

4-2-2 Plan for Nationwide Artisanal Fishing Port Development

On the coast of Morocco, there are boat landing sites at 120 different locations, which are utilizing sandy beaches and coral reefs. These are the central areas for the landing sites of the artisanal fishing industry. At most locations, there are no facilities to accommodate fishing and distribution activities.

In developing such infrastructures, such things as the effectiveness of investment capital and speed of development must be taken into consideration. Development of the marine production and distribution networks should only be done in such a way as to supplement the existing infrastructure. It is a good policy to prioritize investment goals. The landing sites expected to play an important role in the regional development of the fishing industry, such as those with relatively high production rates and those felt to have high development potential in terms of natural resources, should be selected and given investment priority. The infrastructures for these wharves will be most effective if developed in such a way that the development itself has a ripple effect on wharves in the surrounding area. According to the Master Plan for development, base facilities for the marine industry (wharves) will be placed into one of three ranks, which will determine their priority for development, and the wharves will be equally distributed throughout Morocco's coastal region.

The Plan for Development

1) Category A - The Artisanal Fishing Industry: Major Bases of Operations

The criterion for designation of a landing site as "Category A" is that it be an established regional center for continuing fishing operations. This regional fishing center, or "base", is also equipped to serve as a back-up facility for major large-scale fishing ports. As a "base" of operations, it shall be a facility that can accommodate large numbers of fishermen and fishing boats, and shall be a year-round center for employment for workers in the fishing industry; or, in the alternative, shall be a facility that shows evidence of investment by local residents in projects promoting the fishing industry, such as fishermen's lock-storage facilities or fishing boat landing facilities that are based on the self-help efforts of the fishermen themselves. It is also important that base facilities be located in areas that have potential for the further development of marine resources with some degree of reserves. Whether or not they are in close proximity to major marine products distribution routes and are visited frequently by middlemen are other conditions to be considered. The facilities located at Imessouane and Cala Iris have been designated as major "base" facilities.

The development of infrastructures for the new base facilities should be done in phases, with reference to their current capacity for fishing boats and the effectiveness of capital investments. Wharves that fall within this category may be found at 12 sites nationwide, i.e. Imessouane, Cala Iris, Souira Kedima, Tafedna, Sidi Hsaine, Tifnit, Moulay Bouselham, Kaa Srass, Tiglet, Saidia, Oued R'mel and Ksar Sghir.

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2) Category "B" Fishing Base Facilities

The Category B fishing village centers around a "satellite" wharf that receives a variety of services from the wharves of Category A villages.

As a policy for the development of Category B, improved distribution will be targeted, as well as an increased volume of catches through more effective fishing operations. A phased development will be pursued, based on mid-level investments.

The fishing villages served by Category B will be those conducting fishing operations to some degree; but, compared to villages served by Category A facilities, have low-volume catches and a small number of fishing boats. Fishing villages that fall within this category may be found at 20 sites nationwide, including Alcount, Sidi Moussa Aglou, Ben Younech, Chmaala, Asilah, Oued Laou, etc.

Alkont, Sidi Moussa-Aglo, Ben Younech, Chemaala, Azila, Oued Laou.

3) Category "C" - General Landing Sites

Fishing villages served by Category C are those that, compared to Category A or Category B, have fewer fishermen and a lower volume of catches. In addition, these are villages that do not derive a substantial portion of their annual income from the fishing industry, apart from the income represented by actual fishing operations. Category C sites may be found at 70 locations nationwide.

4-2-3 Plan for Development

1) Category A Villages

(1) Facilities will be developed in such a way that fishing boats may be safely anchored or safely landed, based on high volume international marine traffic. Plans will be developed for the construction of docks and levees, to create a berthing area that is always calm, allowing fishermen to anchor or salvage fishing vessels even when the sea is rough. This must be done for the protection of the fisherman's most valuable asset -- his fishing vessel.

Depending on the region under development, it may also be necessary to consider localities and plans for the development of pleasure boat facilities to be used by tourists.

To insure the safe operation and navigation of fishing boats; research will be done on such safety facilities as signs and those designed to show the depth and dimensions of waterways, from the berthing area to open sea.

(2) The Planning of Facilities Required for the Dry-docking, Dispatch and Mooring of Fishing Vessels
Land based facilities will be set, including structures such as: docks and jetty needed for the dry-docking, dispatch and mooring of fishing vessels; and service facilities to supply water, fuel and ice to fishing vessels using the wharf. In addition, the feasibility of providing such small-scale machinery as a crane and hand-operated winch will be investigated, in response to actual needs. Such things as water, fuel and ice are essential to fishing operations. Thus, we will explore possibilities for the installation of storage facilities to provide these commodities without hindrance. In addition, it is felt that workshops for the maintenance of fishing vessels and their engines will be carried out under private management. Since the facilities for such maintenance must exist at such installations as fishing ports, we will confirm the availability of land and secure rental facilities.

(3) The Planning of Facilities Required in the Sale, Forwarding and Processing of Marine Products

Facilities will be built to preserve the quality of marine commodities, including: sales lots, auction halls, middlemen's offices and marketing administration offices. The various facilities will be planned as marine products export facilities, based on the concept of the HACCP (Hazard Analysis Critical Control

Point) Care must also be taken to plan facilities in such a way as to comply with the sanitation standards of the European countries to which marine commodities will be exported.

(4) The Planning of Facilities Needed to Raise the Standard of Living

Facilities comprising the social services infrastructure for centers of the fishing population that are near fishing ports shall be built with reference to current conditions, in such a way as to supplement facilities existing at the ports. Specifically, development of a social services infrastructure (with major thoroughfares, electrical power and facilities for water and sewage) and construction of a multi-purpose community services center (concerned with housing developments for fishermen, research, meetings and health services) is expected to lure shops and businesses to the area, leading to the development of a permanent or semi-permanent municipality.

(5) Insuring the Required Land, Open Space and Inter-village Roads

To carry out the above-mentioned development, the required land will need to be secured, and the actual development will need to be coordinated in such a way as to supplement existing port facilities.

With a view to disaster prevention and relief, open space will need to be secured to provide a shelter area for emergency sea rescue operations. It is felt this space will also be needed for regional social events and to provide a marginal area for future expansion.

It must also be acknowledged that some artisanal fishing villages are far from the main roads and are geographically isolated. Since the main roads of such villages are highly susceptible to natural disasters, the durability factor should be given much weight in making plans for highway development.

2) Plans for Development of Category B Villages

(1) Plans for Land-based Light Machinery and Facilities to Salvage Fishing Boats

Since fishing boats are currently moored along sandy beaches or rocky coves, there are sloping access roads used for boat landing which are in need of repairs. Moreover, to increase the effectiveness and safety of boat landing operations, construction of winches and resin wood planks should be done.

(2) Plans for artisanal Land-based Facilities for the Support of Commercial Fishing Activities

The effectiveness of commercial fishing operations will be enhanced by the placement of lockers near wharves for the safe storage of out board engine and fishing gears. In addition, since level land for such activities as the repair and preparation of fishing gears is often hard to find, multi-use spaces on level land in the vicinity of the wharves shall be allocated for such purposes.

(3) Plans for artisanal Temporary Ice Storage Facilities for Catches

To preserve the freshness of the fishermen's catches, and for the storage of ice, a cold storage facility will be built. The ice to be stored at this facility will be brought in from local harbors and production plants by an overland route in refrigerated cars. On the return trip, the fishermen's catches, which will be packed in ice and loaded into these cars, will be taken to the marketplace. At some point in time, when the volume of the catches increases; and, when electrical power and water infrastructures become possible, the possibility of installing ice production and refrigeration equipment will be studied.

(4) Plans for the Improvement of Access Roads

To improve access to main thoroughfares leading to the wharves, access roads will be improved. Through these improvements, refrigeration cars and trucks will gain direct access to the wharves and fishermen will be able to receive a full range of services.

3) Plans for the Development of Category C Facilities

(1) Plans for artisanal Land-based Facilities to Support Commercial Fishing Activities

To increase the effectiveness of fishing operations, multi-purpose fishing gear lockers will be installed near the landing sites for the storage of fishing gear and tackle.

(2) Promoting Development of a Social Services Infrastructure

There are locations within the sites with poor access to the main thoroughfares. To increase the effectiveness of fishing operations and improve the fishermen's standard of living, access roads will be built.

(3) Setting Higher Priorities for Development Based on Developments Within the Fishing Industry

Upon a review of developments within the fishing industry and the state of public facilities within the local area; assuming that any conditions for development have been met, the ranks previously assigned to fishing villages will be upgraded and any required development projects will be undertaken.

4-2-4 Plans for the Upgrading of Commercial Fishing Technology

While facilities are being developed, plans for improved commercial fishing technology will be made. The infrastructures put in place will have to reach the point of being able to function at their optimal levels. In this regard, any plans for improvement will need to be made based on the state of Morocco's natural resources; social customs; and customary fishing tackle, fishing methods, fishing boats and fishing equipment. Improved fishing technology should be introduced at a conservative pace, only after full implementation of a monitoring/control system to prevent "over fishing". The technological improvements planned are divided into two categories, as follows: (1) those that can be quickly implemented, and (2) those that can be implemented only after further research.

1) Short-term Development Plans

(1) Improvements of Fishing Tackle Based on Commercial Fishing Laws

Trap Fishing :

At the present time, Spiny lobsters and European lobster are being harvested mainly by use of trammel net, which creates the risk of "overfishing". Hereafter, a change from the use of trammel net to the use of baskets is something that will have to be considered. However, baskets in current use are of an arched shape; and, hence, only small numbers of them can be stacked into a small fishing vessel. If the type of basket used is of a larger, collapsible type, both the number of baskets that may be stacked on a ship and the volume of the catch will be increased.

Purse seine :

In the Mediterranean, artisanal fishing vessels conduct roll-net fishing by use of lighted vessels. Due to competition among these vessels, the resulting luminosity is more than is needed. If each lantern is presumed to have a luminosity index of 4, no more than 2 or 3 lanterns should be required.

Bottom longline Fishing :

Rather than have the bottom longline trailing the trunk line on the ocean floor, it is better to attach floats to the middle of the ropes, allowing their mid-sections to rise up from the bottom. It is felt the use of sardines or mackerel as bait; and cutting them into narrow strips rather than round slices, has increased the catches of this operations.

Small-scale Set Nets : Careful thought must be given to the shape of the nets, the positioning of bag nets, the size of nets and the choice of locations for the nets.

Octopus Pot Fishing : The octopus pot now in use are not limited to empty cylindrical shaped cans. Since there's a chance that an octopus will escape before being landed, the entrance to the jars should be made narrower.

The Introduction of New Technology : With the development of rocky bottom areas on the Atlantic Ocean side, it has been found that level seabeds, which are considered ideal for the use of vertical longline, are not long frequented by schools of fish. However, by placing artificial reefs (FADs) along the route traveled by schools of fish, it is possible to "create" the boundaries of fishing grounds.

(2) Disposition of Research Vessels

In order to conduct investigation of new fishing grounds, current fishing technology and certification examinations for the introduction of new fishing technology; and, oceanic research, some 5 to 10 ton research vessels will be required. These vessels will need to be equipped with purse seine, gill nets, traps and the equipment needed to conduct basic oceanic research. Two vessels should be dispatched in the Atlantic Ocean; one should be dispatched in the Mediterranean area.

(3) Improvement of Fishing Vessels and Their Equipment

Fish Finder : These devices are useful for locating schools of fish and determining what types of fish are present. They greatly increase the fishing efficiency.

GPS : This device helps fishing boat navigators find favorable locations for their vessels; and, when used in conjunction with fish finders, it permits fishing vessels to reach fishing grounds with less search time, allowing owners to conserve on fuel. If the sea is slightly choppy, flag poles and buoys are hard to locate, which can lead to equipment losses. By the use of the GPS, such needless losses can be avoided.

2) Long-term Development Plan

(1) Creation of Fishing Grounds

With a view to increasing marine resources, fish hatching and nursing areas will be protected by the creation of artificial reefs and sea weed forest areas.

(2) Fishing Vessels : As the cornerstone for modernization of the artisanal fishing industry, fishing vessels should be modernized through long-term research and development.

Materials for the Hulls of Vessels : FRP, aluminum and water-resistant veneer are materials to be investigated.

Engines : Vessels will be motorized by the use of fuel conserving diesel engines.

