

Japan International Cooperation Agency (JICA)  
Kingdom of Morocco  
Ministry of Ocean Fishery

THE STUDY  
OF  
FISHING VILLAGES DEVELOPMENT PLAN  
IN  
THE KINGDOM OF MOROCCO

FINAL REPORT

JULY 1998

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## PREFACE

In response to the request from the Government of Kingdom of Morocco, the Government of Japan decided to conduct a development study on The Study of Fishing Villages Development Plan in the Kingdom of Morocco and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent to Morocco a study team headed by Mr. Yasuo ISHIMOTO, Overseas Agro-Fisheries Consultants Co., Ltd., five times between November 1996 and June 1998.

The team held discussions with the officials concerned of the Government of Morocco, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Morocco for their close cooperation extended to the team.

July, 1998



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Kimio Fujita  
President

Japan International Cooperation Agency

Mr. Kimio Fujita  
President  
Japan International Cooperation Agency

July, 1998

## LETTER OF TRANSMITTAL

Dear Sir,

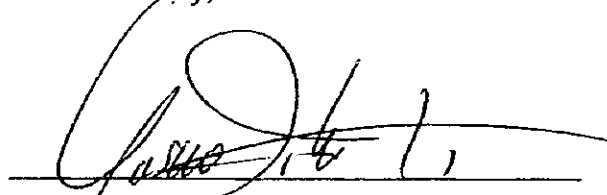
We are pleased to submit the Final Report for "the Study of Fishing Villages Development Plan in the Kingdom of Morocco".

The Study was conducted by the Study Team established by the Joint Venture in the period from 7th November, 1996 to 16th July, 1998 in accordance with the contract signed with the Japan International Cooperation Agency. As part of the Study, a master plan for the promotion of artisanal fisheries in Morocco was prepared and a feasibility study on six priority fishing villages for development was conducted. Based on the overall findings of the Study, recommendations are made to the Government of the Kingdom of Morocco to develop fisheries-related infrastructure as well as social infrastructure, both of which will play a central role in the development of artisanal fisheries, in these six fishing villages in the five year period from 1999 to 2003 together with recommendations to the Ministry of Ocean Fishery and other related organizations to implement various measures designed to develop artisanal fisheries.

All members of the Study Team wish to express their deep gratitude to the personnel of your Agency, the Ministry of Foreign Affairs and the Ministry of Agriculture, Forestry and Fisheries for their understanding of and cooperation for the Study. We would also like to express our gratitude to the personnel of the Moroccan Ministry of Ocean Fishery, Office National des Pêches (ONP), Institut National de Recherches Halieutiques (INRH), the Embassy of Japan in Morocco and the JICA Morocco Office for their valuable advice and cooperation for the Study.

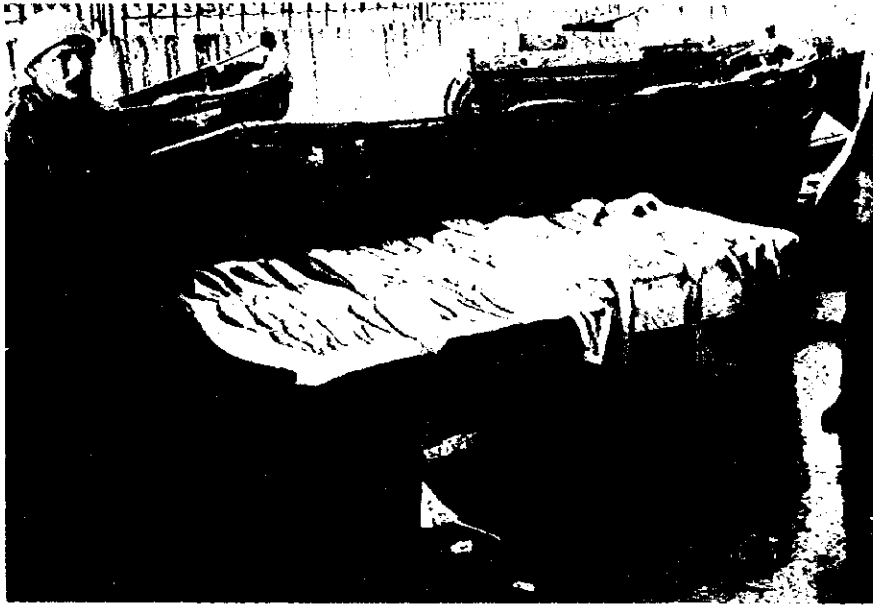
The Study Team sincerely hopes that the findings of the Study will prove useful for the promotion of the Project in the coming years.

Yours faithfully,



Yasuo Ishimoto  
Overseas Agro-Fisheries Consultants Co., Ltd.  
Representative  
Joint Venture for the Study of Fishing Villages  
Development Plan in the Kingdom of Morocco

**PHOTO**



Fish retailer in the fishing port



Fish retailer on the street

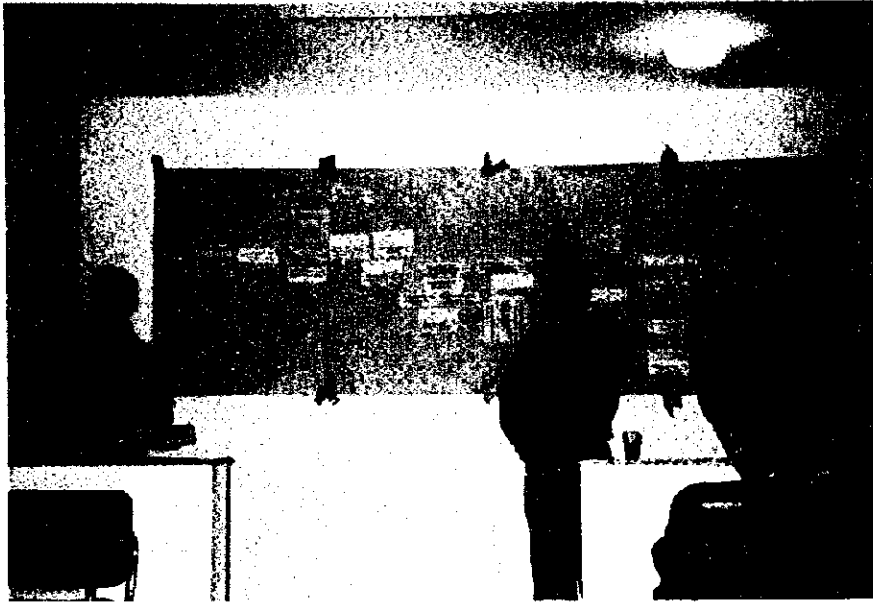




Fish market at Agadir



Sardine canning factory at Agadir



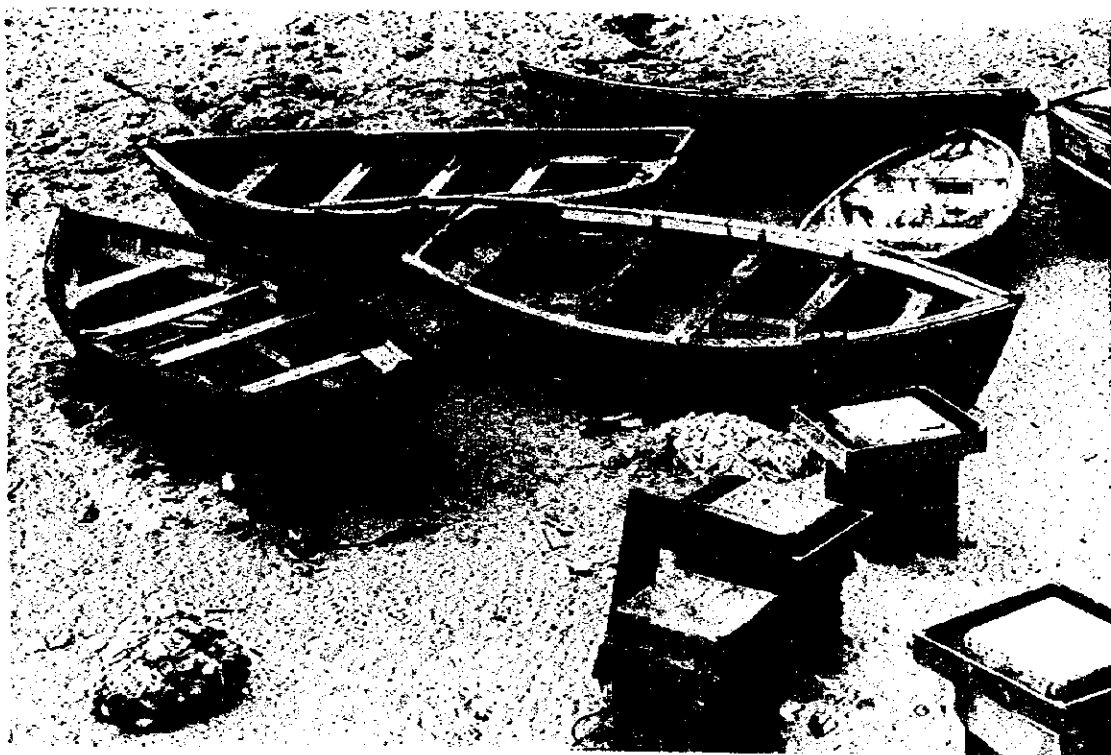
Scene of PCM (member of Japanese mission team)



Scene of PCM (moroccan counterpart)



