HP outboard engine	Monitoring of fishing villages, Transport of fishing equipments
Pick-up trucks	4 trucks (Port-Gentil, Oyem, Lambarene, Libreville, each 1 truck)	4WD, Double cabins type	Monitoring of fishing villages, Transport of fishing equipments
Data analysis Equipments	7 sets (1 set for each target area)	Note-type computer, Personal computer, Printer, Scanner, etc.	Monitoring (collected documents, information arrangement) Materials of training / seminars
Communication modems with mobile phone	7 sets (1 set for each target area)	Small communication modem of local mobile phone company	Communication between DGPA head office and provincial offices

5. Management Plan

(1) Management Structure

DGPA is the main implementation body of the loan schemes. 'Central Fund Management Committee (CFMC)' is established in DGPA head office to inspect the progress of financial programs all over Gabon, and monitor the activity at actual sites if necessary.

In every target area for the financial program, 'Regional Fund Management Committee' is established to properly manage a loan scheme at both viewpoints of government and fishing community. Especially, in Lambarene and Port-Gentil, Small-scale Fishing Community Centers take responsibilities to manage local loan schemes for local fishers together with DGPA Provincial Offices.

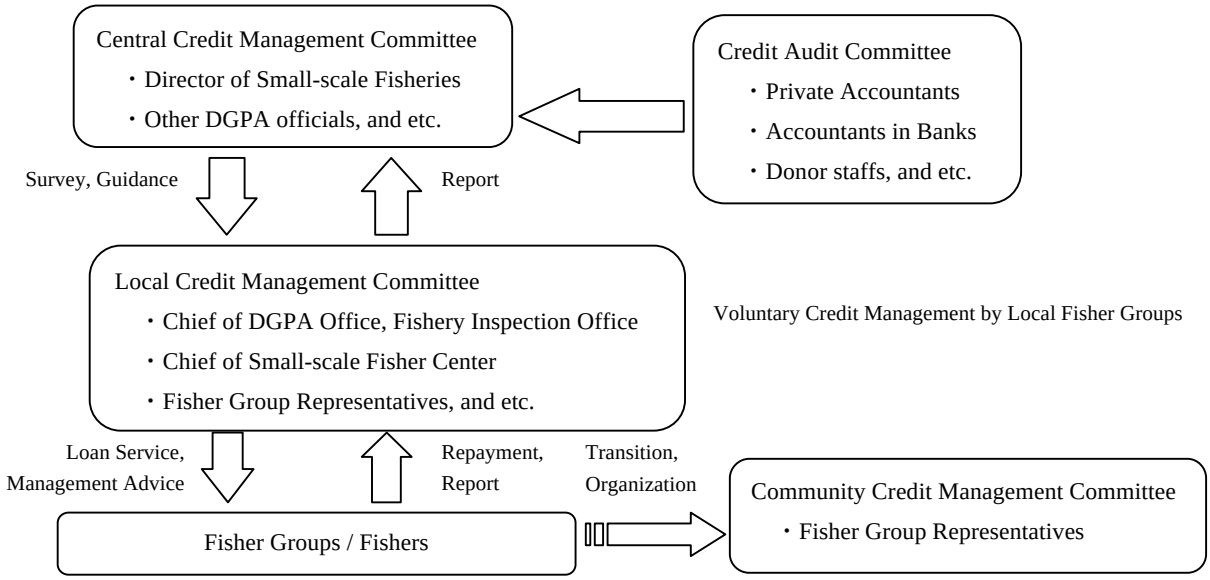

Figure 4.6 Management Structure of Financing Project

Basically, DGPA Provincial Offices and Fishing Community Centers manage to recover repaid money from local fisher's groups / associations. In case of the long-term loan program, because of the large amount of its loan, CFMC directly takes responsibility to control / manage the loan program.

In order to evaluate / inspect the revolving condition and program account of the loan programs at a neutral position, 'Fund Audit Committee' is established, which is composed of accountants working for private banks, donors' managers, etc. The committee is expected to maintain the transparency of accounting management of these loan programs. It is desirable to effectively utilize JOCVs (Japanese volunteers for rural development) and NGOs for organization of fishing community and guidance of program management.

(2) Personnel Plan

In Charge	No. of Personnels	Necessary Period	
Central Credit Managemeny Committee	5 persons	5 persons × 10 days × 12 months × 10 years	DGPA head office
Local Credit Managemeny Committee	5 persons × 7 regions	35 persons × 10 days × 12 months × 10 years	DGPA Provincial Office, Fisheries Inspection Office, Fisher Group
Credit Aduit Committee	5 person	5 persons × 10 days	Private Accountant, Private

		× 12 months × 10 years	Bank, Donors, and etc.
Expert in Credit Management	1 person	3 months × 2 times × 6 years	Foreign Experts
Extension Officers of Rural Development	1 person × 7 regions	24 months × 3 times	Foreign Volunteers

(3) Utilization of NGO

There is not any NGO which has a lot of experience of fisheries loan programs in Gabon. Basically, it is better that DGPA conducts these programs by itself.

(4) Education and Training for Personnel

Target Persons	Period	Content	Method
DGPA Official 5 persons	1.5 months	Management Methods for Microcredit	Training in Foreign Country
DGPA Official 5 persons	1.5 months	Managemant and Audit of Credit Funds	Entrust of Local Financial Insitutes

6. Implementation Plan

A. Micro-credit

Activities	Organization	Schedule (year) 1	2	3	4	5	6	7	8	9	10	11	12	Outputs
Establish central management committees	DGPA													Establishment of management system
Apply / obtain for implementation budgets	DGPA													Preparation of budge and credit funds
Select target villages, Prepare equipment lists and quotations	DGPA													Selection of high credibility groups
Purchase / provide equipments, Open bank accounts	DGPA													Bank accounts of each target areas
Collect repayment money, Monitor for credit repayments	DGPA													Completion of credit repayment from groups
Establish local management committee, Make management guidance	DGPA													Fisher organization in each village / area
Manage credit funds voluntarily by local management committee	DGPA													Proper fund management by fishers groups

B. Long-term loan

Activities	Organization	Schedule (year) 1	2	3	4	5	6	7	8	9	10	11	12	Outputs
Establish fishers organizations (credit management committee)	DGPA													Establishment of local fisher associations
Apply / obtain for implementation budgets	DGPA													Preparation of budge and credit funds
Screen proposals of fisher groups, Conduct field survey	DGPA													Selection of good proposals
Provide loans to fisher groups	DGPA													Smooth fund transaction / management

Support the purchase / transport of equipments	DGPA						▬			▬			▬	Smooth procurement of equipments
Conduct activities in fisher groups, Collect repayment money	DGPA						▬	▬	▬	▬	▬	▬	▬	Proper business management by local fishers
Give technical advices, Evaluate activity progression, Audit accounting conditions	DGPA						▬	▬	▬	▬	▬	▬	▬	Improvement of financial capacity of fishers associations

7. Project Cost

In case of the long-term loan program, because of lending a capital fund from governmental banks, DGPA does not need to prepare the capital fund from other donors in principle.

(1) Facility and Equipment

Items	Quantity	Unit price (thousand FCFA)	Total cost (thousands FCFA)	Note
Boats with outboard engins	3	4,800	14,400	
Vechcles	4	8,000	32,000	
Computer sets	7	1,000	7,000	
Communication modems	7	150	1,050	
Total			54,450	

(2) Personnel Cost

Items	Quantity	Unit price (thousand FCFA)	Total cost (thousands FCFA)	Note
Expert of Credit Management				Foreign experts
・Personnel cost	36 months	10,000	360,000	
・Transportaion	12 times	6,000	72,000	
・Activity cost	36 months	500	18,000	
Total			450,000	

(3) Management Cost

Items	Quantity	Unit price (thousand FCFA)	Total cost (thousands FCFA)	Note
C/P travel allowance	3,600 person day	50	180,000	
Transportation cost	480 persons time	500	240,000	
Meeting cost	120 months	100	12,000	
Supplier cost	120 months	100	12,000	
Fuel cost for monitoring	120 months × 6 areas	100	72,000	Fuel costs for vehiele and boats
Total			516,000	

(4) Initial fund of microcredit

Items	Quantity	Unit price (thousand FCFA)	Total cost (thousands FCFA)	Note
Microcedit funds	30	300	9,000	For coastal fishers
Microcredit fund	70	100	7,000	For inland and lagoon fishers
Total			16,000	

In case of long-term loans, DGPA don't need to look for loan funds, because the governmental banks lend the initial funds.

8. Expected Benefit and Impact

(1) Economic benefit

By implementation of the loan programs, fishers' groups / associations are expected to promote the effectiveness of fishing activities by smooth renewal of fishing gears and the preservation and processing of captured fishes. Consequently, these effects of the programs improve the income level of small-scale fishers. In addition, since it is difficult for fishers to procure fishing materials by themselves in the rural fishing villages, they have to buy materials from middle agents visiting the villages at higher prices. If the procurement channel of fishing materials in the rural areas is established under the project, fishers become to procure necessary materials locally at reasonable price as needed.

(2) Social impacts

i) Upgrading of education / health standards

In the inland fishing villages including those facing to lagoons, fishers become able to afford to pay necessary costs for education and boarding for their children since there is no school near villages. In the current situation, the most of fishing household members have to go to the hospital in town if they become ill, and the medical cost to be paid is heavy burden for fishers. If the deposit becomes accustomed for fishing households through the credit repayment activity under the project, they will be able to prepare for such emergency payment.

ii) Raising awareness on household management

By making log-book keep recoding everyday, farmers/fishers households will raise their consciousness on household management so as to do the planned fishing.

iii) Stabilization of cooperative activities

In the inland fishing villages including those facing to lagoons, fishers operate fishing individually or by family basis. They are expected to form some organizations even if it is small-scale, under the project. It is expected that they will tackle on new small business such as manufacturing and sale of local products and handicrafts specialized in each region, as a starting opportunity of creating organizations.

9. Monitoring

A. Micro-credit

In case of the micro-credit program, officials in charge in DGPA Provincial Offices or Inspection Offices visit target fishers' groups / associations once a month. At that time, the officials check the activity condition of their groups and associations, and collect their repaid money. In addition, the officials of DGPA head office also visit each target area once a few months to confirm the actual situation of loan lending and repayment.

B. Long-term Loan

In case of long-term loan, officials in charge in DGPA head office, provincial office, or inspection office, regularly visit targeted fishing communities to confirm the progress of their program activities.

10. Environment Impact

Because aiming to establish a fishery financial system, the loan program does not directly make serious impact to natural environment. However, it is possible that the proposals of fishers' groups / associations make minor impacts to fishery resources in target areas. Therefore, it is necessary to reconsider the content of the loan programs under the proper consideration of environmental impacts. On the other hand, the project cannot be continued due to the lack of fund if the repayment of credit is delayed / stopped. In addition, there is a possibility to cause a split of community if unequal opportunities on credit are given to fishers. It is necessary to examine carefully the qualification of farmers/fishers, as well as to consider that disqualified persons have a chance to participate in the project as a member of group.

11. Collaboration with Other Projects

The project is desirable to collaborate with the following projects;

	Related projects	Relation	Necesity of colaboartion
4.4.2	Project for strengthening of fisher's organizations	Utilazation of credit schemes	Fisher association and DGPA jointly manage the credit scheme to strenghen the management of fishers associations.
4.4.3	Project for Diversification of Income Sources	Creation of alternative income sources	Fishers groups utilize microcredit as initial funds for the alternative income activities.
4.4.12	Project for Aquaculture Extenstion	Utilazation of credit schemes	Fish farmers need to find the initial funds. They can receive neceary funds from microcredit schemes, and buy necessary equipments and fish fry / fingerlings.

African Development Bank's program, Project of Support to Fisheries and Aquaculture Sectors, plans to conduct micro-credit programs for small-scale fishers all over Gabon. The program should be planned on the basis of this master plan.

Currently, UNDP also conducts the local developement program, The Program of Suporting Local Network for Local Government and Development (ART GOLD) in Estuaire and Ogooue Maritime provinces. Especially, the program of Etimboue district in Ogooue Maritime supports the villages located in lagoons. The program is expected to carry out a microcredit scheme for lagoon fishers, based on this master plan.

4.4.2 Project for Strengthening of Fisher's Organizations

1. Outline of the Project

(1) Abstract

The fishers engaged in coastal fishing organize groups / association in their villages and regions. In order to support their lives as groups, their groups / associations jointly make their fishing activities and financially support necessary funds each others. On the other hand, the fishers engaged in inland water / lagoon fishing rarely organize their groups / associations. In spite of living in a same village, the fishers individually go fishing and proceed / sell their captured fish.

In terms of organization of small-scale fishers, in coastal fishers, we utilize an existing fisher's association at each village and make effort to raise / strengthen the association function at local level. In fishing village in inland water and lagoon regions, we focus on organizing local fisher's associations at village level, and make effort to form a communication network among fishers.

(2) Target Areas

Basically, all fishing villages are target areas all over Gabon. To lift up the project effect, it is desirable to implement the project at the following regions where fisher's associations or small-scale fisher's centers have been established.

- Coastal region: Estuare province (Owendo and Cocobeach areas), Ogooue-Maritime province (Port-Gentil area), and Nyanga province (Mayumba area),
- Lagoon region: Ogooue-Maritime province (Omboue and Gamba areas), and Nyamga province (Haut Banio district)
- Inland water region: Moyen-Ogooue province (Omboue and Gamba areas), and Nyamga province (Haut-Banio district)

(3) Target Groups

Small-scale fishers related to the Small-scale Fisher's Centers

(Owendo, Port-Gnetil and Lambarene)
Fishers participating in local fisher's associations

(4) Period
Preparation period: 2009-2010 (2 years)
Implementation period: 2011 – 2020 (10 years)

2. Objective and Relevance

A. Strengthening of fisher's organizations in coastal fishing villages

(1) Objective
The services for coastal fishers by fisher's associations / organizations are strengthened.

(2) Relevance
In the fisher's associations in Owendo and Port-Gentil, the representatives of Gabonese and foreign fishers serve the board committee's members of theirs associations to be involved in the management of the Small-scale Fisher's Centers. However, the advantage of their association members does not appear remarkable. Even though many local fishers registered their associations as regular members, most of them are not engaged in any association activities, and the activities of their association are to stagnate. To solve the stagnant situation, we should support the fisher's associations to extend the advantages of their memberships by assisting their procurement and purchase of fishing gears, joint sale of captured fish, and joint purchase of necessary materials and equipments.

There are fisher's associations in Cocobeach and Mayumba, which are only voluntary groups for mutual help but do not make full-scale activities as fisher's associations. In order to improve the fishing activities and livelihoods of local fishers effectively, we should organize fisher's associations invested by fishers, and support the associations to carry out their activities such as micro-credit schemes and joint sale / purchase at regional level.

(3) Outcome to be achieved
- Fishers can purchase fishing gears at local stores / dealers at low prices,
- Fishers can receive loan services at low interests,
- Fishers can sell fresh fish and fish food produced by themselves,
- Fishers intend to pay the membership fees of their associations, and
- The management capacity of fisher's associations is improved.

B. Strengthening of fisher's associations in lagoon and inland water regions

(1) Objective
Fishers engaged in lagoon and inland water fishing organize their associations to support their fishing activities and livelihoods.

(2) Relevance
Most fishers engaged in lagoon and inland water fishing are Gabonese. The fishers form isolated communities that are scattered in vast lagoons and along rivers, and mainly earn cash income from the fish product sale. In Etimboue and Ndougou districts of Ogooue-Maritime province, the associations of lagoon fishers have been already established. However, in other lagoon and inland water regions, there is not any organizational activity of local fishers.

In these two regions where fisher's associations have existed, we should reinforce the communication network between fishing villages under their associations, and guide the association activities of joint sale and purchase. In other regions where any fisher's associations have not been organized yet, we should urge to form fisher's organizations to combine local fishers / fishing communities, and support the fishers to make their voluntary activities under their associations.

(3) Outcome to be achieved
- Fisher's associations can communicate with local fishing communities at any time,

- Fisher's associations improve their accounting capacity to manage their funds properly,
- Local fishers positively participate in their association activities,
- Local fishers intend to pay their membership fees to the associations, and,
- Fisher's associations manage to stabilize the fish sale prices for local fishers.

3. Project Contents and Activities

A. Strengthening of fisher's organizations in coastal fishing villages

In coastal villages, many fisher groups have been organized among foreign fishers. The fishers living at a same village help each other, and jointly work for fishing in groups. As a rare case, in Milembie village of Estuary province, Gabonese fishers have formed a local fisher's association. We should utilize the existing fisher's associations to reinforce their management system and programs in corroboration with DGPA offices. Finally, we should grow those associations as independent business bodies to provide several support services for local fishers, who are their members.

(1) Organization of fisher's associations and making of their action plans

In the regions where the fisher's associations are organized for the management of small-scale fishery centers, we should make the further action plans of the fisher's centers and consider the management systems of the association, in order to strengthen the activities of existing associations.

In addition, in Cocobeach of Estuary province and Mayumba of Nyanga province, Beninese and Nigerian fishers organize their associations to support their fishing activities each other. However, fishery centers that have ice plants and fish landing places have not been constructed in those regions. Therefore, the association's activities of the regions are limited only for mutual helps in foreign fisher's communities, and not included the physical assistances for their fishing activities. We should support the activities of those existing fisher's associations, and improve the management systems to give several services to local fishers.

(2) Organization strengthening of fishers' associations

At first, we should reconsider the current organization structure of fishers' associations, and reform the board management committees consists of representatives of local fishers. Most of fisher's associations collect annual / monthly membership fees as their management funds. However, they take a lot of time and labor only for membership fee collection, and the collection rate is not so high in practice. Anyway, local fishers should invest their money to buy the association's shares, and the associations plan some profit-making activities by utilizing the collected initial funds.

Moreover, we should request the dealers of fresh / processed fish to invest the fisher's association, and allow only fish dealers investing the associations to purchase fresh / processed fish at fishing villages. By those ways, we put a call out for investment to fisher's associations to secure their necessary management funds.

All investment for fisher's associations is managed in bank accounts opened with the assistance of DGPA provincial offices, fisheries inspection offices and small-scale fisher's centers. As for the investment management, under the supervision / guidance of DGPA provincial offices and small-scale fisher's centers, each fisher's association deposits / withdraws their necessary funds in bank accounts.

(3) Introduction of micro-credit schemes

Even though fisher's associations have collected the investments from local fishers and fish dealers, they are still difficult to collect sufficient funds for implementing support services to the fishers of association's members.

Therefore, many associations cannot start their practical activities, even though they have collected some investments as initial funds. Under those situations, the associations cannot provide enough services to fishers, and fishers gradually lose their interests in association's activities.

In order to break the stagnant situation of fisher's associations and extend the merits of fisher's associations, we should introduce loan systems with low interests for their members, and support their groups to procure

/ purchase fishing gears and materials. For those reasons, we should introduce the micro-credit schemes described in the part of 'Project of Financial Schemes for Small-scale Fishers'.

Those financial systems are jointly operated by fisher's associations and governmental sectors, such as fishery centers or DGPA provincial offices. The board committee members and officers in fisher's associations take part in the finance programs to strengthen their accounting abilities for the association management.

(4) Joint sale / purchase of fisher's associations

In combination with the micro-credit schemes, fisher's associations open and hold their direct stores for local fishers to procure necessary fishing gears and materials at lower prices. According to the request of the association's members, the direct stores purchase a large amount of fishing gears / materials at low prices from dealers. Then, the stores sell them to their members at lower prices by the reduction of profit margins. If fishers receive loans from the fisher's associations and purchase fishing gears / materials at the direct stores by their loans, the loan funds are efficiently revolved / utilized in the system of association. The direct stores sell not only fishing gears / materials, but also agricultural / processed products, which the association members produced. Therefore, the stores become key places for promotion of local special products.

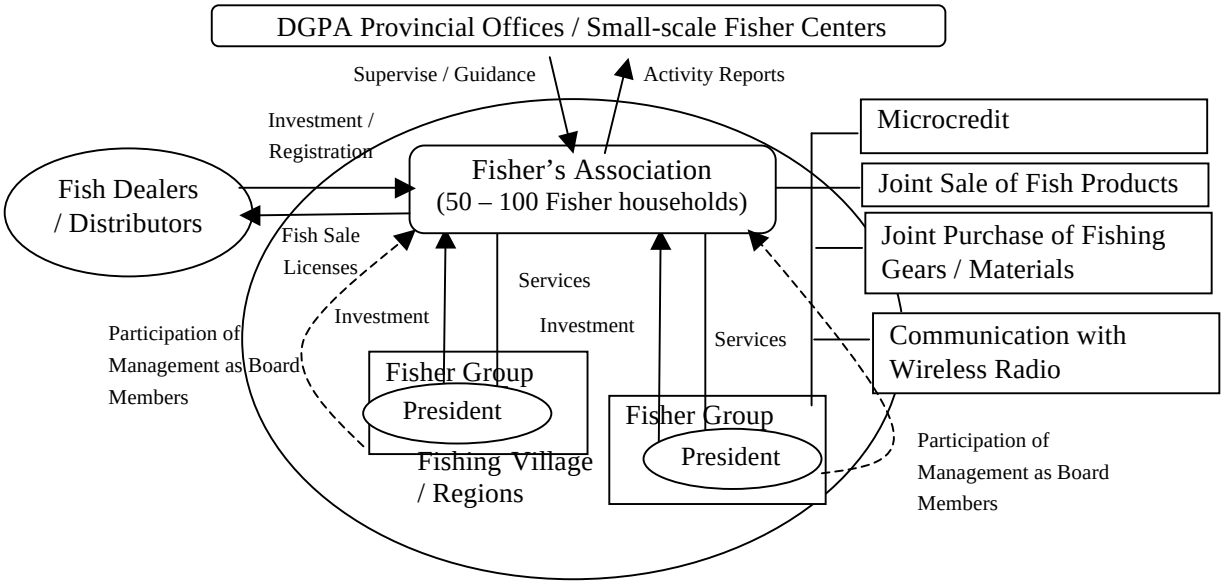

Figure 4.7 Management Relationship of Fisher Association

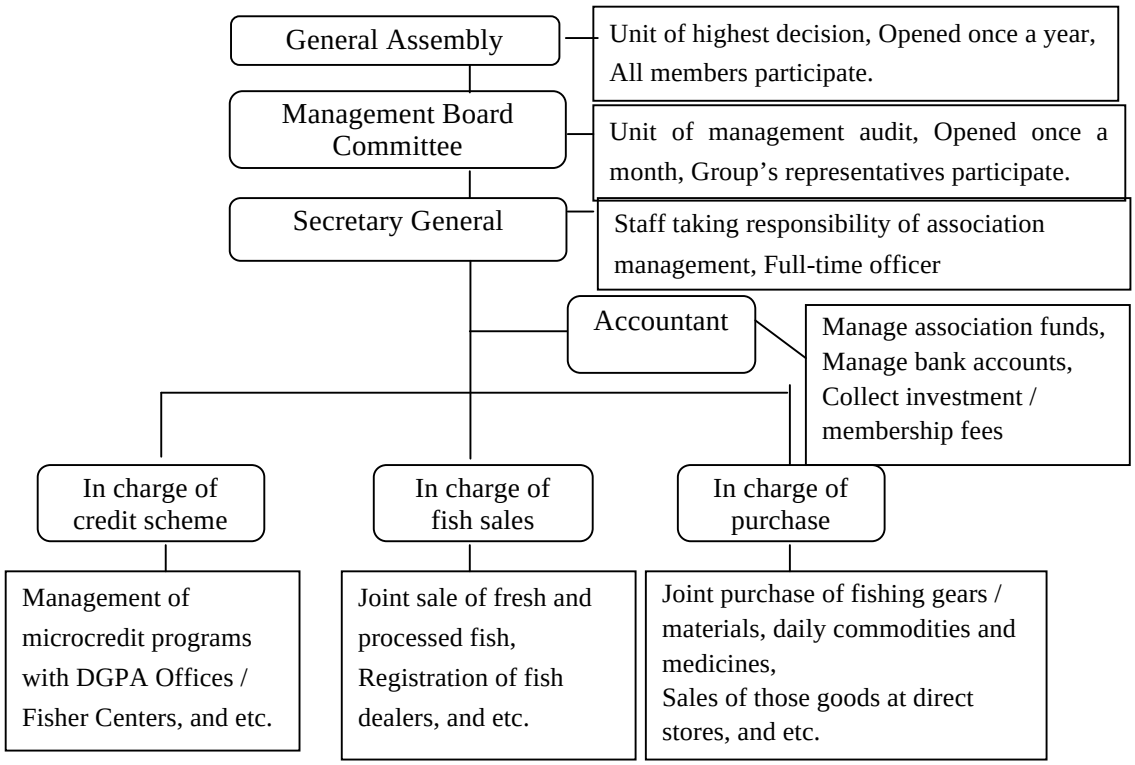

Figure 4.8 Organizational Structure of Fisher's Association (proposition)

B. Strengthening of Fisher's Association in Fishing Villages in Lagoon and Inland Water Regions

In lagoon and inland water regions, Gabonese fishers are engaged in small-scale fishing with small fishing gears in family. They rarely work for fishing jointly together with other fishers as a group. However, it is difficult for the fishers to get out of a petty business situation, if they just continue their current small-scale fishing individually.

In order to improve the livelihood of small-scale fishers in the future, it is very important to make effort to add value to captured fish, for example, fishers of same regions or villages cooperate together to sell / process fish as groups.

To realize the situation, we should tackle to organize local fishers in regions or villages, and form a fisher's group consist of more than 5 members as a receiver of DGPA support services. Moreover, we should introduce micro-credit programs for fisher's groups to support their cooperative activities.

(1) Support for organizing fisher's associations

In lagoon regions, small fisher's associations have been organized at regional or village level under the DGPA supervision in Etimboue and Nedougou districts of Ogooue-Maritime province. In inland water regions, small fisher's associations exist at Ebel Abanga village of Moyen-Ogooue province and Bitouga village of Woleu-Ntem province.

In the regions and villages where fisher's associations exist, we should review actual activities of existing associations, and lead local fishers to make a practical management system as an association. However, in most fishing villages of lagoon and inland water regions, there is not any functional organization of local fishers practically. Those fishers don't have any relationship with associations and organizations, and just continue to work for small-scale fishing by individual or in family. For those fishing villages, we should support fishers to start their fishing activities in a small group, and tackle to lead their groups to receive some services of fishing activities offered by DGPA.

(2) Leadership training for fisher's associations and groups

Because most fishers of lagoon and inland water regions don't have any experience and knowledge in the association business and management, they cannot find any merit to form their associations and manage their association activities. In the villages where fisher's associations are newly formed, fishers don't have enough experience to make some group activities, and not enough awareness to work together as groups.

In order to train the management and business of fisher's association such as its vision and mission, organization making, and accounting system, DGPA should hold training or seminars for fishers who positively work for their associations and group activities. Afterward, DGPA provincial offices and fisheries inspection offices regularly visit the villages whose fishers have taken trainings or seminars, monitor the association and group activities of fishers, and give technical advices in association management and accounting or fisheries and processing skills in accordance with the request of fisher's associations and groups.

(3) Introduction of micro-credit programs

Because many fishing villages indicate the difficulty of fishing gear's renewal by lack of their funds, the micro-credit system for small-scale fishers with low interest should be introduced as a joint program of fisher's associations and DGPA offices. This credit system also supports some activities that fishers process and market local special products (salted dried fish, cassava stick, and etc.) as value-added commodities. Since fisher's associations cooperate with this credit programs, the association's board members and officers learn the credit management and audit to realize the accountability of association financial status, which has been unclear.

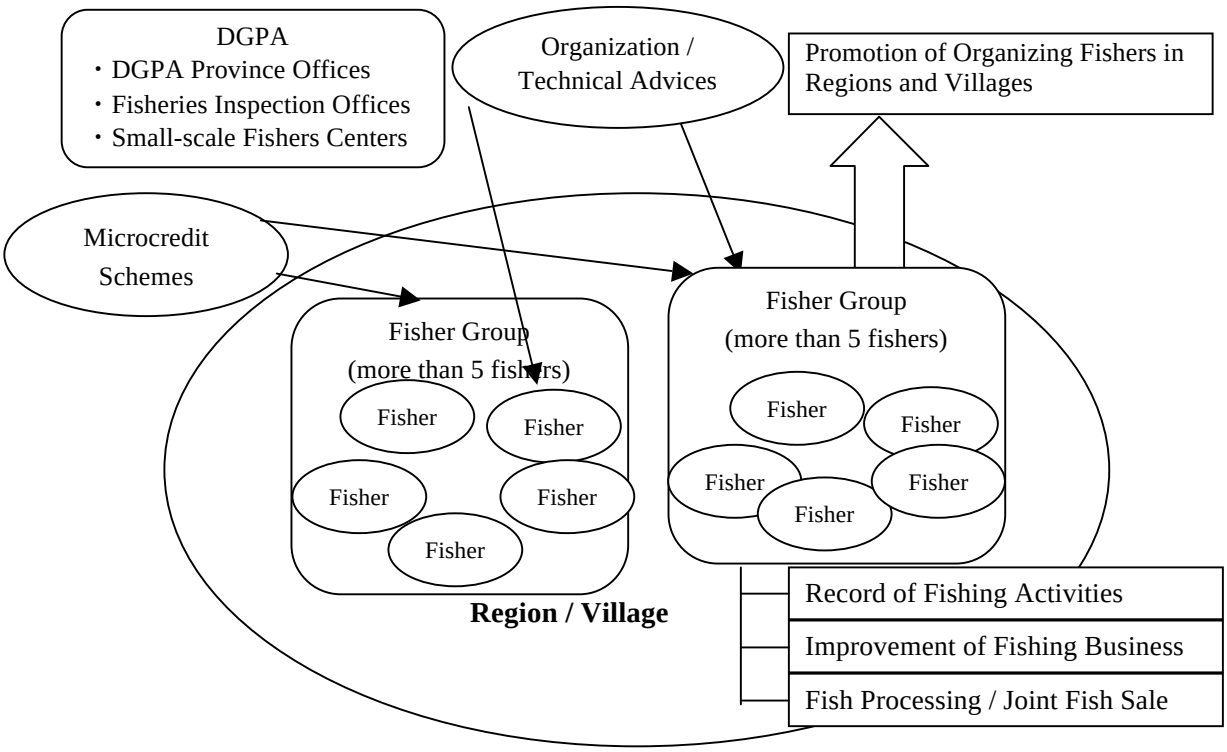

Figure 4.9 Implementation structure for organizing fisher's groups in lagoon and inland water regions

4. Facilities and Equipment Plan

(1) Facility Plan

To utilize the existing facilities, we don't consider constructing new facilities. However, in case to prepare direct stores operated by fisher's associations, the associations need to collect the initial funds.

(2) Equipment Plan

In fishing villages promoting the organization of fisher's associations and groups, DGPA provincial offices,

fisheries inspection offices and small-scale fisher's centers need to confirm the current activity conditions of the associations and groups by their regular monitoring. For the smooth implementation of monitoring activities, land and water routes should be improved as transportation measures. The data analysis devices should be equipped to arrange information and documents collected by the monitoring.

Equipment	Quantity	Specification	Note（Purpose）
Boats with outboard engines	3 sets (Omboue, Mayumba, Lambarene)	FRP boats Engine: 40 HP	For monitoring
Pick-up truck	4 cars (Estuaire, Wolue-Ntem, Moyen-Ogooue, Ogooue-Maritime)	4WD, Double cabin	For monitoring
Data analysis devices	7 sets (1 set for each target area)	Note computer, Printer, Scanner, and etc.	Arrangement of collected materials and information, Materials makings of trainings and seminars.
Communication modem	7 modems (1 set for each target area)	Communication modem of local mobile phones	Communication tools between town and village areas

5. Management Plan

(1) Management Structure

Directorate General of Fisheries and Aquaculture (DGPA) is the implementation body for the project. Under the supervision of DGPA, DGPA Provincial Offices, Fisheries Inspection Offices and Small-scale Fisher's Center in target areas carry out the project implementation. As for the support of organizational activities in target villages, it is desirable to utilize international volunteers specializing in rural development.

(2) Personnel Plan

In charge	No. of persons	Period	Organization
Officers in charge of fisher's organization vitalization	2 persons	10 days × 12 times ×10 years	DGPA Head Office
Extension officers	7 persons (1 for each target area)	Every days	DGPA Provincial Offices Fisheries Inspection Offices
Expert in fisher organization	1 person	3 moths × 2 times × 5 years	Foreign Experts
Extension officers for rural development	7 persons (1 for each target area)	24 moths × 3 times	Foreign Volunteers

(3) Utilization of NGOs

NGOs are not necessary for the project in special.

(4) Education and Training for Personnel

Target persons	Period	Contents	Method
DGPA Officers 5 persons	3 months	Fisheries Community Development	Training in foreign country
DGPA Officers 5 persons	3 months	Management of Fisheries Cooperative Association	Training in foreign country

6. Implementation Plan

A. Strengthening of fisher's associations of coastal villages

Activities	Implementing Organizations	Schedule (year) 1	2	3	4	5	6	7	8	9	10	11	12	Outputs
Make action plans of strengthening fisher's associations	DGPA, Fisher's Association													Action plan of association business and management
Apply / secure the project implementation budgets	DGPA													Sufficient implementation budgets for project
Procure / transport fishing gears / materials	DGPA, Fisher's Association													Establishment of procurement routes of fishing gears
Prepare the implementation structure / system of microcredit programs	DGPA, Fisher's Association													Development of fisher's associations for loan scheme management
Implement the microcredit programs	DGPA, Fisher's Association													Revitalization of association's activities by credit schemes
Prepare places and management system of direct stores	DGPA, Fisher's Association													Establishment of direct store's facilities and management bodies
Run the direct stores of fishers' associations.	Fisher's Association													Proper management of direct stores
Evaluate / audit the business progress of fisher's association	DGPA													Accountability of association management

B. Strengthening of fisher's associations of lagoon and inland water regions

Activities	Implementing Organizations	Schedule (year) 1	2	3	4	5	6	7	8	9	10	11	12	Outputs
Form the structures of local fisher's organizations	DGPA, Fisher's Association													Organization of local fishers as groups
Make the basic rules of the associations, and their activity plans	DGPA, Fisher's Association													Decision of activity plans of fisher's groups
Apply / secure the project implementation budgets	DGPA													Sufficient budget for project implementation
Implement the microcredit programs	DGPA													Vitalization of fisher's activities by loan schemes
Consider the introduction of wireless radio systems between villages	DGPA, Fisher's Association													Establishment of communication networks of fishers
Equip a wireless radio device in each village	DGPA													Proper management of communication systems
Evaluate / audit the activities of fisher's organizations	DGPA													Accountability of activities of fisher's groups / associations

7. Project Cost

(1) Facility and Equipment

Items	Quantity	Unit price (thousand FCFA)	Total cost (thousand FCFA)	Note
Boats with outboard engines	3	4,800	14,400	
Pick-up trucks	4	8,000	32,000	
Data analysis devices	7	1,000	7,000	
Communication modem	7	150	1,050	
Total			54,450	

(2) Personnel Cost

Items	Quantity	Unit price (thousand FCFA)	Total cost (thousand FCFA)	Note
Foreign expert (Strengthening of fisher's organization)				
- Salary	30 months	10,000	300,000	
- Transportation	10 times	6,000	60,000	
- Activity costs	30 months	500	15,000	
Total			375,000	

(3) Management Cost

Items	Quantity	Unit price (thousand FCFA)	Total cost (thousand FCFA)	Note
C/P travall allowaence	3,600 months	50	180,000	
Transportation	480 times	500	240,000	
Meeting cost	120 month	100	12,000	
Expendable supply cost	120 moth	100	12,000	
Total			469,000	

8. Expected Benefit and Impacts

(1) Economic Benefit

Since fishers jointly sell their captured fish, they can not only reduce their sale costs, but also sell fish at stable prices in market. In addition, since they jointly purchase their necessary fishing gears and materials, they negotiate to make the purchase prices lower than regular prices. The effect of those cost reduction is not small. Therefore, it is expected to increase the fisheries profits by 10 – 20 %.

