Programme of Modernization, Rehabilitation, and Development of Marine Fisheries and Aquaculture in Lebanon

Republic of Lebanon
Ministry of Agriculture
Directorate of Rural Development and natural Resources
Department of Fisheries and Wildlife

June 2010

SUMMARY OF
PROJECT PROFILE PROPOSAL

Project Country	**Lebanon**
Title	**Programme of Modernization, Rehabilitation and Development of Marine Fisheries and Aquaculture in Lebanon**
Government implementation Agency	**Ministry of Agriculture / Department of Fisheries and Wildlife**
Starting Date	**2010**
Duration	**5 years**
Budget	**US$ 10,000,000**

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Executive Summary

The rehabilitation of fisheries and aquaculture sectors is one of the major challenges facing Lebanon. The Lebanese fishermen, with 220 km coastline and 2,662 fishing vessels, are producing less than 6,000 tons of fish yearly and importing 19,000 tons. Most of the fish are undersize and of uncertain quality. The sustainability of the sector is questionable. Setting this sector on the right track is mandatory for the well-being and sustainability of local artisanal fishermen, public (to consume more and better quality fish at more affordable prices), and the Lebanese economy by decreasing the import bill.

The civil war (1975-1990) caused major destruction to the infrastructure of the Department of Fisheries and Wildlife (DFW) of the Lebanese Ministry of Agriculture. Local efforts resulted in partial rehabilitation of the facilities of the Oceanographic & Fisheries Institute at Batroun (North) and Trout Hatchery at Anjar & Hermel (Central Plateau) and Freshwater Fish Hatchery near Beirut. These require further extensive construction and equipping so that they become fully functional and perform their roles. These objectives include, but not limited to, conducting vital marine research and collecting data (catch, stock, and socio-economic assessment), improving fishing gear and vessels, replacing illegal nets, training local fishermen on new techniques, resource conservation, and safety, introduction of modern processing and cold storage facilities, establishing fisheries extension service, and the introduction of modern aquaculture. These activities should lead to sound and sustainable management of coastal environments and fishery resources. A 10% annual increase of fish landings from local waters and aquaculture is expected, thus leading to gradual decrease in imports and possible export of high value fishes. More reliable and credible biological, oceanographic, and statistical information on the fisheries situation and its ecology is to be disseminated to the public. Creation of new jobs and poverty alleviation of the fisheries communities is a natural outcome of this project. Developing a well-trained and highly professional DFW staff of fisheries scientists, workers, and talent will ensue.

The need for International assistance, to achieve the Project's objectives, is imperative for its success. The recruitment of a Project Coordinator and consultants in Fisheries, Aquaculture and Environment is a prerequisite to launching the project so as to review and re-evaluate the situation and project documents. The service of a number of other consultants like marine biologists, MIS/GIS specialists, master fishermen, and boat builders is stipulated.

Fishermen lack access of to institutional credit, which necessitates the need to provide them with a Revolving Credit Fund to help them obtain badly needed cash to upgrade their businesses.

This project is estimated to cost about US$ 10,000,000 and to be completed within five years.

PROJECT PROFILE

PROGRAMME OF MODERNIZATION, REHABILITATION AND DEVELOPMENT OF MARINE FISHERIES AND AQUACULTURE IN LEBANON

1- PROJECT TITLE:

Programme of Modernization, Rehabilitation, and Development of Marine Fisheries and Aquaculture in Lebanon (LEBFISH)

2- LEBANESE GOVERNMENT AGENCY CONCERNED:

Ministry of Agriculture (MOA) / Department of Fisheries & Wildlife (DFW)

3- ESTIMATED DURATION:

Five (5) years

4- ESTIMATED PROJECT COST:

US$ 10,000,000

5- PROJECT LOCATION & SHORT DESCRIPTION:

The project will be located at Batroun (Institute of Oceanography and Fisheries), Chouaifat (Aquaculture Centre), Anjar (Fish Farming Centre), Hermel (Fish Farming Centre), and South Lebanon (Marine Fisheries & Aquaculture Centre). It aims at the rehabilitation and upgrading of the Government facilities and capacity building for the Department of Fisheries & Wildlife. It also involves the rehabilitation and modernization of the fishing techniques and aquaculture and fisheries research.

6- BACKGROUND & JUSTIFICATION:

6.1 Current Situation of the Sector:

Lebanon is a predominantly mountainous country, with an area of 10,452 sq. km. and a population of around four millions. Nearly half of the country's population lives in the Greater Beirut area. The Lebanese coastline is 220 km long. The land rises steeply from the coast in the North, while in the South it forms a very narrow coastal plain. The continental shelf is narrow, especially in the middle and South. Bottom grounds are mainly rough with intensive rocky patches good for stationary demersal gear.

The fishing fleet consisted of 2,662 small fishing vessels (average 6.9m LOA). The average annual income of the fishermen, in 1998, was estimated to be US $800. About 6,500 artisanal fishermen distributed all over the Lebanese coast produced 6,000 tons of fish in 2000s them. Fish imports were reported to be about 19,000 tons in 2009. The potential for fish consumption in Lebanon is at least 35,000 ton per year due to increase in demand and flourishing tourism. The per capita fish consumption was about 3.75 kg per year in 2000.

The fisheries of Lebanon are classified as small scale "artisanal" and traditional based mainly on bottom stationary gear (trammels and longlines), purse seine nets, and beach seines. Fishing operations, with the exception of longlines, are mostly carried out at depths of up to 50m. Most of fishing nets used have extremely small mesh size (less than 2x2 cm). Because of the strict control by the military, the extensive fishing with explosives has been significantly reduced during the past few years. Fishing equipment are expensive. Moreover, the traditional fishermen have no access to institutional credit.

Aquaculture is limited to freshwater rainbow trout and a small shrimp farm in North Lebanon. The Department of Fisheries and Wildlife (DFW) - Ministry of Agriculture (MOA) operates one trout hatchery at Anjar (Bekaa Valley) that was rehabilitated in the 1990's and has been producing about 1 million fingerlings of rainbow trout per year. There are several private trout farms (in the Bekaa Valley and Mount Lebanon areas) producing about 1,000 tons per year. Furthermore, DFW operates a pilot mariculture station in Batroun.

6.2 Approaches to the Improvements in the Sector:

To increase the local fish production and supply; the following approaches are to be considered:

a) **Coastal/Marine fisheries**: needs to be rehabilitated by upgrading small-scale traditional fishing with the governmental support such as the provision of better fishing gear, vessels, techniques, and credit facilities.

b) **Research**: It is imperative to conduct research on marine environments and mariculture. This is to obtain crucial data needed in putting management plans for the sustainable exploitation of marine resources. In addition, to seek the most appropriate means to maximize benefits.
The existing fisheries resources have to be thoroughly re-examined in relation with various environmental aspects of the Lebanese water. This is to lead to optimization and sustainability of exploitation of marine resources through improved knowledge of the resource and better fishing vessels/gear. To achieve this, it is crucial to improve/upgrade/equip the related facilities including the mariculture pilot hatchery, laboratory equipments, research vessel, and infrastructure of the Oceanographic & Fishing Institute - Batroun.

c) **Aquaculture**: should be evaluated in respect to technical and economic feasibility. To achieve this, it is indispensable to strengthen the present demonstration/training capabilities of the DFW by improving/upgrading/equipping its related facilities and equipment including the aquaculture pilot stations at different locations, laboratory equipments, and training of local staff to operate the facilities, conducting trials and providing extension services.

7 - OBJECTIVES OF THE PROJECT

i) Short-term Objectives

+ **Marine Fisheries**: The project aims at strengthening the government's capacity for research and experimentation related to marine and freshwater environments and coastal fisheries in Lebanon. This necessitates the upgrade,

rehabilitate, and equip the Institute of Oceanography and Fisheries at Batroun to undertake, but not be limited to, the following functions:

- Catch/stock assessment.
- Marine research.
- Improving fishing gears.
- Establishment of Fiberglass Boat Building Yard.
- Fishing training.
- New fishing gears.
- Fish processing techniques.
- Local market Survey.
- Extension Services.
- Fishermen cooperatives and associations.
- Rehabilitation and establishment of aquarium/museum facilities.
- Socio-economic studies.
- Providing credit to fishermen.

+ **Aquaculture Pilot Projects**: To experiment and demonstrate the feasibility of marine and freshwater fish farming at the following sites:
  - Batroun: Institute of Oceanography and Fisheries
  - Chouaifat: Aquaculture Centre
  - Hermel: Aquaculture Centre
  - Anjar: Fish Farming Centre
  - South Lebanon
+ **Capacity building & Training** of DFW staff: and local fishermen..
+ **Consultations**: the services of consultants are to be solicited in the following fields:
  - Aquaculture: Marine and freshwater.
  - Environment.
  - Fisheries.
  - Stock assessment
  - Other: e.g. ship builders, MIS, etc.

ii) Medium and long-term Objectives

Through the operation of the project facilities and equipment, the following objectives will be achieved in the medium and long run.

a) To improve the marine research activities in relation with marine environments and fisheries resources, and upgrade those capabilities

b) To provide the relevant governmental agencies with proper data, advice, and services for appropriate policymaking and planning.

c) To ensure an appropriate sustainable management of fisheries resources and marine environments in the Lebanese waters.

d) To develop the appropriate fishing methods and gear suitable for the coastal fishermen.

e) Development of aquaculture

f) Increase fish production

iii) The relations between the Project and its Objectives

The implementation of the Project would serve as an impetus to the sound management of marine environments including fisheries resources as well as development of appropriate fishing techniques and aquaculture industry.

8- OUTLINES OF THE PROJECT

8.1 Project Sites & Scope:

8.1.1 Batroun -Institute of Oceanography and Fisheries: The Batroun site, 53 km north of Beirut, was constructed by the MOA, in the early seventies, in order to accommodate various maritime activities; particularly, a technical fishing school, a public aquarium, laboratories, etc.

