

5-2 Fishing Villages Five-Year Development Projects (General)

5-2-1 Outline of the Projects

Development of the artisanal fisheries sector, which has so far tended to lag behind coastal fisheries and offshore fisheries, will start from the fishing villages that were selected in the Master Plan (4-11 Criteria for Selection of Fishing Villages for Development) and be successively expanded to other fishing villages. In carrying out the development of target fishing villages, rather than concentrating too much on the development of just fisheries infrastructure, the ultimate objective has been identified as the improvement of fishermen's lifestyles in general. Specific objectives identified as common objectives of the 6 model villages are as follows:

- 1) Raising of fisheries incomes through increasing the size of catches and raising fish prices
- 2) Reduction of fisheries expenses through construction of related infrastructure facilities
- 3) Improvement of the living environment in fishing villages through social infrastructure development
- 4) Realization of secure lifestyles through introduction of fishermen's social security schemes
- 5) Promotion of joint activities by fishermen through establishment of fishermen's cooperative associations
- 6) Realization of sustained fisheries activities through resource management and diffusion of fisheries technologies

5-2-2 Contents of the Projects

The projects proposed under the master plan can broadly be divided into three types: 1) projects requiring large-scale capital expenditure, 2) projects requiring capital expenditure by the Morocco side, and 3) projects that can be realized through institutional development.

1) Projects requiring large-scale capital expenditure refer to landing beach facility construction projects. Landing beach facilities, which include the construction of harbor and land facilities, requires massive capital expenditure and high level construction technology. Specifically speaking, such projects involve the construction and provision of port facilities, marketing-related facilities (ice making machines and ice storage, fish markets), fishermen's work support facilities on land (workshops, slipways, fishermen's lockers), fishermen's welfare facilities (fisheries centers or community centers, toilets and local style showers known as 'hamam'), and so on. The specific concept for construction of such facilities is given in section 5-2-3 (Infrastructure Development Concept).

2) Projects to be implemented within the existing institutional framework on the Morocco side are projects for the development of basic social infrastructure such as roads, electricity supply, water supply and telephones, etc. Such projects need to be implemented while maintaining close links with responsible agencies, i.e. MTP, commune rurale, ONE (Office National d'Electricité), ONEP (Office National de l'Eau Potable) or, depending on the target fishing village concerned, the implementing agencies of regional development plans which incorporate such villages. As fishing village communities grow in maturity, the demand for further social infrastructure such as clinics for fishermen and inhabitants and schools for fishermen's children will arise. (Details are given in Section 5-2-4)

3) Projects that can be sufficiently realized through institutional development or expansion in duties of responsible government agencies (in other words, "soft" aspect planning) are, 1) establishment of social security schemes, 2) formation of fishermen's cooperative associations, and 3) appropriate resource management. Social security schemes that target fishermen have already been initiated by ONP (Office National des Pêches), but these only cater to coastal and offshore fishermen, while schemes for the benefit of artisanal fishermen have barely got off the ground. Concerning support for the establishment of fishermen's cooperative associations, MPM and ODECO (Office de Développement de la Coopération) will take the initiative in acting as the operating bodies of facilities. Concerning resource management and fisheries technology diffusion activities, it is necessary for MPM, INRH and ONP to cooperate in collecting and analyzing data on catches, reflecting findings in appropriate fisheries management measures and providing guidance to fishermen to ensure that stable catches can be secured into the future. (Details are given in Section 5-2-5)

5-2-3 Concept for Landing Beach Fishery Infrastructure Development

1) Fisheries Production Infrastructure

(1) Fishing Ports

Because artisanal fishermen in Morocco use nearby beaches to land and put their boats out to sea, the breaking of waves near the beach line greatly limits fishing boat access, even if offing wave conditions may be suited to fishing, and this greatly reduces the number of days on which fishing boats are able to operate. As a measure to improve the situation, the location of breakwaters at fishing ports should be planned further outside the breaking zone to provide calm water for fishing vessels passing between breakwaters. Another vitally important issue when planning fishing ports concerns measures for dealing with drift sand. If a fishing port is constructed in a poor position, not only will the port become blocked up with drift sand, but the shape of the existing coastal beach will become deformed due to unnatural sand accumulation and erosion. For this reason, consideration needs to be given to wave conditions, drift sand countermeasures and protection of the surrounding beaches and natural environment when determining the position of fishing ports. Consequently, the position and water depth of fishing ports are often determined not just according to the required draught of fishing boats but also the water depth where waves cease to break and the limit depth of sand drift, and so on. Furthermore, fishing port structures, as well as obviously having to offer safety against waves and other external forces, must incorporate wave protection for fishing boats entering and leaving port and be convenient for the landing of catches and mooring of boats, etc.

(2) Fishing Port Positioning

Generally speaking, the maximum average wind speed in which small fishing boats can go sailing in Morocco is roughly 10 m/second and the maximum effective height of waves ($H_{1/3}$) for fishing boats to carry out fishing is 1.0 m. In cases of swells where the wave cycle is long, fishing boats can sometimes sail and conduct fishing in offshore waters where the effective wave height is roughly 2.0 m. At times of strong winds, small fishing boats find it difficult to maneuver sharply, so it is necessary to design and construct breakwaters and port entrances that allow slow moving boats safe turning basins not subject to the effects of strong cross winds and high waves. Specifically speaking, waves approaching the coast break and become higher when they reach a certain water depth and, if the height of waves after breaking reaches 1.3 m or more, conditions for fishing boats become extremely dangerous. Therefore, fishing ports must not be positioned in areas where wave conditions are like this.

The coastlines used by small fishing boats consist of sandy beaches where the seabed is gently sloping and

shallow for long distances. In such conditions, it is thought that extreme drifting of sand is caused by shore currents and coastal currents. Since waves approaching the coast stir up bottom sand and carry it towards the coast when a certain water depth in comparison to the wave height is reached, it is desirable for fishing ports to be positioned in areas where water is deeper than the limit depth of bed drift. The construction of fishing ports which are not prone to blocking by drift sand all the year round is costly, however, when one considers the inconvenience and dredging costs that are incurred in cases where fishing ports do become blocked, it is better to construct ports that are not affected by drift sand, even if this does make the original construction cost higher. Fishing port design conditions should be set with consideration given to the allowable amount of drift sand blockage, however, it is difficult to make an accurate quantitative estimation of such an amount. If there is considered to be no problem in allowing slight blockage of the port entrance, it is necessary to plan construction without paying regard to small and infrequent offing waves (waves in excess of 2.0 m occurring 2-40 days per year). In the case of Morocco, if it is assumed that the maximum offing wave height is 2.0 m, the limit depth of surface sand drift is between 4.0-8.0 m.

(3) Beach Deformation Countermeasures

Generally speaking, beaches in Morocco consist of indented pocket beaches surrounded by protruding coastal cliffs and shore reefs and, sand beaches in areas where rivers flow down to the coast. There are also beaches which are a combined form of these two types. The shore extension of pocket beaches is roughly 2 km or less, whereas that of sand beaches can reach in excess of 10 km. When planning a fishing port, by constructing in offshore areas away from sea cliffs and shore reefs where the water depth is such that breaking waves and sand drift do not occur, access to the port is made easy, port blockage can be prevented and deformation of natural beaches can be avoided. However, because the existence of fishing port breakwaters and other structures can impede coastal currents and change the balance of sand transportation on natural beaches, proper consideration needs to be given to shore currents, coastal currents and design water depth. Therefore, when planning a fishing port, it is ideal to plan an offshore artificial island type or equivalent rather than a type which impedes coastal currents, and thus ensure that sand drift and the sediment balance are not affected.

Based on the above conditions for overall fishing port planning, and with consideration given to local customs and features of fishing activities in Morocco as assessed in the field surveys, the following concept has been adopted with respect to the construction of fishing port facilities.

(1) Concept Regarding Construction of Breakwaters and Revetments

although maintenance and dredging costs are relatively cheap, because of the coastline in Morocco consisting mainly of sand beaches, it is necessary to design facilities that do not invite drift sand. Moreover, even if drift sand should arise, this needs to be limited in range and volume as much as possible to ensure that maintenance and dredging work can be easily carried out.

Concerning the structure of breakwaters, revetments and other facilities, with a view to reducing initial construction cost, simplifying maintenance and enabling faster recovery following disasters, etc., the maximum possible priority will be given to adopting construction methods and materials that are commonly used in Morocco. Moreover, since it is often the case that fishing ports are located close to coastal areas which are attractive to tourists because of their landscape, natural beauty and opportunities for marine sports, etc., consideration needs to be given to harmonizing fishing port construction with such surrounding conditions.

(2) Concept Regarding Construction of Wharves and Slipways

Since the fishing boats used in artisanal fisheries are small-scale (roughly 6 m in length) and it is predicted that no sudden changeover to large FRP fishing boats will occur in the near future, mooring facilities such as wharves and slipways, etc. that are suited to use by the existing fishing boats will be planned.

In Morocco, because fishing boats are hauled onto land after returning from fishing trips for reasons of maintenance and protection (extension of service life), slipways which enable the manual landing of boats to be carried out safely will be constructed. Also, in boat laying-up areas behind the slipways, space will be provided to enable maintenance work such as painting and joint sealing, etc. to be carried out. Water depth to the front of slipways will be set at -1.5 m from the minimum tide level in order to allow continuous use regardless of ocean conditions. The same water depth will also be adopted for wharves and, on the Atlantic Ocean side where differences in the tide level are large, work will be made easier by providing artificially excavated steps.

(3) Concept Regarding Provision of Waterways and Anchorage

Many of the artisanal fisheries bases on the Moroccan coastline offer good natural harbor in which they possess calm waters surrounded by shore reefs and peninsulas, etc. However, on the Atlantic Ocean side in particular, tide differences are large and the sea bottom is rocky, and in cases where fog, etc. impedes visibility, leading lights on land will be provided to aid navigation and help fishing boats avoid the risk of running onto rocks, etc.

Anchorage must be secured in the form of calm water surrounded by breakwaters and other facilities with as large an area as possible to allow the easy maneuvering of fishing vessels. However, as the construction of breakwaters further away from the coast means a higher construction cost, the optimal anchorage shape should be decided taking the desirable position of breakwaters and the maneuverability of fishing boats into consideration.

2) Construction of the Fisheries Marketing Infrastructure

(1) Concept Regarding Construction of Public Fish Markets

Fish are currently distributed to domestic and export markets, and facilities will be planned to allow appropriate auctioning for both these marketing routes. Landed fish usually undergo screening, sorting and weighing in fish markets before being placed on tables for auction to agents. Agents pack their purchased fish into insulated fish boxes together with ice and ship them in refrigerated trucks. In the Project, the use of ice will initially be considered only for fish that are intended for export but not for fish intended for domestic marketing. In the future, when the demand for ice increases, this will be covered through consigning the installation of ice making machines to private operators.

Detailed facility specifications and related equipment will be planned according to HACCP (Hazard Analysis-Critical Point) thinking. Also, care will be taken to ensure that hygiene standards in the EU, which is the major export destination, are complied with. From the viewpoints of maintenance and hygiene control, fish markets will need to be independent buildings located close to landing wharves. These facilities should be introduced at those locations which command a strategic position for collection of the catch landed on different beaches, taking the different functions of individual fishing ports and the optimum transportation/distribution routes into consideration (it is unnecessary to introduce these facilities at all fishing ports).

(2) Installation of Ice Making Machines and Ice Storage

Ice making machines will be installed to preserve the freshness of fish intended for export. Crushed ice, which is commonly used in Morocco and possesses good cooling efficiency, will be the type made. Moreover, in order to deal with fluctuations in the volume of handled fish, ice storage capable of storing a three-day supply of necessary ice will be provided. The ice making machines and ice storage will be the free-falling type whereby ice produced in the ice making machines drops into the ice storage. Such a system is simple in construction, is rarely subject to breakdown and is easy to maintain. In addition, refrigerators will be installed to handle the temporary storage of fish at times of large catches or when all fish catches cannot be sold at auction. The refrigerators will also be used to preserve the freshness of bait that is used for long line fishing. In terms of facilities layout, the ice making machines and ice storage/refrigeration facilities will be installed in the same buildings to make maintenance easier. Moreover, it is desirable to locate such facilities next to the fish markets.

(3) Construction of Fishermen's Lockers

Since fishermen's lockers can broadly be divided into the accommodation type and fishing gear storage type depending on locally adopted fishing methods and distances from beaches of fishermen's homes, lockers that comply with each local situation will be planned. Accommodation type fishermen's lockers will be made large enough to allow fishermen to stay overnight and prepare meals. In some cases, fishermen's lockers are made large enough to store fishing boats. Fishermen's lockers that are intended to store fishing gear only need to be large enough to store outboard engines, etc. In terms of facilities layout, it is desirable to locate fishermen's lockers close to slipways and more economic to place them in groups.

(4) Fuel

Facilities for refueling by private fuel suppliers will be provided to enable artisanal fishermen to obtain tax-free gasoline. Facilities installation, etc. will be entrusted to the private fuel suppliers, but it is necessary to consider the securing of necessary land and linkage with other structures. In terms of facilities layout, fuel dispensers will be installed close to wharves that are used for fishing trip preparation.

(5) Workshops

Consideration will be given to the provision of sites and tools for workshops necessary for conducting maintenance on the outboard engines and hulls of small wooden fishing boats. Outboard engine repairs will mainly be conducted indoors, and outdoor test tanks will only be used for carrying out operation tests. As for hull repairs, woodworking, etc. will be done indoors, but painting and joint sealing, etc. will be performed outdoors. Therefore, it is desirable to secure enough space for such activities to be performed outside the workshops. In terms of facilities layout, it is best to locate the workshops close to the slipways.

(6) Fisheries Store Rooms

Store rooms are needed in order to store dried algae rouge and other seaweed in a dry state away from rain and so on until they are ready to be shipped. In consideration of ventilation and storage space, it is necessary to secure a ceiling height of at least 4 m or so. In terms of facilities layout, it is necessary to secure sufficient space around the store rooms to enable outdoor drying.

(7) Construction of Fishermen's Welfare Buildings

Facilities for the provision of daily necessities and fisheries-related private sector services will be provided mainly for the benefit of fishermen using fishing port facilities. In operational terms, booths will be provided for renting out to private operators.

(8) Construction of Fisheries Centers

The fisheries centers will accommodate organizations and personnel concerned with the promotion of local fisheries, that is to say, DRAMs, fisheries cooperative associations, fisheries instructors and branch offices of the INRH. Also, facilities will be added to support various social education and training activities for local fishermen and residents.

(9) Waste Water Treatment Facilities

Waste water that is generated within fishing ports and fisheries-related facilities will undergo treatment before being discharged into the public water body. Ground infiltration septic tanks, which are cheap to install and simple to use and maintain, will be provided to carry out waste water treatment. In cases where ground infiltration is not desirable, the soil purification method of treatment can also be combined with the septic tanks.

(10) Solid Waste Treatment Facilities

Treatment of solid waste generated within fishing ports will target waste paper and wood, etc. which is harmless when incinerated. The heat from solid waste incineration will be reused for the hamam, etc. Fish remains and so on will be used as food for chickens, etc. and other items may be composted for use as fertilizer. Concerning plastic products such as vinyl, which produce harmful gases when burned, and empty cans, etc. which cannot be reused within fishing ports, the waste collection system by the commune will be utilized. Moreover, on the software side, it is necessary to initiate fishermen campaigns for the regular cleaning of fishing ports and prevention of casual waste disposal.

(11) Multipurpose Spaces

One feature of fishing ports is that fish catches are only landed at specific limited times, so multipurpose spaces will be provided to mitigate spatial problems that arise from this and to offer an area for community activities to take place.

5-2-4 Social Infrastructure Development Concept

(1) Construction of Housing for Fishermen

Some fishermen hope to build houses close to the project sites in order to give up semi-dependence on agriculture and make a living by concentrating solely on fishing. Since the availability of nearby land differs according to each Project site, vigorous and sustained efforts will need to be made by communes, provinces and operating agencies to secure residential land for fishermen. Viewed in terms of the planning, the construction of houses to the rear of fishing ports would pave the way for new development by enabling new communities to grow in unison with the fishing ports.

(2) Provision of Commuter Access

According to the field surveys, primary schools are located within a reasonable walking distance from the fishing villages. However, in cases of junior high school and above, it is often necessary for parents to put their children into dormitories because such schools are located so far away. Moreover, it is obligatory in Morocco for women to return home at the weekend and, for fishermen who stay in fishermen's lockers, there are no means of transport to enable them to return to their inland homes. As a realistic solution to these problems, it is economic to introduce vehicles, etc. that make it possible for people to commute to school and work in groups.

(3) Establishment of Clinics

With preventive public health and medical care as a major issue, measures are considered necessary to establish and spread public sanitation and prevention, which are currently neglected, to local fishermen and residents. For this reason, clinics manned by public health nurses will be established within the fisheries centers to carry out regular measurements of blood pressure, weight and other basic data and thus manage the health of and provide individual guidance to fishermen on health issues. Moreover, by staging lecture meetings on specific subjects relating to women in general and pregnant women and nursing mothers, etc., the health situation of all inhabitants of local communities will steadily be improved.

(4) Establishment of Roads, Electricity and Water Supply

The basic social infrastructure, consisting of roads, electricity and water supply, etc., is developed to a certain degree in communities that are located on flat land. However, in communities that are located in mountainous areas, the situation is more serious in general. For example, vehicular access is made difficult by the steep gradient and narrow width of roads, there is no electricity supply and residents have to hand-draw water from wells.

It is hoped to develop the social infrastructure as much as possible in such districts within the projects, however, since the project cost and effect would be adversely affected by carrying out phased, small-scale infrastructure development, it is necessary to consider development that complements PNER (Programme Nationale d'Électrification Rurale), PAGER (Programme d'Approvisionnement Groupéen Eau Potable des Population Rurale), etc.

5-2-5 Development of Software Areas

1) Social Security

Entry into public social security schemes by fishermen is advancing in the fields of offshore and coastal fishing, however, in the field of artisanal fishing, only a few districts have entered such schemes. In particular, only a few artisanal fishermen who are based in the major ports of Agadir and Safi, etc. are covered by social security. A major factor behind this is the existing fish marketing system, in that the fish that are caught by artisanal fishermen are not sold through official channels. In other words, on the artisanal fisheries landing beaches, all trading between fishermen and agents is conducted in cash and there are some cases where fishermen must give up part of their catch for free in order to pay off their debts to the agents. Since most landing beaches are located far away from banks, the fishermen store income from sales in their homes in the form of cash.