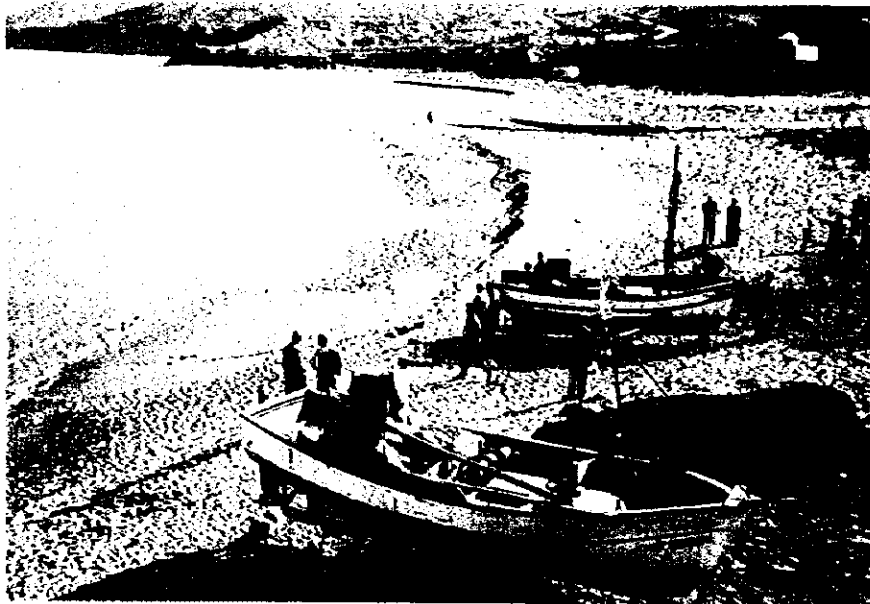
**Fish landing site at Souira Kedima**



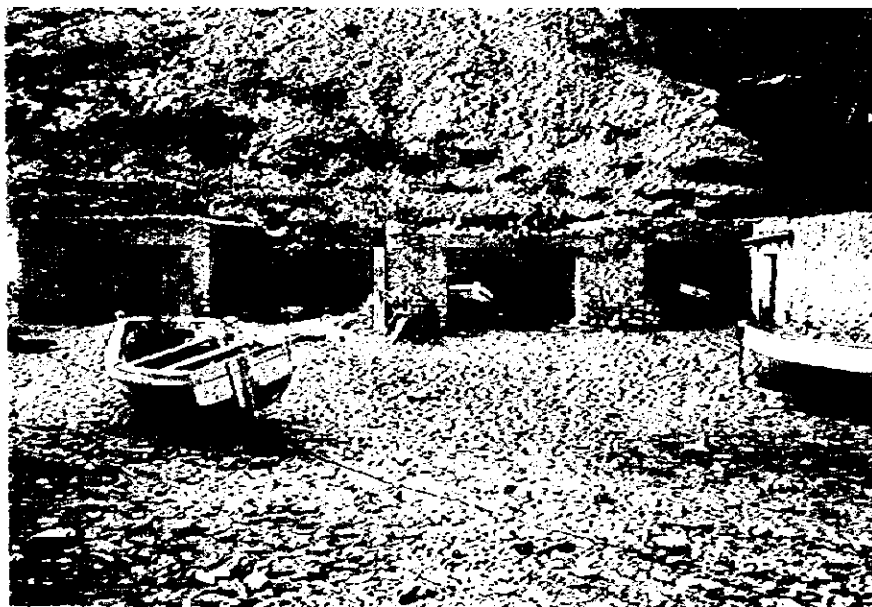
**Fishing boat (with out-board engine)  
and bottom gill net (Souira Kedima)**



**Fish landing site at Sidi Hsaine**



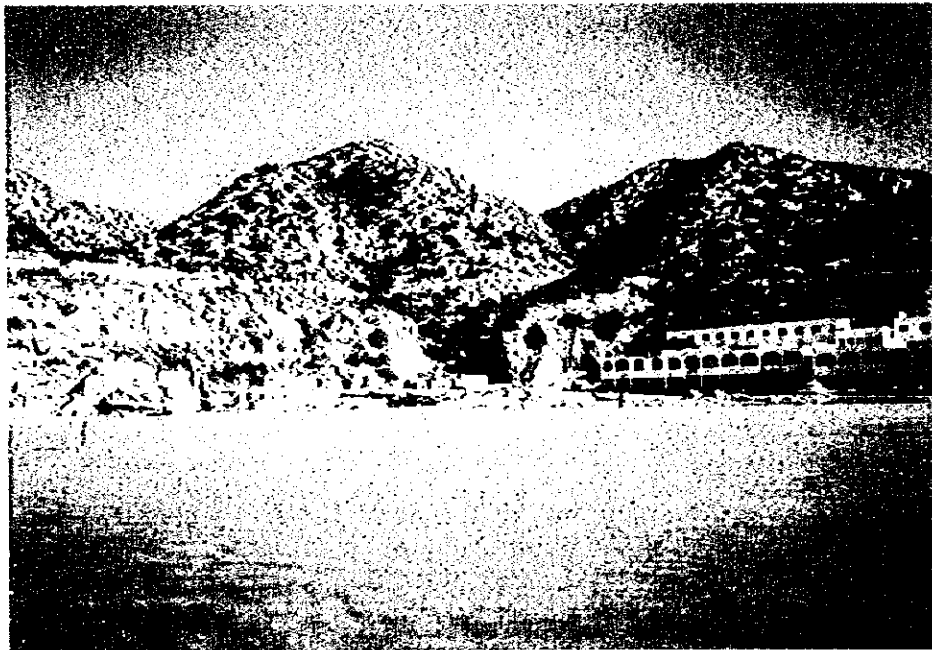
**Small purse seiner (with in-board engine) at Sidi Hsaine**



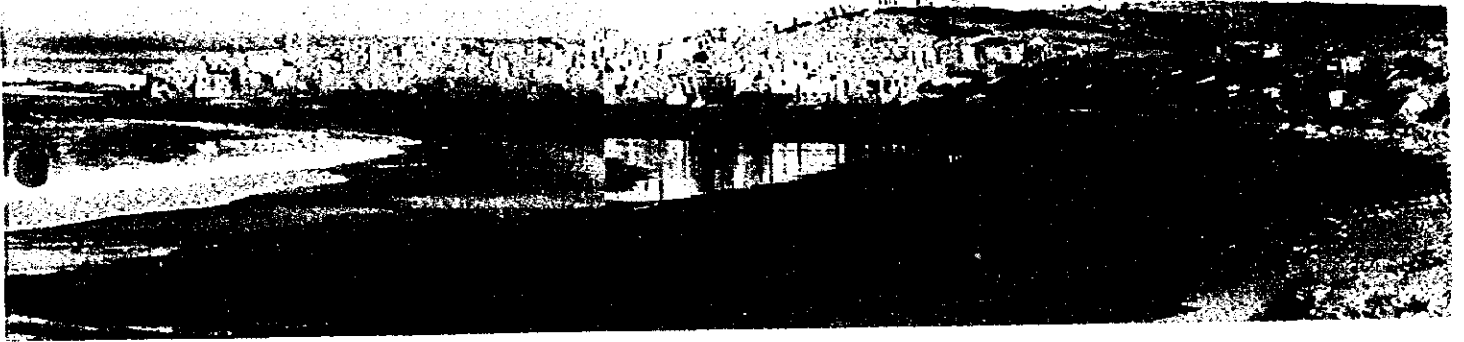
**Fishing boat storage at Sidi Hsaine**



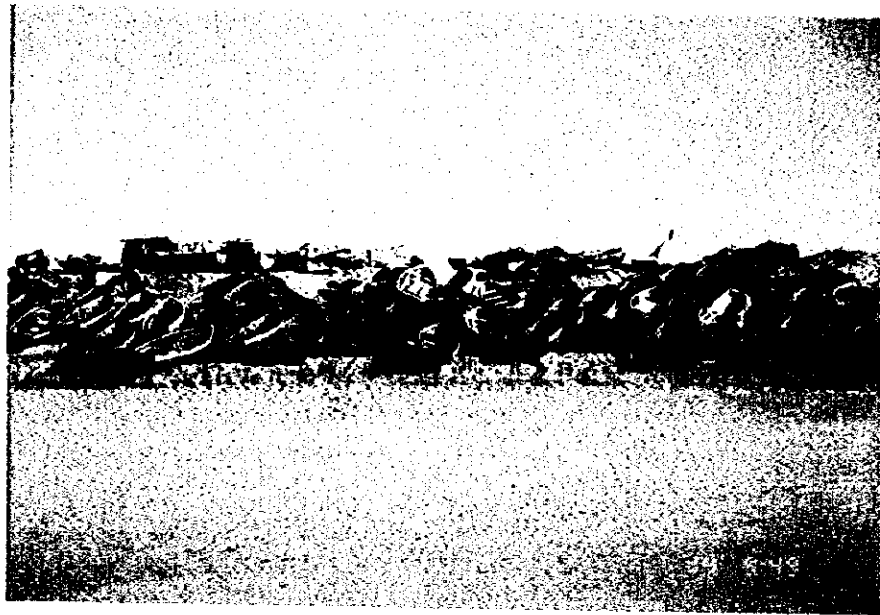
Fish landing site at Tafedna



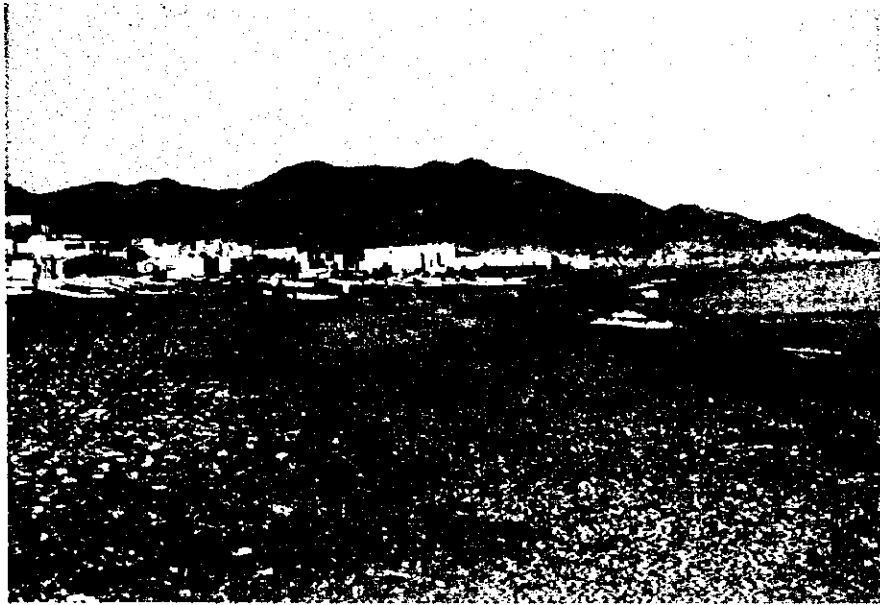
Fishermen's lockers at Tafedna



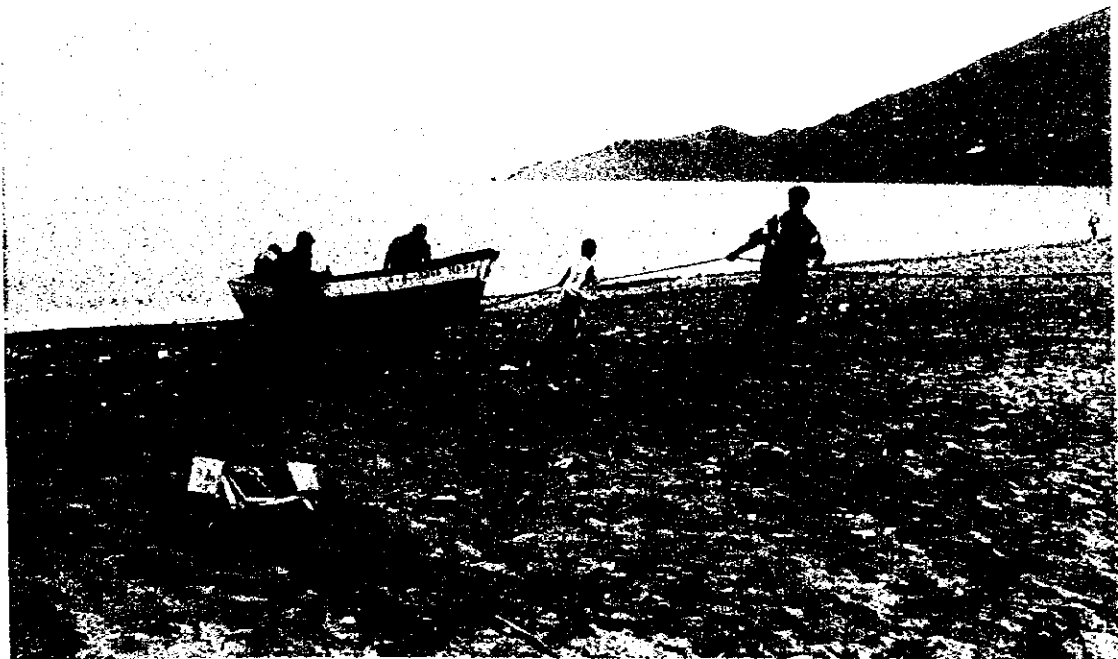
Fish landing site at Tifnit



Departure of fishing trip (Tifnit)