Upscaling of Vessels : Vessels will need to be powered by engines with sufficient horsepower to: allow for the safety of a fishing vessel, increase the number of days a vessel may be engaged in fishing operations, and allow for the increased loading of equipment. The maximum allowable horsepower rating for the tax exemption of out board engine may be increased to approximately 40 HP. Ships that are well-suited to Moroccan waters, are easy to operate in terms of shape, and are of the most economical size will need to be developed.

The INRH is expected to lead the field as an organization that will wrestle with problems which must be solved to meet the above objectives. INRH progress in research and development will serve as a cornerstone in the development of a artisanal fishing industry in Morocco that is healthy and aimed at continuous growth. The role of the INRH will be examined in the section to follow.

3) Plan for Development of the Artisanal Fishing Industry: Role of INRH in Artisanal Fishery Development Plan

The INRH is Morocco's top research organization in the field of fisheries research and technology. The INRH is expected to take the lead in solving technical problems related to development of the artisanal fishing industry. Moreover, it is also responsible to take the lead in biological study of fisheries resources that will allow Morocco to make continuous, effective use of her natural resources. However, an organized system and roles will have to be developed in order for the INRH to carry out the following types of research:

- i) Biological study of resources
- ii) Experimental research on appropriate fishing gear and the development of new fishing gear allowing for the efficient use of resources
- iii) Experimental research on fishing methods improvement that would allow fishing gear to be put to its maximum use
- iv) Experimental research on FADs, artificial reefs and sea weed forest
- v) Experimental research on the efficiency of fishing vessels
- vi) Investigative research on the handling of catches and the development of marine resources that are not being used

At least 10 researchers will be needed to carry out the above research. The Fishing Technology Development Plan referred to earlier will be carried out under the guidance of INRH researchers.

The INRH has always played a central role in conducting research on the development of commercial fishing technology. However, a system whereby the technologies developed by this organization are passed to fishermen and others who disseminate technologies has yet to be established. In this regard, it would be desirable for the INRH to hold direct seminars and workshops, and allow opportunities for on-site technical presentations.

4-2-5 Project Implementation Schedule

The development of artisanal fisheries landing beaches throughout the country will, as indicated in the table, be divided into two phases lasting 10 years each, and the basic infrastructure for all the landing beaches will be completed over roughly 20 years. Dissemination officers will play the central role in the provision of training and education and the organization of fishermen. It is desirable that dissemination officers implement the study of landing quantities in a joint effort with the INRH.

Table 4-2-1 Implementation Schedule of Artisanal Fishing Village Landing Beach Development

		Phase 1 (10 Years)	Phase 2 (10 Years)
Infrastructure and equipment supply	Major artisanal fishery bases	Category A (fishing port and land infrastructure)	Category B (additional development of fishing ports, etc.)
	Satellite fishing village development	Categories B & C (roads and land infrastructure)	Category C (roads and land infrastructure)
	Education and training facility development	Artisanal fishermen dissemination staff training facility at Larache CQPM development	
	Study and research facility development	Small survey ship (INRH) Research laboratory development (INRH)	
Software development	Training and education of dissemination staff and fisheries successors	■■■■■■■■■■	■■■■■■■■■■
	Training and education of fishermen	■■■■■■■■■■	■■■■■■■■■■
	Study and research	■■■■■■■■■■	■■■■■■■■■■

4-3 Plans to Improve Procedures for the Processing and Shipment of Marine Products

4-3-1 Basic Concept

Most of the produce for this industry is comprised of fresh marine products which are export oriented. Thus, plans for the improvement of procedures for processing and shipping the produce are aimed at raising market prices through increased value, based on preserving product freshness. At the present time, preserving product freshness and enhancing its value relate to the improvement of utensils and handling procedures. In the future, as the prices of fresh marine produce are stabilized by preservation techniques, the international and domestic markets can be controlled and increased market values can be anticipated, it will be necessary to increase the market value of marine products which are now low-priced or are not being marketed. Values may be enhanced by processing techniques; and high market values may be attained through the introduction or improvement of packaging techniques.

4-3-2 Plans for the Improvement of Preservation Techniques for Fresh Marine Produce

1) Shipboard Procedures After The Produce Is Caught

The artisanal fishing industry has a artisanal management base. Moreover, since investment capital is generally scarce, facilities are generally not being improved. One reason for the lack of investment capital is the lack of investment interest, based on the common view of fishermen that investment in projects to increase earnings by increasing the volume of catches are better than investing in facilities to preserve product freshness.

Another problem is the view that freshness can be insured by responsible fishermen; when, in fact, it is hard to verify freshness and insure a catch does not lose its freshness during the 2 hour trek from the fishing grounds to the wharf, by visual inspection alone.

In fact, fish begin to deteriorate immediately after they die; and, especially during the hot season from spring to autumn, fish that are thrown into a ship's hold in the blazing heat are bound to lose their freshness. Due to the increased length and expanded area of fishing operations, which will be made possible by upgrading both artisanal and coastal fishing vessels, on-board refrigeration facilities to

preserve product freshness will be indispensable.

On the general subject of preserving the freshness of fish, an important point to remember is that, once freshness is lost, fish cannot be returned to its original condition. Steps to preserve the fish must either be taken before it begins to lose its freshness, or the fish may only be preserved in its partially deteriorated state. Thus, steps must be taken to preserve the fish immediately after it is caught. Toward this end, ice boxes must be placed aboard fishing vessels, allowing the catch to be preserved in ice.

Ice boxes must be designed in such a way that they may be readily accepted by fishermen, in view of the available space aboard a ship, whether or not a ship can control temperatures, economy and convenience of use. Over time, ice boxes can gradually be improved. For the present, fish boxes with internal insulation that are filled with ice may be used to preserve the freshness of catches. The volume of ice provided (by weight) should equal the volume of the catch. The size and shape of the boxes will of course be limited by the sizes of the ships, but should not be so small as to limit the size of a catch. The fish boxes will be jointly developed by the INRH and ONP, which will be required to distribute the boxes after a model has been manufactured and field tested.

2) Preserving Fish: A Japanese Traditional Method

"Seikoh" is a Japanese traditional method of preserving fish which slows chemical changes, primarily in the muscle tissues, through extraction of the blood. In concrete, a long and slender stick made of metal or plastic is inserted into the body of a large-sized fish from the head along the backbone to kill instantly by destroying the spinal code. However, this method of fish preservation is not well known in Morocco. Hereafter, the effects of preserving fish by this method and other conventional methods should be tested and compared by the INRH, including its effects on market values. Based on the results of this research, this method should be evaluated in terms of its potential for widespread use in Morocco.

3) Plans for the Development of Ice Production Plants and Cold Storage Facilities at the Wharves

To preserve the freshness of marine products, ice production plants and artisanal refrigerators will be needed at the wharves of artisanal fishing villages. At artisanal wharves, cold-storage facilities with refrigerated rooms for the storage of ice should be provided. Daily ice production and cold storage capacities should be determined on the basis of annual production volumes (the volume of catches) and the demand of local fishing villages. In this regard, care must be taken to develop facilities in such a way that, once installed, they do not remain idle.

4-3-3 Plans for Improved Forwarding Procedures

Methods for the improvement of forwarding procedures fall into the two broad categories of product quality management and marketing management. The catches of artisanal fishermen are mainly comprised of high quality marine products. Thus, implementing a management system focused on quality is more effective than implementing one based on quantity. The fish caught consists mainly of varieties that spoil slowly; and, moreover, the fishermen take virtually no measures to preserve the freshness of catches. Shipboard management methods that may be employed to preserve the freshness of catches are: the above-mentioned use of insulated fish boxes packed with ice; "Seikoh", the Japanese method of fish preservation; and, in addition, the use of fresh reed mats. In terms of land-based fish preservation techniques, live fish are considered "fresh" fish. In the marine products industry, temperature control is the key to preserving the freshness of a catch.

1) Improvement of Containers

To preserve the catch once it is landed, improved containers will be required. The wooden boxes in current use are economical, produced locally and are highly re-usable. However, in terms of sanitation, they present a host of problems. Hereafter, plastic containers that are water resistant, easy to wash and

sanitary will need to be used. Concerning the use of this plastic fish container, it has already been included in plans to be implemented by the ONP; and, as a further development, cold storage boxes to preserve fish for export will also be required. Styrene foam boxes are already being used by some exporters, and it is felt they will be more widely used hereafter.

2) Plans to Improve Processing Techniques

At present, no portion of the catch produced by the artisanal fishing industry is subject to food processing. Thus, any judgements concerning the potential of applying such techniques to this industry must be based on speculation. As short-term plans, fish may be dried and salted, preserved in salt, or smoked. Refined seaweeds, frozen foods, semi-processed foods and seasoned foods may be developed via middle to long-range plans.

There was once an agency belonging to the INRH which was committed to research and development activities in the field of marine food processing. Promotion of this field will require the renewed interest of research organizations in the development of new products and in quality assurance, which is largely based on past experience and reform initiatives. These research and development agencies will actively seek information from foreign and domestic sources, will acquire sales literature and develop products. They will also actively seek the cooperation of the countries in which target products are consumed and technologically advanced countries, and develop products with marketing potential. Based on their research of powerful new product sales strategies, they will set up exclusive new product advertising corners at specialty stores, supermarkets and newly established centers of the INRH.

3) Marketing: Administrative and Management Organizations

An organization for market management, which provides the means for the effective domestic distribution of marine products, will need to be established. From a long-range point of view, the ONP is planning to set up and manage fresh fish markets at the various wharves. However, it would not be cost effective to dispatch employees and set up markets at each of the fishing villages, and it would be very difficult to maintain such a network. Thus; while the ONP will be responsible for administering the markets at the major wharves of artisanal fishing villages; it is felt it would be more realistic for the markets at smaller wharves to be run by independent fishermen's organizations (e.g., a Fisherman's Cooperative League), under the guidance of regional offices of the ONP and the Office of Maritime and Fishing Industries. The structure and management of these organizations should be determined under the guidance of newly established fishermen's advocate groups and regional offices of the ONP.

4-4 Plans for the Administration of Fishing Grounds and Conservation of Resources

4-4-1 Basic Concepts

If the modernization of fishing technology and gradually increasing volume of catches are left to proceed unchecked, "overfishing" will be the result resources will ultimately be depleted. To ascertain an approximate "safe utilization" level for replenishable marine resources, the Maximum Supply Yield (MSY) and Maximum Economic Yield (MEY) the following planned steps must be taken:

- 1) Degree of resource exploitation - Get a grasp at the level of use, including the biological aspects, and suggest effective administrative policies
- 2) Implement instructional programs to gain the understanding and support of fishermen in the area of resource management
- 3) Research and implement methods of environmental protection for fishing grounds

4-4-2 Study and Management of Resources

1) Study and Management by Species of Fish

The resource status, or degree of exploitation, of all marine species caught in Morocco would not be a practical research goal. Thus, for the sake of effective research, it would be better to focus on important varieties. The researchers should also take note of those species being caught by off-shore and coastal fishing vessels, such as octopuses and squid, to gain a grasp of the conditions and degree of exploitation. Once conditions have been understood, appropriate policies for resource management are to be recommended. In this regard, the researchers must also consider the economic impact of the proposed policies on the fishermen themselves.

Researchers will not only be responsible for assembling basic quantitative data on the species caught by coastal and offshore trollers (i.e., those species with heads and legs, such as squids and octopuses), but will also be required to collect specific data on: the dates and times of catches, the area of the fishing grounds in which certain catches are made, the depths at which catches are made, the water temperatures, the length of dragnet operations, and the quantities and varieties caught on each expedition.

Based on the data collected, the researchers will acquire a grasp of resource conditions by analysis of the relationship between the total volume of the catch and the volumes of catches at specific fishing grounds.

Shallow water fish; such as sardines, hard-mouthed sardines, Atlantic horse mackerel and mackerel are caught mainly by roll nets and drag nets. On the Mediterranean side, these resources are being exploited by both coastal and artisanal fishermen. These varieties mature in short periods of time. Since they are migratory egg layers, oceanic conditions such as water temperature and the amount of plankton, determine reproduction levels and migratory patterns

--- which leads to great variations in the volumes of catches. Hence, researches will be required to assemble data on time and place, water temperature, the areas of fishing grounds in which catches are made, and the varieties/quantities caught on one expedition.