In these circumstances, where the fishermen cannot receive income supplement and are unable to prove their income, they are unable to enter into social security or receive public funding (for example, small loans from CNCA). As a result, fishermen are continually uneasy about expenses at times of illness, what will happen in the event of unexpected accidents, and expenses for the renewal of fishing boats, engines and fishing gear, etc. Eventually, the fishermen end up relying on loans from visiting agents to cover many of their expenses including those incurred by ceremonial occasions (marriages and funerals, etc.).

In these circumstances, even though artisanal fishermen have had a strong desire to enter social security schemes, it has been physically impossible for them to do so. If artisanal fishing village promotion measures are implemented and branches of ONP are stationed on beaches to carry out mediation in the wholesale stage and automatically collect commissions and social security fees, it is anticipated that the social standing of fishermen will be more firmly established.

In fishing villages where fish wholesale facilities are established on landing beaches as a result of the facilities construction projects, it is important that the ONP dispatches staff who have plenty of knowledge

concerning entry into social security schemes. In particular, since the method of distribution of income from catches is complicated among artisanal fishermen, it is necessary to examine the level of commissions and social security fees that can be set in accordance with current conditions. Moreover, it is necessary for the ONP and CNCA to cooperate in creating an environment where the provision of loans to artisanal fishermen can be carried out through, for example, opening temporary savings windows in fishing villages and holding meetings to explain financial systems.

2) Fishermen's Cooperative Associations

Together with the construction of landing beach facilities by MPM and other public agencies, it is necessary to form operating organizations to effectively utilize the facilities seen from the viewpoint of the beneficiaries. Moreover, when viewed from a long-term standpoint unrelated to facilities construction, it is urgently necessary for the sake of mutual aid by fishermen, who are currently placed in a weak social position, to form fishermen's cooperative associations that will enable fishermen to take the initiative in improving their own working and living environment.

Concerning support for the establishment of fishermen's cooperative associations, MPM and ODECO will take the initiative. In specific terms, staff of MPM and ODECO will start by providing literacy education to fishermen in a joint effort, because there are still many fishermen who cannot read or write. During this stage, potential future leaders of fishermen's cooperative associations will be targeted, and ODECO staff will take the initiative in teaching such fishermen about the advantages of cooperative associations, methods of establishment and methods of operation, etc. Following the establishment of fishermen's cooperative associations, ODECO staff will continue to provide periodic advice until the associations are able to become independently active. It is also important that responsible staff of MPM and ODECO make an effort to learn more about cooperative association activities in other countries.

3) Appropriate Resource Management

The greatest problems facing resource management in the artisanal fisheries sector are a lack of data and absence of a data collection setup. It is first necessary for MPM to take the initiative in building setups for collecting data on fish catches that are landed at the new landing beach facilities. The INRH will then scientifically analyze the state of resources by compiling such data collected on land and data collected at sea.

The small survey ships shall be around 8 m in length and be fitted with an inboard diesel engine, fish detector, GPS and fishing device. These shall be based in ports where port facilities are constructed under the landing beach facilities construction projects, and two such ships shall be stationed on the Atlantic Ocean side and one on the Mediterranean Sea side. Moreover, in order to efficiently implement surveys, an artisanal fisheries resource survey team shall be formed and a branch office established in Souira Kedima on the Atlantic Ocean side. The INRH shall provide the staff and funding for the survey team (including crews of the survey ships).

4) Participation of Women in Fisheries

One feature of fisheries in Morocco is the very low participation rate of women. The long distances between landing beaches and homes are thought to be one factor behind this, however, even in the case of sites like Kaasulas, where homes are located close to the landing beach, women cannot be seen helping out in fisheries activities. A lot of women work in separated and inconspicuous places such as marine product processing facilities, canning plants, fillet refrigeration plants, octopus processing plants and anchovy salt processing plants, etc., however, no women at all can be seen working in open areas such as the markets and landing beaches. In the study, there were reports from Moulay Bouselham and Miruleft that working women collect shells and seaweed on the beaches, however, these are thought to be exceptions to the rule.

The participation of female labor in fisheries marketing is reported in many countries throughout the world, and this is thought to play an important role in the dissemination of fish diets and formation of fish and shell prices. In Morocco, too, if inconspicuous working places in landing beach fish markets and so on can be found, it is thought that more jobs can be found for women in the artisanal fisheries sector in future.

5-2-6 Implementation Schedule

The five year plan for artisanal fishery development is as shown in Figure 5-2-2.

The first village where fisheries infrastructure development will be implemented under the plan for landing beach facility construction is Souira Kedima on the Atlantic Ocean side. Fisheries operations here are the largest of all the target fishing villages and it is thought that the greatest effect can be gained from project implementation here.

The second village for implementation is Sidi Hsaine on the Mediterranean Sea side. Located on the Mediterranean coast where fisheries infrastructure is still undeveloped, it is anticipated that this village will become a major center of artisanal fisheries second only to Cara Iris which is currently undergoing development. Implementation is planned to commence from the first half of the year 2000, however, before that it will be necessary for MTP to construct access roads to the Project site.

The third stage of implementation will take place in the two villages of Tafedna and Tifnit. Since these villages are both located on the Atlantic Ocean coast and are only separated by around 250 km, it will be possible to simultaneously implement the projects in both villages even though the local governments and supervisory branch offices of MPM are different. However, in the case of Tifnit, because the landing beach and surrounding area are under the authority of SONABA (Société Nationale d'Aménagement de la Baie d'Agadir) it will be necessary to carry out ample coordination with this corporation and related agencies to ensure that no discord arises with local development plans.

Since establishment of the social security system centering around the ONP is based on the premise that caught fish be sold in fish markets managed by the ONP, it is important to first ensure the construction of fish markets in order to secure benefits from the system. In cases where the ONP does not have its own plans to construct fish markets, there will be no choice but to wait until the period for the improvement plan for landing beach facilities.

5-2-7 Implementing Agencies

The development of artisanal fishing villages has come to be recognized as a national project of major importance from the viewpoints of local development, relief for weak members of society and economic development ever since the start of the Study for the Fishing Village Equipment Supply Plan, and MPM has taken the initiative in advancing this development through maintaining close links with related government agencies, local governments and private organizations. The Five Year Plan for Fishing Villages Development will be advanced with MPM, ONP and INRH acting as the core implementing agencies.

(1) Ministère des Pêches Maritimes (MPM)

The MPM (the Marine Transportation Division was transferred to the Ministry of Transport following organizational reform in August 1997) controls administration relating to ocean fisheries in Morocco and is composed of the general administrative minister, administrative vice-minister, minister's secretariat, various advisory organs, the fisheries farming division, ocean fisheries engineering division, legal cooperation division, education division and general affairs division, etc. all under the supervision of MPM.

External educational organs are the ISTPM in Agadir, the ITPM in Tantan, Al Hoceima and Safi, and the CQPM in Laayoun. The INRH, which previously belonged to the ONP, was also attached to MPM in 1997. Moreover, there are DRAM offices in 18 major port cities throughout the country and carry out fisheries administration on the local level. The number of staff is currently 1,100 but has been increasing in recent years in response to the growing work load. The annual budget in 1997/98 was 18,500,000 DH from public investment and 94,573,000 DH for administrative expenses and has steadily been increasing every year.

(2) Office Nationale des Pêches (ONP)

The ONP was established as a related technical agency of MPM. Its headquarters are located in Casablanca and it possesses 15 regional offices in 15 major port cities, a further nine regional branch offices and a work force of 416 employees. The ONP is composed of four departments, such as the administration department, financial accounting department, survey department and commercial department. The ESPM research institute belonged to the ONP until 1996, but this was transferred under the supervision of the secretary of MPM as the INRH in 1997. The duties of the ONP are to manage regional wholesale fish markets, modernize coastal fisheries, raise the quality of marine products, promote domestic marketing of marine products, and so on. Income comes from landing commissions that are charged to fishing ports under its control (some fishing ports are controlled by ODEP) and sales from its ice making and ice storage operations.

In the area of coastal fisheries, the ONP has achieved good results in modernizing fisheries, raising productivity and improving the social status of coastal fishermen, etc. Future plans include the further raising of productivity, promoting the clearance of EU hygiene standards, developing new domestic and foreign markets and securing funds for the modernization of fisheries, etc.

In the area of artisanal fisheries, the ONP has so far dispatched staff to a few landing beaches with the aim of managing local markets. However, when the projects come to be implemented, it is planned for the ONP to manage wholesale markets in the target fishing villages. Regarding Imessouane and Cara Iris, it is planned for operation and management staff to be permanently stationed from 1998. Moreover, the ONP is also scheduled to take charge of life insurance and social security matters for artisanal fishermen.

(3) Institut National de Recherches Halieutiques (INRH)

The INRH is currently advancing the construction of centers at a number of sites with the aim of expanding its functions, and support for some of these will also be provided under the projects. As a result, bases for study and research activities will be formed in remote areas away from the Casablanca headquarters and this will expedite activities designed to better understand and support coastal and artisanal fisheries. Thought is being given to providing small boats to the main centers in order to help them clarify the effects of the recent decline in octopus resources on coastal and artisanal fisheries and to carry out study and research on matters concerning artisanal fisheries in general. Plans are also being considered for the establishment of teams consisting of three to five staff members specializing in biology, fisheries technology and economic matters to take charge of artisanal fisheries (two teams each on the Atlantic Ocean side and Mediterranean Sea side).

It is scheduled for three centers in Nador, Laayoun and Dakhla to commence operations in 1998 and another center in Agadir to commence operations in 1999.

Other issues that require attention are as follows.

Kaasulas: resolution of red tide and shell poisoning and education of fisherman in resource protection matters

Imessouane: stocking of scallop
Moulay Bousselham: extensive farming of oysters
Cara Iris: mussel farming and organization of fishermen
National level: appropriate fisheries cooperatives formation

5-2-8 Financial and Economic Analysis

The projects will be evaluated from the two viewpoints of financial analysis and economic analysis. Financial analysis involves examining the profitability of project facilities seen from the viewpoint of the operating agencies and uses the financial internal rate of return (FIRR) to make an objective judgment. Economic analysis, on the other hand, involves examining the usefulness of the projects viewed in terms of the overall national economy and uses the economic internal rate of return (EIRR) to indicate the level of priority of each project. The main difference between these two analysis methods lies in the prices that are used to calculate the project cost and benefit. In the financial analysis, the cost of goods and services is judged in terms of market prices, but in the economic analysis, the cost within the whole Moroccan economy (shadow prices) is assessed. The two methods also differ concerning the significance that is attached to figures obtained through FIRR and EIRR and the manner in which project value is judged. In the case of financial analysis, the project is judged to be a profitable concern if the FIRR is large in comparison to the long-term rate of interest in Morocco. In this case, it is assumed that funds for capital expenditure can be borrowed from banks that offer the said interest rate. In the case of economic analysis, on the other hand, there are no objective indicators that can be used for making comparisons. The analysis is essentially a relative assessment in which projects that present a larger EIRR within the national economy are judged to have a higher priority level.

1) Financial Analysis Methodology

Assuming the profits made by operating agencies following project implementation to be benefit and the capital expenditure (CAPEX) and operation expenditure (OPEX) incurred through project implementation and facilities operation to be cost, cost-benefit calculation is carried out. In the actual calculation, the net cash flow obtained from the difference between cost and benefit is projected over a 30 year period starting from the project implementation year, and the sum total is then sought by using an optional discount rate to calculate the net present value (NPV). The discount rate is then altered on a trial and error basis until the discount rate where the sum total of the net present value becomes zero is found. This is the financial internal rate of return. Before carrying out the calculations here, the following preconditions shall be set.

- (1) The Project period shall be 30 years.
- (2) All prices used in the calculations shall be based on the Moroccan national currency, the dirham (DH).
- (3) Concerning depreciation cost and the rate of interest, since these are internal factors within the FIRR calculation, they shall not be counted as costs. As for inflation, since this has an effect on both cost and benefit, it shall be assumed that it cancels itself out and shall not be taken into consideration.
- (4) The project facilities will be operated and maintained by newly organized bodies formed around the local fisheries cooperative associations. All the project facilities except for the fish markets will basically be run by these bodies, but operation of the fish markets will be placed in the hands of the ONP in line with past custom. In the financial analysis, separate analyses shall not be performed for both organizations, but both shall be treated as a single operating body.

- (5) The fishing grounds used by the project target fishing villages shall be assumed to maintain sufficient resource levels following project implementation.
- (6) Since the projects do not involve any input in terms of fishing boats and fishing gear, the unit catch per fishing boat will not change.

2) Economic Analysis Methodology

Assuming the increase in production that arises in the case of project implementation (with project) compared to the case of no project implementation (without project) to be benefit and the capital expenditure (CAPEX) and operation expenditure (OPEX) incurred by project implementation and facilities operation to be cost, cost-benefit calculation is carried out. The net cash flow obtained from the difference between cost and benefit is projected over a 30 year period starting from the project implementation year, the sum total net present value (NPV) is then sought by using an optional discount rate, and the discount rate where the sum total of the net present value becomes zero is found. In this respect, the calculation methodology is the same as that used in the financial analysis. Moreover, the preconditions for calculation are also the same.

Whereas market prices are used to calculate cost and benefit in the financial analysis, in the economic analysis, it is necessary to assess project usefulness based on cost and benefit viewed in terms of the whole national economy of Morocco. Concretely speaking, it is necessary to use the following conversion coefficients to revise market prices into shadow prices.

- (1) For goods and services that are imported from abroad (trade goods), the shadow exchange rate (SER), which is obtained by adjusting the official exchange rate to better reflect actual economic conditions in Morocco, is used. The price of trade goods is obtained by multiplying the domestic price by 1.14 (see Table 5-2-7-1).

- (2) Concerning the unskilled labor (day labor) element of personnel expenses, under the conditions of high unemployment that exist in Morocco, it is likely that a fair labor market does not exist (i.e. it is a buyers' market) and that wages are set at dumping levels. In view of this, with respect to the wages of unskilled workers, standard wages are multiplied by a shadow labor coefficient of 0.5 to obtain the cost. In the actual analysis, the facilities construction cost is divided into the three elements of trade goods, non-trade goods (domestically produced goods) and personnel expenses (further broken down into skilled engineers cost and unskilled workers cost) and the ratio of each element is calculated. The trade goods cost is multiplied by the SER, the unskilled labor cost is multiplied by the shadow labor coefficient and other elements are multiplied by 1.0 to obtain a multiple average and finally arrive at the shadow construction coefficient (see Table 5-2-7-2).

- (3) Concerning tax, since this is no more than a moving commodity within the country, it is omitted from cost as a transfer item. TVA is levied on general consumer goods and services, however, concerning the cost of kerosene, gasoline, electricity and other daily necessities, a reduced tax rate of 7% is levied.

3) Results of Financial and Economic Analysis

The results of calculating the FIRR and EIRR are indicated below.

Concerning the facilities development project in Sidi Hsaine, two alternative projects have been considered: Alternative 1 involves the construction of full-scale fishing port facilities, while Alternative 2 involves the construction of only the bare minimum necessary facilities with a view to limiting initial cost.

Table 5-2-4 Results of FIRR and EIRR Calculation

Project	FIRR	EIRR
Souira Kedima	2.53	12.28
Sidi Hsaine 1	Incalculable	Incalculable
Sidi Hsaine 2	Incalculable	1.14
Tafedna	6.01	14.40
Tifnit	Incalculable	6.18
Kaa Srass	Incalculable	Incalculable
Moulay Bousselham	Incalculable	6.52

The landing facilities to be constructed in each project, rather than being called production facilities intended to pursue profit, are better described as public facilities intended to pursue convenience. Consequently, the projects do not possess sufficient capacity to repay initial capital investment and it is not possible to calculate the FIRR in four of the six projects. In the remaining two projects, too, the estimated FIRR is far less than the long-term lending rate offered by financial institutions in Morocco and the projects cannot be called profitable. Since even the long-term lending rate offered by the World Bank and other international financial institutions is set at around 8%, profitability could still not be secured even if the source of funds was changed. In conclusion, it is thought wise to consider implementation of the projects under the grant aid scheme of a donor country.

In the economic analysis using the EIRR, apart from the cases of Sidi Hsaine (Alternative 1) and Kaa Suras where massive capital investment is required in comparison to the project benefit, somewhat adequate figures are obtained. In the said two projects, because natural conditions surrounding the envisaged landing facilities construction sites are far more severe than around the other sites, it is necessary to plan full-scale fishing ports with breakwaters that are sufficiently resistant to waves and extend to depths where there is no drift sand accumulation, in order for the ports to be functional over 30 years or more. This would greatly inflate the initial capital investment cost far above the benefit to be gained from project implementation and is the reason why the economic evaluation is so low. The EIRR in the remaining five projects is ranked in the following order of priority:

- (1) Tafedna,
- (2) Souira Kedima,
- (3) Moulay Bousselham,
- (4) Tifnit and,
- (5) Sidi Hsaine (Alternative 2).

The reason why the three projects other than Souira Kedima are assessed in a relatively favorable way is that the necessity of costly port facilities is much smaller and this translates into more attractive figures in the calculation. Souira Kedima is calculated to be second on the list of priority and it is forecast that, as the fishing village with the greatest level of fisheries activity among the six projects, the level of contribution project implementation will make to the actual economy will be the largest. As for Sidi Hsaine, which is given the lowest assessment in the calculation, since this fishing village has the potential to become one of the few fisheries centers to exist on the undeveloped Mediterranean coast, it is anticipated that development here could trigger growth of the local economy.