The site (3 hectare) is comprised of the following:

- Marine Research Laboratories (3-story building)
- Administration/Dormitory building (5-story building)
- Conference Center
- Aquarium/Museum
- Pilot Mariculture Hatchery and Grow-out Facility
- Workshop Building.
- Support facilities e.g. kitchen and dining facilities

Considerable parts of the buildings was vandalized and damaged throughout the civil war. The Laboratories and Administration/Dormitory buildings have been partially rehabilitated and equipped in the early 2000s. The Aquarium/Museum requires massive rehabilitation and equipping. Moreover, a Mariculture Hatchery and Grow-Out Pilot Project facility was constructed in 2000. The facility needs major modifications and upgrading to become fully functional. **Annex 1** states current situation of the facilities.

8.1.2 Chouaifat - Aquaculture Centre: is about 5 km south of Beirut. Hatchery and Grow-Out concrete tanks were partially constructed. These are intended as pilot facilities for Tilapia and other warm freshwater fish species. The facilities require equipping, instrumentation, and completion of construction.

8.1.3 Anjar - Fish Farming Centre: is 56 km East of Beirut in the Bekaa Valley (Central Plateau) at an elevation of about 900m. It was constructed in 1961. The Centre is a Trout Hatchery and Breeding Facility that was designed to produce 2-3 million fingerlings a year. It requires upgrading of the facilities, modern equipping, and securing continuous water supply. Furthermore, some modifications are needed to ensure the breeding and hatching of other species of fish to help in re-populating the Lebanese rivers with endogenous fish species.

8.1.4 Hermel - Fish Farming Centre: is 140 km northeast of Beirut. Facilities were constructed in 2004 as a Trout Hatchery and Breeding Facility. It requires equipping to become fully operational.

8.1.5 South Lebanon (Sour/Tyr) - Marine Fisheries & Aquaculture Centre: is 85 km South of Beirut. No facilities exist there. There are 530 fishing vessels distributed over seven fishing ports in South Lebanon. It is imperative that South Lebanon has a specialized fisheries facility that acts as a pilot center to train local fishermen on modern fishing and aquaculture techniques. It is intended to construct and equip pilot facilities to produce shrimps, marine fish (onshore and offshore), sponge, mollusks, sea turtles, etc.

8.2 PROJECT SCOPE

8.2.1 LABORATORY EQUIPMENT:

The premises at Batroun would give an excellent opportunity for the DFW to experiment on e.g. planktons, chemistry, biology, as well as the physical oceanography and cartography.

The equipments listed in **Annex 2** are needed to initiate the activities on more modern research level. This list is not comprehensive and needs to be evaluated by Fisheries, Aquaculture, and Environmental Consultants

8.2.2 BOATS, ACCESSORIES & FISHING GEAR

The MOA-DFW, in its rehabilitation phase, needs the boats and accessories listed in **Annex 3**.

8.2.3 VEHICLES: the vehicles listed in **Annex 4** are required

8.2.4 AQUACULTURE PILOT STATIONS

8.2.4.1 Target/Proposed Species

1. Sea bass (*Dicentrarchus labrax*) (onshore and submerged offshore cages)
2. Sea bream (*Sparus Aurata*) (onshore and submerged offshore cages)
3. Red snapper (*Chrysophrys* spp)
4. Penaeid shrimp (*Penaeus semisulcatus*)
5. Penaeid shrimp (*Penaeus japonicus*)
6. Rabbit Fish (*Siganus* spp)
7. Trout (*Salmo* spp)
8. Carp (*Carpe* spp)
9. Catfish (*Silurus glanis*)
10. Sea Turtle
11. Sponge
12. Mollusks
13. Other

8.2.4.2 Production Seasons

8.2.4.2.1 Marine Fish (Annex 7 gives the mean Sea (Mediterranean) water temperatures).

Spawning: March-June (during increasing temperature period, with induced spawning, subject to change depending on species)

Larval Rearing: 2 months (from hatch-out larva to .2.5 cm size)

Growing-out: 6-7 months (from 2.5 cm to marketable size 200-300g)

8.2.4.2.2 Marine Shrimp (Penaeus semisulcatus), (Penaeus japonicus)

Spawning: Apr.-Oct. (during high temperature period, with eye-stalk ablation of gravid female)

Larval Rearing: 1.5 months (from nauplius to postlarva)

Growing-out: 6-7 months (from postlarva to marketable size 25g)

8.2.4.2.3 Freshwater Fish:

Spawning: January-March (Trout), March- June (Carp & Catfish)
Larval Rearing: 3 weeks (Trout), 2 weeks (Carp & Catfish)
Grow-Out: 6 months (trout), 12 months (Carp), 12 -18 months (Catfish)

8.2.5 DATA COLLECTION: it is imperative that Lebanon has reliable and countrywide data on catch assessment, stock assessment and socio-economic situation.

9 – PROJECT ACTIVITIES

The main areas of activities would be concentrated on marine fisheries, fresh water fisheries, fishermen training, capacity building, fisheries research & development, and aquaculture. Therefore, the activities in each of the above areas would include the following:

9.1 Marine Fisheries

The marine fisheries in Lebanon are mostly inshore fisheries consisting of about 2,662 vessels operated by some 6,500 fishermen producing about 6,000 tons a year. The infrastructure to support the sector has suffered destruction and negligence during the 17 years of civil war. In order to help revitalizing this sector a boat-building yard is to be established in Batroun. This yard will be equipped with molds, fiberglass, resin, engines, propellers, etc. to build prototypes of fiberglass boats (7-15m LOA). An expert ship builder is expected to train the DFW and local fishermen on building fishing boats, patrol boats and Research Vessel. Eventually, the MOA will provide the facilities, premises and know how; while local fishermen are expected to provide the raw materials and proper equipment and gear to build their own fiberglass vessels. Furthermore, the facility will construct patrol-type boats for the use of DFW Fishing Rangers to enforce Fishing Laws and Regulations. Training on new fishing gear and techniques is supposed to take place simultaneously.

The Research vessel together with the laboratory facilities in Batroun are expected to provide valuable information for fishermen and the fisheries administration.

9.2 Fishery Development Centers and Revolving Fund:

Six integrated "Fishery Development Centers" (FDC) are to be established at the major fish landing sites. The appropriate sites would be Tripoli, Batroun, Jounieh, Dora, Sidon, and Tyr. The size and services to be offered by each FDC, is to be determined according to size of the fishery and the number of fishermen at each site. Each should have a suitable jetty for the fishing boats, a cold store, ice making plant, refueling, fresh water, loading and offloading facilities, workshop for repair and maintenance, fish transport facilities, stores, processing hall, and administration building. The Credit Advisor Consultant will advice and supervise the administration of the FDC that will be done by the Fishermen Cooperative at the particular port. Each Cooperative will establish and operate a "Revolving Fund" (RV) to provide fishermen with assured access to easy credit. The initial seed money for the RV to be provided by the Project. The administration of the RV may be turned over to the already existing Agriculture Credit Bank if it is strengthened to include expertise in fisheries/cooperatives credit.

The Cooperatives will also assist fishermen in marketing of their catches for a service fee.

The six FDCs are expected to provide services to the nearby minor landing sites along the coast.

The establishment of an integrated "fisheries Development Centers" (FDC) at the major fish landing sites is a means for institutionalizing the fishermen. Fishermen in each of these FDCs would join together to from a local fishermen cooperative society (if that cooperative does not already exist) or strengthen the existing one. The cooperative would, through an elected Board, run the affairs of the fishermen including fish marketing services and the facilities of the FDC. It would also establish, with the support and supervision of concerned Ministries, the rules and procedures that will govern the operations of the cooperative. Fishermen from smaller fish landing sites along the coast, can affiliate themselves with the FDC nearest to them. To promote membership, cooperatives services should be limited to fishermen and members only.

9.2 Freshwater Fisheries

Fresh water fisheries in Lebanon, although, at present, is considered very negligible, is generally practiced in two ways; in rivers and lakes and in natural spring-water areas. Fresh water fisheries in rivers is seasonal while the fisheries in the natural lakes and in spring-water areas are more permanent. Therefore, the expansion of fresh water fish can be carried out through the upgrading and expansion of activities at Anjar where spring-water is abundant. The Anjar and Hermel stations requires proper staffing, equipment, modification to the water supply system and etc. so that they could serve as pilot centers for the provision of fingerlings, technical advice and management support to the general public in the Bekaa and as means of expanding popular fresh water species such as rainbow trout.

Expansion in fresh water fisheries, through natural development and aquaculture, would provide significant supplies of fish to the local market especially that the areas of expansion have a very good marketing outlet, catering for the numerous tourist restaurants and game fishing areas.

9.3 Capacity Building

The DFW in the Ministry of Agriculture would require strengthening in staff and facilities. Besides regulating the fisheries sector by establishing and enforcing laws for a better control and monitoring of the sector, a "Fishermen Extension Section" (FES) should be established. The FES, with proper staffing, would establish direct relationship with the cooperatives to insure that extension services to fishermen are given and rules and regulations are followed. Proper training to the DFW, by competent consultants, is imperative in order that they in turn will disseminate their acquired knowledge.

9.4 Fisheries Research & Development

As a means of sustaining the efforts in rehabilitating and developing the Lebanese fisheries sector, a program of research in fisheries and aquaculture is essential. The nucleus of a fisheries research center was constructed in Batroun.

The original objectives of establishing the Institute were to undergo study of biological and physiological environment of the Lebanese coast, fish stock assessment, population dynamics, fish mortality, etc. and for training of skippers in marine fishing. Mariculture investigations were also planned.

Repairs and completion of the institute will be most beneficial for the overall fisheries development. The project should include funds for the institute to be completed. It should be provided with a moderate size research vessel, a docking jetty with facilities, equipment, and supplies for the laboratories, completion of the Aquarium and Museum, training facilities for marine fishing.

The eventual completion and operation of the Institute would provide an opportunity to expand its activities to include services/cooperation with other countries in the region. It could also provide essential research activities for studies on pollution problems that affect the fisheries and their ecology. Research will provide information on the indigenous and migratory species in Lebanese waters. It will also provide knowledge on currents, seasonally, availability of non-traditional fish species suitable for commercial exploitation and knowledge on other marine products such as sponge, and its proper exploitation techniques. In addition, knowledge on bivalves, crustaceans, resources, etc. would be gained.
The proposed research vessel will carry out experimental and exploratory fishing as well as provide training facilities. Results achieved will be relayed to fishermen through the established extension services with improved fishing methods and equipment.