Fish landing site at Kaa Srass



Hauling up of fishing boat (Kaa Srass)



**Fish landing site at Moulay Bouselham**



**Fishing boat (with out-board engine) and gill net (Moulay Bouselham)**

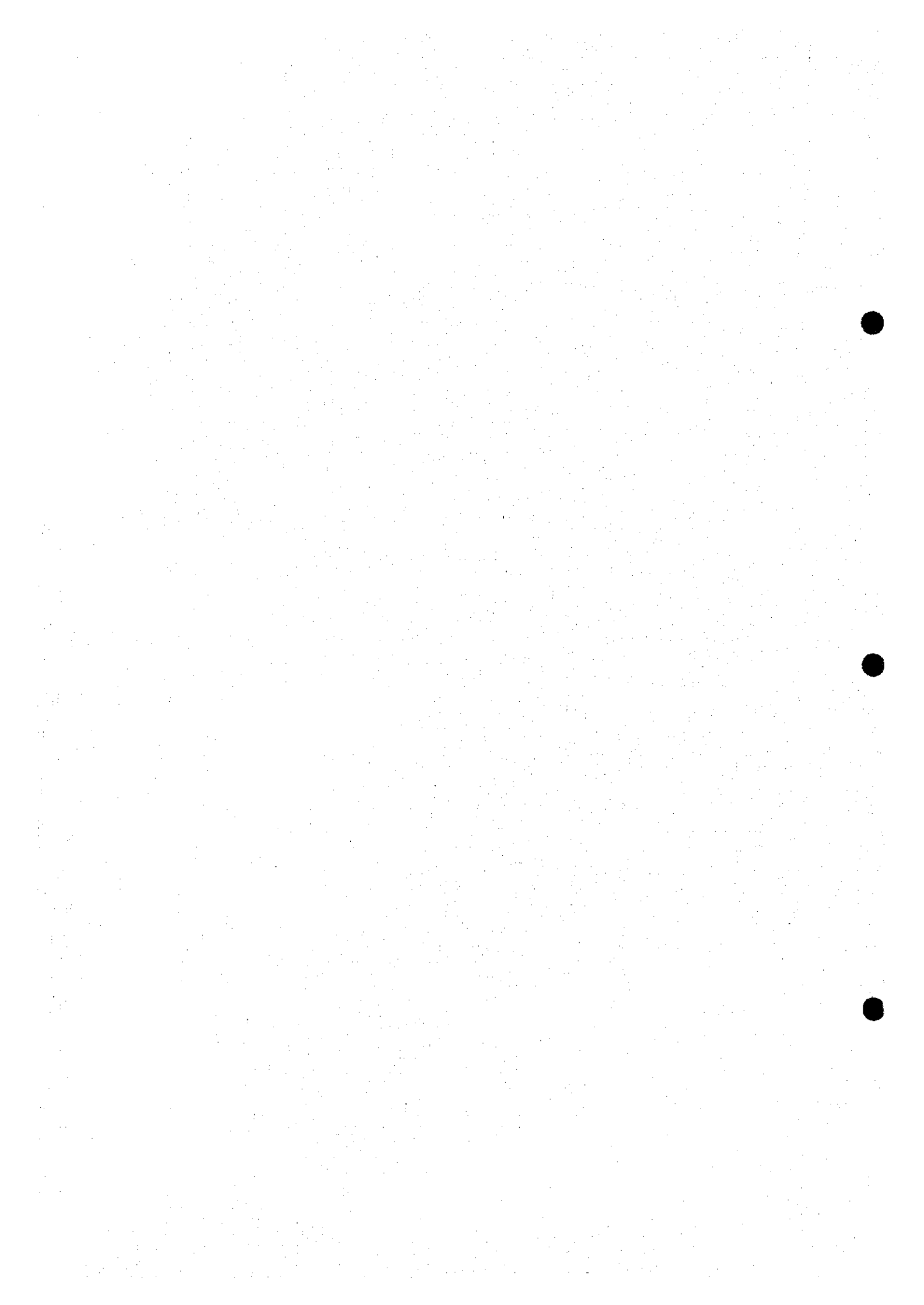


## List of Abbreviated

Abbreviated	Name
	Agence pour la Promotion et le Développement Economique et Social des Prefectures et Provinces du Nord du Royaume
	Solidarité National
AEFCS	Administration des Eaux et Forêt et de la Conservation des Sols
BOD	Biological Oxgen Demand
C/R	Commune Rurale
CAPEX	Capital Expenditure
CDER	Centre de Développement des Energies Renouvelables
CDL	Chart Datum Level
CID	Conseil, Ingénierie et Développement
CNCA	Caisse Nationale du Credit Agricole
COSPER	Comité de Suivi des Programme d'Électrification Rurale
CQPM	Centre de Qualification Professionnelle Maritime
DH	Dirham
DL	Datum Level
DPC	Diréction du Patrimoine Culturel
DRAM	Délégation Regionale des Affairs Maritimes
DREF	Délégation Regionale des Eaux et Forêt
EIRR	Economic Internal Rate of Return
ERAC	Etablissement Regional d'Aménagement et Construction
EU	European Union
F/S	Feasibility Study
FAD	Fish Aggregation Device
FAO	Food and Agriculture Organization of the United Nations
FDR	Fond Développement Rural
FIRR	Financial Internal Rate of Return
FOB	Freight on Board
FRP	Fiberglass Reinforced Plastic
GPS	Global Positioning System
GTZ	Deutsche Gesellschaft für Technishe Zusammenarbeit
HACCP	Hazard Analysis-Critical Control Point
ICCAP	International Commission for the Conservation of Atlantic Tunas
ICONE	
INRH	Institut National de Recherches Halieutiques
ISTPM	Institut Spécialisé de Technologie des Pêches Maritimes
ITPM	Institut de Technologie des Pêches Maritimes
LPEE	Laboratoire Public d'Essais et d'Etudes
MAC	Ministère des Affaires Culturelles
MEY	Maximum Economic Yield

Abbreviated	Name
MPM	Ministère des Pêches Maritimes
MSY	Maximum Sustainable Yield
MTP	Ministère des Travaux Publics
NGO	Non-Governmental Organization
NPV	Net Present Value
ODECO	Office de Développement de la Coopération
ODEP	Office d'Exploitation des Ports
OFCF	Overseas Fishery Cooperation Foundation
ONE	Office National d'Electricité
ONEP	Office National de l'Eau Potable
ONP	Office National des Pêches
OPEX	Operation Expenditure
PAGER	Programme d'Approvisionnement Groupéen Eau Potable des Population Rurale
PCM	Project Cycle Management
PDM	Project Design Matrix
PERG	Programme d'Électrification Rurale Globale
PNER	Programme Nationale d'Électrification Rurale
RAK	Régie Autonome de Kenitra
SER	Shadow Exchange Rate
SGG	Secrétaire General de Gouvernement
SONABA	Société Nationale d'Aménagement de la Baie d'Agadir
TAC	Total Allowable Catch
TVA	Taxe sure la Valeur Ajoutée
WID	Women in Development

## SUMMARY & RECOMMENDATIONS



## SUMMARY & RECOMMENDATIONS

### SUMMARY

#### A. Introduction

##### A-1 Objectives of the Study

Morocco is endowed with a vast continental shelf and rich fishery resources. The fisheries sector has been rapidly growing in recent years and the production output accounts for 2% of the GNP and 14% of the total export earnings, illustrating its importance as a foreign currency earner. In 1992, the Government of Morocco prepared the Sixth Fisheries Development Plan, spelling out the following directions and targets for fisheries for the five year period from 1993 to 1997.

- a) Modernisation and development of coastal fisheries
- b) Moroccanisation of offshore fisheries (appointment of Moroccans to senior crew positions and compulsory landing of the catch at a Moroccan port)
- c) Conservation of fishery resources and institutional development
- d) Promotion of fish culture

Of the above, "the modernisation and development of coastal fisheries" called for emphasis on artisanal fisheries. Although fishermen engaged in artisanal fisheries total approximately 20,000 or some 30% of all fishermen in Morocco, the total production volume of some 30,000 tons accounts for only 5% of Morocco's total fisheries production. The productivity of artisanal fisheries is very low and, accordingly, the income and standard of living of fishermen are poor. Infrastructure, including landing site, access roads and marketing facilities, has not yet been developed at many artisanal fishing villages scattered along the coast. Meanwhile, the government has been actively implementing a regional development project, focusing on coastal areas, to eradicate poverty in the country and the development of artisanal fishing villages is one of the most important pillars of this project.

The main objectives of the Study are (i) the preparation of a master plan for the development of artisanal fishing villages, designed to contribute to an improved standard of living for artisanal fishermen, a productivity increase of fishing activities and improved added-value of the catch, for artisanal fishing villages located along the coast between Saidia on the Mediterranean coast at the border with neighbouring Algeria and Sidi Fini in southern Morocco on the Atlantic side and (ii) the implementation of a feasibility study on some of these fishing villages as models for regional development.

In addition to achieving the above two objectives, the transfer of and guidance on technologies/techniques, including the specific survey method for each study item and the planning process and principles of the master plan, to the Moroccan counterparts was conducted.

##### A-2 Study Phases

During the Phase 1 Study, a master plan was prepared to develop fishing villages based on the findings of a survey on the conditions surrounding artisanal coastal fishing villages. Moreover, the fishing villages subject to the feasibility study were selected, taking the importance of each village in terms of regional development and fisheries production potential into consideration.

The Phase 2 Study featured a natural conditions survey on geology and sea conditions, etc. for those villages selected in Phase 1, a social conditions survey on village communities and a PCM designed to identify the ideas and needs of residents. In addition, an environmental survey was conducted to assess

the possible impacts of the master plan on the surrounding environment. Based on the findings of these surveys, the basic plan on the optimal facilities was conducted and the feasibility study, including evaluation of these facilities, was made.

## B. Present Conditions of Study Area

### B-1 Natural Conditions

On the Mediterranean side, the steep slopes of the Rif Mountains are often close to the coast and the fishermen living in mountainous areas form scattered communities without any coherent hamlets. Although there are few mountains near the coast on the Atlantic side, the steep cliffs of coastal terraces dominate the scenery with little flat land suitable for landing beaches. The southern part of the Atlantic coast is adjacent to the Sahara Desert and is characterised by savannah-type vegetation.