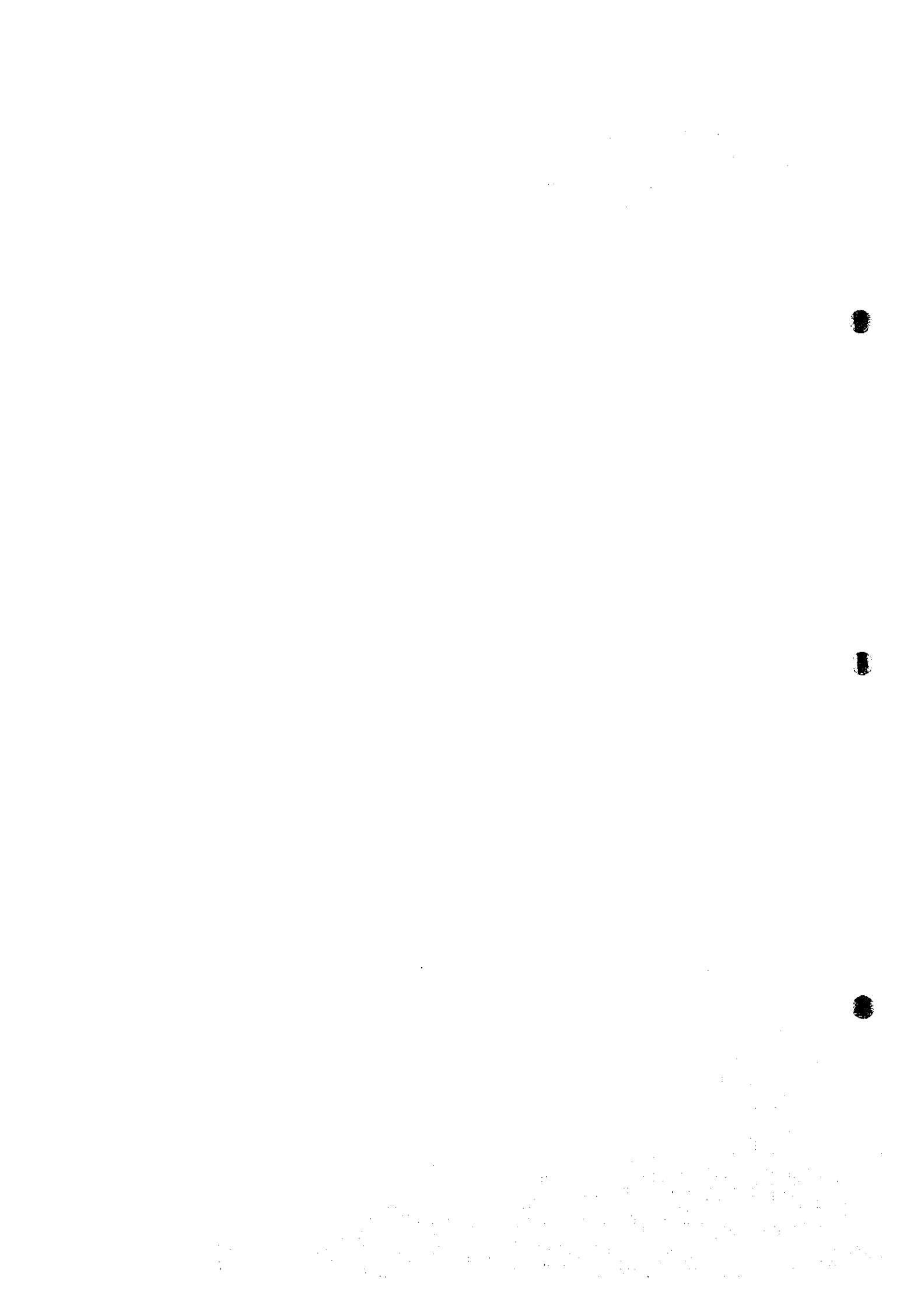
In the financial and economic analysis, benefit was estimated from the two elements of the increase in landed quantities and the rise in average fish prices. Concerning the increase in landed quantities, it was assumed that the number of fishing days will increase to around 220 days per year as a result of port facilities construction, and this was used to estimate how far current fishing days can be increased. Accordingly, the room for increase varies depending on the content of facilities and current number of fishing days. This increased portion was converted into increase in the landed quantity of fish and was calculated over a range of 3% in the sensitivity analysis. As for the rise in average fish prices, the rate of increase was set based on hearing survey responses which stated that fish prices rise by approximately 5% in the case where fish are sold at competitive prices in market auction. In the sensitivity analysis, this was calculated over a range of 2%. This smaller fluctuation range was adopted because the rate of increase in fish prices is not influenced by natural conditions as much as the rate of increase in landed quantities. The success of the project depends on whether or not the anticipated benefit can be obtained. The increase in landed quantities may be adversely influenced by unavoidable factors such as migration of fishing grounds and abnormal weather conditions, however, excluding such factors, it is essential that the administrative side provides support in maintaining the fishing port facilities, particularly through implementing maintenance dredging, and so on. Moreover, the running of permanent services such as ice making and ice storage facilities for removing restrictions on operating time is an extremely important issue for the operating side.

Concerning the rise in fish prices, this is largely influenced by the realization of fair competitive prices and preservation of caught fish freshness. Achievement of the first factor is dependent on activities of the ONP, which will run the fish markets. In other words, by efficiently carrying out fair auctioning, not only will fresh fish be sold to agents quickly, thus giving them time to concentrate on subsequent sales activity, but higher income from sales will be provided to fishermen, thus giving them time to rest and prepare for their next fishing trips. As for the second factor (preservation of fish freshness), it is important for organizations running the facilities to strive to prevent deterioration of fish quality through providing constant services using the ice making and ice storage facilities. Moreover, in the future, it is also important for MPM to take the initiative in conducting education activities designed to encourage fishermen to use ice onboard fishing boats for preserving the freshness of caught fish.

Economic and financial analysis do not enable projects to be evaluated in a manner which takes into account numerous non-quantifiable and indirect benefits of project implementation, but a few of those benefits are given below.

- (1) The movement of people, goods and money within the target areas will become more active.
- (2) Fishermen and residents will feel a greater sense of security by entering fisheries-related social security schemes.

- (3) The time saving effect created through infrastructure development will generate surplus production capacity in sectors other than fisheries.
- (4) New jobs for people engaged in fisheries, especially young workers, will be created.
- (5) The flow of population out of fishing villages into cities will be put under control.



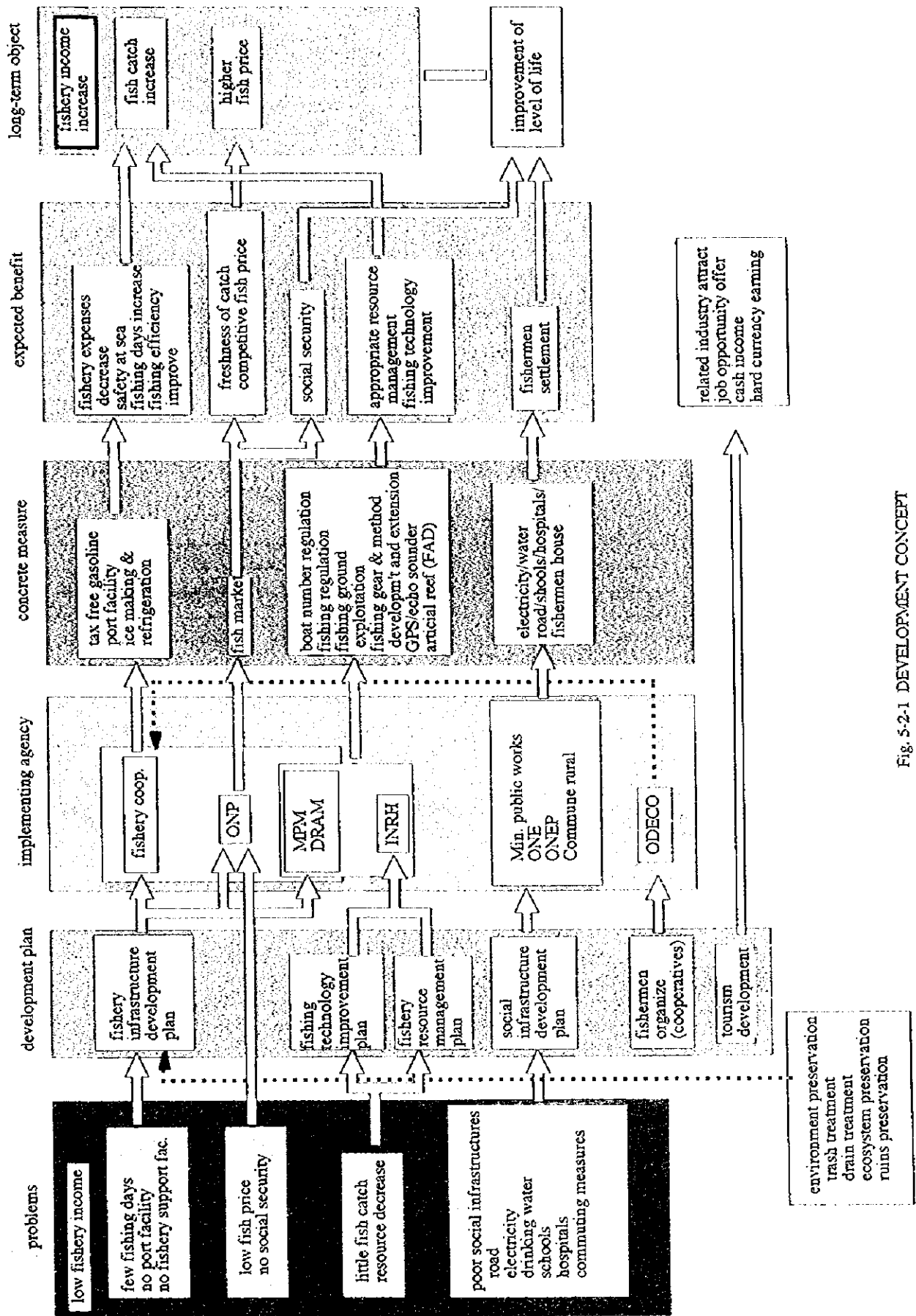


Fig. 5-2-1 DEVELOPMENT CONCEPT



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Table 5-2-2 Implementation Schedule of the Fishing Villages Five-Year Development Plan

Action Plan by Responsible Agency	1999	2000	2001	2002	2003
Ministry of Ocean Fishery					
Facilities construction on landing beaches					
Souira Kedma					
Sidi Haeine					
Tafedna					
Tifnit					
Kaassias					
Moulay Bousselham					
Resource study (system for collecting statistics on landing area catches)		System construction in joint effort with organizations running the constructed landing facilities	Data collection and analysis Fishermen education activities by dissemination officers	Data collection and analysis Fishermen education activities by dissemination officers	Data collection and analysis Fishermen education activities by dissemination officers
Fisheries regulation			Fishermen education activities by dissemination officers Joint survey and education activities with the INRH	Fishermen education activities by dissemination officers Fishermen education activities by dissemination officers	Fishermen education activities by dissemination officers Fishermen education activities by dissemination officers
Fishing ground protections (protected area designation and signage with red flags)					
Training and education					
Fisheries dissemination officer training courses (courses)	Opening of course at Larache College	Dissemination officer training	Dissemination officer training	Dissemination officer training	
Fishermen training courses		Dissemination officers to landing beaches to provide practical guidance			
ONP					
Development and dissemination of on board treatment technology following catching		Technical development in joint effort with dispatched dissemination officers	Technical dissemination via dissemination officers	Technical dissemination via dissemination officers	Technical dissemination via dissemination officers
Construction of storage facilities on landing beaches		Technical development in joint effort with the Ministry of Ocean Fishery			
Adoption of plastic and styrene fish boxes	Implement in unison with landing beach construction plans of the Ministry of Ocean Fishery		Phased dissemination	Phased dissemination	Phased dissemination
Marine product processing technology improvement (testing and research)	Trial introduction and monitoring at main fishing ports		Demonstration	Demonstration	
Development of fresh fish marketing operators	Coordination with the OYCF Sardines Commercialization Plan (Agadir)				
Improvement of the sanitary environment at marketing and processing facilities	Technical guidance to marketing operators in joint effort with dispatched dissemination officers		Guidance on improvement to existing facilities	Guidance on improvement to existing facilities	Continuation of guidance
Establishment of sanitary inspection agencies	Design of model facilities that satisfy sanitary standards		Construction and start of operations at inspection agencies in large-scale fishing ports	Construction and start of operations at inspection agencies in large-scale fishing ports	Guidance on improvement to existing facilities Successive expansion to other fishing ports
Preparation of social security schemes	Design of model facilities that satisfy sanitary standard items		Promotion of entry into social security schemes	Promotion of entry into social security schemes	
INRH	Information provision to fishermen	Information provision to fishermen			
Improvement of fishing gear and fishing methods	Field survey	Prototype manufacture and trial operation	Prototype manufacture and trial operation	Analysis and evaluation of trial results	Manufacture and dissemination of finished articles
Boasting of fishing ground survey capacity (introduction and use of survey ships)	Preliminary survey of landing sites Formation of Atlantic Ocean team	Introduction of survey ships and survey on Atlantic Ocean side Formation of the Mediterranean Sea team Introduction of survey ships and start of the survey	Continued survey on the Atlantic Ocean side Start of survey on the Mediterranean Sea	Data analysis and feedback to fishing ground protection and fisheries regulation	Continued surveys
Resources survey (sea survey and resources analysis)	Research into matching of boat hulls, engines and propellers	Practical matching testing using model fishing boats	Continued survey and data analysis	Continued survey and data analysis	Continued survey and data analysis
Modernization of fishing boats and equipment (design, construction and dissemination)	Preparation for research and development	Manufacture of trial fish aggregating devices	Research into hull structure, shape and materials	Research into hull structure, shape and materials	Manufacture of appropriate prototype artisanal fishing boats
Fishing ground formation (research and development)			Trial installation and monitoring	Trial installation and monitoring	Data analysis and evaluation
Surrounding environmental protection (survey)		Land survey by the study team	Land survey by the study team	Land survey by the study team	Lead survey by the study team
ODECO					
Formation of fishermen's groups (cooperative associations)	Establishment in Souira Kedma	Establishment in Sidi Haeine	Establishment in Tafedna and Tifnit	Establishment in Kaassias	Establishment in Moulay Bousselham
Other related agencies		Nader	Bassouira/Agadir	Tecouan	Kenitra
Provinces (coordination of related agencies)	Saï		(Extension from the main line into Tafedna)		
ONP (extension of transmission line network)					
ODEP (fishing ports maintenance)	Periodically check the constructed landing beach and port facilities and carry out improvements and repairs where necessary		(Construction of access road linking Tafedna to the main road)		
Ministry of Public Works (road construction)					
SONABA (infrastructure development around Tifnit)			(Construction of public infrastructure in Tifnit)		
CNCA (small-scale fisheries finance)			Examination of all-scale financing schemes in joint effort with the fishermen's cooperative associations and ONP, etc.		
Agence du Nord (infrastructure development in northern regions)			(Construction of roads and provision of power supply to Sidi Haeine)		