9.5 Aquaculture.

The population of Lebanon is around 4 million. Local fish production does not exceed 6,000 tons per year while Lebanon imports about 19,000 tons **(Annex 5)** of fish yearly. Thus, annual per capita consumption is about 3.75 kg as compared to 67 kg for Japan, 33 kg for Spain & China, 9 kg for Russia, 7 kg for USA, 4.5 kg for Iran, 2 kg for Sudan, and 16 kg for the whole World (1997). The potential for Fish Consumption in Lebanon is estimated to be about 35,000 Ton per Year.
Local production contributes less than 27% of local consumption. Aquaculture (limited, to date, to Rainbow Trout and some shrimps and tilapia) contributes about 17 % of local production and 4% of local fish consumption.
Aquaculture seems to be a very feasible means to bridge this gap. Aquaculture Projects for e.g. Shrimp, Trout, Tilapia, Sea Bass and Sea Bream are expected to be feasible and highly profitable. The DFW did introduce Trout Fish Farming in the past. It has established, in1999 & 2000, the infrastructure for aquaculture pilot projects at two locations (Batroun & Chouaifat). However, there are no local experts in this field who can run research and trials and help disseminate the knowledge and the establishment of local commercial projects. The need for International Aquaculture Consultant(s) to assess the situation and provide sound advice is imperative. The consultant is to help introducing new species, establish aquaculture pilot projects where feasible, and train DFW staff on modern aquaculture techniques.

A more detailed listing of project outputs is as follows:

2. Fishery Development Centers (FDC)

1. Six **FDC**s will be established in the main six fish landing sites. Each would be appropriately equipped with infrastructure facilities including fishing ports, cold stores, ice plant, fish handling, and processing hall, workshop, supplies stores, fuel and fresh water supplies, and administration building. The FDC will also cater for nearby smaller fish landing sites along the coast.

2. **Credit Scheme (Revolving Fund)**
   - **a.** The Project should provide seed money for a Credit Scheme to allow fishermen access to institutionalized credit for the provision of fishing gear, equipments and the mechanization of boats on easy-term Basis. The seed money to be managed by each cooperative under a revolving fund Rules,

supported and supervised by the Credit Advisor Consultant and respective administration(s).

3. **Institute of Oceanography and Fisheries (IOF)** Funds should be allocated to equip the IOF with laboratories, materials, furnishing, equipment, jetty, and training facilities for skippers, biologists, mariculture and fisheries research workers.

4. **Research and Training Vessel** A multi-purpose research and training vessel of about 15m to be operated by the IOF. It should be equipped with research facilities/equipment and should be suitable for purse seining with light attraction, bottom, and pelagic long-lining and netting for exploratory and demonstrative fishing operations, etc.

5. **Aquarium and Fish Museum** While the structure of the Aquarium and Fish Museum are already standing, funds should be allocated to complete the overhaul. The operation of these two functions will complement the activities of the IOF. The establishment of a restaurant on top of the aquarium, on BOT basis could prove very beneficial.

6. **Introduction of New fishing Gear and Equipments**
    a. Development/improvement of the efficiency of fishing operations would require introduction of new equipment such as echo sounders, power-blocks and netting. Fishermen would be adequately trained on there use.

7. **Modifications and Up-grading of Existing Fishing Gear/Equipment:** The project to provide technical knowledge for the modification and upgrading of operational vessels, gear and related equipment. This will also require constructing boat building facility or modifying existing building. Furthermore, prototypes and molds would be required together with all requisites including fiberglass, resin, and engines. A workshop also should be established for maintenance purposes.

8. **MIS/GIS (Management/Geographic Information System)/WAN (Wide Area Network)/LAN (Large Area Network):** to connect all sites to DFW headquarters. This will eventually serve as National Information Centre for Fisheries and Aquaculture and provide the public with online vital information through intranet/web page.

9. **Consultations:**
   In order that the needs for the project to be assessed, the services of international consultants is required. They are to be experts in fisheries, aquaculture, environment, training, MIS, and any other field as deemed necessary for the project implementation. The Fisheries Consultant, Aquaculture Consultant, and the Environmental consultant are to visit Lebanon prior to the launching of the Project. They are to assess the situation, give their recommendations, and revise the scope and activities of the Project if necessary.

10. **Catch assessment, stock assessment and socio-economic studies**: this is needed to derive long term management plans.

11. **Replacing illegal nets**: since almost all nets used by fishermen are illegal with mesh size less than 2x2 cm, it is imperative for the sustainability of the resource to replace all nets by larger mesh size ones. To encourage fishermen to do so, replacing a certain percentage of their nets with legal ones on condition that the fishermen replace the remaining portion at their own expense

12. **Training and Fellowships**:
    On-the-job training of new recruits of fishermen and DFW staff on fishing methods, aquaculture, boat building, boat operation should be part of the Project. A program of fellowships abroad for advanced training in various areas of fisheries and aquaculture to be administered by the Project should be included.
    The local & international training is to include, but not limited to, the following:
    - Boat building, operation and maintenance
    - Fishing gear & techniques
    - Research methods
    - Aquarium & museum management
    - The use of procured equipment and instrument
    - Hatchery techniques, equipment, handling, parent stocks…etc.
    - Cage & Tank construction, size, materials, maintenance, necessary installation equipment, positioning, auxiliary cage equipment…etc.
    - General Aquaculture e.g. management, water quality, ecology, environmental issues, cage densities and carrying densities, instruments…etc.
    - Specific Sea Bass and Sea Bream cultural methods, biology, species…. etc.
    - Feeds formulations, manufacturing, and dispensing.
    - Feeding, nutritional requirements and feeding methods and equipment.
    - Diseases and their control.
    - Harvesting techniques and necessary equipment.
    - Social and Environmental impacts
    - Economics and Marketing.
    - Handling, storage, and transportation of fish.

13. **Support to Government Fisheries Administration** In order that the above activities are implemented on sustainable basis, support to the government fisheries administration by establishing Fisheries Extension Section (FES) is essential for the organization and management matters and for post-project activities.

14. **Aquaculture Pilot Projects:** (**Annex 6** gives some Meteorological data for some locations on the Lebanese Coast):
    - **Batroun**: To make the site fully operational it requires certain modifications and upgrading of:
        + Water Supply: upgrade of existing seawater pumping system
        + Main seawater filters
        + 2 growing tanks (recirculating with drum-type biofilters)
        + 2 Biofilters for the whole Hatchery
        + Water heaters
        + Dosing equipment
        + Dinitrification and sterilization equipment
        + Computerized Control System
        + Greenhouse Fiberglass (Tedlar coated) Cover
        + Parent stocks

+ Aquaculture requisites e.g. feed and netting
+ Exhaust Fans
+ PCs and related equipment
+ Spare parts
+ Other requisites as deemed necessary

- **Chouaifat**: To make the site operational it requires certain modifications and upgrading of:
  + 3 Biofilters (drum type)
  + Water heaters
  + Dosing equipment
  + Dinitrification and sterilization equipment
  + Computerized Control System
  + Greenhouse Fiberglass (Tedlar coated) Cover
  + Parent stocks
  + Aquaculture requisites e.g. feed and netting
  + Research facilities and laboratory equipment and instrumentation
  + PCs and related equipment
  + Spare parts
  + Other requisites as deemed necessary

- **Anjar:** To make the site operational it requires certain modifications and upgrading of:
  + Modification and rehabilitation of the water supply system
  + Modern hatcheries
  + Dosing equipment
  + New hatchery facilities
  + Water cooler for hatchery
  + Main Water filter
  + Upgrade existing electrical standby system
  + Parent stocks
  + New fish tanks for parent stocks
  + Warehouse facility
  + Aquaculture requisites e.g. feed and netting
  + Research facilities and laboratory equipment and instrumentation
  + PCs and related equipment
  + Pilot feed plant
  + Egg sorter and counter
  + Spare parts.
  + Other requisites as deemed necessary

- **Hermel:** requires further equipping to become functional.

- **South Lebanon (Sour/Tyr Region):** No facilities exist. It requires an international aquaculture consultant to prepare proposals and complete project design and documentation for shrimps, marine fish (onshore and offshore), sea turtles, and sponge.

10 PROJECT INPUTS

10.1 Consultants: The TORs (Terms of Reference) for the consultants are in **Annex 7.**

- Project Coordinator (60 man month)
- Fisheries Development Consultant (18 man month)
- Marine biologist/stock assessment specialist (24 man month)
- Aquaculture Consultant (18 man month)
- Environmental Consultant (3 man month)
- Socio-economist/credit advisor (12 man month)
- Marine Biologists/Stock Assessment Expert (24 man month)
- Fishing Technologists (24 man month)
- Master fisherman (12 man month)
- Fish Marketing Advisor (12 man month)
- Marine Engineer (6 man month)
- Boat Building Specialist (6 man month)
- Fish Handling and Processing Expert (6 man month)
- MIS/GIS Consultant (6 man month)
- Aquarium / Museum Specialists (6 man month)

10.2 Contractual Services

- Completion and furnishing of the IOF.
- Design, construction work, and equipping of aquarium/museum
- Design, construction work, and equipping of boat building facility
- Design, construction work, and equipping of Aquaculture Freshwater and Marine Pilot Projects.
- Design, equip, and implement MIS/WAN/LAN.

10.3 Equipment: Provisions to be made for the supply of:

- Multi purpose research/fishing vessel of about 15 m.
- Fishing gears and fishing equipment: Provision to be made for power-block (net haulers), echo sounders, electrical lights for purse-seining, fishing nets etc. for training and demonstrative-exploratory fishing in deep waters/bottom fishing techniques, long lining, and fishing in possible trawling areas.
- Boat Building supplies: engines, outboard and inboard engines, workshop equipment and tools, moulds, fiberglass, resin, etc.
- Boats
- Fishing nets
- Vehicles
- Office equipment (e.g. PCs, networking, other hardware, software)
- Aquaculture supplies and requisites: fiberglass, parent stock, laboratory equipment, biofilters, etc.
- Laboratory Equipment.
- Decompression Chambers.