Through regional organizations such as the ICCAP, researchers will exchange information with the owners of foreign vessels that operate in the Mediterranean and develop appropriate measures to provide for the continuous, non-exploitive use of resources. In gaining a grasp of resource conditions; the researchers will, in viewing the species individually, pay attention to fluctuations in the total volume of a catch. TAC (Total Allowance Catch) may then be imposed, as needed.

Deep water white fish; such as sole, groupers and sea bream, which have their main haunts in the sandy or rocky regions in or around coastal areas, are important varieties for the artisanal fishing industry, due to their high unit values. However, since fish like sea bream and groupers take years to mature, care must be taken not to overfish. The smallest permissible catching size must be set and fishing tackle regulations, such as those pertaining to the apertures of gill nets must be made accordingly. In Japan, increasing the size of apertures beyond the normal limits for certain catches of the large-sized high valued Turbot has improved the financial status of fishing families. For these important species, the length, weight and rate of development must be measured (perhaps once a month), in addition to determining the volume of the catch, and biological data must be compiled. If it is hard to measure all varieties simultaneously, 1 or 2 target species may be selected for study each year, with research to be repeated, e.g., every 5 years.

Since shelled varieties (e.g., Ise shrimp and European lobster) take 3 to 4 years to mature, it is easy to overfish and deplete resources. With a view to resource conditions, regulations must be considered that will not only protect egg-bearing mothers and set seasonal limits, but will set size and area restrictions, as well. Regular inspections must be made to insure compliance with size, weight and egg-bearing restrictions. Inspections may be made for a full year, and repeated every five years, by the same system referred to earlier.

Such resource conservation inspections are mainly conducted by the INRA. In the future, agencies related to the Office of Maritime and Fishing Industries will develop a system of collecting information from the regional wharves and conduct joint inspections.

In conjunction with the development of artisanal fishing villages, it is important to devise a system for compiling production statistics to evaluate the fishing industry in relation to its natural resources. Advocates of the fishing industry and ONP staff members will compile raw data based on development of the artisanal fishing villages. However, as a tentative methods, the following may be considered:

- (1) Collect data every day over a 1 year period on the volumes of catches and varieties caught for each of the fishing methods, based on the random selection of 2 or 3 fishing vessels representing villages on the Mediterranean and Atlantic sides of Morocco.
- (2) Divide the year into 4 seasons and collect data from all vessels in operation for a full week during each season.

Once ONP pricing has begun; for the sake of analysis, it is necessary to chart the sales of catches by ship, and to know the weights and varieties of marine products forwarded without pricing.

2) Regulation and Protection of the artisanal Fishing Industry

With a view to regulating the artisanal and coastal fishing industries, local fishermen must be granted the exclusive right to use ports even before facilities are built, and the legal limits for the size and quantity of ships that may be served must be set. In addition, the regulation of trolling operations in coastal areas, which are even now subject to fishing regulations, and issuance of detailed directives will help protect not only the small scale fishing industry, but the resources and breeding grounds of the coastal regions, as well.

3) Regulations for the artisanal Fishing Industry

Besides being registered to operate their vessels and licensed to conduct specific fishing operations, artisanal fishermen should also be required to obtain seasonal fishing ground use permits and licenses to change their bases of operation.

It goes without saying that fishermen should respect national regulations regarding certain deep water species, such as the Ise shrimp, whose quantities are limited and may easily be "overfished" In addition, the fishermen of various regions should, of their own volition, strive to develop regulations for the maximum size of catches, the fishing "season" and permissible fishing tackle..

4-4-3 Understanding Fishing Regulations

Fishing regulations are essential for the beneficial use of marine resources. However; no matter how "ecologically correct" these regulations are, they can only be implemented with the cooperation of the fishermen who rely on marine resources to make their livings. To increase the effectiveness of fishing regulations, stronger controls have been contemplated. However; since fishermen can devise evasive strategies, such measures would not be cost effective, even if they could be implemented.

Fishing regulations are not simply something to be imposed on fishermen by the government. It is very important that regulations be mutually agreeable, and will be voluntarily observed by fishermen. For this reason, as well, the results of resource conservation inspections should be published in a form that is easily understood by fishermen, and presented in such a way that fishermen will see the end benefits to them of observing the regulations. If a commercial fishing advocates system is put in place, instructional programs will be required regarding regulations and the conservation of marine resources.

4-4-4 Fishing Ground Conservation

(1) Fishing Ground Conservation via Zoning and Protected Territories

The coastal regions are breeding grounds for marine species. The uneven and hidden portions of rocky areas and coral reefs often become the preserves of young fish. At present, troll fishing is prohibited within 3 nautical miles of the Moroccan shoreline --- though it is permitted at depths of 80 meters or more in one area on the Mediterranean side. Since this regulation is extremely important for fishing ground conservation, strong enforcement is considered necessary. In lagoon areas, restrictions on the size of net apertures, fishing areas and fishing seasons are needed to protect the reproductive cycles of marine species and prevent the use of methods whereby the young fish may be caught. Restricted fishing areas may be varied in a circular rotational fashion, being changed every 2 to 3 years; or, certain areas of active reproduction, where it is felt young fish should be protected, may be designated as fish preserves or national parks where fishing operations may be prohibited for long periods of time. In the case of the former; since fishing grounds may be uniformly used, a non-exhaustive use of fishing grounds may be anticipated. In the case of the latter, these preserves may be used as tourist attractions for those who enjoy scuba diving and snorkeling. In view of fish migration based on the motion of tides and currents, the creation of such preserves will result in the transfer of new fish to unrestricted fishing areas, making the preserve a base for the replenishment of marine species. It is believed that the latter method of conservation will be especially effective on the Mediterranean side.

(2) The Promotion of Varied Methods for the Utilization of Marine Resources

Beginning with a single fishing technique and introducing methods to fishermen that offer a variety of options will have a positive ripple effect on catches, while preventing the danger of "overfishing". For example, with the advent of reef fishing, drag lines and vertical extension lines came to the fore. Ultimately, there will be a need for new fishing methods to allow for the use of untapped resources. In an area near the Straits of Gibraltar; quite by accident, it became apparent that black tuna could be caught with extension lines, which has ushered in a kind of "boom". It is possible that similar opportunities will be found. However, if this "boom" continues unchecked with its current volume of catches, it will soon reach a point where it no longer produces profits. It is a fact that, on the Moroccan side of the Mediterranean; as of 1994, tuna could no longer be caught by fixed net fishing. As well as researchers, it is important that fishermen have inquiring minds. Based on the experience of fishermen, it is hoped that researchers will find new equipment and new methods which contribute to the development of new fishing technologies.

(3) The Creation of Man-made Reefs and Fish Holding Areas

In monotonous sandy areas just off the coast of Morocco, new fishing grounds can be created through the installation of man-made reefs and the development of fish holding areas. The active participation of fishermen should be solicited in this development, to give them a sense of personal achievement. In this way; beginning with the concept of what the industry has provided, fishermen are led to the concept of what they can achieve through their own efforts.

However, placing such an obstacle on the ocean's floor will make it impossible to drag nets through the area. This is expected to have the affect of preventing troll fishing operations in coastal areas based on novel fishing methods. Research will need to be begun on the selection and installation of man-made reefs that will have a positive economic impact.

The manufacture and installation of concrete blocks, as is done in Japan, is one approach that has been considered for the construction of man-made reefs. However, an economical method would be to stack old auto tires in pyramid shapes.

(4) Environmental Protection

The coastal sea waters are direct depositories of river water; and earth and sand which is carried by the rain. Care must be taken to prevent contaminated factory waste; sewage from cities; and earth and sand from reckless developments to find their way into the ocean.

4-5 Plans to Improve Distribution System

4-5-1 Basic Concepts

All fish being caught by artisanal fishermen is top quality produce that brings a market price of from 20 to 50 DH. Compared to the surface water varieties being caught by coastal fishermen, their market price is 8 to 10 times as high, if measured by weight. Thus, quality preservation has an important role to play in maintaining the market value of the artisanal fisherman's catch. Since 1995, all fish handlers have had a legal duty to transport fresh fish by use of refrigeration cars. However, not all transporters and broker have shown a zeal for the preservation of fish. Moreover, in many cases, artisanal fishing villages do not have cold-storage facilities or ice production plants nearby. In general, artisanal fishing villages lack transportation facilities, making it hard to transport fish. Moreover, since most of the fish caught by artisanal fishermen are currently for export, a plan to improve the transportation facilities used by artisanal fishermen must necessarily be quite different than a plan for the development of facilities in general use.

Looked at in terms of market price, it is felt that fresh fish is most likely to be the major commodity handled by artisanal fishermen from this time forward. Thus, the introduction of transport cars that can keep the fish at low temperature during transport is the most feasible plan.

The installation of cold storage equipment and facilities, and the introduction of cold storage cars for the transportation of commodities to their destination are requirements for improving the transportation infrastructure. In addition, cold storage boxes and ice chests will need to be introduced. The ONP has played a central role in researching the possibility of having wooden containers replaced by plastic ones for considerations of sanitation, and is supporting a plan that will require the observance of European sanitation standards.

Among the most urgent development priorities for the improvement of transportation equipment and facilities are: the construction of fish market facilities at the wharves, the improvement of existing market facilities in areas receiving transported goods, the provision of all required equipment, the development of small retail store in new housing areas, and the replacement of country roadside stands with permanent, sanitary facilities.

Transportation personnel must receive active guidance in sanitation management, food preservation management, and their related technologies. From an economic point of view, the private ownership of market property is felt to be best for the development of free enterprise and the most conducive to reform objectives. At present, brokers are receiving almost no financial support from the national government. To insure the future development of stable transportation and market infrastructures, a financing system and legal support structure for artisanal producers and transporters will need to be put in place.

4-5-2 Training for the Handlers of Fresh Fish

To clarify the rights, responsibilities and duties of fresh fish handlers, a specific "occupation" (e.g., Fresh Marine Produce Handler) must be created. A system for the education and training of operatives will need to be developed, leading to the issuance a license and designation as a trained specialist. The present system, whereby anyone can freely enter the occupation and begin to handle fresh fish, will need to be reformed. Through a certain level of order and regulation, fresh fish handling can be undertaken in such a way as to improve product quality and insure thorough sanitation management. Guidance on the subject of sanitation will be provided by the ONP, which is already involved in market sanitation management, and MPM. Facilities of the CQPM and ITPM will be used for education and training. When such a system has been put in place, fresh fish handlers will be more knowledgeable and more qualified to ply their trade. They will become certified specialists and, as they do, can assume responsibility for sanitation management.

4-5-3 Marine Product Sanitation and Inspection Agencies

A portion of the fresh fish cold storage and processing facilities now being used by exporters are in compliance with European sanitation standards. Such exporters have independently established their own "Hazard Analysis Critical Control Point" systems. Thus, it may be said that the technical know-how needed to administer sanitation programs is already available locally. Hereafter, the refrigeration and manufacturing sectors, the avante garde industries responsible for this know-how, will through their own original ideas impart their collective knowledge to the general population at the fisherman's level. It is anticipated that this new wave of knowledge will set the stage for the administration of sanitation programs at the fishermen's level and throughout all related industries. Moreover, since Morocco's fresh fish have already penetrated the European market, the national government itself will have to come to terms with the need for reforms in sanitation. While it is realistic to leave the inspection of fresh fish for export to existing organizations and certain designated exporters for the present; on a mid-term to long-term basis, facilities and equipment will need to be secured at the major ports for sanitation and products administration. Especially in the case of fresh fish for export, government inspection agencies must be created, product quality must be certified and their sanitary condition must be cleared by officials dispatched for this purpose. The existence of such a system has been confirmed to exist for agricultural produce, livestock and processed seafood products for export. Isn't it time to apply the system to seafood products that include fresh fish?

It should also be noted that, while the administration of food products sanitation programs is the responsibility of the Welfare Ministry and the Bureau of Domestic Animal Sanitation by law, the support and cooperation of MPM needs to be strengthened.

Accordingly, the exchange of technology and information should be accelerated through various means, including human interaction. While standards for the administration of marine products sanitation programs are just now being developed, it is also a fact that marine products of the artisanal fishing industry are directly bound to the European market and must thereby be responsive to the sanitation standards of that market. Thus, to implement sanitation reforms based on present conditions in Morocco, it is most urgent that an organization for the administration of sanitation programs be formed.