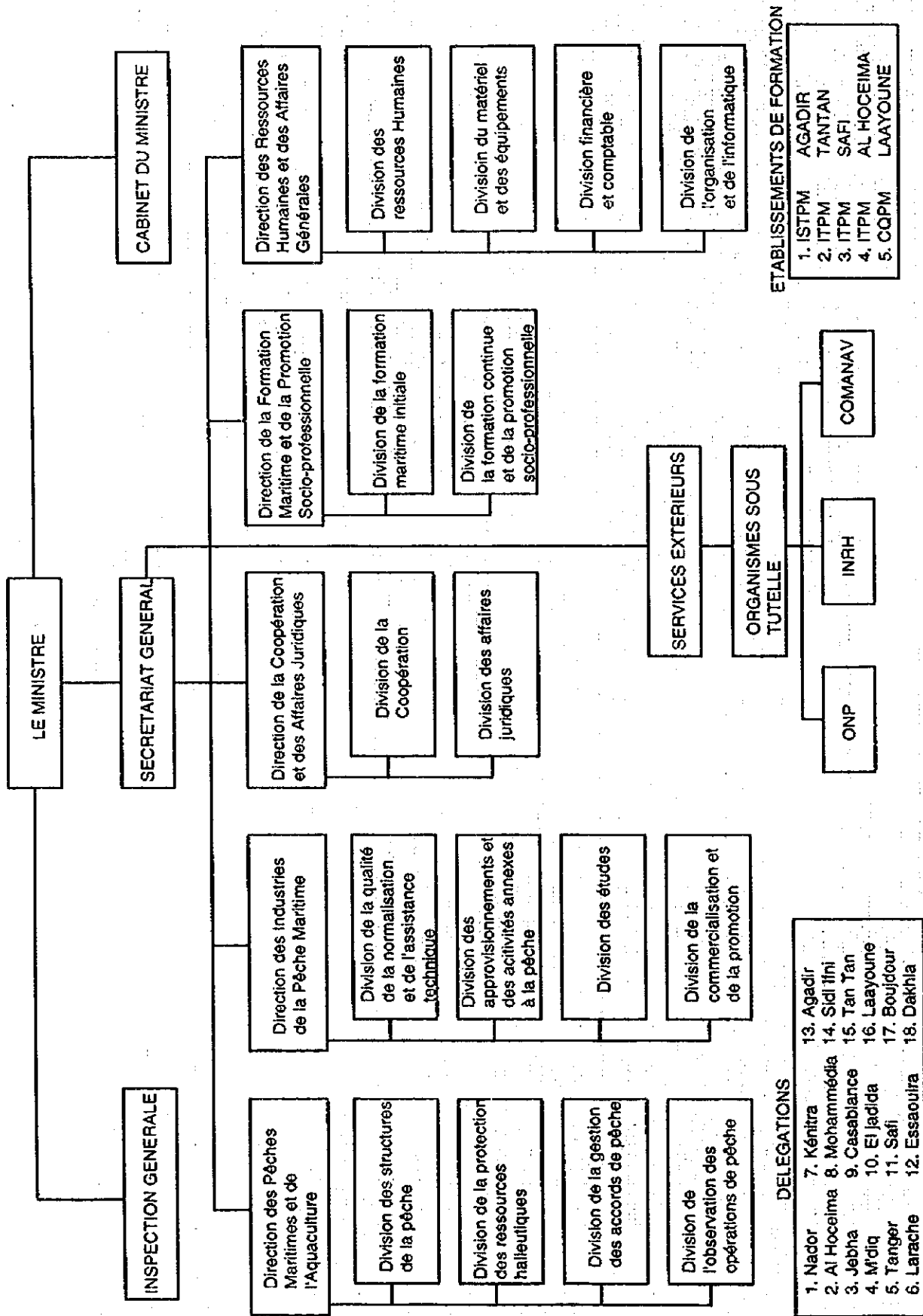


Fig. 5-2-3 Organization chart of Ministry of Ocean Fishery

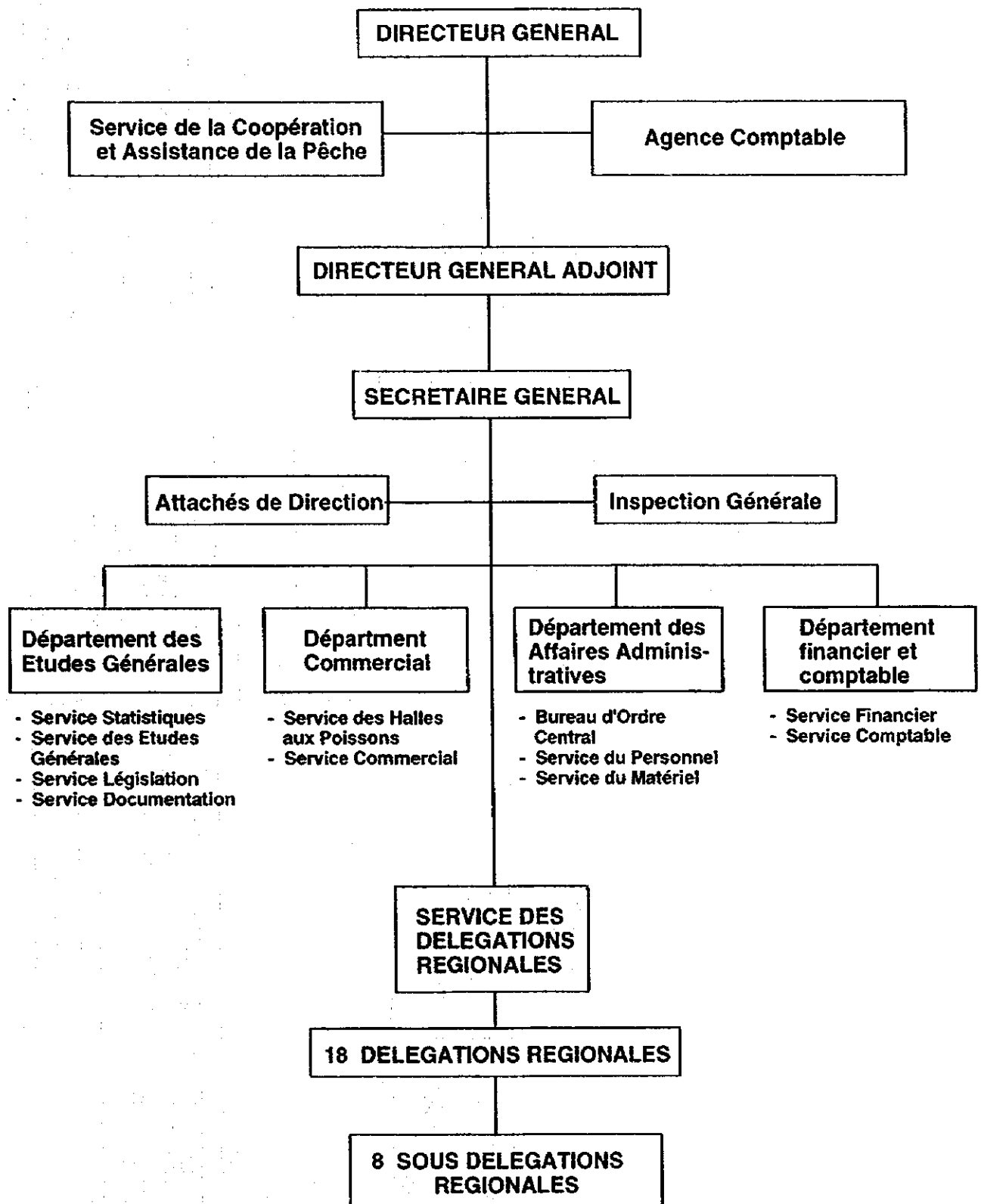


Fig. 5-2-4 Organization chart of ONP

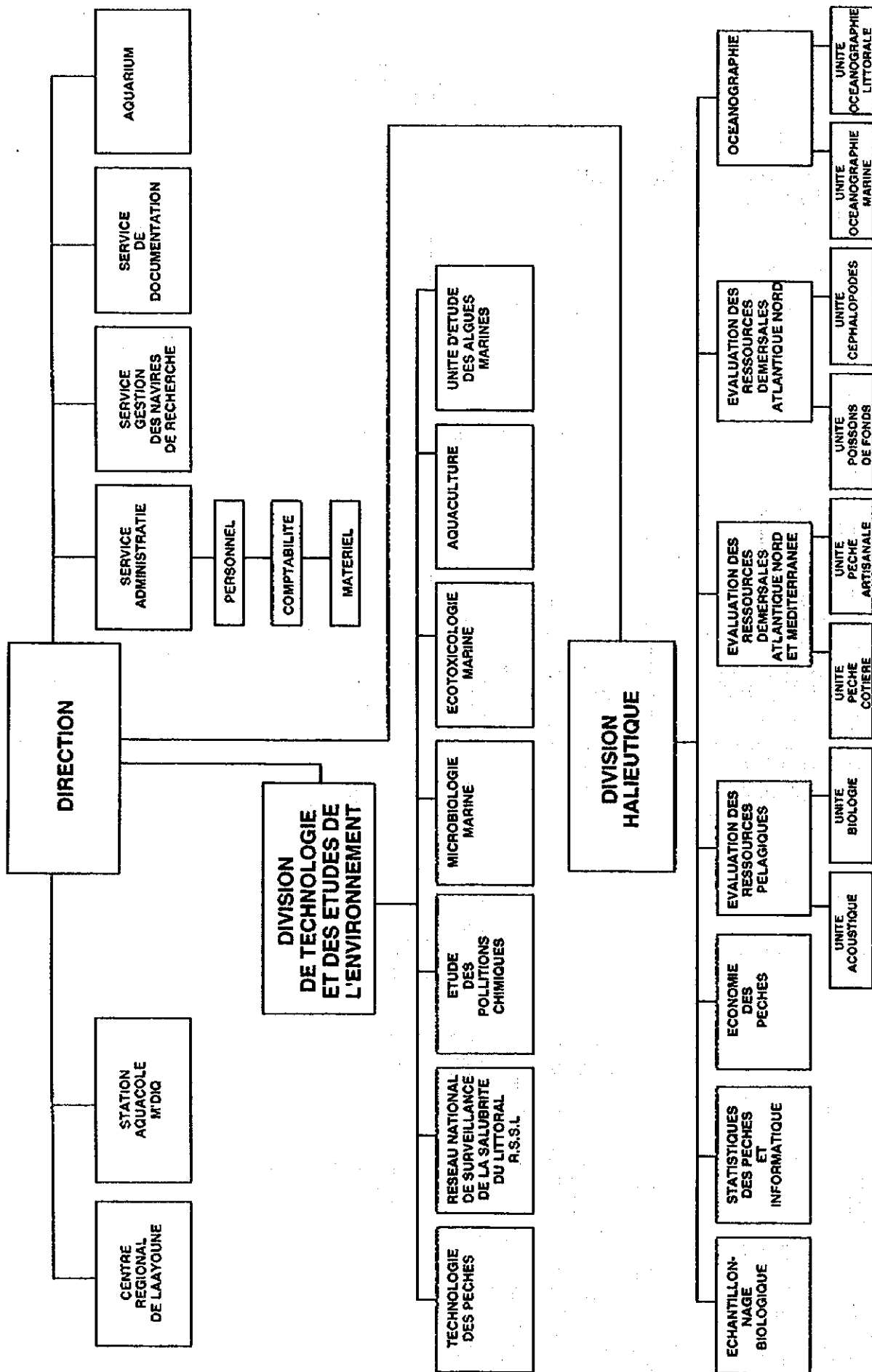


Fig. 5-2-5 Organization chart of INRH

MINISTRE DES PÊCHES MARITIMES
ET DE LA MARINE MARCHANDE

BUDGET GENERAL DE L'ETAT
REPRESENTATION DU BUDGET DU MINISTERE
DES PÊCHES MARITIMES ET DE LA MARINE MARCHANDE

BUDGET DE FONCTIONNEMENT		BUDGET D'INVESTISSEMENT				
ANNEE	BUDGET GENERAL	M/PMMM	PART RELATIV	BUDGET GENERAL DE L'ETAT	M/PMMM	PART RELATIVE %
1982	18.104.558.648	20.831.936	0,11	16.806.638.698	42.020.000	0,25
1983	20.139.608.797	23.543.140	0,11	18.713.896.623	28.310.000	0,25
1984	18.964.001.832	23.368.640	0,12	10.154.456.947	10.700.000	0,10
1985	21.283.626.490	25.730.894	0,12	12.281.750.947	11.500.000	0,09
1986	22.098.949.292	28.292.000	0,12	10.502.733.000	30.800.000	0,15
1987	23.676.923.636	33.905.000	0,14	19.924.239.000	25.000.000	0,12
1988	25.134.371.394	34.723.000	0,14	36.638.529.000	35.000.000	0,09
1989	28.829.610.750	40.095.000	0,14	34.802.373.000	35.000.000	0,10
1990	30.347.064.387	48.530.669	0,15	15.168.189.250	25.200.000	0,16
1991	33.119.600.000	52.637.719	0,15	12.899.800.000	24.000.000	0,18
1992	37.287.908.724	58.432.107	0,15	13.591.604.000	29.600.000	0,21
1993	41.841.763.880	63.505.320	0,15	15.106.373.000	10.000.000	0,06
1994	47.111.256.560	68.894.560	0,14	19.097.355.000	12.500.000	0,03
1995	47.174.419.000	73.636.000	0,15	16.623.600.000	30.000.000	0,18
1ers/96	26.204.690.000	38.167.000	0,14	7.970.550.000	88.500.000	1,11
96/97	50.604.936.000	86.839.000	0,17	15.129.100.000	177.000.000	1,16
97/98	57.577.551.000	94.573.000	0,16	16.641.630.000	185.000.000	1,11

Table 5-2-2 Standard Conversion Factor

(Unit: Million DH)

Year	Import Tax	Import Value	Export Value
1991	12,908	59,730	37,283
1992	14,469	62,805	33,959
1993	14,742	61,905	34,366
1994	15,321	65,963	36,546
1995	11,835	72,868	40,240
Average in 5 years	13,855	64,654	36,479

Standard Conversion Factor	0.88
Shadow Exchange Rate	1.14

Note:

No export tax and export subvention exist in Morocco.

Source: La Douane (Custom)

Table 5-2-3 Construction Conversion Factor (i)

Souira Ksdima

Type of works	A Percentage in total construction cost (%)	B Percentage of labor cost in each type of work (%)	C Percentage of non-skilled labor in labor cost of each type of work (%)	D Percentage of non-material in each type of work (%)	E: B x C (%)	F: 100 - (D+E) (%)	G Shadow exchange rate	H shadow wage rate	Conversion factors in each type of work I: D x G + E x H + F	Construction Conversion Factor A x I
Civil work										
Earth work	27.00	42.00	80.00	30.00	33.60	36.40	1.14	0.50	0.87	23.60
Foundation work	2.00	42.00	70.00	30.00	29.40	40.60	1.14	0.50	0.90	1.79
Steel work	4.00	46.00	90.00	0.00	41.40	58.60	1.14	0.50	0.79	3.17
Form work	3.00	21.00	90.00	0.00	18.90	81.10	1.14	0.50	0.91	2.72
Concrete work	38.00	23.00	90.00	10.00	20.70	69.30	1.14	0.50	0.91	34.60
Stone work	26.00	35.00	70.00	30.00	24.50	45.50	1.14	0.50	0.92	23.91
Sum	100.00									
Building work										
Earth work	5.00	22.00	80.00	30.00	17.60	52.40	1.14	0.50	0.95	4.77
Concrete work	30.00	23.00	90.00	10.00	20.70	69.30	1.14	0.50	0.91	27.32
Finish work	35.00	38.00	90.00	10.00	34.20	55.80	1.14	0.50	0.84	29.51
Mechanical work	4.00	44.00	70.00	5.00	30.80	64.20	1.14	0.50	0.85	3.41
Electrical work	11.00	39.00	70.00	20.00	27.30	52.70	1.14	0.50	0.89	9.81
External work	15.00	22.00	80.00	30.00	17.60	52.40	1.14	0.50	0.95	14.31
Sum	100.00									

Table 5.2.3 Construction Conversion Factor (a)

Type of works	Percentage of head construction cost (%)		Percentage of non-skilled labor in labor cost of each type of work (%)		Percentage of trade material in each type of work (%)		Percentage of non-skilled labor cost in each type of work (%)		Shadow exchange rate		Construction Unit Conversion Factor	
	A	B	C	D	E	F	G	H	I	J	K	L
Civil work												
Earth work	27.00	42.00	80.00	30.00	35.00	36.00	1.14	0.50	3.87	1.40		
Foundation work	2.00	42.00	70.00	30.00	29.00	40.00	1.14	0.50	4.90	1.10		
Steel work	4.00	46.00	70.00	0.00	41.00	58.00	1.14	0.50	3.70	3.17		
Form work	3.00	21.00	90.00	0.00	18.00	81.00	1.14	0.50	2.97	2.11		
Concrete work	38.00	23.00	90.00	10.00	20.00	60.00	1.14	0.50	0.97	14.00		
Stone work	26.00	35.00	70.00	30.00	24.00	45.00	1.14	0.50	1.17	31.00		
Subtotal	100.00									0.90		
Building work												
Earth work	5.00	22.00	80.00	30.00	13.00	52.00	1.14	0.50	2.75	4.17		
Concrete work	30.00	28.00	90.00	10.00	20.00	65.00	1.14	0.50	0.91	1.10		
Form work	35.00	38.00	90.00	0.00	34.00	55.00	1.14	0.70	1.81	1.90		
Mechanical work	4.00	44.00	70.00	5.00	37.00	64.00	1.14	0.50	0.86	4.42		
Electrical work	11.00	39.00	70.00	20.00	27.00	52.00	1.14	0.70	1.40	1.72		
External work	15.00	27.00	80.00	30.00	17.00	40.00	1.14	0.50	1.19	14.32		
Subtotal	100.00									0.90		

Table 5-2-3 Construction Conversion Factor (ii)

Sidi Hsaine

Type of works	A		B		C		D		E:B x C		F:100 - (D+E)		G		H		I:D x G + E x H + F		A x I		
	Percentage in total construction cost (%)	Percentage of labor cost in each type of work (%)	Percentage of non-skilled labor in labor cost of each type of work (%)	Percentage of non-skilled labor in each type of work (%)	Percentage of trade skilled labor cost in each type of work (%)	Percentage of non-skilled labor cost in each type of work (%)	Percentage of other cost in each type of work (%)	Shadow exchange rate	shadow wage rate (%)	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work
Civil work																					
Earth work	27.00	42.00	80.00	30.00	30.00	33.60	36.40	1.14	1.14	0.50	0.50	0.87	0.87	0.50	0.50	0.87	0.87	0.50	0.50	23.60	
Foundation work	2.00	42.00	70.00	30.00	30.00	29.40	40.60	1.14	1.14	0.50	0.50	0.90	0.90	0.50	0.50	0.90	0.90	0.50	0.50	1.79	
Steel work	4.00	46.00	90.00	0.00	0.00	41.40	58.60	1.14	1.14	0.50	0.50	0.79	0.79	0.50	0.50	0.79	0.79	0.50	0.50	3.17	
Form work	3.00	21.00	90.00	0.00	0.00	18.90	81.10	1.14	1.14	0.50	0.50	0.91	0.91	0.50	0.50	0.91	0.91	0.50	0.50	2.72	
Concrete work	38.00	23.00	90.00	10.00	10.00	20.70	69.30	1.14	1.14	0.50	0.50	0.91	0.91	0.50	0.50	0.91	0.91	0.50	0.50	34.60	
Stone work	26.00	35.00	70.00	30.00	30.00	24.30	45.50	1.14	1.14	0.50	0.50	0.92	0.92	0.50	0.50	0.92	0.92	0.50	0.50	23.91	
Sum	100.00																				
Building work																					
Earth work	5.00	22.00	80.00	30.00	30.00	17.60	52.40	1.14	1.14	0.50	0.50	0.95	0.95	0.50	0.50	0.95	0.95	0.50	0.50	4.77	
Concrete work	30.00	23.00	90.00	10.00	10.00	20.70	69.30	1.14	1.14	0.50	0.50	0.91	0.91	0.50	0.50	0.91	0.91	0.50	0.50	27.32	
Finish work	35.00	38.00	90.00	10.00	10.00	34.20	55.80	1.14	1.14	0.50	0.50	0.84	0.84	0.50	0.50	0.84	0.84	0.50	0.50	29.51	
Mechanical work	4.00	44.00	70.00	5.00	5.00	30.80	64.20	1.14	1.14	0.50	0.50	0.85	0.85	0.50	0.50	0.85	0.85	0.50	0.50	3.41	
Electrical work	11.00	39.00	70.00	20.00	20.00	27.30	52.70	1.14	1.14	0.50	0.50	0.89	0.89	0.50	0.50	0.89	0.89	0.50	0.50	9.81	
External work	15.00	22.00	80.00	30.00	30.00	17.60	52.40	1.14	1.14	0.50	0.50	0.95	0.95	0.50	0.50	0.95	0.95	0.50	0.50	14.31	
Sum	100.00																				

Table 5-2-3 Construction Conversion Factor (ii)

Type of works	A		B		C		D		E: B x C (%)		F: 100 - (D+E)		G		H		I: D x G + E x H + F		Construction Conversion Factor	
	Percentage in total construction cost (%)	Percentage of labor cost in each type of work (%)	Percentage of non-skilled labor in labor cost of each type of work (%)	Percentage of non-skilled labor in labor cost of each type of work (%)	Percentage of trade material in each type of work (%)	Percentage of non-skilled labor cost in each type of work (%)	Percentage of other cost in each type of work (%)	Shadow exchange rate	shadow wage rate	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work	Conversion factors in each type of work		
Civil work																				
Earth work	46.00	42.00	80.00	30.00	30.00	33.60	36.40	1.14	0.50	0.87	40.20	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Foundation work	1.00	42.00	70.00	30.00	30.00	29.40	40.60	1.14	0.50	0.90	7.28	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Concrete work	8.00	23.00	90.00	10.00	10.00	20.70	69.30	1.14	0.50	0.92	41.38	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Stone work	45.00	35.00	70.00	30.00	30.00	24.50	45.50	1.14	0.50	0.92	41.38	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Sum	100.00																			
Building work																				
Earth work	5.00	22.00	80.00	30.00	30.00	17.60	52.40	1.14	0.50	0.95	4.77	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Concrete work	30.00	23.00	90.00	10.00	10.00	20.70	69.30	1.14	0.50	0.91	27.32	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Finish work	35.00	38.00	90.00	10.00	10.00	34.20	55.80	1.14	0.50	0.84	29.51	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Mechanical work	4.00	44.00	70.00	5.00	5.00	30.80	64.20	1.14	0.50	0.85	3.41	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Electrical work	11.00	39.00	70.00	20.00	20.00	27.30	52.70	1.14	0.50	0.89	9.81	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
External work	15.00	22.00	80.00	30.00	30.00	17.60	52.40	1.14	0.50	0.95	14.31	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Sum	100.00																			