(2) Social Impacts

i) Upgrading of creditability of fishing villages

Since fishers who are members of cooperatives can act as an organization but not as individual, their voice and creditability to society will rise. In addition, local young fishers have a chance to work as staff of cooperatives as new job opportunity, while there is no job at present. Furthermore, in the under-populated fishing villages, fishery cooperatives have a potential to give a chance to stay and work in the villages having the desire to the future, since the cooperatives assist fishers (members) in living security and economic activities.

ii) Stabilization of cooperative activities

By the fund management by fishery cooperatives itself, they will be able to provide fishers (members) with social services such as primary education, medical service, etc. in the under-developed rural villages. In the primary education, it is difficult to ensure the residence of school-teachers and the improvement of facilities, but the cooperatives will be able to support the relevant costs by its management fund, as required. In medical service, it is difficult to make the medicines always ready and to keep the resident medical staff, but it is expected that the cooperatives can tackle on medical service for members in fishing village.

9. Monitoring

The officers of DGPA Provincial Offices and Fisheries Inspection Offices regularly visit the fishing villages

in which fishers make effort to form their organizations. When the officers visit the fishing villages, they have time to discuss with local fishers and confirm the actual progress of their group organization and activities.

10. Environmental Impact

The project aims to promote to organize local fishers as associations or groups by the regular guidance and supervision to fishing communities. Therefore, the project implementation may not cause any negative impacts to surrounding environment directly. However, in case there is existing cooperatives, it is important to well discuss so as not to split the organization by the introduction of new system.

11. Relationships with Other Projects

The project should be conducted in corroboration with the following projects.

	Related projects	Relationship	Necessity of relationship
4.4.1	Project of Financing of Small-scale Fishery	Introducution of microcredit schemes	To strengthen the activties of fisher's associations, the microcedit programs are jointly managed by DGPA and fisher's asscoiation.
4.4.3	Project for Diversification of IncomeSources	Organization of fisher's groups / association	To start some activities for alternative income sources, fishers need to meet together for organizing associtaions or groups.
4.4.6	Project for Improvement of Fishing Village Environemnt	Equipment of wireless radio networks	By the equipment of wireless radio networks, the regular communication and opinion exchanging are promoted between fishers belonging to their association.
4.4.13	Project for Valorization and Improvement of Quality of Fishery Products	Development of value-added products	As for the processed products of captured fish, the women of fishing village need to organize their groups and make proceessing activities in groups.

4.4.3 Project for Diversification of Income Sources

1. Outline of the Project

(1) Abstract

The fish catch quantities of inland waters are often fluctuated by various conditions such as climate, geography and resources. Especially, the catch quantities are strongly affected by the change of water level of rivers between dry and rainy seasons. The fisher's households, which depend on only cash income from inland water fishing, sometimes face the difficulties to sustain their livelihoods in the period of low fish catch.

In order to increase and improve the incomes of fisher's households throughout a whole year, we should promote their diversified management to earn cash incomes from agriculture, livestock and aquaculture as well as fisheries. Since the dependence on fisheries incomes gets reduced, it is expected to ease the intensive fishing operation in limited areas of inland water's fishing grounds.

(2) Target Areas

The target areas of the project are the villages, whose fishers engaged in fishing in lagoon and inland water regions all over Gabon. Especially, in fishing villages along Rivers Woleu and Ntem, the diversification of income sources with agriculture and livestock activities has been already experimented. It is effective to conduct the project in the regions in first priority.

(3) Target Groups

30 fishing villages are selected in the whole country. One fisher's group consisting of 20 – 30 persons is targeted at each village.

- Woleu-Ntem Province (inland waters region) 10 villages
- Moyen-Ogooue Province (inland waters region) 5 villages
- Omboue region of Ogooue-Maritime Province (lagoon region) 5 villages
- Hopeful villages in other provinces (inland waters or lagoon region) 10 villages

In collaboration with other projects for micro-credit and fisher's organization, fishers can have their funds on hands through the management of revolving funds for implementation of profitable activities, such as joint sale and purchase, etc. Therefore, the villages, which have well-arranged structures for their organizational management are selected as target groups of the project.

(4) Period

The project is planned in 5 years from 2015 to 2020, when the fundamental structure of fisher's organizations has been established, provided that 2-year preparation period (2014 - 2015) is required.

2. Objective and Relevance

(1) Project Objective

The fishers, who are engaged in fishing in inland water and lagoon regions, can earn necessary cash incomes from other sources besides fisheries to sustain their family finances in the period of low fish catch.

(2) Relevance

In the middle reaches of River Ogooue and the lake group region around the river, because the fish catch quantity by gill or dragged nets goes up in the dry season, fishing activity is the main income source to maintain the fisher's family finances. On the other hand, since the water level become too high in the rainy season that fishers cannot catch enough fish by their small gears.

In the upper reach of rivers, since the water level becomes high in the rainy season that fishers are easy to move several fishing grounds in rivers by small canoes. However, in the dry season when the water level goes down and the river's bottom is exposed on the water, fishers cannot reach the fishing grounds even by small canoes. Like this, the seasonal fluctuation of rainfall and water level largely affect the fishing activities. Therefore, only a few fishing villages can secure sufficient quantity of fish catch to sustain the fisher's family finances throughout the year. In the period of low fish catch, it is important to secure some income sources besides fishing, such as vegetable / flower farming, chicken / egg production, and souvenir production.

(3) Outcome to be achieved

- Fisher's families can earn 30 % of their annual income from other activities besides fisheries.
- Fishers sell agricultural products (vegetable, fruit) and livestock products (milk, egg) in / out of their villages.
- Local special products can be sold at higher prices

3. Project Contents and Activities

DGPA cannot cover all skills and methods of alternative income sources to local fishers alone. Therefore, in cooperation with other sector's offices or organizations such as agriculture and livestock, DGPA leads fishers to secure their alternative incomes. As alternative income sources, many fishing communities are engaged in agriculture and livestock. The development of local value-added products, such as processed freshwater prawns, small dried fish, sugar scan liquor, and cassava sticks, is also important to earn

alternative income.

Moreover, in villages / regions facing main roads, the operation of small-scale stores / stands and restraints / cafes is important to sell local special products, and to secure new income sources. To extend the alternative income's development to other areas, DGPA should plan training programs together with other related agencies (IGAD, and etc.), and advise basic skills to fishers. In case that some fisher's groups need initial funds for their activities, DGPA should support them to purchase necessary fishing materials and equipments in collaboration with micro-credit schemes. Moreover, the exhibition of local products should be held to promote the special products developed in fishing villages to the people outside the village.

(1) Establishment of conferences in alternative income sources

To promote the creation of alternative income sources in fishing villages, we should consider the fishing community development in the general aspects with various sector's experts such as agriculture, livestock, processing and etc. DGPA, in charge of fishing community development, well-knows only fishing method, fish processing, and aquaculture. However, to develop skills and products of other sectors such as agriculture, livestock and forestry, DGPA should receive technical supports from government agencies and organizations of other industrial sectors.

To take the information and tendency of rural development in other sectors beside fisheries effectively, DGPA call various key persons working for those sectors, and establish a liaison conference to discuss fishing community development with alternative income sources. Especially, because agriculture, livestock and forestry are important for fishing communities, DGPA should appoint some officers in charge for rural development in the related ministries and governmental agencies, such as Ministry of Agriculture, Ministry of Forestry and IGAD, as members of the liaison conference. Additionally, to consider the creation of new business activities in fishing villages, DGPA should invite some staffs of private companies and NGOs, which tackle local product marketing and tourism development, as members or informants of the conference.

Through the discussion in the liaison conference, it is expected that the members belonging to various sectors collect various ideas for fishing community development. Based on information and ideas provided from the liaison conference, DGPA should consider effective methods and measures to introduce the alternative income sources with high realization potential in each region.

(2) Planning and Implementation of model programs for alternative income sources

Referring to discussion of the liaison conference above-mentioned, DGPA prepare some actual business plans to create alternative incomes, and conduct model programs for the fisher's groups, which have some achievements of local business activities. Though various production activities can be considered as alternative income sources between fishing seasons, the production and marketing of agricultural and livestock products is more effective to earn supplementary incomes. Many fishing villages have made agricultural and livestock products, parallel to their fishing activities.

As for new agricultural and livestock products which any fishing village has not started to farm or culture in earnest yet, for example, vegetable and fruit farming at kitchen gardens and egg production by poultry farming, DGPA make collaboration with IGAD to encourage fisher's groups to begin those production. Especially, DGPA call some fishing villages, whose fishers have already formed the groups and carried out group's activities, and discussed the implementation of model programs with their groups.

All activities to generate alternative incomes in villages or regions, they have opportunities to submit their business plan proposals to DGPA provincial offices in order to extend their current activities as model programs. DGPA and IGAD jointly screen those business proposals. When some proposed activities are accepted as model programs, DGPA should give the fisher's groups some opportunities of technical trainings and financial supports in accordance of their requests and necessities.

(3) Technical trainings and seminars for generating alternative incomes

On the discussion with related organizations like IGAD, DGPA entrust technical trainings and regular field

advices to the related agencies or organizations, according to the request of fisher's groups. DGPA coordinate with related organizations for fishers to take training sessions in first priority.

The agriculture and livestock training sessions are held at the training center or farms belonging to IGAD in the period of low fish catch to teach basic skills and methods of farming and breeding to fishers. In other topics, such as food processing, hygienic management, and packing, according to fisher's requests, DGPA arrange the training sessions / seminars on those topics.

The fishers learn necessary techniques and skills through the training sessions and practices, and start their original activities to generate alternative incomes in their villages by their self-efforts, on principle. If fisher's groups need initial funds for their program's activities, DGPA provincial offices or fisheries inspection offices offer them to receive micro-credit. The groups estimate the purchase cost of necessary equipments for alternative income activities as well as fishing gears, and apply for micro-credit programs to DGPA offices. The limit of the micro-credit for a group is set within 300,000 – 500,000 FCFA. But, it depends on the number of members in the group. The groups should consider the appropriate scale of their business activities by the amount of micro-credit. The repayment period is basically within 6 months. In vegetable and fruit farming, the groups repay their credits in full at harvest times.

(4) Presentation of model program of alternative income sources to other villages

DGPA should positively make opportunities to present the model programs, in which fisher groups tackle to generate alternative income sources, to other neighbor fishers. In order to learn the practical activities of model programs, DGPA provincial offices take representatives of neighbor fishers to the model fishing villages, and make opportunities to discuss the generation of alternative income sources between fishers. At first, DGPA provincial offices call fishers in their original programs. Gradually, DGPA lead fishers to voluntarily hold a study meeting to exchange their information each other. As a part of the extension activities of DGPA provincial offices, DGPA conduct study tours for some fisher groups to see other fisher group's activities of alternative income generation.

(5) Sales promotion of developed commodities as alternative income sources

In the tackling of alternative income generation, it is expected to develop some value-added commodities by the utilization of local products and goods. For the purpose to gather the representatives of fisher groups, who are engaged in the activities of alternative income generation, DGPA should hold the local product exhibitions and show local special products developed by fisher groups to the public. At those exhibitions, DGPA should hold spot sale marketing for the developed products to the consumers in practice.

(6) Extension of one village one product movement

This project mainly supports the model programs which aim to secure the alternative income sources for fishing villages. In case that the project achieves expected outputs to some extent, DGPA try to disseminate 'One Village One Product Movement' to other villages of rural regions as a national-wide social movement.

When such opportunity arises, DGPA receive financial supports for One village One product Movement from donor's countries (especially Japan), and consider the national-wide rural development program in collaboration with other ministries and agencies, on the basis of the experiences of surrounding countries which have carried out the movement. As a result of this development study, the production / processing of the following products and commodities are expected to become alternative income sources besides fishing activities.

Table 4.7 Business Models (Proposal) as the Source of Alternative Revenue

Alternative Income Sources		Characteristics of Alternative Income Sources
Agricultural products	Vegetable and Fruit	Since it is difficult to get fresh vegetables and fruits in rural regions, the farming of vegetables (cabbage, tomato, egg plant, etc.) and fruits (pineapple, grapefruit, mango, etc.) are introduced to the regions as utilization of vacant lands such as front and back yards. Though many

Agricultural products	Vegetable and Fruit	Since it is difficult to get fresh vegetables and fruits in rural regions, the farming of vegetables (cabbage, tomato, egg plant, etc.) and fruits (pineapple, grapefruit, mango, etc.) are introduced to the regions as utilization of vacant lands such as front and back yards. Though many farmers and fishers usually practice shifting cultivation in the forest, they don't have much experience to cultivate flat fields and work on nursery. Therefore, it is necessary to give basic technical advices of vegetable / fruit culture in collaboration with IGAD.
	Fresh Flower	Because fresh flowers are not distributed in Gabon, hotels, restaurants and cafes usually use imitated flowers as decoration. Even though some problems of their transportation and freshness management still remain, fresh flowers generally have high added value. If the villages are located near the urban areas, flower culture becomes a precious income source at the off-season for fishing.
Livestock products	Poultry	Because the people are accustomed to have omelets as breakfast, the egg demand in Gabon is not small. In addition, since chicken cousins are often found in restaurants and cafes, farmers can prepare the sale routes if they can produce it. Because poultry can be integrated with freshwater pond culture, it has advantage of performance of operational cost.
	Dairy Farming	In Gabon, we rarely find fresh milk in market. Most milk sold in stores is the processed one imported from surrounding countries. In addition, though the large amount of cheeses is consumed, all of them are imported. Some problems of large initial investment and quality control for milk cow and sheep still remain. However, because there are a lot of unutilized grass fields in rural areas, dairy farming is expected to become one of alternative income sources.
Processed food	Fisheries processed food	In Kango of Estuary province, local women cook freshwater prawns captured in local rivers, and sell the cooked prawns at road stands. In addition, they sell small dried fish as relish, and process ray and sans-nom which are difficult to sell out as fresh fish into local special products, for the purpose of value-addition to locally captured fish.
	Agricultural processed food	In Wolue-Ntem province, some people of fishing villages sell sugar-cane liquor at road stands as a special product. Women process cassava products in fishing villages, and usually sell them in town markets. Since they have much experience to produce and sell some agricultural processed food, in collaboration with agricultural organizations like IGAD, they make effort to develop new agricultural processed food, such as fried cassava chip, fresh juice of local fruits, cassava liquor, etc.
Forestry product	Charcoal	In rural villages, women collect firewood for home cooking from the forest as daily work. Since Gabon has large forest areas, the people simply get firewood and don't make charcoal even in rural areas. However, in urban areas like Libreville, the charcoal is necessary for barbeque. If they can produce high quality charcoals, it is expected that they can sell them in urban markets at proper prices.
Others	Direct Sale	The sale of local products is not entrusted to distributors, and fisher groups / organizations invest their direct stores and stalls to sell their products directly to local residents and visitors by their hands. Because fishers directly sell their products to consumers, they can get more profit rather than sale to distributors. For the purpose of sales promotion of local captured fish, it is considered that women open restaurants and cafes to sell the cuisines of local fish. Therefore, they sell more amounts of value-added local fish..
	Souvenir	The designs of traditional ceremonial masks are characteristic in Gabon, and many imitation masks are sold for travelers in souvenir markets. Because

4. Facility and Equipment Plan

(1) Facility Plan

Because the existing facilities and farms are utilized for technical training sessions, it is not necessary to build the new facilities for the project. For monitoring to the activities of fisher groups, the existing cars and boats, equipped in DGPA provincial offices and fisheries inspection offices by other projects, are effectively utilized. Fisher groups utilize own funds or receive micro-credit to build necessary and small-scale facilities for alternative income generation.

(2) Equipment Plan

As mentioned above, technical training sessions are conducted with the existing equipments. Therefore, it is not necessary to introduce new special equipments.

5. Management Plan

(1) Management Structure

The liaison conference for alternative income generation, whose secretary office is located in DGPA head office, decides the implementation policy of the project and takes responsibility of the coordination and management of model programs and technical extensions. Though, in principle, DGPA head office is the implementation agency, the implementation of necessary training sessions and practical advices are entrusted to IGAD, NGOs and private companies.

Local liaison groups are established to utilize particular resources for alternative income generation effectively; the liaison group consists of IGAD local offices, vocational schools, and local enterprises as well as DGPA local offices to discuss the model program in cooperation with local governments.

Since it is important to plan and implement the fishing community development in general aspects, we should consider arranging several junior experts in rural development. In 3 target regions, we should arrange an international volunteer of rural development like JOCV to strengthen the support programs to fisher groups.

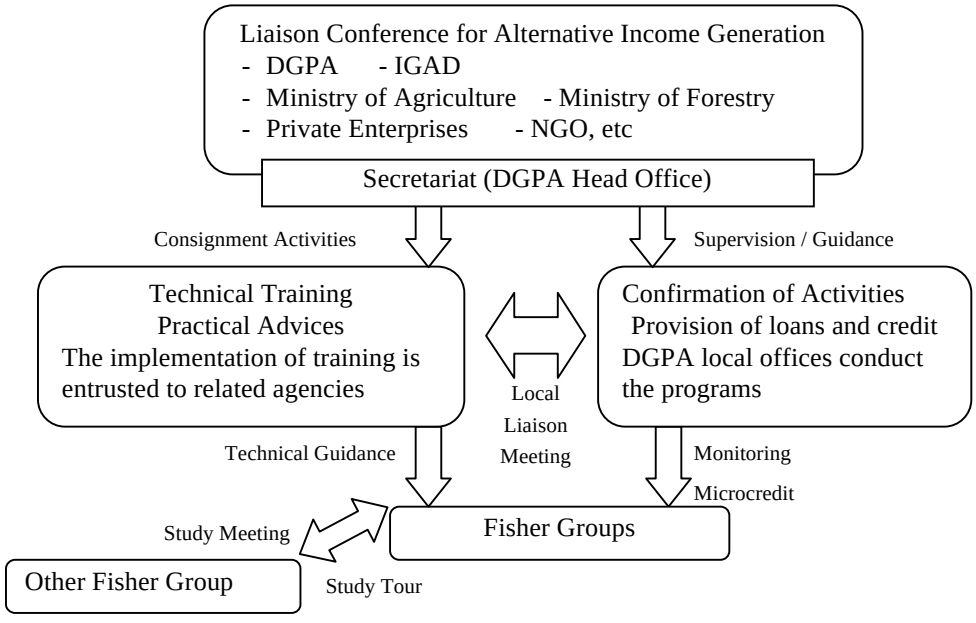

Figure 4.10 Project Implementation Structure for Alternative Income Generation (Proposition)

(2) Personnel Plan

In charge	Quantity	Period	Organization
Expert for Community Development	1 person	6 months × 6 times	Foreigner's Specialists
Liaison Conference for Alternative Income Sources	10 persons	10 persons × 5days × 12 months × 5 years	Governmental Organization related to alternative income generation, Private Company, NGO, etc.
Expert for Agriculture and Livestock	2 persons	2 persons × 10 days × 12 months × 5 years	IGAD、Researchers of Ministry of Agriculture
Expert for Food Processing	2 persons	2 persons × 10 days × 12 months × 5 years	Private Company (Food Processing Managers, etc.)
Expert for Sale Promotion	2 persons	2 persons × 10 days × 12 months × 5 years	Private Company (Marketing Manager, etc.)
Expert for Other Sectors	10 persons	2 persons × 10 days × 12 months × 5 years	Research Institute, Enterprise, NGO, etc.
Extension Officers for Rural Development	3 persons	3 persons × 24 months × 2 times	International Cooperation Volunteers (JOCV, etc.)
Expert for One Village One Product Movement	1 persons	6 months × 3 times	Foreigner's Specialist

(3) Utilization of NGOs

Since DGPA take the initiative in carrying out the dispatch of experts and technical training sessions in cooperation with governmental organizations of other sectors, basically most of necessary personnel for the project implementation are maintained from governmental organizations. Therefore, the extensive utilization of NGOs is not considered at present. However, in case that only governmental organization cannot tackle some requests of fisher's groups, it is possible to entrust the training implementation and practical advices to private companies or NGOs.

(4) Education and Training for Personnel

The field training or guidance of special technical skills is planned to entrust to the related organizations. Therefore, the training sessions or educational programs of technical skills are not necessary for DGPA officials specifically. However, the sight-visit and practical training of 'One Village One Product Movement' are held in the countries which have carried it out.

Target group	Period	Contents	Method
Officials working for the ministries related to agricultural and fisheries development (including DGPA) 15 persons	2 months × 3 years	One Village One Product Movement	Sight observation and practical sessions
Officials working for the ministries related to agricultural and fisheries development (including DGPA) 30 persons	0.5 months × 6 times	One Village One Product Movement	Sight observation of the movement activities in surrounding countries

6. Implementation Plan

Activities	Implementing Agencies	Schedule (year)												Outputs
		1	2	3	4	5	6	7	8	9	10	11	12	
Establish the liaison conference for alternative income sources	DGPA						▬							Establishment of the conference
Apply for the project implementation budgets	DGPA						▬							Acquisition of Implementation budgets

Screen proposals of model programs of fishers organizations	DGPA, Related Organizations							■					Selection of model programs and fishing villages
Hold technical trainings in agriculture, livestock, and processing.	DGPA, Related Organizations								Proper implementation				Advices of Necessary skills
Make alternative income activities in model fishing villages	DGPA, Related Organizations								■	■	■	■	Settlement of activities of alternative income activities
Conduct study meetings among fishing villages and study tours	DGPA、Related Organizations								Proper implementation				Promotion of opinion exchange between villages
Hold the exhibition of local special products	DGPA									■	■	■ ■	Acknowledgment of local special products
Consider / develop One Village One Product Movement	DGPA, Related Organizations										■	■	Start of one village one product movement

7. Project Cost

(1) Facility and Equipment

There is no cost of facilities and equipments for the project, because the existing facilities and equipments are fully utilized.

(2) Personnel Cost

Item	Quantity	Unit Price (thousand FCFA)	Total Cost (thousand FCFA)	Note
Foreigner Expert (Community Development)			(414,000)	
・Personnel cost	36 months	10,000	360,000	
・Transportation	6 times	6,000	36,000	
・Activity cost	36 months	500	18,000	
Foreigner Expert (One Village One Product Movement)			(207,000)	
・Personnel cost	18 ヵ月	10,000	180,000	
・Transportation	3 回	6,000	18,000	
・Activity cost	18 ヵ月	500	9,000	
Total			621,000	

(3) Management Cost

Item	Quantity	Unit Price (thousand FCFA)	Total Cost (thousand FCFA)	Note
Entrust cost of training and guidance	50 times (5 years)	500	25,000	
C/P travel cost	3,600 man day	50	180,000	
Transportation	480 man time	500	240,000	
Meeting cost	120 month	100	12,000	
Cost of expedble supplies	120 month	100	12,000	
Total			469,000	

8. Expected Benefit and Impact

(1) Economic benefit

At present, the quantity of fish catch is small in half of year in fishing villages of lagoon and inland water regions. Therefore, if alternative incomes beside fisheries could be secured, the economic effect of family

finances is very large. The profitability of alternative income sources is dependent on the scale and content of activities in fisher groups. Since fisher groups usually avoid a large amount of investment for their equipment, if they properly produce and sell their products, it is highly estimated to secure enough profits by their activities.

(2) Social impacts

i) Stabilization of cooperative activities

If the fishers whose livelihood depend on fishery up to present can tackle and make efforts to production activity other than fishery as a group, it is expected to create new social aspect in the mind of fishers. In particular, since fishing is done individually on the water, they are apt to be individualistic. By the activities that ensure new sources of income, local fishers will tackle on them in harmony with each other and will become aware of the merit of cooperative body. As the activities aiming at ensuring of income sources can create new business chances, it is expected that such activities will be effective to ease the on-going under-population situation of fishing villages by keeping young fishers who cannot earn enough income from fishery and cannot help going out for temporary work.

ii) Upgrading of women's independence

In the ordinary fishing households, the sharing by types of works between men and women can be observed, like men to be engaged in fishing and hunting are women to be engaged in farming and animal husbandry. However, it is expected that new income sources will provide with chances for men and women to work together in household, so as to activate the income generating activities.

iii) Job creation for fishers who cannot engage in fishing due to physical reasons

The creation of alternative income sources will enable the old and/or handicapped fishers to obtain the job opportunities.

iv) Stabilization of management of fishing households

Since fishing is easy to be affected by natural conditions (climate and natural disaster), it is difficult to make a plan of revenue and expenditure in the household account by anticipating the income from fishing in advance. Therefore, fishers are apt to spend sales income without planning when they get a catch. It will be easier to estimate the future income by ensuring new sources of income. By doing so, it is expected that the planned fishing household management can be achieved with stable income earning.

9. Monitoring

Technical follow-up to the model fishing villages, which carry out alternative income activities, is conducted by the governmental and private organizations which are entrusted technical training sessions and guidance. The officials of DGPA provincial offices and fisheries inspection offices regularly visit the model villages to confirm their activity conditions for alternative income generation, which are carried out by local fisher groups.

10. Environmental Impact

Because the project supports the activities for alternative income generation by technical training and field guidance, the impact of the project to surrounding environments is negligible. However, in accordance with the activities of alternative income generation in the model villages, it possibly happens to dump kitchen garbage and discharge wasted water into natural rivers. Most activities of fisher groups are small-scale, and make only small quantities of garbage and drained water. Therefore, the impact to surrounding environments is not large. On the other hand, as same as the Project for financing of small-scale fishery, it is necessary to examine carefully the contents of the proposed activities, so that the project can be continued without the lack of fund.

11. Collaboration with Other Projects

It is desirable to conduct the project in collaboration with the following projects.

	Related project	Relation	Necesity of relationship
4.4.1	Project for Financing of	Introduction of	It is desirable to utilize microcredit scheme as

	Small-scaleFishery	Microcreidt	initial funds for the activities of alternative income generation.
4.4.2	Project for Strengthening of Fisher's Organizations	Organization of Fisher Groups	Local fishers should form their group to tackle the activties for new income source generation.
4.4.13	Project for Valorization and Improvement of Quality of Fishery Products	Development of Value-added Products	Since we can consider the processed products of captured fish as one of alterative income sources, it is desirable to tackle the fish processing in collaboration with this project.

4.4.4 Project for Development of Set-Net Fishing

1. Outline of the Project

(1) Abstract

In the coastal areas, the fishers use fishing boats with outboard engines, spending lot of fuel oil for their fishing in the inshore and some part of the coastal areas. This increases their fishing cost including expenses for repairing the engines and it affects livelihood of the fishers. Small set-net fishing may be useful to improve this situation and make additional incomes for the fishers, because this fishing method spends less fishing cost and time than their present fishing with boats and engines.

Because high fishing skill and techniques are not required for operation of small set-net fishing, fishers having little fishing experience are also able to operate the fishing, after they have training. Depending on conditions of fishing grounds and scale/structure of the net, it could be a useful fishing method and a source of income for fishers in the lagoon and inland-water areas where they do not have useful fishing measures.

With these ideas, a pilot project was executed for trial operation of a small set-net fishing in Port-Gentil in May - October 2008 and usefulness of the fishing method was confirmed.

Based on the results of the pilot project, this project consisting of two phases is prepared to develop and promote the fishing in the project area in the coastal areas and the lagoon/ inland water areas. The first phase is to develop the nets suitable for each project area, transfer techniques for making, operating the net as well as management system. Since this fishing occupies fishing areas by fixing the nets, it is necessary to control the fishing so as not to make troubles with other fishing or activities such as water transportation. This phase therefore include preparation of regulations of the fishing. In the second phase, the fishing method will be introduced to the fishers in the project areas.

(2) Project Areas

The project areas are Port-Gentil, Libreville in the coastal areas and Kango, Omboué in the lagoon/ inland water areas. The villages and fishing grounds (areas to fix the nets) for the project are required to have the following conditions. They will be selected through the research to be made in the early stage of the Project.

Socioeconomic condition:

- Fishers can operate and maintain the net from their village.
- Fishing ground for the net is to be an area where the set-net will not cause conflicts with other fishing and water transportation.
- Fishing village is to have a good access to fish-markets
- Fishers work together, understanding the project.

Natural condition:
- Area with little influence of current and waves
- Area where passages of fish are found.

(3) Target Groups

Groups of fishers of the fishing villages in the project areas will be selected for the project. The numbers of the groups each consisting of seven to 10 persons to be set are planned as follows:

Phase-1 : Two groups in each project area (Port-Gentil, Libreville, Kango, Omboué)
= 8 groups, 80 persons in total
Phase-2 : 40 groups in Port-Gentil and Libreville (400 persons in total)
20 groups in Kango and Omboué (200 persons in total)

(4) Period

Phase-1: Two years
Phase-2: Four years

2. Objective and Relevance

(1) Objective

To introduce small set-net fishing for the small-scale fishers so as to earn additional incomes for their livelihood by operating and managing the nets,

(2) Relevance

Set-net fishing is a method to trap fish, moving by themselves into the net and fishers need not to drive their boats, spending a lot of fuel oil and time, to look for fish. They can land fish in a short time operation of the net.

If they have a good area for the set-net fishing near their village, they can save time and fuel for the fishing. It is possible to work with the net in part-time to earn additional incomes from it, continuing their present fishing. In the inland water areas, because of the features mentioned above, the set-net fishing can become a valid source of incomes for the fishers who do not have fishing skills and measures.

(3) Outcomes to be achieved

【Phase-1】

1. Models of small set-net are made and installed.
2. Instructor teams of the project execution agencies and fishers groups have acquired the ability to make, install, operate and maintain the nets.
3. The Fishers groups operate and manage the nets.
4. The Fishers groups earn incomes by operating the nets.
5. Regulations on the small set-net fishing are prepared.
6. Funds for the project are made and managed.

【Phase-2】

1. The set-nets developed in the Phase-1 are made and installed by the Instructor teams and the fishers groups selected for the phase-2.
2. The fishers groups operate and manage the nets.
3. The Fishers groups earn incomes by operating the nets.
4. Funds for the project are managed.

3. Project Contents and Activities

【Phase-1】

The followings activities are included. Though a series of the activities, the Instructor teams and the fishers groups acquire the ability to make, install, operate and maintain the nets.

1. Survey of the project areas: to select fishing areas, fishing villages and fishers groups.
2. Survey of the fishing grounds together with the fishers groups selected to identify fishing grounds

(places to install the net) and design the net

3. Procurement of materials: to procure materials for making the nets in Gabon and/or from other countries.
4. Making and installation of the nets: The instructor teams and the fishers groups make the nets and install them.
5. Operation and maintenance of the net: The fishers groups make the nets and install them, keeping records of the operations
6. Sales of catches: The fishers groups sell the catches, keeping records of the sales.
7. Monitoring of the operations and sales: The instructor teams monitor the operation/sales and evaluate management of the fishing.
8. Management of the funds: The project agencies manage the funds for the project established with the share of the sales money.
9. Preparation of regulations: DGPA prepares regulations on the set-net fishing.

【Phase-2】

The instructor teams conduct the technical transfer programs to the fishers groups for making, installation, operation and maintenance of the set net and give instructions to the fishers for their management of the fishing/sales and monitoring their operations. The activities follow the procedure of the Phase-1.

4. Equipment Plan

Equipment	Quantity	Descriptions	Notes
Phase-1			
Small set-net	2 sets	Completed sets	Made in Japan
Material for the net	8 sets	Floats, led sinkers, anchors, net webs, net twine, rope	Making the net
Boats with outboard engine	4 boats	Made of FRP, Length: 7.2m x Breadth: 1.8m、Outboard engine: 40 hp	Survey of the
Equipment for survey	4 sets	Portable echo sounder、portable GPS	Survey of fishing grounds
Phase-2			
Material for the net	8 sets	Floats, led sinkers, anchors, net webs, net twine, rope	Making the net
Outboard engine	4 sets	Outboard engine: 40 hp	

5. Management Plan

(1) Management Structure

Responsible/Supervising organization : DGPA

Executing agency in project areas : Inspection Office of Estuary Province (for Libreville and Kango)
Inspection Office of Ogoué Maritime Province (for Port Gentil and Omboué)

Organization	Functions/operations
Responsible/Supervising organization : DGPA	- To prepare implementation plan of the Project. To Promote and supervise the implementation. - To Obtain finances and secure budget necessary for the project. - To procure necessary equipment/material - To monitor and supervise the execution and manage the schedule of execution of the project. - To manage the fund for the project - To make regulations on the set-net fishing
Executing agency in project areas : - Inspection Office of Estuary Province - Inspection Office of	- To organize the instructor teams: One team for each project area (Port Gentil, Libreville, Kango and Omboué) - To conduct the project activities with the instructor teams, instructing the fishers groups. - Survey of project areas - Contract with each of the fishers group for the project.

Ogoué Maritime Province	- Survey of fishing grounds, place for installation of the nets, design of the nets. - Making the nets, installation of the nets and instructions to the fishers groups for operation - Monitoring of the operations and management of the nets. - Management of the fund.

(2) Personnel Plan

Personnel	Person	Period in total	Recruit the personnel from
Supervising team of DGPA			
Project manager	1	6 years	DGPA（DPA）
Project coordinator	1	6 years	DGPA
Fishery instructor (fishing net)	1	6 years	DGPA
Fishing gear specialist (Set-net)	1	3 years	Japanese expert
Instructor team to be organized by the Inspection Office.（Four teams in total for four project areas）			
Team Leader	4	6 years	Inspector Office
Fishery instructor (fishing net)	8	6 years	Inspector Office
Management of money	4	6 years	Inspector Office or Fishery Center

(3) Utilization of NGO

Following activities can be entrusted to NGO, so that the executing agencies can spare more time to guide the fishers in the project.

- Guidance on recording of fishing operation/sales of catches to the fishers and collection of the records from them.
- Collection of repayment from all the fishers groups for the cooperative.
- Keeping the books on catches and repayment/balance of loan of each fisher's group.