The Mediterranean coast has a dry summer and wet winter with a strong northwestern seasonal wind. The Atlantic side is generally much drier and strong rain is often associated with the passing front of a depression.

Along the Mediterranean coast, while the seasonal wind in winter causes high waves, the sea is generally calm in other seasons, providing suitable conditions for the activities of artisanal fishing boats. Meanwhile, lengthy swells caused by depressions which are born offshore are prominent along the Atlantic coast. The period between November and March is dangerous for the coastal operation of artisanal fishing boats as the waves violently break near the shore.

### B-2 Current Conditions of Artisanal Fisheries

#### 1) Regional Fisheries

While fisheries on the Atlantic side have jumped from traditional fishing using artisanal wooden boats to fishing by offshore trawlers and purse seiner, those on the Mediterranean side have gradually progressed from the use of artisanal fishing boats to artisanal purse seiner equipped with an outboard engine and further to artisanal fishing boats with an inboard engine (mainly for purse seine) engaged in not only purse seine but also drift netting and long lining. Many artisanal boats with an inboard engine are also equipped with a fish finder and capstan. The difference in the development paths of these two areas is presumably attributable to the topographical conditions governing the landing of fish as well as fishing boats and the inflow of technology and funds from Europe to fishing villages situated along the Mediterranean coast.

In regard to the desirable direction for fisheries development, there appears to be a lower requirement for improvement of the catching ability on the Mediterranean side. Rather, fisheries on this side have reached the stage where the introduction of resources management-type fisheries to maintain the healthy state of fishery resources is required, focusing on the development of fishing grounds and the voluntary implementation of fisheries regulations in particular.

In contrast, artisanal fishing boats operating on the Atlantic coast use a sounding rope with a weight at the end to determine the sea depth as well as the bottom materials in their search for good fishing grounds. While this method is appropriate to obtain vital information, it is quite inefficient as it takes a long time to find or develop good fishing grounds. While wide areas are used as fishing grounds, the use density is still low, providing potential for an increased catch.

The recent availability of inexpensive GPS equipment and fish finders in particular should help to improve the fishing efficiency in terms of the development of fishing grounds and the assured finding of laid fishing gear (such as baskets, gill nets and trammel nets, etc.)

The prospect of introducing larger fishing boats and mechanising fishing boats in general were examined under the Study from the viewpoints of developing fishing grounds far from the coast and improving the safety of fishing activities. It was found that there is no idle sea area between the subject area of coastal fisheries and artisanal fisheries or between neighbouring artisanal fishing villages, suggesting little merit in introducing larger fishing boats.

## 2) Marketing

The fish caught by artisanal fisheries is mainly exported because of its high quality. After landing, the fish is bought by middlemen on the beach through cross-trade without going to market and is exported by land or air to Europe via exporters operating in major cities. Because distributed fresh is almost exclusively high quality fish, sizable processing facilities have not been developed. In the marketing process, while EU standards on freshness management and hygiene control are abided by in some cases, there is generally much room for improvement. Few species are marketed for domestic consumption, notably European conger eel and merurusa. In addition, those failing to meet the export standards are also marketed domestically.

Concerning the places where ONP (Office National des Pêches) has no branch office, there is no control over fish landing and the fishery is not commercialized. Consequently, many artisanal fishermen depend entirely on middlemen to support their livelihoods through the sale of their catch to these middlemen.

While past and existing government policies have been gradually developing the infrastructure for coastal fisheries, the construction of facilities for artisanal fisheries has lagged behind. In some villages, a fishermen's group or the village administration has developed a slipway, fishermen's locker and simple fish market, etc. In general, however, the fisheries infrastructure is poor as evidenced by the use of natural beaches for the landing of fishing boats and fish trading at the side of boats. The inadequacy of port facilities often means that fishing boats cannot leave the beach due to their inability to safely pass the wave breaking zone near the shore, particularly in winter when there are high swells, even though the offshore water appears calm.

In general, many fishing villages are located far from the nearest trunk road and the poor conditions of access roads cause inconvenience in the transportation of fish. This situation also makes it difficult for artisanal fishermen to obtain not only fuel and fishing gear but also daily necessities. Moreover, the lack of ice-making facilities and ice storage facilities on landing beaches makes it impossible to preserve fish quality, resulting in a decline of the fish price.

## 3) Fishing Villages

The households in most fishing villages are scattered and inefficient administration can be pointed out in terms of the implementation of various policies. In many cases, fishermen are also engaged in stock raising or farming. Regional communities are male dominated based on the Islamic religion although women have some power at home.

It is very rare for women to help with fishing work. Women are engaged in limited activities as in the case of collection of shellfish at Moulay Bouselham or seaweed at beaches in southern Morocco, but this is still the exception and few women are seen working on beaches in other areas.

A spontaneous fishermen's group operates in each fishing village under the leadership of an elder. However, fishermen customarily shift location in pursuit of fishing grounds, resulting in the difficulty of maintaining the continuity of such groups. Young people in particular often move to learn new skills or to become fishermen on coastal fishing boats to earn more money. Each fishing boat has a crew of approximately three. There are rules on how the income from fishing activities is distributed and boat owners, captains and ordinary crews receive their respective shares according to these rules.

## 4) Fishing Village Infrastructure

The domestic trunk road network has been fairly well developed, posing no problems for the road transportation of the catch. However, the landing beaches of artisanal fishing villages generally suffer from poor road access, forcing middlemen to use four wheel-drive trucks or similar at many sites. Most of the access roads to these beaches are structurally vulnerable to collapse or flooding by heavy rain.

While villages along trunk roads receive electricity supply, even a short distance from a trunk road is sufficient to see villages without such supply. Consequently, the introduction of such electrical equipment as refrigerators and ice-making machines is slow although battery-powered televisions are popular.

Few villages enjoy water supply services and water has to be fetched by hand from rivers or lowland wells. Sewerage facilities are not available.

The main dwelling area in many villages is located some distance from the landing beach because of the scarcity of flat land along the coast and the high price of such land when it is available. Because of this lack of suitable land, the lockers and other facilities of fishermen at the landing beach are commonly located at the foot of steep cliffs consisting of fragile rock and measures have not been taken to protect them from heavy rain and earthquakes, etc.

No efforts are made to keep the landing beach tidy and, therefore, rubbish is scattered all over the beach. As many of the landing beaches are also tourism sites, the introduction of waste disposal facilities is highly desirable.

The fair distance of the dwelling area from the beach and the scattered households have resulted in an uneconomical situation where the mobilisation of family labour and regional community organization are difficult. At some villages, people have expressed a hope to move closer to the beach if land is available and such wishes of regional people should be incorporated in the formulation of future development planning.

## C. Master Plan

### C-1 Approach

#### 1) Master Plan for Promotion of Artisanal Fisheries

The socioeconomic importance of artisanal fisheries in Morocco is comparable to that of offshore fisheries and coastal fisheries. As agriculture, which is the economic backbone of Morocco, is unstable due to drought and other reasons, there are strong expectations in regard to artisanal fisheries which can possibly provide employment and income in regional areas.

The formulation of a master plan for artisanal fisheries must be supported by an accurate understanding of the conditions surrounding this particular type of fisheries and thorough analysis of the development potential as well as constraining factors. The following problems have, in fact, been identified by the study on and analysis of the current conditions of artisanal fisheries in Morocco.

- (1) Uneven distribution of fisheries resources
- (2) Inefficient fishing technologies/techniques
- (3) Necessity for sustainable development
- (4) Lack of fisheries infrastructure
- (5) Establishment of distribution network
- (6) Insufficient organization of fishermen
- (7) Fragile economic base of fishermen
- (8) Difficulty of law enforcement

In view of these problems, the following issues can be identified as objectives of policies designed to



promote artisanal fisheries in Morocco.

- (1) Eradication of poverty
- (2) Regional development
- (3) Solutions to social problems, such as illegal marijuana trade
- (4) Formation of fishing village culture

Items 1) and (2) are the most important issues for national policies while Item (3) is urgent but is a regionalised development objective. Item (4) is a long-term objective. The basic approach of increasing the income of fishermen and seeking the possibility of creating regional employment should be adopted to achieve these objectives. Accordingly, ① an increase of the fisheries production volume, ② an increase of fish prices, ③ a reduction of the production cost and ④ improvement of socioeconomic development are necessary.

It must be noted here that efforts should be guided towards creating services including various related industries comprising both those directly linked to fishery as well as other sector industries which evolve from the fishing industry, and employment through the increased income of fishermen instead of aiming at increasing the number of fishermen in view of the limited nature of fishery resources. Moreover, the promotion of artisanal fisheries should be examined as part of the overall regional development policy and also as a measure to create a new fishing village culture.

## 2) Increase of Fisheries Production

The present Study has reached the conclusion that there is little room for the expansion of fishing grounds and that the most effective ways of increasing fisheries production are extended fishing activities based on the development of fishing port infrastructure and improved operation efficiency by means of improved fishing technologies/techniques.

### (1) Development of Infrastructure

An increase of both the daily length of operation and the annual number of days of operation of small fishing vessels is feasible through improvement of fishery infrastructure. In order to formulate nation-wide planning, it will be necessary for the MPM (Ministère des Pêches Maritimes) to establish a national fishing ports development committee under its own leadership and to formulate a national fishing ports development plan and a artisanal fishing ports development plan.

### (2) Improvement of Fishing Technologies/Techniques

The wide use of fish finders and GPS equipment can improve the operation efficiency. In areas of the Atlantic coast where the history of fishing is relatively short, a production increase can be expected through the improvement of fishing gear and fishing methods and also through the effective combination of fishing gear.

### (3) Appropriate Resources Management

There is no way to proceed with the development of artisanal fisheries without considering the trends of resources availability.

In this context, measures of which the urgent implementation is required include establishment of a government regime to fully control fishery resources through the introduction of the numerical control of fishing boats at the national level.

### (4) Pending Tasks and Risks Related to Increase of Fisheries Production

The implementation of all of the above-mentioned measures may not achieve the intended effects. In particular, if efforts are concentrated too much on the development of infrastructure, the fear of depleting

fishery resources and the imbalance between the development of infrastructure and the development of finance, marketing and organization could emerge as constraining factors. In some cases, dependence solely on fishery of a highly seasonal nature may be insufficient to provide a stable income for artisanal fishermen, making the creation of income sources for women living in fishing villages, including the family-based processing of fishery products, necessary.

### 3) Increase of Fish Prices and Reduction of Production Cost

#### (1) Increase of Fish Prices

With careful consideration to the balance between private sector participation and government development investment, a national program should be pursued to develop ice storage facilities together with the development of auction halls. Even though export expansion is primarily a matter for the private sector, government involvement is required for the enforcement of international hygiene standards and other matters. In relation to domestic fish consumption, particular attention should be paid (i) to the fact that within overall Moroccan social structure, a coherent fishing community culture is still in the development stage and (ii) to the effectivity of a close link between the development of artisanal fisheries and the development of tourism.

