別添資料

3．R／D（英語）

RECORD OF DISCUSSIONS BETWEEN JAPANES IMPLEMENTATION STUDY TEAM AND AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF TUNISIA ON JAPANESE TECHNICAL COOPERATION FOR THE PROJECT FOR SUSTAINABLE MANAGEMENT OF COASTAL FISHERIES RESOURCES IN THE REPBULIC OF TUNISIA

The Government of Japan represented by the Japanese Implementation Study Team (hereinafter referred to as "the Japanese Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by JICA Tunisia Resident Representative Mr.Eizen Irei, exchanged views and had a series of discussions with the Tunisian authorities (hereinafter referred to as "the Tunisian Team") concerned with respect to desirable measures to be taken by the Japanese Government represented by JICA and the Government of the Republic of Tunisia represented by Ministry of Agriculture and Water Resources (hereinafter referred to as "MAWR") for the successful implementation of the Project for Sustainable Management of Coastal Fisheries Resources in the Republic of Tunisia.

As a result of the discussions, the Japanese Team and the Tunisian Team agreed to propose to their respective Governments the matters referred to in the document attached hereto.

These texts were done in both English and French, each text being equally authentic. In case of any divergence of interpretation, the English text shall prevail.

Tunis, March 10th, 2005

Mr. Eizen Irei
Resident Representative in Tunisia
Japan International Cooperation Agency
Japan

Mr. Slaheddine DHAOUI
General Director of Fisheries and Aquaculture
Ministry of Agriculture and Water Resources
The Republic of Tunisia

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN THE JAPANESE GOVERNMENT REPRESENTED BY JICA AND THE TUNISIAN GOVERNMENT REPRESENTED BY MAWR

1. The Government of the Republic of Tunisia will implement the Project for Sustainable Management of Coastal Fisheries Resources in the Republic of Tunisia(hereinafter referred to as "the Project") in cooperation with JICA.

2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan, JICA will take, at its own expense, the following measures according to the normal procedures under the Technical Cooperation Scheme of Japan.

1. DISPATCH OF JAPANESE EXPERTS

JICA will provide the services of the Japanese experts as listed in Annex II.

2. PROVISION OF MACHINERY AND EQUIPMENT

JICA will provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The Equipment will become the property of the Government of the Republic of Tunisia upon being delivered C.I.F. (cost, insurance and freight) to the Tunisian authorities concerned at the ports and/or airports of disembarkation.

3. TRAINING OF TUNISIAN PERSONNEL IN JAPAN

JICA will receive the Tunisian personnel connected with the Project for

technical training in Japan.

III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE REPUBLIC OF TUNISIA

1. The Government of the Republic of Tunisia will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.

2. The Government of the Republic of Tunisia will ensure that the technologies and knowledge acquired by the Tunisian nationals as a result of Japanese technical cooperation will contribute to the economic and social development of the Republic of Tunisia.

3. The Government of the Republic of Tunisia will grant in the Republic of Tunisia privileges, exemptions and benefits as listed in Annex IV and will grant privileges, exemptions and benefits no less favorable than those granted to experts of third countries or international organizations performing similar missions to the Japanese experts referred to in II-1 above and their families in accordance with the Tunisian laws and regulations in force.

4. The Government of the Republic of Tunisia will ensure that the Equipment referred to in II-2 above will be utilized effectively for the implementation of the Project in consultation with the Japanese experts referred to in Annex II.

5. The Government of the Republic of Tunisia will take necessary measures to ensure that the knowledge and experience acquired by the Tunisian personnel from technical training in Japan will be utilized effectively in the implementation of the Project.