(4) Education and Training for Personnel

Number of trainees	Period	Training contents	Means of training
Pase-1 : Training for the fishery instructors of DGPA and Inspector Office			
Fishery instructors 9 persons	2 years	Survey of fishing grounds. Making set-nets, installation of the net. Management of the set-net fishing	OJT by Japanese expert
Phase-2 : Training for the fishery instructors of DGPA and Inspector Office			
Fishery instructors 9 persons	1year	Survey of fishing grounds. Making set-nets, installation of the net. Management of the set-net fishing	OJT by Japanese expert

6. Implementation Schedule

Activities		Schedule (year)										Outcome
		1	2	3	4	5	6	7	8	9	10	
Phase-1												
Survey of the site												Selection of fishing grounds
Procurement of material, making nets, installation												Nets installed
Operation/management												Management of fund, Regulations on set-net fishing.
Phase-2												
Survey of the site												Selection of fishing grounds
Procurement of material, making nets, installation												Nets installed
Operation/management												Management of fund, re-procurement of material

7. Project Cost

(1) Facilities and Equipment

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Phase-1				
Small set-net	2 sets	24,000	48,000	Import（Japan）
Materials for the net	8 sets	4,400	35,200	
Boats with outboard engine 40hp	4 sets	7,500	30,000	
Equipment for survey	4 sets	360	1,440	
Sub-total			110,640	
Phase-2				
Materials for the net	60 sets	4,800	288,000	
Outboard engine 40hp	4 sets	2,300	9,200	
Sub-total			288,000	
Total			398,640	

(2) Personnel Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Phase-1				
Allowance for fishers	400 psn-days	12/day	48,000	Making/setting nets
Foreign expert	12 psn-month	12,000/month	144,000	
Sub-total			192,000	
Phase-2				
Foreign expert	6 psn-month	12,000/month	72,000	
Total			264,000	

(3) Management Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Phase-1				
Travel expenses for C/P	288 days	50 /day	14,400	
Transportation for C/P	48 tines	150 /time	7,200	
Rental car for C/P	120 days	50 /day	6,000	
Travel expenses for Instructor	360 days	50 /day	18,000	
Transportatio for Instructor	24 times	450 /time	10,800	
Rental boat	120 times	70 /time	5,600	
Sub-total			64,800	
Phase-2				
Travel expenses for C/P	576 days	50 /day	28,800	
Transportation for C/P	48 times	150 /time	7,200	
Rental car for C/P	240 days	50 /day	12,000	
Travel expenses for Instructor	720 days	50 /days	36,000	
Transportation for Instructor	48 times	450 /time	21,600	
Rental boat	480 times	70 /time	33,600	
Sub-total			139,200	
Total			204,000	

8. Expected Benefit and Impact

(1) Economic benefit

Catches will be increased. The catches with the set-nets of the project will be expected as follows.

	Coastal areas	Inland-water area
Number of the nets in Phase-1	4 sets	4 sets

Number of the nets in Phase-2	40 sets	20 sets
Total number of the nets	44 sets	24 sets
Total catch expected	With assumption of Catch per operation =50kg、Number of operation =100 times/year	
	220 ton/year	120 ton/year

With the catches estimated above and 100 times of the fishing operation a year, the incomes for the fishers can be expect as follows:

	Per year	Per month
Catches	5,000 kg	417 kg
Selling price in average	1,200 CFA/kg	1,200 CFA/kg
Sales amount	6,000,000 CFA	500,000 CFA
Expenses for fishing （8,000CFA/time）	800,000 CFA	667,000 CFA
Expenses for maintenance	200,000 CFA	17,000 CFA
Repayment of loan for the net (*)with assumption that the repayment period is two years	1,400,000 CFA	117,000 CFA
Incomes for the fishers	3,600,000 CFA	300,000 CFA
Averaged incomes per person (10 persons in a group)	360,000 CFA/person	30,000 CFA/ person
(*)Averaged incomes per person after finish the repayment	500,000 CFA/person	41,600 CFA/ person

(2) Social impacts

The small set-net fishing is not only for the foreign fishers working for the coastal fishery. It is a fishing method which Gabonese fishers, having few fishing gears for coastal fishing, can also work with. The fishing method is therefore useful to create job-opportunities evenly for the people in the communities and maintain the multinational societies.

i) Ensuring of safety life

This project aims at creating a source of additional incomes for fishers by introduction of a small set-net fishing method that needs less cost. With this fishing method, the fishers groups will be able to obtain catches regularly in a short time operation. They will be able to take fish from the set-nets on the way back to their villages from their primary fishing, and thereby they may have additional incomes without changes of their present fishing and living patterns.

In the coastal fishing villages, electricity and water are supplied for much more people than in inland areas; but still small-scale fishers do not have water supply yet. These small-scale fishers are main targets of this project, and if they obtain additional incomes enough to pay water bill, they can get water supply. They may repair their houses as well. They will be also able to send their children to school and pay medical bills for their family members. Thus, the project will contribute to improve the fisher's living conditions including health care and education of their family.

ii) Stabilization of cooperative activities

In the process of introduction of the new fishing method, all the fishers of the project areas must have talks and mutual understanding on the fishing method. It is therefore expected that the fishers will have communications more frequently among the villages and it will contribute to activate the villages in the areas.

9. Monitoring

DGPA conducts monitoring on the project as follows.

Subject to monitor	Monitor	Schedule	To be monitored
Progress of introduction of nets	DGPA	After fixing net	Inspection Office/fishers groups
Condition of operation	Inspection office	Once/month	Instruction team/Fishers groups
Management of fund	DGPA	Every three months	Inspection Office

10. Environmental Impact

Fisheries resource may be affected, depending on conditions such as structure/scale of net, number of nets and place to fix net. Besides, this fishing may cause troubles with other fishing and/or activities such as transportation, depending on places to fix the net. In order not to make those problems, it is essential to control the fishing along with regulations, which regulate structure/sale of nets, number of nets and water areas to install the nets. Keeping records on every fishing operation is indispensable for long-term observation on the catches for management of the resources. In the phase-1 of this project, the regulation will be prepared.

11. Collaboration with Other Projects

For procurement of the equipment/ materials for the set-nets, it is desirable to coordinate with the Project for Financing of Small-scale Fishery, to utilize the credits and make repayment.

4. 4. 5 Project for Modernization of Fishing Boats

1. Outline of the Project

(1) Abstract

It is essential to exploit the fishery resources in the coastal areas for development of the fishery of Gabon and it is therefore necessary to promote the fishing in the coastal/offshore areas with fishing boats capable for sailing and fishing in the open sea.

In the pilot project, conducted in 2008, for trial operation of a new fishing boat equipped with an inboard diesel engine, it was verified that the boat is effective in sailing and fishing in the open sea and exploitation of new fishing grounds in the coastal areas is possible with the boat. Based on these results, it is planned to introduce the new fishing boats with instructions for fishers on operation of the boats for development of fishery in the coastal/offshore areas.

This project consists of two phases. The phase-1 is to conduct experimental operations of the new boats for experimental fishing, development of fishing methods/ gears and to evaluate profitability of the boats. In this phase, the boats are operated based on Port-Gentil Fishery Center. This phase includes training of the fishers groups on operation of the boats, experimental fishing to exploit new fishing grounds, establishment of a cooperative under DGPA to support the fishers groups for their fishing operation with the boats and to manage the fund for the project.

In the phase-2, the project area includes Libreville and Mayumba in addition to Port-Gentil. The new boats will be introduced with instructions for the fishers groups selected in these areas.

In Mayumba, under instructions and supports of DGPA, the fishers groups operate experimental fishing with the boats for exploitation of the fishery resources in the coastal/offshore areas.

(2) Project areas

Operation areas of the new boats are in the coastal/offshore areas of Gabon. For the Phase-1, Port-Gentil Fishery Center is the base of the operation. For the Phase-2, the new boats are operated based on Libreville

Fishery Center (tentative name) and Mayumba Fishery Center (tentative name) in addition to Port-Gentil Fishery Center.

(3) Persons to participate in the project

DGPA: Approx. 10 persons (including personnel of the Inspection Offices and the Fishery Centers)
Fishers groups: Port Gentil= 12 groups (approx. 60 persons) ,
Libreville = 12 groups (approx. 60 persons),
Mayumba = 2 groups (approx. 10 persons),
(The above are total numbers of the phase-1 and the phase-2)

(4) Period

Phase-1 : 3 years
Phase-2 : 3 years

2. Objective and Relevance

(1) Objective

For promotion of the coastal fishery, the project has the following direct objectives.
To introduce new fishing boats with capacity of fishing in the open sea
To encourage fishers operate experimental fishing with the boats to exploit the resources in the coastal/offshore areas.

(2) Relevance

Fishing boats of good seaworthiness are necessary for fishing in the open sea. A pilot project was conducted in Port-Gentil in 2008, in which a small fishing boat (equipped an inboard diesel engine) was built in Gabon for fishing in the coastal/offshore areas and operated by a fishers group. As a result of the project, the boat was verified to be capable for sailing and fishing in the open sea with the following advantages.

- Good seaworthiness
- Stable operation of the inboard diesel engine
- Good fuel-efficiency and extension of range of navigation and fishing time,
- Capacity to exploit new fishing grounds, together with echo sounder and GPS

Exploitation of resources in the coastal areas is essential for promotion of the fisheries in Gabon. It is therefore necessary to promote fishing in the coastal areas with fishing boats capable in sailing and fishing in the open sea. This project is to introduce the new fishing boats with abovementioned capacity and to promote the fishing with the boats by trained fishers.

(3) Outcomes to be achieved

1. The fishers groups do fishing in the coastal areas, by operating the new boats.
2. For management of the new boats, a cooperative is organized under DGPA
3. The cooperative assist the fishers groups for their operation of the fishing boats and sales of the catches.
4. The funds for the project are managed.
5. The fishing boats are re-procured with the funds.

3. Activities of the Project

(1) Training of the fishers groups to operate the fishing boats:

Fishery instructors of DGPA (CMPA) and/or the Inspection Offices train the fishers groups to operate the fishing boats. The first training will be made for about one month including lectures before starting the operation of the boats. The instructors will make necessary instructions for the fishers groups.

(2) Establishment of the cooperative for management of the fishing boats, Procurement of the fishing boats and Selection of the fishers groups:

DGPA organizes a cooperative to support the fishers groups for their operation of the fishing boats and to manage the funds for the project. Under a contract with the cooperative, the fisher's groups operate and manage the fishing boat. The cooperative places staff at the Fishery Centers to assist the fishers groups in

their preparation for fishing and sales of catch as well as collection of management charge (repayment of loan for the fishing boats).

1. Establishment of the cooperative by DGPA
2. Management of the cooperative under instruction and supervision of DGPA
3. Instructions for the fishers groups on operation/maintenance of the fishing boats
4. Assist the fishers groups for preparation for fishing and sales of the catches
5. Collection of management charge (repayment of loan for the fishing boats)
6. Management of the funds for the project under supervision of DGPA

(3) Support for maintenance

DGPA trains mechanics of diesel engines in the Fishery Centers for maintenance of engines of the boats.

(4) Development of fishing methods and fishing grounds (Mayumba)

Two fishers groups will be selected and two of the new boats with fishing gears/materials will be provided to conduct the following activities with technical and financial supports by DGPA.

1) DGPA's instructor team trains the fishers groups to operate the boats and experiment fishing.
2) Under a contract with DGPA and the cooperative, the fishers groups operate the fishing boats for experimental fishing for trials of new fishing gears and exploitation of new fishing grounds.
3) DGPA and the cooperative disseminate the information/ results of the experimental fishing to fishers in other areas.

4. Equipment Plan

Equipment	Quantity	Descriptions	Notes
Fishing boats	26 sets	Made of FRP, Length: 12m x Breadth: 2m, With insulated fish-holds, cabin at the fore Inboard diesel engine: 28 hp Equipped with echo-sounder, potable GPS, hand bilge water pump.	Phase-1: POG= 4 boats Phase-2: POG= 8 boats LBV= 12 boats MYB= 2 boats
Spare parts of engine of the boats	26 sets		
Mooring buoy and Anchor, chain, rope	26 sets		
Fishing material	2 sets	Fishing material for long lines, purse seine,	Phase-2: MYB= 2 boats
VHF radio set	3 sets	For the Fishery Centers Provided with antenna, transformer for power supply.	Phase-1: POG= 1 set Phase-2: LBV= 1 boats MYB= 1 boats

5. Management Plan

(1) Management Structure

Responsible/Supervising organization : DGPA/Inspection Office

- To direct and supervise the project
- To organize the cooperative for management of the boats, instruct and supervise the management of the cooperative.
- To select the fishers groups
- To procure the new fishing boats and other equipment/materials

Cooperative for management of the boats

- To guide and instruct the fishers groups for their operation of the new fishing boats
- To assist the fishers groups for their preparation of the boats
- To collect money (repayment of the loan) from sales of the catches.

– To manage the funds established with the money collected from the fishers groups
– To re-procure the boat with the fund.

Instructors of DGPA (CMPA) and the Inspection Office

– To instruct the fishers groups for operation of the boats and fishing technique
– To provide results of experimental fishing for other fishers.
– To train mechanics for maintenance /repair of diesel engine
– To advice the fishers groups no maintenance of the engine

Fishers groups

– To make a contract with the cooperative to operate the boats
– To have instructions/training for operation of the boats
– To operate the boat under the contract with the cooperative
– To record data of the fishing operation and sales of catches every time and submit the records to the cooperative.
– To pay money (repayment of the loan) to the cooperative from the sales money of the catches
– To obtain the ownership of the boat when the repayment is finished.

(2) Personnel Plan

Personnel	Persons	Period in total	Recruit the personnel from
DGPA			
Project manager	1	6 years	DGPA (DPA)
Project coordinator	1	6 years	DGPA
Cooperative for management of the boats			
Manager of the cooperative	3	3 years	DGPA Phase-1 (1) , Phase-2 (2)
Accountant	3	3 years	DGPA Phase-1 (1) , Phase-2 (2)
Service staff	5	3 years	DGPA Phase-1 (2) , Phase-2 (3)
Instructors of DGPA (CMPA) and the Inspection Office.			
Instructor on boat and fishing	1	6 years	DGPA (CMPA)
Mechanic for diesel engine	2	3 years	Inspector Office/ CCPAP

(3) Utilization of NGO

Following activities may be entrusted to NGO, so that the executing agencies can spare more time to guide the fishers in the project.

- Guidance on recording of fishing operation and sales of catches and collection of the records
- Collection of sales money and settlement of expenses, collection of repayment from all the fishers groups
- Keeping the books on fishing/ catches and repayment/balance of loan of each fishers group.

(4) Education and Training for Personnel

Number of trainees	Period	Training contents	Means of training
Manager of cooperative 3 persons Accountant 3 persons Service staff 5 persons	2 years	Management of cooperative Management of fund Service for the fishers	OJT by DGPA and foreign fishery expert
Mechanic 2 persons	2 year	Maintenance of diesel engines	OJT by foreign engineer
Fisher's groups of Mayumba 2 groups = 10 persons	6 months	Operation of the boat Fishing technique	OJT on board by Fishery Instructor of DGPA and foreign fishery expert.

6. Implementation Schedule

Activities	Execution	Schedule (year)												Results
			1	2	3		5	6	8	9	10		11	12
Phase-1														
Organize the cooperative in POG	DGPA			▬										
Supervision of coop.	DGPA				▬	▬	▬							
Selection of fisher's gp.	DGPA/ Coop.			▬										Fishers groups

Training of fisher's gp.	CMPA												
Training of mechanics	CMPA												Maintenance of engine
Procurement of boats	DGPA												Fishing boats
Fishing with boats	Coop.												Records of fishing
Operation of cooperative	Coop.												Support fishers
Management of fund	Coop.												Re-procurement of boats
Phase-2													
Organize the cooperative in LBV, MYB	DGPA												Cooperative in LBV
Supervision of coop.	DGPA												
Selection of fisher's gp.	DGPA/ Coop.												Fishers groups
Training of fishers gp.	CMPA												
Training of mechanics	CMPA												Maintenance of engine
Procurement of boats	DGPA												Fishing boats
Fishing with boats	Coop.												Records of fishing
Operation of cooperative	Coop.												Support fishers
Management of fund	Coop.												Re-procurement of boats

7. Project Cost

(1) Facilities/Equipment

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
FRP fishing boat	26 sets	27,000	702,000	
Spare parts of engine of the boats	26 sets	2,000	52,000	
Mooring buoys and anchors	26 sets	600	15,600	
Fishing materials for the boats	26 sets	2,000	52,000	
VHF radio for the Fishery Centers	3 sets	800	2,400	
Total			824,000	

(2) Personnel Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Personnel of cooperative	396 psn-days	180/month	71,280	POG(4),LBV(4),MYB(3)
Foreign expert	48 psn-month	1,000/month	48,000	
Travel expense for above	96 psn-days	50/month	4,800	
Transportation expense	48 times	150/time	72,00	
Total			131,280	

(3) Management Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Travel expenses for C/P	240 psn-days	50 /day	12,000	
Transportation for C/P	200 days	150 /day	30,000	
Travel expenses for instructor of CMPA	360 psn-days	50 /day	18,000	
Transportation for Instructor	24 psn-days	150 /day	3,600	
Expenses for Cooperative	108 months	400 /month	43,200	
Expenses for sailing of boats	26 boats	500 /time	13,000	
Total			119,800	

8. Expected Benefit and Impact

(1) Economic benefit

Catches will increase with the operation of the 26 new fishing boats, introduced in the project. The increase of the catches is expected to be 374 ton annually, based on the expected catch per boat at 14.4 ton/year. Under instructions and management of the project by DGPA and the cooperative, if the fishers groups make

payment (repayment of the loan) to the cooperative as scheduled, it would be possible to construct new fishing boats with the funds.

Incomes of the fishers are estimated as follows, provided that they make the fishing voyages three times per month, 36 times per annum.

	Per year	Per one voyage
Catches	14.4 ton	400 kg
Selling price in average	1,425 CFA/kg	1,425 CFA/kg
Sales amount	20,520,000 CFA	570,000 CFA
Expenses for the fishing	9,000,000 CFA	250,000 CFA
Gross profit	11,520,000 CFA	220,000 CFA
Annual incomes of the fishers (Owner and crew)		
	Owner	Crew
Sharing ratio	50% of gross profit	50% of gross profit
Shares of the gross profit	5,760,000 CFA	5,760,000 CFA
Share per fisherman (in a case of five fishers)		1,152,000 CFA/person
Money to the cooperative (Repayment of loan) (*/1)	3,540,000 CFA	
Owner's expenses （maintenance expenses）	1,000,000 CFA	
Owner's net income	1,220,000 CFA	

(*/1) Estimated on conditions of the loan 26,000,000CFA with 2% interest 2% annually, repayment in eight years.

(2) Social impact

Although the main participants in this project are basically the foreign fishers who are well experienced in fishing in the coastal areas, the Gabonese fishers also have chances to participate in the project as owners of the new fishing boats or as crewmembers joining in the foreign fisher's groups, working on the boats. The project will not therefore give rise to conflicts among the fishers of different nationalities.

i) Habitation of young generation in the villages

There are many cases that young fishers, earning little income by fishing, seek jobs such as construction work in major cities. Although they may have better payment from the casual jobs in cities than fishing, they are discharged from the job when it is finished. Because of no other jobs available for them, they return to the villages, but it is difficult for them to return to their fishing. With this project, promoting modernization of fishing boats, if the fishing work on board becomes effective and easier, providing better incomes, the working conditions for the young fishers will be improved, and thereby they will need not to seek casual labor in cities and remain in the villages, working for the fishery. It will contribute to activation of the fishing villages, preventing from aging of the fishers.

ii) Upgrading of safety during fishing

While accidents of fishing boats happen every year, the new fishing boats will increase safety in sailing and fishing work in open sea, thereby decreasing danger on lives and loss of assets of fishers. With increased safety, coupled with increased efficiency of fishing work and income, people will see the coastal fishery in a new light and young people may thus enter into the fishery. By increasing young fishers, aging of fishers will be prevented and modernization of the fishery will be accelerated.

iii) Enhancement of physical distribution and human exchanges

As the fishing boats introduced under the Project can navigate between Mayumba – Port-Gentil – Libreville, the fishers of Mayumba will be able to unload fish at Port-Gentil or Libreville after fishing, and be back to Mayumba after buying requisites such as ice, fuel and materials. Therefore, it is expected that the physical distribution and human exchanges between different regions will be expanded through the effective operation of project boats.

9. Monitoring

DGPA conducts monitoring on the Phase-1 and Phase-2 as follows.

Subject to monitor	Monitor	Schedule	To be monitored

Procurement of the new boats	DGPA	Once/month	Boat builder
Training of the fishers groups	DGPA	End of initial training	Instructors team/Fishers groups
Operation of the boats by the groups	DGPA	Every three months	Cooperative/Fishers groups
Operation of the cooperative	DGPA	Every three months	Cooperative
Management of the fund	DGPA	Every three months	Cooperative

10. Environmental Impact

There is no serious impact on environment. Waste of engine oil should be properly treated. The workshops of the Fishery Centers need to collect the waste oil and bring it to fuel-stations for its disposal appropriately Since excessive catching may affects fishery resources, it is necessary to monitor changes of the catches continuously by keeping recording of fishing data on every operation for management of the resources. In addition, it is necessary to fully discuss not to make troubles among fishers groups concerning the ownership and right of use of fishing boats.

11. Collaboration with Other Projects

There is no other project to be coordinated.

4. 4. 6 Project for Improvement of Fishing Village Environment

1. Outline of the Project

(1) Abstract

In the inland water areas, including lagoon areas, having only small villages, sparsely scattered with a small population, there are neither roads nor means of communication. The villagers have difficulties in having information or services from the local public office and communication among the villages. They cannot contact others to request immediate help in case of emergency, either.

In the cities of the coastal areas, though they have better conditions in transportation and communication than aforementioned case, the fishing villages with a dense population are under unsanitary environment due to no drainage facilities and poor road conditions. These conditions also affect activities in the villages.

Many of women of fishing families have to work much longer than men for processing/ selling fish besides housework. Since they have to do housework as well as childcare, they have difficulty in spending time for earning incomes. In particular in the fishing village where women do fishing, this situation tends to be more conspicuous.

With these situations, this project is aimed at improving environment of fishing villages with following components, i) setting up communication systems for fishing villages in the inland-water areas, ii) improvement of roads and drainage system in coastal fishing villages and iii) setting up facilities to support working women in fishing villages where many women are doing fishing by themselves.

(2) Project Areas

i) Establishment of communication system among fishing villages

The project area is to have some exchanges among villages and can be expected that their community activities become active with a communication system. From the following areas, fishing villages for the

project will be selected through surveys to be conducted in the beginning of the project.

Moyen Ogoué Province: Lake areas (Lacs Sud、Lacs Nord) southwest of Lambaréné
Ogoué Maritime Province: Areas of Lagoon Nkomi (Olendé is included.)
Nyanga Province: Areas of Lagoon Banio

ii) Improvement of living environment

Ogoué Maritime Province: Port Gentil area
Estuary Province: Pont-Numba area, Aviation area, Owendou area

iii) Establishment of facilities to support working women

Estuary Province: Kango

(3) Target Groups

- People living in fishing villages of the project areas
- Inspection Office and/or Fishery Center, controlling the project areas
- Women working for fishing in Kango approx. 200 persons.

(4) Period

i) Establishment of communication system among fishing villages: 3 years
ii) Improvement of living environment: 5 years
iii) Establishment of facilities to support working women: 4 years

2. Objective and Relevance

(1) Objective

Objectives of the project are as follows:

- To establish communication systems among the Inspection Office/Fishery Center and fishing villages which have presently no way to communicate. Utilizing the communication system, the project is aimed at supporting community activities among fishing villages as well as providing information and services from the Inspection Office/Fishery Center for the villagers.
- To improve living environment of the villages to facilitate villagers' lives.
- To support working women by arranging the environment in which women can work with mind at ease.

(2) Relevance

Utilizing the communication systems, the villagers can communicate with others in the project area as well as have information/service from the local public office. This will improve lives and security of the villagers. They can also communicate with merchants to activate and improve their fishing and marketing of catches. With improved roads and drainage facilities, sanitary conditions of the villages will be improved. It facilitates to improve the villagers' lives.

Having facilities and activities of the project, women of fishing villages will have more chances to participate in economical activities.

(3) Outcomes to be achieved

i) Establishment of communication system among fishing villages

1. Communication systems are established in the project areas.
2. It becomes easier to provide information and services from the Inspection Office/ Fishery Center

ii) Improvement of living environment

1. Roads and drainage facilities are constructed in the fishing villages
2. Villagers clean and maintain the drainage facilities.

iii) Establishment of facilities to support the working women

1. "Women's house" is built and utilized for supporting women working for their families.

3. Project Contents and Activities

(1) Establishment of communication system among fishing villages

1) Selection of fishing villages in the project areas

The project areas for communication system are as follows.

a) Moyen-Ogooué Province: Lacs Sud, south of Ogoué river, southwest of Lambaréné
Lacs Nord, north of Ogoué river, southwest of Lambaréné
Center station = In the Inspection Office of Moyen Ogoué Province in Lambaréné
Key-station = In two villages (Lacs Sud: 1、Lacs Nord: 1)
Satellite station= In 20 villages

b) Ogooué-Maritime Province: Areas of Lagoon Nkomi (Olendé is included.)
Center station = In Omboué Fishery Center
Key-station = In one village
Satellite station= In 10 villages

c) Nyanga Province: Areas of Lagoon Banio
Center station = In the Inspection Office
Key-station = Ndindi
Satellite station= In 10 villages

2) Operation system of communication system

Persons in charge (operators of the system) are to be selected from each village and the Inspection Office/Fishery Center. Ways of communication among the stations have to be arranged.

3) Procurement of equipment and their installation

DGPA procures necessary equipment/material including radio telephones, antennas and equipment for power supply. DGPA also arrange with manufacturer of the radio equipment for installation and adjustment of the radio equipment in all the stations, including instructions how to operate the radio and maintain the system.

(2) Improvement of living environment

1) Selection of the villages:

For selection of target villages, DGPA ask villages in the project areas to submit their proposal for improvement of environment of their villages. (Form for the proposal is prepared by DGPA.) The target villages shall be selected through evaluation of the proposal.

2) Planning for improvement:

DGPA examines the proposal together with the villagers and prepare plans of necessary facilities such as roads and drainage facilities.

3) Construction of facilities:

4) Maintenance of facilities by villagers:

(3) Establishment of facilities to support the working women

This component is to support women working in fishery, enabling them i) to put their infants/children under day care service, ii) to have training for work to earn incomes and iii) to participate in community activities such as cooking course, so that they can put themselves to their work. For this purpose, the project prepares facilities with functions of day care service, vocational education and meeting, utilizing community centers if available. The facilities are usually managed by the municipal office. Activities utilizing the facilities are planed and managed by the local women's association, inviting instructors when necessary (See 4. 3. 3 Project for diversification of income sources). Fees are collected from the participants and managed by the women's association for the expenditure of the activities.

4. Facilities and Equipment Plan

(1) Establishment of communication system among fishing villages

i) Equipment plan

Equipment	Quantity	Descriptions	Notes
SSB radio set	7 sets	150 W	For the center stations and key stations

Material for antenna,	7 sets	Antenna pole made of pipe, Height 12m earth plates	For the center stations and key stations
Battery charger	3 sets	220V/DC12V	For the center stations
Battery	3 sets	12V 120AH	For the center stations
Solar panels	4 sets	Solar panels with setting stands	For the key stations
Battery	4 sets	12V 120AH	For the key stations
Generator	4 sets	500 VA	For the key stations
SSB radio set	36 sets	100 W	For the satellite stations
Material for antenna	36 sets	Antenna pole made of pipe, Height 12m earth plates	For the satellite stations
Solar panels	36 sets	Solar panels with setting stands	For the satellite stations
Battery	36 sets	12V 100AH	For the satellite stations
Generator	36 sets	500 VA	For the satellite stations

(2) Improvement of living environment

i) Facilities plan

Facility	Structures	Area/ Dimensions	Notes
Drainage	Made of concrete, PVC pipe	Approx. 1km /village	
Sewage disposal	Sewage disposal tank	5m x 10m 2 tanks/village	
Road		Approx. 1km /village	

(3) Establishment of facilities to support the working women

i) Facilities plan

Facility	Structures	Area/ Dimensions	Notes
"Women's House"	CB construction, One-story house	Rooms for training, day care, lavatory, storage approx. $100m^2$	

5. Management Plan

(1) Management Structure

Responsible/Supervising organization : DGPA

- To promote and supervise the project
- To direct and supervise the implementation (procurement of equipment, their installation, construction of facilities, training and operation)

i) Establishment of communication system among fishing villages

Executing agency: Inspection Office/ Fishery Center

- To select the fishing villages, under supervision of DGPA
- To prepare manual for utilization of the communication system, under supervision of DGPA
- To instruct the villages on utilization of the communication system and monitoring.
- To instruct the villages on maintenance of the system.

ii) Improvement of living environment

Executing agency: Provincial Offices or City offices, having jurisdiction over the project area

iii) Establishment of facilities to support the working women

Executing agency: Kango City Office, Kango Women's Association

(2) Personnel Plan

i) Establishment of communication system among fishing villages

Personnel	Persons	Period in total	Recruit the personnel from
Project manager	1	years	DGPA
Project coordinator	1	years	DGPA
Technician of radio equipment	1	years	DGPA
Instructor for communication system	3	years	Inspection Office

Operator of the center station	3	years	Inspection Office
Operator of the station in village	40	years	Fishing villages

ii) Improvement of living environment

Personnel	Persons	Period in total	Recruit the personnel from
Project manager	1	years	DGPA
Project coordinator	1	years	Provincial Offices or City offices
Design of the facilities and supervision of the construction	1	years	Provincial Offices or City offices
Instructor on environment of village	4	years	Inspection Office
Leaders for cleaning of village	40	years	Fishing villages

iii) Establishment of facilities to support the working women

Personnel	Persons	Period in total	Recruit the personnel from
Project coordinator	1	3 years	Komo Provincial Office or Kango City office
Design of the facilities and supervision of the construction	1	1 years	Komo Provincial Office or Kango City office
Planning/ management of activities	3	years	Kango Women's Association

(3) Utilization of NGO

Following activities may be entrusted to NGO, so that the executing agencies can spare more time to guide the fishers/ villagers in the project.

i) Establishment of communication system among fishing villages:
- Guidance to the villagers for utilization of the communication system and utilization of the system for activities of the community.

ii) Improvement of living environment:
- Guidance and support the villagers for cleaning/maintenance of the draining facilities,

iii) Establishment of facilities to support the working women:
- Guidance and support the Women's Association for their activities, utilizing "Women's House".

(4) Education and Training for Personnel

i) Establishment of communication system among fishing villages

Number of trainees	Period	Training contents	Means of training
Technician of radio equipment 1 person	1 month	Operation and maintenance of the radio equipment system	OJT by engineers of manufacturer of the radio equipment.
Operator of the center station 3 persons	1 month		
Operator of the station of the villages	1 week	Operation and maintenance of the radio equipment	

ii) Improvement of living environment

Number of trainees	Period	Training contents	Means of training
Instructor on environment of village 4 persons	1 week	Leaning and maintenance of the drainage system	OJT by engineers after construction of the system
Leaders for cleaning of village 40 persons	1 week		

6. Implementation Plan

Activities		Schedule (year)												Outcome
		1	2	3	4	5	6	7	8	9	10	11	12	
1) Establishment of communication system among fishing villages														
Selection of villages				▬										
Procurement of equipment				▬	▬									Equipment

Installation of equipment					▬	▬								Completion of setting the system
Training to operate the system					▪	▪								Acquire ability to operate the radio system
Operation of the system					▬	▬	▪	▪	▪	▪	▪	▪	▪	Records of operation.
2) Improvement of living environment														
Selection of villages					▬									
Design of facilities						▬								Designs
Construction							▬							Completion of facilities
Maintenance								▬	▬	▪	▪	▪	▪	Maintenance
iii) Establishment of facilities to support the working women														
Organizing Women's association, Planning of activities					▬									Articles of association
Construction of "Women's house"						▬								Certificate of completion of the house
Utilization of the House							▬	▬	▪	▪	▪	▪		Report of activities

7. Project Cost

(1) Establishment of communication system among fishing villages

i) Facilities and Equipment

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
SSB radio set	7 sets	5,600	39,200	Antenna included
Equipment for power supply (Center)	3 sets	640	1,920	
Equipment for power supply (Key)	4 sets	2,840	11,360	
SSB radio set for villages	36 sets	7,640	275,000	Antenna / power equipment included
Transportation / installation of equipment			90,000	
Total			427,520	

ii) Personnel Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Designing/Supervision	10% of cost for equipment		42,750	
Total			42,750	

iii) Management Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Travel expenses for C/P	120 man-days	50 /day	6,000	
Transportation for C/P	60 times	60 /times	36,000	
Travel expenses for radio technician of DGPA	225 man-days	50 /day	11,250	
Transportation for the technician	15 times	60 /times	9,000	
Total			62,250	

(2) Improvement of living environment

i) Facilities and Equipment

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Drainage	4,000 m	80 /m	320,000	
Sewage disposal tank	8 units	20,000 /unit	160,000	
Road	4,000 m	200 /m	800,000	
Total			1,280,000	

ii) Personnel Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Designing/Supervising	24 man-month	1,000 /month	24,000	
Travel expenses for supervisor	12 times	900 /time	10,800	15 days/time
Instructor on environment of village	36 mon-month	200 /month	7,200	
Leaders for cleaning of village	960 man-month	100 /month	96,000	
Total			133,500	

iii) Management Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Travel expenses for C/P	72 man-days	50 /day	3,600	
Transportation for C/P	24 times	150 /times	3,600	
Total			7,200	

(3) Establishment of facilities to support the working women

i) Facilities and Equipment

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Construction of "Women's House"	100 m^2	500 /m	50,000	
Total			50,000	

ii) Personnel Cost

Item	Quantity	Unit price (1,000 CFA)	Amount (1,000 CFA)	Note
Designing/Supervising	10 % of construction cost		5,000	
NGO Staff (Promotion)	12 man-month	3,000 /month	36,000	
Total			41,000	

iii) Management Cost

Expenses for activities will be paid with money collected as charges for utilization of the House and participant's fees.

8. Expected Benefit and Impact

(1) Economic benefit

Up to the present, fishers have difficulty in selling fish in fresh and have to smoke or salt-dry the fish to store, because fish-buyers visit the villages only occasionally. With the communication system among the villages, fishers will be able to contact with fish-buyers to sell their catches in fresh. Through communication with fishers, fish-buyers will be able to visit the villages timely to purchase fresh fish. If the fishers can sell their catches in fresh at better price than smoked or dried fish, they will have better incomes.

(2) Social impact

i) Ensuring of safety life

The local public office will be able to understand situations and needs of the villages and provide instructions/ services for the people of the villages. They will thus have better relationships with the local public office. Through communication and exchange of information with people of other villages, they will

have various exchanges among the villages, though their activities have been limited almost within their villages up to now.
Having a means of communication for emergency, safety and security of the villagers will be improved. Implementation of this project by the government will confirm that the fishing village areas are legally secured for the fishers, ensuring their right of residence. Thereby the fishers will eliminate their feeling of mistrust over the administration and they may also make efforts by themselves, spending their money, to improve their villages for future.

ii) Upgrading of health standard
Improvement of drainage canals will reduce the occurrence of mosquito resulting in the reduction of infectious rate to malaria.

iii) Enhancement of cooperative activities
The cooperative works such as cleaning and maintenance of village facilities will be required, and thus the cooperation work system among inhabitants will be established.

iv) Upgrading of women's independence
Marketing of fish/ fishery products are carried out mainly by women and there are also some women working for fishing, but it is hard for women to work outside as they are responsible in housework and childcare. By assisting women in reducing their burdens, more women will be able to have working opportunities outside of houses.

9. Monitoring

(1) Establishment of communication system among fishing villages
Under supervision of DGPA, the Inspection Office listens to the opinions of the operators and villagers of each village regarding the following matters every quarter year.

1. Utilization of the communication equipment
2. Situations on transmission of information/ services from the local public office.
3. Benefits and disadvantages made with the communication system (villagers' lives, security, activities for the community, activities for production and marketing of the products)

(2) Improvement of environment of villages

1. Situations for cleaning/maintenance of the drainage facility by the people.
2. Situations for utilization of the roads

(3) Establishment of facilities to support women working in fishery

1. Working hours of women (Ratio of the time for work to earn incomes)

10. Environmental Impact

The project will have no serious affect on environment. Attention must be paid to disposal of the exhausted butteries after their use to supply electricity to the radio sets. It may be considered to reuse the lead plates for sinkers of fishing gears. In addition, it should be fully considered not to cause water pollution by spill out of waste water to the surrounding area, at the stage of designing of drainage ditch.