#### (2) Reduction of Production Cost

The personnel cost is believed to be a minor burden in the case of artisanal fishermen. While the cost of most materials does not pose a serious problem, the cost of fuel oil is a rather sensitive political issue. Other issues, however, can be adequately addressed. The capital cost is very high because the existing institutional finance does not aim at serving artisanal fisheries. Of the various business risks, sea disasters and damage to fishing gear by larger fishing boats are the two largest items which push up the cost of artisanal fisheries.

### 4) Improvement of Socioeconomic Base for Artisanal Fisheries

#### (1) Supplemental Income Sources

Increase in alternative incomes such as agriculture, animal husbandry and craftwork will not only supplement fishermen's household income, but also work to stabilize unsteady flow of fisheries income. Among the variety of alternative income potentials, small-scale activities which will bring cash income to women should be considered.

#### (2) Support to the relevant industry sectors

The artisanal fishery can be promoted indirectly through support to the relevant industry sectors. In order to enhance the relevant industries, preparation of balanced economic infrastructure and improved institutional support for private investment is necessary.

#### (3) Development of Living Infrastructure

Improvement of the basic living infrastructure has an effect on the promotion of artisanal fisheries. Solving of the housing problem is particularly important. A viewpoint of "developing fishing villages" is essential for the future promotion of artisanal fisheries.

#### (4) Provision of Financial Services

Efforts should be made to provide such financial services as microcredit and travelling banks, etc. to meet the needs of artisanal fisheries.

#### (5) Institutional Support

There are many institutional measures which can be used to support artisanal fisheries, including the inclusion of artisanal fishermen in the social insurance scheme and the effective use of subsidies and the tax regime. The problem here appears to be a lack of "clear political will". A registration scheme for artisanal fishermen together with the introduction of the national numerical control of fishing boats and

the integration of artisanal fishermen in the social insurance scheme are worthy of consideration.

#### (6) Development of Fishermen's Organizations

The formation of fishermen's organizations should be advanced with care. It is advisable to provide literacy education, leader's training and other forms of social education and wait for the resulting emergence of responsible leaders. If cooperative associations are hastily formed, there is a risk they might fall apart or be taken advantage of by specific individuals. It is also dangerous to expect too much from cooperative associations in respect to the management of facilities and development funds.

#### 5) Examination of Policy Issues

Clarification of whether "increased income for fishermen" means increased income for existing fishermen or increased income for the general poor rural population is important. What is required is not an increase of the number of fishing boats but maintenance of the artisanal fisheries sector as a highly value-added sector and distribution of the "net income" to the poor through fisheries-related production and service activities.

Artisanal fishermen are highly mobile and tend to change their fishing base depending on various circumstances. If the formulated plan assumes that the present distribution of fishermen is fixed, there is a possibility that its forecast will prove incorrect in later days.

The owners of the artisanal coastal fishing boats used for artisanal fisheries are more interested in obtaining boats only slightly larger than the present and equipped with an inboard engine rather than obtaining much larger boats. As artisanal fishermen are particularly interested in obtaining such equipment as fish finders, GPS equipment and maritime radio equipment, it must be noted that the promotion of artisanal fisheries does not call for the introduction of much larger boats.

Government interference in private economic activities may have undesirable repercussions and, therefore, careful judgement on the part of the government is essential. In particular, the present government involvement in the following policies should be carefully reviewed.

- (1) Tax exemption of fuel oil for large fishing boats and some artisanal fishing boats
- (2) Increase of fisheries improvement and extension officers

One special feature of fishing port construction in Morocco is its substantial external economic effect, centering on promotion of tourism. Another is the strong likelihood in this area of obtaining aid from the governments of countries whose fishing boats operate in Moroccan waters. In the case of pursuing fishery infrastructure improvement under external aid, however, there is susceptibility to errors in the distribution of funds in the form of excessive investment in fishing port infrastructure and deficient investment in other areas. Meanwhile, the input of government funds to develop infrastructure as well as the social and institutional systems and to solve the imbalance between economic and living infrastructure may lead to higher fiscal spending and/or counteract the benefit principle under which beneficiaries pay the cost.

#### 6) Activity Plan

##### (1) National Fishing Port Development Plan

A national fishing ports development plan and artisanal fishing villages development plan must be formulated, taking the following requirements into consideration.

- ① A nationwide artisanal villages development plan should be formulated as a subordinate plan to a national fishing ports development plan which includes the development of major fishing ports.
- ② Fishing ports are classified in five categories depending on their relative importance and expected roles. Category S1 ports are large fishing ports, including those for offshore fisheries. Category S2 ports are artisanal than Category S1 ports and mainly act as bases for coastal fishing boats.

- ③ The fishing ports of artisanal fishing villages are classified in the categories of A, B and C fishing villages (ports).
- ④ The target port distribution is a Category S1, S2 or A port every 30 km or less so that artisanal fishermen can operate at any part of the Moroccan coast.
- ⑤ The priority table to determine the priority of Category A ports should be periodically reviewed.
- ⑥ Regardless of Category A, B or C ports, measures designed to improve the safety of fishing boats entering and leaving the port and the introduction of a fish market, etc. which will have significant development effects with artisanal investment should be conducted as soon as possible.
- ⑦ The disclosure of information on development plans and the introduction of tax and other incentives should be conducted with a view to exploiting the investment potential of the private sector.

#### (2) Feasibility Study on Fishing Villages Development

The formulation of the above two plans must be followed by a feasibility study in each fishing village. In addition, a nationwide feasibility study for the development plan for facilities to ensure the safety of fisheries activities and the fish market and ice storage development plan should be completed as soon as possible. Suira Kedima should be subject to comprehensive development as a model fishing village.

#### (3) Monitoring and Project Evaluation

A monitoring team should be established at the MPM to evaluate the physical and social aspects of individual projects. Completion evaluation should be conducted when physical facilities have generally been completed with post-project evaluation should be conducted two or three years after project completion. These evaluation activities should be participated in by as many sections involved in a project as possible to evaluate the project from the viewpoints of degree of target attainment, effects, efficiency, project suitability and prospects for self-reliant development.

### C-2 Fisheries Production Improvement Plan

Under this plan, infrastructure is developed in each fishing village to increase the number of days of fishing operation in order to achieve a higher production volume. In addition, increased production is assisted by the modernisation of fishing equipment, development of new fishing gear and fishing methods and improvement of fishermen's skills.

#### 1) Nationwide Artisanal Fishing Ports Development Plan

Some 120 artisanal fishing villages scattered along the Moroccan coastline are classified in three categories (A, B and C) based on the development potential and the development of fisheries infrastructure suitable for each category is conducted.

##### Category A Fishing Villages (Ports)

A fishing port with 100 or more fishing boats and enjoying a fairly large production volume and good development potential. It operates all year round and the distribution of fishery products is actively conducted. Here, the development targets include a mooring area, breakwater, revetment, passage and slipway. Such ground facilities as an ice-making machine, cold storage, market, fishermen's locker and administration building, etc. are also introduced. Some 12 villages nationwide are classified as Category A fishing villages (ports), i.e. Immessouane, Cala Iris, Souira Kedima, Tefedna, Sidi Hsaine, Tifnit, Moulay Bousseham, Kaa Sraas, Tiglet, Saidia, Oued R'mel, and Ksar Sghir.

##### Category B Fishing Villages (Ports)

A fishing port with at least 50 fishing boats but less than 100 fishing boats and enjoying a medium production volume. Fishing activities are restricted to certain seasons. The planned civil engineering work involves the construction of a slipway for fishing boats but not other port facilities. The planned ground

facilities are of medium scale and ice is stored in a cold storage. A phased development approach should be employed in line with the future development of fisheries activities. Some 20 villages nationwide are classified as Category B fishing villages (ports), including Alcount, Sidi Moussa Aglou, Ben Younech, Chmaala, Asilah, Oued Laou, etc.

#### Category C Fishing Villages (Ports)

A landing beach with less than 50 fishing boats. No substantial change is expected to occur in the future. Fisheries activities are quite seasonal and the economic dependence on fisheries is low. Improvement work is restricted to the introduction of fishing gear storage and access road improvement, etc. Some 70 fishing villages nationwide are classified as Category C fishing villages (ports).

The planned development/improvement of these fishing villages will be conducted in some 20 years. From the economical point of view, completion of the work in Category A fishing villages (ports) in the first five years or so is desirable.

#### 2) Fishing Technologies/Techniques Improvement Plans

The positive effects of improved fishing port facilities can only materialise when accompanied by improved fishing technologies/techniques to ensure efficient fisheries activities. The INRH (Institut National de Recherches Halieutiques) plays a central role in these plans.

##### (1) Fishing Gear and Fishing Method Improvement Plan

- Improvement of artisanal-scale purse seine: establishment of sustainable and efficient fisheries activities
- Introduction of artisanal set nets: introduction of new fishing technique
- Improvement of artisanal fishing gear: improvement of octopus pots

##### (2) Fish Finding Equipment Improvement Plan

Early introduction of fish finders and GPS.

##### (3) Fishing Boat Modernisation Plan

Under this plan, R & D efforts should be made to identify desirable boat materials (FRP aluminium and waterproof plywood boards, etc.) to improve the economic efficiency of conventional wooden fishing boats, compatibility between the hull and engine of fishing boats and other issues.

#### C-3 Processed Fishery Products Shipment Improvement Plan

Almost all the fish caught by artisanal fisheries is currently traded fresh. The fish handling tools and system are improved under this plan to increase the added value of fish to increase the price at landing beaches.

##### (1) Post Harvest Handling Improvement Plan

- Development of isothermal fish boxes and their introduction to fishing boats
- Accelerated use of ice to maintain fish freshness
- Extension of freshness maintenance techniques: guidance on a special fish killing method designed to preserve freshness
- Development of storage facilities: construction of ice-making, cold storage and other facilities

##### (2) Shipment Improvement Plan

- Improvement of containers: wide use of plastic fish boxes and encouragement of the use of foam polystyrene fish boxes

- Development of new processed fishery products
- R & D on feasible processed fishery products against the background of the current non-existence of such products
- Development of a fish market operation and management system at artisanal landing beaches

#### C-4 Fishing Ground Management and Resources Conservation Plan

Implementation of the following activities is important to achieve sustainable fisheries.

- (1) Proper analysis/surveys to establish the conditions and use of resources and biological data on resources; planning and formulation of resources control measures
- (2) Public relations aimed at fishermen to improve their understanding of and to facilitate their cooperation for resources management
- (3) Study and implementation of fishing ground environment conservation methods
- (4) Deployment of artisanal research vessel
- (5) Development of fishing ground

#### Resources Survey and Control Plan

- Understanding of the resources conditions of major fish species
- Planning to establish a fishery data gathering and statistics implementation system (quantity of fish landing, number of fishing boats, etc.)
- Encouragement of fishermen's understanding of resource management
- Fishing ground conservation plan
- Promotion of diverse fishing methods
- Creation of artificial fish reef and seaweed grounds
- Introduction of executive fishing area for artisanal fisheries
- Grasp of the development potential of fishing grounds for determination of an appropriate landing target quantity

#### C-5 Distribution Improvement Plan

It is believed that the distribution of fresh fish will basically continue to be the main pillar of fish distribution.