6. In accordance with the laws and regulations in force in the Republic of Tunisia, the Government of the Republic of Tunisia will take necessary measures to provide at its own expense :

(1) Services of the Tunisian counterpart personnel and administrative personnel as listed in Annex V;

(2) Land, buildings and facilities as listed in Annex VI;

(3) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above;

7. In accordance with the laws and regulations in force in the Republic of Tunisia, the Government of the Republic of Tunisia will take necessary measures to meet :

(1) Expenses necessary for transportation within the Republic of Tunisia of the Equipment referred to in II-2 above as well as for the installation, operation and maintenance thereof ;

(2) Customs duties, internal taxes and any other charges, imposed in the Republic of Tunisia on the Equipment in the form of donation referred to in II-2 above ; and

(3) Running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. General Director of Fisheries and Aquaculture of Ministry of Agriculture and Water Resources, as the Project Director, will bear overall responsibility for the

administration and implementation of the Project.

2. General Director of Agriculture Training and Extension Agency (AVFA) of Ministry of Agriculture and Water Resources and General Director of National Institute of Marine Sciences and Technologies (INSTM), Ministry of Higher Education, Scientific Research and Technology, as the Project Managers, will be responsible for the managerial and technical matters of the Project.

3. The Japanese Team Leader will provide necessary recommendations and advice to his/her counterpart, the Project Director and the Project Managers on any matters pertaining to the implementation of the Project.

4. The Japanese experts will give necessary technical guidance and advice to the Tunisian counterpart personnel on technical matters pertaining to the implementation of the Project.

5. For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee will be established whose functions and composition are described in Annex VII.

V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by JICA and the Tunisian authorities concerned, at the middle and during the last six months of the cooperation term in order to examine the level of achievement.

VI. CLAIMS AGAINST JAPANESE EXPERTS

The Government of the Republic of Tunisia undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Republic of Tunisia except for those

arising from the willful misconduct or gross negligence of the Japanese experts.

VII. MUTUAL CONSULTATION

There will be mutual consultation between JICA and the Tunisian Government on any major issues arising from, or in connection with this Attached Document.

VIII. MESURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of the Republic of Tunisia, the Government of the Republic of Tunisia will take appropriate measures to make the Project widely known to the people of the Republic of Tunisia.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document is five years from the date of effective start of the Project which will be consulted by both sides.

ANNEX I	MASTER PLAN
ANNEX II	LIST OF JAPANESE EXPERTS
ANNEX III	LIST OF MACHINERY AND EQUIPMENT
ANNEX IV	PRIVILEGES, EXEMPTIONS AND BENEFITS FOR JAPANESE EXPERTS
ANNEX V	LIST OF THE TUNISIAN COUNTERPART AND ADMINISTRATIVE PERSONNEL
ANNEX VI	LIST OF LAND, BUILDINGS AND FACILITIES
ANNEX VII	JOINT COORDINATING COMMITTEE

ANNEX I MASTER PLAN

1 Name of the Project

"Project for Sustainable Management of Coastal Fisheries Resources in the Republic of Tunisia"

2 Framework of the Project

(1) Overall Goal

Models of coastal fisheries resource management for sustainable use of demersal fish are adapted around the southern coastal zone of Tunisia, with participation of fishing communities.

(2) Project Purpose

Models of coastal fisheries resource management for sustainable use of demersal fish, are developed in the selected project sites, with participation of fishing communities.

(3) Outputs

1. Rehabilitation of seagrass bed is demonstrated with participation of fishers in the selected project sites.
2. Experimental activities of stock enhancement are promoted.
3. The plan to diversify income source of fishers is elaborated on the basis of project activities.
4. Technical exchanges with neighbouring countries are promoted to practice the coastal fisheries resource management.

(4) Activities

1-1 Conduct survey for seagrass bed rehabilitation.

1-2 Plan seagrass bed rehabilitation with participation of fishers. (Artificial reef, etc.).

1-3 Implement the plan with participation of fishers.

1-4 Promote the understanding and cooperation of local communities on seagrass bed rehabilitation.

2-1 Improve fry production techniques.

2-2 Improve fry releasing techniques.

2-3 Develop evaluation methods of fry production and releasing techniques.