11. Collaboration with Other Projects

The communication system established in this project will be also useful for "4. 4. 1 Project for Financing of Small-scale Fishery" and "4. 4. 2 Project for Strengthening of Fisher's Organizations". This project also works with "4. 4. 3 Project for Diversification of Income Sources" in activities of vocational training.

4.4.7 Project for Participative Management of Fishery Resources

1. Outline of the project

(1) Abstract

Gabonese fishing resources are considered to have still exploitable margins in general, however, in some places or for some species, the volume of the catch is stagnating, or there is a phenomenon of reduction in fish sizes. Resource management measures must be taken urgently for some resources in semi-closed water bodies such as lagoons, lakes and marshes, or for some fish species, such as shrimp and lobsters. Nevertheless, it is not practical to enforce strict fishing regulations in the inland water region where people depend predominantly on fishing for their lives. The livelihood of the fishers must first be improved in order to get them to understand the significance of fishery resource management.

In this project, measures are put into practice for sustainable management of local fishery resources jointly by the administration and the inhabitants. Simultaneously, supports shall be granted to small-scale fishers for the activities that facilitate diversification of fishing equipment, diversification in income sources, as well as improvement in the living environment.

(2) Target Areas

Town of Kango, Estuary province (river zone)

- Fishing villages around Lake Onangué, Moyen-Ogooué province (village of Nengue-Ntogolo etc.) (zone with lakes/marshes)
- Fishing villages around Omboué, Ogooué-Maritime province (Nkomi Lagoon) (zone of lagoons)

(3) Target Groups

- Kango: Mainly 12 groups of fishing women, fishing for freshwater prawn (around 100 people) (including seven groups who participated in the pilot project on resource management)
- 10 fishing villages around Lake Onangué:
  Small-scale fishers do gill net fishing in dugout canoes with motors (about 100 people) (two of which participated in the pilot project on micro-credit)
- 10 fishing villages around Omboué:
  10 groups of small-scale fishers (about 50 people) (of which 5 groups participated in the pilot project on micro-credit)

(4) Period

2010-2013 (3 years)
The initial year programs involve fishers having experience and having participated in pilot projects
The 2nd and 3rd year operations include other fishers in the project.

2. Objectives and Relevance

(1) Objectives

Data concerning fishery resources shall be efficiently collected and analysed, and on the basis of these results, the fishing activities shall be managed autonomously by the fisher's associations in order to assure a

sustainable exploitation of fishery resources and at the same time to assure a standard of living of the fisher's families.

(2) Relevance

The inland water of Gabon is zone of "free access" for the fishery resources without any fishing regulation. The trend in fishing effort in the inland waters is not clear as the fisheries statistical data covers mostly the marine fisheries only. Moreover, a reduction in the catch and a decrease in their size have been observed in certain fishing area and for certain fish species. Considering the circumstance, both the administration and the fishers must urgently do studies on the situation of the fishery resources in the water in order to deepen their comprehension on their conditions and begin various activities for fishery resource management.

(3) Outcomes to be achieved

- The fishing situation shall be clarified by daily recording of the fishing activities by the fishers;
- A biological study (measurements of the length and weight of fish, analysis of the water quality) shall be carried out periodically in order to clarify the biological characteristics of the concerned fish species;
- Activities to improve the household economy of the fishers shall be carried out, and once the income of the concerned fishers has been increased, their working hours shall be decreased.

3. Project Contents and Activities

The activities of this project can be divided into three types: (1) data collection and analysis, (2) activities to improve the fisher's economic status, and (3) the establishment of an autonomous management system of local fishing resources.

(1) Data Collection and Analysis

The data concerning resources shall be divided into two types: i) recording of fishing activities by the fishers and ii) biological studies.

i) Recording of fishing activities by the fishers

The recording their daily fishing catch and cash receipts will be given to the fishers' group as the obligatory condition for participating in the program of "activities to improve their economic status". The objective of the recording is to quantify the change in the fishing efforts due to "activities for improving their household economy", and thereby to study the possibilities for controlling the pressure on the resource condition of the fish species targeted for this resource management program. Instructions shall be given to the fishers to improve their recordings on the data sheets that were developed through the pilot projects (micro-credit, participative resource management). The recorded data shall be verified during the monthly monitoring to improve the accuracy. The instructions shall be given not only to improve the recording accuracy but also to become able to realize the "improvement of the financial management of the fishers" based on the data recording during the last year.

ii) Biological Study

This biological study shall be done once a month during the first year in order to comprehend the resources situation of the targeted fish specie (in particular, the distribution of fish size, the minimum size for maturity, variation by fishing ground). The length, weight, sex and maturation, shall be recorded by individual for a set number of sampled specimens. Six to ten study sites shall be selected from the fishing grounds currently used by the fishers. A minimum of 100 samples shall be taken by site and by fish species. The data recording sheets used during the pilot project and later improved shall be used.

Table 4.8 Target Zones and Fish Species for Biological Survey

Zone concerned	No. of sites	Concerned Fish Species
Kango	6	*Missala: Macrobrachium macrobrachion, M. vollenhovenil*
Omboué	10	*Ocean Arius Gambensis: Arius latiscutas, carp: Tilapia spp., humped fish: Pseudotolithus elongates*
Onangué Lake	10	*Carp: Tilapia cabrae, T. ogowensis, T. schwebischi*

(2) Activities to improve the household economy of the fishers

If control of the pressure on the fishing of one particular fish species is necessary, it will first be necessary

to replenish the reduction in the income obtained from the catch of the concerned species by the fishers, and improve their household financial situation before taking measures in terms of resource management. The following four items of equipment which were confirmed for the contribution to the improvement of the standard of living of the fishers during the pilot project shall be supplied through credit to the groups of concerned fishers. If other equipment is requested by the fishers, the applications shall be evaluated for its use and purpose, and they may be approved for introduction if they contribute to the improvement of the domestic economy and to reduction of the pressure on the concerned fish species.

i) Outboard Motors
Outboard motors shall be introduced in all the concerned zones. Their introduction shall allow for the reduction in the time required for the fishers to get to the fishing grounds, and thereby create some free time. We shall study what the fishers will be doing with this free time. The degree of expansion of the fishing grounds shall also be examined since they will be able to go fishing farther away.

ii) Replacement Fishing Equipment
Fishing equipment shall be introduced in order to replace present equipment or to obtain a secondary income in view of diversifying fishing equipment, enhancing the fishing activities and reducing fishing time. The gill net shall be supplied for catching freshwater prawns in Kango. The fishing baskets shall be introduced in all zones as equipment that is cheaper than the gill nets. The fishing traps shall be set up in Kango and Omboué in order to create secondary income for the fishers.
iii) Ice boxes
Ice is available in all the concerned zones. Ice boxes shall be introduced for storing and shipping fresh fish that are expensive by weight compared to fish that have been salted, dried or smoked.

iv) First Aid Kits and Raincoats
First aid kits and raincoats shall be introduced in order to improve the fishing environment. First aid kits shall allow for the rapid care of wound (hits and bangs, cuts) and sickness (malaria, etc.). The raincoat shall allow the maintenance of body temperature (physical strength) during bad weather. This will have the impact of increasing the number of fishing outings.

Table 4.9 Expected Impact Brought by Each Equipment to be Provided

Equipment / Impact	Outboard Motor[1]	Replacement Equipment			Cooler	First aid kit/ raincoat
		Gill Net[2]	Crate	Fishing Traps[3]		
i) Creation of free time	○		○			
ii) Enlarging of fisheries	○			○	○	
iii) Diversification of equipment		○	○	○		
iv) Increase in the price of expedited fish					○	
v) Increase in the number of fishing outings	○					○

Note 1: Diesel Motor (long-shafted motor) included. 4 HP gasoline outboard motors shall be provided for Kango.
Note 2: Gill nets concern only Kango.
Note 3: Fish traps concern Kango and Omboué.

The equipment shall be supplied on reimbursable credit. The maximum credit limit shall be set at 100,000 Cfa per group for the repayment period of one year based on the results of the pilot project.

The monofilament net and small mesh nets (less than 40 mm), forbidden for coastal fishing, are used for inland fishing. This does not pose a legal problem, but the project introduce the replacement multifilament nets (all having a mesh of 45 mm or more) to promote the improvement of fishing gear.
(3) Establishment of an autonomous management system for local fishing resources

i) Creation of a local resource management unit and writing up of the by-laws

The results of the activities (1) and (2) here above shall be reported at the fisher's meeting which will be organised quarterly, and the problems pointed out shall be discussed. Around six months after the beginning of the activities, a resource management unit shall be set up to establish the contents and methods for future activities, and to assure the supply of funding and their management.

ii) Establishment of resource management measures

After the creation of the resource management unit, discussions shall take place quarterly on the necessity of the autonomous management of resources and preparation of concrete measures (control of fishing equipment, fish size restriction, determination of closed fishing period and closed fishing area, a management system for fishing grounds) on the basis of the results of the analysis of the monthly data and the opinions of the groups of fishers.

4. Equipment Plan

i) For the collection and analysis of resource data

Equipment	Quantity	Specifications	Observations
Analysers of water quality	3	For the analysis of water quality (temperature, pH, dissolved oxygen, salinity, conductivity)	1 per site
Instruments for measuring samples	3 lots	To measure the length and weight of fish samples: one Sliding tripod/lot, 1 electronic scales/lot, 1 kitchen weighing scale/lot	1 lot per site
Depth recorders	3	Portable, water depth of 0-100 m	1 per site
GPS	3	Portable, to get information on position	1 per site
Ice boxes	3	Around 60 l, for temporary storage and transportation of fish samples	1 per site

ii) For Activities to improve the household economy

Equipment	Quantity	Specifications	Observations		
			Kango	Omboué	Onangué
FRP Boats	16	About 7 meters long, for inland waters	6	5	5
Outboard motors	5	4 HP gasoline	5	-	-
Idem	10	8 HP gasoline	-	10	-
Idem	10	10 HP long-shafted diesel	-	-	10
Gill Nets	12 lots	400 m long (mesh of 50-20 mm, 6-15 doubled yarn), floaters, weights, cording	12		
Crates	320	Oval, around 80 x 50 x 40 cm	120	100	100
Fish Traps	2 lots	(shall be envisaged based on results of the onsite study)	1	1	-
Coolers	25	Around 60 l	5	10	10
First Aid Kits	25	Medicine for wounds, treatment for malaria, antibiotics	5	10	10
Raincoats	125		25	50	50
Equipment replacing the monofilament nets	10 lots	Length of 1.200 m (mesh of 50-60 mm, 9 doubled yarn), floaters, weights, cording	-	5	5

5. Management Plan

(1) Management Structure

i) Collection and analysis of resource data

- Fisher's recordings: Fishing Brigades (Kango, Omboué), Provincial Inspection Offices (Moyen-Ogooué province);

- Biological study and data analysis: Provincial Inspection Office (Estuary province, Ogooué-Maritime province and Moyen-Ogooué province). (However, the collection of samples shall be done with the collaboration of the participating fisher's groups).

ii) Activities for improving the standard of living

- Selection of participating fishers: Selected by the Provincial Fishing Inspection Office (Fishing Brigade) and approved by the DGPA;
- Survey on the necessary equipment: After a survey on the necessary equipment at the Provincial Fishing Inspection Office, there will be a group purchase and distribution by the DGPA;
- Credit contracts, reimbursement and functioning: shall be managed as a group by the resource management unit.

(2) Personnel Plan

Person Responsible	No.	Duration	Source of personnel
Data Collectors	3	5 days/month x 18 months	DGPA
Agents for biological study	3	5 days/month x 18 months	IRAF (or DGPA)
Responsible for credit management	3	5 days/month x 18 months	DGPA (or an NGO)
Expert in the management of fishing resources	1	1,5 months per time x 2 times/year x 3 years	Foreign Expert

(3) Utilization of NGO

The NGO used for the pilot project shall cover onsite training (OJT) during the first three months. The training will involve data collection and analysis, the biological study and analysis, credit management and operations, the inquiry among the fishers and organisation of the workshops.

Those concerned & number	Period	Contents	Method
3 data collectors	3 months	Data Processing	Course, workshop activities
3 biological study agents	3 months	Process of biological study, data processing	Course, workshop activities
3 people in charge of credit management	3 months	Credit management and operations	Course, workshop activities

(4) Education and Training for Personnel

The practical training of the personnel will not be useful before this project becomes operational.

6. Implementation Plan

Activities	Execution	Calendar (months) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36	Results
Selection of villages and target groups of fishers	DGPA		List of fishers
Designing and purchase of equipment	DGPA		Photos of equipment
Resource Data collection and analysis	DGPA		Results of data analysis
Activities for the livelihood improvement	DGPA		Table for credit reimbursement
Establishment of an autonomous management system	DGPA		Minutes of the meeting

7. Project Cost

i) Facilities and Equipment

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Analysers of water quality	3	2.000	6.000	
Measurement Instruments for	3 lots	300	900	

samples				
Depth recorders, GPS	3 lots	300	900	
Coolers	28	60	1.680	
FRP boats (7 m)	16	2.500	40.000	
Outboard motors (4 HP)	5	750	3.750	
Idem (8 HP)	10	1.200	12.000	
Idem (10 HP)	10	1.200	12.000	Long-shafted
Gill Nets	12 lots	250	3.000	
Crates	320	20	6.400	
Fish Traps	4 lots	2.000	8.000	
First Aid Kits	25	60	1.500	
Raincoats	125	5	625	
Replacement equipment of monofilament nets	10 lots	1.200	12.000	
Total			108.755	

ii) Personnel Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
NGO			(16.650)	
Per diem, Lodging	90 man-days	50	4.500	
Transportation	3 months	1.050	3.150	
Remuneration	180 man-days	50	9.000	
Expert			(81.000)	Foreign Expert
Remuneration	6 months	10.000	60.000	
Air Transport	3 round-trip	6.000	18.000	
Miscellaneous	6 months	500	3.000	
Total			97.650	

iii) Management Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Travel expense for personnel of the Gabonese authority	1.080 man-days	50	54.000	
Transportation expense	36 months	500	18.000	
Expense for meetings/ Expense for consumables	36 months	200	7.200	
Total			79.200	

8. Expected Benefit and Impact

(1) Economic benefit

At present, fishers in the target areas possess only the cheap fishing materials (hook & line, long-line, cage, etc.), and are affected largely by seasonal difference of catch due to the limited means of mobilization, the limited fish species and catch. With this project, after obtaining outboard motor and fishing gears, fishers will be able to choose the most suitable fishing methods among several options depending on conditions of fishing grounds, and finally resulting in the stabilization of fishing income throughout the year. In addition, since the project is implemented mainly in the inland and lagoon areas where it is easier to manage resources than in open sea and the target villages are poorer than coastal villages, it is expected to contribute for mitigation of regional difference of income levels. (2) Social impact

i) Elevation of regional solidarity

Through the participation and the collaboration to various activities (fishery-related data collection, conferences of regional resources management unit, etc.), it is expected that fishers will begin to think about the importance of resources management and the necessary actions to be taken for sustainable fishing

activities. By doing so, the consciousness to co-manage resources on community basis will become established on fishers, and the regional solidarity will be raised.

ii) Upgrading of health standard

There are a lot of fishers who do fishing by staying in the camps for several days in the target areas (the inland and lagoon areas). Therefore, fishers are easy to be infected by disease (malaria, etc.) and be injured (blow, scratch, etc.), that condition restricts fishers the number of fishing days and make them difficult to spend the stable life. The project will introduce equipments such as outboard motor, alternative fishing gears, and other relevant materials necessary for diversification of income sources as one of the resources management activities. For example, with the outboard motor introduced in this project, fishers are not necessary to stay in the camps, so as to do one-day fishing. On the other hand, with the introduction of materials for improvement of fishing environment such as the first-aid box, rain-jacket and so on, fishers will be able to self-control physical conditions and to recover early from disease / injury, so as to engage in fishing with peace of mind.

9. Monitoring

Contents	Frequency	Registration	Entity Responsible
Data collection and analysis	Once per month	Data Registration Sheet	Provincial Inspection Office
Credit Reimbursement and operations	Once per month	Table for Credit reimbursement	Provincial Inspection Office
Establishment of resource management measures	Once every 3 months	Minutes of the meeting on resource management unit	Provincial Inspection Office

10. Impact on the Environment

This project includes the activities that contribute to a sustainable management of fishing resources, with no adverse impact upon the environment. However, in case of restrictions of fishing gears, grounds and/or periods, it is necessary to explain and obtain consensus of fishers through workshops so as to avoid the complain from a part of fishers.

11. Collaboration with other projects

	Related Projects	Correlation	Necessity to collaborate
4.4.1	Project for Financing of Small-scale Fishery	Functioning of credit	Standardisation of management procedure
4.4.3	Project for Diversification of Income Sources	Creation de income replacement sources	Sharing of work information
4.4.4	Project for Development of Set-net Fishing	Installation of fish traps	Sharing of techniques

4.4.8 Project for Management of Coastal Fishing Grounds

1. Outline of the project

(1) Abstract

The coastal zone of Gabon (3 nautical miles from the coast) has been defined by the law as a zone reserved for small-scale fishing, however, the industrial fishing boats fish there with no punishment since the surveillance system has not yet been set up. For this reason, the coastal demersal fish resources have already been caught, and the fishing equipment of the small-scale fishers suffer damage because of this. In order to allow the small-scale fishers to protect their fishing grounds themselves, daily surveillance and notifications by the inhabitants shall take place in collaboration with the surveillance system of the administration (Ship Surveillance System (SSN), radars, surveillance speed boats). Moreover, artificial reefs shall be set up near the coastal fishing grounds in order to discourage the fishing boats by causing

material damage to their boats and to create spawning and nursery grounds for marine organisms.

(2) Target Areas

The 3 zones here below are concerned by the Project.

Table 4.10 Target Areas, Waters and Villages for Management of Coastal Fishing Grounds

City	Waters	Fishers's Village
Mayumba (Nyanga Province)	Coastal waters of Mayumba (Pointe Kouango, Zone 17, Point Panga, Point Nyanga)	Popo
Port-Gentil (Ogooué-Maritime Province)	Coastal waters of Port-Gentil (Ozori～Oléndé)	Ozori, Oléndé (camp)
Cocobeach (Estuary Province)	Coastal waters of Cocobeach	Cocobeach

(3) Target Groups

- Mayumba: 20 small-scale coastal fisher's groups (around 60 people)
- Port-Gentil: 10 small-scale coastal fisher's groups (around 100 people)
- Cocobeach: 20 small-scale coastal fisher's groups (around 100 people)

(4) Period

- The establishment of a shared surveillance system covering the coastal fishing grounds: 2009 to 2012 (three years);
- Fabrication, setting up and management of artificial reefs: 2011 to 2013 (three years)

2. Objectives and Relevance

(1) Objectives

The surveillance system of the coastal zone shall be established jointly by the administration and the small-scale fisherman. The setting up of artificial reefs shall limit the activities of the illegal fishing boats and create a zone for the production of yolk sac fries and fish nurseries.

(2) Relevance

Fishing boats doing illegal fishing within the coastal zone of Gabon, and not being punished, threaten the destruction of the fishing equipment and fishing grounds of the small-scale fishers. Setting up this project shall allow for the creation and management of the fishing grounds, as well as establishment of a surveillance system with the participation of the fishers, and therefore the project is also judged to be pertinent from an environmental and socio-economic viewpoint.

(3) Achievement Indicators

- Artificial reefs shall be built and set up with the participation of the fishers who manage the fishing grounds;
- Illegal fishing by the fishing boats shall be declined by the surveillance of the inhabitants and by the impact of the reefs;
- The reef environment shall become places for spawning and nursery for useful marine organism, and thereby increase the volume of the catch.

3. Project Contents and Activities

The activities of this project are of two types: (1) establishment of co-surveillance system of the coastal fishing grounds, (2) fabrication, installation and management of artificial reefs.

(1) Establishment of co-surveillance system of the coastal fishing grounds

i) Establishment of a surveillance and notification system of the coastal fishing grounds

The surveillance and notification system of the coastal fishing grounds by the local fishers shall be established on the basis of the pilot project carried out in Mayumba. Resource management units composed of the fishing villages, fishermen's organisations (associations and groups of fishers) using the coastal fishing grounds, and Fishing Brigades shall be set up for this purpose. If a fisherman while fishing sees a fishing boat in violation of the law in the coastal zone, he shall notify the nearest Provincial Inspection Office (or Fishing Brigade) and inform the GPS coordinates by radio-telephone. However, since the fishing boats often fish in the coast zone at night, night surveillance shall also be covered. In the fishing villages where the fishers do not fish at night, surveillance will be done by rotation with fishing equipment and methods usable at night (lantern fishing of cuttlefish, troll fishing with a trolling line, etc.).

ii) Establishment of coastal surveillance system by the DGPA (to be carried out by the PSPA)

PSPA shall set up two new Fishing Brigades at Iguela and Sette Cama for the surveillance and protection of the coastal fishing resources and provide speed boats and radars to the four existing Brigades (Pont Numba, Omboué, Mayumba and Cocobeach). The local fishers in collaboration with the Fishing Brigades arranged and strengthened by the PSPA shall find and charge for the illegal fishing activities. Since many fishing boats fish at night and hide the name and number code of the boat, a legal arrangement shall be set up in order to allow the Fishing Brigade, accompanied by a policeman from the coast guard having the right to make arrests, to immediately go to the fishing boat after receiving the notification in order to arrest those responsible.

(2) Fabrication, installation and management of artificial reefs (Creation of fishing ground)

The objectives of setting up reefs at each site are as follows:

- Area around Mayumba: Creation of spawning ground for lobsters and prevention of the fishing operation by trawlers
- Area around Port-Gentil: Creation of coastal fishing ground for demersal fish and prevention of the fishing operation by trawlers
- Area around Cocobeach: Improvement in the fishing efficiency of small-scale fishers

i) Study of sites proposed for the reefs

The Natural conditions such as relief of the ocean bottom and nature of the ground in the existing coastal fishing grounds shall be studied in order to select the best places to install the artificial reefs (Mayumba: four sites, Port-Gentil: three sites, Cocobeach: two sites). The actual places for the reefs shall be determined through discussions between the concerned villages and the administration just before installation time.

ii) Designing of the reefs

The reefs shall be designed according to the objectives and natural conditions at the installation sites. The basic design criteria are: 1) the local fishers must be able to participate in the building and setting up of the reefs, 2) the size should be large enough to present an obstacle to the trawling boats, 3) the structure form should be determined by taking into consideration the life style of the concerned ocean organisms.

iii) Management of the reefs

The resource management units established as mentioned in the above section (1) shall discuss and decide on the management system for the fishing ground where the artificial reefs are installed. Concretely, they will determine about the permissible fishing equipment and methods, fishing periods, collection of fishing fees, management system, source of management expenses, etc. Moreover, a biological study shall also be done around the artificial reefs quarterly within the framework of monitoring activities to adjust the management methods accordingly to the results.

4. Facilities and Equipment Plan

(1) -i) Surveillance of coastal fishing grounds and notification by local fishers

Equipment	Quantity	Specifications	Observations
Surveillance Equipment	3 lots	VHF Radio-telephones (power 20W) (10), night vision binoculars (10), GPS (10)	1 lot per zone

(1) - ii Coastal surveillance system by the DGPA

i) Facilities Plan

Facilities	Specifications and structure	Size	Observations
Fishing Brigades	Reinforced concrete without storeys	About 100 m²	Iguela, Sette Cama
Slipways	Reinforced concrete (Pre-stressed concrete), with sliding agent	5m (l) x 15m (L)	Idem

ii) Equipment Plan

Equipment	Quantity	Specifications	Observations
Surveillance Speed boats	6	90 HP Outboard motor x 2, in FRP	For the Brigades (6 places)
Tractors for boats	6	To pull the speed boats on the road	Idem
BLU Radio-telephones	6	Power 150W	Idem
VHF Radio-telephones	6	Power 20 W	Idem
Radars	6	Scope around 12 nautical miles	Idem
Surveillance equipment	6 lots	Binoculars, GPS, buoys, winches	Idem

(2) Fabrication, Installation and Management of Reefs

i) Facility Plan

Facilities	Structure & details	Size	Observations
Langouste Reefs	Cylindrical, reinforced concrete	Diameter 3 m x 1,5 h x 40 units	MYB(4)
Middle-sized Reefs	Right Hexagons with cavities	About 800 kg/unit x 150 units	POG(2), CCB(1)
Small-sized Reefs	Cubic with armatures	About 200 kg/unit x 600 units	POG(2), CCB(1)

ii) Equipment Plan

Equipment	Quantity	Specifications	Observations
Equipment for onsite study	3 lots	Fish detector (1), soil sampler (1), current meter (1)	1 lot for each zone
Follow-up Equipment	3 lots	Scuba diving Equipment (4), compressor (1), sub-marine video (1), screen (1), crates/nets	1 lot for each zone
Surveillance Equipment	3 lots	VHF Radiotelephones (power 20W) (10), night vision binoculars (10), GPS (10)	1 lot for each zone

5. Management Plan

(1) Management Structure

- Creation of resource management units: DGPA (Provincial Inspection Offices and Fishing Brigades included);
- Selection of concerned marine zones: resource management units;
- Supervision for building of the facilities and supplying of equipment: local consultant and DGPA;
- Surveillance of coastal fishing grounds and notification by local fishers; daily management by resource management units;
- Establishment of coastal surveillance system: (Designing, supplying and installation) PSPA;
  (Management) DGPA + collaboration of the Coast Guard;
- Fabrication and installation of reefs, commissioned with a local construction company:
  (Designing): Expert;
  (Fabrication and supervision of installation): DGPA;
- Reef Management: Resource Management Unit + Expert.

(2) Plan for Personnel

Responsibilities	No.	Duration	Source of personnel
Data Collector	3	5 days/time x 12 times/year x 3years	Fishing Brigade
Responsible for reef follow-up	8	5 days/times x 4 times/year x 32years	DGPA et IRAF
Surveillance Speed Boat Pilot	6	1 day/week x 50 times/year x 2 years	Fishing Brigade
Surveillance Officer	6	Every day	Fishing Brigade
Expert in fishery management	1	2 months x 2 times/year x 3 years	Foreign Expert
Coastal surveillance Expert	1	2 months	Foreign Expert
Reef Expert	1	2 months x 2 times/an x 3 years	Foreign Expert
Deep-sea diver	2	5 days x 4 sites x 4 times/an x 2 years	Deep sea diving store
Radar and radio-telephone Technician	1	2 months	Building Technician
Legal Expert	1	2 months	Gabonese legal advisor

(3) Utilization of NGO

It is desirable to cooperate with NGO for organizing the resources management unit and for conducting surveillance by local fishers.

(4) Education and Training for Personnel

Those concerned and number	Period	Contents	Method
Four DGPA agents	6 months	Biological Study (through deep sea diving)	Commissioned to a foreign divers
Idem 6	2 months	Use of radar/radiotelephone	Commissioned to Instrument Manufacturer

6. Implementation Plan

Activities	Execution	Calendar (months) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36	Results
Selection of villages and target groups of fishers	DGPA		List of Fishers
Creation of resource management unit	DGPA		Statutes of the Unit
Surveillance by local fishers	DGPA		Reports of
Designing and supervision of construction (Fishery Brigades)	DGPA		Inspection reports construction
Designing and purchase of equipment	DGPA		Photos of equipment
Coastal surveillance by DGPA	DGPA		Boat operation and surveillance report
Study of reefs, selection of installation points	DGPA		Study report
Designing, fabrication and installation of reefs	DGPA		Photos of installed reefs
Management of reefs and monitoring	DGPA		Monitoring records

7. Project Cost

(1)-i) Surveillance of coastal fishing grounds and notification of local fishers

i) Equipment

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Surveillance Equipment	3 lots	500	1.500	

ii) Personnel Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations

Expert in fishery management				Foreign Expert
Remuneration	12 months	10.000	120.000	
Air Transport	3 round-trip tickets	6.000	18.000	
Miscellaneous	12 months	500	6.000	
Total			144.000	

iii) Management Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Travelling expenses for personnel of Gabonese authority	480 man-days	50	24.000	
Transportation expense	12 months	500	6.000	
Meeting expenditure/ Expense for consumables	12 months	200	2.400	
Total			32.400	

(1)-ii) Establishment of Coastal Surveillance System by the DGPA (within the framework of the PSPA)

i) Facilities and Equipment

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Fishing Brigades	2	40.000	80.000	
Slipways	2	50.000	100.000	
Surveillance Speed boats	6	80.000	480.000	
Tractors for pulling boats	6	6.000	36.000	
BLU/VHF Radio-telephones	6 lots	11.000	66.000	
Radars	6	40.000	240.000	
Surveillance Equipment	6 lots	1.000	6.000	
Total			1.008.000	

ii) Personnel Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Local Consultant (conception, management of construction)	Expense for facilities and equipment x 10%	100.800	100.800	Consultant in Gabon
Coastal Surveillance Expert	2 months	13.500	27.000	Foreign Expert
Legal Expert	2 months	9.000	18.000	Expert in Gabon
Expert in Electronic Instruments	2 months	13.500	27.000	Fabrication Technician
Total			172.800	

iii) Management Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Travel expenses for personnel of Gabonese authority	480 man-days	50	24.000	
Transportation Expense	12 months	500	6.000	
Expenditure for meetings/ Expense for consumables	12 months	200	2.400	
Cost of Fuel for speed boats	15KL/year x 6 speed boats x 2 years	500	90.000	
Cost of Maintenance	Installation and equipment expense x 5%/year		50.400	
Total			172.800	

(2) Fabrication, installation and management of reefs

i) Facilities and Equipment

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Reefs for langouste	40	2.500	100.000	Including cost of installation
Medium-size Reefs	150	500	75.000	Idem
Small-sized Reefs	600	40	24.000	Idem
Total			199.000	

ii) Personnel Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Deep sea diver (follow-up)			(67.200)	Foreign divers
Remuneration	320 man-days	100	32.000	
Per diem, lodging	320 man-days	50	16.000	
Transportation	8 round-trip tickets	2.400	19.200	
Reef Expert			(162.000)	Foreign Expert
Remuneration	12 months	10.000	120.000	
Air Transport	6 round-trip	6.000	36.000	
Miscellaneous	12 months	500	6.000	
Total			229.200	

iii) Management Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Observations
Travelling expenses for personnel of Gabonese authority	480 man-days	50	24.000	
Transportation Expense	12 months	500	6.000	
Expenditure for meetings/ Expense for consumables	12 months	200	12.400	
Total			32.400	

8. Expected Benefits and Profitability

(1) Economic benefit

The execution of this project will allow for the reduction in the number of fishing boats operating illegally in the coastal zone, it will assure safer fishing for the small-scale coastal fishers and sustainable management system of coastal resources. By this activity, the catch by small-scale fishery may be increased, that leads to the stabilization of fisher's income.

(2) Social impact

i) Security keeping of the region

Although the coastal 3-mile zone is legally set forth as an exclusive zone for small-scale fishery at present, there is no effect of restraint against illegal fishing operation of trawlers because of no surveillance and notification system and no penal regulations. With this project, if the artificial reefs are installed in the coastal fishing areas by administrative leadership and the surveillance of those areas is strengthened, fishers will cooperate with administration and will become to manage the reef-installed fishing groundsby themselves. Through such a co-management system, it is expected that the relevant activities on community basis are frequently conducted and the regional security status will be improved.

9. Monitoring

Contents	Frequency	Recordings	Responsible Entity
Reef Management	Quarterly	Report on resource management units	DGPA
Recordings on fishing by	Monthly	Data Recording sheet of the	DGPA

fishers		fishers	
Biological Study	Quarterly	Recording on visible fish species, video	Diver, Biological study agent
Activities of coastal surveillance	Quarterly	Recording of fisher's notifications, recording of speed boat assignments, reports	DGPA

10. Environmental Impact

These activities that contribute to the sustainable management of fishery resources have no adverse impact upon the environment. However, since fish concentrate around artificial reefs, it is necessary to regulate fishing activities in order to avoid the over fishing around the artificial reefs. Furthermore, it is necessary to explain and obtain consensus of trawl fishing boats on the objectives, effects and installation zones of artificial reefs prior to implementation.

11. Collaboration with other projects

	Related Projects	Correlations	Necessity to collaborate
4.4.7	Project for Participative Management of Fishery Resources	Establishment of regulations for the use of the fishing grounds	Unification of establishment method

4.4.9 Project for Development of Aquaculture Technology

1. Outline of the project

(1) Abstract

There are abundant water resources (e.g., rivers, lakes, lagoons, etc.) in Gabon. Although there is potential of aquaculture development, it is hardly realized effectively. In this project, identification of new aquaculture species, development of feed, development in aquaculture engineering and blackish water aquaculture are aimed and the necessary facilities and equipment are installed.

(2) Target Areas

Development of techniques for fresh water aquaculture : Estuaire Province, Libreville city, the Peyrie aquaculture station (The Peyrie aquaculture station is elevated to the Peyrie National Aquaculture development Center)

Development of techniques for blackish water aquaculture : Nyanga Province, Mayumba(brackish water lagoon)

(3) Target Groups

Small scale fish farmers in Estuaire Province: 10 pers., Staff of the Peyrie aquaculture station: 10 pers., Fishers in Mayumba: 2 groups (10 pers.)

(4) Period

2010～2020 (10 years)

- Development of new aquaculture species：5 years
- Feed development：5 years
- Aquaculture engineering：5 years
- Brackish water aquaculture：5years

2. Objective and Relevance

(1) Objective

i) Identification of new aquaculture species : Identification of the new aquaculture species other than Nile (*Oreochromis niloticus*) and new species which can be reared in ponds with Nile Tilapia.

ii) Feed development : Developing of the compound feed using local material (making of pellet feed is included)

iii) Aquaculture engineering : Drawing up of standard design for various aquaculture ponds (design criteria of ponds and buildings, etc.)

iv) Brackish water aquaculture : selecting suitable species and establishing aquaculture technique in brackish water

(2) Relevance

i) Development of new aquaculture species

The fish species currently cultivated is limited to *Oreochromis niloticus*, and for this reason, the profitability of the aquaculture is not good. Therefore, the investigation and research on alternative species including species that can be stocked together with tilapia is required.

ii) Feed development

It is possible to obtain a compound feed for fish that is made by the feed company (SMAG) in Gabon. However, since this feed is very expensive, only the aquaculture farmer near Libreville can make a profit by the intensive culture with this feed. In order to raise productivity gradually in other districts, it is necessary to make the aquaculture system shift from extensive to semi-intensive in the future. For that purpose, development of cheaper feed is indispensable.

iii) Development of aquaculture engineering technology

The aquaculture ponds in Gabon are not constructed in full consideration of geographical feature and hydrologic conditions. For this reason, there are many ponds which cannot be drained completely. Additionally the water depth of those ponds is extremely shallow. These are some of the causes of low productivity. In order to clarify appropriate aquaculture technology, it is necessary to decide upon design criteria, such as structure, size, and number of fish ponds and size, form, and material for fish cages.

iv) Brackish-water aquaculture

The existence of high-valued fish and shellfishes, such as mangrove oyster and mud club, is confirmed in the blackish water and the seawater region in Gabon. However, since they have not reached market size when they are caught, they are consumed locally. On the other hand, the culture technology of these fish and shellfishes is already developed in Southeast Asia, Senegal and Cote d'Ivoire in African country, etc., and productions on commercial bases are performed. When performing selection of a culture species and establishment of the culture method, these existing culture technology developed elsewhere could be applied. The brackish water aquaculture development can create an additional income source for small-scale fishers.