4-6 Regional Socio-economic Development Plan for Fishing Villages

4-6-1 Basic Concept

With the exception of big city areas, the coastal regions in which artisanal fishing villages are located are substandard in terms of the standard living, the social infrastructure and the level of economic activity. These are areas for future regional development. Thus, the current plan should be conceived not merely as a plan for direct development of the fishing industry, but as an overall plan for development which will benefit the entire region. Of course, the fishing industry will be benefited in a direct way through the continuous development of fishing villages. Development will mean increased economic status, not only for fishermen and fishermen's associations, but for all residents of the fishing villages, alike. It will also have many indirect benefits. As a long-term phased development plan, it will help to eliminate poverty, provide employment opportunities for women, promote small business enterprises and contribute to development of the educational and public health infrastructures.

Development of the social infrastructure, to include education for fishermen and the general residents of fishing villages, is dealt with in another section of this report. This section will spotlight the role development of fishing villages can and should play in a plan for development of the entire region. Project details are covered in sections that describe planned improvements of the production systems for fishing villages of various categories.

Development Plan: Basic Focus

1) Restructuring of the artisanal Fishing Village

Historically, Morocco's artisanal fishing villages have been characterized by highly concentrated fixed populations subsisting on fishing and agriculture. Thus, wharves, farms and residential areas, the population's bases of life support, have in many instances been separated by great distances. This factor is expected to present great problems in the pending development of artisanal fishing villages. Should it become practicable, a mass relocation of fishermen's residences to areas adjoining the wharf would be a desirable solution. Moreover, through bold measures such as agricultural land exchanges, the increased efficiency of both fishing and agricultural operations can be anticipated. These undertakings will be most effective if carried out in conjunction with fishing port development and the development of infrastructures to accommodate shifting patterns of population.

2) Improving the Bases of Fishing Villages

A great deal of time and effort is being devoted to making such basic family necessities as water, electricity and fuel available to the families of artisanal fishing villages. The lack of such facilities is a great social burden, since levels of education attained by fishermen and their attendant social mobility depend so much on these basic life's necessities.

In terms of meeting these social needs, the basic plan for the development of fishing villages will give special emphasis to the all-important improvement of water supply facilities. The other necessities, including electricity, fuel, roads and the communications infrastructure will be provided with reference to the large-scale plan for regional development. If the production reform plans for a particular village call for the development of such facilities, the development itself can be carried out independently or under the auspices of the plan for regional development.

3) Reform of Emergency Medical Treatment System

Since there are no clinics or dispensaries in artisanal fishing villages, village residents must depend on nearby towns for these services. To overcome this problem, local clinic able to provide a certain level of emergency treatment for illnesses and injuries will be constructed. Besides emergency medical treatment, these clinics will provide the instruction and guidance needed to improve the public health and sanitation systems.

4-6-2 Details of Plan for Development

1) Category A

Category A fishing villages are those given priority for the general development of base facilities for ports and infrastructures. Thus, general construction projects including those for the improvement of basic social infrastructures may be undertaken here. In this regard, plans should be developed in a progressive manner as the keynote for regional development, and developers should undertake projects in the spirit of pioneers. The following are potential plans for the regional development of social infrastructures.

(i) Construction to Accommodate New Centers of Fishing Population

With a view to creating appropriate centers of concentration for the fishing population, giving due weight to plans for improved production and other plans for development, a survey will be made of land being used for private residences and public facilities. Then, roads, water and electrical power infrastructures will be constructed. Thus, plans for a functional, effective lifestyle may be executed as new centers of population emerge. In addition, assembly halls and churches will be built for local residents; and schools (at the elementary and junior high school levels), clinics and financial service centers will be built for general area residents, by use of public lands.

(2) Construction of Clinics

Emergency medical treatment facilities will be built for the use of village residents and general area residents. Basic examination equipment will of course be provided. Trained paramedics will be placed at the centers, who will coordinate their services in support of hospitals nearby.

In addition; since research has not been done on specific sicknesses and endemic diseases the local population may be suffering from, a system must be developed to expand and support existing basic health services in the areas of: health education, nutrition, and mother-child health Programs of the Office of Public Health and related agencies will be used to provide the necessary trained personnel.

(3) Establishing Financial Service Centers

As production bases are established, the flow of men and materials will be hastened; and, consequently, the flow of cash will increase. To accommodate the increase, it is necessary that local financial services be initiated to augment the services of the CNCA (Caisse Nationale du Credit Agricole) and other banks. This will be a tremendous asset to fishermen and brokers at busy times of the banking year, even if services are only used during the peak fishing season. Moreover, through the placement of financial service centers in local fishing villages, private financing may be conveniently arranged for the purpose of building fishing vessels and marine products processing centers.

(4) Erecting Community Centers

While the "hard" market production facilities needed to develop a artisanal fishing village are important factors; the "soft" aspects of development, including the education and training of fishermen, the processing and storage of catches, and the greater use of women on the job market are also very important.

2) Category B

Since Category B fishing villages will primarily be developed with land-based facilities, there will be no large-scale construction. Thus, the plans for development will not be so comprehensive as to include plans for shifting centers of population. However, a network support system through Category A villages will need to be established. Through this system, Category B villages will receive support from Category A villages in areas other than construction.

(1) Creation of Regional Medical Services Communications System

By networking with Category A villages, Category B villages will be enabled to coordinate emergency medical treatment. This may be accomplished by establishing an emergency medical alert network comprised of medical facilities in large cities and Category A villages. When telecommunications are interrupted, wireless equipment may be used. In localities with no electricity, artisanal wind powered or solar powered generators may be employed.

(2) Development of Water Supply Facilities

Village residents are spending a great deal of time and energy in the procurement of drinking water. To allay the problem, artisanal construction projects may be initiated to increase the number and improve the quality of water supply lines and water drawing facilities. Plans for these project will be carried out with reference to former water supply plans, and facilities shall be permanently installed. Other facilities, including electrical power facilities and roads, will be installed as needed, based on the progress of projects being carried out under former development plans.

3) Category C

Other fishing villages are only expected to require artisanal development projects; and, like Category B villages, Category C villages will need to form networks with Category A villages at their center, and use the system that created the network to obtain essential services.

4-7 Plans for Improving the Lifestyle of artisanal Fishermen - Education, Training and Organization for the Advancement of Fishing Villages

4-7-1 Basic Concept

For the development of the artisanal fishing industry and fishing villages, fishermen will need: advanced knowledge of fishing techniques; instruction in the techniques of preserving their catches; the proper facilities and equipment; and the knowledge and technology required for the processing and distribution of their catches. In addition; with a view to organizing fishermen, the improved financial status of fishing families and installation of an infrastructure that allows for the beneficial use of resources will be important factors in the development of fishing villages.

4-7-2 Plans for Education and Training

Two types of courses are to be planned; one for Advocates of the artisanal Fishing Industry, and one for the education and training of artisanal fishermen.

1) Educational Course for Advocates of the artisanal Fishing Industry

A course for the education of fishing industry Advocates will be offered at the Rarashu CQPM, which is planned for development. The content of the course shall be as follows:

Number of Students :	20 per year
Length of Course :	2 years
Course Entrance Qualifications :	Civil servants employed in the region; recent graduates; 30 years of age or under
Qualification to be attained :	Fishing Industry Advocate
Lectures & Instruction (Subjects) :	Communication Skills (French, Arabic); Small-scale Fishing Technology; Techniques for Use of Fishing Gear; Techniques for Collection of Data on Catch; Methods of Creating Fishermen's Unions; Basic Marine Products Quality Control - Administration of Sanitation Programs; Accounting for Fishing Families; Ways of Securing Small Loans; The Development of Village Settlements; The Processing, Distribution and Sale of Marine Products; Oceanology - Meteorology; Engine Maintenance & Repair; Navigational Safety Measures

Student Composition	Sources of Students CQPM, ITPM, ONP, Specialists dispatched as exchange students sponsored by the Agriculture-Economics University
Budget Source	Moroccan Government
Facilities and Equipment	Facilities and equipment of the CQPM Special Equipment Requirement for Course - Coastal fishing vessels of 5 ton class (fully equipped), Specifications - 5 to 7 meters; FRP fishing vessel with external fishing gear, artisanal ice production plant; ice production plant repair parts set; 3 gill nets; baskets; extension lines; fishing tackle, such as drag lines; parts for external equipment repair practicum.

Advocates will be dispatched to the branch DRAMs and in future to every province and commune in accordance with the development of fishing villages. After course completion, Advocates will remain affiliates of the CQPM and will be part of an organization formed for the advancement of knowledge and technology related to the fishing industry.

2) Training Course for artisanal Fishermen

The Advocates shall offer training workshops to artisanal fishermen under the auspices of the ITPM, CQPM and ONP. The same workshops offered at public facilities (such as those of the ITPM and CQPM) shall be offered locally (at villages).

- Improvement of small-scale fisheries technology (gillnet, long line, hand line, octopus pot, basket, seine net)
- Technology for onboard processing of caught fish and preservation of freshness
- Technology for use of fishing machinery (GPS, fish detector utilization)
- Marine product processing technology
- Outboard engine maintenance and repair technology
- Maritime safety measures
- Protection and effective utilization of resources
- Fisheries business management

By making courses open to around 20 fishermen and implementing them over less than a week, the burden placed on fishermen will be reduced in that they will be able to attend without neglecting their work.

From the viewpoint of achieving common interest for attendees, artisanal fishermen's groups in each area will be targeted and completion certificates will be awarded at the end of courses.

Furthermore, with respect to the next generation of fishermen who will inherit fisheries operations, courses that last for between one and two months will be established and opportunities for intensive education given. The course contents will be based on the above curriculum, with education in theoretical matters added. Fishermen will have a greater incentive to attend courses if some kind of qualifications are awarded following completion. Moreover, by establishing a system whereby attendees with excellent results can enter dissemination officer training courses, this will lead to the development of high quality dissemination staff.

4-8 Plans for Organizing Fishermen

1) Basic policies for cooperative activities of fishermen

Public organs are going to support the implementation of cooperative activities of fishermen for two reasons. One is to improve the fishermen's ability to manage their household economy by themselves and the other is to develop fisherman cooperatives as the subject to perform maintenance and management of facilities. Management of the household economy of fishermen involves the undertaking by the cooperative of part of availability of funds for operating funds, investment, maintenance, and so on as well as various services that fishermen formally relied on brokers.

2) Instructions in simplified management of the household economy of fishermen

Fishermen apt to rely on middlemen for the supply of fishing implements, fuels, etc. due to insufficiency in their funds. Therefore it is necessary to perform such instructions that enable fishermen to perform management of the household economy of fishermen where they can purchase their nets, ropes, hooks, etc. by themselves continuously without relying on middlemen. For that purpose, although the raising of the income of fishery businesses is the first requisite, this point is mentioned in other sections, so this section focuses on the improvement of management ability of fishermen.

A matter that can be implemented from the first year is instructions to enable fishermen to establish their management plans by maintaining a simple housekeeping book. However, fishermen in Morocco have generally a low level of literacy, it is necessary to incorporate literacy education as a preliminary stage for it. For implementation, repeat short-term seminars by circulating instructors are preferable. In addition, there are those people among fishermen who have acquired the ability to speak French or English as well as reading and writing Arabic through the experiences of many changes of occupation and working abroad. A system to enable such fishermen to learn household bookkeeping first and then instruct seminars on the shore will be established by MPM and communes and further it will be backed up by the caïdat. Further, after a few years, it will be possible to give guidance so that the fisherman unions as described later organize seminar by themselves.

However, these seminars require some measures for implementation under the present situation where fishermen do not settle in a place. Most fishermen usually leave their hometown and are employed on various shores during a period in their life cycle. Such period may include several years of work on board a coastal fishing boat. In many cases they return to their hometown after resigning work on coastal fishing boats and then go to other shores in the form of work away from home for a period of several months. Therefore, when planning the time of implementing seminars for individual fishermen, it is necessary to consider two types of fishermen: relatively young fishermen who are working in various places out of their own shore and those fishermen who have already returned to their hometown after fishing work on board coastal fishing boats.

For those fishermen who are working in various places out of their hometown, it is better to admit a wide range of fishermen to the lectures for literacy held in each shore without limiting the qualification for admission to those who were born in that shore or the crew of fishing boats registered to that shore. Further, when the circumstance that most fishermen have experienced work on board coastal fishing boats is taken in consideration, it will be efficient to perform lectures for literacy in large fishing ports. On the other hand, it is important to give education for literacy for those fishermen who finished work on board coastal fishing boats in their hometown. Although the period for work away from home may differ from a district to another, such period shall be used for literacy education for inhabitants other than fishermen and education for fishermen must be planned outside the period for work away from home.