3-1 Carry out market research to determine species for aquaculture and food processing from mainly demersal fish.

3-2 Carry out experimental activities of environment-friendly aquaculture with participation of fishers.

3-3 Carry out experimental activities of seafood processing and introduce the techniques to fishers.

3-4 Carry out promotion of fisheries products to local consumers.

3-5 Elaborate action plans with ownership of fishers' groups and governmental bodies to diversify income source of fishers.

4.1 Make a plan for technical exchanges (e.g. seminars and information exchange) with neighbouring countries on coastal fisheries resource management.

4.2 Carry out technical exchanges with neighbouring countries.

4.3 Feedback the views of participants of technical exchanges to enrich the Models of coastal fisheries resource management.

3 Target groups

(1) Coastal Fishers (Including members of Tunisia Agriculture and Fisheries Union (UTAP) and other groups concerned fisheries sector)

(2) Staffs of Fisheries Professional Training Centres(CFPPs) of Agriculture Training and Extension Agency(AVFA) and National Institute of Marine Sciences and Technologies (INSTM)

(3) Staffs of concerned Regional Agriculture Development Commissions (CRDAs) of Ministy of Agriculture and Water resources

4 Target areas

The southern coastal zone

5. Duration of the Project

Five (5) years

Note: The inputs concerned Output1 to 3 mentioned above will be introduced mainly in the first three years. Activities for the last two years should involve promotion of inter-regional cooperation with other neighboring counties.

The master plan may be modified from time to time within the framework of the R/D according to the progress of the Project by signing of the minutes of meetings between Tunisian Government and Japanese Government.

ANNEX II LIST OF JAPANESE EXPERTS

The Japanese sides will dispatch, at its own expense, Japanese expert(s) concerned the following expertise through JICA.

(1) Long-term expert(s)

1) Resource Management

2) Environmental Rehabilitation

(2) Short-term experts

Expected cooperation fields are the followings.

1) Environmental Impact Assessment
2) Stock Enhancement/ Aquaculture
3) Small scale marine aquaculture
4) Releasing technique
5) Fisheries Food Processing
6) Others (e.g. Selective Fishing Techniques, etc.)

ANNEX III LIST OF MACHINERY AND EQUIPMENT

The Government of Japan will provide equipment, machinery and materials necessary for the implementation of the Project.(e.g. Seagrass bed rehabilitation, fry production, aquaculture, seafood processing and so on)

The Government of Japan will provide a vehicle for transportation and a small-size research boat for the Project activities in the shallow coastal areas, while the Government of the Republic of Tunisia provides a vehicle for the Project.

The Government of Japan will provide materials to develop artificial reefs.

ANNEX IV.

PRIVILEGES, EXEMPTIONS AND BENEFITS FOR JAPANESE EXPERTS

1. The Government of the Republic of Tunisia will grant exemptions from income tax and other charges of any kind imposed on or in connection with allowances remitted from abroad in accordance with the Tunisian laws and regulations in force.

2. The Government of the Republic of Tunisia will grant exemptions from customs duties with respect to importation of personal effects by the Japanese experts and their families, as well as importation of machinery and equipment for their activities in accordance with the Tunisian laws and regulations in force.

ANNEX V

LIST OF THE TUNISIAN COUNTERPART AND ADMINISTRATIVE PERSONNEL

1) Project Director and Project Manager will be assigned from the following institutions:

Project Director: General Director of Fisheries and Aquaculture (DGPA), Ministry of Agriculture and Water Resources

Project Manager:

General Director of Agriculture Training and Extension Agency (AVFA) of Ministry of Agriculture and Water Resources, and

General Director of National Institute of Marine Sciences and Technologies (INSTM), Ministry of Scientific Research, Technology and Capacity Building.

2) Counterparts shall be assigned from DGPA, AVFA, INSTM and concerned CRDAs in fields related to the activities of Japanese Experts.