##### (1) Plan to Foster Fresh Fish Distributors

A qualitative improvement of fish dealers is attempted through education on the hygienic handling of fish so that high quality fish can be distributed at home and abroad.

##### (2) Plan to Establish Fish Hygiene Inspection Organization

The hygiene standards demanded by importers are becoming stricter following the introduction of the HACCP and other developments. The Moroccan government should facilitate the establishment of a public organizations which has the authority to issue inspection certificates for regional fishery products for export.

#### C-6 Regional Socioeconomic Development Plan

All artisanal fishing villages in Morocco are located far from urban areas and the development of social infrastructure in these villages lags far behind urban areas. The construction of various facilities to meet BHN is urgently required. Particularly important is the development of electricity supply, water supply and sewerage services, access roads, a telecommunications network and fuel procurement routes. In

addition, the regional access to education and medical care must be improved. The development of these villages is planned in accordance with the respective categories set forth in the National Artisanal Fishing Village (Port) Development Plan.

#### Category A Villages (Ports)

Priority is given to the development of electricity and water supply facilities and to access roads. In the course of development work, the priority issue is the securing of the necessary land for fishermen's housing and public facilities. The actual work involves, among others, the allocation of space to house a clinic, the establishment of a regional branch of a bank or similar financial body and the construction of a community centre.

Development will be carried out in accordance with the categories contained in the national plan for fishing villages development.

#### Category B Villages (Ports)

Priority is given to the development of electricity and water supply facilities and to access roads as in the case of Category A villages (ports). In addition, a telecommunication link will be established to give regional people access to the emergency medical care system.

#### Category C Villages (Ports)

Priority is given to the development of water supply facilities and to access roads.

### C-7 Education, Training and Cooperative Plan

Programmes to train extension officers and fishermen are introduced to improve the fishing technologies/techniques of fishermen, to diffuse processing and distribution technologies/techniques and to organize fishermen.

### C-8 Education and Training Plan

#### (1) Extension Officer Training Course

An artisanal fisheries extension officer training course is established at the CQPM (an upgrading training organization for fishermen) located in Larache. After two years training, the newly qualified extension officers are assigned to DRAM (Délégation Regionale des Affaires Maritimes: regional office of the Ministère des Pêches Maritimes) to provide guidance for fishermen.

#### (2) Artisanal Fishermen Training Course

A short training workshop is held for fishermen at those fishing villages which are developed as artisanal fisheries development bases to improve the fishing technologies/techniques of fishermen.

### C-9 Fishermen's Cooperative Plan

The creation of cooperatives in the fisheries sector has lagged far behind the agricultural sector, presumably because of the high mobility of regional fishermen in their pursuit of better fishing grounds and also because of the relative absence of joint work, i.e. relative absence of fisheries activities using various types of nets. For the establishment of fishermen's cooperatives, the first emphasis is placed on the education of leading fishermen with a view to consolidating cooperative activities over time. At the initial stage of cooperative activities, it appears practical to focus on the maintenance of various facilities and the joint purchase of fuel, subsequently expanding the scope of activities step by step.

### C-10 Environmental Conservation Measures

The development of fishing facilities at artisanal fishing villages has a relatively artisanal impact on the surrounding environment because of the artisanal-scale of such development. Nevertheless, the wide ranging nature of development activities, from the construction of ports to the development of village infrastructure demands careful environmental consideration at the planning stage of individual projects.

On the Mediterranean coast, vegetation has been lost through human activities over a long period of time, resulting in the widespread collapse of slopes and loss of top soil. Given the abundance of historical ruins and other tourism resources along this coast, any plan to develop a fishing village (port) must carefully take these factors into consideration.

On the Atlantic coast, arid areas are particularly noticeable in the south and the weak vegetal cover is very vulnerable to development activities. As a result, once vegetation is lost, it may be very difficult to restore. Some swamps along this coastline are the habitat of rare birds, requiring extra care in the case of fishing village development. Another factor which requires careful attention is littoral drift along the coastline.

#### D. Feasibility Study

##### D-1. Souira Kedima

The Souira Kedima beach is situated at an inlet surrounded by a shore reef and is located some 30 km southwest of Safi. It provides a relatively large landing beach for artisanal fisheries. Some 1,000 fishermen operate from this beach and their families live in commune rurales in the hinterland of the beach. A sardine processing factory once operated here. The number of fishing boats using the beach seasonally varies from some 70 to 350 and the annual days of operation are 150 days. The main fish landed at the beach are European conger eels and lobsters. Bottom long lining, trammel netting, gill netting and hand line fishing are the leading fishing methods used. The annual landed quantity of fish is estimated to be approximately 2,200 tons worth 56 million DH. The average annual income per fishing household is estimated to be approximately 6,900 US\$.

There are some 180 fishermen's lockers at this landing beach which are also used as simple accommodation with electricity and water supply where the fishermen spend the night. There is a artisanal fish market run by a commune although the state of hygiene has room for improvement.

In addition to fishing, fishermen support their lives by farming as well as stock raising but the fishing income accounts for 80 - 90% of the total income. In general, regional fishermen commence their career at the age of around seventeen. They travel quite a lot when young to work at different beaches but tend to settle as they grow older.

The reef at this beach is mixed with the sand. The inflow of nutritious bases from the river is one reason for the generation of rich coastal fishery resources.

The PCM conducted on fishermen found problems relating to social security, fishing technologies/ techniques, safe navigation, infrastructure, fishing village environment and fisheries-related services. The fishermen also pointed out the need for resources management and the establishment of a cooperative.

To solve the above-mentioned problems, the implementation of a development project incorporating the following work is necessary.

- Construction of the facilities listed in Table 5-3-A-16 under the infrastructure development plan
- Establishment of a resources monitoring system under the fisheries resources management plan
- Introduction of new fishing technologies/techniques through the guidance of extension officers under



- the fisheries technology/technique improvement plan
- Step by step establishment of a fishermen's cooperative under the fishermen's cooperative plan
- Implementation of a tourism development plan and a social infrastructure development plan

The implementation and management of this project by MPM, ONP, INRH and fishermen's groups, etc. will eventually lead to an increased landed quantity and increased fish prices. Given an estimated FIRR and EIRR 2.53 and 12.28 respectively, the implementation of the project under Japan's grant aid scheme or similar is desirable to achieve regional development, rectification of the income gap and the fair distribution of social benefits.

As the planned new facilities are rather artisanal, their environmental impacts will be equally artisanal. However, it is desirable to establish appropriate measures to deal with household and other types of waste water in view of the likelihood of an increased volume of waste water in the future. As development activities affect various aspects of the social environment, a participatory approach should be adopted in the implementation of such activities.

#### D-2 Sidi Hsaine

This beach is situated in an isolated area between Nador and Al Hoseima and the access conditions are extremely poor. Some 300 fishermen operate from this beach and their homes are scattered on the steep slopes in the hinterland. Eight groups of purse seiner catch sardines and anchovies while 70 artisanal fishing boats use hand lines or trammel nets to catch demersal fish as well as pelagic fish. The purse seiner used are advanced-type artisanal fishing boats equipped with a fish finder and diesel engine. The fishing boats operate 200 - 210 days a year which is relatively high compared to other fishing villages. The estimated annual landed quantity of fish is 1,300 tons worth 15.38 million DH. The average annual income per fishing household is estimated to be 8,800 US\$.

There are 10 large warehouses on the beach which are capable of storing the fishing boats and these are surrounded by a restaurant, cafe and general store, etc. Drinking water is manually fetched from wells dug at the riverbed and is transported by donkeys and other means. The conditions of the access road (7 km in length) are extremely poor and the road is closed at the time of rain. Electricity supply has only reached Tizirhine, a village located 7 km away. A primary school is the only public facility in the area.

The average fishing household size of 14 persons is large, resulting in much larger houses and housing sites than in other areas. Life is almost exclusively dependent on income from fishing. A diet of fish is very popular. In addition to the personal consumption of fish caught during the fishing season, fish is bought from outside during the off season. Many fishermen have had the experience of working on purse seiner at such ports as Nador and Al Hoseima when they were young.

The vegetation is poor and many collapsed sites due to erosion are observed. The growth of seaweed is poor to the west of the beach because of the inflow of sand and silt. The regional vegetation is said to have been very rich in the past and restoration efforts must be made in the future.

The PCM conducted on fishermen pointed out the need to develop fisheries as well as social infrastructure and to ensure navigational safety. Because of the relatively high income enjoyed by regional fishermen and the long period of operation each year, the necessity for full-scale port development is not strong. However, the implementation of a development project incorporating the following work is necessary to solve regional problems.

- Construction of the facilities listed in Table 5-3-B-18 and 19 under the infrastructure development plan
- Examination of both full-scale fishing port infrastructure development (Alternative Plan-1) and the limited development of simple fish landing facilities (Alternative Plan-2)

- Establishment of a close link between social infrastructure development, featuring the access road and electricity and water supply, etc. and a master development plan for the area
- Improvement of the efficiency of fisheries activities through the implementation of the fisheries-related services development plan
- Gradual organization of fishermen under the facility operation and control plan with a view to the establishment of a fishermen's cooperative in the future
- Establishment of a resources monitoring system under the fisheries resources management plan

The implementation of this project should eventually achieve, among others, an increase of the number of fishing days, extension of the operation hours, increase of fish prices, improvement of fish quality and cost reduction. However, the expected benefits are so artisanal in comparison to investment cost that the FIRR cannot be estimated for both Alternative Projects. Similarly, the EIRR for Alternative Project A cannot be estimated although the EIRR for Alternative Plan-2 is 1.14%. The implementation of the project for Sidi Hsaine under Japan's grant aid scheme or similar is desirable to achieve regional development and the fair distribution of social benefits.

The planting of trees in the hinterland to develop forests for fish breeding should prove beneficial for the protection and fostering of fisheries resources.

### D-3 Tafedna

This beach which has developed a river mouth fan is located 30 km south of Essaouira and is surrounded by steep rocky ground. Some 400 fishermen operate from this beach and live in a nearby commune rurale. There is an apartment-type building on the beach which provides accommodation for summer visitors. Fishermen also use part of the building as temporary accommodation as well as their fishing base. Some 120 - 150 fishing boats operate from the beach but also move to other beaches depending on the regional fishing conditions. The annual days of operation are approximately 160 days and the main fish species caught are such high quality fish as European conger eels, lobsters, spear squid, sea bream and common sea bass. The fishing methods used are bottom long line and trammel net. The annual landed quantity is estimated to be approximately 1,400 tons worth 22.47 million DH. Accordingly, the average annual income per fishing household is estimated to be approximately 7,000 US\$ (some 1,000 US\$ per capita). The fishermen live in an inland area between several kilometres and 10 km from the beach and are also engaged in farming. Some fishermen often spend the night at the fishermen's lockers on the beach while others travel from home. The average household size is 6.2 persons. The 17 km long access road from the state road is very fragile and becomes impassable at the time of rain. The barren soil in the area means a generally low crop yield.