10.4 Other Inputs

- Fellowship
- Training

10.5 Government Inputs

- The Lebanese Government will provide furnished offices, at relevant sites equipped with adequate office furniture and communication facilities.
- It will assign the required number of counterpart staff (technical and support staff).
- It will provide the necessary local support, transportation facilities, etc. and facilitate Project operations with other Government departments.
- It will provide operational expenses not covered Project inputs.
- Provide all necessary assistance for international staff and their local standing.

11. PROJECT OUTPUTS

Several outputs, of far reaching social and economical effects, are expected to be produced during and after the implementation of this Project. Some of those outputs will be physically felt and bring immediate benefits in the process of rehabilitation and development of the overall Lebanese economy. Other outputs would be realized in the long term.

The apparent outputs are summarized as follows:

- Gradual increase of fish landings from local waters and aquaculture by about 15% annually; thus, reducing imports, decreasing trade balance, and possibly expanding exports of high value species.
- Improvement of fishing effort through upgrading of work force, equipment, and introduction of more efficient fishing techniques and methods.
- Repair and/or replacement of old, destroyed, and lost fishing gear and equipment.
- Better exploitation of inshore fishing grounds and exploration offshore waters for other commercial fisheries; shrimp, swordfish, sponge, etc.
- More reliable and credible biological, oceanographic, and statistical information on the fisheries situation and its ecology.
- Exploration of the mariculture opportunities available along the Lebanese coastline.
- Upgrading and expanding fresh water fish culture and better exploitation of fresh water resources.
- Creation of jobs and increase in income to help raise standards of living of fishermen.
- Establishing a good base for fisheries research and sustainable development.
- Creating a well-trained and highly professional cadre of fisheries scientists; workers and talent.
- A well documented fishery industry.
- Provide the public with online information about fisheries and aquaculture and related information.
- Better developed fish marketing and distribution channels as well as higher quality fish products.
- More reliable sources of fish for touristic areas, restaurants, and institutions.
- Demonstrate the feasibility of aquaculture to the private sector, thus, creating new investment opportunities for private investors. This will, in turn, increase local supply of fish and subsequently decrease fish imports.

12. PROJECT COST

		Cost US$
12.1 Consultants		
- Project Coordinator		350,000
- Socio-economist/credit advisor		60,000
- Fisheries Development Consultant		75,000
- Aquaculture Consultant		75,000
- Environmental Consultant		25,000
- Marine Biologist/Catch & Stock Assessment Expert		85,000
- Fishing Technologists		75,000
- Master Fisherman		40,000
- Fish Marketing Advisor		50,000
- Marine Engineer		50,000
- Boat Building Expert		25,000
- Fish Handling and Processing Expert		30,000
- MIS/GIS Consultant		30,000
- Aquarium/Museum Specialist		30,000
	Sub-total	**1,000,000**
12.2 Contractual Services		
- Completion and furnishing of the IOF		300,000
- Design, construction works and equipping of aquarium/museum		200,000
- Design, construction works and equipping of boat building facility		200,000
- Design, construction works and equipping of Aquaculture Freshwater and Marine Pilot Projects in Batroun, Chouaifat, Anjar, Hermel, and South Lebanon		1,400,000
- Design, equip and implement MIS/GIS		200,000
- Catch & Stock assessment surveys		500,000
- Socio-economic & Fisheries Sectoral study		200,000
	Sub-total	**3,000,000**
12.3 Equipment		
- Laboratory Equipment (Annex 2)		100,000
- Research and Training (Annex 3)		1,000,000
- Boats and Coastal Patrol/Inspection boats (Annex 3)		500,000
- Fishing Gear (Annex 3)		1,000,000
- Vehicles (Annex 4)		200,000
- Office Automation (MIS/GIS/LAN/WAN)		200,000
	Sub-total	**3,000,000**
12.4 Other		
- Fishermen Credit Fund		2,000,000
- Travel		200,000
- Fellowships and Training		300,000
- Counterpart DFW Staff		300,000
- Miscellaneous		200,000
	Sub-total	**3,000,000**
	Total	**10,000,000**

13. WORK PLAN

The Project Coordinator, Fisheries Consultant, Aquaculture Consultant, Environmental Consultant, and DFW should prepare a detailed Project Work Plan for the implementation of the Project. The recruitment of the Project Coordinator, Fisheries Consultant, Aquaculture Consultant, and Environmental Consultant is to be done shortly before the onset of project implementation to finalize the Project formulation and re-evaluate the project document as per the TORs of the concerned consultants. The work Plan is expected to be periodically reviewed.

14. MONITORING AND EVALUATION

The Project will be subject to periodic review in accordance with the policies and procedures established by the donor and applicable Lebanese laws and Regulations, in consultation with the Executing Agency/Counterpart Ministry.

15. IMPLEMENTATION PRIORITIES

The overall assessment of the fisheries sector in Lebanon indicates that the sector, as a whole, requires various actions to rehabilitate it as well as develop it on a sustainable basis. However, priorities in the process of implementation may be considered based on the more urgent needs to the less urgent ones. The rehabilitation of the small-scale marine fisheries sector through the provision of better fishing means should receive top priority. Next priority in implementation should be the completion of the IOF in Batroun to serve the research and development of the sector. The provision of the research vessel is also important. The completion of the Museum and Aquarium may be carried out at a later stage.
If sufficient scientific and economical studies establish the feasibility of both Aquaculture (mariculture and freshwater) activities, mariculture should receive a higher priority in implementation over fresh water aquaculture.
During the "Preparatory Phase" of four months, the sequence and strategy for implementation of the rehabilitation and modernization of the fisheries and aquaculture sector in Lebanon would be set.

16. BENEFITS & EFFECTS OF THE PROJECT:

16.1 Population that will benefit of the project:

+ About 6,500 coastal fishermen will receive direct benefit from the project, by being provided with better management of fishing grounds, technical development of fishing gear and boats, and the use of the rehabilitated facilities and equipment of the Batroun complex.
+ All Lebanese will have the increased opportunity of purchasing better quality marine and freshwater fish because of the increase of local fish production.
+ The Batroun complex will be widely opened not only for Lebanese researches but also for those from neighboring Mediterranean countries and other concerned countries. The Project will contributor to overall fishery development in the Eastern part of the Mediterranean Sea.

16.2 Area that will benefit from the Project

The Project will provide benefit to all over Lebanon with particular emphasis on fishing development and sound management of environment including fishery resources.

16.3 Economic and Social Effects of the Project

16.3.1 Current Situation

Because of the 17-year war, coastal small-scale fishermen have been seriously damaged with the loss of fishing gear/boat. Their fishing capability is still same level as the pre-war stage 30 years ago without any particular improvement. Furthermore, the coastal fishing ground seems to have deteriorated due to the insufficient management of fishery resources and pollution.

16.3.2 Expected Effects of the Project

Though the Project, the government is supporting activities will be strengthened in the form of technical development and extension services to small-scale fishermen, e.g. identification of the under-utilized resources, development of better fishing gear and methods, and management of marine environments. These activities will lead to sound and sustainable management of coastal environments including fishery resources, as well as upgrading of small-scale fishermen in the most appropriate way.

17. Operation and Management of the Project

Supervising Ministry: Ministry of Agriculture

Implementing Agency: Department of Fisheries & Wildlife

Annex 1

STATUS OF INSTITUTE OF OCEANOGRAPHY & FISHERIES- BATROUN

Location: Batroun, North Lebanon, 53 km north of Beirut
Facilities:

+ Administrative Building:
  - Offices: equipped
  - Library premises: not equipped
  - Classrooms premises: not equipped
  - Conference Room: partially equipped
+ Laboratories premises: partially equipped but with no consumables
  - Marine Biology
  - Microbiology
  - Chemical Oceanography
+ Dormitories: equipped
  - Rooms: 25 rooms
  - Kitchen
  - Dining Hall
  - Recreation facility
+ Hatchery and Raceways: under one greenhouse (1000 sq.m.): equipped but with no consumables: composed of:
  - Spawning & Maturation Room:
  - Algae room
  - Larvae room
  - Nursery room
  - Raceways: three 2x17 m
+ Aquarium/Museum Building Facility: need refurbishment and equipping
+ Support Facilities:
  - Standby Electrical Generator: 100 KVA
  - Pumping Station (two 7.5 hp pumps) & Water Reservoirs (Two 50 cu.m.)
  - Workshop: need refurbishment & not equipped
  - Residence for Institute's Director: need refurbishment & not equipped
+ Personnel:
  - Director: 1
  - Administrative Aide: 1
  - Guard: 1

Annex 2

EQUIPMENT NEEDED FOR IOF - BATROUN

1- Equipment for Environment Monitoring

1) Gas chromatography with accessories	1 set
2) Atomic absorption	1 set
3) Computer with peripherals	1 set
4) Lyophilizer with extra vacuum pump	1 set
5) STD with oxygen probes	1 set
6) Nutrient auto-analyzer	1 set
7) Specialized equipment for bathymetry	1 set
8) Reversing thermometer:	
- Unprotected	40 sets
- Protected	40 sets
9) Nansen reversing water bottle with frame for holding	40 sets
10) Reversing thermometers	2 units
11) Rack for resting Nansen reversing water bottles	6 sets
12) Ekman Merz Current Meter:	
- for weak current - 3 knots	3 sets
- for strong current - 6 knots	3 sets
- for weak and strong current	3 sets
13) Self-recording current meter	1 set
14) Sounding Machine, Motor Drive (driven by a 100 volt D.C. enclosed motor) depths suitable for up to 3000 m.	3 sets
15) Meter wheel:	
1. measuring range (0-1.000 m)	3 sets
2. measuring range (0-10.000 m)	3 sets
16) Hydrophone	6 sets
17) Mud snapper	3 sets
18) Piston Core sampler	2 sets
19) Mud Penetrometer	2 sets
20) Chloronity determination outfit	
21) (Knudsen burette - Pipette…)	6 sets
22) Salinometer	3 sets
23) Fish rearing and feeding through with supports flow spout and other equipment	12 sets
24) Fish incubation cabinet complete with all its parts: Water trays, egg containers, incubator stand, activator rod and stopper, etc…	12 sets
25) Aqua Lator Floating unit Horse Power complete ½ hp Model PDL- 503	10 sets
26) Aqua screen self cleaning self powdered:	
▪ 2 feet length by 18 inches diameter	12 sets
▪ 3 feet length by 22 inches diameter	12 sets
27) Miscellaneous equipment	1 lot