ANNEX VI LIST OF LAND, BUILDINGS AND FACILITIES

The Tunisian side will provide the buildings and facilities necessary for the Project. The buildings and facilities include the followings:

a. Land, buildings and facilities

b. Rooms and space necessary for installation and storage of the equipment

c. Office space and necessary facilities for the Japanese experts

d Electricity, water supply, air-conditioning and necessary telecommunication facilities

e Other facilities mutually agreed upon, if necessary

VII JOINT COORDINATING COMMITTEE

The Joint Coordinating Committee (hereinafter referred to as "JCC") will be established for the effective and successful implementation of the Project. The JCC will meet at least once a year or whenever necessity arises, in order to fulfill the following functions.

(1) Functions

1) To formulate annual work plan for the Project.
2) To review the annual work plan for the Project.
3) To review and exchange of views on major issues in connection with the Project.
4) To examine of the local budget and staffing necessary for the Project.(Note)

(Note) The Tunisian side will secure the local budget which is necessary to ensure the self-reliant operation and sustainability of the Project. The local budget includes the followings:

a. Operational cost of the facilities and machinery such as fuel cost, lighting and heating expenses, water fee and so on.
b. Personnel cost of Tunisian counterparts
c. Insurance fee for the equipment and machinery.

5) To coordinate the Project with collaborating organizations.
6) Others

(2) Committee members

1) Chairperson: Project Director
2) Vice Chairpersons: Project Managers
3) Members:

(Tunisian Side)

a. Representative of DG PÊCHE
b. Representative of AVFA
c. Representative of INSTM
d. Representative of DGCI (Regional Agriculture Development Commissions)
e. Representative of APIP (Fishing Port Management Agency)
f. Representative of GIPP (Inter-professional Association of Fishing

Products)

g. Representative of UTAP (Tunisian Agriculture and Fisheries Union)

h. Representative of Ministry of Foreign Affairs

i. Other persons concerned with the Project decided by the Tunisian side, if necessary

(Japanese Sides)

a. Japanese Team Leader

b. Japanese Experts

c. Resident Representatives of JICA Tunisia Office

d. Other personnel concerned with the Project decided by JICA, if necessary

別添資料

４．実施協議時ミニッツ（英語）

MINUTES OF MEETINGS BETWEEN JAPANES IMPLEMENTATION STUDY TEAM AND AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF TUNISIA ON JAPANESE TECHNICAL COOPERATION FOR THE PROJECT FOR SUSTAINABLE MANAGEMENT OF COASTAL FISHERIES RESOURCES IN THE REPBULIC OF TUNISIA

The Government of Japan represented by the Japanese Implementation Study Team (hereinafter referred to as "the Japanese Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by JICA Tunisia Resident Representative Mr.Eizen Irei, exchanged views and had a series of discussions with the Tunisian authorities (hereinafter referred to as "the Tunisian Team") concerned with respect to desirable measures to be taken by the Japanese Government represented by JICA and the Government of the Republic of Tunisia represented by Ministry of Agriculture and Water Resources for the successful implementation of the Project for Sustainable Management of Coastal Fisheries Resources in the Republic of Tunisia.
As a result of the discussions, the Japanese Team and the Tunisian Team agreed to propose to their respective Governments the matters referred to in the document attached hereto. This_Minutes of Meetings are considered as a supplement document of the Record of Discussions which is signed at the same time.

These texts were done in both English and French, each text being equally authentic. In case of any divergence of interpretation, the English text shall prevail.

Tunis, March 10th, 2005

Mr. Eizen Irei
Resident Representative in Tunisia
Japan International Cooperation Agency
Japan

Mr. Slaheddine DHAOUI
General Director of Fisheries and Aquaculture
Ministry of Agriculture and Water Resources
The Republic of Tunisia

ATTACHED DOCUMENTS

1. **Outline of the Project**

   Framework of the Project is shown in Project Design Matrix1 (PDM1) as ANNEX I.

   Implementation plan of the Project activities is shown in Plan of Operation1 (PO1) as ANNEX II.