(3) Outcome to be achieved

i) Identification of new aquaculture species :

- New species for aquaculture are selected.
- Investigation of the selected fish species for aquaculture is conducted, and the possibility is clarified.
- Aquaculture technique for selected species are established.

ii) Feed development :

- The local materials usable for the fish feed formulation are selected.
- The feed formula suitable for extensive and semi-intensive aquaculture is developed.
- A manual for making pellet feed is published.
- The dissemination of the semi-intensive aquaculture using compound feed is stared.

iii) Aquaculture engineering :

- Design criteria of aquaculture facilities and a standard design suitable for various aquaculture systems, such as integrated fish farming, cage culture and semi-intensive culture with feeding, are drawn up.

iv) Brackish-water aquaculture

・The appropriate species for brackish water aquaculture are selected.
・The culture experiments of selected species is started and culture possibility is clarified.

3. Project Contents and Activities

(1) Identification of new aquaculture species

Current situation survey (biological: seasonal change of fish catches, average weight of the fish, mixed rate of a sex, maturity, gastric contents, etc. sociological: a price of fish, the ease of treating, popularity, etc.) of the species for aquaculture are conducted, and suitable species is selected from the result. Then, natural fry / fingerlings are collected, rearing experiments are conducted in a pond or a cage (hapa), and suitable species are determined. Technical development on the farming of walking catfish, native tilapia, other catfishes, and Yara (*Schilbe* sp.) is performed first.

(2) Feed development

Search of the feed materials, determination of formulae for compound feeds, and establishment of a pellet production method are performed. District survey is conducted first and the availability as materials is studied. The industrial and agricultural wastes (beer yeasts, oil cake, bran, etc.) are investigated, and the price, available quantity, preservation situation, nutritional values, etc. are checked. Then, the compound feeds in various formulae are made and the most efficient formula is determined through rearing experiments. Through a trial and error process about a pellet production method, the procedure with remarks is determined. After that, the manual for making pellet feed is completed. . The dissemination of the developed feed production technology to the aquaculture farmers is started when the feed formulation and the way of making pellet feed becomes clear.

(3) Development of aquaculture engineering

Design criteria for aquaculture facilities and a standard design suitable for each aquaculture system, such as integrated fish farming, cage culture and semi-intensive culture with feeding, are drawn up. Aquaculture experiments are conducted in the ponds of each aquaculture stations based on the standard design proposal considered. The obtained data are analyzed to investigate the appropriate standards of the aquaculture facilities. Moreover, the production data of each aquaculture stations are accumulated and analyzed simultaneously, and then the appropriate culture method even for beginners is proposed.

(4) Development of brackish water aquaculture

The aquaculture technology of oyster and mangrove crab in brackish-water is developed by the staff of DGPA and Mayumba fishery center. Since the technical knowledge of brackish-water aquaculture is needed, selection of suitable species and aquaculture experiments are conducted under a foreign expert's instruction. The aquaculture technologies of the mangrove crab performed for 30 years in Thailand and oyster culture performed for 20 years in Senegal are fully utilized. Finally profitability is also taken into consideration to conclude on the actual possibility of the dissemination to fishers.

4. Facilities and Equipment Plan

(1) Facilities plan

Facilities	Finishing / structure	Area/size	Remarks（purpose）
laboratory （including a wet laboratory）	One –storied house / Reinforced-Concrete	$30m^2$	Rearing and observation of fishes

(2) Equipments plan

Equipments	Quantity	Specification	Remarks (purpose)
1) new species			
Stereo microscope	1 set	Magnification 50 x	Observation of eggs, larvae, etc.
Refrigerator	1 set	100L (internal volume)	Preservation of a hormone drug etc.
Polycarbonate tank	10 pieces	500L	For rearing of fishes
Air blower	2 sets	150L/min	For rearing of fishes

2) Feed development			
Freezer	1 set	200L (internal volume)	Preservation of a vitamin tablet etc.
Pellet machine	1 set	150kg/h (throughput capacity)	Making of a pellet
Blue sheet	5 sheets	10m x 10m	Drying of a pellet
Pickup	1 set	S/C 4WD	Transport of materials etc.
3) For blackish-water aquaculture			
FRP Boat	1 boat	7m length	Transport of materials etc.
Outboard motor	1 set	20H.P. of gasoline	same as the above for a boat drive
Net fabric for partition	200m	30-50mm of mesh size	
Rope	300m	12mm in diameter	

5. Management Plan

(1) Management Structure

The management and monitoring is conducted by DGPA. "Aquaculture technical development project" management and administration committee are organized in the department of DGPA, and carries out management and monitoring of the project in each aquaculture station. Actual work is performed by provincial fishery inspection office at each local aquaculture station.

(2) Personnel Plan

Charge	Number	Period	Personnel resources
Field survey (including sample collection of feed materials)	2 persons	4 months	DGPA
Collecting brood-stock	5 persons	1.5 months	Fisherman
Commission of aquaculture experiment	2 persons	6 months x 4 times	Each aquaculture station
Blackish water aquaculture experiment	2 person x 2 group	6 months x 2 times	Fishers
Expert of brackish water aquaculture	1 person	8 months	Foreign expert

(3) Utilization of NGO: Not necessary

(4) Education and Training for Personnel: Not necessary

6. Implementation Plan

Activities	Conducting organization (person)	Schedule (year)												Results
		1	2	3	4	5	6	7	8	9	10	11	12	
Development of new aquaculture species	Peyrie national aquaculture development Center													Development of new aquaculture species
Feed development														Making of compounded feed
Aquaculture engineering														Drawing up of standard design for various aquaculture
Brackish water aquaculture (selection of suitable species)	DGPA													Selection of suitable species
Ditto (establishment of aquaculture method)	DGPA													establishment of aquaculture method

7. Project Cost

(1) Facilities and Equipment

Item of expense	Quantity	Unit price (1,000 CFA)	Price (1,000 CFA)	Remarks
Living thing laboratory	$30m^2$	1,000	30,000	
Stereo microscope	1 set	675	675,675	Foreign supply
Refrigerator	1 set	135	135	
Polycarbonate tank	10 pieces	800	8,000	Foreign supply (Japan)
Air blower	2 sets	405	810	Foreign supply
Freezer	1 set	225	225	
Pellet machine	1 set	9,000	9,000	Foreign supply
Blue sheet	5 sheets	45	225	
Pickup truck	1 set	8,000	8,000	
FRP boat	1 boat	2,500	2,500	
Outboard motor	1 set	1,700	1,700	
Net fabric for a partition	200m	2	400	
Rope	100 m x 3 rolls	30	90	
Total			61,760	

(2) Personnel Cost

Item of expense	Quantity	Unit price (1,000 CFA)	Price (1,000 CFA)	Remarks
Expenses of dispatch expert				Foreign expert
Personnel expenses	8months	10,000	80,000	
Airfare	1 time	6,000	12,000	
Local operational cost	8 months	500	4,000	
Total			96,000	

(3) Management Cost

Item of expense	Quantity	Unit price (1,000 CFA)	Price (1,000 CFA)	Remarks
Staff of DGPA				
Traveling expenses	840 person days	50	42,000	Mayumba is included
Transportation expenses	129 person time	150	19,350	Same as the above
Convention expenses	60 months	100	6,000	
Aquaculture experiment	48 person days	15	21,600	Each aquaculture station
Brackish water aquaculture experiment	24 person days	5	3,600	Fishers group
Total			92,550	

8. Expected Benefit and Profitability

This project is aimed at technical development, so that the direct economic benefit and/or social impact cannot be considered. However, with the development of appropriate technology and the extension to villages, the following indirect effects can be expected.

(1) Economic benefit

If the appropriate aquaculture technology in Gabon is developed, underdeveloped abundant water resources can be exploited. Then it will become possible to increase the quantity of the fishery product for which it depended only on the fish catch up to present. Furthermore, it can contribute also to the improvement in income of small-scale fishers and small-scale farmers.

(2) Social impact

i) Habitation of young generation in the villages

As a part of support services of the government, if the aquaculture techniques are developed and extended,

the job opportunities in rural area will be borne, and it is expected to affect onthe outflow of young generation to urban area. In addition, if the villager's revenue increases by doing aquaculture on community basis, it is expected to lead to the improvement of village living conditions like upgrading in basic infrastructure (electricity, water) and installation of community television.

9. Monitoring

The project progress is monitored by the DGPA once a month.

10. Environmental Impact

It is necessary to pay special attention to the feeding and drainage method, as it is possible to cause the pollution by the effects of over-feeding and contaminated water in the surrounding waters. In cases of oyster culture and pen culture of mangrove crab, it is necessary to make enough investigation on the project site as it is possible to affect the navigation channel. In addition, since the Aquaculture Technical Development Center will be located in Libreville city area, it should be considered not to cause the ground sinking and/or the lack of water by the excess pumping up of underground water.

11. Collaboration with other projects

The project of OFCF is a project that is specialized in an African catfish aquaculture developmnet. Since a testing procedure, its method, and "how to treat brood-stocks and fingerlings", "breeding method", etc. are also important items for this project, cooperating with this project is desirable

4.4.10 Project for Improvement of Production Capacity of Fry / Fingerling

1. Outline of the project

(1) Abstract

Eleven existing aquaculture stations are in Gabon now however the stations cannot produce and supply sufficient fry / fingerling of tilapia for farmers. Under these circumstances, by PSPA, two fry / fingerling production centers (Oyem fry / fingerling production center (establishment), Lebamba fry / fingerling production center (expansion of the existing station)) are improved, and strengthening of fry / fingerling production capacity is planned. In this project, three existing aquaculture stations (Wolen-Ntem province: Oyem aquaculture station, Nyanga province: Tchibanga Aquaculture station, Ogooue-Lolo province: Koulamoutou Aquaculture station) are expanded as a base of dissemination of integrated fish farming techniques. Furthermore, in order to complement the activities at the two above-mentioned fry / fingerling production centers, the fry / fingerling production technology is disseminated to aquaculture farmers around the stations.

(2) Target Areas

Wolen-Ntem province, the Oyem aquaculture station
(immediate implementation without facility expansion)
Nyanga province, the Tchibanga aquaculture station
(immediate implementation without facility expansion)
Ogooue-Lolo province, the Koulamoutou aquaculture station
(after necessary repair on the existing facility)

(3) Target Groups

Small-scale fish farmers in Wolen-Ntem Province: 5 pers., Staff of the Oyem aquaculture station: 13 pers.
Small-scale fish farmers in Nyanga Province: 3 pers., Staff of the Tchibanga aquaculture station: 9 pers.
Small-scale fish farmers in Ogooue-Lolo Province:5 pers., Staff of the Koulamoutou aquaculture station: 8

pers.

(4) Period
Capacity strengthening of the station: 3 years
Dissemination to aquaculture farmers: 3 years

2. Objective and Relevance

(1) Objective

- Improvement in the fry / fingerling production capacity in each aquaculture station. (distribution of fingerlings is attained)
- Dissemination to the aquaculture farmers of tilapia fry / fingerling production method. (fry / fingerling production of tilapia is attained)
- Publishing a fry / fingerling production manual.

(2) Relevance

Now, the aquaculture stations cannot fully achieve the intended functions because of shortage in operational funds, limited human resources, and inappropriate technology, etc. The fry / fingerling production of the aquaculture fish is not performed either. Moreover, since there are also very few private fry / fingerling producers, aquaculture farmers are experiencing difficulties in getting fingerlings. Since there are few realistic possibilities that private fry / fingerling producers will increase the number in a short time, it is desirable to carry out the supply of fingerlings by public administration initiative. It is necessary to improve the production capacity in each aquaculture station, and to distribute of fry / fingerlings and disseminate the production method to the aquaculture farmers.

(3) Outcomes to be achieved

- Tilapia fingerlings are produced 10,000 or more in each aquaculture station.
- Five or more core farms for dissemination of fish farming techniques are established. Each core farms performing as a model farm disseminate the aquaculture techniques to 50 or more new farmers.
- The manual on fry / fingerling production techniques for dissemination to farmers is completed.

3. Project Contents and Activities

(1) Capability strengthening of the station

Personnel training of each station are performed for three years at the beginning. The staff learns techniques by actually performing fry / fingerling production. First, existing aquaculture stations are streamlined according to a scrap and build plan. Then, at the stations identified as the bases of dissemination, sufficient staff is stationed according to the importance. During the first several months, training with intensive lecture and practical skill exercises are conducted under a foreign expert's instruction. Since fish handling is very important, it is made to master by performing repetition instructions. The personnel who completed the training course start the extension activities to aquaculture farmers, and improve their technique.

(2) Dissemination to aquaculture farmers

The aquaculture farmer (farmer which has already practiced integrated fish farming) who can be a core-farmer is selected, and they are trained at the stations. The training period is for five days consisting of two days of lecture (Basic lecture of aquaculture) and three days of practical skill exercises (on-site training). Since brood-stock handling and sexing of fish is very important, it is made to master by performing repetition instructions. After stocking brood-stocks into the ponds, the station staff performs daily management. When fry comes out, the lecture about a fry is conducted for two days at the stations again. Then, if fry grow and they become fingerling size, the practice of handling is performed. After ending a series of above work, fry / fingerling production is performed in each farmer’s ponds. When repair of a fry / fingerling production pond is needed, a station lends the tools to the aquaculture farmers, and the farmers carry it out by themselves. When performing fry / fingerling production first in the pond of the farmer, the staff of a station advises for them. The farmer who is able to produce the enough fingerlings is authorized as a core farmer. Then the farmer plays the role as the lecturer in next training. Although training begins with the farmers around a station, the same training is gradually extended to distant farmers.

(3) Publishing of a fry / fingerling production manual

Since various data about fry / fingerling production is accumulated by repeating the training and performing it as mentioned above, those data are used to improve the existing fry / fingerling production manual.

4. Facilities and Equipment Plan

(1) Facilities plan

Facilities	Finishing and structure	Area and a size	Remarks (purpose)
Repair and expansion of a aquaculture station (Koulamoutou)	Water depth 80cm～100cm	Pond area: 2,000m^2	

(2) Equipments plan

Equipments	Quantity	Specification	Remarks (purpose)
The equipments for aquaculture stations (Oyem, Tchibanga, Koulamoutou)	3 sets	A drain pump, tools for pond construction, handling tools (seine, scoop net, bucket, etc.), tanks for fish transportation	1 sets / station

5. Management Plan

(1) Management Structure

The management and monitoring for this project is conducted by DGPA. “Fry / fingerling production capacity enhancement project” management and administration committee are organized in the department of DGPA, and carries out management and monitoring of the project for each aquaculture station. Actual work is performed by provincial fishery offices and local aquaculture stations.

(2) Personnel Plan

Charge	Number	Period	Personnel resources
Expert of fry / fingerling production	1 person	8 months	Foreign expert

(3) Utilization of NGO : Unnecessary

(4) Education and Training for Personnel : Unnecessary

6. Implementation Plan

Activities	Conducting organization (person)	Schedule (year)												Results
		1	2	3	4	5	6	7	8	9	10	11	12	
Capability strengthening of aquaculture stations		―	―	―										
Dissemination of integrated fish culture to aquaculture farmers				―	―	―								
Manual preparation						―								

7. Project Cost

(1) Facilities and Equipments

Item of expense	Quantity	Unit price (1,000 CFA)	Price (1,000 CFA)	Remarks
Repair and expansion of a aquaculture station (Koulamoutou)	2,000m^2	7.5/10m^2	1,500	
The equipments for aquaculture stations (Oyem, Tchibanga, Koulamoutou)	3 sets	800	2,400	
Total			3,900	

(2) Personnel Cost

Item of expense	Quantity	Unit price	Price	Remarks

		(1,000 CFA)	(1,000 CFA)	
Expenses of dispatch expert				Foreign expert
Personnel expenses	8 months	10,000	80,000	
Airfare	1 time	6,000	12,000	
Local operational cost	8 months	500	4,000	
Total			96,000	

(3) Management Cost

Item of expense	Quantity	Unit price (1,000 CFA)	Price (1,000 CFA)	Remarks
C/P traveling expenses	1,800 person days	50	90,000	
Transportation expenses	120 person time	300	36,000	
Convention expenses	60 months	100	6,000	
Total			132,000	

8. Expected Benefit and Impact

(1) Economic benefit

i) Aquaculture station

If fry / fingerling production technique is improved to produce many fingerlings, the stations will become able to distribute the fry / fingerlings along with the extension activities to aquaculture farmers. For example, if 10,000 fingerlings per year can be distributed at a price of 200 CFA/fish, it will become an income of 2,000,000 CFA. Bloodstocks required for the fry / fingerling production are 130 fish (300g ♀100 fish and 300g ♂ 30). The feed cost for one year (bloodstocks and fingerlings) takes 300,000 CFA (about 730kg) including transportation cost. If these are calculated, 1,700,000 CFA can remain and this balance can be used on the next fry / fingerling production.

ii) Aquaculture farmer

The farmers can cut down the purchasing expenses of fry / fingerlings, if fry / fingerlings can be produced in their ponds. For example, when the pond of recommended size of 225m^2 (15m x 15m) - 400m^2 (20m x 20m) is used, 340 – 600 male fish of 30g or more size is needed ((at stocking density 1.5/m^2). If the purchase price of a fingerling is 200 CFA/fish, a farmer can save 68,000 - 120,000 CFA per a pond.

(2) Social impact

i) Habitation of young generation in the villages

As a part of the government support services, if necessary fry / fingerling can be stably produced and supplied, it is expected that the existing abandoned fish ponds will be reactivated, and aquaculture will be developed as regional industry in the rural area. In addition, as an alternative source of income for villages where fishing and hunting are restricted because of the setting-up of national parks, the groundwork for aquaculture development with livestock and forestry on community basis will be prepared.

9. Monitoring

The project progress is monitored by the DGPA once a month.

10. Environmental Impact

As same as “the Project for Development of Aquaculture Techniques”, it is necessary to fully consider the effects to underground water and to the water pollution caused by drainage in the surrounding water.

11. Collaboration with Other Projects

OFCF "aquaculture development support project”: The seed production method based on the tilapia seed production technique carried out in OFCF project is practiced and the method suitable for each aquaculture station is developed.

OFCF "aquaculture development support project (phase 2)": The project of OFCF is "development of techniques", this project is "adaptation and dissemination of techniques" and it differs in contents. Since

there are many useful things, such as "how to treat brood-stocks and fingerlings" etc. in OFCF project, cooperating with it is desirable.

4.4.11 Project for Aquaculture Extension

1. Outline of the project

(1) Abstract

i) Integrated fish farming

In Gabon, there are 4 provinces (Ogooue-lolo, Ngounie, Nyanga, Wolen-Ntem) in which extensive aquaculture is conducted. Among those, in provinces other than Wolen-Ntem province, many aquaculture farmers abandoned the ponds and have interrupted the aquaculture itself. It is because the dissemination of appropriate aquaculture technology was not conducted, so aquaculture was not profitable. In this project, the integrative culture method (appropriate aquaculture technology) which combined fish culture, livestock, vegetable cultivation, etc. is disseminated to aquaculture farmers using an OJT system. In order to increase the number of new comers, the target range of participant is extended not only to an aquaculture farmer but to those who are interested in the project. The following aquaculture stations are repaired as the model farms. In a northern part area: Oyem aquaculture station, in a Middle East part area: Koulamoutou aquaculture station, in a southern part area: Tchibanga aquaculture station. Moreover, in the eastern part of the country where creation of alternative income sources other than hunting (aquaculture, livestock, community forest, etc.) is immediately needed because of recent setting up of the national park, the Makokou aquaculture station is established newly.

ii) Cage culture

There is a big difference of the fish catches between rainy season and dry season in the middle reaches of the Ogooue River and the adjacent lake regions. Since the rainy season's fish catches decreases, a fisherman's income is not stable throughout the year. Therefore, it is necessary to find alternative incomes during the rainy season. The catchment of the Ogooue River is an area where temperature is the highest in Gabon, and since the area is unsuitable for cultivation of vegetables, rearing livestock, etc., cage culture is introduced as one of the alternative income sources. Some kinds of cage types (a floating type, a direct setting on the bottom type, etc.) are used, and the cage culture method is transferred to participants (priority is given to small-scale fishers) in training. The OJT training period is about two months. After the end of training, participants return to each fishing villages and practice cage culture in the appropriate places near their villages.

(2) Target Areas

i) Integrated fish farming

Wolen-Ntem province: Oyem aquaculture station (enforcement is immediately possible in equipment)
Nyanga province:Tchibanga aquaculture station (enforcement is immediately possible in equipment)
Ogooue-Lolo province: Koulamoutou aquaculture station (those of repair with necessity)
Ogouoe-Ivindo province: Makokou aquaculture station (new establishment)

ii) Cage culture

Moyen-Ogooue province: Lambaréné aquaculture station (tentative name) (new establishment)
Ogooue-Maritime province: the lagoon of Omboue circumference

(3) Target Groups

i) Integrated fish farming

Farmers in Wolen-Ntem Province: 24 pers., Staff of the Oyem aquaculture station: 13 pers.

Farmers in Nyanga Province: 12 pers., Staff of the Tchibanga aquaculture station: 9 pers.
Farmers in Ogooue-Lolo Province: 12 pers., Staff of the Koulamoutou aquaculture station: 8 pers.
Farmers in Ogooue-Ivindo Province: 12 pers., Staff of the Koulamoutou aquaculture station: 8 pers.

ii) Cage culture

Fishers / farmers in Moyen-ogooue Province: 12 pers., Staff of the Lambaréné aquaculture station (tentative name) (establishment): 5 pers.
Fishers / farmers in Ogooue-Maritime Province: 12 pers.

(4) Period: 2010～2015 (5 years)

2. Objective and Relevance

(1) Objective

- Implementation of the dissemination of integrated fish farming technology to improve the income of aquaculture farmers.
- Implementation of the dissemination of the cage culture as one of the sources of an additional income of small-scale fishers (alternative income source of the rainy season)

(2) Relevance

Based on the appropriate aquaculture technology (integrated fish farming) developed in the pilot project conducted from May 2008 to November, aquaculture farmers (including the farmers who have abandoned their fish ponds) are instructed and the sustainable aquaculture method is disseminated. The abandoned ponds are activated by this way and the aquaculture techniques are also extended to the farmers without previous aquaculture experiences. Moreover, the pilot project about cage culture technology that was carried out in the same pilot project period has already confirmed that the cage culture can become small fisher's alternative income source.

(3) Outcome to be achieved

- Five or more core farms for dissemination of integrated fish farming are established as model farms. Each model farm disseminate further the technology to 50 or more new farmers.
- The manual on integrated fish farming for dissemination to farmers is published.
- At least 10 fishers per year participate in cage culture training.
- By the end of the project, at least 10 persons begin the cage culture after the training.

3. Project Contents and Activities

(1) Integrated fish farming

Integrated fish farming is disseminated using each aquaculture station as a base. The location of each station is as follows. In a northern part area: Oyem aquaculture station, in a middle East part area: Koulamoutou aquaculture station, in a southern part area: Tchibanga aquaculture station, in an eastern part area: Makokou aquaculture station. Each aquaculture station is used as a model farm at the beginning, and the selected aquaculture farmers are trained using the same method as the pilot project. After the end of training, when an aquaculture farmer starts integrated fish farming in their village, the aquaculture station supports the farmer to become a new model farmer there. If an initial investment is required (repair of a pond, construction of a livestock hut, livestock purchase cost, etc.), the aquaculture dissemination fund set at each station is used. Then, the demonstration to other farmers is performed using the new model farm. In a demonstration, surrounding farmers are invited and the harvesting of fish is shown. If there are some farmers who are interested in integrated fish farming, they will be asked to participate in the next training. Moreover, the knowledge acquired through the training and the dissemination activities is used to improve the existing aquaculture manual. The information on the aquaculture development in other sites is collected from the farmers who participated in the training, and aquaculture potential survey is also conducted. After survey, the staff of provincial fishery office visit the site and carry out a field survey, and finally, the DGPA staff visit the site and check aquaculture possibility.

(2) Cage culture

The Lambaréné aquaculture station (tentative name) is used as the base, and cage culture is disseminated.

The aquaculture method is trained to individual fishers who are interested in the project using some kinds of cages (a floating type, a direct setting on the bottom type, etc.). A training period is carried out for about two months, and the participant is trained about daily management, cage fabrication and installation, handling and stocking of fish, kind and collection of feed, feeding method, etc. After the end of the training, when small-scale fishers start cage culture, an aquaculture station offers technical support and performs monitoring continuously. Moreover, the fishers around the new site are assembled to hold a meeting for introduction of cage culture. Then candidates who are interested in the cage culture are made to participate in the training and cage culture is disseminated gradually. The information on the other appropriate places for cage culture is collected from the fishers who participated in training, and the mapping is conducted. Moreover, since initial investment is needed also for cage culture at the time of a start, the credit system is made in a station.

4. Facilities and Equipments Plan

(1) Facilities plan

Facilities	Finishing and structure	Area and a size	Remarks
Repair and expansion of a aquaculture station (Oyem, Tchibanga, Koulamoutou)	Reconstruction of ponds and canals for inlet and outlet, reinforcement of bank, installation of a livestock huts	Total pond area Oyem: 12,000m^2 Tchibanga: 3,100m^2 Koulamoutou: 2,500m^2	
Lambaréné aquaculture station (establishment)	The management office, a storehouse, a rest room, etc.	Total area: 400 m^2 Building area: 125m^2	
Makokou aquaculture station (establishment)	The management office, a storehouse, a rest room, ponds for demonstration and rearing fish, livestock huts, etc.	Total area: 10,000 m^2	

(2) Equipments plan

Equipments	Quantity	Specification	Remarks
The equipments for aquaculture stations (Oyem, Tchibanga, Koulamoutou)	4 sets	A drain pump, tools for pond construction, handling tools (seine, scoop net, bucket, etc.), tanks for fish transportation	
The equipments for the Lambaréné Aquaculture station	1 set	cages for fingerlings and table fish, handling tools (seine, scoop net, bucket, etc.), and tanks for fingerlings transportation	
A pickup truck for transportation (fingerlings and feed materials)	4 sets	A pickup vehicle, S/C 4WD	1set/ station

5. Management plan

(1) Management Structure

The management and monitoring is conducted by DGPA. "Integrated fish farming dissemination project", "Cage culture dissemination project" management and administration committee are organized in the department of DGPA, and carries out management and monitoring of the project in each aquaculture station. Actual work is performed by provincial fishery office and each local aquaculture station.

(2) Personnel plan

Charge	Number	Period	Personnel resources
Integrated fish culture	16 persons / year	For three years	Participant farmer
Cage culture	8 persons / year	For three years	Participant fishers

(3) Practical use of NGO: Not necessary

(4) Education of staff: Not necessary

6. Implementation Plan

Activities	Conducting organization (person)	Schedule (year)												Results
		1	2	3	4	5	6	7	8	9	10	11	12	
Dissemination of Integrated fish farming	Aquaculture station	———												
Manual preparation	DGPA					———								
Dissemination of cage culture	Aquaculture station	———												

7. Project Cost

(1) Facilities and equipment

Item of expenese	Quantity	Unit price (1,000 CFA)	Price (1,000 CFA)	Remarks
Repair and expansion of a Aquaculture station (Oyem, Tchibanga, Koulamoutou)	5,000m^2	7.5/10m^2	3,750	
Lambaréné Aquaculture station (establishment)	125m^2	1,000/m^2	125,000	
Makokou Aquaculture station (establishment)	2,500m^2	7.5/10m^2	1,875,000	
The equipments for Aquaculture stations (Oyem, Tchibanga, Koulamoutou, Makokou)	4 sets	800	3,200	
The equipments for the Lambarene Aquaculture station	1 set	1,000	1,000	
A pickup truck for transportation (fingerlings and feed materials)	4 sets	8,000	32,000	1set/ station
Total			2,039,950	

(2) Personnel Cost

Item of expenses	Quantity	Unit price (1000 CFA)	Price (1000 CFA)	Remarks
A daily allowance and transportation expenses	48 persons	300 CFA / person	14,400	Integrated Fish culture
A daily allowance and transportation expenses	24 persons	200 CFA / person	4,800	Cage culture
Total			19,200	

(3) Management Cost

Item of expenses	Quantity	Unit price (1,000 CFA)	Price (1,000 CFA)	Remarks
C/P traveling expenses	15 days x 2 person x 60 months	50	90,000	
Transportation expenses	2 persons x 60 times	300	36,000	
Convention expenses	60 months	100	6,000	
Total			132,000	

8. Expected Benefit and Impact

(1) Economic benefit

1) Integrated fish farming

i) Aquaculture station

Like the pilot project, the station can obtain 50% of final profits and then the station saves it and uses it as a fund of the next training. For example, initial investment spends 2,420,000 CFA consisting of 2,100,000 CFA of livestock huts construction costs (pigs, ducks, chickens, goats), and 320,000 CFA of livestock purchasing expenses. As operation cost, feed cost 400,000 CFA for pigs and chickens is required. On the other hand, the total weight of the fish production is set to about 720kg, then the station can sell it by 2,000 CFA/kg and the gross sales become 1,440,000 CFA. Since the half of the income except the running cost is paid to a participating farmer, the income of the station itself is set to 520,000

CFA((1,440,000CFA-400,000CFA) / 2). Only feed cost is needed from the 2nd time, so 520,000 CFA becomes an income every six months.

Item		Unit price (CFA)	Total (CFA)
Initial investment	Livestock hut	For 4 kinds of livestock	2,100,000
	Buying expense	For 4 kinds of livestock	320,000
Total			2,420,000
Operational expenses			
	Feed cost	for pigs and chickens	400,000
Value of production (fish)	720kg	2,000/kg	1,440,000
Subtotal			1,040,000
Remuneration to a farmhouse	1/2		520,000
Income			520,000

ii) Fish farmers

Like a pilot project, participating farmers can obtain 50% of final profits of the project. After the end of training, when an aquaculture farmer begins the integrated fish farming at home, their income increases further. For example, when the aquaculture farmer which has 3-5 ponds (about 1,000m^2) as an average model farmer is assumed, the balance of payments of half a year is as follows. In this example, it is assumed that the farmer already has ponds and can carry out the fry / fingerling production by themselves. Here, the example of a duck is introduced because the integration with duck is the easiest. First, the farmer need to spend repair expense 300,000 CFA of a pond, livestock hut construction costs 700,000 CFA, and livestock purchase cost 300,000 CFA as initial investment. The total weight of fish production is set to about 540kg, and the station can sell it by 2,000 CFA/kg, and the gross sales becomes 1,080,000 CFA. It is insufficient by 220,000 CFA to the total of 1,300,000 CFA concerning initial investment. However, since initial investment is not needed in next half year, all the sales amount of the fish becomes an income from the 2nd time. The aquaculture farmer can pay the debt after the 2nd harvest. . All the sales amount of the fish becomes an income from the 3rd time and it can be a stable income source. Moreover, if pond area of average model farm is set to about 1,000m^2, the numbers of required aquaculture farmers in 2020 is assumed to be about 800 farmers.

Item		Unit price (CFA)	Total (CFA)
Initial investment	Repair expense of a pond (three ponds)	100,000	300,000
	Livestock hut	For ducks	700,000
	Buying expense	40 ducks	300,000
Subtotal			1,300,000
Operational expenses	Feed cost for ducks	0	0
Value of production (fish)	540kg	2,000/kg	1,080,000
Total			220,000
The after 2nd time	The balance carried forward		220,000
Value of production	540kg	2,000/kg	1,080,000
Total			860,000

2) Cage culture

i) Aquaculture station

When using 15 cages, initial investment is required 525,000 CFA (35,000CFA x 15 cages). The transport cost of feeds is assumed to be contained in a participant's transportation expenses. If there are two participants in training and the aquaculture station pays each 100,000 CFA/person/month, the total remuneration per training is 400,000CFA. Since this is repeated twice by the harvest, the total remuneration cost is set to 800,000CFA. On the other hand, if 50kg harvest is made from one cage and the station can sell it by 2,000 CFA/kg, the sales in 15 cages become 1,500,000CFA. As a result, the center can save 700,000 CFA within half a year, then, and makes it to set up a cage culture dissemination fund.

Item		Unit price (CFA)	Total (CFA)

Initial investment	Cage (15 set)	35,000	525,000
Operational expenses	Feed cost	0	0
	Transportation cost of feed	0	0
Remuneration to a participant	2 person x 2 months x 2 time	100,000/month	800,000
Value of production (fish)	50kg x 15 cages	2,000/kg	1,500,000
Income			700,000

ii) Fish farmers

The cage of the same size as what was used by the pilot project is used, and it is assumed that about 50kg harvest can be obtained within half a year. The making cost of a cage takes 35,000 CFA as initial investment. It becomes 100,000 CFA, if the quantity of fish production is 50kg and the station can sell it by 2,000 CFA/kg. As a result, the income of one cage becomes 65,000 CFA. Since cage cost is not necessary, the sales amount of fishes serves as an income from the 2nd time. However, the feed cost of the rearing fish is not contained in this case. It is necessary to secure feed for fish by themselves.

Item		Unit price (CFA)	Total (CFA)
Initial investment	Cage (1 set)	35,000	35,000
Operational expenses	Feed cost	0	0
	Transportation cost of feed	0	0
Value of production (fish)	50kg x 1cage	2,000/kg	100,000
Income			65,000

(2) Social impact

Aquaculture requires initial investment and there is no income for several months until harvesting. Therefore, the farmer without funding ability is difficult to participate. On the other hand, when a farmer with funding ability begins aquaculture, the employment (income) opportunity for surrounding poor farmers is created and activation of an area is expected.

i) Habitation of young generation in the villages

After the extension of aquaculture, the integrated fish farming will stabilize the farmer's income while the cage culture can become a source of income during off-season of fishing. Thus, the outflow of young generation to urban area can be reduced, so as to stop the depopulation and the aging in the rural area.

ii) Upgrading of women's independence

Aquaculture, as well as agriculture, can be engaged by women even who have to do housework and child care, since the activities required daily are only to do feeding (approx. 1 hour each at morning and afternoon), cleaning, and watching around ponds. No heavy physical labor is required except during the harvest of grown-out fish.

iii) Improvement of food life (nutrition)

In the inland region, the most of people depend on wild animal as a source of animal protein, resulting in one of the environmental problems. If aquaculture is extended to villages, fish will be deemed as an alternative source of income as well as of protein. Rural people will be able to increase fish consumption instead of wild animal, thus it will contribute to health promotion.

iv) Ensuring of safety life

By the extension of aquaculture, it is expected that some fishers may convert from fishing to aquaculture since aquaculture has less risk than fishing (accident of boat, etc.) and can obtain more stable production. In addition, aquaculture will enable the old and/or handicapped fishers to obtain the job opportunities.

9. Monitoring

The project progress is monitored by the DGPA once a month.

10. Environmental Impact

In local villages, livestock (pigs, goats, ducks, chickens etc.) are usually reared in a free-range condition. In this integrated fish-farming project, it uses feces and urine as an organic fertilizer in a culture pond. It is thought that there is no adverse influence to environment. However, since the bad smell and feces and urine of livestock may have a bad influence to neighbors or environment when the integrated fish farming is expanded to an industrial scale, it is necessary to take the influence into consideration.