2- <u>Sounding machines</u>

1 lot

1) Sounding machine - hand operated up to 400 m

- motor driven up to 3000 m

2) Meter wheel
3) Clinometer for sounding wire, suspension type
4) Hydrophone
5) Lead for sounding machine

3- Bottom sampler 1 lot

1) Harukawa's bottom sampler
2) Nio's dredge
3) Improved sieve shaker for sand and mud

4- Water bottle 1 lot

1) Underway bucket for surface water
2) Ekman reversing water bottle
3) Kitahara's water bottle R. Type (Transparent) Kitahara's

5- Temperature measuring apparatus 1 lot

1) Reversing thermometer (with the Certificate)
2) Thermometer reversing frame, shot patters
3) Thermometer reversing frame, Rigosha's pattern
4) Sea water thermometer ("with the Certificate")
5) Thermometer reader
6) Maximum and minimum thermometer
7) Pistant thermometers
8) Bathythermogragh (thermarine Recorder)

6- Current meters 1 lot

1) Current drag
2) Ono's self-recording current meter
3) Lead for current meter

7- Recording tade cadol (Richard or Fuess) 1 lot

8- Tacting transparency, color and specific gravity of waters 1 lot

1) Visibility dise (Secchi's dise)
2) Submarine illuminometer (photoelectric call method)
3) Forel standard water color set
4) Kanuma's hydrometer (with the certificate)

9 - Equipment for chemical analysis of fresh and sea water 1 lot

1) Standard sea water for measuring chlorinate (Certified by the committee of Japanese Normal Seawater)
2) Chlorinate determination outfit
3) Magnetic stirrer
4) Total carbonic acid estimation outfit for field use
5) Automatic determination apparatus of chlorinate content
6) Rigo Salinometer
7) Hydrogen-ion comparator for sea water
8) Out fit for determining quality of waters for hatcheries and nurseries
9) Fixanal preparations (Maker: riddled Haim, Germany) Sodium carbonate etc

10) Universal ph Indicator (Maker: Riddle-De Ger.)
11) Universal ph indicator paper
12) Dubosoq colorimeter
13) Winkler bottle for oxygen quantitative analysis
14) Sea water bottle (for chemical analysis)
15) Sea water bottle (for salinity determination)

10-Equipment for popular education 1 lot

Observational apparatus set for education purpose

11- Meteorological instruments 1 lot

1) Thermograph (Certif.)
2) Hydrograph
3) Aneroid barometer (Certif.)
4) Barograph (Certif.: = Self-recording barometer) 5) wane
5) Biram's animator
6) Robinson type recording anemometer (Certif.)
7) Rain gangue (Certif.)
8) Evaporating gangue (Certif.)
9) Stevenson screen

12- Audio-Visual Equipment (To equip the Conference Hall) 1 lot

1) TV projector
2) Slide Projector
3) Overhead projector
4) Acoustic equipment, wireless headphones and microphones, speakers, etc.
5) Immediate interpretation facilities
6) VCR/DVD
7) LCD Projector
8) Recording equipment
9) Laser Pointers
10) Etc.

13 - Equipment for Laboratory for Microbiology and Pollution 1 lot

1) Millipore filters (Maker, Millipore Filter Corporation U.S.A.)
2) J-Z Sampler for bacteria in waters
3) Equipment for preserving deep-sea bacteria under pressure
4) Centrifuge electrically driven 3.000 rpm with its tubes
5) Dissecting instruments and trays enameled
6) Microscope and phase microscope
7) Photograph for microscope
8) Portable microscope
9) Dissecting microscope, binocular
10) Balances, automatic spring, and chemical balance
11) Sterilizers. Dry, Vapor, and Auto-Clave
12) Culture shaker
13) Electric thermostat (Incubator)
14) Low temperature thermostat
15) PH electrode meter
16) Distiller

17) Ion exchange resin water purifier
18) Stains & chemical drugs
19) Glass apparatus
20) Thermo-circulator
21) Emery bacteria bottom sampler

14- <u>Equipment for Planktonology, Phytoplankton & Zooplankton Laboratory</u> 1 lot

1) Kitakara's surface plankton net
2) Kitakara's quantitative plankton net
3) North Pacific Ocean Standard plankton net (Norpac type)
4) Marukawa's medium-layer plankton net
5) Scrip's medium-layer plankton net
6) Sample plankton net (for fisherman's use)
7) CLARK-BUMPUS underway plankton sampler
8) Notoda's plankton catcher
9) Flow meter for plankton net
10) Kotoda's plankton specimen concentration net
11) Kureki's madium layer larva net
12) 130 cm. plankton and larva net (Maruchi model)
13) Nakamura's larva net
14) Tripping devise for plankton bet
15) Double reliesing devise for plankton net
16) Filtering apparatus for plankton
17) Milipers filter (Maker: Millipers filter Corporation U.S.A.)
18) Felsem's plankton sample divider
19) Stemple pipette and dilution bottle
20) Counting plates, ruled. Size 40x78mm
    - perpendicular line
    - reticule
21) Stage for plankton counting plate
22) Micro slide, of thick glass, with one or two spherical concavities
23) Slide glass and Cover glass
24) Kokubo's outfit for quantitative determination of plankton
25) Matsudaira's apparatus for determinating the amount of water displaced by plankton
26) Motoda's plankton filtering equipment by suction
27) Centrifuge, hand driven
28) Centrifuge, electrically driven
29) Centrifuge tube
30) Vacuum pumpa (Rotary)
31) Microscope. Phase micros; Portable-micros (1.000 x) and binocular microscope for plankton dissection

15- <u>Equipment for Laboratory for Fisheries Biology and Algology</u> 1 lot

1) Aquaria with filter
2) Air compressor (the central aerating system is desired)
3) Air pumps and stirrer
4) Chemical drugs for preparing the culture medium
5) Photoelectric colorimeters
6) Fluorescent & turbidity photometer

7) Spectrophotometer
8) Spectroscope
9) Spectrophotoapparatus
10) Microscopes, phase microscope. Dissecting microscope
11) Microscope photo camera
12) Chemical balance
13) Jordan's sunshine recorder
14) Recording thermometer for water temperature (Certif.)
15) Akanuma's hydrometers (Certif.)
16) Thermometer
17) Total carbonic acid estimation outfit for field use
18) Hydrogen-ion comparator for sea water
19) Outfit for determining quality of waters for hatcheries and nurseries
20) Chemical trays, Cloth, Paper, thick wood plate and Concret block for prossing of sol wend specimens
21) Enameled trays, Cloth, Paper, thick wood plats and Concert block for pressing of sol wend specimens
22) Glass bottle, with big mouth, for preserving the specimens
23) Glass slide, cover glass, other glass & instruments. (petri's dish, glass tube etc...)
24) Motor bith for determining the production of ocean, lake, etc...

16- <u>Equipment for Laboratory for Ecology and Invertebrates</u> 1 lot

1) Aquaria with filter
2) Air compressor (the central aerating system is desires)
3) Air pumps
4) Microscope and its accessories (photo camera etc...)
5) Akanuma's Hydrometer
6) Thermometers
7) Recording thermometer for water temperature
8) Hydrogen-ion comparator for sea water
9) Outfit for determining quality of water
10) Enameled trays, plastic trays
11) Dissecting instruments
12) Ice bos for keeping materials in fresh condition
13) Glass bottle for preserved specimens
14) Glass instruments
15) Dissecting microscope
16) Phase microscope
17) Polyethylene backs for carrying living animals
18) Nets and other tools (Cages, Traps, etc...) for collecting invertebrates
19) Aqua-lung and its accessories

17- <u>Equipment for Laboratory for Fish and other Vertebrates</u> 1 lot

1) Aquaria with filter
2) Air compressor (the central aerating system is desires)
3) Air pumps
4) Microscope and its accessories (photo camera etc...)
5) Akanuma's Hydrometer
6) Thermometers
7) Recording thermometer for water temperature

8) Hydrogen-ion comparator for sea water
9) Outfit for determining quality of water
10) Enameled trays, plastic trays
11) Dissecting instruments
12) Ice bos for keeping materials in fresh condition
13) Glass bottle for preserved specimens
14) Glass instruments
15) Dissecting microscope
16) Phase microscope
17) Scole projector for fish age determining
18) Fish measuring board
19) Balances. Spring balances
20) Polyothyoun backed for carrying the living fishes and other vertebrates
21) Fish tags
22) Big tank under the floor of store room for preserving the big fish and other vertebrates
23) Polyethylene trays
24) Nets for collecting or catching fishes & others
25) Equaling and its accessories
26) Soft-ox (Soft-ray)

18- <u>Equipment for Offices, dormitory, and dining facilities</u>

1) **Offices:** 15 set
   - Desks
   - Chairs
   - Air conditioning
   - Server
   - PCs
   - WAN/LAN
   - Telephone network
   - Painting
   - Filing cabinets & closets
   - Etc
2) **Dormitory** 25 set
   - TV
   - AC
   - Telephone
   - Internet outlet
   - Carpeting
   - Mattresses as needed
   - Pillows, towels, and linen as needed
   - Drapes
   - Toilet accessories
   - Etc.
3) **Dining facilities**: 1 lot
   - Stoves
   - Fridges
   - Cooking utensils
   - Cutlery sets as needed
   - Etc

Annex 3

VESSELS & FISHING GEAR

1- Fiberglass boat construction yard

Establishment of a shipyard for the construction of 7-15 meter LOA fiberglass prototypes boats. This will allow the fishermen to build their own fiberglass boats in the future.