2. **Ratification of the Project Document**

   The Tunisian side and the Japanese side will make up the Project Document and ratify it in the first Joint Coordinating Committee (JCC) after the commencement of the Project in order to clarify the detail plan and approach of the Project. The draft of the Project Document is attached as ANNEX III.

3. **Measures to be taken by the commencement of the Project**

   The Tunisian side determines the institutions to be in charge of respective Project activities in the field. Accordingly, institution(s) for which Japanese Experts will be assigned, must be defined as soon as possible.

4. **Expert for Socio-economic development activities**

   The Japanese side will recruit local expert to conduct socio-economic development activities.

ANNEX I	Project Design Matrix1 (PDM1)
ANNEX II	Plan of Operation1 (PO1)
ANNEX III	The draft of the Project Document

ANNEX I

Project Design Matrix 1 **(PDM1)** As of 10 March 2005

Project Name: Project for Sustainable Managemen of Coastal Fisheries Resources in the Republic of Tunisia
Project Site: Southern coastal zone
Implementing Agencies: DGPA, AVFA-CFPP, INSTM and UTAP
Target Groups (1) Coastal Fishers(Including UTAP) Target Group(2) Staffs of AVFA (CFPP), INSTM Target Group(3) Staffs of concerned CDRAs
Duration of the Project: 5 years from 2005

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal: Models of coastal fisheries resource management for sustainable use of demersal fish are adapted around the southern coastal zone of Tunisia, with participation of fishing communities.	1) The surface of coastal waters under the coastal fisheries resource management is doubled in the southern coastal zone of Tunisia. 2) Fisheries resource recruitment increases around the coastal waters under the comprehensive coastal fisheries resource management. Note1) 3) Tunisia prepares plans to continuously hold the seminars for technical exchanges with neighbouring countries.	1) INSTM Report 2) INSTM Report 3) Project report	
Project Purpose: Models of coastal fisheries resource management for sustainable use of demersal fish, are developed in the selected project sites, with participation of fishing communities.	1) Meetings are regularly held for co-management between fisher's organizations, local communities and governmental bodies to jointly plan, implement and evaluate the coastal fisheries resource management . 2) Fishers act in self-disciplined manner for rehabilitation of seagrass bed and reservation of coastal fisheries resource. Note2)	1) Project report 2) Questionnaire survey	Pollutants in the southern coastal zone are not rapidly increased.
Outputs: 1. Rehabilitation of seagrass bed is demonstrated with participation of fishers in the selected project sites.	1) Area of seagrass bed is expanded in the selected coastal waters. Note1) 2) Fishers continuously participate in the planning and implementation of the rehabilitation of seagrass bed.	1) Project report 2) Project report	Red tide is not occurred at the Project site.
2. Experimental activities of stock enhancement are promoted.	1) The number of released frys is increased. Note1) 2) The number of released species is increased. Note1) 3)Evaluation manuals on frys production and releasing techniques are made up.	1) Project report 2) Project report 3) Project report	
3. The plan to diversify income source of fishers is elaborated on the basis of project activities.	1) The number of fishers participating in seminars and pilot projects of aquaculture and food processing are increased. Note1) 2) The plan to diversify income source of fishers is made up by target fishers' groups and governmental bodies.	1) Project report 2) Project report	
4. Technical exchanges with neighbouring countries are promoted to practice the coastal fisheries resource management.	1)Tunisia introduces the coastal fisheries resource management to neighbouring countries several times.	1) Project report	

Note1) Numerical target shall be set after the commencement of the Project.

Note2) To be measured by whether fishing activities are not carried out intentionally around the artificial reefs functioning as nursery areas, whether small juveniles are released even if they are caught, etc. Achievement level is to be evaluated by the number of waters with changes of fishers' behavior.