In order to avoid the pollution on the aquatic environment by the excessive feeds (internal organs of fish or wild animals, leftover food, etc.) to the fish in the cages, establishment of suitable feed method and strengthening of instruction are required. In the closed aquatic environment such as a lake, it is necessary to introduce the permission system for installation of fish cages by DGPA to prevent uncontrolled expansion of fish cage which may cause rapid degradation of water quality. When installing a cage in a place with large water level fluctuation, a cage may be carried away and it may become a cause of an unexpected accident. The installation of fish cages should be done carefully. Under the present circumstances, in cage culture, natural fry / fingerlings are used. Therefore, over-fishing of fry / fingerlings can be considered. It is also important to advance research that aims at establishment of fry / fingerlings production technique simultaneously with the development of cage culture in Gabon.

11. Collaboration with Other Projects

- FAO "food security support project (PASA)"
  In this project, a Chinese aquaculture expert and an aquaculture engineer are dispatched to inland 4 provinces to assist private sector aquaculture farmers. Since the contents are overlapped, cooperating with this project is desirable. Specifically, visit of the activity sites, opinion exchange, etc. are performed.
- African Development Bank "Fisheries and Aquaculture Sector Support Project (PSPA)"
  Since repair and establishment of the Aquaculture stations are planned in this project, it is indispensable to cooperate with the PSPA project to advance this project.
- PDDI "Project for Financing of Small-scale Fishery (4.4.1)"
  For financing the farmers to build cages, purchase fingerlings, improve aquaculture ponds, etc., cooperation with this project is desirable.

4.4.12 Project for Improvement of Fresh Fish Distribution System

1. Outline of the Project

(1) Abstract

Outside of Libreville, Port-Gentil and Lambaréné, Gabon has almost no national infrastructure for the distribution of fresh fish products. Therefore, the conservation of fish caught depends only upon traditional processing methods – smoking, salting, etc., which fetch lower market prices than fresh fish and therefore the fish processing leads to financial losses for the processors. Fresh fish products are distributed in the urban zones, but they are often processed and sold by unhygienic methods in the absence of standards concerning the manipulation of these products. The present project shall establish small-scale community fishing centres at the main landing places in the regions having no infrastructure for the distribution of fresh fish products in order to set up the standards on the manipulation of fish products (especially, the standards of materials and equipment for distribution).

In addition, in Mayumba on the southern coast where the potential development of luxury seafood (lobster, blue crabs, oysters, mangrove crabs, etc.) is high, the project shall develop the distribution system of live seafood products and fresh products to Libreville and

Port-Gentil, after consolidation of the resource management system now being set up.

(2) Target Areas
- Setting up of Community Fishing Centres: Cocobeach, Mayumba, Kango, Ebel-Abanga, Ndjolé, Makokou
- Standardisation of the material and equipment of distribution: Libreville, Port-Gentil
- Development of the distribution of living fish products and fresh fish products: Mayumba

(3) Target Groups

Part of Project	Those concerned (participants)
Setting up of Centres	Agents DGPA (DPA, SQIS)
Standardisation of distribution equipment	Agents DGPA (DRCS)
Development of the distribution of fish products living/fresh	2 DGPA agents, two SQIS inspectors or technicians 2 or 3 groups of fishers in Mayumba Hotels, restaurants: about 10 places in Libreville, about 5 in Port-Gentil

(4) Period
- Setting up of Community Fishing Centres: 2009 to 2012 (three years)
- Standardisation of materials and equipment for distribution: 2011 to 2013 (three years)
- Development of the distribution of living and fresh fish products: middle of the year 2011 to the middle of the year 2014 (three years).

2. Objectives and Relevance

(1) Objectives

The objectives are to set up distribution infrastructure and standards for the manipulation of fresh fish products in Gabon, and to improve the quality and hygiene of fish products. Objectives also include a more effective use of the luxury seafood resources of Mayumba and an increase in the income of the fishers.

(2) Relevance

The setting up of national distribution infrastructure for fresh fish products will allow for the reduction in the loss of economic value of these products, as well as the post-harvest loss of fish. Moreover, an improvement in the lives of the local fishers is to be expected in Mayumba because of the increase in their income.

(3) Achievement Indexes
- The distribution of fresh fish products will become possible at the main landing places in the country;
- With the standardisation of material and equipment of distribution of fresh fish products, the manipulation of these products will become hygienic;
- Transportation of living and fresh fish products can be expedited from Mayumba to Libreville and Port-Gentil.

3. Contents and Activities of the Project

The present project is divided into three parts: (1) construction of the fishery centres at the main landing places, (2) standardisation of the material and equipment for the distribution of fresh fish products, and (3) development of the distribution system of living and fresh fish products from Mayumba.

(1) Construction of the community fishing Centres at the main landing places (to be realized by the PSPA).

An estimation in the approximate scale of the main facilities of the community fishing centres, based on the data on quantities of fishery products delivered in 2005 at the targeted landing sites, is indicated in the following table.

Table 4.11 Scale of Major Facilities of the Planned Community Fishing Center

Sites	Cocobeach	Mayumba	Kango	Ebel-Abanga	Ndjolé	Makokou
Quantity delivered (small pelagic)	2.471 (1.762)	4.337 (2.434)	890	1.842	800 (estimation)	1.044
Average Quantity handled per day (high fishing season)	12 t	18 t	3 t	7 t	3 t	4 t
Surface of the processing area (75 kg/m^2)	180 m^2	225 m^2	40 m^2	90 m^2	40 m^2	50 m^2
Quantity put on ice (except pelagic)	709 t	1.903 t	890 t	1.842 t	800 t	1.044 t
Ice making Capacity (percentage of fish on ice 100%)	2,5 t/day	6 t/ day	3 t/ day	6 t/ day	3 t/ day	4 t/ day
Ice Storage	5 t (15m^3)	12 t (36m^3)	6 t (18m^3)	12 t (36m^3)	6 t (18m^3)	8 t (25m^3)
Warehouse (storage of isotherm fish crates)	50 m^2	120 m^2	60 m^2	120 m^2	60 m^2	80 m^2
Mechanical workshop	30 m^2	30 m^2	30 m^2	30 m^2	30 m^2	30 m^2
Administrative Office	30 m^2	30 m^2	30 m^2	30 m^2	30 m^2	30 m^2
Total Constructions	350 m^2	500 m^2	220 m^2	330 m^2	220 m^2	250 m^2

Although direct landing by the dugout canoes onto the beach is possible in Cocobeach and Mayumba, the four other sites (Kango, Ebel-Abanga, Ndjolé, Makokou) in inland region would require the setting up of a ramp or a pontoon for the landing of the caught fish because of the topography of the terrace of the river bank.

In case of PASA's organisational decision differs from the above estimates, the project will adjust the plan to the scale and contents of the facilities decided by the PSPA.

(2) Standardisation of material and equipment for the distribution of fresh fish

The project shall clarify the work procedure, points verified, inspection methods and standards of evaluation for the hygienic handling of the caught fish, according to Gabonese sanitary standards concerning fish products. On that basis, stipulations and standards concerning the specifications for the distribution equipment for fresh fish products shall be set up concerning minimum requirements to guarantee hygiene. In addition, by using pilot projects, other stipulations will also clarify the rate of ice to fish products according to the materials and type of isotherm fish crates are being used, as well as the possible duration of conservation of fresh fish products. The application of these standards shall begin in Libreville and Port-Gentil.

(3) Development of distribution of live and fresh fish from Mayumba

A. Distribution of live fish

The main activities to be developed in this project shall be as follows:

i) Study on the demand of fish to find outlets for distribution: Market for the fish products will be found through a study on demand and sales promotion using product samples at hotels, restaurants, etc. in Libreville and Port-Gentil.
ii) Supply and installation of material and equipment: Fishing equipment, facilities, material and equipment, etc., for storage and pre-processing before distribution of the living fish products will be supplied and installed.
iii) Catching fish: Targeted fish species will be caught by using crates supplied, then put into storage cages set on the fore beach area.
iv) Pre-processing for the transportation of living fish products: After being removed from the cages and acclimatised to the water temperature in the tanks situated on the beach (progressive reduction of the temperature to just below 10°C by adding ice), the live fish will then be put into coolers kept cool on ice and then transported.

v) Transportation of living fish products: The products will be transported by road or air towards the consumer zones.
vi) Follow-up: A follow-up will be carried out concerning the distribution conditions, as well as the sale and consumption.

In addition, the quantity targeted for the distribution of live fish products is one ton for lobster and two tons for blue crab, corresponding to about 5% of the annual landing of respective species at Mayumba.

B. Distribution of fresh fish

A group for the transportation and sale of fresh fish products from Mayumba will be set up to buy the catch from the coastal fishers to send and sell it as fresh fish at Port-Gentil. This sales group of fresh fish products will be selected after an extensive public recruiting effort that will go outside the region – Port-Gentil, Libreville, others -, as well as business people in fish products.

For the purchase and sales mentioned above, the sales group shall use and maintain trucks for the transportation of fresh fish products under a contract between the DGPA and the group of small-scale fishers, and the group shall transport the fresh fish on ice to the zones of consumption (Libreville and others) to sell them there. The community fishing centres shall be used for supply of ice, temporary storage on ice of the bought fish products, loading onto the trucks, etc.

4. Facilities and Equipment Plan

(1) Facilities Plan

Fishing Centres	Structure/Details	Surface/ dimensions	Observations
Cocobeach	Reinforced Concrete Structure, with no storeys	350 m^2	Processing area for fresh fish products, ice making and storage, storage of isotherm cases, mechanical workshop, Administrative office, toilets
Mayumba		500 m^2	Idem above.
Kango		220 m^2	Idem above + ramp
Ebel-Abanga		330 m^2	Idem above + ramp
Ndjolé		220 m^2	Idem above + ramp
Makokou		250 m^2	Idem above + ramp

(2) Equipment Plan

i) Construction of Fishery Centres

Equipment	No.	Specifications	Observations
Fish Cases	1 000	Plastic, about 60 litres	
Isotherm Fish Cases	500	Inside Capacity : 150 litres	
Weighing scales	72	12 platform scales (100 kg), 60 spring scales (20 kg)	
Repair equipment	6 lots	General and special tools, hydraulic pressing equipment, work counter space	

ii) For the development of distribution of live and fresh fish from Mayumba

Equipment	No.	Specifications	Observations
Isotherm Truck	1	Isotherm truck, product load capacity : 3 tons	Transportation of fresh fish products on ice
Fish cases	3		
Fish cases	30		
Cord	200 m	Diameter 12 mm	For the buoys
Buoys	6	Diameter 500 mm	For storage cages
Tanks	3	1 m × 1 m × 0,5 m	To adjust the temperature of the sea water
Aerators	3	For 0,5 tons of water	For acclimatizing to the temperature of the water in the tanks
Isotherm fish cases	20	100 litres	For the transportation of living fish products

5. Management Plan

(1) Management Structure

It is the DGPA (especially the DPA and DRCS-SQIS) who will manage the project mentioned above. However, concerning number ii) above, the Group of small-scale fishers of Mayumba and the sales group will be responsible, with supervision and technical advice from the DGPA.

(2) Personnel Plan

Responsibilities	Number	Duration	Source of personnel
Study and designing	5 people	3 months	External Sub-contractor
Construction of facilities and installation of equipment	20 people	12 months	External Sub-contractor
Training in the use of the equipment	3 people	1 month	DPA, SQIS, fishers
Formulation of standards for the handling of fresh fish and standardisation of material and equipment	3 people	6 months	DRCS
Marketing study	3 people	1 month	DPA, SQIS, fishers
Techniques for handling and transporting live fish	2 people	1 month	SQIS
Treatment and distribution of live fish	1 group		Fishers × 5
Treatment and distribution of fresh fish	1 group		Sales Group for fish products
Follow-up	3 people		DPA, SQIS, fishers

(3) Utilisation of NGO

The NGO will be entrusted for socio-economic survey on the target users of each fishery centre and for preparatory works for establishment of operation & management body of the centre. In addition, it is possible to collaborate with the local NGO (which is now doing fish marketing) for sales promotion of live fish from Mayumba to Libreville.

(4) Education and Training for Personnel

Educating and training will not be necessary. On the other hand, an SQIS inspector or technician will have to give to the groups of fishers onsite technical advices concerning the handling of live fish and their pre-treatment before being transported, as well as technical advice concerning the conservation system of live fish to their destination.

6. Implementation Plan

Activities	Execution	Calendar (years) 1	2	3	4	5	Results
Designing & supervision of the building of the centres	DGPA						Achievement report
Designing & purchase of equipment	DGPA						Photos of equipment, reports
Establishment of distribution standards, standardisation of equipment	DRCS						Standards
Study on demand for live & fresh fish, and planning	DGPA						Study report
Purchase of distribution equipment, instruction on handling	DGPA						Photo of equipment, report
Management and monitoring	Groups of fishers						Fishing and shipping records

7. Project Cost

i) Facilities and Equipment Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Total (in thousands FCfa)	Observations
Fishery Centre of Cocobeach	350 m²	1.000	350.000	

Fishery Centre of Mayumba	500 m²	1.000	500.000	
Fishery Centre of Kango	220 m²	1.000	220.000	
Fishery Centre of Ebel-Abanga	330 m²	1.000	330.000	
Fishery Centre of Ndjolé	220 m²	1.000	220.000	
Fishery Centre of Makokou	250 m²	1.000	250.000	
Ice Making & Storage	49 t/jour	20.000	980.000	
Fish Cases	1.000	20	60.000	
Isotherm fish cases	500	400	200.000	
Weighing scales	72	150	15.000	
Repair equipment	6 lots	4.000	24.000	
Materiel for expediting the fish	1 lot		3.000	Mayumba
Total			3.133.000	

ii) Personnel Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Total (in thousands FCfa)	Observations
Designing and supervision	Cost of facilities & equipment x 10%		313.000	
Travel	20	50	1.000	DGPA/SQIS
Transportation	10	50	500	DGPA/SQIS
Transportation (fishers)	10	50	500	Distribution and market study
Total			316.000	

iii) Management Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Total (in thousands FCfa)	Observations
Hiring of fishers	15 days	20	300	Distribution and Marketing Study
Cost of electricity	10 months	10	100	Cost of electricity
Total			400	

8. Expected Benefits and Profitability

(1) Economic benefit

In terms of profits from the setting up of the fishery centres, we can mention the increase in the sales price based on the weight for fresh fish, which is higher than the price per kg received for the traditional processed products (smoked, salted), because of the new possibility of distributing these fresh products. Concretely, the price is 500 Cfa Francs per kilogramme if the fish is salted or smoked, as opposed to 1000 Cfa Francs per kilogramme if the fish is fresh. The quantities of fish annually delivered (quantities for distribution of fresh fish products, small pelagic excluded) in the six targeted zones are 7,188 tons. If we presume that 25% should be reoriented towards the distribution as fresh fish products, we can hope to receive an annual profit of 898.5 million Cfa Francs. Moreover, with the setting up of a repair system for outboard motors, the frequency of the fishing outings should increase significantly. In addition, if the standardisation of the distribution equipment of fresh fish products progresses, a smaller waste quantity will be thrown out because of bad conservation conditions and the consumers will be able to safely and confidently buy these fresh products.

Moreover, a big increase in the sales price is expected as an advantage of the distribution of live fish from Mayumba towards Libreville and Port-Gentil. In the absence of past results concerning the distribution of live fishing products in Gabon, establishing quantities for demand and sales prices for live seafood products is not easy, however, we can hope for a price that will be between 1.5 and 2 times higher than the price for fresh fish.

(2) Social impact

i) Upgrading of women’s independence

In the target areas of the project, there is no ice and storage to keep fresh fish except processing into smoked or salted/dried fish. After the fresh fish marketing can be realized with construction of fishery centers, it is anticipated that the work load and income of women processing fish in the fishing villages may decrease and some village women has to shift the job for selling fresh fish. By this change, village women can increase opportunities to go to the town resulting in the enlargement of their activity area, and thus it will contribute to the upgrading of women's social status and help in their independence.

ii) Improvement of food life (nutrition)
In the target areas, fishers cannot help doing one-day fishing due to the lack of ice, and the daily volume of fish sold to market largely varies depending on the catch. Therefore, there are some unsold fish that are lost freshness, and those fish are treated smoked or salted/dried resulting in poor quality in the processed products. With the establishment of fresh fish marketing infrastructure, the fish freshness will be improved, and it will be possible to supply stably the hygienic fish to consumers. By realizing this matter, the occurrence rate of food poisoning will be reduced so as to contribute to the promotion of health of people.

iii) Enlargement of physical distribution and human exchanges
With the improvement of fresh fish distribution system, the marketing of fresh fish from fishing villages (production area) to local towns (consumption area) will be enabled, and accordingly the physical distribution including general goods will be activated and the human exchanges will be also enhanced.

9. Monitoring
The data on the number, sale and distribution of fish caught, to be gathered by the groups of fishers using data sheets, will be consolidated and analysed once a month by the DGPA or SQIS agents, and will help to improve the techniques for distribution and sales promotions.

10. Environmental Impact
In designing of the Fishery Centres (civil engineering structures such as a landing wharf, a slipway, etc. in particular), it is necessary to study on the effects by the construction of structure to the natural environment such as shoreline (sea or river), tidal flow (or river-water flow), etc. and the biological environment (fauna and flora), and to consider to cause the changes as small as possible. In addition, as for the operation of the Centre, it is necessary to make necessary treatment of waste (fish guts, scales and bones) and effluents (after processing and washing of fish) in accordance with the Gabonese standards.

11. Collaboration with Other Projects
There are no similar projects now being carried out or being envisaged for the next few years.

4.4.13 Project for Valorisation and Improvement of Quality of Fishery Products

1. Outline of the Project
(1) Abstract
Fish species typically caught in big numbers in Gabon are the Sans-nom and the tilapia for inland fishing and sardines for ocean fishing. Because of its appearance and odour, the Sans-nom has not been used very much as fresh fish until now, despite its low price (a quarter or one fifth that of the tilapia). Moreover, although sardines make up a big proportion of the fish being caught by the Gabonese coastal fishers, they are hardly ever distributed as fresh fish. Instead they are smoked according to tradition, and the majority is distributed at a low price in the inland markets or exported to neighbouring countries (Cameroon, Congo).

Moreover, in terms of controls of fish being exported by industrial fishing, the Service of Quality and Sanitary Inspection (SQIS) of the DGPA, carries out sanitary inspections of the facilities concerned and organoleptic inspections of products, and they then deliver certificates. Through conventions signed with the Ministry of Trade and Industrial Development and the Ministry of Mines, Petroleum, Hydrocarbons, Energy, Hydraulic Resources and the Promotion of New Energies, the SQIS is able to carry out its scientific and microbiological tests in the laboratories of these ministries, since the SQIS does not have either laboratory or equipment to carry out product inspections. The inspections of fishing products are still

insufficient at present, because of a lack of control equipment and insufficient experience in the use of the techniques.

In order to develop the techniques of processing of fish (increase in the value-added products) and improve their quality and hygiene, the present project shall set up the facilities and systems for testing processing techniques and for carrying out the necessary inspections for quality.

(2) Target Areas

Site for setting up the facilities:

Small-Scale Fishery Support Center of Libreville (temporary name), in Oloumi, Libreville.

Site for the development of processing techniques:

Processing room of the Fishery Community Centre of Lambaréné and facilities mentioned here above.

Site for training the personnel:

Specialised Centre of Valorisation and Technology of Ocean Products (Agadir, The Kingdom of Morocco)

(3) Target Groups

- Technical development: SQIS inspector and technician (total of 2 people);
- Assistants: processing group from Lambaréné (around 5 people);
- Agents from the Direction of Regulations, Control and Surveillance (DRCS) of the DGPA (around 10 people);
- SQIS Agents (around 7 people).

(4) Period

- Development of the processing of Sans-nom and sardines: Mid-year 2009 to mid-year 2011 (two years);
- Setting up of a qualitative and sanitary inspection system for fish products: 2011 to 2013 (three years).

2. Objectives and Relevance

(1) Objectives

Objectives include job creations in the new processing industries, and an increase in the incomes of the population who have always worked with traditional processing methods, through the development and effective use of new processing techniques with fish species that are easy to catch

Another objective is the setting up in Gabon of facilities and equipment with the necessary functions for inspection of quality and sanitary management of fish products, making it possible to meet regulatory inspection requirements for exporting these products towards the European Union. It will also be necessary to acquire the techniques for use and maintenance of the control apparatus concerned with the exportation of fish products. Moreover, it will be necessary in Gabon to create the necessary functions of quality and sanitary management of fish products in order to assure a domestic distribution of the fisheries products and the processed fish products, including there in the distribution of these processed products in neighbouring countries.

(2) Relevance

Concerning the Sans-nom, in addition to the fish pads made with Sans-nom which have already been developed through a pilot project, it is essential to develop new processing methods of this fish species which complies with the tastes and needs of the Gabonese population. In addition, the development of new processing techniques will also allow the distribution of sardines as an additional value added product (pâté, fish flour, etc). The development and use of these technologies should allow for a more effective use of fish resources, a promotion of employment, gains in foreign currency, and a future improvement of income and life style for the small-scale fishers.

However, in order to improve the quality and sanitary management of fish products which are still inadequate in terms of the present regulations for exportation to the European Union, in order to support and promote revenue in foreign currency generated through the exporting of these products, and in order to guarantee the safety of all products distributed in Gabon and offer them to the local population, the DGPA must have its own facilities and equipment authorizing them to carry out the necessary inspections and tests. In addition, the improvement of knowledge and technologies in this area through training in other countries such as Morocco is promising for an even more effective use of the facilities and equipment newly developed and set up.

(3) Outcomes to be achieved

- Three new processing techniques for the Sans-nom are developed, and their products are being distributed in Gabon;
- Two new processing techniques for sardines are developed, and their products are being distributed in Gabon and in the neighbouring countries;
- Facilities are set up for quality control and sanitary management of fish products, fitted with inspection functions allowing them to comply with regulation requirements for the exporting of products towards the European Union;
- Techniques on the use and maintenance of the different inspection apparatus required for the export of fish products are acquired;
- An inspection and management system is created for the distribution in Gabon and in the neighbouring countries of fish products and transformed fish products.

3. Contents and Activities of the Project

i) Development of processing techniques of the Sans-nom

- Five new processing techniques of the Sans-nom, considered to be experimental with the present equipment, will be selected because of their promising nature;
- Processed products of the Sans-nom, will be experimentally produced using these five techniques;
- Three types among the five mentioned above, will be selected by means of tasting activities carried out by those concerned;
- These three types will benefit from additional improvements;
- Sales will be promoted after market and distribution studies;
- Monitoring will be done and the results will be examined and evaluated.

ii) Development of processing techniques of sardines

- Three new processing techniques of the sardine considered experimental with the present equipment, will be selected because of their promising nature;
- Processed sardine products shall be experimentally produced using these three techniques;
- Two types among the three mentioned above, will be selected through tasting activities carried out by those concerned;
- These two types shall benefit from additional improvements;
- Sales shall be promoted after market and distribution studies.
- Monitoring will be done and the results will be examined and evaluated.

Moreover, a group of women will be organised in Mayumba and they will produce fish flour on a small-scale using sardines.

iii) Setting up of a qualitative and sanitary inspection system of fish products

- The study of the basic concept for the construction of new facilities and the setting up of new equipment will be done;
- A bid tender to select the company for the building of the facilities and the supply of equipment will be carried out;
- The construction of the facilities and the setting up of the equipment will be done;
- The training in the use and maintenance of the equipment will be organised;
- An inspection and management system will be created for the distribution in Gabon and in neighbouring countries of fish products and transformed fish products.

4. Facilities and Equipment Plan

(1) Facilities Plan

Facilities	Structure/Details	Surface/dimensions	Observations
Inspection & experimental processing facilities	Reinforced concrete	Environ 300 m^2	Libreville
Processing workshop for fish flour	One-storey building made of wood	10 m × 15 m	Mayumba
Temporary storage of fish –raw material	Storage on ice, isotherm structure	4 m × 5m	
Drying area in the sum	Wood shelves		
Storage of products	One-storey building made of wood	5 m × 5m	

(2) Equipment Plan

Equipment	No.	Specifications	Observations
Equipment for processing experiments	1 lot		Libreville
Apparatus for inspection & testing	1 lot	For food product use (fish products)	
Small pan to boil the fish	1	Flat pan in stainless steel ; oven, gas burner	Mayumba
Indoor baskets for above cooking	3	Stainless steel Pans with screens	
Chain block	1	100 kg	
Fish cases	40	40 litre plastic Containers	
Trolley	1	Stainless steel	
Frame supports for sun drying	100	Frames with fine mesh or screen	
Flour mill	1		
Platform weighing scales	1	100 kg	
Brush(es), tube(s)			

5. Management Plan

(1) Management Structure

Although the DGPA will benefit from the technical advice of the SQIS, it twill remain as the executive entity for the construction of the facilities and setting up of the equipment. Once the construction and setting up has ended, the SQIS will then be responsible for operations and surveillance.

(2) Personnel Plan

Responsibilities	Number	Duration	Source of personnel
Technical Development	2 people	12 months	SQIS
Assistants for processing	5 people	4 months	Group of existing transformers
Study of basic concept	5 people	1 month	External Sub-contractor
Construction of facilities & setting up of equipment	20 people	8 months	External Sub-contractor
Training in the use of the equipment	3 people	1 month	SQIS
Creation of inspection for domestic distribution	3 people	1 month	SQIS
Advice for domestic distribution	3 people	6 months	SQIS

(3) Utilisation of NGO

It is possible to entrust the NGO with sales promotion of processed products.

(4) Education and Training for Personnel

Whereas educating and training the personnel are not necessary preconditions for this project, nevertheless, technical instruction for an appropriate duration is necessary for learning on the use and maintenance of the equipment.

6. Implementation Plan

Activities	Execution	Calendar (years) 1	2	3	4	5	Results
Technical development of processing	SQIS						Experimental
Technical development of processing of sardine	SQIS						Experimental processing report
Processing and monitoring	SQIS						Processing and sales records
Designing & supervision of construction of facilities	DGPA						Achievement report
Designing & purchase of equipment	SQIS						Photos of equipment, report
Training of SQIS personnel (training in third countries)	SQIS						Training report
Technical support for those concerned with marketing and distribution	SQIS						Technical support report
Support in management and maintenance of equipment	SQIS						Training report

7. Project Cost

i) Facilities and Equipment

Budgetary Chapter	Quantity	Unit price (in thousands FCfa)	Total (in thousands FCfa)	Observations
Centre for Sanitary Inspections & Improvement in Quality of fish products	1 lot		400.000	Libreville
Processing workshop for fish flour	1 lot		120.000	Mayumba
Inspection Equipment	1 lot		400.000	Libreville
Processing Equipment	1 lot		200	Lambaréné
Production equipment for fish flour	1 lot		20.000	Mayumba
Total			800.200	

ii) Personnel Cost

Budgetary Chapter	Quantity	Unit price (in thousands FCfa)	Total (in thousands FCfa)	Observations
Travel	2 people × 12 times	30	720	CCPAL, SQIS Agents
Transport (LBN)	12 times	50	600	SQIS Agents
Transport (LBV)	12 times	15	180	SQIS Agents
Conception & supervision	Cost of facilities & equipment x 10%		80.000	
Total			81.500	

iii) Management Cost

Budgetary Chapter	Quantity	Unit price (in thousands FCfa)	Total (in thousands FCfa)	Observations
Fish raw material	For 15 times	20	300	Fish, condiments
Consumables	For 15 times	10	150	Detergent, plastic bags, etc.
Assistants for processing	5 people × 12 times	15	900	Groups of transformers
Transport (inside Libreville)	12	15	180	Support by GA
Total			1.530	

8. Expected Benefits and Impact

(1) Economic benefit

If the development of new processing techniques creates a stronger demand for species that until now have

not been used despite the abundant resources, the increase in the catch will allow for a direct contribution to the increase in the fisher's income. Moreover, a contribution to the food supply in Gabon and towards neighbouring countries, the offer of good quality fishing products for consumers, and the promotion of employment through the creation of a new processing industry are also to be expected. In addition, the promotion of exportation of these processed products promises a gain in foreign currency, representing another advantage over the past.

The setting up of a quality and sanitary inspection system of fish products will reinforce the confidence in the quality and hygiene of Gabonese products, and their exports to the European Union should increase. We can also consider that in Gabon and in the neighbouring countries, the higher standards in the safety of fish products will reinforce the confidence of the population in these products and will thereby contribute to their popularity and increase their consumption.

Moreover, the improvement in knowledge and technologies in this domain by means of training in third party countries set up in Morocco should increase even more the effective use of the facilities and equipment newly developed in addition to achieving the objectives mentioned above.

(2) Social impact

i) Upgrading of education / health standards

The valorization of fish species that can be caught abundantly will be effective to increase the income of fishers and processors. By increase of income, fishers can go out fishing with a sense of security, and it will contribute to effective utilization of resources. On the other hand, the most of processors targeted under this project will be those acting as retailer and/or canteen operator in the urban area. The side income from processing will be utilized for domestic account so as to contribute to the improvement of education and health conditions of children.

ii) Improvement of food life (nutrition)

With the diversification of processed products, fish intake rate (approx. 40% at present) will be increased, while the intake of wild animal meat may be reduced in the total animal protein consumption at the general households. Thus, the people's metabolic level will be improved.

With adequate execution of quality and hygienic inspection of fishery products, the products that are deteriorated will be reduced at the public markets, so that the occurrence of food poisoning will be decreased, contributing to the promotion of health condition of the people. In addition, the quality of fishery products for export will be controlled so that the people of neighboring countries will be also benefited with improvement of food life and health condition.

9. Monitoring

For the monitoring of the development of the processing techniques, development of market and distribution, sales promotion and tendencies of consumer needs, the SQIS agents will fill out a data sheet after each processing experiment, consolidate and analyse these data once a month and propose improvements when necessary.

The monitoring will not be necessary during the construction period of the facilities or when the equipment is being set up. However, after this stage, concerning the advice on qualitative and sanitary management given to the fishing companies for export products and to the processing companies, and concerning the inspection of these products using the equipment that has been set up, the data sheets will be designed, allowing for the recording of necessary information, and this will be recorded each time advice is given or an inspection takes place. The SQIS agents shall determine the priorities, examine and evaluate these data sheets once a month. The same procedure will be set up concerning the advice given to the small-scale fishers and stakeholders of the sales distribution which targets fish products for Gabon and the neighbouring countries.

10. Environmental Impact

The waste and drain water after fish processing have to be treated in accordance with the Gabonese standards, but not discharge directly to the surrounding environment. The water treatment system has already equipped

in the SQIS's existing facilities in Libreville and the CCPAL, and there is an existing system for collecting raw waste regularly by the municipality.

11. Collaboration with Other Projects

There are no similar projects now being developed or which are planned for the next few years.

4.4.14 Project for Capacity Development of Fisheries-Related Organizations

1. Outline of the Project

(1) Abstract

Gabon does not have enough technicians in the area of fishing, thereby constituting a bottleneck for the development of fishing and the fishing villages. In the present project, a communication system shall be established between the Fishery and Aquaculture Training Center in Port-Môle of Libreville (CMPA) and the regional facilities concerned with fishing, the training of instructors, technicians, promoters and data collectors.

(2) Target Areas

The CMPA, Provincial Fishing Inspection Offices (9 places), Fishing Brigades (4 places), Small-scale Community Fishing Centres (4 places), Fish Farming Stations (4 places).

(3) Target Groups

The DGPA technical Personnel (regional agents included)

(4) Period : 2009 to 2020 (12 years)

2. Objective and Relevance

(1) Objectives

A training system for fishing shall be established in Gabon in order to effectively apply this Master Plan. Concretely, the facilities and related equipment shall be set up and the human resources who cover the development of fishing, shall be trained.

(2) Relevance

In Gabon, the number of people who have the techniques, knowledge, experience and qualifications to establish project plans, manage the execution of the project, cover the follow-up and evaluation, give instructions for improvement for various types of fishing development projects, is inadequate. This project shall cover the training of the human resources in charge of development, an indispensable long-term activity for the sustainable management of all projects.

(3) Outcomes to be achieved

- 10 technical fishing agents (instructors), 10 technicians, 50 fishing promoters shall be trained;
- Basic facilities and equipment for training and extension services in all regions, like the CMPA, the small-scale community fishing Centres, the Fish Farm Stations, shall be organized and refurbished;
- The method for statistical fishing data collection shall be improved and the precision of its contents will be sharpened.

3. Contents and Activities of the Project

(1) Reinforcement of the technical capacities of the DGPA Agents

i) Training of the technical fishing agents

Within the framework of the South-South cooperation, the technical fishing agents shall be trained to become CMPA instructors. Concretely, the training of technical agents shall take place through the collaboration with Tunisia (three years beginning in October, 2007, four people) in the area of navigation /

fishing, as well as motor, refrigerator system, and the collaboration with Egypt (International Egyptian Centre for Agriculture: CIEA) (three years beginning in May, 2008; two people) in the area of aquaculture. Moreover, the training of technical agents shall take place in Morocco, in Tunisia, in Senegal and in Japan in different areas: fishing resource management (one person), processing of fishing products/ management of hygiene and the quality of products (one person), financing of fishing (one person), fishing organisation and systems (one person), and ten technical fishing agents shall be trained for the year 2020. The training shall take place during a period of six to twelve months for those ranked director of a DGPA service. After the end of the training, the technical fishing agents shall prepare the basic plan for the CMPA facilities that are to be reorganised, and also the training programme in various areas of expertise.

The donor should carry out an inquiry every year in the countries concerned with the South-South cooperation to verify the requests of each country in each domain. Then the donor will establish an annual training programme defined mainly in Morocco, in Tunisia, in Egypt and in Senegal on the basis of requests from each country, and will then prepare to welcome the trainees.

ii) Training of fish farming technicians
Practical training shall take place to improve the technical level of the fish farm technicians at the stations throughout the country.
Place: Songhai School of Porto-Novo, Benin (managed by an NGO), or
National Aquaculture Centre of Foumban in Cameroon
Duration:12 to 24 months
Contents:Theory and practice in inland fish farming
Number of Participants: 10 fish farm technicians to have the rank of Fish Farm Station Chief

The training of the technicians in areas other than fish farming will take place at the CMPA which should be refurbished, and this training will be presented by the technical fish farm agents who have already been trained in i) here above.

iii) Training of regional agents
For the Heads of the Provincial Fishery Inspection Offices and the Heads of the Fishery Brigades (including candidates who rank as officers) from each province, training concerning project management, fishing statistics, the fishing code and system, extension of fishing knowledge, the financing of the fishers, resource management, coastal surveillance (Heads of Fishery Brigades only), accounting; will take place periodically at the DGPA headquarters (twice a year for around ten days each time).