2 Research and Training & Inspection

1. Fisheries patrol boats — 6 units
2. Molds for 7-15m fiberglass fishing boats to build: — 7 units
   - Fishery research and training vessel about 15M length
   - Prototype fiber glass polyvalent vessel 7-15m
   - Purse seiner about 15M length
   - 6 Patrol boats (9m)
3. Fiberglass to build the above — 17 lots
4. Resin to build the above — 17 lots
5. Out board engine about 25 HP to build the above — 17 units
6. Inboard Engine(s) about 40 HP to build the above — 17 units
7. Equipment and accessories for the above (e.g. controls, electrical, communication and other equipment/instruments) to build the above — 17 lots
8. Spare parts for the above (3years supply) — 17 lots
9. Others as deemed necessary.

3 Decompression Chambers

1. Decompression chambers Uniseat with ventilation — 6 units
2. Decompression chambers multi-seat with ventilation — 3 unit

4 Fishing Gear

1. Fishing nets/float/rope/sinker — 2,600 lots
   1) Surrounding net for sardine
   2) Small trawl or dray net
   3) Gill nets (floating g.n. fixed or non-fixed, mid water g.n., bottom g.n., trial g.n., & surrounding g.n.
   4) Stick-held dip net: Pr. T. Toda, one of the Japanese fisheries experts very reasonably suggested the use fullness of this net, though he had not yet good result.
   5) Simple dip nets big and small
   6) Four angle dip not: May be it is useful for catching *Siganus spp*
   7) Bag not
   8) Beach seine
   9) Bottom set net
   10) Tarp
   11) Corralling net
   12) Fish attracting lams (above and in water)
   13) fish finder
   14) Diving apparatus (Aqua-Lung etc...) Medical Chambers
   15) line hauler

16) Net hauler
17) Harpoon gun
18) Octopus long line & post
19) Sea purch drifting long line (flouting)
20) Mockerel long line (Midwater)
21) Tuna long line (Midwater)
22) Sea bream long line (Bottom)
23) Eel ion line (Bottom)
24) Vertical long line
25) Trolling for tuna & Seriolo
26) Skipjack pole and line
27) Mackerel pole and line
28) Squid hand line
29) Sea bream hand line
30) Fat base hand line
31) Jigs used for angling for sea fish
32) Feather hooks used for freshwater fisheries
33) Floats and Sinkers for angling
34) Sea weed-scythe and twister
35) Octopus hook
36) Drag combed-hook
37) Rakes
38) Shell fish spatula for divers use

2. Fishing line and hook — 30 lot
3. Heat insulated iceboxes about 80 liters — 2600 units

5 Navigation and investigation

1) Sounding machine — 10 units
2) Magnetic compose — 10 units
3) Radar — 10 units
4) Radio direction — 10 units
5) Wind lane — 10 units

5 Fish Handling & Processing Facilities

To handle the produce and act as demonstration facilities at the aquaculture and fisheries centers — 8 units

6 Cold Storage Facilities

To handle the produce and act as demonstration facilities at the aquaculture and fisheries centers — 8 units

Annex 4

VEHICLES

The following vehicles are required:

1)	2- ton truck for live fish transport equipped with FRP tanks, aerator, oxygen bottles, cooling unit and filtration unit	1 unit
2)	4-WD sport/utilities car for extension service	10 units
3)	1-ton pick-up truck for general use	4 units
4)	Spare parts for the above (3 years supply)	13 lots
5)	Others as deemed necessary.	

Annex 5

Fish Import & Export

Summary of Fish Statistics by Weight (Ton)

Year	2005			2006			2007			2008			2009		
Description	**Production**	**Import**	**Export**	**Production**	**Import**	**Export**	**Production**	**Import**	**Export**	**Production**	**Import**	**Export**	**Production**	**Import**	**Export**
Live fish.		13	0		1	0		6	0		6	0		4	0
Fresh or chilled Fish	5,000	3,721	50	5,000	3,642	49	5,000	3,991	43	5,000	5,246	46	5,000	6,579	931
(Trout: Aquaculture)	*(600)*			*(800)*			*(800)*			*(1,000)*			*(1,000)*		
Frozen Fish		7,840	1		7,545	0		6,113	2		4,154	6		4,889	3
Fish fillets		1,211	3		2,275	5		2,996	4		3,733	9		6,103	22
Dried, Salted or Smoked Fish		26	14		22	33		26	51		27	60		21	53
Crustaceans		932	1		584	2		957	1		1,001	6		1,515	13
Molluscs		330	1		286	0		226	0		464	1		480	0
Total	**5,600**	**14,073**	**71**	**5,800**	**14,357**	**90**	**5,800**	**14,316**	101	**6,000**	**14,630**	**128**	**6,000**	**19,590**	**183**

Annex 6

Meteorological Data

Air Temperature: (°Celsius)

Month	Tripoli (North)			Beirut (Centre)			Qasmeih (South)		
	Tmin	Tmax	Tmean	Tmin	Tmax	Tmean	Tmin	Tmax	Tmean
January	9.3	16.4	12.8	11.3	16.4	13.8	9.8	17.6	13.7
February	9.7	16.8	13.2	11.1	17.3	14.2	10.0	17.7	13.9
March	11.1	18.6	14.9	12.6	19.3	16.0	11.5	19.8	15.6
April	13.6	21.1	17.4	15.2	22.7	19.0	13.6	22.4	18.0
May	17.0	24.4	20.7	18.5	26.2	22.3	17.1	25.8	21.4
June	19.9	27.0	23.4	21.5	29.9	25.7	20.4	28.1	24.3
July	22.0	29.0	25.5	23.8	31.7	27.8	22.6	29.8	26.2
August	22.7	29.8	26.2	24.3	32.5	28.1	23.4	30.7	27.0
September	21.4	29.1	25.3	23.2	20.6	26.9	22.2	29.8	26.0
October	18.4	26.6	22.5	20.6	27.1	23.9	18.9	27.3	23.1
November	15.0	23.3	19.1	16.9	22.5	19.7	15.9	24.8	20.3
December	10.9	18.7	14.8	13.2	18.3	15.8	13.2	20.9	17.1
Absolute	-2.3	39.6	19.6	-1.5	43.2	20.2	-0.3	44.5	20.5

Water Temperature: Average (°Celsius)

Month	Tripoli (North)		Batroun (North)
	1999	**1998**	**1999**
January	19.0	17.5	17.5
February	17.7	16.8	16.0
March	17.7	16.8	17.2
April	18.9	19.2	19.0
May	22.6	21.2	23.0
June	26.7	25.5	26.5
July	27.9	27.5	28.5
August	29.3	27.1	29.0
September	28.6	30.4	28.0
October	26.5	29.1	26.0
November	22.8	25.8	23.0
December	19.9	23.8	19.7
Mean	23.1	21.3	22.8

Maximum Wind (m/s) and Wind Direction.

	Tripoli (North) 1999		Beirut (Centre) 2000		Tyr (South) 1999	
	Speed (@15m)	**Direction**	**Speed (@15m)**	**Direction**	**Speed (@10m)**	**Direction**
January	27	MNW	27	WSW	10.9	
February	20	WNW	18	SW	8.8	
March	19	WSW	15	WSW	12.0	
April	12	SW	20	SW	9.5	
May	7	WNW	18	SSW	8.8	
June	23	WSW	11	SW	7.2	
July	12	WSW	12	SW	8.2	
August	13	NNE	9	SW	6.6	
September	14	NNE	12	SW	7.2	
October	11	ESE	14	SW	7.5	
November	16	NNW	17	SSE	8.4	
December	15	N	19	WSW	11.0	

Wave Height * (cm) - Tripoli (North) - 1998

	Minimum	**Maximum**	**Mean**
January	47.1	113.5	82.2
February	29.8	121.1	46.3
March	33.3	125.4	50.6
April	21.0	87.6	33.9
May	23.1	93.7	33.4
June	17.9	71.8	27.6
July	25.6	82.9	34.5
August	18.2	47.7	23.0
September	28.3	75.8	35.5
October	21.6	69.8	30.5
November	21.9	82.2	32.2
December	30	92.4	30.1
Absolute	1	327	

*** Wave Heights 8-12m were observed in Beirut and other Areas during the 1960's**

Annex 7

TERMS OF REFERENCE FOR CONSULTANTS

TERMS OF REFERENCE

For

PROJECT COORDINATOR

Scope of Work:

The Coordinator shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Responsible for all Project operations.
- Prepare yearly project detailed work plans, as well as work plans and amendments to terms of reference of project personnel.
- Assume the supervision of personnel, consultants, and contractors, as well as all the facilities and budget assigned to the project.
- Identify all equipment and supplies to be purchased through the project and prepare all training activities (budget, travel, technical modules, consultants to be recruited, etc).
- Meeting of Donor and Government obligations towards the Project.
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to the Project and plan, coordinate and monitor their work
- Implement the work program.
- Revise bidding documents prepared by the consultants, short list of bidders, invitation for bidding, outline bid evaluation guidelines and technical backstopping and commissioning guidelines
- Advice on:
  - Establishment of FES at Ministry, selection of FDC sites,
  - Coordinate with cooperatives on their establishment and operation,
  - Selection of gear, equipment training programs, etc.
  - Reconstruction and work program of IOF for fisheries research.
- Develop operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding.
- Setting up the framework needed for ensuring the sustainability of the project.
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to his section of the Project. Plan, coordinate and monitor their work to implement the work program.
- Other pertaining tasks as deemed necessary

Consultants Reporting Obligations:

1. Monthly, 6-monthly and yearly Progress Reports.
2. Report on each bidding operation and its progress.
3. Operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding: within 4 months of commencement of consultancy.
4. Framework needed for ensuring the sustainability of the project: within 4 months of commencement of consultancy.
5. Final Report.

Qualifications:

- A Master degree and preferably a PhD in marine science/aquaculture/business administration.