Activities:	Inputs		Preconditions
1-1Conduct survey for seagrass bed rehabilitation. 1-2 Plan seagrass bed rehabilitation with participation of fishers. (Artificial reef, etc.). 1-3 Implement the plan with participation of fishers. 1-4 Promote the understanding and cooperation of local communities on seagrass bed rehabilitation. 2-1 Improve fry production techniques. 2-2 Improve fry releasing techniques. 2-3 Develop evaluation methods of fry production and releasing techniques. 3.1Carry out market research to determine species for aquaculture and food processing from mainly demersal fish. 3.2 Carry out experimental activities of environment-friendly aquaculture with participation of fishers. 3.3 Carry out experimental activities of seafood processing and introduce the techniques to fishers. 3.4 Carry out promotion of fisheries products to local consumers. 3.5 Elaborate action plans with ownership of fishers' groups and governmental bodies to diversify income source of fishers. 4.1 Make a plan for technical exchanges (e.g. seminars and information exchange) with neighbouring countries on coastal fisheries resource management. 4.2 Carry out technical exchanges with neighbouring countries. 4.3 Feedback the views of participants of technical exchanges to enrich the Models of coastal fisheries resource management.	〔Japanese side〕 1. Dispatch of Japanese Long-term Experts Resource Management(Chief advisor) Environmental Rehabilitation 2. Dispatch of Japanese Short-term Experts Environmental Impact Assessment Stock Enhancement/ Aquaculture Small scale marine aquaculture Releasing Techinique Fisheries Food Processing Others 3. Counterpart Training in Japan 2-3 persons/year 4. Equipment necessary for the implementation of the Project Including one vehicle and one small research boat 5. Part of expenses for Project activities	〔Tunisian side〕 1.Tunisian counterparts (1) Project Director (2) Project Managers (3) Counterparts (4) Secretary (5) Administrative staff (6) Drivers 2.Equipment including one vehicle 3.Land, Buildings and Facilities including office for Japanese experts 4.Local cost Necessary budget for project activities	

☆Tunisian domestic species will be used for aquaculture and release.

☆ The Project will be tentatively estimated as a five year Project, although inputs will be mainly introduced in the first three years. Activities for the last two years should be considered to promote inter-regional cooperation with other neighboring countires.

ANNEX II

2005/3/10

Plan of Operation 1(PO1)

Outputs / Activities	Description of Activities	YEAR 1	2	3	4	5	In charge	Collaboration
1. Rehabilitation of costal environment is demonstrated with participation of local fisherpersons.								
1.1 Conduct survey for seagrass bed rehabilitation.								
1) Interview survey to coastal fishers	Conduct interview survey for coastal fishers about environmental and socio-economic situation.						DGPA	INSTM, UTAP,AVFA
2) Observe environmental conditions of potential sites	Environmental conditions of potential sites are confirmed through field observation						DGPA	INSTM, UTAP,AVFA
3) Identify and determine priority sites	Identify and determine priority sites for environmental rehabilitation in the Project based on the above survey						DGPA	INSTM, UTAP,AVFA
1.2 Plan seagrass bed rehabilitation with participation of fishers. (Artificial reef, etc.).								
1) Review existing references and information	Review existing references and information on the environmental condition of the southern coastal zone of Tunisia and foregoing project results on the installation of artificial reef in Tunisia and in other counties having similar environmental problems						DGPA	INSTM
2) Determine the type and scale of facilities to be installed	Based on the above examination, concrete type and scale of facilities to be installed are determned.						DGPA	INSTM
3) Prepare actual plan of facility installation	Prepare actual plan of facility installation. The plan include not only the sites and time schedule but also specification and cost of facilities, and management and monitoring plan after installion.						DGPA	INSTM
1.3 Implement the plan with participation of fishers.								
1) Explain the abve plan to local fisherpersons and obtain concensus	Organize participatory meeting on the environmental rehabilitation plan of the Project and obtain concensus of fishers and other stakeholders about facility installation.						DGPA	AVFA, UTAP
2) Procure materials of facilities to be installed	Procure necessary materials of facilities basically in Tunisia						DGPA	
3) Assemble and install facilities, ie, small-scale artificial reef	Planned facilities, ie., small-scale artificial reef are assembled and installed with participation of fishers						DGPA	AVFA, UTAP, APIP,INSTM,ANPE
4) Monitoring	Carry out underwater monitoring of facilities installed in the Project						INSTM	APIP
5)Practice selective fishing methods	Practice selective fishing methods with fishers.						DGPA	UTAP,AVFA,INSTM
1.4 Promote the understanding and cooperation of local communities on seagrass bed rehabilitation.								
1) Plan the activities to promote local communities' understaindings .	Plan the activities, such as workshops, distribution of PR tools, to promote local communities' understaindings .						AVFA	DGPA/GIPP
2)Implement the activities.	Implement the planned activities, such as workshops, distribution of PR tools.						AVFA	DGPA/GIPP