The beach is fronted by extensive shallow water with ground of very fine sand and this shallow water becomes turbid when the sea is rough. The regional vegetation is shrub, mainly consisting of algal. As the top soil is both shallow and poor, it is unsuitable for cultivation.

The PCM conducted on fishermen found such problems as a low standard of living, lack of infrastructure development and the need for safe fisheries activities. The fishermen also pointed out the need for resources management and improved fisheries-related services. The implementation of a development project incorporating the following work is necessary to solve these problems.

- Construction of the facilities listed in Table 5-3-C-16 under the basic social infrastructure development plan
- Establishment of a close link between social infrastructure development, featuring the access road and electricity supply, and a master development plan for the area
- Placing of development emphasis on ground facilities under the fisheries infrastructure development plan in view of the fact that the construction of port facilities on a shoaling beach is extremely expensive and also because of the likelihood of sea conditions with the phenomenon of littoral drift

- Improvement of the efficiency of fisheries activities through the implementation of the fisheries-related services development plan
- Implementation of the facilities operation and control plan by the ONP while encouraging fishermen to join the social security system
- Establishment of a resources monitoring system under the fisheries resources management plan
- Examination of the possibility of introducing new technologies/techniques under the fisheries technology/technique improvement plan
- Gradual organization of a fishermen to establish a cooperative

The implementation of this project should eventually achieve, among others, an extension of the operating hours, increase of fish prices, improvement of fish quality and cost reduction. However, the expected benefits are so artisanal in comparison to investment cost that the FIRR and EIRR of 6.01 and 14.40 respectively are low. The implementation of the project for Tafedna under Japan's grant aid scheme or similar is desirable to achieve regional development and the fair distribution of social benefits.

In the case of Tafedna, the preparation of a development project which takes the desirable co-existence of tourism and fisheries into consideration is desirable. Measures to treat waste water and to prevent bad odour are important while measures to prevent land collapse are also necessary in view of the fragile nature of the regional soil.

#### D-4 Tifnit

The Tifnit beach is situated 25 km south of Agadir on a steep slope with sandy areas and reefs. Large-scale tourism development is planned in the hinterland. Some 400 fishermen operate here and these fishermen live in a nearby commune rurale and temporarily move to the fishermen's lockers during the fishing season. While some 250 fishing boats use the beach, the often move to fishing grounds in the south. Fishing is possible on some 208 days of the year and the angling of spear squid is very popular. Other regional fishing methods are trammel net, bottom long line and trawling, etc., annually producing a landed quantity of 356 tons worth 14 million DH. The average annual income per fishing household is estimated to be approximately 5,600 US\$.

There are many fishermen's lockers at this beach which can be used as temporary accommodation for regional fishermen and artisanal huts used by urban people for vacational purposes. Because of the proximity to Agadir, middlemen are engaged in open air trading and take the fish they buy to processing sites in Agadir. The average household size is 6.3 persons and families live in the nearby commune rurale. As the surrounding area is agricultural, part of the household income depends on farming. The fishermen do not often move around as the area enjoys favourable fishing grounds and a reliable market in Agadir. The Sous Massa National Park lies 15 km further south and is a habitat for bald ibis, an endangered bird. The beach and surrounding area are including in the subject site of a large-scale tourism development plan of the SONABA and the outcome of this development plan will significantly affect the future of fisheries at this beach.

The PCM conducted on fishermen found problems relating to social security and weak social infrastructure as well as social services. The fishermen also expressed a hope for resources conservation, establishment of a distribution network and safe fisheries activities.

The implementation of a development project incorporating the following work is necessary to solve these problems.

- Construction of the facilities listed in Table 5-3-D-12 under the basic social infrastructure development plan
- Establishment of a close link between social infrastructure development, featuring electricity supply and water supply, etc., and the development plan of the SONABA

- Construction of only ground facilities, excluding port facilities, under the fisheries infrastructure development plan in view of the adverse impacts of littoral drift on port facilities
- Improvement of the efficiency of fisheries activities through the implementation of the fisheries-related services development plan
- Implementation of the facilities operation and control plan by the ONP while encouraging fishermen to join the social security system
- Establishment of a resources monitoring system under the fisheries resources management plan
- Examination of the possibility of introducing new technologies/techniques under the fisheries technology/technique improvement plan
- Adoption of a slow approach for the organization of fishermen into a cooperative

The implementation of this project should eventually achieve, among others, an extension of the operating hours, increase of fish prices, improvement of fish quality and cost reduction. However, the expected benefits are so artisanal in comparison to investment cost that the FIRR cannot be estimated. Meanwhile, the EIRR is 6.18. The implementation of the project for Tifnit under Japan's grant aid scheme or similar is desirable to achieve regional development and the fair distribution of social benefits.

In the case of Tifnit, the preparation of a development project which takes the desirable co-existence of tourism and fisheries into consideration is desirable. The protection of bald ibis is particularly important in addition to measures to treat waste water from ground facilities and to prevent bad odour. The planting of trees to create sandbreak forests as well as to fix the soil is also desirable.

#### D-5 Kas Srass

This is a sandy beach facing the Mediterranean. It is adjacent to the delta formed by Oued Laou River and the inflow of nutrient salts bases has created excellent fishing grounds. Some 500 fishermen operate from this beach who live in the commune rurale situated next to the beach. A fishery products processing factory which is financed by Spanish capital is currently operating in the village. There are some 220 fishing boats, including 15 artisanal purse seiner. The annual days of operation of artisanal fishing boats are estimated to be 194 days. The main regional fishing methods are purse seine, drift netting, trammel netting and hand line fishing to catch sardines, anchovies, yellowfin horse mackerel yellow sea bream and silver bream, etc. While the dredge netting of European cockles used to be popular, it has been suspended in recent years due to the occurrence of shellfish poisoning. The annual landed quantity is estimated to be 1,000 tons worth 22 million DH. The average annual income per fishing household is estimated to be some 6,000 US\$.

The fishermen live in a village community formed along the state road which runs parallel to the landing beach. Among the fishing villages studied, the distance between the landing beach and housing area is the shortest here. Many households have farmland near their homes and produce crops for their own consumption.

Because the beach is sandwiched between Oued Laou River and Aharous River, there is an inflow of sand from these rivers to the beach. The beach forms a straight line which is unsuitable for the construction of port facilities from a topographical point of view as the beach is directly hit by offshore waves.

The PCM conducted on fishermen found such problems as a low standard of living, lack of social security provision and concern in regard to operational safety. The fishermen also pointed out low fish prices and a high production cost. The implementation of a development project incorporating the following work is necessary to solve these problems.

- Construction of the facilities listed in Table 5-3-E-1 under the fisheries production and distribution infrastructure development plans
- Establishment of a close link between social infrastructure development, featuring water supply and electricity supply, etc., and a master development plan for the area

- Implementation of a further detailed survey on the feasibility of constructing an offshore island-type port which is planned under the fisheries infrastructure development plan in view of avoiding the accumulation of littoral drift and the high construction cost of port facilities along the straight shoreline
- Implementation of the facilities operation and control plan by the ONP while encouraging fishermen to join the social security system
- Establishment of a resources monitoring system under the fisheries resources management plan
- Examination of the possibility of introducing new technologies/techniques under the fisheries technology/technique improvement plan
- Adoption of a slow approach for the organization of fishermen into a cooperative, commencing with the consolidation of the necessary foundations

The implementation of this project should eventually achieve, among others, an extension of the operating hours, increase of fish prices, improvement of fish quality and cost reduction. However, the expected benefits are so artisanal in comparison to investment cost that the FIRR cannot be estimated. Moreover, the EIRR cannot be estimated because of the artisanal benefits resulting from the implementation of these plans. The implementation of the project for Kaa Sraas under Japan's grant aid scheme or similar is desirable to achieve regional development and the fair distribution of social benefits. While an artificial offshore island-type fishing base will not cause littoral drift or adverse impacts on the environment, there is concern that a port plan featuring a breakwater directly stretching from the beach will affect the environment.

#### D-6 Moulay Bouselham

Moulay Bouselham is situated at the opening of the Merja Zerga lagoon and fisheries are conducted in both the inland water and ocean. Some 400 fishermen operate here but many are also engaged in farming, reflecting the fact that the area is a rich agricultural zone. The fishing of short-necked clams is predominant inside the lagoon while European hake, sea bream and hairtail are caught by angling. Of the some 120 fishing boats, approximately 60 operate on the high sea. The annual days of operation are estimated to be 194 days. The annual landed quantity is estimated to be 760 tons worth 19 million DH. The landing beach is located in a calm area facing one of the lagoon's water courses and the fishing boats are simply pulled onto the beach. The fishermen live in a nearby commune rurale within walking distance of the beach. This area is characterised by the participation of women in fisheries activities (fishing of short-necked clams) and the co-existence of fisheries and tourism.

As the area is a tourism site not far from Rabat, the capital of Morocco, roads and electricity supply are in place. In contrast, the development of a water supply system has been slow and fishermen's households rely on wells for the supply of water. The lagoon is registered wetland under the Ramsar Convention with species listed in the Annexes of the Washington Convention and Migratory Birds Convention and, therefore, environmental consideration is necessary when envisaging a large-scale development project.

The PCM conducted on women engaged in fisheries and the interviews with fishermen found such problems as concern in regard to operational safety, few employment opportunities, low fish prices, high cost of living and insufficient welfare provision for widows, etc. The need for improved fisheries-related services was also pointed out. The implementation of a development project incorporating the following work is necessary to solve these problems.

- Implementation of the step by step improvement of the social structure through self-help efforts as the functions of the relatively well developed social infrastructure in this area compared to other areas can be consolidated through such efforts
- Construction of the ground facilities listed in Table 5-3-F-1 under the fisheries production and

distribution infrastructure development plan. While the reef on the ocean side poses navigational problems, its excavation could have unpredictable environmental impacts, including a change of the lagoon's water level. Consequently, no work should be planned for the reef under the development project for Moulay Bousselham. However, such safety measures as the installation of beacons should be implemented.

- Implementation of the facilities operation and control plan by the ONP while encouraging fishermen to join the social security system
- Establishment of a resources monitoring system under the fisheries resources management plan
- Efforts to create cooperatives involving fishermen and working women

The implementation of this project should eventually achieve, among others, an extension of the operating hours, increase of fish prices, improvement of fish quality and cost reduction. However, the expected additional benefits are so artisanal in comparison to investment cost that the FIRR cannot be estimated. The estimated EIRR is 6.52. The implementation of the project is desirable to achieve regional development and the fair distribution of social benefits.

The planned project takes special care not to damage the indigenous flora and fauna in the lagoon by means of restricting its scope to the development of ground facilities while avoiding such large-scale development as the creation of a new passage through the reef section. The operation of the ground facilities should have a positive effect on tourism in terms of new jobs and improved income.