Further, while proceeding with education for literacy and instructions in simple household management skills for fishermen, it is necessary to encourage fishermen to deposit money to bank accounts. However,

as can be seen from the example of fishermen in Agadir, fishermen not always willing to save surplus money for a simple reason that banks exist there. It is important for each bank to encourage fishermen to make deposits by circulating each shore so that fishermen can make deposit periodically. However, banks are not willing to collect money in rural areas due to the risk in transportation of cash.

3) Access of small fishermen to funds

Arrangement of public fish markets are proposed in this plan and such markets are planned to meet the standards of the EU, a large destination of exports. Once public markets have been installed, it can be fully expected that it will become difficult to maintain conventional symbiotic relations between middlemen and fishermen and small fishermen will become difficult to obtain loans from brokers.

Basic symbiotic relations between middlemen and fishermen are such relations where fishermen sell their catches to particular middlemen and receive loans from middlemen in considerations of it. For example, fishermen receive the supply of low-price gasoline, obtain foods, assign the management and purchase of materials, and receive loans. For fisherman, who have few funds, receiving loans through the symbiotic relations with middlemen is indispensable for continuing fishing actually.

Under the present conditions, it is generally recognized that fisherman will be able to sell their fish at a higher prices and thus increase income after the public market has been installed. On the other hand, however, it is possible that review of conventional symbiotic relations between middlemen and fishermen will become inevitable after the public market has been installed and procurement of funds by fishermen will become difficult for the present. Under the present conditions where fishermen have few possibility of obtaining funds from other sources than brokers, it is necessary for the administrative organ to re-define middlemen as "small private financial organs" and instruct brokers to continue to provide small loans for fishermen even if they cannot purchase their catches exclusively. As one of countermeasures, it is possible to take positive measures so that loans of CNCA to brokers are provided not only as operating funds for brokerage but also for the purpose of providing sub-loans to fishermen in the form of so-called two-step loans in Japan.

Further, the possibility of fishermen to receive loans directly from the CNCA is not totally denied. However, the CNCA is not willing to provide loans to fishermen directly because of high mobility of fishermen, inability of mortgaging their fishing boats due to not being insured, or absence of their bank accounts. However, opening an account is a requisite for fishermen not only for the management of funds but also for receiving loans from the CNCA. Although it is very difficult to replace the loans from middlemen with those from the CNCA under the present conditions, because it will become possible to receive loans from the CNCA if stable management of fishery businesses, establishment of the guarantee for mortgages by cooperatives, and so on have been realized in the future, so governmental must give guidance by setting such situation as a target.

4) Development of fisherman cooperatives as the subject to perform maintenance and management of facilities

After harbor facilities and fishery-related facilities have been arranged, a fisherman cooperative will engage in the maintenance and management of those facilities and materials. Main roles of such cooperatives will include the establishment of appropriate procedure and implementation of the

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- 1) One of the reasons for low rate of saving is a low level of literacy. If an account has been opened, illiterate persons cannot make deposits or use checks. Another reason is that, while it is required to report the expenses according to the Commercial Law that was revised recently, fishermen dislike to leave evidences of their real expenses in the form of the records of bank transaction with the intention of escaping from tax collection based on their exactly grasped expenses.

maintenance, and management of the member fee.

(1) Configuration of the fisherman cooperative

The fisherman cooperative will consist of fishermen who register their fishing boats to the pertinent shore as members, where the representative and the members to directly engage in management will be elected among from all members. Those fishermen who have brought their fishing boats into that shore from other places will not be included in members but the rental for the facilities will be collected from them. Since there is the representative of fishermen (Amin) in almost every shore at present, the representative of fishermen may become the representative the union as it is if there is no special problem. Basic policies of the union shall be decided at the management conference consisting of these members. Further, because it is expected that fishermen engaging in management may be not skillful, they shall receive advice to some extent from the officials dispatched from MPM in the initial stage. However in view of the fact that this fisherman cooperative is basically the own cooperative of fishermen, instructions from the officials dispatched from MPM shall be limited to the minimum extent.

(2) Training for the management of fisherman cooperatives

Although the present objective of the fisherman cooperative is to maintain and manage the facilities and the production bases for fishermen by collecting fees from fishermen as beneficiaries and using them as original funds, sufficient knowledge of management is required for it. A problem which many unions in Morocco are facing is the shortage of funds for expanding production and the shortage of management skills. This is a problem that this fisherman cooperative will also face. Therefore, promotion of the idea in the establishment of the cooperative and its legal background and further management ability in the initial state of establishment is important not only for the maintenance and management but also for the expansion in the future. Because it does not seem that much know-how in this regard is accumulated in MPM, the fisherman cooperative will be able to efficiently improve the ability to fully perform the management of funds and others under the cooperations of the Cooperative Promotion Agency (ODECO), which is performing instructions of cooperatives in various sectors in Morocco.

(3) Expansion of roles of this cooperative in the future

With regard to this cooperative, the expansion of roles expected in the future are considered to be as follows:

- Purchase of new materials and machinery in connection with the expansion of fishery activities
- Expansion of lockers for fishermen
- Expansion of services including shops
- Joint purchase of nets, feed, etc.
- Promotion of social insurance as well as registration of fishery boats
- Note) These packaged plans will be described in other sections.
- Undertaking of literacy education and training for management of fishery businesses for individual fishermen.
- Instructions and diffusion of fishery techniques for fishermen
- Undertaking of the management of the public market
- Guarantee of mortgage for fishermen to received loans from a public financial organ (CNCA, etc.)

The first three of the above are possible through effective management of collected fees. However, because the subsequent items involve more complex factors, it is important to accumulate sufficient knowledge to achieve these objectives under the cooperations of the officials from MPM as well as ODECO

to obtain a long-term prospect.

4-9 Advancement of Women into Society

1) View of Women in development (WID) " in Morocco

Cases where women obtain cash income through the relation with the sea are rare in present Morocco except those in some areas. In the present situation, therefore, it is difficult for this master plan to simply encourage women to participate in fishing activities to obtain cash incomes. Instead, without sticking to enabling women to obtain their cash income from the sea, this master plan pays attention to the point that the household economy of fishermen can be stabilized with the income of women by taking consideration the circumstances that the household economy of fishermen mainly relying on the income from fishing is seasonal and highly unstable. In other words, this plan proposes the method for supporting women while showing the relations between men and women in a household and the role of women in the purpose of obtaining and increasing the total cash income of fishery business.

2) Women and men with regard to the expenses in the household

(1) Cash income of women and associated obstacles

The Koran specified that the share of women in case the succession of heritages is half that of men. And, in correspondence to it, expenses in the household are basically borne by men with women exempted from expenses in the household. In actual cases, however, women strongly feel the necessity of stabilizing the household economy by their own cash incomes. Among the common problems concerning the community and household shown by women in the form of a simplified PCM, shortage of income in the household and the acquisition of cash income by the own work of women were central problems. In many cases, it was shown that agriculture is not suitable as a source of cash income because of dry climate except in some areas when women attempt to obtain their own cash income and the low level of literacy among women becomes an obstacle when they attempt to organize a mutual-aid organization such as a cooperative. Nevertheless, women are obtaining cash income in some areas though the amount is small. Income sources for women are diversified from processing of catches to manufacture of objects of craftwork and production of special agricultural products. Therefore, although it is the present status that the income of men accounts for the most portion of the cash income in the household, men not always have the absolute right to speak in the household in all areas. Results of looking into the right to speak about expenses in the household by taking in consideration these points are as follows:

(2) Expenses in the household

Among those households in which men's right to speak is large about expenses in the household, there are such cases where men not only control expenses but also perform daily management of money. In these cases, when have almost no right to speak about money in the household. If women have some income, such income will be integrated with the total income of the household and expenses will be made by the sole discretion of men. This policy will apply equally to those expenses that are directly related to the occupation such as agriculture and other expenses such as the educational expenses for children. For example, there are such districts where it is accustomed that children write down necessary thing on paper and ask men to expense money for them if school things for children become necessary. Further, there are many such districts where men alone go to the market (souk) to be held once a week.

On the other hand, though the number of cases is small, there are such cases where the purposes of expense are decided through mutual consultation between women and men though the income of women is integrated with the income of men or the income of women is not integrated with the income of men and women can expense their income freely by their own discretion. Even in the latter case, however, is mostly

to the extent that the household economy is not completely divided between women and men but women can decide the expenses for daily consumption by their discretion.

Although how the expenses are decided in the household depends on complex factors such as the area, race, conservatism, and personality, it seems to be sure that at least the difference in income between women and men largely affects the decision of the purposes of expense. Households in Mouley Busselham and Tafedna can be cited as examples of the latter case.

In Mouley Busselham, fishery and collection activities by women are exceptionally vivid. Most of women go to the catching of clams in the lagoon if required as thus many women are obtaining a certain income. And in those households where men are out of work, income of women exceeds that of men in many cases. Therefore, the cases where the purposes of expense are decided by women are remarkably more frequent than in other areas.

Further, in Tafedna on the Atlantic coast, women are obtaining their income from collection of algal oil, a special product in this area, and women have strong will to obtain cash income. Although the income of men and women from collection of algal oil is integrated in the household with the income of men from fishery in this case, the purposes of expense are decided by mutual consultations between men and women. Among the households in Tafedna involving those women who are engaged in collection of algal oil, there was no such household where men also have the right to decide the purposes of expense in the household.

These examples were also found in other districts among the households involving those women who are participating in cooperative activities. In these districts where some women are already obtaining their income in some way, other women also understand the possibility of obtaining cash income. Further, the incentive to obtaining cash income is enhanced among women to the extent that women can propose by themselves the sources of cash income that can be realized in the future. Therefore, it is sure that the improvement of the cash income of women will not only contribute to the stabilization of household economy in fishery businesses but also contribute to the more frequent adoption of women's opinions in the household such as the enhancement of women's right to speak about the operation of household economy and will further stimulate the incentive among women to obtaining cash income.

3) Present status of cooperative activities by women

(1) Characteristics and members of cooperatives

In five districts as the object of survey at this time, there are a few cooperatives of women. Representative ones include the cooperative for the manufacture of simple objects of craftwork and that for collecting algal oil. Under the present conditions, there is no those related to fishery (except those in inland waters) among the cooperatives organized by women. When looking into whole Morocco, 92 unions organized by women alone were registered in October 1997, at the time of survey. Among them, 31 were related to agriculture, 60 related to craftwork and one related to other fields. However, this is the number of unions organized by women alone and the number of unions organized by both men and women is far more larger.

More than 80% of the members of these unions consist of single women and widows. Under the present conditions where the sources of cash income for women are quite limited, particularly for widows, earning cash income by themselves is important and they have strong will to do so. Further, in villages, married women under present conditions must obtain the permission of their husbands to talk with other men or participate in an assembly where men are attending, so it is not easy to let married women participate in social activities. Further, they must care their children after the birth of a baby. However, few of these restrictions are imposed on single women and they can attend any assembly by their discretion. The same circumstances apply to widows as well. However, most of the cooperatives that we surveyed consisted of single women. To let general women participate in group activities, it will be the shortest way to start activities by setting those women who belong to these two categories, particularly those single women who

are endowed with an enterprising spirit, as the first target and then involve married women.

(2) Subjects in operation of unions consisting of both women and men

Though there is no problem in those unions consisting of women alone, there are some examples that a cooperative in which both women and men participate breaks up into that of women and that of men in a short time. The basic cause of such breakup is the difference in attitude to cooperative activities between men and women. In many cases, women disagree the attitude of men to union activities and want to divide cooperative activities into those of women and those of men.

Such breakup often occurs shortly after the establishment of a union and while its operation is not well underway. Further, in those cooperatives in which both women and men participate, usually men undertake management. Therefore, once a union consisting of women alone has been formed, it is an important factor for finally deciding its existence to overcome the difficulty in procurement of funds, etc. by various ways. Although a method to be used when the union cannot be managed by women alone is to hire a male manager, it is quite difficult.

A species of tree that lives within a quite limited area around Essaouira on the Atlantic coast of Morocco. Oil taken from its fruits is a high-grade product that is rare even in the land of Morocco and is used for cosmetics and foods.