Table 2.3. Composition of wages and labor cost

Type of works	Percentage of labor cost in each type of work (%)		Percentage of man-hours in each type of work (%)		Percentage of man-hours in each type of work (%)		Percentage of man-hours in each type of work (%)		Percentage of man-hours in each type of work (%)		Percentage of man-hours in each type of work (%)	
	A	B	C	D	E	F	G	H	I	J	K	L
Civil work												
Earth work	27.00	42.00	80.00	40.00	33.00	66.00	1.14	0.56	0.47	0.56	0.47	23.00
Foundation work	2.00	42.00	70.00	30.00	29.00	40.00	1.14	0.56	0.56	0.56	0.56	1.70
Steel work	4.00	26.00	90.00	0.00	47.00	58.00	1.14	0.56	0.70	0.56	0.70	3.12
Form work	3.00	21.00	90.00	0.00	18.00	51.00	1.14	0.56	0.41	0.56	0.41	2.72
Concrete work	48.00	24.00	60.00	10.00	20.70	69.30	1.14	0.56	0.71	0.56	0.71	32.00
Shoring work	76.00	38.00	70.00	30.00	24.50	45.50	1.14	0.56	0.43	0.56	0.43	14.00
Sum	100.00											100.00
Building work												
Earth work	5.00	22.00	80.00	30.00	17.00	52.00	1.14	0.56	0.68	0.56	0.68	2.77
Concrete work	30.00	24.00	90.00	10.00	29.70	60.30	1.14	0.56	0.51	0.56	0.51	23.32
Form work	35.00	38.00	90.00	10.00	34.20	58.80	1.14	0.56	0.84	0.56	0.84	29.51
Mechanical work	4.00	44.00	70.00	5.00	39.80	64.20	1.14	0.56	0.84	0.56	0.84	8.41
Electrical work	11.00	40.00	70.00	20.00	27.30	52.70	1.14	0.56	0.50	0.56	0.50	9.81
External work	15.00	23.00	80.00	30.00	17.00	52.00	1.14	0.56	0.68	0.56	0.68	14.31
Sum	100.00											100.00

Table 5.2.3 Construction Conversion Factor (00)

Type of works	Percentage in total construction cost (%)		Percentage of labor cost in each type of work (%)		Percentage of non-skilled labor in each type of work (%)		Percentage of trade material in each type of work (%)		Percentage of non-skilled labor cost in each type of work (%)		Percentage of other cost in each type of work (%)		Shadow exchange rate		Shelter wage rate		Conversion factor in each type of work		Conversion factor
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
Civil work	46.00	42.00	80.00	30.00	33.00	36.20	1.14	0.60	0.87	0.60	0.87	46.20	0.60	0.87	0.60	0.87	0.60	0.87	46.20
Earth work	3.00	42.00	73.00	30.00	29.70	40.00	1.14	0.80	0.90	0.80	0.90	0.90	0.80	0.90	0.80	0.90	0.80	0.90	0.90
Foundation work	8.00	23.00	90.00	10.00	20.70	69.30	1.14	0.20	0.70	0.20	0.70	0.70	0.20	0.70	0.20	0.70	0.20	0.70	0.70
Concrete work	48.00	38.00	70.00	30.00	24.80	48.84	1.14	0.80	0.80	0.80	0.80	41.38	0.80	0.80	0.80	0.80	0.80	0.80	41.38
Stone work	100.00																		
Building work																			
Earth work	5.00	22.00	80.00	40.00	17.60	52.40	1.14	0.50	0.50	0.50	0.50	3.77	0.50	0.50	0.50	0.50	0.50	0.50	3.77
Concrete work	30.00	23.00	90.00	10.00	20.70	60.30	1.14	0.80	0.80	0.80	0.80	2.72	0.80	0.80	0.80	0.80	0.80	0.80	2.72
Plumb work	55.00	58.00	90.00	10.00	34.20	55.80	1.14	0.80	0.80	0.80	0.80	29.03	0.80	0.80	0.80	0.80	0.80	0.80	29.03
Mechanical work	4.00	44.00	8.00	20.00	30.80	60.20	1.14	0.80	0.80	0.80	0.80	3.47	0.80	0.80	0.80	0.80	0.80	0.80	3.47
Electrical work	11.00	30.00	70.00	20.00	2.40	52.70	1.14	0.60	0.60	0.60	0.60	1.44	0.60	0.60	0.60	0.60	0.60	0.60	1.44
External work	18.00	22.00	80.00	40.00	17.60	52.40	1.14	0.80	0.80	0.80	0.80	1.44	0.80	0.80	0.80	0.80	0.80	0.80	1.44
Sum	100.00																		100.00

Table 5-2-3 Construction Conversion Factor (iv)

Tifnit

Type of works	A Percentage in total construction cost (%)	B Percentage of labor cost in each type of work (%)	C Percentage of non-skilled labor in labor cost of each type of work (%)	D Percentage of trade material in each type of work (%)	E: B x C (%)	F: 100 - (D+E) work (%)	G Shadow exchange rate	H shadow wage rate	I: D x G + E x H + F work	Conversion factors in each type of work	A x I Construction Conversion Factor
Civil work											
Earth work	37.00	42.00	80.00	30.00	33.60	36.40	1.14	1.14	0.50	0.87	32.34
Foundation work	1.00	42.00	70.00	30.00	29.40	40.60	1.14	1.14	0.50	0.90	0.90
Steel work	3.00	46.00	90.00	0.00	41.40	58.60	1.14	1.14	0.50	0.79	2.38
Form work	2.00	21.00	90.00	0.00	18.90	81.10	1.14	1.14	0.50	0.91	1.81
Concrete work	24.00	23.00	90.00	10.00	20.70	69.30	1.14	1.14	0.50	0.91	21.85
Stone work	35.00	35.00	70.00	30.00	24.50	45.50	1.14	1.14	0.50	0.92	30.34
Sum	100.00										
Building work											
Earth work	5.00	22.00	80.00	30.00	17.60	52.40	1.14	1.14	0.50	0.95	4.77
Concrete work	30.00	23.00	90.00	10.00	20.70	69.30	1.14	1.14	0.50	0.91	27.32
Finish work	35.00	38.00	90.00	10.00	34.20	55.80	1.14	1.14	0.50	0.84	29.51
Mechanical work	4.00	44.00	70.00	5.00	30.80	64.20	1.14	1.14	0.50	0.85	3.41
Electrical work	11.00	39.00	70.00	20.00	27.30	52.70	1.14	1.14	0.50	0.89	9.81
External work	15.00	22.00	80.00	30.00	17.60	52.40	1.14	1.14	0.50	0.95	14.31
Sum	100.00										

Table 5-2-3 Construction Conversion Factor (v)

Type of works	Kaa Strass									
	A	B	C	D	E: B x C (%)	F: 100 - (D+E) (%)	G	H	I: D x G + E x H + F	A x I
	Percentage in total construction cost (%)	Percentage of labor cost in each type of work (%)	Percentage of non-skilled labor in labor cost of each type of work (%)	Percentage of trade material in each type of work (%)	Percentage of non-skilled labor cost in each type of work (%)	Percentage of other cost in each type of work (%)	Shadow exchange rate	shadow wage rate	Conversion factors in each type of work	Construction Conversion Factor
Civil work										
Earth work	25.00	42.00	80.00	30.00	33.60	36.40	1.14	0.50	0.87	21.85
Foundation work	1.00	42.00	70.00	30.00	20.40	40.60	1.14	0.50	0.90	0.90
Steel work	3.00	46.00	90.00	0.00	41.40	58.60	1.14	0.50	0.79	2.38
Form work	2.00	21.00	90.00	0.00	18.90	81.10	1.14	0.50	0.91	1.81
Concrete work	30.00	23.00	90.00	10.00	20.70	69.30	1.14	0.50	0.91	27.32
Stone work	99.00	35.00	70.00	30.00	24.50	45.50	1.14	0.50	0.92	35.86
Sum	100.00									
Building work										
Earth work	5.00	22.00	80.00	30.00	17.60	52.40	1.14	0.50	0.95	4.77
Concrete work	30.00	23.00	90.00	10.00	20.70	69.30	1.14	0.50	0.91	27.52
Finish work	35.00	38.00	90.00	10.00	34.20	55.80	1.14	0.50	0.84	29.51
Mechanical work	4.00	44.00	70.00	5.00	30.80	64.20	1.14	0.50	0.85	3.41
Electrical work	11.00	39.00	70.00	20.00	27.30	52.70	1.14	0.50	0.89	9.81
External work	15.00	22.00	80.00	30.00	17.60	52.40	1.14	0.50	0.95	14.31
Sum	100.00									

Table 5-2-3 Construction Conversion Factor (vi)

Moulay Boussetham

Type of works	A		B		C		D	E: B x C		F: 100 - (D+E)	G	H	I: D x G + E x H + F	A x I
	Percentage in total construction cost (%)	Percentage of labor cost in each type of work (%)	Percentage of labor cost in each type of work (%)	Percentage of non-skilled labor in labor cost of each type of work (%)	Percentage of trade material in each type of work (%)	Percentage of non-skilled labor cost in each type of work (%)		Percentage of other cost in each type of work (%)	Shadow exchange rate					
Building work														
Earth work	5.00	22.00	80.00	30.00	17.60	52.40	1.14	0.50	0.95	4.77				
Concrete work	30.00	23.00	90.00	10.00	20.70	69.30	1.14	0.50	0.91	27.32				
Finish work	35.00	38.00	90.00	10.00	34.20	55.80	1.14	0.50	0.84	29.51				
Mechanical work	4.00	44.00	70.00	5.00	30.80	64.20	1.14	0.50	0.85	3.41				
Electrical work	11.00	39.00	70.00	20.00	27.30	52.70	1.14	0.50	0.89	9.81				
External work	15.00	22.00	80.00	30.00	17.60	52.40	1.14	0.50	0.95	14.31				
Sum	100.00													

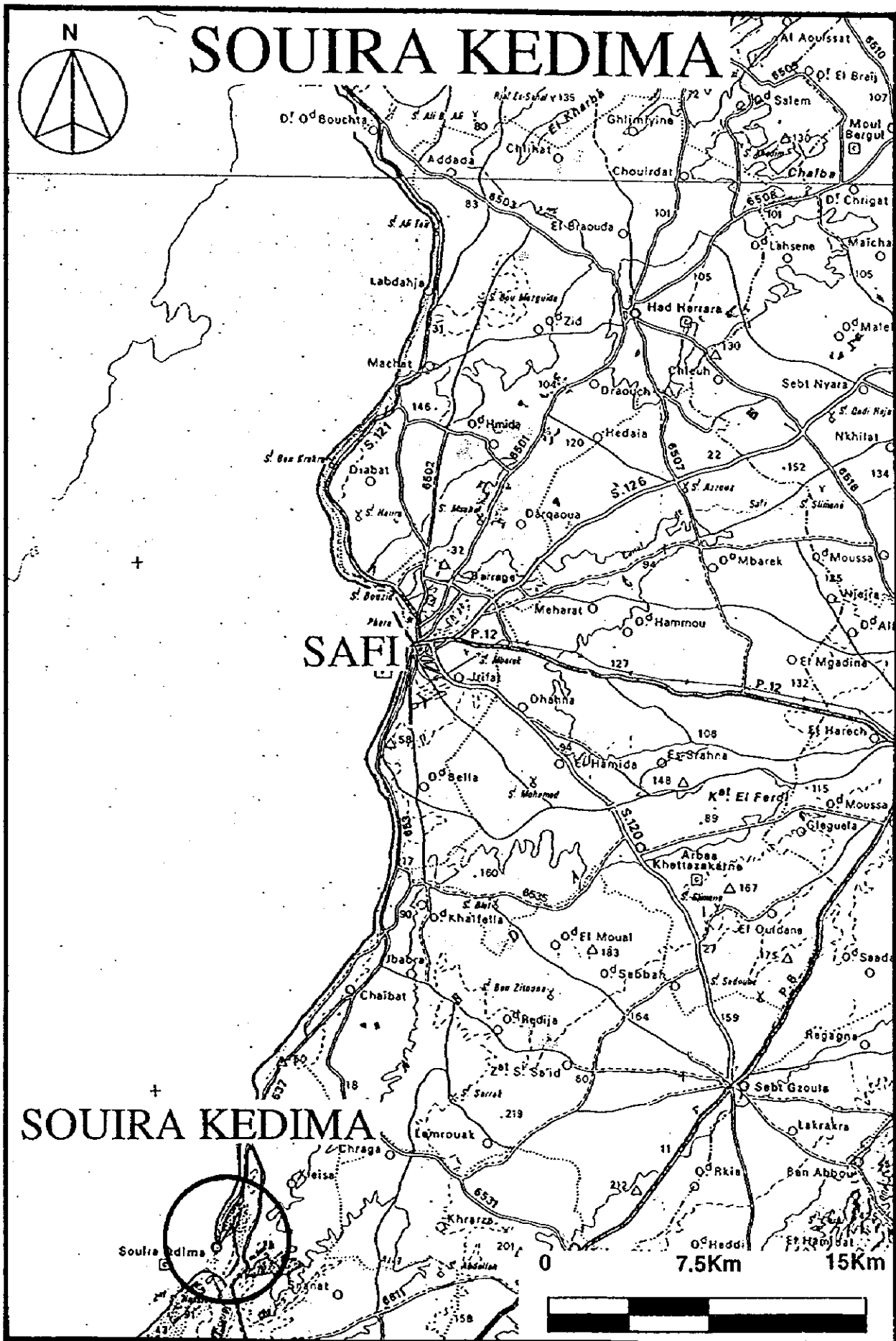
5.3 Results of Study in Each Target Area

- A Souira Kedima
- B Sidi Hsaine
- C Tafedna
- D Tifnit
- E Kaa Srass
- F Moulay Bouselham

Table 8.2.3. Construction Category of Expenditure

Type of works	Percentage of total construction cost (%)		Percentage of total material cost (%)		Percentage of total labor cost (%)		Percentage of total work cost (%)		Percentage of total work cost (%)		Percentage of total work cost (%)		Percentage of total work cost (%)	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Percentage of total construction cost (%)	Percentage of total construction cost (%)	Percentage of total material cost (%)	Percentage of total material cost (%)	Percentage of total labor cost (%)	Percentage of total labor cost (%)	Percentage of total work cost (%)	Percentage of total work cost (%)	Percentage of total work cost (%)	Percentage of total work cost (%)	Percentage of total work cost (%)	Percentage of total work cost (%)	Percentage of total work cost (%)	Percentage of total work cost (%)
Building work														
Earth work	5.00	22.00	50.00	30.00	17.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete work	30.00	23.00	90.00	10.00	20.00	70.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plumb work	35.00	18.00	90.00	10.00	50.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mechanical work	4.00	42.00	30.00	70.00	40.00	60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical work	11.00	10.00	70.00	30.00	20.00	80.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
General work	15.00	22.00	80.00	20.00	12.00	88.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	100.00													0.85

Souira Kedima



A Souira Kedima

1. General conditions of the site

The site is a sandy beach on the Atlantic Ocean. The beach has been formed on the edge of an alluvial fan of rivers. A reef zone which is 200m long is located 240m off the beach. Inside of the reef zone is a relatively calm harbor. The presumed population of the small-scale fishermen basing in Souira Kedima is about 1,000, and that of their families is about 6,000¹. Many of these artisanal fishermen live in the commune rurale including Souira Kedima. There are some artisanal fishermen who come from other adjacent commune rurales. The number of residents in the whole commune rurale is over 12,000². Although agriculture is practiced in this commune rurale, the residents earn most of their incomes by fishing. They catch European conger, sea bream (*Pagellus* spp.), delete, spiny lobsters, and European lobster mainly by means of bottom longline and trammel net. Judging from their actual catch, average income per person (including fishermen's family members) is estimated to be lower than officially reported average income per person in the country³. But average income in this site seems to be higher than that of the residents in agricultural villages or in mountain areas in Morocco. Thus, the living standard of the fishermen in this village is accounted to be above the typical poverty level.

1) Fishery Production

(1) Overview

In the neighboring waters off Souira Kedima, nutrient substances from the river running on the south of this landing beach have been deposited in the coastal waters. As the upwelling of the sea. (exchanges of water between the seabed and the surface) generated along the coast agitate them, the basic production volume is high. There used be sardine processing factories operating near the river mouth as sardines provided rich resources in the neighboring waters. The offing has been known as a good fishery with the Canary Current (cold current) running to the south into the waters on the continental shelf. Safi, a fishing port located at 30 km to the north of Souira Kedima, has been thriving on coastal sardine fishery with purse seine, and a lot of sardine processing factories are still active.

Some of the current artisanal fisheries are shared with the neighboring fishing villages and ports, leaving no untapped fishing grounds. However, the fishing grounds in this area are generally considered to be in a sound condition, judging from the catches, sizes of fishes, forms of operation and scales of fishing gears.

(2) Number of Fishing Boats

Ranging from 350 boats identified by the CID to 70 boats operational identified in this survey, the statistics on the number of fishing boats vary greatly. The number registered at the DRAM in Safi is 66 as of January, 1997, providing the basis for the estimation that the number of boats operating around the year is about 70. It seems that the number of operating boats sometimes increases up to 350 in summer as fishing boats move into this area from other larger ports (such as Safi, El Jadida and Essaouira).

All the fishing boats used in this area are small-size wooden boats about 5 to 6 m long, with gross tonnage of about 2 t. All of them use outboard motors, with four boats out of the 66 registered at the DRAM using eight horse powers and the rest using fifteen horse powers.

¹ These figures are calculated based on the site researches.

² From "Population Legale du Maroc, 1994, Direction de la Statistique, Maroc".