(2) Training of fishing promoters
i) Training of technical promoters and data collection
Technical promoters and data collectors throughout the country shall be trained at the CMPA that will be refurbished.
Training Period: 30 days each time
Training Contents:

- Data Collecting Agents: Methods in data collection (study of landing places, recording of fisher's activities), method for data processing (computer);
- Fishing Promoter Agents: Technical training (fishing methods and equipment, fish farming, operating equipment), extension methods, financing of fishers, resource management;

Participants: 50 people

ii) Organising of an extension service system for the fishers and fish farmers
Promoters trained at the CMPA and who will be assigned to various places, shall cover instruction and extension services for the fishers in the Small-Scale Community Fishing Centres, the Provincial Fishing Inspection Offices and the Fishing Brigades. The extension of fish farming techniques shall be done for the key regional fish farms in all the fish farm Stations for around six months in the form of practical training. And after this training, they will play a demonstration role for the other fish farmers in the region.

iii) Refurbishing of the training facilities
- Enlarging of the CMPA facilities and renewal of the training equipment
- Setting up of audio-visual equipment in the Provincial Fishing Inspection Offices and Fish Farm Stations throughout the country

(3) Organization of a Communication System between the DGPA and the Regional offices

Communication and computer equipment, as well as the means of transportation shall be reinforced in the facilities below, for statistical fishing data collection and extension activities.
- Nine Provincial Fishing Inspection Offices;
- Four Fishing Brigades (Cocobeach, Pont Numba, Kango, Mayumba);
- Four small-scale fishing community centres (Port-Gentil, Lambaréné, Omboué, Owendo);
- Six Fish Farming Stations (Four Existing Stations: Owendo, Tchibanga, Lébamba, Koulamoutou, and two Stations to be built: Lambaréné and Makokou).

4. Facilities and Equipment Plan

i) Facilities Plan

Facilities	Finishing & structure	Size	Observations
Administrative Building: CMPA	Reinforced concrete, 1-storey	Around 300m^2	Administrative office, office for instructors, meeting room, classroom
Laboratory CMPA	Reinforced concrete, 1-storey	Around 800m^2	Production of fishing equipment, practice fixing motors, navigational apparatus, testing of processing processes, biological observation, chemical testing
Residence CMPA	Reinforced concrete, ground floor only	Around 500m^2	2 people per room x 15 rooms, kitchen

ii) Equipment Plan

Equipment	No.	Specifications	Remarks
Training Equipment	1 lot	2 small fishing boats, motor simulator, freezer simulator, electric circuit unit, navigation apparatus for practice, tools for biological and chemical testing	For CMPA
Data Processing Equipment	21 lots	Computer, printer, photocopier	
Fax Machines	21		
Pickup trucks	21	Double cabin, 4x4 (4 wheel drive)	
Scooters	42	125 cc	

5. Management Plan

(1) Management Structure

The DGPA shall be in charge of the management of the project from the planning stage to the operational stage.

(2) Personnel Plan

Person Responsible	Q'ty	Duration	Source of personnel
CMPA Agents	10	15 days each time x 4 times/year	DGPA
Promoters/ Data collectors	50	5 days/month x 12 months/year	DGPA

(3) Utilisation of NGO

It is possible to obtain assistance from the experienced NGO in project management and book-keeping, as well as in the training on social survey and organizational strengthening.

6. Implementation Plan

Activities	Execution	Calendar (years) 1 2 3 4 5 6 7 8 9 10	Results
Training of senior fishery officers (South-South cooperation)	DGPA		Training report
Training of aquaculture specialists (neighbouring countries)	DGPA		Training report
Training of regional agents	DGPA		Training records & report
Training of technical promoters and data collectors	DGPA		ditto
Extension to fishers and fish farmers	DGPA		ditto
Establishment of the training centre	DGPA		Achievement report
Establishment of communication system with the regional agencies	DGPA		Photos of equipment, operation records

7. Project Cost

i) Facilities and Equipment

Budgetary Chapter	Quantity	Unit Price (thousands FCFA)	Amount (thousands FCFA)	Remarks
CMPA Buildings	2.000 m^2	800	1.280.000	
Training Equipment	1 lot		1.000.000	
Data Processing Equipment	21 lots	1.000	21.000	
Fax Machines	21	200	4.200	
Pickup Trucks	21	8.000	168.000	
Scooters	42	1.500	63.000	
Total			2.536.200	

ii) Personnel Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Remarks
Remuneration of CMPA instructors	600 man-days/year	15	9.000	
Remuneration of promoters	3.000 man-days/year	10	30.000	
Cost of engineering design of structures and equipment	Cost of structures and equipment x 10%		253.620	
Total			292.620	

iii) Management Cost

Budgetary Chapter	Quantity	Unit Price (in thousands FCfa)	Amount (in thousands FCfa)	Remarks
Cost of training abroad	10 people x 6 months	2.000	120.000	
Cost of training of fish farm technicians	20 people x 12 months	1.000	240.000	
Transportation costs of regional agents	10 people x 10 days x 2 times/year	50	10.000	
Cost of training of promoters	10 people/times x 30 days x 4 times/year	50	60.000	
Total			430.000	

8. Expected Benefits and Profitability

The improvement in the technical level of the DGPA agents and the stimulation of the extension activities for the fishers and fish farms shall increase the productivity of fishing and fish farming. The advantages due to the improvement in productivity have not been indicated for this project since they shall be calculated for each priority project.

9. Monitoring

Periodical internal inspections (quarterly) by the DGPA shall assure the correct payment of the expenses for the project. They will also show the indicators targeted for each stage and will evaluate if the results shall allow for the attaining of objectives.

10. Environmental Impact

The execution of an Environmental Impact Study (EI) will be useful.

11. Collaboration with other projects

None

4.5 Approximate Cost of Priority Projects

The approximate cost of each project is indicated in the table here below. In 2008, the total estimated amount was 26,633 Million Cfa Francs (around 40.6 million Euros and 5,278 Million yen, at an exchange rate of 1 Euro = 130 yen), including the cost of facilities and equipment which come to 17,288 million Cfa Francs (64.9%), personnel expense (experts, consultants, NGO personnel) at 4,634 million Cfa Francs (17.4%), the cost of management (including the cost of the personnel of the Gabonese Authorities) at 4,710 million Cfa Francs (17.7%).

Table 4.12 Cost of Priority Projects

Projects	(in thousands of Cfa Francs)			
	Cost of facilities & equipment	Personnel expense	Management cost	Total
(1) Project for Financing of Small-scale Fishery	634 450	450 000	516 000	1 600 450
(2) Project for Strengthening of Fisher's Organisations	54 450	375 000	469 000	898 450
(3) Project for Diverification of Income Sources	600 000	621 000	469 000	1 690 000
(4) Project for Development of Set-Net Fishing	398 640	264 000	204 000	866 640
(5) Project for Modernisation of Fishing Boats	824 000	131 280	119 800	1 075 000
(6) Project for Improvement of Fishing Village Environment	1 757 520	217 250	69 450	2 044 220
(7) Project for Participative Management of Fishery Resources	108 755	97 650	79 200	285 605
(8) Project for Management of Coastal Fishing Ground	1 208 500	546 000	237 600	1 992 100
(9) Project for Development of Aquaculture Technique	61 760	96 000	92 550	250 310
(10) Project for Improvement of Production Capacities of Fry / Fingerling	3 900	96 000	132 000	231 900
(11) Project for Aquaculture Extension	2 039 950	19 200	132 000	2 191 150
(12) Project for Improvement of Fresh Fish Distribution System	3 133 000	316 000	400	3 449 400
(13) Project for Valorisation and Improvement of the Quality of Fishery Products	800 200	81 500	1 530	883 230
(14) Project for Capacity Building of Fisheries-Related Organizations	2 536 200	292 620	430 000	3 258 820
Sub-total	14 161 245	3 603 500	2 952 530	20 717 275
Cost of management (CCP/CEGP, setting up of the project office, writing up the execution programme, training for internal controllers, hiring of external controllers)	150 000	-	710 000	860 000
Sub-total	14 311 245	3 603 500	3 662 530	21 577 275
Reserve fund (considering a 5% increase in prices per year)	2 976 902	1 030 771	1 047 657	5 055 330
Total	17 288 147	4 634 271	4 710 187	26 632 605

4.6 Project Implementation Plan

4.6.1 Implementation Structure

The competent authority of the PDDI is the Ministry of the Forestry Economy, Waters, Fishing and Aquaculture (MEEPA), and it is responsible for the execution of the priority projects and the budgeting of the projects upon the initiative of the DGPA. In order to realise this PDDI with no problems, as a concrete step, it shall first be necessary to establish within the Ministry, an upstream agency to manage the projects, the Project Coordinating Committee (CCP), then create within the DGPA another agency which establishes the priorities among all the projects and makes decisions concerning the concrete orientation for each project, the Committee for the Execution and Management of the Projects (CEGP).

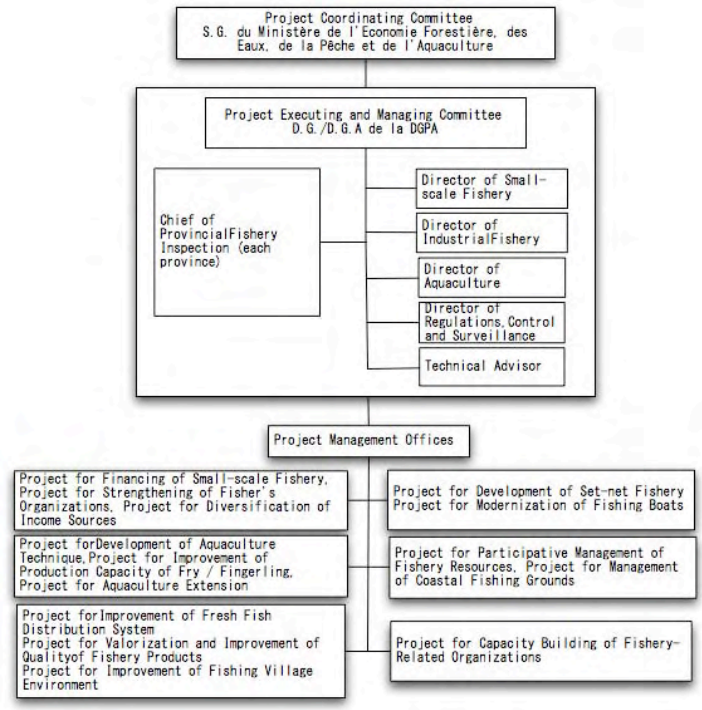

Figure 4.11 Organisation Chart of the Implementation System of the Priority Project

(1) Project Coordination Committee (CCP)
The CCP shall be presided over by the General Secretary of the MEEPA in charge of fishing, and shall be made up of those responsible for planning in the four ministries: the Ministry of Planning and Programming of Development, the Ministry of the Economy, Finance, Budget and Privatisation, the Ministry of Public Works, Infrastructures and Construction, and the Ministry of Housing, Habitat and Urbanism. At the meeting of the Committee, the members shall discuss effective realisation of the PDDI as well as the situation of the advancement of the priority projects. Through the committee, on the other hand, the collaboration and support of the ministries other than the MEEP shall be involved into the implementations of priority projects.

(2) Project Execution and Management Committee (CEGP)
The CEGP shall determine a basic orientation to execute the priority projects, shall supervise the activities of each project realised in each region and shall carry out the follow-up and technical evaluation. Moreover, they shall establish the order of priority of the projects, and shall make decisions concerning the setting up and improvement in the management of the projects. The CEGP shall also be obligated to carry out studies concerning the projects and give the results to the CCP if requested to do so. The Committee shall be presided over by the General Director of Fishing and Aquaculture (DG) or the Assistant General Director (DGA) and shall be made up of the following members: four technical directors from the DGPA (the Director of Small-Scale Fishing (DPA), the Director of Industrial Fishing (DPI), the Director of Aquaculture (DAQ) and the Director of Regulations, Control and Surveillance (DRCS)), two technical advisors as well as five Heads of priority Provincial Inspection Offices (from the Provinces of the Estuary, the Ogooué-Maritime, Nyanga, the Moyen-Ogooué and Woleu-Ntem). The main roles of the CEGP are indicated here below:

i) Selection of the personnel in charge of the realisation of the PDDI and the necessary budgeting;
ii) Establishment and necessary apportionment of the programme of priority projects, the effective distribution of the funds and the effective assignment of the personnel;
iii) Selection and assignment of the technical experts necessary to support the priority projects;

iv) Supervision and evaluation of the situation of the advancement of the priority projects in collaboration with each Provincial Inspection Office, and the necessary modification of the projects in order to respond to specific problems.

(3) Project Office

At the beginning of each priority project, a project office shall be set up (several similar projects that take place at the same time can share an office). Each office shall be managed and maintained by a Project leader designated by the DGPA.

4.6.2 Management and Maintenance Plan

The present PDDI consists of fourteen priority projects, supposing that the various equipment and facilities are supplied. This section explains the orientation for the management and maintenance of the equipment and the facilities.

Table 4.13 Orientation of Management and Maintenance of Equipment and Facilities Supplied for the Projects

Priority Projects	Equipment/facilities Supplied	Orientation of Management/Maintenance
(1) Project for Financing of Small-scale Fishery	(E) Fishing equipment, outboard motors, small boats, pickup trucks, computers, modems for mobile phones	Materials supplied through credit shall be managed and maintained by the groups of fishers. (The other equipment shall be used for project management, it will be used and maintained by the Provincial Inspection Office that is responsible (or the Fishing Brigade) with the DGPA budget.
(2) Project for Strengthening of Fisher's Organisations	(E) Small boats, pickup trucks, computers, modems for mobile phones	
(3) Project for Diverification of Income Sources	(I) Facilities for activities for the diversification of income (E) Equipment for activities of diversification of income	These facilities and equipment shall be managed and maintained by each village as collective shared property.
(4) Project for Development of Set-Net Fishing	(E) Set-nets and accessories, small FRP boats, equipment to study fisheries	The boats and equipment for studies shall be managed and maintained by the Community Fishing Centres. The set-nets shall be sold to the groups of fishers on credit, and managed and maintained by these groups under their own responsibility
(5) Project for Modernisation of Fishing Boats	(E) FRP fishing boats, spare parts for motors, equipment for anchoring the boat, VHF radiotelephones	The fishing boats shall be sold to the groups of fishers or to private businesses on long-term credit, and managed and maintained by them under their own responsiblitity.
(6) Project for Improvement of Fishing Village Environment	(I) Roads in the villages, water pipes for the water sanitation system, «Women's Centre » (E) BLU and VHF Radiotelephones, equipment for antennae	The villages where this equipment and the facilities will be supplied shall be responsible for their management and maintenance with administrative support.
(7) Project for Participative Management of Fishery Resources	(E) Equipment for studies, FRP boats, fishing equipment, first aid kits, etc.	The equipment shall be supplied to the groups of fishers on credit, and managed and maintained under the responsibility of each group.
(8) Project for Management of Coastal Fishing	(I) Offices for the Fishing Brigades, slipways, artificial reefs,	The equipment and facilities shall be managed and maintained by each Provincial Inspection Office (or Fishing

Ground	(E) Surveillance speed boats, radiotelephones, radar, surveillance equipment, equipment for biological studies	Brigade) with the DGPA Budget.
(9) Project for Development of Aquaculture Technique	(I) Biological Laboratory (E) Equipment for animal raising and fish observation, equipment for the development of feed, FRP Boat, netting, ropes, etc.	The equipment and facilities shall be managed and maintained by the Fish Farm Development Centre of the Peyrie (proposed name) with the DGPA Budget.
(10) Project for Improvement of Production Capacities of Fry / Fingerling	(I) Refurbishment of three fish farm Stations (E) Pumps, pond digging tools, equipment for catching fish, vats for transporting young fish	The equipment and facilities shall be managed and maintained by each fish farm Station with the DGPA Budget. Theprofits from the sale of young fish shall be saved as working capital for the fish farm operations of each Station.
(11) Project for Aquaculture Extension	(I) Building of two fish farm Stations and repair of three Stations (E) Equipment and vehicles for the production of young fish & fish farms	
(12) Project for Improvement of Fresh Fish Distribution System	(I) Building of six Community Fishing Centres (E) Fish cases, scales, repair equipment, equipment for conservation and transportation of fresh fish products	The co-management system of equipment and facilities shall be established between the DGPA and a local association. Each Centre shall have its own financial autonomy with the exception of the salary of the Head of the Centre.
(13) Project for Valorisation and Improvement of the Quality of Fishery Products	(I) Installation of inspection and experimental processing, workshop for the production of fish flour, storage, drying area in the sun. (E) Equipment for experiments in processing, inspection equipment, etc.	The equipment and facilities shall be directly managed and maintained by the DGPA. Those of Mayumba shall nevertheless be managed and maintained by a local association of fishers.
(14) Project for Capacity Building of Fisheries-Related Organizations	(I) CMPA (E) Training Equipment, extension vehicles and equipment	The equipment and facilities shall be directly managed and maintained by the DGPA.

4.6.3 Implementation Schedule

The priority projects proposed in the present PDDI shall be implemented within the next ten years (2011 – 2020), after a two-year preparation period. However, the projects having parts that are to be carried out within the framework of other projects that are already being developed, such as the PSPA, can begin in the year 2009 (See the table here below).

The starting period of each priority project corresponds to its priority established by the development plan. This order has been determined mainly upon the basis of four conditions: i) a positive result was seen in the pilot project, ii) a setting up of infrastructure (supply of equipment or facilities) shall be effective in the immediate improvement of the situation, iii) the personnel for the project already have the technical capacity and are available, and iv) it involves a project with the objective of training of human resources.

During the preparative period, the following operations concerning the budget, personnel and organisation shall be carried out to facilitate the projects implementation; the establishment of the CCP and CECP, the

budgeting in the Gabonese Government and the assurance of the sources of funding, the writing up of the implementation plan for the projects, the training of the associations such as the fisher's cooperative, the retraining of the internal DGPA controllers and the introduction of the system of external control.

Table 4.14 Implementation Schedule of the Priority Projects

Activities	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Preparation												
(1)Setting-up of CCP/CEGP												
(2)Arrangement of budget arrangement and source of funds in Gabon												
(3)Preparation of implementation plan and formulation of organization												
(4) Re-education and activation of internal audits in DGPA												
(5)Introduction of external auditing system												
Priority Projects												
1. Project for Financing ofSmall-scae Fishery												
(1)Micro-credit	(implementation by PSPA during 3 years since 2009)											
(2)Long-term loan				(Preparation for first 2 years)				(operation after thirdyears)				
2. Project for Stregthening of Fisher'sOrganizations												
3. Project for Diversification of Income Sources												
4. Project for Development of Set-net Fishery		(Phase-1: Technical development))				(Phase-2: extension, utilization of long-termloan system)						
5. Project for Modernization of Fishing Boats		(Phase-1: Technical development)				(Phase-2: extension,utilization of long-term loan system)						
6. Project forImprovement of Fishing Village Environmen												
(1)Village communication system a												
(2)Living environment												
(3)Support environment forworking women												
7. Project for Participatory Management of Fishery Resources												
8. Project for Management of Coastal Fishing Grounds												
(1)Co-surveillance system												
(2)Artificial reefs												
9. Project for Development of Aquaculture Techniques												
(1)Establishment of Aquaculture Development Center (La Peyrie, by PSPA)												
(2)Technical development												
10. Project for Strengthening of Production Capacity of Fry /Fingerlings												
(1)Improvement of fish fry /fingerling production centers(3 locations,by PSPA)												
(2)On-the-job training of station's staff and fish farmers												
11. Project for Aquaculture Extension												
(1)Improvement of aquaculture stations (5 locations, by PSPA)												
(2)On-the-job training on integrated farming and cage culture												
12. Project for Improvement of Fresh Fish Distribution System												
(1)Construction of fishery centers (by PSPA)												
(2)Standarization of equipment for freshfish marketing												
(3)Live /freshfish marketing (Mayumba)												
13. Project for Valorisation and Improvement of Quality o Fishery Products												
(1)Processing of Sans-nom and sardine												
(2)Fishery products quality and sanitary inspection system												
14. Project for Capacity building of Fishery-Related Organizations												
(1)Strengthening of capacity of DGPA personnel												
(2)Training of fishery extension workers												
(3)Construction of CMPA												
(4)Communication & transportation												

4.6.4 Monitoring (Surveillance, Evaluation, Improvement)

The CEGP shall carry out the monitoring on the progress of all the projects, shall organise an annual meeting to review the projects and shall produce an annual evaluation report on activities. The annual report should compile the results, achievements and lessons obtained from the implemented project in the previous year and it also specify the expected schedule and the budgeting situation for the project to be implemented in the next year. Since the annual report of the evaluation of activities plays a significant role in the realisation of projects in collaboration with the donors, it shall be distributed among the main donors.

On the other hand, at the end of the year, the CEGP shall establish a financial report of each priority project. This report shall, after having been verified by the DGPA, be audited and approved by the external controllers. Given the fact that such a control system should function well, the Gabonese Government can inspire confidence in the donors who will financially support the projects.

4.7 Evaluation of the Priority Projects

4.7.1 Expected Results

(1) Pertinence and effectiveness

The fourteen priority projects proposed in this Master Plan can be classified and divided into three types from the viewpoint of pertinence and effectiveness: (1) projects (expansion of scale or target area the pilot projects) for which the pertinence and effectiveness have been verified by the pilot projects (technical aspect, socio-economic aspect and profitability aspect), (2) projects (application of the contents of the pilot projects) for which the pertinence has been verified by reflection of the results and lessons drawn from the pilot project or similar previous projects, and (3) projects (mainly building and improving infrastructures) for which the pertinence of the contents has been verified in other projects such as PSPA, OFCF, etc.

Table 4.15 Classification of Projects by Level of Verification

Level of verification of the pertinence and effectiveness	Project concerned
1) Projects for which the pertinence and effectiveness were verified by the pilot projects	(1) Financing Project of small-scale fishery (micro-credit); (4) Development Project of set-net fishing (5) Modernisation Project of fishing boats (7) Participative Management project for fishing resources (11) Extension Project for fish farming (13) Project for the Valorisation and Improvement of the quality of fishing products (valorisation of products) (14) Training Project of human resources in the area of fishing
2) Projects for which the pertinence has been verified by the reflection of results and lessons drawn from the pilot projects or similar previous projects	(1) Financing Project of small-scale fishery (long-term credit) (2) Project for the reinforcing of the fisher's organisations (3) Project for the diversification of income sources (8) Coastal Fishery Management Project (10) Project for the Improvement in the Young Fish Production Techniques
3) Projects for which the pertinence of the contents has been verified in other projects	(6) Environmental Improvement Project of the Fishing Villages (9) Development Project in Fish Farming Techniques (12) Project for the Improvement in the distribution system of fresh fish (13) Project of Valorisation and Improvement in the quality of fishing products (Improvement of the Quality)

(2) Effectiveness of the Execution of the Project

The system and method of execution of the priority projects has been verified through the pilot projects in order to assure their effective execution. Based on these results, the execution systems to be adopted at each site for the execution of each priority project can be classified as follows:

Table 4.16 Classification of Projects by Type of Execution System

Effective Execution System	Project concerned
(1) Execution coordinated by the Regional Management Committee	Financing of small-scale fishing, the reinforcement of the fisher's organisations, diversification of income sources, the improving of the environment in the fishing villages, participative management of fishing resources.
(2) Execution coordinated by the Fishing Centres	Development of set-net fishing, the modernisation of the fishing boats, the improving of the fishing villages.
(3) Execution coordinated by the fish farming Station	Development of fish farming techniques, the improvement in young fish production techniques, the extension of fish farming
(4) Execution coordinated by other concerned agencies (IRAF, IGAD, etc.) a NGO's	Participative Management of Fishing Resources, the management of coastal fisheries
(5) Execution coordinated by the DGPA.	Improvement in the Distribution System; valorisation and improvement in the quality of fishing products and the training of human resources.

(3) Impact

This Master Plan which is tightly related to the Strategic Document for Growth and Poverty Reduction (SDGPR), the directing plan, and the Sectional Programme for Forests, Fishing and the Environment (PSFE), allowed us to expect for positive impacts, not only in Gabon, but also in the neighbouring countries, from a viewpoint of effective use of the abundant fishery resources (increase in food production and resources management) and the development in farming and fishing villages (increase in the income of the farming villages and a reduction in the regional disparities).

The number of people in the target groups of each priority project are estimated about 5,600 small-scale fishers, about 200 fish farmers (including agents of aquaculture stations), in 48 fishing villages, as shown in the table below. Since each project has formulated with a sustainable system after the project activities (setting-up and operation of credits, saving and re-utilization of sales income, technical transfer by OJT, etc.), it is expected that the effects of the projects will spread the envisaged benefits to all the inhabitants in the region.

Table 4.17 Direct Beneficiaries Estimated by Project

Priority projects	Target groups (direct beneficiaries)
Project for Financing of Small-scale Fishery	Small-scale fishers: 590 groups (2,950 persons)
Project for Strengthening of Fisher's Organisations	Same as above (Numbers is duplicated)
Project for Diverification of Income Sources	Small-scale fishers: 30 villages (900 persons)
Project for Development of Set-Net Fishing	Small-scale fishers: 68 groups (680 persons)
Project for Modernisation of Fishing Boats	Small-scale coastal fishers: 26 groups (130 persons)
Project for Improvement of Fishing Village Environment	Inland 44 villages, coastal 4 villages, women fishers(220persons)
Project for Participative Management of Fishery Resources	Small-scale inland fishers: 32 groups (150 persons)
Project for Management of Coastal Fishing Ground	Small-scale coastal fishers: 50 groups (260 persons)
Project for Development of Aquaculture Technique	10 fish farmers, 2 coastal fishers groups (10 persons), 10 agents of aquaculture stations
Project for Improvement of Production Capacities of Fry / Fingerling	13 fish farmers, 30 agents of aquaculture stations
Project for Aquaculture Extension	84 fish farmers, 46 agents of aquaculture stations
Project for Improvement of Fresh Fish Distribution System	Small-scale fishers (about 600), fish buyers / retailers (about 300)
Project for Valorisation and Improvement of the Quality of Fishery Products	Fish processing groups (15 persons), 19 DGPA staff
Project for Capacity Building of Fisheries-Related Organizations	10 fishery officers, 30 regional officers, 50 extension workers

(4) Autonomous Development

The various pilot projects implemented during the six-month development study clearly indicated significant results and lessons, and were a precious experience for the DGPA, the executive body, to assure the future development of fishing. It was decided that the DGPA should pursue these pilot projects, for which the necessary expense would be accumulated by the funds created in the pilot projects. Moreover, the payments of the equipment bought within the context of the projects in the form of micro-credit and the project on participatory management of fishery resources are being reimbursed by the concerned groups, and a revolving system was established for the use of these amounts as funds for the continuation of the projects. Moreover, the budgeting of the necessary cost for management and control of the DGPA is also advancing. These points mentioned above allow us to hope for development of an autonomous project

management system on the part of the Gabonese party, even for the execution of the priority projects that are the enlarged and practicing versions of the pilot projects.

4.7.2 Economic Evaluation

This Master Plan is centred upon the improvement of the support services in the way of capacity building of the fishing organisations, the development and extension of the techniques, available credit, etc., and the entire project is not adapted to a conventional evaluation such as the internal economic profitability. In this Master Plan, whereas the prior condition is to "more or less maintain the volume of fish now being supplied on a per person basis", which is defined as the objective of fishing production to be aimed in the training and capacity building, the projects themselves do not have a specific fish production target. Concerning the economic advantages that we can expect, as a reference, and without limiting ourselves to the period extending up to the year 2020, the economic pertinence of the Master Plan shall be evaluated in the comparison between the cost of execution and the total expected benefits of the projects.

(1) Required Conditions

The economic evaluation shall be done in Cfa francs (fixed exchange rate : 1 euros = 655.975 Cfa francs), and the rate of inflation shall not be taken into account.

(2) Type of economic revenues and their calculation

The main benefits of the Master Plan that can be calculated are as follows:

i) Increase of fish production by the introduction of appropriate fishing techniques and credit

The national fish production has been stagnating at around 41,000 to 46,000 tons (43,500 tons on the average) since 2001. This tendency has been visible for the past ten years, and it is estimated that this stagnant tendency shall not change if the Master Plan is not applied. In other words, the Master Plan is expected to increase the national fish production at least by 15,000 from the current stagnant level to 58,000 tons during the next 10 years from 2011 to 2020. However, since the increase in the fish production is considered to be achieved due mainly to the introduction of the set-net and the modern fishing boats, this production increase is designed to be realized in the last 6 years with a constant increment of 2,500 ton per year beginning from 2015 after these technical developments have been attained. As for the economic profits to be obtained, if we consider that 50% of the average price of fresh fish (1,000 Cfa francs per kg.) covers the cost of production, every kilogram of fish production would give a profit of 500 Cfa francs per kg. The annual economic gain by the fish production increase due to the Master Plan therefore can be calculated as follows:

Table 4.18 Revenue Expected from the Increase in Production

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Increase in production (1000 tons)	0	0	0	0	0	0	2.5	5.0	7.5	10.0	12.5	15.0
Annual Profits (billions of F.Cfa)	0	0	0	0	0	0	1.25	2.50	3.75	5.00	6.25	7.50

ii) Reduction in economic losses through the improvement in post harvest techniques

Since there is no ice available currently in the six landing places included in the Master Plan, fresh fish are hardly distributed and instead they are processed into smoked or salted and dried fish for preservation through traditional methods. Therefore, on the bases of price per kilogramme of fresh fish, half the economic value of the catch is lost through the smoking and drying process. Through the execution of the Master Plan,, we can expect that 50% of the catch, excluding the small pelagic, landed at the six landing zones, which until now was processed into smoked or salted and dried fish, is sold as fresh fish, and the corresponding economic loss is eliminated (500 Cfa francs per kg). In other words, beginning in the year 2013 when these six landing zones are arranged, we can estimate that annual profits of around 1.8 billion Cfa francs will be obtained (see table here below).

Table 4.19 Revenue Expected from the Reduction of Economic Loss

	Cocobeach	Mayumba	Kango	Ebel-Abanga	Ndjolé	Makokou	Total
Annual Production (tons)	2,471	4,337	890	1,842	800	1,044	11,384
Improved distribution of fresh fish	709	1,903	890	1,842	800	1,044	7,188
x 50% (tons)	354	952	445	921	400	522	3,594
Annual Profits (billions of Cfa F)	0.18	0.48	0.22	0.46	0.20	0.26	1.80

iii) Conservation of Fishery Resources through the exclusion of the trawlers from the coastal zone

Ten to twenty fishing boats fish illegally every day in the protected three-nautical-mile coastal zone. Through the execution of this Master Plan, the fishing in the coastal zone by the trawlers will be controlled resulting in conservation of the fish resources, and the corresponding economic value can be passed on to the small-scale fishers. Since the trawlers fish outside the 3-nautical mile limit during the day and then come into the 3-mile coastal zone at night, 50% of the demersal fish catch of industrial fishing (around 10,000 tons) are considered to be illegal catch, the economic value of which can been calculated at 1000 Cfa francs per kg. x 5,000 tons = 5,000,000,000 Cfa francs per year. If the Master Plan is not executed, the illegal fishing of trawlers in the coastal zone will continue to catch 5,000 tons of fish every year. Assuming the implementation of Master Plan corrects the situation gradually by reducing the illegal fish catch by 500 tons every year to achieve the total reduction of 5,000 tons at the end of the ten-year period, the economic value of the fish recourses that are to be saved is considered to represent the pure profits of the Master Plan due to control of illegal fishing. In other words, the Master Plan will save 500 tons of fish resources every year during the ten-year period from 2011 to 2020.

Table 4.20 Revenue Expected from the Decrease of Catch by Trawlers

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Decrease in the production (1000 tons)	0	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Annual Profits (billions of Cfa F)	0	0	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00

(3) Types of Costs and their Calculation

The approximate cost of the individual programmes and the calendar for the execution of the priority projects are indicated in the following table. Taking into account the V.A.T. (18%), the conversion into economic cost was done by multiplying by 0.85 for the cost of setting up the structures and equipment, and by 1.0 (no reduction rate) for personnel expenditure and the cost of management.

Table 4.21 Distribution of Economic Cost by Year and by Project

Activities	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	合計
Preparation													
(1)Setting-up of CCP/CEGP	42.5	42.5	42.5										127.5
(2)Arrangement of budget arrangement and source of fun Gabon	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	60.0
(3)Preparation of implementation plan and formulation o organization	150.0	150.0	0.0	0.0	0.0	0.0	75.0	75.0	0.0	0.0	0.0	0.0	450.0
(4) Re-education and activation of internal audits in DGPA	0.0	50.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	100.0
(5)Introduction of external auditing system	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	100.0
Priority Projects													
1. Project for Financing of Small-scae Fishery													
(1) Fund for Micro-credit	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	0.0	0.0	187.0
(2) Fund for long-term loan	0.0	0.0	0.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	306.0
(3) Equipment Cost	46.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.3
(4) Personnel & Management Cost	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	80.5	966.0
2. Project for Stregthening of Fisher's Organizations													
(1) Equipment Cost	0.0	0.0	46.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.3
(2) Personnel & Management Cost	0.0	0.0	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	844.0
3. Project for Diversification of Income Sources													
(1) Facilities & Equipment Cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	102.0	102.0	102.0	102.0	102.0	510.0
(2) Personnel & Management Cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	218.0	218.0	218.0	218.0	218.0	1,090.0
4. Project for Development of Set-net Fishery													
(1) Equipment Cost	0.0	0.0	94.0	0.0	0.0	244.8	0.0	0.0	0.0	0.0	0.0	0.0	338.8
(2) Personnel & Management Cost	0.0	0.0	128.4	128.4	0.0	52.8	52.8	52.8	52.8	0.0	0.0	0.0	468.0
5. Project for Modernization of Fishing Boats													
(1) Equipment Cost	0.0	0.0	109.5	0.0	0.0	0.0	197.0	197.0	197.0	0.0	0.0	0.0	700.4
(2) Personnel & Management Cost	0.0	0.0	41.8	41.8	41.8	0.0	41.8	41.8	41.8	0.0	0.0	0.0	251.1
6. Project for Improvement of Fishing Village Environment													
(1) Village communication system (Equipment Cost)	0.0	0.0	363.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	363.4
(Personnel & Management Cost)	0.0	0.0	35.0	35.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	105.0
(2) Village living environemnt (Facilities & Equipment)	0.0	0.0	0.0	217.6	217.6	217.6	217.6	217.6	0.0	0.0	0.0	0.0	1,088.0
(Personnel & Management Cost)	0.0	0.0	0.0	28.1	28.1	28.1	28.1	28.1	0.0	0.0	0.0	0.0	140.7
(3) Support facilities for working women (Facilities & Equipment)	0.0	0.0	0.0	42.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.5
(Personnel & Management Cost)	0.0	0.0	0.0	20.5	20.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.0
7. Project for Participatory Management of Fishery Resources													
(1) Equipment Cost	0.0	0.0	30.8	30.8	30.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.4
(2) Personnel & Management Cost	0.0	0.0	59.0	59.0	59.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	176.9
8. Project for Management of Coastal Fishing Grounds													
(1) Fishing grounds surveillance (Facilities & Equipment)	0.0	858.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	858.1
(Personnel & Management Cost)	0.0	0.0	174.0	174.0	174.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	522.0
(2) Artificail reefs (Facilities & Equipment)	0.0	0.0	169.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	169.2
(Personnel & Management Cost)	0.0	0.0	87.2	87.2	87.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	261.6
9. Project for Development of Aquaculture Techniques													
(1) Facilities & Equipment Cost	52.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.5
(2) Personnel & Management Cost	37.7	37.7	37.7	37.7	37.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	188.6
10. Project for Strengthening of Production Capacity of /Fingerlings													
(1) Facilities & Equipment Cost	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3
(2) Personnel & Management Cost	45.6	45.6	45.6	45.6	45.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	228.0
11. Project for Aquaculture Extension													
(1) Facilities & Equipment Cost	0.0	0.0	0.0	867.0	867.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,734.0
(2) Personnel & Management Cost	0.0	0.0	0.0	30.2	30.2	30.2	30.2	30.2	0.0	0.0	0.0	0.0	151.2
12. Project for Improvement of Fresh Fish Distribution System													
(1) Facilities & Equipment Cost	1,331.5	1,331.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,663.1
(2) Personnel & Management Cost	63.3	63.3	63.3	63.3	63.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	316.4
13. Project for Valorisation and Improvement of Quality Fishery Products													
(1) Facilities & Equipment Cost	0.0	0.0	0.0	680.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	680.2
(2) Personnel & Management Cost	0.0	0.0	0.0	16.6	16.6	16.6	16.6	16.6	0.0	0.0	0.0	0.0	83.0
14. Project for Capacity building of Fishery-Related Organizations													
(1) Facilities & Equipment Cost	0.0	0.0	1,077.9	1,077.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,155.8
(2) Personnel & Management Cost	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2	722.6
Total	1,937.1	2,743.1	2,864.4	3,976.2	2,047.3	883.0	1,002.0	1,272.0	904.4	612.8	594.1	594.1	19,430.6

(4) Calculation of the Economic Internal Rate of Return (EIRR)

On the basis of the profits and costs converted into economic costs here above, the calculation of the internal economic profitability rate has given us a relatively high rate of 29.8%.