(3) Conditions to enable women to perform union activities

Many cooperative have been organized by the initiative of the public sector, where unions are initiated with the incentive and technical provided by the related organ such as the Ministry of Agriculture and the Ministry of International Trade and Industries. After the application for a union has been approved, tax incentives and subsidies will be provided. There are many cases where subsidies are delivered in the form of minimum required machines and materials. Therefore the maintenance and expansion of management performed thereafter will become the first independent activities.

A problem that may hinder independent activities is the low level of literacy among members. This is common to cooperatives of men and those of women and hinder the elementary management work such as bookkeeping. Among women, the level of literacy is further lower than among men. Actually, however, the ability to read and write of the representative and accountant is regarded as the minimum condition for establishing a cooperative. Therefore, the start point for promoting women's cooperative activities will be to proceed with literacy education for women as well, as a link of adult education, by utilizing the facilities for re-education of fishermen within the scope of this project.

(4) Future policies for the cash income of women and their organization to unions

At present, among the industries adopted in union activities of women, the most strongly preferred industry in the object villages is bee-keeping. Bee-keeping is an industry that is performed in wide areas of Morocco and many women say that there is no problem of skills in this industry. Further, the consumption of honey is very large all over the land of Morocco. However, because women have almost no income in many households in the coastal area at present, it is very difficult for the women in the object villages to have a fund for the initial investment for starting bee-keeping. With regard to this problem, it is necessary to start examinations of the package for the initial investment supports and literacy education for unions of women by installing a conference between the related ministry and agencies, local governments, public entities, aiding organs, and so on.

Further, when adult women were questioned about the future of their daughters, they strongly desired that their daughters can obtain cash income in their villages. One option for obtaining cash income is craftwork. Pieces of handicraft of Morocco are on a high level. However, the skills for most of them have developed in cities while the market for simple pieces of handicraft in village is small. Therefore, skills to

produce a piece of handicraft on a certain level must be learned in a college in a city. Indeed, many women have a desire to learn the skills for handicraft in a collage to obtain cash income. However, the opportunity to go to a collage is quite limited. Under the present conditions, many women hesitate about going to a collage by leaving the village. However, under the circumstances that more and more fishermen come to consider that going to a collage will become possible as transportation becomes more convenient, it will be necessary to consider the policies to enable women to make access to collages by several means. Once the access to collage has been enabled, it will be possible to design a curriculum in collages to teach management skills such as bookkeeping. Further, although this will be detailed separately because it concerns unions as the whole, it is necessary for administrative organs to enhance the effect of mutual learning by supporting the formation of a network among unions.

4-10 Present Status and Future Orientation of Artisanal Fishermen Living in Cities

1) View of small fishermen in cities

It is difficult to have a uniform view of fishermen in cities because of the differences in facilities as well as the characteristics of fishermen from one large fishery harbor to another. Therefore, this section describes the artisanal fishermen in the Agadir port, where we performed main surveys.

Artisanal fishermen living in cities are mentioned here for two reasons: the first is to grasp the present status of artisanal fishermen living in cities and show the orientation to contribute to the planning policies for them and the second is to learn the lessons for proceeding with small fishing village promotion plans in other districts from their activities that have been clarified by the survey at this time.

2) Artisanal fishermen in the Agadir port

Artisanal fishermen in the Agadir port have a total of 700 fishing boats and it is said that more than half of those fishing boats are engaging in fishing while moving to Tifnit, Imesouane, Agro, Sidi Ifni and so on during the period from mid-June to the end of October. During the season of rough sea, 350 fishing boats are moored in the district called the New Port while other 350 fishing boats are moored separately in three ports (Kaoila tree, Lam Zalaka, and MunHoront). Artisanal fishermen were urged to move the mooring point each time the Agadir port was expanded and they so far moved the mooring point three times. The current New Port is not constructed for artisanal fishermen, either.

Further, most of artisanal fishermen in the Agadir port cannot have their own lockers. They install a metallic box with a size of about 2 m × 1 m on the edge of the water to store their fishing implements, or place their nets directly on the edge of the water. According to the ODEP, which manages the harbor, however, it is illegal and the ODEP sometimes remove such boxes and nets.

A temporary mooring point for artisanal fishermen to unload their catches was installed in the past besides the market for to shipment o the public fish market. However, such accidents have come to occur that fishing boats of artisanal fishermen are crushed by the ships for coastal fishing that protruded to that point. As a result, artisanal fishermen have come to unload their catches at a point apart from it.

On the other hand, the most advantageous point of artisanal fishermen in cities is that they can increase the days of fishing as much as the weather permits because of the existence of a harbor. In the Agadir port, it is reported that they go to fishing in an annual average of pace in the middle between a cycle of 4 days of work and 3 days of rest and a cycle of 5 days of work and 2 days of rest. This means that they can go to fishing during a maximum of 240 days per year.

Partially for this reason, about half of the small fishermen in the Agadir port do not participate in the mote to other fishing grounds during the summer period. They rarely go to another artisanal fishing villages for operation for a long period and in most cases, fishermen born in Agadir have performed fishing in Agadir since they became fishermen. The size of operation itself is similar to that of fishermen in other artisanal

fishing villages, where they usually go to fishing in a group of three to four fishermen. However, there are those small-sized fishermen who go to fishing in a team of two fisherman or singly throughout the year. In most cases, they use a single method for fishing throughout the year.

(3) Arrangement of facilities

Most of artisanal fishermen in the Agadir port are occupied by those who were born in Agadir or its peripheral areas. They have no will to move to any peripheral small fishing villages if the fishing harbor is arranged and they can have a locker, etc. there accompanied by an increase of income. One large reasons is the opportunity for education. They say that to live in Agadir is important for the education of their children. Another reason for living in Agadir is that they have own houses in Agadir.

Further, it is reported that the number of small fishing boats has increased during these 10 years. This is not because fishermen have moved with their fishing boats to Agadir from other villages but because those who have lived in Agadir bought their fishing boats. Successors of fishermen in recent years are mainly sons of present fishermen and this circumstance is the same as in other small fishing villages. Similarly, most of artisanal fishermen in other large fishery harbors such as Essaoura and Safi are also natives of their respective cities. Under the present circumstances where they have the hope to live there continuously, it is necessary to support the artisanal fishermen in large fishery harbors to live there continuously by providing them with opportunities of employment in their local city. Under the present circumstances, there are no exclusive facilities for use by artisanal fishermen so artisanal fishermen are always urged to use part of the facilities for coastal and offshore fishing boats. The facilities that are required for the present are warehouses for fishermen to store their fishing implements. There are plans to expand the Agadir port and other large harbors, so it is indispensable to include at least the securing of an anchorage for small fishermen and construction of a warehouse for fishermen. It will be necessary to investigate to what degree the efficiency and catches of artisanal fishermen are suppressed by the circumstance that they are urged to use part of the facilities for coastal fishing boats. From the viewpoint that artisanal fishermen are catching high-value fish, these are points to be taken in consideration.

4) Relations of the system of tax-free gasoline with the sale of fish to the public market as well as intervention of middlemen

Under the present conditions, those fishermen who have registered their shipping boats and obtained the notebook issued by DRAMs may purchase tax-free gasoline in the Agadir port even if they are not selling fish to the public market. However, the total quantity of purchase of each fishing boats are investigated monthly by DRAMs to prevent any illegal resale of gasoline. In and after the next fiscal year, the quantity of fish sold to the public market also will be written the notebook issued by DRAMs and thus it will become necessary to sell fish to the public market to purchase tax-free gasoline.

However, because many of fishermen sell their fish to middlemen and middlemen sell such fish collectively at the auction in the public market, it is difficult under the present conditions to tell which fishermen sold their fish to the public market. Although the details of the measures for improvement are not finalized, it is planned at present to fix the monthly quota of gasoline for each fishing boat. However, it is necessary to make efforts to grasp the present status of small fishing boats in individual fishery harbors in order to decide the necessary volume of quota in spite of applying a uniform quota all over the county.

The reason why artisanal fishermen do not sell their fish to the public market is that they sell their fish to middlemen to avoid any accident during unloading and sale as described above. With regard to this point, management to grasp the sales of each fisherman to some extent is considered possible even in case where middlemen sell their fish collectively, so it is not necessary to positively exclude the intervention of middlemen with this regard. There are some owners of several artisanal fishing boats who use such method where artisanal fishing boats unload their fish at a point immediately besides the public market

and leave immediately and the ship owner receives the catches on the land and sell them in the public market. And a problem that was mentioned by fishermen frequently is that the catch per boat is small and they are let wait in the public market while the catches of coastal fishing boats are handled there, so they request middlemen to sell their catches collectively. Fishermen feel that their catches can be sold by auction without waiting when they have been brought into the public market if the catch per boat is 20 kg or more. With regard to this point, however, the ODEP is providing a place for auction with that first priority of use is given to artisanal fishermen, so the second problem will be solved if it functions smoothly. By the way, in the Agadir port, there are no relations between middlemen and artisanal fishermen of lending and borrowing gasoline or funds.

5) Access to financing

In either the Agadir port or other large fishery harbors, there are banks in or near the harbor and can be accessed easily. In the case of the Agadir port, some ship owners having artisanal fishing boats have opened their accounts but very few among the crew have opened their accounts. Crew cite their small net incomes as the largest reason for not opening their accounts. Although crews of artisanal fishing boats state that their annual net income is approx. 20,000 DH from the viewpoint of the consumption of their own household, it is also said that they earn 600 to 700DH a day when fishing is performed. Therefore, it is probable that they are not yet accustomed to deposit money because usually they cannot earn an amount sufficient to deposit money. It is considered possible for financing organs to from a habit of artisanal fishermen to make saving in cases of temporary high income by encourage them to do so positively.

When some funds are required for repairing the boat or purchasing fishing implements, they seldom use bank loans. Although this is because they have not opened an account in the bank and thus they cannot receive loans, they have actually other ways of obtaining funds without relying on bank loans. Small fishermen save money by having themselves employed as crew on board other small fishing boats in the Agadir port apart from borrowing money from their relatives or friends. It is said that this temporary employment is quite easy. Therefore, under present conditions, there is no problem in procuring funds. Further, this present status seems to suggest that the number of fishermen is insufficient with compared with the number of fishing boats.

6) Conclusions

Artisanal fishermen in cities are generally advantageous. However, they never obtain incomes that are remarkably higher than those of other fishermen. Therefore, we cannot be optimistic in the way that the living standard of artisanal fishermen in other artisanal fishing village is simply raised when the fishery harbor and its related facilities have been arranged. Further, by considering that artisanal fishermen in large fishery harbors also have problems that are characteristics of them, it is necessary to make a plan for them.

4-11 Environmental Protection Measures

4-11-1 Basic Concept

In Morocco, the coastal area is one of the areas with the highest productivity and various economic activities are concentrated to this area. Therefore, the environmental impact of human activities is not small. Natural environments in this area are not entirely durable against the impact of human activities because of the hinterland of the shore constituting a steep slope in many locations due to the topological characteristics that mountains are extending close to the shore and fragile ecosystems in many locations.

On the other hand, because the size of the development of small fishing villages is smaller than that of the development of fishery harbors for the purpose of coastal and offshore fishery, the range and size of the environmental impact of such development is relatively small. However, because a wide range of contents from the construction of fishery harbor to the arrangement of infrastructure are involved, examinations from various aspects are required.

(1) Coast on the Mediterranean Sea

On the Mediterranean side, because of a small ratio of the land that is effective for economic activities, the abuse of fragile soil and concentrated land used in promising areas have been continued historically. Although natural environments are left in some areas that are difficult to access due to the Rif Mountains, loss of vegetation and effluence of surface soil in rural areas and the loss of natural environments in the suburbs of cities are becoming problems. It is needless to say that care should be taken in development activities on the land, particularly those on sloping lands, so that no more loss of vegetation or effluence of surface soil will not occur and, if possible, it is desirable to implement more positive measure to protect soils such as the afforestation on a wide area.

The oceanic ecosystem is considered to be generally oligotrophic except some regional differences and, except in some areas that contain important ecosystem, it is expected that the influence of construction of underwater structures on the ecosystem such as the loss of habitats of aquatic organs are not so large and the range of such influence is localized. In some areas under the Rif Mountains, cautions for drift sand are required.