## RECOMMENDATIONS

### < Master Plan >

MPM should start to formulate the National Fishing Ports Development Plan proposed by the master plan in cooperation with MTP (Ministère des Travaux Publics), beginning with the classification of each fishing port or landing beach into a specific category. Together with this plan, a artisanal fishing village development plan should be formulated and the phased development of fishing villages should proceed based on their respective priorities.

As the technical development of artisanal fisheries relies on the R & D initiative of the INRH, a new section for exclusive R & D on artisanal fisheries should be established at the INRH to conduct the necessary work. In addition, a system to gather statistical data on artisanal fisheries should be established to accumulate accurate data. Moreover, appropriate resources management policies based on scientific data should be recommended to MPM.

### < Suitability of Project Implementation >

A detailed feasibility study was conducted on the development projects for three of the six fishing villages selected for the Study while basic surveys were conducted on the remaining three villages. The resulting EIRRs which show the economic viability of the project were 12.28% for Souira Kedima, 1.14% for Sidi Hassen (Alternative Plan-2), 14.40% for Tafedna, incalculable for Kaa Sraas, 6.18% for Tifnit and 6.52% for Moulay Bousselham. Despite the generally low EIRR figures, each project appears important for the development of social infrastructure, reduction of poverty, creation of new employment opportunities and the earning of foreign currency, etc. and is technically feasible. With more than 10,000 beneficiaries, the projects should be implemented as soon as possible.

### < Priorities of Project Implementation >

Of the studied fishing villages, Souira Kedima is a artisanal fishing village recording the highest landed quantity of fish in Morocco and can be developed as a centre-piece artisanal fishing village. In view of the

importance of Souira Kedima, project implementation as soon as possible is highly desirable in order to develop fishing technologies/techniques and to organize regional fishermen so that the newly acquired knowledge and development measures which have proven to be effective can benefit the development of other villages. The other five villages are also important from the viewpoint of regional development and the respective projects should be implemented as soon as possible so that these villages can act as model artisanal fishing villages in each regionality.

< Implementation of Construction Work >

(1) In regard to the development projects for Sidi Hsaine and Kaa Srass, the relevant plans should be submitted to the Agence pour la Promotion et le Développement Economique et Social des Prefectures et Provinces du Nord du Royaume with a view to obtaining various conveniences for the projects, including exemption from Taxe sur la Valeur Ajoutée (TVA). It is particularly important to obtain funding assistance by the said agency for the construction/improvement of the access road to each village.

(2) In the case of Tafedna, improvement of the access road (17 km long) is particularly important. Given the present dangerous state of the road for the passage of project-related work vehicles, MTP should be approached to urgently improve the road conditions prior to the commencement of construction work under the project.

(3) During the construction of the new facilities at each subject village, regional fisheries activities may be slightly disrupted. Prior to the commencement of the work, therefore, thorough consultations involving MPM, the commune, the province and regional fishermen must be held to establish a precise understanding of the project contents by all parties.

< Organizations >

(1) MPM should establish a section responsible for artisanal fishing village development projects. This section will then coordinate the government ministries/agencies, regional public bodies and other organizations involved in project promotion and implementation. This section will also be responsible for all relevant approval and permission procedures, including provision of the necessary land and permission regarding the use of certain quarry sites as stone and sediment supply sources.

(2) Following the completion of the development work at key fishing villages, MPM should establish local branches of DRAM at these villages to manage artisanal fisheries. These branch offices should be manned by two staff members of the Ministry who will be assigned such work as the gathering of statistical data, law enforcement and the provision of guidance on fisheries activities. MPM must select those staff members who are capable of and suitable for providing guidance for fishermen and must dispatch them to their places of assignment after the necessary training.

(3) The Artisanal Fisheries Section of MPM should make active efforts to organize a fishermen's cooperative in each village in cooperation with the ODECO. In organizing such cooperatives, regular visits should be made to the villages in accordance with the five year development plan to provide wide-ranging guidance for the candidate leaders of the cooperatives on such issues as daily work and the formulation of a long-term plan, etc.

(4) The INRH should organize a team of three engineers to conduct technical development for artisanal fisheries. This team should tour the villages with a view to developing the optimal fishing technologies/techniques for each village. The subject issues for technical development include actual fishing technologies/techniques, improvement of the hull of fishing boats, storage method of the catch and the development of fishing grounds. The INRH should also conduct a resources survey at each landing beach from the viewpoint of conserving resources and should also monitor environmental changes. In order

to guarantee these activities, the INRH should secure the necessary annual budget and appoint qualified personnel for the anticipated work.

(5) The National Fisheries Corporation (ONP) should dispatch two staff members to the fish market at each of those landing beaches developed under the project with a view to ensuring the fair trading of fishery products. The ONP should also collect market commission to secure the original funds for a social security system and should try to establish a welfare regime for fishermen through the control of such funds.

(6) In response to a request by MPM, Fond Développement Rurale (FDR) should provide financial assistance for project implementation at those major fishing villages in the south which the Moroccan government plans to develop using its own funds. In the two year period commencing in 1998, the FDR should secure the necessary funding for a feasibility study on the candidate villages and should entrust a consultancy company to conduct the study. Based on the draft design of facilities and estimates established by this study, MPM should secure the necessary national budget for project implementation. In regard to fishing villages other than major fishing villages, the FDR should provide loans for the development of access roads, sewage services and medical clinics, etc. through consultations with communes, provinces and other relevant organizations.

(7) In cooperation with communes and provinces, MPM and ONP should encourage a fish diet and activate the distribution of fish in areas around fishing villages where development work has been completed. It is essential that inexpensive fish is hygienically sold in regular markets (souks). To meet this requirement, a system should be established to encourage fishermen to land sardines and other inexpensive fish on market days so that fresh fish can be available in the markets.

#### < Development Sites >

In the course of the present feasibility study, it was found that a village named Sidi Boufdail in Tiznit Province has suitable conditions for the development of a fishing village and landing beach. As the site was not included in the original subject landing beaches for development, a detailed survey was not conducted. As the development of a key fishing village to the south of Agadir is important from the viewpoint of regional development, it is hoped that a detailed survey on this site will be conducted as soon as possible to facilitate development in the southern part of Morocco.

#### < Environmental Improvement >

It is a well-known fact that forests for fish breeding and hinterland forests play an important role in the conservation of fisheries resources. It is not unusual to observe devastated mountainous areas without forests along Morocco's Mediterranean coast while a desert landscape is frequently seen on the Atlantic coast due to the arid climate. Regreening work, including the planting of trees on slopes, must be actively conducted to improve the environment in order to sustain regional fisheries activities.



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# CHAPTER 1

## CHAPTER 1 PREFACE

### 1-1 Background of Research

Since the 1970s, Morocco has gradually developed and modernized its offshore large boat fishing. At first, the industry was dependent on foreign fishing vessels with foreign crews and the catch was always disembarked at Las Palmas, Spain. However, to nationalize the industry under its policy of "Moroccanization", the government launched projects to train Moroccans as captains, and built large-scale harbors and provided facilities to accommodate large catches. As a result, Morocco has increased the size of its catches and the volume of its marine exports.

The Moroccan government has never pursued a policy of developing artisanal fishery using wooden vessels, and has always had an ineffective "low-yield" fishing industry.

However, aware of the vast economic and social disparities between urban and rural area, which have hindered economic progress, the government is now launching bold initiatives for rural development. In this connection, it was felt that a development plan based on Morocco's rich marine and touristic resources would be most effective in developing its coastal regions. Moreover, a plan that focused on creation of a port infrastructure for the development of Morocco's scattered fishing villages would contribute directly to an improved standard of living for Morocco's artisanal fishermen.

Thus, in 1995, Ministry of Ocean Fishery (MPM)<sup>1)</sup> began studies and implementing a plan to develop a plan to develop an infrastructure for Morocco's fishing villages. This plan selected 12 larding sites for infrastructural development that would be the "center" for Morocco's development of its artisanal fishery and serve to improve the lives of Moroccan fishermen.

Of course, the development of Morocco's artisanal fishery will not merely depend on creation of a small port infrastructure. This will depend on comprehensive planning in areas such as: fishing technology, marketing, coastal resources management, improvement of marine products marketing systems, improvement of processing technology, establishment of associations for fishermen and the formation of fishing village communities.

In this regard, the Moroccan government requested Japan's technical assistance in devising a plan for development of Morocco's artisanal fishing villages in December of 1995. In response to this request, the Japanese government dispatched a Preliminary Research Team to Morocco in July of 1996 to determine the background and scope of the request; and, at the same time, to study the feasibility of Japanese technical assistance, conduct a S/W conference for research on the area and finalize the formal agreement.

Following this initial visit, four missions were dispatched to have meetings on study plan. These activities were carried out from November to December of 1996; and from February to March, June to July and August to November of 1997, according to specifications jointly developed by the Department of Oceanic, Fishing and Maritime Affairs (Morocco) and the Preliminary Research Team (Japan).

### 1-2 Research Goals

The Study area is a coastal region extending from Saidia, on eastern Mediterranean, to Sidi Ifni on the Atlantic coast -- a distance of about 1200 kilometers. It focuses on centers of population for the fishing industry, and aims to: improve living conditions of Morocco's fishermen, increase productivity, and enhance

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<sup>1)</sup> Following the reform of ministries and agencies in 1997, the Shipping Department was made independent of the Ministry of Ocean Fishery and became the new Ministry of Fisheries.

price support for local catches. While producing a master plan to develop artisanal fishing villages, the study team will, with a view to their overall development, select some fishing villages to serve as a models for development.

Then, a Project Feasibility Study will be made. In addition, the Study team shall, through joint operations conducted within the Project's time constraints, facilitate the transfer of technology and offer guidance on study methods for the various fields, procedures of the planning, ways of viewing the Project, and so on.

### 1-3 Scope of Work

The Study Project will be carried out in 2 phases, based on careful consideration of factors such as seasons, culture, and social conditions.

#### Phase 1 Development of the Master Plan

In-country Preparations	
Primary On-site Study	November - December 1996
Secondary On-site Study	February - March 1997

#### Phase 2 Feasibility Study

In-country Operations (Preparation of Interim Report)	June - July 1997
Discussion and Presentation of Interim Report	August - November 1997
Phase 2 On-site Study	
Phase 2 In-country Operations	
Explanation of Draft Final Report	June 1998
Presentation of Final Report	

During Phase 1, a Master Plan for the promotion of artisanal fishing villages was be developed. The Master Plan includes sections on the planning and development of small-scale commercial fishing facilities, a fishing village infrastructure, distribution system reform and shipping procedures related to development of a commercial fishing infrastructure.

During Phase 2, three (3) of the six (6) representative locations selected during the Phase 1 were chosen as objects for execution of a Development Plan formation, and the studies needed for development of the required specifications was carried out. In addition, a consecutive development plan for the other three (3) locations was considered, and the initial research was conducted.

#### 1-4 Implementation of Study

The phase 1 and phase 2 were carried out by the study team members listed below, with the cooperation of the Ministry of Ocean Fishery and other related government agencies.

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