- A minimum of 10 years of progressive international experience, preferably in the Middle East or Mediterranean countries in running comparable size projects.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation of feasibility studies, project proposals, financial proposals, project implementation, work plans, budgets
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Coordinator will be provided with office space at the MOA Beirut or regional offices.
- The Coordinator is to coordinate with MOA designated staff.
- The Coordinator is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 60 months

TERMS OF REFERENCE

For

AQUACULTURE CONSULTANT

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Evaluate and submit proposals for the potential for Aquaculture Projects fresh water and marine (on-shore and submerged offshore).
- Evaluate the environmental impacts of aquaculture in the proposed areas in collaboration with the International Environmental Consultant.
- Deliver a comprehensive report on the Aquaculture Potential that includes, but not limited to, technical evaluation, aquaculture method/technique, complete project design, possible diseases, nutritional and health considerations, marketing of produce, environmental impact and mitigation measures, expected algal bloom, feed, sustainability, personnel and training requirements, economic feasibility, financing and etc.
- Prepare training manuals and programs for local personnel for:
    + Hatchery techniques, equipment, handling, parent stocks…etc.
    + Cage construction, size, materials, maintenance, necessary installation equipment, positioning, auxiliary cage equipment…etc.
    + General Aquaculture e.g. management, water quality, ecology, environmental issues, cage densities and carrying densities, instruments…etc.
    + Specific fish species cultural methods, biology, and etc.
    + Feeds formulations, manufacturing and dispensing.
    + Feeding, nutritional requirements and feeding methods and equipment.
    + Diseases and their control.
    + Harvesting techniques and necessary equipment.
    + Economics and Marketing.
    + Handling, storage and transportation of fish.
- Plan the establishment of aquaculture projects as per the above reports.
- Prepare bidding documents for the establishment of aquaculture projects, training program, short list of bidders, invitation for bidding, outline bid evaluation guidelines and technical backstopping and commissioning guidelines.
- Supervision of project implementation.
- Train local personnel and supervise training programs.
- Develop operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding.
- Setting up the framework needed for ensuring the sustainability of the project.
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to his section of the Project. Plan, coordinate and monitor their work to implement the work program.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

6. Monthly Progress Reports.
7. Aquaculture Potential comprehensive report: within 3 months of commencement of consultancy.

8. Plan for the establishment of aquaculture projects: within 3 months of commencement of consultancy.
9. Training manuals and programs: within 3 months of commencement of consultancy.
10. Bidding documents for the establishment of aquaculture projects, short list of bidders, invitation for bidding, bid evaluation guidelines and technical backstopping and commissioning guidelines: within 4 months of commencement of consultancy.
11. Operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding: within 4 months of commencement of consultancy.
12. Framework needed for ensuring the sustainability of the project: within 4 months of commencement of consultancy.
13. Final Report.

Qualifications:

- A Master degree and preferably a PhD in Fisheries and/or aquaculture.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in evaluating and preparation of proposals and technical reports about aquaculture projects (freshwater)
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs in aquaculture.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation of feasibility studies, project proposals, financial proposals, project implementation, work plans, budgets
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in management of large-scale aquaculture projects.
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 18 months (non-continuous) divided as follows:

- 4 months to complete reports 2-7 of Consultants Reporting Obligations described above.
- Eight (12) months to complete project implementation, train local staff and submit final report.

TERMS OF REFERENCE

For

FISHERIES CONSULTANT

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Evaluate and submit proposals regarding the status and the potential for improvement of the Fisheries Sector in Lebanon.
- Evaluate the environmental and socio-economic impacts of current and new fishing gear and techniques in collaboration with the International Environmental Consultant.
- Deliver a comprehensive report on the Fisheries Status and Potential.
- Advise on the establishment of Fisheries Extension Services (FES) within the DFW/MOA and help in its establishment.
- Coordinate with fishermen cooperatives, their operation and help in the establishment of new ones and their operation.
- Selection of Fishing Gear and equipment.
- Provide technical specifications and blueprints for the boats to be built.
- Advise on the completion of the Institute of Oceanography and Fisheries at Batroun and its work and research programmes
- Prepare and implement training manuals and programs for local personnel in all aspects of fisheries (as per project documents and/or his proposals).
- Plan the introduction of new equipment, gear, and techniques as per the above reports.
- Prepare bidding documents for the purchase all pertaining equipment, gear and supplies (as per project documents and/or his proposals), training program, short list of bidders, invitation for bidding, outline bid evaluation guidelines and technical backstopping and commissioning guidelines.
- Supervision of project implementation.
- Train local personnel and supervise training programs.
- Develop operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding.
- Setting up the framework needed for ensuring the sustainability of the project.
- Prepare terms of reference (TORs) for all the experts or consultants needed to implement the project (as per project documents and/or his proposals).
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to his section of the Project. Plan, coordinate, and monitor their work to implement the work program.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Fisheries Status and Potential comprehensive report: within 3 months of commencement of consultancy.
3. Training manuals and programs: within 3 months of commencement of consultancy.
4. Bidding documents for the purchase of equipment, gear and supplies, short list of bidders, invitation for bidding, bid evaluation guidelines and technical backstopping and commissioning guidelines: within 4 months of commencement of consultancy.

5. Operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding: within 4 months of commencement of consultancy.
6. Framework needed for ensuring the sustainability of the project: within 4 months of commencement of consultancy.
7. Final Report.

Qualifications:

- A Master degree and preferably a PhD in Fisheries.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in evaluating and preparation of proposals and technical reports about fisheries and fisheries projects.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs in aquaculture.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation of feasibility studies, project proposals, financial proposals, project implementation, work plans, budgets
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in management of large-scale aquaculture projects.
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 18 months (non-continuous) divided as follows:

- 4 months to complete reports 2-7 of Consultants Reporting Obligations described above.
- Eight (12) months to complete project implementation, train local staff and submit final report.

TERMS OF REFERENCE

For

Socio-Economist/Credit advisor

Scope of Work:

- Supervise and advise on the organization of the Fishermen Cooperatives Societies within the six FDCs
- Assist/train on the day-to-day operations of the cooperatives.
- Set the criteria to operate the Revolving Fund and assist the FDCs to manage it properly.
- Assist in the establishment and administration of the revolving fund to provide access to easy credit for provision of supplies etc...
- Conduct countrywide socio-economic study
- Develop the criteria for an appropriate fish marketing system
- Other pertaining tasks as deemed necessary.

Qualifications:

- A Master of Science degree and preferably a PhD in sociology/economics/finance.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in conducting socio-economic surveys, marketing studies and credit facilities.
- Fluency in oral and written English or French (Arabic is an asset) with proven and demonstrated track record of report writing.

Consultants Reporting Obligations:

- Monthly Progress Reports.
- Report on the operation of different components of his/her work..
- Final Report.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 12 months

TERMS OF REFERENCE

For

ENVIRONMENTAL CONSULTANT

Scope of Work:

- Conduct Environmental Impact Assessment (EIA) studies for Aquaculture projects fresh water and marine (on-shore and offshore) and Fisheries Sector.
- Conduct or arrange to perform all necessary pertaining tests.
- Advise on potential of aquaculture at proposed sites and new fishing equipment, gear and techniques.
- Submit EIA reports as per the above.
- Other pertaining tasks as deemed necessary.

Qualifications:

- A Master of Science degree and preferably a PhD in Environmental Sciences
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in conducting EIA studies.
- Fluency in oral and written English or French (Arabic is an asset) with proven and demonstrated track record of report writing.

Consultants Reporting Obligations:

- Monthly Progress Reports.
- Report on Potential of Aquaculture projects and Fisheries Sector at the proposed sites.
- EIA study report
- Final Report.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 3 months

TERMS OF REFERENCE

For

MARINE BIOLOGIST/CATCH & STOCK ASSESSMENT EXPERT

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture-Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Design and implement a catch and stock assessment survey of in-shore and offshore waters of Lebanon including a reliable system for a systematic fisheries data collection for the small-scale fishery.
- Identify and promote the use of appropriate fishery resource and evaluation technique.
- Prepare initial review of the state of the fish stocks and determine annual sustainable yield.
- Advice on various fisheries management and development options available.
- Selection of Fishing Gear and equipment.
- Advise on the completion of the Institute of Oceanography and Fisheries at Batroun and Aquarium/Museum and its work and research programmes
- Prepare and implement training manuals and programs for local personnel in all aspects of fisheries (as per project documents and/or his proposals).
- Prepare bidding documents for the purchase all pertaining equipment, gear and supplies (as per project documents and/or his proposals), training program, short list of bidders, invitation for bidding, outline bid evaluation guidelines and technical backstopping and commissioning guidelines.
- Supervision of project implementation.
- Train local personnel and supervise training programs.
- Develop operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding.
- Setting up the framework needed for ensuring the sustainability of the project.
- Prepare terms of reference (TORs) for all the experts or consultants needed to implement the project (as per project documents and/or his proposals).
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to his section of the Project. Plan, coordinate and monitor their work to implement the work program.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Comprehensive report: within 3 months of commencement of consultancy.
3. Training manuals and programs: within 3 months of commencement of consultancy.
4. Bidding documents for the purchase of equipment, gear and supplies, short list of bidders, invitation for bidding, bid evaluation guidelines and technical backstopping and commissioning guidelines: within 4 months of commencement of consultancy.
5. Operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding: within 4 months of commencement of consultancy.
6. Framework needed for ensuring the sustainability of the project: within 4 months of commencement of consultancy.

7. Final Report.

Qualifications:

- A Master degree and preferably a PhD in Marine Biology.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in evaluating and preparation of proposals and technical reports on marine biology.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation of feasibility studies, project proposals, financial proposals, project implementation, work plans, budgets
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 24 months

TERMS OF REFERENCE

For

FISHING TECHNOLOGIST

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Supervise the rehabilitation of gear and fishing equipment at local fishing harbors coordination with the cooperatives.
- Advise and assist on the rehabilitation of existing fishing boats, gear and equipment
- Advise on the planning and construction of new, more efficient boats, equipment and related infrastructure facilities.
- Provide technical specifications and blueprints for the boats to be built.
- Advise on training of counterpart staff on-the-job and fellowships aboard.
- Prepare and implement training manuals and programs for local personnel.
- Setting up the framework needed for ensuring the sustainability of the project.
- Prepare terms of reference (TORs) for all the experts or consultants needed to implement the project (as per project documents and/or his proposals).
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Training manuals and programs.
3. Operation plan, work program, budget, and training program.
4. Framework needed for ensuring the sustainability of the project.
5. Final Report.