As other characteristics on the Mediterranean side, it can be cited that there are many cultural heritages and they attract attentions as tourist resources. In spite of the existence of rich cultural assets in this area, their importance is not commonly recognized and the activities to protect them are not in progress except in some areas. For the purpose of preserving them for the future, negative influence of the development plan on them must be avoided as much as possible. On the other hand, how to understand the value of tourist development from the standpoint of fishery development is a difficult problem, considerations not give remarkable negative influences on tourist development are required with the notion of not reducing the present potentiality of development any further.

(2) Atlantic side

In the coastal area on the Atlantic side, there are many lands of high productivity and the rate of land use is high. Further, although relatively large marine resources are left in the southern sea area, dry climate on the land becomes more intense in more southern areas, cautions are required for a large sized development. Particularly, care should be taken when removing vegetation in dry areas, otherwise conversion into desert may be accelerated. If possible, it is desirable to incorporate those components such as boundary forests as well as additional forests for fastening sand hills.

Further, locations suitable for human activities frequently overlap the locations suitable as habitats of other animals (such as damp grounds and river mouth areas), there are few natural areas that are not influenced by human activities in spite of the importance of the preservation of the nature.

For the locations of important ecosystems and habitats of important species such as the candidates for reservation area, not only the considerations for the protection of nature but also the examinations from the viewpoint of the preservation in coexistence with the utilization of resources by inhabitants. In addition, full attention shall be paid to the problem of drift sand in the whole coastal area on the Atlantic Ocean.

4-11-2 Cautions for Environmental Protection in the Artisanal Fishing Village Promotion Plan

As described in the previous section, the environments in the beaches and coastal areas of Morocco are not entirely resistant to the influences of human activities; they rather require adequate considerations. Activity items for the development of small fishing villages shown in this master plan and negative influences that they may cause are listed in Table 4.8. Further, those items that require special mention are briefly described in the following.

1) Fishery-related marine structures such as breakwaters and unloading quays

Cautions for drift sand are required in all areas of Morocco. Particularly sufficient surveys are required for the areas and the Rif Mountains and dry areas in the south of the coastal area on the Atlantic Ocean.

2) Construction of unloading ramps

The matrix show "Conversion of economic activities with unemployment" as the influences that may be caused by this activity, and this may affect those fishermen who work as full-time porters to handle fishing boats and marine products. Those who engage in these operations sometimes belong to the extremely poor class, so care should be taken so that this activity will not rob them of their income source. Although these porters are still required if a ramp alone is constructed but care should be taken if a winch is mounted on it.

3) Construction of markets

Although conventional good relations with brokers may be lost after the construction of the market, it must be considered an inevitable path for fishermen to acquire their independence. However, as much as possible means shall be taken to avoid any friction.

4) Construction of mobile fisherman camps

Construction of mobile fishermen camps has both merits and demerits. Clarification of the location of camp will enable to prevent unnecessary deterioration of vegetation as well as the recovery rubbish and concentrated sewage treatment but tourists unless adequate management is performed, no incentive of mobile fishermen to stay in the fixed camp will not occur and rather cause conflicts with local fishermen or tourists. Adequate planning shall be performed including not only the arrangement of facilities but also the method for operating them.

5) Construction of houses for fishermen

The coasts of Morocco are regarded as important tourist resources and the development of fishing villages and tourist development often overlap there. Although it is confirmed that fishermen have a strong desire to move to a location near the shore and it is considered that the construction of new houses are preferable from the viewpoint of the development of fishing villages, it is necessary to perform sufficient coordination with tourist development.

On the other hand, houses are relatively scattered in present fishing villages, so preliminary consideration must be given to the social influence of moving them into a more dense area of houses. Further, this may provide a good chance for fishermen to form their organization.

6) Preservation of vegetation

Various activities for the promotion of fishing villages may cause the deterioration of land vegetation. Problems of the erosion of soils and conversion to desert have already occurred in most of the coastal area of Morocco, the loss of vegetation exceeding the present level is probable to arise a serious problem.

Further, many of full-time fishermen are engaged in agriculture enough for self support when viewed from the standpoint of their households, so it is considered that the preservation of soils also contribute to the stabilization of fishermen's households. Although it cannot be said uniformly due to the regional differences, it is considered necessary depending on individual areas to implement the recovery of vegetation and preservation of soils as components of the fishing village promotion plan, by advancing one step from the preservation of vegetation.

4-12 Criteria for selection of fishery villages to be developed

4-12-1 Basic concept

In the national fishing village arrangement plan, artisanal fishery landing beaches, which are reported to line in 120 locations in the area as the object of survey, are divided into three categories of A, B, and C according to their importance in terms of fishery and an outline concept for the arrangement of their facilities is shown. To put this plan into practice, it is necessary that the security of budgets, allocation of personnel, and development of organizations are performed in cooperations. As the first phase of the total plan, it is considered that selecting particular fishing villages as bases and performing concentrated arrangement of such villages have large merits in the effects of investments and far-reaching effects on all artisanal fishery businesses.

Therefore, it has been decided here to select several fishing villages with high priorities for development among from the fishing villages of category A as shown in the fishery production improvement plan (main artisanal fishery bases) and set them as the object of the feasibility study in the future.

1) Concept of selection and policy for evaluation

For selecting those fishing villages that are to be developed with first priority, it is desirable to apply a method that provides as much objective and quantitative as possible judgment and evaluation. Quantitative calculations can show the result of evaluation clearly and can be understood easily. Once a fishing village has been selected as the object of development, much funds will be invested there for the arrangement of unloading beaches providing large economic far-reaching effects on its peripheral settlements as well. Because this has a large meaning in the regional development, selection of such villages must be performed carefully and fairly.

As a method for selection, each fishing village was evaluated according to the grade given to it when it was measured on the following scales:

- (1) Feasibility of development (Is there sufficient room for the development when fishery is promoted for the future?).
- (2) Strength of fishery (Is fishery already performed vividly and can be easily put on the orbit as a business?).
- (3) Aptitude for development (Is fishery in the state where it can be profitable as a business?).

Evaluation on each of these three scales was performed as follows:

(1) Feasibility of development was evaluated using two indexes: marine resources and the distance to a main harbor. Marine resources were evaluated by the length of coast per fishing boat belonging to the pertinent fishing village. As the longer the length of coast, the larger the fishing ground that can be secured, it is considered that each fishing boat has a higher frequency of access to marine resources. As to the distance to a main harbor, it was judged that the larger the distance to a main fishery harbor, the higher the necessity of arranging the facilities for the fishery harbor for the improvement of safety and effective use of sea areas and has a larger room for the development in the future.

(2) Strength of fishery was evaluated based on the number of fishermen living in the pertinent fishing village and the annual catch. In other words, it is considered that the larger the number of fishermen, the stronger the competitions among fishermen with vivid will for catching and because various private service systems are well arranged, the necessity for investment in public facilities is low. Further, the larger the

annual catch, circulation routes in the private sector such as middlemen and market are well arranged already so that they have a capacity to accommodate the increase in the catch in the future smoothly and are more advantageous in putting fishery onto the orbit as a business.

(3) Aptitude for development was evaluated using two indexes: the proximity to the market and the average catch per operating day. When looking fishery from the aspect of business, fishermen obtain their income by shipping the fish they caught to the market. Because main road networks in Morocco are relatively well arranged, it is considered that the shipment to a large market is possible if fish can be brought to a trunk road and thus the distance from the fishing village to a trunk road is assumed as the proximity to the market. The average catch per operating day is set as another index because we consider that the higher the average catch per operating day, the higher the fishing skills of fishermen and they are blessed with marine resources. It is considered that such fishing villages will produce efficient results of development because much catch can be obtained with a small number of fishermen when investments are made in these villages.

4-12-2 Selection of fishing villages to be developed

The following shall be taken in consideration when selecting fishing villages with first priority for development. First, the coastal area of Morocco is broadly divided into the portions on the Mediterranean side and Atlantic side. As the characteristics on the Mediterranean side, as described previously, the marine resources that have already caught nearly to the limit and fishing villages that are located on the coast at dense intervals can be cited. As the characteristics on the Atlantic side, on the other hand, rich marine resources due to many reefs located near the coast and fishing villages that are sited at large intervals. Because the conditions of resources and circulation as well as the conditions of fishing villages differ depending on individual sea areas, in this way, selection of fishing villages to be developed was performed separately on the Mediterranean side and Atlantic side.

4-12-3 Proposal

As a result of selection considering the above mentioned points, the following fishing villages have been proposed as the object of development:

Mediterranean side

1. Sidi Hsanine
2. Kaa Srass

Atlantic side

1. Saura Kedima
2. Tadedna
3. Tifnit
4. Moulay Bousselham

Wedd Rumel, which has the priority equal to Moulay Bousselham, has been excluded from this plan because it has been decided as the object of survey by the EU.

No	Name of village	Development potentiality (*2+*3)/2		Fishery strength (*5+*6)/2		Development propriety (*8+*9)/2			Total point *1+*4+*7=	Note	
		Fishery resources *2	Port distance *3	*4	Num. of fishermen *5	Annual fish catch *6	*7	Market approach *8			Average fish catch *9
M 3	SIDI HSAINE	4.0	3	5	2.5	4	1	3.0	4	2	9.5
M 6	KAASRAS	2.5	1	4	3.5	5	2	3.0	5	1	9.0
M 10	OUED R'MEL	2.0	1	3	3.5	5	2	3.5	5	2	9.0
M 7	OUED LAOU	2.5	2	3	2.5	4	1	3.5	5	2	8.5
M 2	RESTINGA MARCHICA	4.0	5	3	1.5	2	1	2.0	3	1	7.5
M 8	AZLA	1.5	2	1	3.0	5	1	3.0	5	1	7.5
M 11	KSAR SGHIR	2.5	2	3	1.5	2	1	3.5	5	2	7.5
M 5	CHMAALA	2.0	1	3	2.0	3	1	3.0	4	2	7.0
M 12	DIKE	2.5	3	2	1.0	1	1	3.5	5	2	7.0
M 1	SAIDA	2.0	2	2	1.0	1	1	3.0	4	2	6.0
M 4	LAZIB	3.0	3	3	1.5	2	1	1.5	1	2	6.0
M 9	BEN YOUNECH	2.5	3	2	2.0	3	1	1.5	2	1	6.0
A 14	SOURA KEDIMA	2.0	1	3	5.0	5	5	4.5	4	5	11.5
A 15	TAFELNEY	4.0	3	5	3.0	4	2	3.0	3	3	10.0
A 13	MY BOUSSELHAM	3.5	3	4	2.0	3	1	3.5	5	2	9.0
A 17	TIFNITE	2.5	2	3	3.0	4	2	3.5	4	3	9.0
A 16	TIGUERTE	3.0	3	3	1.5	1	2	4.0	5	3	8.5
A 18	SIDI MOUSSA AGLOU	5.0	5	5	1.0	1	1	2.5	2	3	8.5
A 19	MIRLEFT	4.0	5	3	1.0	1	1	3.5	5	2	8.5
A 20	ALKOUNT	2.5	3	2	1.5	2	1	3.5	5	2	7.5

*1 Development potentiality, estimated by (*2 + *3)/2

*2 Fishery resources (ranked by coast length per boat) . *10

*3 Distance of port (ranked by distance from main port) . *12

*4 Fishery strength, estimated by (*5 + *6)/3

*5 Number of Fishermen (ranked by fishermen in the village) . *13

*6 Annual fish catch (ranked by total fish catch in the village) . *18

*7 Development propriety, estimated by(*8 + *9)