³ According to "World Development Report 97", Moroccan per capita income (1995) is US\$1,110.

In using the bottom long line, they start baiting in the late afternoon. sardine and squid are used for bait. They leave port between around 10:00 p.m. and 12:00 midnight, arriving at the destination in about two to four hours. Monofilament line attached with 1,000 to 1,500 hooks is installed and fishermen wait until the dawn. By 10:00 a.m., they finish hauling the line, and by 1:00 p.m., they return to the port to sell fishes. Major components of a typical catch include European conger, red pandra (*Pagellus sp.*), Sea bream (*Pagellus spp.*), sea bream (*Diplodus spp.*), and Blue whiting.

In many cases, they leave port between 2:00 a.m. and 4:00 a.m. for using the trammel net. It usually takes two to four hours to the fishing ground. The net has been already installed in the fishing ground, which will be installed in the sea again after collecting a catch by hauling the net by three units (one unit is about 400 m). They apply different fishing methods for different target species. When targeting at sea bream (*Diplodus spp.*), John dory, and Rockfish, they check the net every day. By contrast, they leave the net in place for three days for catching Spiny lobsters and European lobster. In this method, they take advantage of chances where Spiny lobsters or European lobster accidentally get caught in the net in attempting to eat fishes that have been caught in the net. The peak hour for returning to the port is around 11:00 in the morning with some boats returning after 6:00 in the evening. Spiny lobsters are dealt alive.

For fishing with the gill nets, they leave port between 4:00 a.m. and 6:00 a.m., returning before noon. As in the case of the trammel net, they haul the net that has been installed from the previous day. Unlike fishing with the trammel net, however, they check the net every day since the purpose is to sell the catch as fresh fish. A typical catch mostly consists of expensive species such as sea bream (*Diplodus spp.*), red pandra (*Pagellus sp.*) and other types of sea breams and European sea bass. However, in the survey in September, there were more triggerfishes than other species in the catch.

Angling fishery includes handline fishing for sea breams around the rocky tracts in the offing and fishing for triggerfishes which seasonally migrate to the surveyed area. Angling fishery is often seen in winter as well when the sea is rough. Additionally, in the areas near the surveyed area, trawling and angling fishery are undertaken for European sea bass. In the survey in September, it was found that, in many cases, they leave port around 4:00 a.m. or 5:00 a.m., and return around 11:00 a.m. or noon. A typical catch mostly consists of species such as triggerfishes, Besgue, Sea bream (*Pagellus spp.*), Saint Pierre, Forkbead, and European conger with some Octopus.

(5) Landed quantity and value

Table 2 summarizes the average landed quantity and value by fishing method as of the September survey. The unit prices by species are listed in Table 3.

Table 5-3-A-1 Average Landed Quantity and Value

Fishing Method (Number of Samples)	Bottom Long Line		Trammel Net		Gill Net		Angling		Total	
	Weight (kg)	Amount (DH)	Weight (kg)	Amount (DH)	Weight (kg)	Amount (DH)	Weight (kg)	Amount (DH)	Weight (kg)	Amount (DH)
September Hearing Survey	142.5	2553.2	36.2	4210.2	66.2	2628.5	62.3	1546.7	100.5	2848.9
Number of Samples	102		45		17		21		185	
September Observation Survey	76	1068.3	20.9	1645.5	40.9	548.7	60.4	514.6	59	1023
Number of Samples	62		19		18		10		109	
Weighted Average	117.36	1991.8	31.7	3448.8	53.2	1558.9	61.7	1213.8	85.1	2172.0

Table 5-3-A-2 Unit Price by Species in Souira Kedima (September Survey)

Name of Fish Species	Most Frequent Unit Price (DH/kg)	Unit Price Range (DH/kg)
Triggerfish sp., Gray triggerfish	10	10
Red pandra (<i>Pagellus sp.</i>)	10	10
European conger	10	8-10
Sea bream (<i>Sparus spp.</i>)	80	80
European lobster	120	100-130
Spiny lobsters	240	230-250
European sea bass	100	90-110
Blue whiting	15	10-15
Sea bream (<i>Pagellus spp.</i>)	60	40-70
Octopus	35	35-40
Rockfish	40	35-40
Gurnard	35	30-35
Red mullet	20	20-50
Sea bream (<i>Diplodus spp./Diplodus bellotii</i>)	25	10-35
John dory	25	35

Pertaining to the landed quantity and value from Souira Kedima, study to date indicates that September best reflects the average condition in this regard for the entire year. On this basis, annual totals were estimated applying the figures for September for landed quantity and value per vessel-day as indicated under the September survey (2 weeks) of 85 kg and DH 2,172, respectively. Total number of vessels engaged in fishing was computed on the basis of number of possible fishing days x number of departing fishing vessels per day.

Annual landed quantity = 85 kg x 25855 = 2197675 = about 2198 t.

Annual landed value = 2172 DH x 25855 = 56157060 DH = 56.16 million DH

(6) Fishery Balance

Table 5-3-A-3 summarizes roughly calculated breakdown of annual income of a artisanal fisherman, assuming 75% or 115 days for actual operating days out of 153 days per year allowing operation as under the current condition. The average annual income per fisherman was calculated by simply dividing the net income after excluding expenses by the number of the crew members, yielding 64,000 DH (US\$6,900) (US\$1 = 9.25 DH). Assuming the average number of family members to be seven, cash income per capita is calculated to be about US\$990. This figure, of course, does not account for damages on the boat due to accidents, loss of engines or fishing gears, injuries or fatal accidents. It is also necessary to consider incomes earned by other members of a fishery household that constitute the entire family income. However, given that food is mostly self-supplied, this size of income does not seem to be on the poverty line.

Table 5-3-A-3 Rough Estimate of Income per Fisherman in Souira Kedima

(Unit : DH)

Revenue/ Day	Revenue/ Year	Annual Expenses for Fuel and Bait	Annual Fishing Gear Repair Expenses	Depreciation of Fishing Gear	Boat/Engine Maintenance Expenses	Depreciation of Boat/ Engine	Profit	Profit per Fisherman
2,172	249,780	22,712.5	2,557.5	25,575	4,000	4,000	190,935	63,645

Note:

Actual shares of income vary among the boat owner, the skipper and seamen, which also depend on the fishing method.

The following conditions are assumed as calculation basis:

The outboard motor operates four hours a day, consuming 40 liters of fuel at 25 DH/liter. Bait costs 15 DH/day for angling, and 300 DH/day for the bottom long line fishery. The gill net and the trammel net cost 15000 DH per set (three boxes) respectively, and their life is half a year, requiring 10% of the net cost for repair annually. The boat costs 20,000 DH with life of 20 years, requiring about 10% of the annual boat share for maintenance. The depreciation is calculated by dividing the cost by the number of years of service life. The engine costs 18,000 DH with life of six years, requiring the same level of maintenance and depreciation expenses as for the boat. For the trammel net, two modes of operation were considered; (1) use of two sets for operation for two days out of three, and (2) combined use with long line, for operation with long line for two days and operation with trammel nets for one day.

2) Fisheries and Social Infrastructure

The project site is reached by driving about 30 km from Safi along the flat trunk road extending in the south. The landing beach is located close to this trunk road. The coastal line on the north of the project site is formed with rocky reefs and sandy beaches, with the reefs extending directly to the sea facing the existing landing beach. On the south, the ERAC (Establishment Regional d'Amenagement et Construction) is subdividing housing lots, mainly for construction of villas and rental lodges for summer. Such subdivisions have been continued, planned to reach the south end of the existing landing beach. On the landing beach, about 180 fishermen's lockers have been erected, sponsored by the commune, where fishermen stay over a long period. Among surrounding buildings, there are small-scale outboard motor repair shops, restaurants, barbershops, general stores and glossary stores, supporting fishermen's life while they stay at the lockers. Fishermen come from the inland area, traveling on foot or by small-size motorbike. As for fuel for outboard motors, Lamin purchase duty-free fuel from Safi to sell to fishermen. In the field of distribution of fishes, the commune sets up a small-scale fish market where auction is held. A mosque for prayer is also constructed.

For water supply, the ONEP takes in water from the well along the Tensift River on the south of the project site, which is pumped up to the elevated water tank with a volume of 200 m³ located on its premises. As the capacity of the well currently narrowly meets the demand, it is planned to build a new well after 2000. As for electricity, the ONE supplies power through its nationwide power supply network terminal into the ERAC premises at 22 KV, which is then stepped down by a transformer for power supply. Although power is not supplied to the landing beach, it is possible to accommodate for service wire branching from the ERAC premises in future.

Public facilities include an elementary school 4 km away from the landing beach toward the inland, and a clinic next to the commune office on the premises of the ERAC.

3) Fishery Community

(1) Fishery Households and their Composition

The average number of the family members of a fishery household is 7.2 with 3.7 men and 3.5 women, indicating that about the same number of the opposite sexes compose a family.

Table 5-3-A-4 Average Household Composition

Souira Kedima	Men	Women	Total
	3.7	3.5	7.2

(2) Housing Arrangement

The fishermen's housing units are single-story houses with traditional white walls, with a central patio surrounded by three rooms on its three sides. An average house usually does not have a passage between rooms. Instead, the patio serves as the passage to another room. It also provides space for prayer and household duties other than cooking, such as drying washed clothing. Houses are located at a considerable distance of 8.2 km away from the beach.

Table 5-3-A-5 Housing Arrangement

	Building Form (Number of Units by Form)	Distance From the House to the Beach (km)	Number of Rooms	Ownership (Number of Owners)	Site Area (m ²)	Water Supply
Souira Kedima	Standard 35	8.24	3.2	Owned 20	3070	Tap water 2
	Clay 4			Leased 1		Well and others 33
	Barracks 1			Rent-free 1		
				Owned by parent 18		

The site area is quite large 307 square meters. This is, however, due to the fact that the house itself is rather spacious as actually observed. In addition, many of these houses have huts for domestic animals and vegetable gardens as well.

In most cases, the householder owns the house. However, there are many who live with their parents who are the owners of the houses.

(3) Fuel

At least 80% of the households have reported that they use firewood. One third of the fishermen households reported that they purchase all of firewood they use. One of the reasons may be that a high percentage of the area where wood is collected is privately owned. In fact, firewood vendors come and go in this area. Firewood is collected by three groups: men, women and children.

Table 5-3-A-6 Use of Energy

	Power Supply	Butane Gas			Firewood						Purchase of Firewood in Winter	
	Using or Not	Using or Not	Small Cylinder	Large cylinder	Using or Not	Purpose (Number of Households)	How to Procure (Number of Households)	Firewood Collector	Where to Collect Firewood	Weight (kg)	Ratio of Adults	
Souira Kedima	Yes 48	Number of user households	19	40	34	Cooling 28	Felling 2	Male adult 13	Private land 10	282	All 11	
	No 44	Average per user										
		Number of cylinders	18.05	31.35	6	Baking bread 32	Picking 22	Female adult 19	Forest 11		Half 3	
		Average per household										
		Number of cylinders	8.10			Heating 22	Purchasing 14	Child 20	Protected zone 2		A few None 0 21	

Agriculture among Fishery Households

(1) Ownership and Use of Fields

The average area owned per household is 1.5 ha. The current average cultivated area is around 0.8 ha, small compared to villages in the steep mountain areas in Morocco. Agriculture is managed with land other than the cultivated, allotted to land under recovery, pastures and unused land.

Table 5-3-A-7 Use of Cultivated Land

		Cultivated Land (ha)	Land under Recovery (ha)	Pastures (ha)	Wasteland (ha)	Total (ha)	The Farthest Fields (Only those Owned by Fishermen) (km)
Souira Kedima	Average of all households	0.84	0.15	0.45	0.13	1.56	
	Average of land owned by fishermen	3.05	1.50	3.60	2.50		1.88

(2) Field Production and Stock Raising

① Grains, vegetables and fruits

In addition to the staple food such as barley, wheat and corn, a lot of other types of produce are grown by many of the households. Among the 19 types of self-supplied and purchased produce covered in the survey, 13 types are grown, which indicates that they are growing diversified types of produce. It does not mean, however, this area is particularly suitable for agriculture in terms of natural conditions as rainfall is not really sufficient, nor is irrigation.

Table 5-3-A-8 Self-supplied and Purchased Produce

Souira Kedima		Grains				Beans			Vegetables				
		Barley	Wheat	Corn	Others	Chick Beans	Lentils	Others	Green and red vegetables	Tomato	Potato	Others	
	Self-supplying household	5	12	8	0	0	2	4	1	1	2	7	
	Purchasing household	1	1	1	1	5	2	1	3	4	2	1	
		Fruits											
		Olive	Almond	Apple	Orange	Argand	Fig	Pomegranate	Total				Total
	Self-supplying household	3	0	0	0	1	4	1	0				13
	Purchasing household	4	3	3	3	3	0	0	3				17

② Stock Raising

At present, preparation for setting up a cooperative is under way with the caidat taking the initiative. With some households, the share of income from livestock totals to nearly 30% of the total annual income.

How Fishermen Make Living

(1) Incomes from fishery and agriculture earned by fishery households

Comparison of incomes from fishery with those from agriculture indicates that nearly 90% of the total income is from fishery. A minor percentage of income is from sale of merchandise and other businesses, most of which is from sale of livestock.

Table 5-3-A-9 Shares of Income Sources

	April through October			November through March		
	Income from Agriculture	Income from Fishery	Income from Sale and Others	Income from Agriculture	Income from Fishery	Income from Sale and Others
Souira Kedima	8.63%	90.75%	0.63%	12.50%	86.63%	0.88%

(2) Number of Operating Personnel per Boat and Distribution of Catches

Table 5-3-A-10 Distribution of Catches

Souira Kedima	Number of Persons Involved per Boat					Distribution of Catches						
	Boat Owner	Fishing Master	Crew Member	Personne l for Boat Transfer	Cleaning Personne l	Boat Expenses	Boat Owner	Fishing Master	Crew Member	Personne l for Boat Transfer	Cleaning Personne l	Others
Bottom long line fishery	0	1	3	0	1	25%	0%	38%	33%	0%	5%	0%
Angling fishery	1	1	2	0	0	15%	34%	17%	34%	0%	0%	0%
Net fishery	0	1	3	0	1	25%	0%	38%	33%	0%	5%	0%

(Bottom long line fishery)

The personnel per boat consists of one fishing master, three crew members and one apprentice fisherman. This is the composition commonly found at the four beaches on the Atlantic Ocean. Although it was found that the boat owner also acts as the fishing master for all boats surveyed, in fact, there are cases where some other person acts as the fishing master.

As for distribution of catches, 25% is for the boat use (cost), about 38% goes to the boat owner and fishing master, about 33% goes to three crew members, and about 5% to the apprentice. These shares are the same for all the four beaches on the Atlantic coast. According to this distribution arrangement, the share per crew member is about 11%. Thus, the apprentice, whose share is about 5%, gets a relatively generous share, compared to that of a crew member. This is a practice common with the case of net fishery, leading us to assume that it provides with those young people engaged in these fisheries strong incentives.

(Angling fishery)

In angling fishery, the operating personnel consists of on a fishing master and two crew members. No apprentice is employed in this case. The number of crew members is less than in the cases of bottom long line and net fisheries by one person. In the cases where the fishing master is employed by the boat owner, as shown in the data obtained, the fishing master gets 17%, and the crew of two about 34%, making no difference between shares of the fishing master and the respective crew members. On the other hand, the boat owner gets 34%, which is twice the amount each of the fishing master and the crew members gets.

(Net fishery)

The composition and distribution of catches in net fishery are very similar to the case for bottom long line fishery. However, there are additional personnel getting minor shares from cleaning the beach or repairing the fishing net. Many of these people do not have fishery experiences. The fact that there are quite a number of people engaged in such minor undertakings is characteristic to this area. This can be attributed to relatively massive landed quantities and a great number of fishing boats, compared to other beaches, easily allowing these people to obtain incomes.

(3) Sources of Fishes for Consumption and Frequency of Consumption among Fishermen

Fishermen can acquire 100% of fishes for own consumption from their engagement in fishery in summer. In winter, however, only boat owners can do so, and crew members purchase 7% of fishes they consume.

Table 5-3-A-11 Acquisition of Fishes for Consumption

		April through October			November through March		
		Fishes from Own Catch	Purchased Fresh Fishes	Canned Fishes	Fishes from Own Catch	Purchased Fresh Fishes	Canned Fishes
Souira	Boat owner	100%	0%	20%	100%	0%	20%
Kedima	Crew members	100%	0%	0%	93%	7%	0%

Table 5-3-A-12 Frequency of Fish Consumption in a week

		April through October					November through March				
		Every Day	4 - 6 Days	2 - 3 Days	1 Day	None	Every Day	4 - 6 Days	2 - 3 Days	1 Day	None
Souira	Boat owner	10%	50%	40%	0%	0%	10%	30%	20%	40%	0%
Kedima	Crew members	7%	23%	60%	10%	0%	0%	0%	30%	70%	0%

In summer, about half of the fishermen consume fishes two to three times a week. By contrast, the frequency of fish consumption is reduced by 50% in winter. Among boat owners, 10% of them consume fishes every day through summer and winter. Still, boat owners who consume fishes only once a week in winter increases to 40%.

Migration and Settling of Fishermen

(1) Starting Period of Fishery Career

The average starting age is 17 years old, which indicates they enter fishery at a relatively early stage of life. About half of them start with assisting jobs.

Table 5-3-A-13 Starting Period of Fishery Career

	Starting Age	Starting Job	
		Crew Member	Assisting Job
Souira	17.1	53%	48%
Kedima			

(2) Migration of Settling of Fishermen

About half of boat owners have changed boats and have experiences as a fisherman at other beaches. Although the percentage is not as high as that of boat owners, crew members also show a relatively high ratio at 33% for migration experiences.

Table 5-3-A-14 Migration of Fishermen

		Number of Boat Transfer Instances	Average Service Years per Boat	Ratio of Fishermen with Experiences at Other Beaches	Type of Boats Experienced at Other Beaches (Percentage)		Experienced Beach (Number of Experiences, Multiple Answers Accepted)				
					Coastal Boat	Small-scale Boat					
Souira Kedima	Boat owner	3.3	10.3	50% (5/10)	33%	67%	Tariaya 3	Boujdor 2	Safi 2		
	Crew members	3.7	4.5 Beach average	33% (10/30) 38% (15/40)	10%	90%	Tariaya 7	Agadir 2	Safi 1	Tan Tan 1	Layune 1

Particularly characteristic is that more than half of the destinations of fishermen migrating are areas in south Morocco such as Tarfaya, Boujdor, TanTan and Rayune and that they go aboard small-size fishing boats in many cases.