Qualifications:

- A B.Sc. and preferably a Masters in Fishing Technology.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in fishing technology.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs.
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 24 months

TERMS OF REFERENCE

For

MASTER FISHERMAN

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- In cooperation and coordination with the Gear Technologist will conduct exploratory/demonstrative fishing to ascertain good grounds for use of appropriate gear.
- Establish a demonstrative unit at IOF to train counterparts and new fishermen recruits on new fishing methods and gear to raise efficiency of fishing effort.
- Selection of Fishing Gear and equipment.
- Prepare and implement training manuals and programs for local personnel in all aspects of fisheries (as per project documents and/or his proposals).
- Train local personnel and supervise training programs.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Training manuals and programs.
3. Framework needed for ensuring the sustainability of the project.
4. Final Report.

Qualifications:

- A higher vocational degree (and preferably a university degree in fishing.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries as a Master fisherman.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs.
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 12 months

TERMS OF REFERENCE

For

FISH MARKETING ADVISOR

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Evaluate present marketing of fish products and means to improve the situation.
- Supervise and advise on the Marketing of Fish for the Fishermen Cooperatives.
- Assist in the implantation of the day-to-day operation of the cooperatives for fish marketing channels and techniques, including supply and distribution of fishing materials and equipment.
- Conduct marketing surveys.
- Prepare and implement pertaining training manuals and programs for local personnel (as per project documents and/or his proposals).
- Supervision of project implementation.
- Train local personnel and supervise training programs.
- Develop operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding.
- Setting up the framework needed for ensuring the sustainability of the project.
- Prepare terms of reference (TORs) for all the experts or consultants needed to implement the project (as per project documents and/or his proposals).
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to his section of the Project. Plan, coordinate and monitor their work to implement the work program.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Training manuals and programs: within 3 months of commencement of consultancy.
3. Operation plan, research plan, work program, budget, and training program and assist in preparation of proposals to secure external funding: within 4 months of commencement of consultancy.
4. Framework needed for ensuring the sustainability of the project: within 4 months of commencement of consultancy.
5. Final Report.

Qualifications:

- A Master degree and preferably a PhD in Marketing.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in marketing of fish and fisheries products.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in evaluating and preparation of proposals and technical reports.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs.

- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation of feasibility studies, project proposals, financial proposals, project implementation, work plans, budgets
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 12 months

TERMS OF REFERENCE

For

MARINE ENGINEER

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Provide practical experience in operating and maintenance of marine inboard and outboard engines and associated engineering and fishing equipment on board small fishing boats.
- Responsible for the installation operation and maintenance of diesel engines on new, and possibly larger boats, equipment and tools.
- Prepare and implement training manuals and programs for local personnel in all aspects of fisheries (as per project documents and/or his proposals).
- Supervision of project implementation.
- Train local personnel and supervise training programs.
- Setting up the framework needed for ensuring the sustainability of the project.
- Prepare terms of reference (TORs) for all the experts or consultants needed to implement the project (as per project documents and/or his proposals).
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to his section of the Project. Plan, coordinate and monitor their work to implement the work program.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Training manuals and programs.
3. Operation plan, research plan, work program, budget, and training program. Framework needed for ensuring the sustainability of the project: within 4 months of commencement of consultancy.
4. Final Report.

Qualifications:

- A B.Sc. and preferably Master degree in Marine Engineering.
- A minimum of 10 years international experience, preferably in the Middle East or Mediterranean countries, in operation, installation and maintenance of marine engines.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs.
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.

- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 12 months

TERMS OF REFERENCE

For

BOAT BUILDING SPECIALIST

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Provide practical experience in building fiberglass boats of different sizes.
- Provide technical specifications for the boats to be built.
- Prepare and implement training manuals and programs for local personnel.
- Train local personnel and supervise training programs.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Training manuals and programs.
3. Final Report.

Qualifications:

- A Higher Vocational Degree and preferably a University degree in boat building.
- A minimum of 10 years international experience, preferably in the Middle East or Mediterranean countries, in building and maintenance of fiberglass fishing boats.
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 6 months

TERMS OF REFERENCE

For

FISH HANDLING & PROCESSING EXPERT

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Provide practical experience on modern techniques of fish handling, processing, cold storage and packaging on board fishing boats and on shore.
- Will be responsible for the installation, operation and maintenance of fish handling, processing, cold storage and packaging sites.
- Prepare and implement training manuals and programs for local personnel.
- Supervision of project implementation.
- Train local personnel and supervise training programs.
- Setting up the framework needed for ensuring the sustainability of the project.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Training manuals and programs.
3. Final Report.

Qualifications:

- A B.Sc. and preferably Master degree in Food Technology or related field.
- A minimum of 10 years international experience, preferably in the Middle East or Mediterranean countries, in operation, installation and maintenance of fish handling and processing facilities.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs.
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 6 months

TERMS OF REFERENCE

For

MIS/GIS CONSULTANT

Scope of Work:

The DFW to design and install a Management Information System (MIS)/Geographical Information System (GIS)/Wide Area Network (WAN)/Large Area Network (LAN). This is to enable the DFW personnel and the public to prepare and timely access of data and reports needed internally and externally. The MIS should have database that integrates accounting, financial, physical performance indicators and technical information. Moreover, it is to provide for on-line interaction between regional offices and the DFW Headquarters.

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- The consultant is to assess the DFW's needs for MIS/WAN/LAN and its pertaining systems and to finalize the draft MIS Terms of Reference (TOR).
- Design the MIS and specify all the necessary hardware and software together with the WAN/LAN that connects all DFW operational centers and allows Public access to all available information (web page or intranet or other).
- Develop a Short List of reputable and qualified consultants/contractors who can supply and install the MIS/WAN/LAN.
- Design a web page for the DFW
- Plan the establishment of WAN/LAN and MIS.
- Prepare bidding documents for the establishment of MIS/WAN/LAN, training program, short list of bidders, invitation for bidding, outline bid evaluation guidelines and technical backstopping and commissioning guidelines.
- Assist in the evaluation of the bids.
- Supervision of the installation and commissioning of MIS/WAN/LAN to ensure that MIS/WAN/LAN is being installed is functional and responsive to DFW's needs.
- Train DFW personnel on the operation of the MIS/WAN/LAN and supervise training programs.
- Setting up the framework needed for ensuring the sustainability of the project.
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to his section of the Project. Plan, coordinate and monitor their work to implement the work program.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. MIS/LAN comprehensive report: within 1 month of commencement of consultancy.
3. Plan for the establishment of MIS/WAN/LAN: within 1 month of commencement of consultancy.
4. Training manuals and programs: within 1 month of commencement of consultancy.
5. Bidding documents for the establishment of MIS/WAN/LAN, short list of bidders, invitation for bidding, bid evaluation guidelines and technical backstopping and commissioning guidelines: within 1.5 months of commencement of consultancy.
6. Framework needed for ensuring the sustainability of the project: within 1month of commencement of consultancy.

7. Final Report.

Qualifications:

- A Master degree and preferably a PhD in Computer Sciences or related field.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in evaluating and preparation of proposals and technical reports for MIS/WAN/LAN.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs.
- The Consultant should have a proven and demonstrated track record in Management Information Systems and Institutional Management.
- Deep knowledge and experience with computer software and hardware
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 6 months

TERMS OF REFERENCE

For

AQUARIUM/MUSEUM SPECIALIST

Scope of Work:

The Consultant shall work under the general supervision of the Ministry of Agriculture- Directorate of Rural Development and Natural Resources- Department of Fisheries and Wildlife. His/her duties shall include, but not limited to the following tasks:

- Assess the needs of the existing Aquarium/Museum structure.
- Coordinate with the appropriate consultants on the rehabilitation and equipping of the structure.
- Prepare bidding documents for the rehabilitation and equipping of the Aquarium/Museum, training program, short list of bidders, invitation for bidding, outline bid evaluation guidelines and technical backstopping and commissioning guidelines.
- Equip and stock the Aquarium/Museum.
- Supervision of project implementation.
- Train local personnel and supervise training programs.
- Setting up the framework needed for ensuring the sustainability of the project.
- Supervise the work of the experts, contractors, consultants, counterparts etc. assigned to his section of the Project. Plan, coordinate and monitor their work to implement the work program.
- Other pertaining tasks as deemed necessary.

Consultants Reporting Obligations:

1. Monthly Progress Reports.
2. Aquarium/Museum Rehabilitation Comprehensive Report: within 1 month of commencement of consultancy.
3. Plan for the establishment of the Aquarium/Museum: within 1 month of commencement of consultancy.
4. Training manuals and programs: within 1 month of commencement of consultancy.
5. Bidding documents for the establishment of aquaculture projects, short list of bidders, invitation for bidding, bid evaluation guidelines and technical backstopping and commissioning guidelines: within 1.5 months of commencement of consultancy.
6. Framework needed for ensuring the sustainability of the project: within 1month of commencement of consultancy.
7. Final Report.

Qualifications:

- A Master degree and preferably a PhD in Aquarium/Museum Sciences or related field.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in establishment and operation of Aquarium/Museum.
- A minimum of 10 years of international experience, preferably in the Middle East or Mediterranean countries in preparation and implementation of training programs.
- Fluency in oral and written Arabic or English with proven and demonstrated track record of report writing.

Location: Ministry of Agriculture (MOA) offices in Beirut and its regional offices as needed.

Other Conditions:

- The Consultant will be provided with office space at the MOA Beirut or regional offices.
- The consultant is to coordinate with MOA designated staff.
- The consultant is to refrain from such activities that constitute a conflict of interest with the services and goods provided under this assignment and the related ones.

Duration: 6 months