*8 Market approach (ranked by distance from the village) . *22

*9 Average fish catch (ranked by average fish catch per boat per time) . *16

0-0.11:1, 0.12-0.22:2, 0.23-0.33:3, 0.34-0.44:4, 0.45-.5, unit:km/boat

0-12:1, 13-24:2, 25-36:3, 37-48:4, 49-.5, unit:km

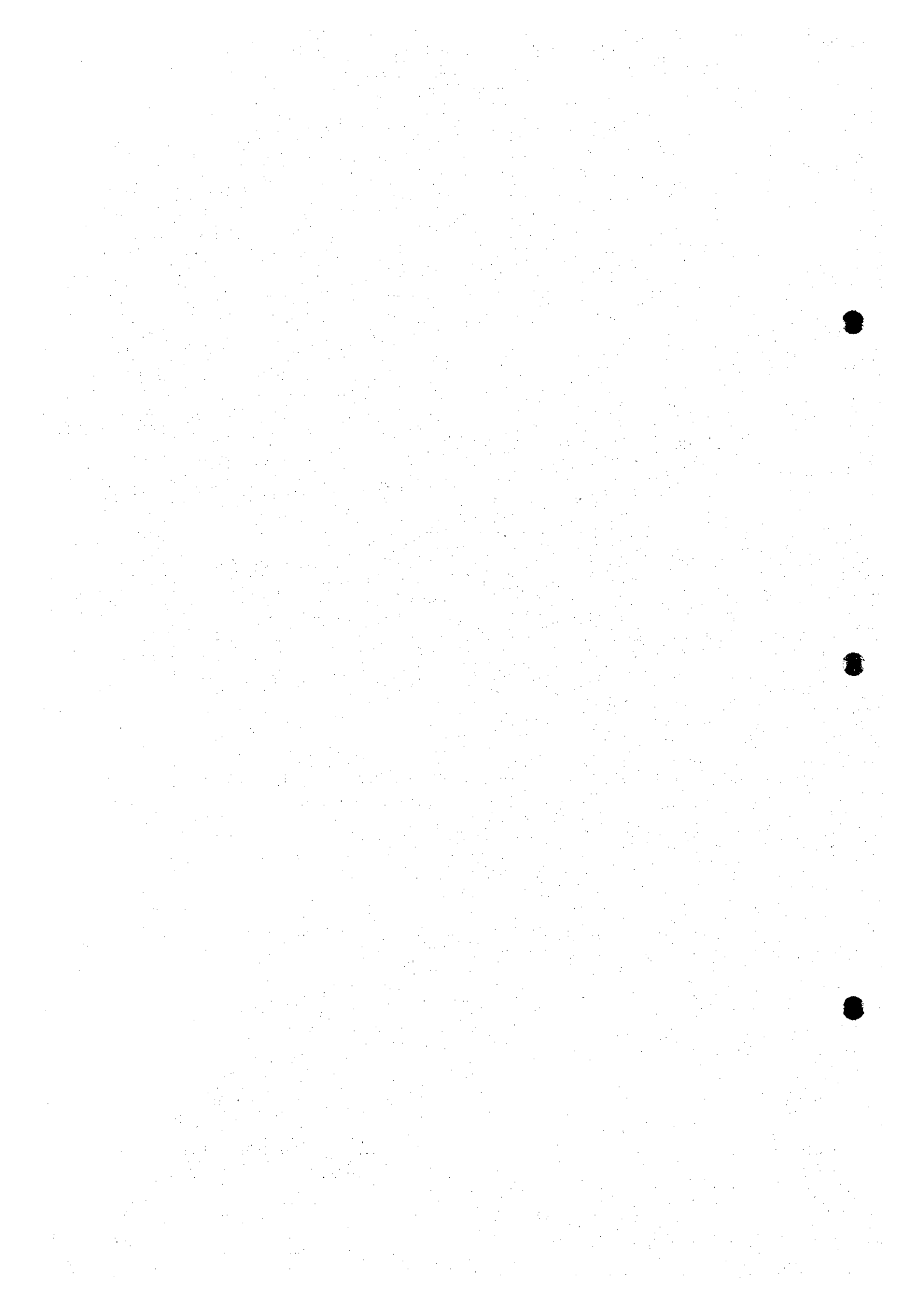
0-100:1, 101-200:2, 201-300:3, 301-400:4, 401-.5, unit:person

0-300:1, 301-600:2, 601-900:3, 901-1200:4, 1500-.5, unit:ton/year

0-4:5, 5-9:4, 10-14:3, 15-20:2, 21-.1, unit:km

0-30:1, 31-60:2, 61-90:3, 91-120:4, 121-.5, unit:kg/boat . time

CHAPTER 5



CHAPTER 5 FEASIBILITY STUDY (F/S)

5-1 Study Methodology and Approach to Development Project Formulation

Upon taking into consideration the thoughts of the Government of Morocco with respect to the fishing villages that were judged by the study team to have a high order of priority for development as a result of the first field survey conducted from November to December 1996, it was eventually decided to select the following six fishing villages as targets for the feasibility study.

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| A. | Souira Kedima | Safi Province (Atlantic Ocean side) |
| B. | Sidi Hseine | Nador Province (Mediterranean Sea side) |
| C. | Tafedna | Essaouira Province (Atlantic Ocean side) |
| D. | Tifnit | Agadir Province (Atlantic Ocean side) |
| E. | Kaa Srass | Tetouan Province (Mediterranean Sea side) |
| F. | Moulay Bouselham | Kenitra Province (Atlantic Ocean side) |

The order in which the fishing villages are listed directly corresponds to the order of priority that is to be attached to each. Accurate study including surveying and other natural conditions surveys were conducted in the three highest priority villages, whereas basic surveys in preparation for future detailed study were conducted in the three lower priority villages.

The F/S was conducted in accordance with PCM method by combining the implementation of workshops with hearings and document research by study team members and also re-consigning work to local survey companies. Concerning the workshops, these were staged with the aim of directly reflecting the thoughts of fishermen in making a wide and accurate analysis of problems in the fishing villages, and in the case of high priority areas the framework of the development project (PDM) was compiled based on the workshop findings. At the same time, the study team members conducted hearing surveys and collected data and materials from local fishermen and related agencies and also carried out surveying and other technical studies.

Concerning the linkage between workshops and other study methods, although the workshops prove useful in organizing problems and gaining an overall view of the situation, because time constraints mean that it is difficult to ascertain detailed facts and it is not always possible to conduct more technically oriented analysis through workshops alone, it is the role of the other above-mentioned study methods to supplement these deficiencies. In the report, too, each PDM is basically founded on the findings of workshops, and the more detailed sector-separate action plans reflect in full the results obtained from both the workshops and the other study methods. Contents of the action plans have been stated from an expert viewpoint by each responsible study team member according to each item given in the PDM "Activities" column.

The workshops were implemented in the manner described below (for details on each workshop, see 'Workshop Records' in the appendix).

Upon visiting each model fishing village, first a small number of fishermen were gathered and so-called mapping was carried out for two or three hours in order to confirm local geographical conditions and

conducted participation analysis⁶ of fishermen. Following that, a workshop attended by around eight fishermen, a number of personnel from related agencies on the Morocco side, a number of Japanese experts and some local counterpart staff was staged for around four hours with the aim of conducting problem analysis and clarifying the state of problems confronting the fishermen. In the high priority fishing villages, a further two or three hours were spent on a separate day to conduct objective analysis and to identify a set of objectives with the aim of finding solutions to the problems. In these villages, several Japanese study team members and local counterparts held further discussions before preparing PDM or the framework of the development project.

In view of the fact that participants use various languages (Japanese, French, Arabic and Berber) and the fact that the literacy rate of fishermen (the most important participants) is low, it was forecast that great difficulty would be encountered in achieving progress in the workshops. However, owing to the earnest translating efforts of the local counterparts, no great difficulties arose in terms of communication and the following output was achieved as a result of the active discussions that were held.

- 1) In the two workshops staged at MPM, problems confronting artisanal fisheries in Morocco were investigated from a broad viewpoint and a PDM was prepared to act as a tentative master plan for the development of artisanal fisheries.
- 2) In the three top priority fishing villages, the workshops covered a lot of ground from problem analysis to PDM preparation, and the opinions of artisanal fishermen (the direct beneficiaries) were incorporated into such framework of the development project (PDM). In the three lower priority fishing villages, due to the limited time available, only problem analysis was carried out and a general direction for the development projects was confirmed.
- 3) The participating fishermen were highly satisfied with the content of the workshops. Moreover, it is considered that the workshop discussions served to enlighten and motivate the fishermen in that they were encouraged to make more autonomous efforts towards the resolution of problems. Officials from MPM were also impressed with the utilization of PCM methods, saying among other things that it was the first time they had properly incorporated the views of local inhabitants and that the workshops constituted an extremely logical process of project formulation. As for the counterparts on the Morocco side, the workshops provided a valuable opportunity for them to come into contact for the first time with actual conditions in artisanal fishing villages, and the whole exercise proved to be highly useful.
- 4) Since officials from MPM and related agencies and the local counterparts were in attendance at the workshops, it was possible to carry out technical transfer with respect to PCM methods through conducting lectures and OJT.

⁶ In the study, analysis of the current conditions of fishermen and the people and organizations, etc. that surround them was carried out in the form of a separate interview survey, etc. by the team member responsible for fishing village society. Accordingly, thorough analysis of participants for such analysis was not carried out at the workshops, but only supplementary analysis was carried out. The aim of participant analysis is to clarify the roles of persons with a view to the future implementation of projects, however, this was not performed because such discussion was a little premature in the initial workshop stage. Since it was already confirmed that artisanal fishermen are faced with problems and possess development needs in the trial PCM workshops conducted in the first field survey, analysis was advanced based on the perception that all such fishermen are the main beneficiaries.

The following points can be raised as problems or issues for future attention concerning the workshops.

1) Due to local social customs, it is difficult for women to take part in public meetings and, except for the case of Moulay Bousselham, participants in the workshops were limited to men only. It is thought that the opinions of women should have been reflected more in the analysis of problems and compilation of development projects.

2) The prepared PDM do not yet contain clear indicators for achievement and it is particularly necessary to add more detail in terms of quantitative indicators. Concerning numerical indicators, it is necessary to incorporate fundamental base line surveying and continuous data collection into the activities. In the three fishing villages where PDM were prepared, i.e. Souira Kedima, Tafedna and Sidi Hseine, local offices of MPM were visited and the understanding of office managers and deputy managers given to the PCM methods and the way of regional development based on such methods.

3) Concerning the overall activity items contained in the PDM, as well, more detailed planning is required for their implementation. With respect to this point, however, each study team member has put forward action plans relating to his own field of expertise. These action plans need to be coordinated with relevant programs that are currently being prepared or are scheduled for implementation by the Government of Morocco, related agencies and local governments, in order to ensure the feasibility of action plans.

At the same time as the utilization of PCM, the following surveys and studies were conducted in each specialist area.

1) Survey of Natural Conditions

The following technical surveys, which are necessary for the implementation of infrastructure development and other plans on the hardware side, were conducted in the three top priority fishing villages (Souira Kedima, Tafedna and Sidi Hsaine). All these surveys were consigned to LPÉE (Laboratoire Public d'Essais et d'Études), a local surveying company.

- (1) Topographic surveying
- (2) Sounding
- (3) Ocean conditions survey
- (4) Geological survey (boring survey)

2) Social Survey

In order to gain a better understanding of social conditions in the target fishing villages, hearing surveys were carried out in the four highest priority fishing villages (Souira Kedima, Tafedna, Sidi Hsaine and Tifnit). Moreover, as a supplement to these activities, a hearing survey was carried out in Agadir to investigate actual conditions facing fishermen who live in cities. These surveys were consigned to CID

(Conseil, Ingeniere et Developpement), a local design consultant company. The study team member in charge of fishermen's society accompanied the CID staff on these occasions and conducted his own hearing surveys. The team member in charge of fishermen's society and the other team members stayed in close contact at all times during the surveys, and questionnaire forms and survey methods were coordinated as much as possible to ensure that accurate information could be obtained from the fishermen.

3) Environmental Survey

The environmental survey has two phase : the first phase, conducted at the time of the Master Plan was intended to gain a general overview of environmental conditions to conduct environmental impact screening and scoping. Main method used were field investigations, records research and interviews with related agencies. This phase is resulting in a greater understanding of the natural and social environments of artisional fishing villages and organization of environmental consideration points. The environmental survey at the time of the F/S, is more detailed Environmental Impact Assessment at each target fishing village. Results of the Surrey of undersea and land environmental conditions through conducting resource mapping, diving, direct observation from land and individual interviews with fishermen, were analyzed to forecast the environmental impact using overlapping method. In Souira Kedima, a local Consultant company, ICONE, was sub-contracted to carry out an detailed study environmental conditions. A point of special note is that, based on the results of the surveys carried out in each target fishing village, measures to avert environmental impact have already been incorporated at the stage of development project preparation and have been examined as component elements in the final assessment.

4) Fishing activity survey

During the F/S, fish landing observation survey and on board fishing ground survey were conducted. Each time when a boat came back for landing, fish species, weight price and fishing gear were recorded by local staff members of MPM. A study team member went to on-board fishing ground survey with fishermen as well as start of INRH and MPM. In the on-board survey, position of the fishing ground, depth and water temperature were recorded using a GPS and a fish finder, and actual fishing method was observed.