4) Environment

Suira Kedima is a sand beach located at about 30km south of Safi. Although the coast is sand, the bottom below intertidal zone is rock covered with sand originating from land. The mouth of Oued Tensift River is about 1km south of the site. Average flow rate of the river is as little as 25m³/s through year, but the highest flow rate recorded is 633m³/s. Judging from the rainfall measured at Safi and Essaouila, annual rainfall in this district seems to be about 300mm. Rainfall from October to March is 40 to 50 mm, and there is almost no rainfall from June to September. Most of the water of Tensift River seems to come from upper watershed area, and it plays a major role to supply sand and nutrients to the coastal area. Judging from the current sand distribution, direction of current and wind, both are mainly from the north, sand from Tensift River is likely to be once dispersed over the whole coastal area and then carried to the south. The distribution of benthic biotope is presented in Figure. The ecological characteristic of the area, except Tensift River, is common, usually seen in this region, featuring combination of rock reef and sand. The most important biotopes in this area seem to be the one existing around the mouth of Tensift River as well as the one existing outside of the reef belt along the beach, which have relatively higher biological productivity. We observed moderate level of eutrophication at the north side of the bay.

Soil type of the hinterland is basically limestone originating from sedimentary soil in the upper watershed of Tensift River, and is relatively vulnerable to erosion. Vegetation is mostly comprised of eucalyptuses, most of which are planted.

There are ruins of a fort built by Portuguese, and this has not been designated as a significant cultural property of the country.

2. Problems in this site

In this study, seven fishermen participated in the PCM workshop.

The discussion was centered on fishery. The structure of their problems was made clear as follows; (See also Problem Tree)

The Core Problem of the fishermen, the beneficiaries of the project, was that their average net income (the sales of their catch after subtraction of various cost) is not sufficient. This Core Problem has been eventually leading to their low living standard. The direct causes of the Core Problem are the following 3 items;

- 1) The sales of catch are not sufficient.
- 2) The selling prices of their catch are low.
- 3) The cost of the whole production is high.

These direct causes can be analyzed in light of cause and effect relationship.

Followings are the results of the classification by group. The items of the fishermen's main concern are shown with *.

[Social Security]

- * There is no social security service such as pension and family allowance for the fisherman.
- * There is neither life insurance nor disaster insurance for fishermen.

[Fishing gears, fishing method, navigation]

- Engines are too old and their horsepower are too small.
- The number of warehouses for fishing gears is too small.
- * There is neither lighthouse nor beacon.
- * Access to fishing places is hard (because there is no breakwater, as stated below.

[Services related to fishing]

- There is no one in the village who can repair vessels. Vessels are difficult to be repaired.
- Spares and parts for vessels are not obtainable in the village.
- Fuel is not obtainable in the village.
- Bait obtainable in the village is too expensive.

[Fishery (production) Infrastructure]

- There is no breakwater.
- There is no slip way.
- There is no wharf.

[Distribution and economy]

- * The number of middlemen is too small and the competition among them is insufficient. (It is because ;)
- There is neither cold storage nor ice.
- The catch is little and is also unstable.
- There is no buyer at the time when fish catch is landed.
- * The middlemen set strict conditions for loans to fishermen.

[Conditions of the village]

- * Their houses are too far from the beach (Most of the fishermen live at least 5km away from the beach).
- There is no school for their children, even though their houses would be built near the beach.

3. Framework of the Development Project

The research members examined the results of whole analyses (Problems Analysis / Objectives Analysis) in the PCM workshop. Formulation of the PDM was undertaken based on the opinions of fishermen. A part of PDM was revised to meet the necessity.

Normally, PDM is composed of 4 levels. The definitions of each level in this project are described as follows. The 4 levels are organically related in terms of means - end relationship.

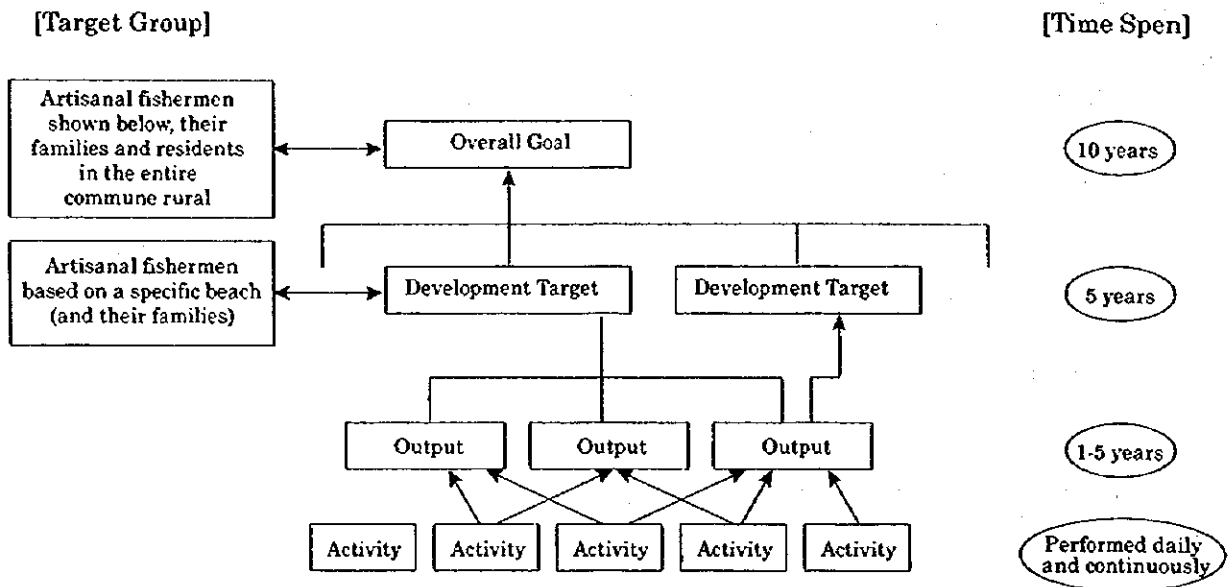
1) Overall Goal: Long-term target which is supposed to be realized by the direct contribution of the following Development Targets, with time span of around 10 years. Beneficiaries, in this case, will be spread to the residents of the entire commune rurale.

2) Development Targets: Normally, the goal of this level is focused on a single matter as a "Project Purpose". But the contents of this development project are diverse and many organizations participate in this project. For that reason, we made multiple goal items instead of making a single goal. The length of the goal would be about 5 years. The beneficiaries of the project are targeted to the artisanal fishermen living in the same commune rurale whose activity places are the same.

3) Outputs: these are concrete and individual issues related to the Development Targets described in (2) above and multiple Development Targets interact with one another to determine the outputs.

4) Activities: This means an action item which will be routinely executed in order to realize the proposed Outputs. Outputs and activities are not necessarily corresponding one to one.

The relation of these 4 levels is described in the following chart.



Structural of Targets in PDM

The goals in the development of Suira Kedima were systematized as follows. (See "PDM" in the attached). Since social infrastructure in this village is relatively well established, the development project may be centered on the promotion of fishery by improving facilities such as harbor, as well as improving operational aspects such as fishing methods, fishery resource management, distribution, and other fishery related services. It seems also necessary to combine the project with tourism development, as well as to build fishermen's housing and to improve educational facilities.

(The development project in this site does not include the improvement of social security services for artisanal fishermen such as pension and insurance, because these problems does not uniquely exist in this site. These problems should be rather settled at national level. These problems will be referred to in the master plan in this study report).

- 1) Overall Goal: Improvement of the local residents' standard of living in this commune.
 - (Indicator) 1. Average income per fisherman will increase.
 2. Household income of the residents will increase.
- 2) Development Targets
 - (1) Selling prices of fish catch will increase. (Indicator: substantial increase in net selling prices by species)
 - (2) Sales volume of catch will increase. (Indicator: increase in sales volume by species)
 - (3) Cost for small-scale fishing operation will become appropriate. (Indicator: cost of fishing gears will become lower)
 - (4) Tourism industry will be more developed. (Indicator: increase in number of tourist).
 - (5) Housing of fishermen will be located closer to the place of the inactivity (beach). (Indicator: the shortened distance between beach and their residence)
- 3) Outputs
 - (1) The number of local middlemen will increase, resulting in a reduction of the middle margin for

marine product prices and the expansion of new marketing channels. (Indicator: increase of middlemen)

- (2) The quality of marine products for sale will be improved. (Indicator: improvement in the methods of preservation and treatment for marine products)
- (3) The annual catch will increase. (Indicator: increase in catch by species)
- (4) The introduction of fisheries resources management will enable sustainable fishing activities. (Indicator: review of the existing regulations for fisheries resources management and appropriate application of the revised regulations)
- (5) Safety in fishing will be ensured. (Indicator: decrease in number of sea accidents and damages)
- (6) The local services of fishing gear repair workshops and fishing gear stores will be expanded. (Indicator: new opening of such workshops and stores)
- (7) Preparation for cooperative organization will be started for the future. (Indicator: rearing of leaders among fishermen)
- (8) The increased local development potential of fishing villages will lead to the development of tourist facilities. (Indicator: increase of hotels and other accommodation facilities, restaurants, tourist attractions and stores)
- (9) The increase of fishermen due to the increase and stabilisation of fishing income will lead to the construction of houses for fishermen near the beach in accordance with the local development plan. (Indicator: increase of new houses and fishermen moving in the area)
- (10) The construction of new houses for fishermen will create a sizable community, leading to the introduction of primary schools and improvement of the literacy rate. (Indicator: introduction of new primary schools)

4) Activities (These items are basically the same as those of PDM, but some adjustment was made.).

(1) Establishment of Infrastructure related to fishery production and fishery distribution

① Building of wharf

② Building of slip way

③ Improvement of supporting facilities for navigation such as lighthouse

④ Improvement of facilities in public market

⑤ Equipment of cold storage

⑥ Management of the above facilities

(2) Improvement of fishery resource management

① Thorough investigation about the present state of resource amount (e.g. "Forming investigation and training team", "Supply of small-scale research vessels" etc.).

② Review of the existing regulations about fishery resource management

③ Practice of revised regulations

(3) Improvement of fishing methods and realization of safe fishing operation

(4) Services related to fishing

① Authorization of various services (Business license)

② Workshops of repair of engine and vessel

③ Opening of new shops

④ Management

- (5) Establishment of the base for fisheries cooperative organization
 - ① Selection of leaders from fishermen
 - ② Training of leaders (e.g. Basic management skill for the improvement of fishing household economy)
 - ③ Conducting basic seminar about fisheries cooperative organization

- (6) Development of tourism
 - ① Framing of regional development projects
 - ② Procurement of land for facilities related to tourism
 - ③ Newly-building or improvement of the facilities as well as its management

- (7) Betterment of housing of fishermen
 - ① Framing of a regional development project
 - ② Procurement of land for housing construction
 - ③ Building of houses and improvement of related infrastructure
 - ④ Financial scheme for fishermen for the purchase of houses

- (8) Construction of a primary school
 - ① Framing of a regional development project
 - ② Procurement of land for a primary school
 - ③ Building of a school
 - ④ Administration of a school

4. Activity Plans by Subject

1) Fishery-related Infrastructure Development Plan

(1) What to develop

As a general scheme, it is planned to make use of the rocky reefs located in front of the existing landing beach and build a breakwater on top of them and to develop an anchorage behind it in order to secure safe operation of fishing boats. In the entire area in front of the landing beach, the rocky reefs are located in shallow waters with part of them exposed. Thus, it would be required to break the underlying rocks in order to secure sufficient water depth in this area, which would require consideration of cost and implication on the existing historical old castle. Therefore, it is planned to construct a fishing port in either of the both sides of the beach where water depth is sufficient.

Fishing boats would enter around the end of the rock extending from the north to the south, entering the port navigating parallel to the shore line. The ends of the rocky reefs are difficult to see from a boat on the sea, which could lead to grounding of a fishing boat in cases of high waves or storm surge. To avoid this, beacon lights will be installed to secure safe passages. In local hearings, there were voices requesting construction of breakwater facilities to counter beam sea encountered upon changing the course. It is considered, however, risks from cross sea can be reduced by taking a safe course using beacons.

A sand dike will be built at the entrance of the anchorage in order to prevent sand from migrating from the river mouth on the south of the project site due to waves from the south. Mooring facilities including the wharf and slipways will be located in the area on the north of the anchorage where the sea is relatively calm so that such facilities can be effectively used.

The approach road will be relocated by relocating the entrance from the trunk road to the south side so that direct access to the distribution facilities including the fish market may be enabled. Local roads branching from the approach road will be arranged so that traffic may be smoothly coordinated among the

respective facilities and required space will be secured for the external works such as parking lots. Among the local roads, the one along the coastal line will be provided with a sidewalk from the beach to the old castle site so that a unified atmosphere may be created over the area including the beach in front of the ERAC's lots for subdivision on the south and the road. On the ground section of the project, various buildings will be constructed. Basically, these buildings will be grouped by use for convenience of maintenance and coordination among the mooring facilities. These will be one-story buildings, considering creation of harmony with the surrounding landscape.

As for the old castle, which cannot be entered at the moment, it seems possible to make it a precious tourism resource as a monument with some repair works. Discussion may be held with the organizations concerned to seek specific ways of utilizing it. The vacant lot on the east of the area where fishermen's lockers are located will be developed so that it may be used for various events.

Development of infrastructure for distribution of fishery products will include installation of a fish market, ice-making/refrigerating facilities and fishery products warehouses. In planning of the fish market, considerations will be given to the export hygiene standard as much of landed quantities are bottom fishes. It will be located behind the landing wharf, in the vicinity of facilities such as ice-making plants/refrigerators. For now, the ice-making capacity will be designed for export portion and the size of the refrigerator will be considered for fishery products left unsold in the peak season and bait for long line fishery.

The major purpose of the fishery product storage is to store dried agar-agar which is material of Chinese gelatin. It will be located near the breakwater to be used as the drying site. The existing auction site will be closed as the ONP will unify auctions according to this facility project.

(2) Management Plan

Among facilities in the fishery-related infrastructure, the fish market will be operated by the ONP. Although the size of the landed quantity may affect, generally the ONP will station two persons (one director and another person) for operating and managing the fish market, mediating sale and purchase of catches between fishermen and middlemen. In this operation, 5% of the auction price will be charged as mediating fees. This will be the only income source for the ONP from the fish market. The ONP will allocate this income to labor expenses, utilities fees for the fish market facilities and its operating expenses.

Facilities on land other than the above (such as fishermen's lockers, workshops, ice-making and refrigerating facilities, toilets and refueling facilities) will be operated and managed by the organization to be newly set up centering around the local fishery cooperative. Its major operations will include:

- | | |
|----------------------------------|--|
| ① Landing operation : | loading and unloading for transferring catches on the returned boats from the gangway to the fish market |
| ② Ice sale operation : | selling of ice used for distribution |
| ③ Refrigerator lease operation : | leasing of the refrigerators used for fishes left unsold and bait for long line fishery |
| ④ Fuel sale operation : | purchase and sale of duty-free gasoline |
| ⑤ Facilities lease operation : | leasing of fishermen's lockers and workshops, etc. |
| ⑥ Services for fishermen : | management of (local style showers) and restaurants |

Operating organizations are roughly classified into the steering committee and executing agents. The steering committee consists of the assistant director of DRAM in Safi, the representative of fishermen and the representative the commune. The executing agents are full-time personnel employed by the steering

committee. Basically these employees will be recruited locally. However, if appropriate human resources are not available locally, professional posts such as managers, accountants and ice-making engineers in particular may be employed from cities nearby. Operation of the facilities will target at establishment of an independent profit system based on the incomes from the operations stated above.

Maintenance of the port facilities will be performed with financial as well as technical support from the MTP. For example, in case drift sand affects navigation at the entrance of the port or in the port, even though the port will be designed to prevent drift sand from being deposited, then the Port Bureau of the MTP and the ODEP will be requested to perform maintenance and dredging works.

2) Fishery resources management plan

At present, the resources for artisanal fishery are assumed to be in a good condition. It is expected that development of the infrastructure related to fishery production and improvement of fishing efficiency will increase the fishing effort by about 8%. Catch quantities are expected to increase by a similar rate. However, the existing data are not sufficient to figure out the level of the resources and to obtain precise prospect of catch quantities. Also, it is required to collect scientific information sufficient for fishermen to rely on. Since their understanding and cooperation is indispensable for management of the resources. It is a significant task to perform monitoring of the condition of the resources and to enhance the management system, taking advantage of the opportunity of infrastructure development.

(1) Monitoring of the Condition of the Resources

A system shall be established to have weight of all landed fishes and shellfishes from Souira Kedima reported by boat and by species. The ONP will record the weight and selling prices by species for those sold at auction. The person-in-charge from ONP would be dispatched 1 year prior of establishment of harbor facilities to begin preparation for the above as well as commence collection of sample data.

As for Spiny lobsters and European lobster which are the most important species here, year-round sampling will be performed to conduct survey on the body length and weight by sex as well as the fecundity condition in order to grasp the current condition of the resources. Since catching of these species with the trammel net tends to provide excessively high fishing intensity, it is required to pay attention in terms of monitoring as well for the prohibited sizes and fishing in the closed season. Among fishes, it is desired to conduct similar surveys for Sea bream (*Pagellus spp.*), European sea bass, and European conger.

Additionally, surveys will be conducted by actually going out to the fishing grounds to administer fixed-point fishing tests as well as to check the conditions of the sea and the fishing conditions. These surveys will be conducted by the INRH. A team will be set up for carrying out surveys on the artisanal fishing in the mid-Atlantic area including Souira Kedima and for providing education and training. This team will consist of three members responsible for surveys on life as fishery resources, fishing gears and fishing methods and fisheries economics, and conduct surveys by visiting landing sites by survey boat. The INRH will set up its branch in Souira Kedima so that it will function as a base for conducting surveys and studies on small-scale fishing grounds. It is recommended that these works be pursued until completion of fishing harbor facilities.

The equipment required for conducting these surveys include computers, measuring instruments, and a small-sized survey boat. This small-sized survey boat is provided with an inboard engine, a fish finder and a GPS, weighing less than 5 tons. It is necessary that equipment and supply plan be carried out simultaneous to the improvement of fishing harbor facilities. Surveys using a small-sized boat will not be limited to Souira Kedima but will cover the area extending from Safi to Agadir for higher efficiency.