Table 4.22 Calculation of EIRR

Year	1	2	3	4	5	6	7	8	9	10	11	12
Cost	1.94	2.74	2.86	3.98	2.05	0.88	1.00	1.27	0.90	0.61	0.59	0.59
Revenue	0.00	0.00	0.50	1.00	3.30	3.80	5.55	7.30	9.05	10.80	12.55	14.30
Benefit	(1.94)	(2.74)	(2.36)	(2.98)	1.25	2.92	4.55	6.03	8.15	10.19	11.96	13.71
EIRR=	29.8%											

The analysis of the responsiveness of profits – 50% for the profitability rate here above has allowed us to obtain a profitability rate that is relatively high at 12.5%, thereby allowing us to believe that this investment represents a low economic risk. Moreover, the profitability rate remains high at 19.3%, even if the cost of the projects increases by 50%. If we consider the annual growth rate to be from 3 to 5% in Gabon, these figures allow us to hope for a satisfactory impact resulting from the investment.

Table 4.23 Results of Sensitivity Test

In case that the benefit is 50% down:					0.5							
Year	1	2	3	4	5	6	7	8	9	10	11	12
Cost	1.94	2.74	2.86	3.98	2.05	0.88	1.00	1.27	0.90	0.61	0.59	0.59
Revenue	0.00	0.00	0.25	0.50	1.65	1.90	2.78	3.65	4.53	5.40	6.28	7.15
Benefit	(1.94)	(2.74)	(2.61)	(3.48)	(0.40)	1.02	1.77	2.38	3.62	4.79	5.68	6.56
EIRR=	12.4%											
In case that thecost is 50% up:					0.5							
Year	1	2	3	4	5	6	7	8	9	10	11	12
Cost	2.91	4.11	4.30	5.96	3.07	1.32	1.50	1.91	1.36	0.92	0.89	0.89
Revenue	0.00	0.00	0.50	1.00	3.30	3.80	5.55	7.30	9.05	10.80	12.55	14.30
Benefit	(2.91)	(4.11)	(3.80)	(4.96)	0.23	2.48	4.05	5.39	7.69	9.88	11.66	13.41
EIRR=	19.3%											

4.7.3 Social Effects

The social impacts which will be brought by the achievement of the objectives of each project are as explained in the item “8. Expected Benefit and Impact” of “4.3 Contents of Priority Projects”. Taking into consideration of these impacts, the figure below shows the integrated social effects expected through the effective implementation of the Master Plan.

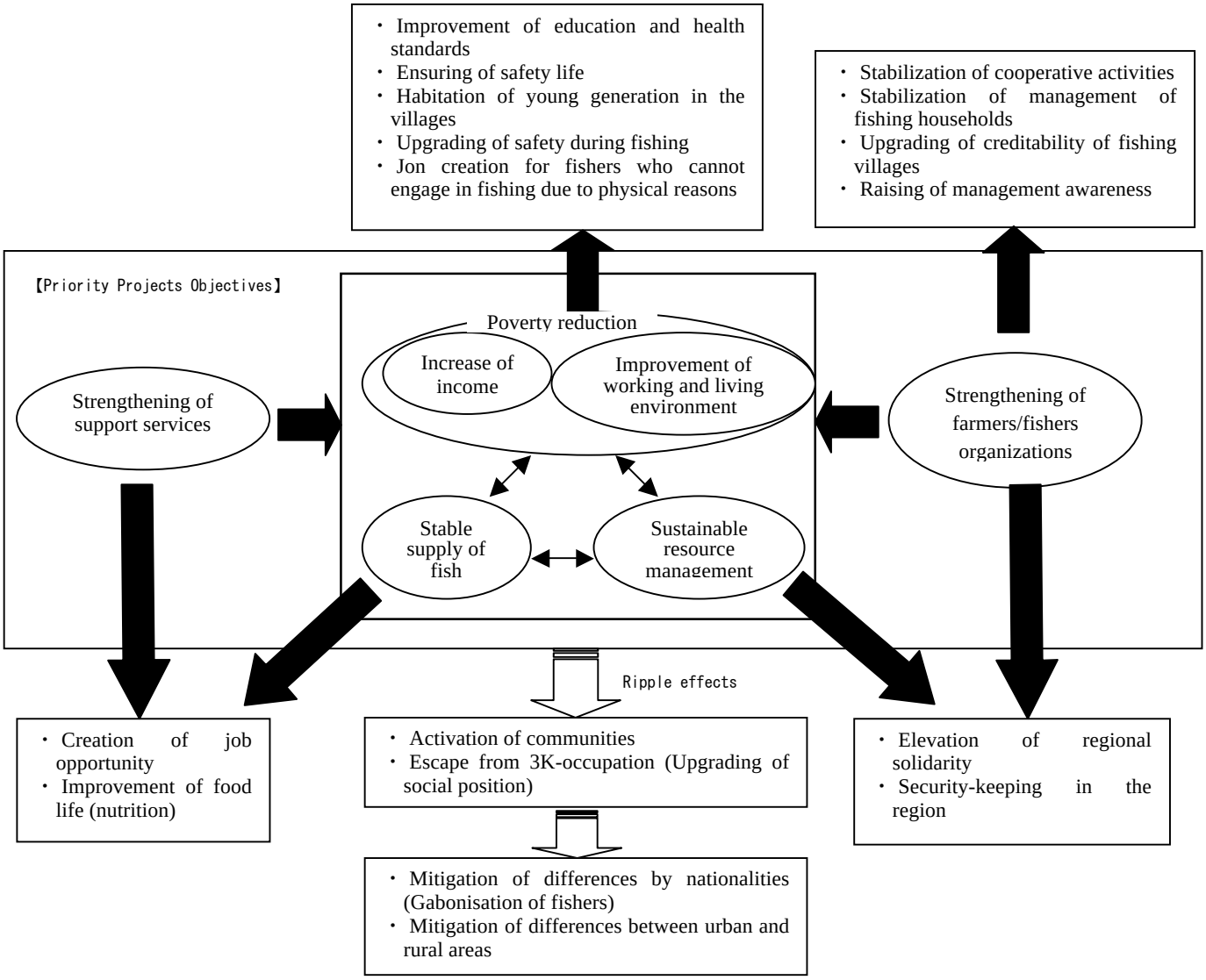

Figure 4.12 Social Effects Expected in the Process of Achievement of Development Objectives

As the ripple effects from the execution of priority projects, the following social effects can be expected.

i) Activation of community
With the support to organizing groups of Gabonese fishers doing fishing individually through the activities concerning to micro-credit, introduction of set-net fishing, and participatory management of resources, it is expected that they will be organized into an autonomous social entity as fisher's cooperatives in future. The fisher's cooperatives can not only support fishing activities and fish sales, but also provide fishers (members of cooperatives) with social services such as education and medical care by establishing the funds necessary for the social services in fishing villages. Furthermore, it is possible for fisher's cooperatives to establish and manage school and/or clinic in the farmers/fishing villages, by investing own money. By doing so, it is expected that social services in the villages will be enhanced by fisher's cooperatives activities.

ii) Upgrading of social position of fishery sector
With modernization of pirogue-type fishing boats in the coastal fishery, we can ensure the safety of fishing operation at sea and the reduction in the occurrence of sea accidents so that even the young fishers with les-experience can go fishing out to open sea without hesitation. In the inland areas, the fisher's work load will be reduced with introduction of outboard motor, while the early recovery and prevention from diseases and injuries will be ensured with supply of medicines so as to maintain the fisher's health in good condition. Finally, fishery will be deemed as one of the attractive jobs to be accepted by young generation.

iii) Establishment of system to receive the administrative services
With introduction of support system such as micro-credit to fishers in the pilot project, the fishers were organized into groups which become the clear contact point from now on for the government support services for fishery development programs. The fishers groups will make possible to build a cooperation system to establish resources management plans and to follow the fishery laws by receiving the administrative services. In addition, it is expected that the community services such as fishing village development will be able to receive not only from fishery administrative organizations but also from public other organizations (municipal offices, etc.).

With the realization of the above-mentioned effects, the following results also can be obtained.

i) Correction of gaps among fishers of various nationalities
Since the most of fishing villages engaging in coastal fishery are composed of foreign fishers, the government supports are so limited thereto that foreign fishers do not trust the government well. With implementation of the projects, the contacts between administration and foreign fishing villages will be more frequent, and the extension services to foreign fishers will be increased as same as Gabonese fishers, so that foreign fishers will also become to trust and cooperate to the administration. Accordingly, the relationships between administration and foreign fishers will be better regardless of their nationalities, and the foreign fishers will be able to have same status as local fishers (Gabonization).
ii) Correction of gaps between urban and rural areas
In the rural areas, if the job opportunities are created so as to work with a relief and the income level and life environment are improved, young fishers will not necessary to go out for seeking jobs in urban area, and thus the depopulation of rural villages will be minimized. In addition, there will be a high possibility to have young leaders contributing to the activation of the future villages.

4.7.4. Initial Environmental Evaluation

(1) Scoping results of the priority projects
Based on the Procedure Guideline of Environmental Impact Assessment of Gabon and JICA Guideline of Environmental / Social Consideration, 25 environmental / social items appropriate for the evaluation of the priority projects are selected. Each project was thoroughly evaluated using three general categories, A, B, and C, in conformity with the JICA guideline.
The evaluation result of each priority project is shown below;

Table 4.24 Results of Environmental and Social Evaluation on Priority Projects

Environmental / Social Items			Priority Projects	1	2	3	4	5	6	7	8	9	10	11	12	13	14
				Financing of Small-scale Fishers	Strengthening of Fisher's Organizations	Diversification of Income Sources	Development of Set-net Fishing	Modernization of Fishing Boats	Improvement of Fishing Village Environment	Participatory Management of Fishery Resources	Management of Coastal Fishing Grounds	Development of Aquaculture Techniques	Improvement of Production Capacity of Fry/Fingerling	Aquaculture Extension	Improvement of Fresh Fish Distribution System	Valorization and Improvement of Quality	Capacity Building of Fisheries-Related Org.
Social Environment	1	Involuntary Resettlement															
	2	Local Economic Activities	B		B				B								
	3	Information Disclosure, Local Stakeholder															
	4	Human Right, Minority People															
	5	Transportation, Public Facility				B				B							
	6	Split of Local Community	B	B			B										
	7	Heritage, Cultural Property															
	8	Water Right, Fishing Right				B			B	B							
	9	Public Health, Hygiene															
	10	Risk, Accident				B				B							
Natural Environment	11	Topography and Geology															
	12	Soil Erosion															
	13	Ground Water									B	B					
	14	Lake and Rivers, Hydrology											B				
	15	Flora and Fauna, Biodiversity											B				
	16	Fisheries Resources	B			B	B							B			
	17	Climate															
	18	Landscape															
Pollution	19	Air Pollution															
	20	Water Contamination						B			B	B	B	B	B		
	21	Soil Contamination															
	22	Solid Waste					B	B						B	B		
	23	Noise, Vibration															
	24	Ground Subsidence															
	25	Offensive Odor												B			
Category (A, B, C)				B	B	B	B	B	B	B	B	B	B	B	B	B	C

The level of adverse impact to each environmental item is indicated by the following grades;
A: Serious impact is expected, B: Some impact is expected, C: Extent of impact is unknown, and
No mark: No impact is expected. IEE/EIA is not necessary.

The categorization (A to C) of each pilot project is made in accordance with the JICA Guideline for Environmental and Social Consideration as follows;

- Category A: The project is likely to have significant adverse impacts on the environment and society.
- Category B: The project is likely to have their somehow adverse impacts on the environment and society.
- Category C: The project is likely to have little adverse impacts on the environment and society.

None of the priority projects does not have socio-economic item that belong to the impact level 'A', but every project has at least one item with impact level 'B', except "14. Project for Capacity Building of Fishery-Related Organizations". Accordingly, all priority projects belong to 'Category B' except "14. Project for Capacity Building of Fishery-Related Organizations" which falls into Category C.

(2) Environmental and social impacts and their mitigating measures in priority projects

As shown in the above table, we evaluated each priority project for a total of 25 environmental and social items, and found several somewhat undesirable impacts (level B). The reasons for Level B evaluation as well as the measures for mitigating or avoiding the negative impacts are explained below in every project.

1) Project for Financing of Small-scale Fishery

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Local Economic Activities	B	If many fishers cannot repay loans, other fishers may lose chances to receive loans next time.	DGPA should grasp the fisher's credibility and repayment capacity by the submission of their fishing activity' data, individual interviews, and so forth.
Split of Community	B	If the imbalance of loan opportunity is occurred in a fishing village, it is concerned that fishers are split out by their disputes.	DGPA should hold a workshop with local fishers to explain the detail of loan scheme and management.
Effect to Fisheries Resources	B	The excess supply of fishing gears raises the fishing pressure to certain water areas rapidly. In the case that fishers begin to use small mesh size nets, it is possible to catch a large amount of fish juveniles. Because worn-out fishing nets are often abandoned in waters, they are possible to cause ghost fishing.	When screening fishing gears and materials on the request list of fisher groups, DGPA should carefully control the actual size and mesh size of fishing nets. DGPA should consider collecting and recycling abandoned worn-out fishing nets in fishing villages as a paid service.

2) Project for Strengthening of Fisher's Organizations

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Split of Community	B	In the case that fisher's associations have already existed in fishing communities, the existing associations may be danger of getting troubles and split by introducing new management system.	DGAP should discuss with local fishers, and consider a proper transition approach for utilizing their existing associations as a core structure of new management system.

3) Project for Diversification of Income Sources

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Local Economic Activities	B	In the case that fishers cannot repay loans, it may cause the unbalance of loan opportunity in their villages.	Through the submission and screening of the project proposals which fisher's groups prepared, DGPA should carefully select the project ideas without any repayment problems.

4) Project for Development of Set-Net Fishery

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Transportation, Public facility	B	By the installation of set-nets, it is possible to disturb some common transportation routes.	DGPA have to avoid the sea areas where many boats and ships commonly pass through, when deciding the installation site.
Water right, Fishing right	B	Since the set-nets occupy certain sea areas exclusively, it is possible to make serious disputes against surrounding fishing villages.	DGPA should hold workshop with surrounding fishers to explain the detail of set-net fishing and arrange the installation sites.
Risk, Trouble	B	It is possible that boats or ships have a minor collision to the set-nets at night.	Since security torches should be set on the set-nets, anyone can know the exact places of set-nets at night.
Fisheries Resources	B	Because of the fluctuation of tidal currents and wrong utilization of set-net, it is possible to exhaust the bottom fish resources in sea areas around the set-net site.	DGPA have to monitor daily fish catch and fishing activities in fisher groups, and inspect their fishing activities to avoid the excessive fishing.

5) Project for Modernization of Fishing Boats

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Split of Community	B	It is possible to get trouble in property and user right of new introduced fishing boats between fishers.	DGPA should hold workshops with fishers to explain the introduction of new fishing boats. In addition, DGPA should consider the proper ownership and utilization on discussion.
Fisheries Resources	B	Rapid increases of fish catch give serious negative impacts to offshore fisheries resources.	DGPA should confirm the daily fish catch from fisher groups, and advise them to avoid the over-fishing condition.
Waste	B	It is possible that fishers flush motor oil out to natural water.	Motor oil should be treated by the special agents through Fishery Center.

6) Project for Improvement of Fishing Villages Environment

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Water Contamination	B	Wasted water discharged from ditches of fishing villages may give negative impact to surrounding environments.	DGPA should study actual impacts to natural environments around the villages by drainage of wasted water, such as the discharge of wasted water in rivers and lakes, and pollution of inhabit of indigenous creatures. According to those study results, we consider the proper drainage method of wasted waters in fishing villages
Waste	B	The solvent of solar panel battery is too acid and toxic. Lead panel is melted out and causes soil contamination.	DGPA should advise fishers to properly collect / dump wasted solvents in containers. Lead panel should be also collected and treated by the special agents.

7) Project for Participatory Management of Fishery Resources

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Local Economic Activities	B	It is predicted that the restriction of fishing method and fishing ground may cause the difference in the catch quantity of prawn and lobster among fishers.	DGPA should hold workshop with fishers to explain the future economic benefit by their activities of resource management / conservation.
Water right, Fishing right	B	In case of restriction of fishing ground utilization, it is possible that a part of fishers may complain of reduction in their fishing opportunities.	In the workshop with local fishers, DGPA explains the positive effect of resource management to their fishing activities.

8) Project for Management of Coastal Fishing Grounds

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Water right, Fishing right	B	The installation of artificial reefs may disturb the fishing operation of existing trawl fishing vessels.	The artificial reefs may effectively exclude illegal fishing vessels out of coastal areas. DGPA should explain the purpose and effect of artificial reefs to the stakeholders of trawl fishing in advance to avoid their misunderstanding.
Risk, Accidents	B	It is possible that trawl net is caught on artificial reefs and broken out.	To avoid a major collision of trawl fishing vessels with artificial reefs, DGPA should inform their installation areas to related persons of trawl fishing in advance.

9) Project for Development of Aquaculture Techniques

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Ground water	B	It possibly happens to pump up a large amount of ground waters to secure sufficient water for aquaculture activities.	The use of ground water is restricted not to pump it up more than its necessary amount.
Water contamination	B	In case to drain fish pond waters to river, swamp and lake directly, the drained water may pollute the environmental condition around the fish farms.	DGPA should lead fish farmers to mitigate the environmental impact of discharge of fish farming water to surrounding water. For example, only surface layer water is drained after storing discarded pond water in other ponds for sedimentation.

10) Project for Strengthening of Production Capacity of Fry /Fingerlings

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Ground water	B	To obtain sufficient waters for fish farming, it is possible to excessively pump up a large amount of ground waters.	The use of ground water have to be restricted not to pumping it up more than its necessary amount.
Water contamination	B	In case to drain fish pond waters to river, swamp and lake directly, the	DGPA should tackle to mitigate the environmental impact of discharge of fish

		drained water may pollute the environmental condition around the fish farms.	pond water to surrounding water. For example, only surface layer water is drained after storing discarded pond water in other ponds for sedimentation.

11) Project for Aquaculture Extension

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Water contamination	B	Since domestic animal manures and fish guts are fed to cultured fish, it may pollute surrounding water.	DGPA should lead fish farmers to mitigate the environmental impact of discharge of fish farming water to surrounding water. For example, only surface layer water is drained after storing discarded pond water in other ponds for sedimentation.
Offensive Odor	B	Because domestic animal manures and fish guts cause offensive odor, the residents living around the fish farms may complain of their odors.	DGPA should advise fish farmers to store the animal manures and fish guts in enclosures to prevent their odors spreading around the fish farms

12) Project for Improvement of Fresh Fish Distribution System

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Hydrology, River and Lake	B	The construction of fisher's centers may modify the landform and water currents around the construction sites.	DGPA should study for natural environmental conditions, such as landform, water / tidal current and so forth, and minimize the change of the landform and water currents around the construction sites.
Flora, Fauna, Biodiversity	B	The construction of fisher's centers negatively affects the aquatic ecology of flora and fauna which inhabit in surrounding area.	DGPA should study for the inhabitation of flora and fauna around the planned sites of fisher's centers. In case of indigenous species, we should make sufficient measures to conserve those species.
Water contamination	B	By the processing of fresh fish in fisher's centers, the waste water mixed with fish bloods and scales may flow into surrounding watersheds.	DGPA should lead fishers not to discharge the waste water of fish processing directly, but take proper treatment to clean it. For example, fish scales, bones and skins are removed from drained water, etc.
Waste	B	The processing of fresh fish produces a large amount of carcasses such as guts and bones in fisher's centers.	DGPA should make basic rules of garbage collection and treatment in fisher centers to dump the waste of fish processing at proper places in proper manners.

13) Project for Valorization and Improvement of Quality of Fishery Products

Environment Items	Evaluation	Anticipated Adverse Impact	Expected Mitigation Measures
Water contamination	B	The wasted water produced in the fish processing may flow in surrounding	The fisher's centers should regularly check the water quality of wasted waters

		water.	by fish processing. In addition, the centers have to take simple treatments to clean the water before discharge it into rivers.
Waste	B	The processing of fresh fish produces a large amount of carcasses such as guts and bones in fisher's centers.	DGPA should make basic rules of garbage collection and treatment in fisher centers to dump the fresh waste of fish processing at proper places in proper manners.

14) Project for Capacity Building of Fisheries-Related Organizations

The main purpose of the project is the human resource development in DGPA. Therefore, there is any possibility to give adverse impacts to local fishing villages and fishers in environmental / social aspects.

CHAPTER 5

RECOMMENDATION

Chapter 5 Recommendations

The following recommendations have been made so that this Master Plan can be quickly implemented, and its operations and continuity be done in a sound and durable way.

(1) Continuous Execution of the Pilot Projects

The eight pilot projects carried out in the various regions of Gabon from May to November 2008 obtained the expected outcome, despite their short operational period. These results have been reflected to the Master Plan, but the staging up from implementation of pilot projects to application of the results requires a certain preparation. Moreover, the same activities can be continued at all pilot project sites, thereby allowing for the obtaining of even more results. In terms of the achievements from this development study, we can mention the formulation of the Master Plan, as well as the continuation of the pilot projects even after the end of the development study. These pilot projects have especially allowed for the stimulation of related activities in the concerned zone, and have reinforced the motivation of government agents and groups of fishers who have participated in the projects. Given the points above mentioned, it is requested that the DGPA – the executing agency, to cover the budget and personnel necessary for the continuation of these pilot projects and to integrate them into the annual activity programme.

(2) Prompt adoption and execution of Master Plan

The execution of the Master Plan will bring the following socio-economic effects:

1) Increase of annual production in weight: approx.25,000 tons or 60% up from the current level (from 43,500 tons to 68,500 tons on average)

2) Increase of annual production in value: approx. 14.3 billions FCFA or 22% up from the current level (from 63.5 to 77.8 billion FCFA)

3) Increase of job opportunity: 6,300 persons or 29% up from the current level (from 21,600 to 27,900 persons)

4) Environmental effects: Fishery resources in the coastal 3-mile zone and inland waters (lagoons and lakes) will be maintained or enhanced on sustainable level.

5) Social effects: The incomes of fishers/farmers are improved so that the rate of fishers belonging to lower than poverty line (50 – 60%) will be half-reduced.

It is expected that this Master Plan will largely contribute to “economics diversification” that is under promotion by the Gabonese government, through the emergence of the above-listed socio-economic effects. It is recommended that this Master Plan will be promptly adopted by the Gabonese Cabinet of Ministers. For its realization the Gabonese government has to urgently tackle on the arrangement of necessary budget and manpower and other measures to be taken.

(3) Reinforcement of the collaboration with other donors

The Fishery and Aquaculture Sector Support Project (PSPA) financed by the African Development Bank since 2005 has not yet reached to the point of effective progress. For that reason, the project contents shall be revised in February, 2009, on the basis of the present Master Plan. Among the priority projects proposed in this Master Plan, it is recommended to execute the following projects and their rapid execution within the framework of the PSPA.

1) Small-scale Fishery Financing Project for (micro-credit: for 500 groups);
2) Aquaculture Techniques Development Project (setting up of the Centre for the Development of Aquaculture Techniques of Libreville at Peyrie);
3) Project for the improvement of fish fry/fingerling production techniques (expansion of the Aquaculture Stations in terms of the production and supply of fish fry/fingerling : Oyem, Tchibanga, Koulamoutou);

4) Aquaculture Extension Project (expansion of existing Stations (Oyem, Tchibanga, Koulamoutou) and construction of new Stations (Lambaréné, Makokou) for the purpose of extending aquaculture techniques

5) Project for the improvement of the distribution system of fresh fish (improvement of six local landing places);

6) Project for the participative management of fishery resources (improvement of a surveillance system of coastal zones by the DGPA)

Concerning the parts of projects that cannot be executed within the framework of the PSPA, it shall also be indispensable to verify the orientation of assistance in fishery sector given by the other donors involved, and to constantly repeat and keep in mind the contents and reasons for this Master Plan when dealing with the donors who can cover financing at the Round Table discussion of donors organised every month. In this process, the JICA – the agency that has written up the management plan, and the DGPA, while working together, shall make an effort to rapidly implement this Master Plan.

(4) Reinforcing of cooperation for development of fishery and management of resources in West Central Africa.

In West Central Africa, fishery and aquaculture are both small-scale activities that have hardly been developed industrially as of yet. Technical research and development without regional cooperation among the countries are often inefficient, and the financial burden for each country is significant. In addition to the active introduction and application of techniques and methods developed up to the present, the promotion of the joint development and common use of the developed techniques in the region is essential for future technical development. Moreover, in the countries facing to the Gulf of Guinea, the joint management of migratory fishery resources is necessary, and the application of common coastal resource management methods is possible since the natural and social conditions are similar.

Given the above-mentioned points, the promotion of exchanges in human and technical resources in West Central Africa (Gabon, Equatorial Guinea, Congo, Cameroon, Sao Tomé and Principe, Chad, The Central African Republic, etc.) and the reinforcing of cooperation for the development of fishing and the management of fishing resources shall be necessary. One of the desired means would be the setting up of a Centre for the Development of Fishery in West Central Africa (suggested name) in Gabon, which could play a central role in the development of regional fishery.

(5) Improvement in the Administrative Capacity of the DGPA

The execution of this Master Plan would require assignment of around 186 DGPA employees (45 of whom would remain at the headquarters and 141 would be in the provinces), and around 32 employees of other governmental agencies and NGO's, or a total of 218 people as the human resources. The agents of the DGPA Headquarters would work concurrently on several projects, but the provincial agents would work for a single project at least for a certain period of time. Moreover, the present personnel of the DGPA is considered to be sufficient given the scope of fishing activities in the country, and it will not be necessary to increase their numbers to carry out this Master Plan. For that reason, the personnel at the headquarters would be required to carry out management, monitoring and support activities for several projects (technical and administrative support for capacity reinforcement), and there would necessarily be capacity reinforcement activities for the provincial agents onsite in order to allow them to manage their daily activities in the field as extension workers and data collectors, recording data and preparing periodical reports together with the coordination of those concerned. Moreover, it shall also be important to use as much as possible the local inhabitants for onsite production activities, and to review the roles of the Fishery Centres and the Aquaculture Stations so that the governmental agents simply devote their efforts to the development, support and extension of techniques and the collection and analysis of data concerning the statistics and management of fishery. It is also urgent to improve the capacity of the agents at the headquarters as technical officers, through training programmes in the South-South Cooperation or in the developed countries, so that they can support and train the provincial agents.

(6) Restructuring of organizations (Establishment of Ministry of Fishery and Aquaculture)

Although the scale of fishery and aquaculture sector of Gabon is small (approx. 1.5% of GDP, approx. 21,700 labor force), the country has rich fishery resources both in marine and inland waters. In particular from the aspect of food security, the fishery resources of Gabon are deemed as the important resources for contributing to supply of fishery products not only in Gabon but also to the neighboring countries. In this context, the sustainable management of the resources is indispensable, and it is necessary to focus on development of aquaculture by using the rich water resources.

For the implementation of the Master Plan, it is desirable to establish an independent organization, namely, Ministry of Fishery and Aquaculture, for development of fishery and aquaculture sector. By doing so, it is expected that the budget execution and various arrangements will be more rapidly made, and the programs and projects will be able to implement more smoothly as originally planned. It is recommended that a new Ministry will be comprised of the following three general directorates.

- D.G. Fisheries (industrial fishery, artisanal fishery, training / extension services)
- D.G. Aquaculture (technical development, seed production, aquaculture extension)
- D.G. Fishing Ground Improvement and Fishery Research (investigation / research, regulations / control / surveillance)

(7) Measures to be taken on taxation and finance in the fisheries sector

Gabon is a petroleum-producing country but the fuel price is almost same level as neighboring countries. During the oil price crisis in 2008, the Gabonese government extended the subsidy for stabilization of food and fuel prices. However, the prices of domestic commodities like fuel and various materials are at a level affordable only by the high-income populations including the foreigners but are too high for the low-income populations like rural farmer and fishers. It is recommended to reduce or exempt TAV for the fisheries and aquaculture materials in Gabon as a part of the government support programs for development of small-scale fisheries and aquaculture by Gabonese.

The Government of Gabon also is recommended to introduce a soft loan program for small to medium scale fishers and farmer for development of fisheries and agriculture. The current loan scheme of the government bank is similar to those of the private banks with the annual lending interest rate of 18% and the short loan period within 3 year. Modernization (or semi-industrialization) of fishing boats and construction of aquaculture ponds requires a large amount of money. It is desirable to establish a loan program specifically adjusted for development of fisheries and aquaculture with an interest rate below 10% and a loan period more than 10 years.

(8) Promotion of Privatisation (operating the structures with independent budgets)

1) Small-scale Fishery Community Centres (CCPA)

Gabon has established four CCPA in Port-Gentil, Lambaréné, Omboué and Owendo, for providing services of production and sale of ice, handling, sale and storage of the catch, repairs of motors, etc. The construction of a small-scale fishery support centre is also planned for Libreville. This Master Plan has also proposed the establishment of six other CCPA, including the landing places in Cocobeach, Mayumba, Kango, Ebél-Abanga, Ndjolé and Makokou, which represent other significant fishing bases. These infrastructure developments would allow for the establishment of small-scale fishery support centres at all significant coastal and inland fishing bases in the country. A system of joint management of the DGPA and the local fisher's associations is planned on for these CCPA, but the management so far in fact comes under the direction of the DGPA because of the insufficient management capacity of the fisher's associations. All the above-mentioned services now being supplied by the CCPA are activities that assure an income, thereby making it possible to run the CCAPs in an autonomous financial management system. Moreover, it is desirable that in the future, the DGPA should develop these CCPA as bases for new activities: credit for

the fishermen, extension of fishing techniques, supply of fishing equipment. Consequently, the income-generating activities among the functions of the CCPA shall gradually be transferred to the fisher's associations, and the DGPA shall mainly take care of the non income-generating activities to be carried out by a limited number of agents, such as the extension of techniques and the support of a credit service.

2) Aquaculture Stations

There now exist ten Aquaculture Stations in Gabon, and this Master Plan has proposed restructuring them by functions into six sites as follows:

i) Development Centre for Aquaculture Techniques (1 site): Peyrie

ii) Production Centre for Fish Fry / Fingerling (3 sites): Oyem, Tchibanga and Koulamoutou

iii) Extension Centre for Aquaculture Techniques (5 sites, 3 of which would also serve as centres for the production of fish fry / fingerling - ii)): Oyem, Tchibanga, Koulamoutou, Lambaréné (new centre) and Makokou (new centre).

The aquaculture stations listed in ii) and iii) among the above structures, shall have income from the sale of fish fry / fingerling, the raising of fish, the raising of animals and vegetable gardening, and therefore can theoretically function on an autonomous budget, not including the salary of the full-time agents of the DGPA. For that reason, a fund for the extension of aquaculture techniques shall be established in the name of each Centre and Station, and it would appear suitable that 50% of the income is used as overhead costs for the production of the following sale, and the remaining 50% is deposited in the fund to be used for the extension of aquaculture techniques (loans for the building of fish farming ponds, etc.). The other existing Aquaculture Stations (four sites at Bitam, Minvoul, Mitzic and Lébamba) shall be sold or privatized.

(9) Administration towards Resources Management

Although the fishery resources in Gabon are generally rich, it is necessary to prepare for appropriate system of resources management from now on. Based on the past experiences in Japan, it is too late to make a management plan after the decrease of resources becomes apparent as a problem, and it would be difficult to control the fishing efforts which are main sources of living for the fishers. It is necessary for the Gabonese administration to tackle on the following matters urgently towards the appropriate resources management.

1) Strengthening of surveillance and control of the coastal water

It is designated by the fishery act of Gabon that the coastal water (3-mile from shoreline) is as an exclusive fishing zone for small-scale fishery in Gabon. However, the illegal fishing by commercial trawlers is daily conducted in this zone. Since this situation would cause the destruction of coastal fishing environment and resources, it must be strictly controlled by the administration. It is recommended that the Ministry of Forest Economy, Waters, Fishery and Aquaculture which is responsible for fishery administration, in collaboration with the organization having the right to arrest, strengthens the surveillance and control of coastal water and give strict penalties to the illegal fishing boats.

2) Establishment of collaboration with stakeholders (fishers, etc.)

It is important for the government to explain to stakeholders (fishers, etc.) and to obtain their understanding that the resources management generally means the control of fishing efforts, but would lead to the maximum sustainable profit gained by the resources in the long term. For doing so, the efforts have to be made to establish a collaboration system with fishers so that all fishers, regardless the nationalities, can follow the ideas of administration for appropriate resources management. For example, it is necessary to extend credit and technical support services equally both to the Gabonese and foreign fishers. In addition, it is important to hear the opinions of fishers by visiting fishing villages every day through the execution of relevant projects.

(10) Administrative Guidance and Supervision on Small-Scale Set-Net Fishery

The set-net fishery occupies a certain water surface, so that it causes the conflicts with other types of fishery and/or it becomes the obstacle against other activities such as surface traffic, depending on the locations. For fishery resources management and avoiding the above-mentioned problems, it is indispensable for DGPA to make fishers understand on the adverse effects of set-net fishery, to formulate the regulations on set-net fishery, and to guide and supervise fishers so as to follow them.

It is, therefore, necessary that DGPA set forth the regulations on set-net fishery at the first stage of development and extension of the technology after on-site examination. The regulation should include the restrictions on 1) qualifications of fishers, 2) allowable water zones for installation, 3) size and units of set-net, 4) procedure for permit, 5) obligations on reporting, and 6) penalties in case of violation.

(11) Effective participation of Gabonese to fisheries sector

The Gabonese small-scale marine fisheries sector for the most part is made up of foreign fishers. Majority of the Gabonese fishers who are limited in financial as well as technical capacities in general having small-scale fishing boat and fishing gears are operating in calmer waters like inside lagoons and bays or inland waters. The government of Gabon is making efforts to create the employment in fisheries by fostering the technical development for the young fishers. In order to increase the employments and to improve fishing techniques and financial capacity of Gabonese fisher effectively, it is important that the government takes measures like the preferential taxation and the soft loan system mentioned in the above sections. In regard to technical support for the fishers, it is recommended to facilitate the transfer of fishing techniques from the foreign fishers to the Gabonese fishers. The development of training facility and equipment and the trainer’s technical upgrading are also indispensable to recruit efficiently the people who wish to enter the fisheries sector.