(2) Resources Management System

The number of boats involved in artisanal fishing at Souira Kedima and other landing sites grounds will be closely grasped. It will be strictly required to have boats registered and to report to the DRAM upon migrating to other landing sites depending on the fishing season. In order to facilitate this, a system will be established to allow fishermen to benefit from such registration. On the whole, it will not be approved to construct a new small-scale fishing boat while allowing control to be applied on construction of alternative boats in terms of size.

While creating a number of opportunities to explain the significance of the fishing control already in effect to fishermen, control on the landing and selling sites will be further enhanced. Registration activities by the DRAM would be commenced simultaneous to the start of harbor facility construction works.

3) Fishing Technology Improvement Plan

In order to maintain the fishing resources in healthy condition and to stabilize the life of fishermen, the following plan will be implemented.

Although the existing fishing gear and fishing methods are not perfect, the initial priority will be placed on improving the operational efficiency by means of increasing the number of operating days and encouraging the wider use of fish finders and GPS. Based on the outcome of these measures, the improvement of fishing gear and methods will be planned later.

One way to stabilize artisanal fishing grounds is diversification of fishing methods. As it is assumed that Atlantic horse mackerel, Atlantic mackerel, and sardines are migrating around Souira Kedima in quantities, it is planned to introduce efficient angling fishery using a greater number of hooks.

Safety of operation will be significantly increased by installing the port facilities and nautical marks. In case rescue activities are required, it is better to use the rescue boat in Safi, which is operable, with an SOS transmitter installed in them so that it will be able to cope with shipwreck due to sudden aggravation of weather. This improvement plan will be carried out by fishery extension offer.

4) Fisheries-related Services Development Plan

The development items include a fisheries center, workshops, fishermen's lockers, and a fisheries-related welfare buildings. The fisheries center will contain a management department in it that will oversee the entire facilities, and will be located at the center of the site, close to the entrance, where the entire view of the facilities can be obtained. Workshops will generate noise, and will be located next to the ship yard on the sea side. Fishermen's lockers will be located behind the ship yard for convenience of use, incorporated into the existing locker site. The fisheries-related welfare buildings will be located in the vicinity of the distribution-related facilities and the fishermen's lockers, considering convenience for fishermen and users associated with the port facilities.

5) Plan for Building Foundation of Fishermen's Cooperative Activities

In Souira Kedima, currently the representative of fishermen (Amin) controls construction of fishermen's warehouses and sale of engine fuel for fishing boats. There is no distinct cooperative. At this point, it is not easy to foresee if this fishermen's representative alone will continue to control management of these or if fishermen will come to organize themselves voluntarily when infrastructure related to fisheries or fishery products is developed. As discussed in the master plan, simply establishing a fisheries cooperative top-down would only lead to its decomposition sooner or later. Otherwise, it might become a tool for a particular person who would take advantage of such organization. Clearly, however, it is impossible for

a fishermen's group to start operation and management immediately without the representative. As the leader and members directly involved in the management are selected at the initial stage, it is quite likely that the existing representative will be selected. As the starting point, delegation of managerial power should be limited to self-management of the fishermen's center, avoiding assigning excessively heavy operation to them when they do not properly understand what is a cooperative. In Morocco, agriculture-related cooperatives are supported by the Agriculture Department in terms of technological assistance concerning production, by ODECO in terms of management technology, development of the legal system, and other aspects. We should wait patiently until a responsible leader emerges from fishermen themselves out of activities such as literacy education, fisheries diary movement, saving movement, environment cleaning movement, leader training and other basic social training, all of which are promoted and continued for two to three years by MPM, commune rurales, ODECO, CNCA in their mutual cooperation. Or the existing fishermen's representative may be selected as a new leader out of this process again. In any case, it is likely that an excellent leader of the group emerging from such social training, who is not a mere man of power would be able grow so as to take charge of more substantial activities.

6) Tourism Development

It is expected that fisheries and tourism industry will develop in close coordination as development of fishing villages proceed. Although it is a short period of annual two months, the trend for increases in the number of tourists to this area has been recognized. This trend will encourage construction of pensions and restaurants, where they supply marine products to summer visitors. The fishermen's cooperative will directly contact these facilities to establish a system for supplying fresh marine products. In future, it will be also possible to open retail shops to sell fishes and shellfishes directly to villa residents.

Marine sports such as surfing and wind surfing are expected to be active pursued in future. Sea surface used for such sports overlap the courses of artisanal fishing boats, there are adjustment between them. As use of yachts and motor boats increases in future, floating piers will be installed for mooring boats within the anchorage. These boats will be charged for management fees by the fisheries cooperative. Operation for chartered fishing boats will not be introduced immediately as casting from the land is most common among angling methods.

The old Portuguese castle site will be restored as historical heritage so that visitors can make a tour of the inside. Future projects include performances of classical theatrical plays with the castle lit up in the high season for tourism.

As coexistence of the sightseeing spots and fisheries is important for Souira Kedima, effort should be made to keep the surrounding areas clean and to control smell of fishes to the minimum level. The fishermen's cooperative and the commune should cooperate in regular cleaning up the beach and the landing site. Considerations should be given to prevent waste water from entering to the gulf.

7) Development of Housing Units for Fishery Households

Possible sites of housing development strongly requested from residents include the area along the beach on the north of the project site and the state-owned site on the south of the approach road. Both candidates neighbor the fishing port, allowing incorporated development of the housing lots and the facilities associated with the fishing port. It is required to narrow down the specifics for probable development including how to proceed with the project and intents of future beneficiaries through discussion with the organizations concerned.

8) Development of Elementary Schools

The existing facilities are located in the inland area within a reach on foot. At present, since fishermen and their families are not settled around the project site, it seems the status quo is acceptable. In future, however, when needs for construction of elementary schools in this area emerge along with construction of housing units for fishery households, validity of such construction should be studied.

5. Evaluation of the Plan

1) Financial Analysis

(1) Project Expenses

The initial investment cost for the project is calculated based on general construction unit prices in Morocco (excluding taxes) for facilities, local domestic prices (including taxes) for locally purchased construction equipment, and the domestic prices in Japan for exported equipment. 8% of the total sum of the facilities construction cost and equipment purchase cost is added to the above as the design and management fees. The land acquisition cost is not accounted, as the planned project site is state-owned. Similarly, the facilities operation cost after completion is calculated based on the domestic prices in Morocco. Table 16 lists all the expenses.

(2) Benefits from the Project

The effects expected to be brought about by the implementation of the project are as follows:

- ① Increases in the number of operating days : Effect of development of the fishing port facilities
- ② Increase in operating hours
Effect of development of refrigerators. That is, fishermen will be able to determine when to return to port without being restrained by middlemen's activities.
- ③ Increases in prices of fishes
Effect of realization of full competition among middlemen in the fish market.
- ④ Improvement of quality of catches in dealing
Effect of use of ice.
- ⑤ Reduction in fisheries-related expenses

This is expected as maintenance of boats will become easier due to development of the slipways and life of boats will be extended. Development of workshops, fishing gear shops and bait shops for long line fishery will also help reduce time required for procuring parts of outboard motors, fishing gears and bait.

Specifically,

- A. The landed quantity is expected to increase from the present annual quantity of 2,197,675 kg to 2,374,050 kg, or by 8%.
- B. The average fish price is expected to increase from the present 25.6 DH/kg to 26.9 DH/kg, or by 5%.

The prospective profits brought to the operating organizations by these project effects are listed below: Table 18 separately shows a list of benefits.

- ① Landing fees : 6% of the auction price in the fish market will be collected. 1% of the amount is to be distributed to the fisheries cooperative and 5% to the ONP.
- ② Ice sale fees
- ③ Fuel commissions
Commissions of 0.2 DH/liter will be collected
- ④ Facility lease fees
For fishermen's lockers, workshops and shops
- ⑤ Income from other operations
Sales from restaurants and hamams
- ⑥ Contribution to the fisheries cooperative
For the initial year only, contributions from member fishermen will be collected upon its establishment.

The residual value of the initial investment is not accounted for since the investment purpose is highly public.

(3) Profitability of the Project

The financial internal rate of return is 2.53%. The calculation table is shown in Table 18.

The long-term loan interest rate at the financial institutes of Morocco is the official discount rate, 9.25%, plus alpha, which means that the actual loan interest is about 12%, accounting for various fees. As the internal rate of return is lower than the loan interest, it is likely that this project will not be able to create profits sufficient for repaying the initial investment, and it is concluded that no profitability is expected. Even the loan interest of the World Bank, around 8%, cannot promise profitability for the project. Therefore, means such as financial assistance free of charge should be sought.

Sensitivity analysis was performed with the landed quantity and the average fish price after completion of the project corrected to as follows:

Table 5-3-A-20 Sensitivity Analysis

Increases in Landed Quantity	Increases in Average Fish Price	FIRR
5%	3%	2.16
	5%	2.30
	7%	2.41
8%	3%	2.39
	5%	2.53
	7%	2.67
11%	3%	2.60
	5%	2.74
	7%	2.88

Based on the above, it is not likely that this project will be profitable even if the expected values for increases in the landed quantity and the average fish price have changed.

2) Economic Analysis

(1) Project Cost

Assuming the items as accounted in the previous financial analysis, correction is made only for transition from the market price to the potential price. That is, out of the initial investment, the amount of the facilities construction cost is multiplied by the potential construction factor, the amount of the equipment purchase cost of imported material by the potential exchange factor, and those of domestic production by 1, adjusting the prices respectively. For the operational expenses, labor cost of unskilled workers is multiplied by the potential labor factor, and transferred items such as TVAs are deducted from the utilities expenses, thus correcting the prices. The value of the land to be lost by facilities construction is not to be accounted for since the expected site (beach) is not currently used for production activities. Table 19 shows the list of expenses.

(2) Benefits of the Project

The benefits expected from this project are the following three:

- ① Increases in the landed quantity (the increased portion will contribute to increases of export and domestic supply.)
- ② Increases in fish prices
- ③ Increases in ice production volume

Increases in export is calculated by multiplying it by the potential exchange factor (1.14) after converting into the FOB (Fright on Board) price at the Casablanca Port (domestic distribution factor: 1.15). In economic analysis, consumer surplus brought about by the project is considered to be a benefit. Therefore, the price at the origin converted to the price at the place of consumption in the Casablanca market, which is a major place of consumption, is used for the portion of increases in the domestic supply. The same expected values are used for increases in the landed quantity and the fish prices as those used in the financial analysis. Table 20 shows the list of benefits.

The benefit of reduction in expenses brought about by reducing the labor of visiting the closest city to purchase fuel, etc. by developing fuel supply facilities, fishing gear shops, and outboard motor workshops in the local area is not accounted as a separate item since this effect is to be transferred to increases in opportunities of operation and as well as in the landed quantity.

The commissions and lease fees accounted in the financial analysis are not accounted as benefits in the economic analysis since they represent transfer of services within the country.

(3) Project Priority

The economic internal rate of return is figured at 12.28%. Table 21 shows the calculation table. Sensitivity analysis was performed with the landed quantity and fish price after completion of the project as follows:

Table 5-3-A-24 Sensitivity Analysis

Increases in Landed Quantity	Increases in Average Fish Price	FIRR
5%	3%	6.28
	5%	8.76
	7%	11.07
8%	3%	9.75
	5%	12.28
	7%	14.52
11%	3%	13.21
	5%	15.49
	7%	17.71

3) Environmental Impact Assessment

(1) Natural environment

1) Impacts of fishing port construction

Figure shows the area which may be vanished by the construction of a port and relevant facilities. As we described in the previous section, the important areas in this site are the one outside of the offshore reef and the one around the mouth of Tensift River. Tensift River is located about 500m from the south edge of the planned fishing port, suggesting that this area will not be directly affected by the construction of the port. On the other hand, construction of a breakwater is planned on the offshore reef. The ecosystem existing outside of the offshore reef should be maintained by minimizing the damage to it during the construction work.

Detail studies should be conducted regarding movement of drift sand. Tensift River supplies substantial amount of sand, thus, accumulation of sand may occur over a long period of time, if water remains stationary inside the breakwater.

2) Impacts of land facilities construction

A sewage treatment plant in the plan will lower the BOD of the effluent to about 20mg/l, however, if it is directly discharged onto the offshore reef, combined with residential effluent, species composition of the rock ecosystem will likely be changed. It would be probably only in a limited area.

On the other hand, we found that inside of the bay has been moderately eutrophicated. Most of the area is planned to be reclaimed in the project. The possibility of eutrophication in the newly constructed port seems to be low.

The project will have no serious impact on terrestrial vegetation. However, it is possible that sand will move inland, depending on the type of fishermen's housing plan.

(2) Social Environment

① Implication on the existing forms of economic activities

In this area, livestock farming (milk cow) is increasing, and the number of households engaged in both livestock farming and fisheries may increase in future. However, construction of housing units for fishery households in the plan can not guarantee to accommodate pastures. Therefore, it is likely to lead to a situation where the housing area and the pastures are far apart. If this is the case, the burden on women and children who are currently in charge of livestock farming may increase.

② Implication on the relationship between fishermen and middlemen

Even if any resistance occurs against control over distribution of export fishes (including large-size European conger) in the market, this is not very likely to cause any serious social turmoil. This prospect is based on the fact that the fishermen in this area do not deeply depend upon middleman, and the middlemen are contracted agents of wholesalers, and that there are also needs for establishment of a market among them. The significance of this issue is expected to be reduced even further by having middlemen understand the advantages provided by the development of a market that the sanitation standards required to be met for exporting to EU in future can be satisfied. Furthermore, it should be recognized that normalization of the market/distribution of high-valued fishery requires change in the existing relationship between the fisherman and the middleman.

③ Conflicts between Housing Zone for Fishery Households and Housing Development Zone

With possible development of villa site development in this area, conflicts are apprehended to occur between fishermen who have moved into the housing zone and the residents of the villas concerning use of the beach area. Also, the asset value of the villa development zone may be reduced by becoming in the vicinity of the housing zone for fishery households. In order to avoid this, it seems effective to distinctly separate the villa and housing zones by planting trees between the two.

④ Constructive implication on conservation of cultural heritage

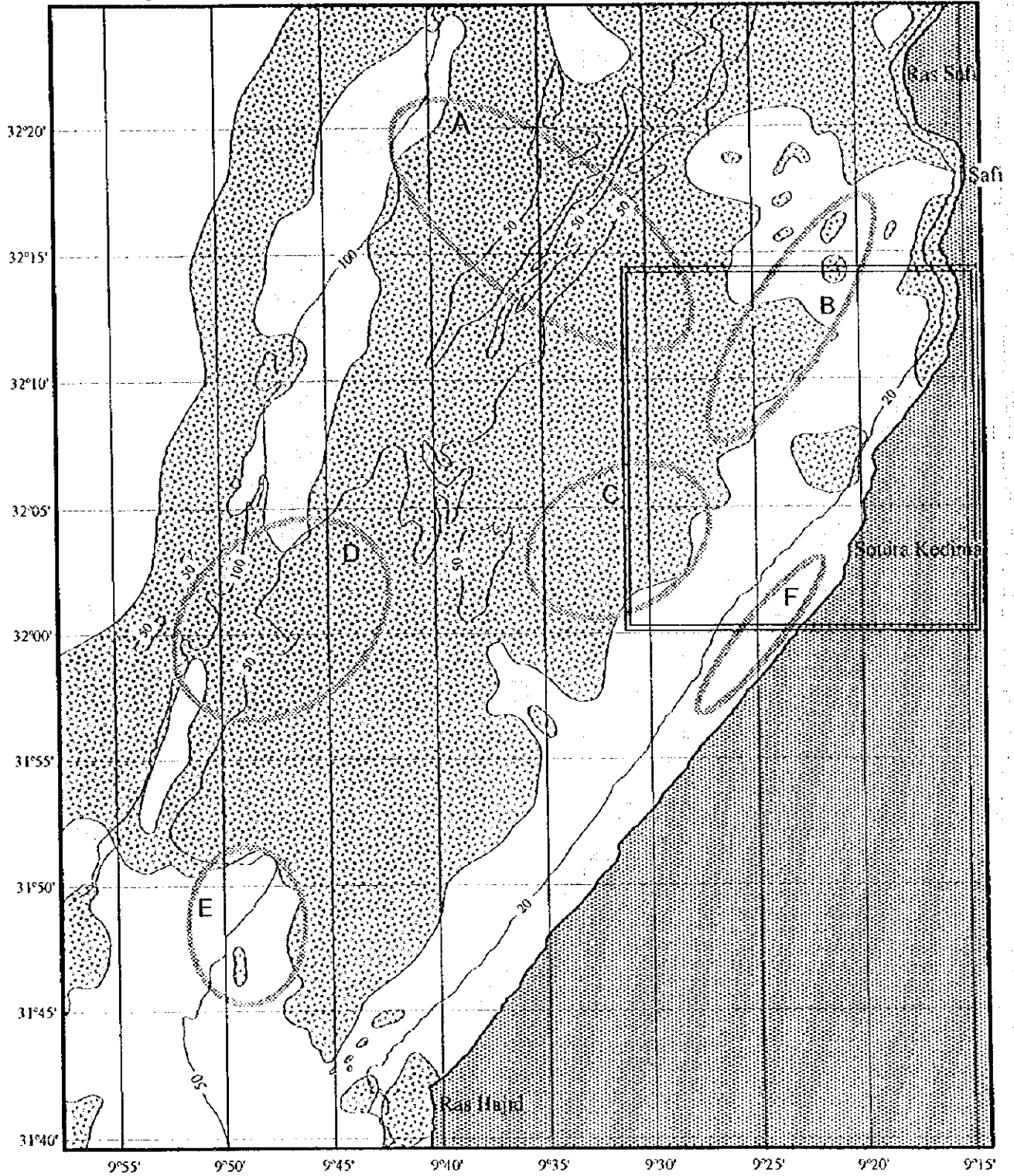
Although not designated as important cultural property by the government, the existing ruins can be utilized for touristic purposes, which will, in turn, bring about the effect of protecting the ruins.





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Fishing Ground of Souira Kedima



-  Rocky Bottom
-  Sandy and Rocky Bottom (Hard to Trawl)
-  Land
-  Good Fishing Ground



Mesurement Points of Fishing Ground of Souira Kedima