Outputs / Activities	Description of Activities	YEAR 1	2	3	4	5	In charge	Collaboration
2. Experimental activities of stock enhancement are promoted.								
2.1 Improve fry production techniques								
1) Determine the target species and prepare plan of fry production experiments	Based on the field survey and discussion, the target species for improvement of fry production techniques are determined. Then, the plan of experiments are prepared.						INSTM	DGPA
2) Provide additional equipment for fry production	Additional equipment necessary for fry production experiment are procured.						INSTM	
3) Procure broodstock	Necessary number of broodstock are procured for breeding in captivity.						INSTM	
4) Carry out experimental fry production	Number of fry production experiments are carried out by Tunisian counterparts mainly in INSTM Monastir together with Japanese experts.						INSTM	
2.2 Improve fry releasing techniques								
1) Examine adequate species and size of juveniles for releasing	Based on the available information about fish ecology and natural environment, adequate species and size of juveniles for releasing are examined.						INSTM	DGPA
2) Introduce and develop methodology of experimental seed releasing	Methodology of marking fish juveniles for release (e.g., removal of fin) and strategic releasing practice are introduced and developed through collaborative work with Tunisian and Japanese experts.						INSTM	
3) Carry out experimental releasing of juveniles	Carry out experimental releasing of artificially-raised juveniles. The sites of fry releasing are not only the sites of environmental rehabilitation of the Project but also existing nursery grounds.						INSTM	DGPA, UTAP
4) Trace and monitor released juveniles	Settlement of released juveniles is monitored through underwater observation. Growth and migration data are supplementally obtained through recapture individuals						INSTM	UTAP
2.3 Develop evaluation methods of fry production and releasing techniques								
1) Compile the experimental results and discuss future evaluation methods of stock enhacement.	Compile the results of experimental fry production and releasing, and discuss alternative evaluation methods						INSTM	DGPA, AVFA, UTAP
2) Develop the evaluation methods of stock enhacement.	Develop evaluation methods of fry production and releasing techniques suitable for the southern coastal zone of Tunisia						INSTM	DGPA

Outputs / Activities	Description of Activities	YEAR 1	2	3	4	5	In charge	Collaboration
3. The plan to diversify income source of fishers is elaborated on the basis of project activities.								
3.1 Carry out market research to determine species for aquaculture and food processing from mainly demersal fish.								
1) Confirm the demand for fish species for aquaculture	Based on the field survey and information gathering, demand for domestic fish species for aquaclture is examined and confirmed.						DGPA	
2) Conduct field survey on the consumer's need	Field survey in terms of interview and questionnaires is carried out in order to clarify consumer's needs for processing fishery products.						DGPA	GIPP
3) Examine preliminary feasibility of aquaculture	Examine briefly cost and benefit of aquaculture for the fish species having demand for aquaculture						DGPA	
4) Determine species to be involved in the Project	Considering the above and the state of technical development (for instance, fry production techniques), species to be involved in the Project are determined						DGPA	INSTM
3.2 Carry out experimental activities of environment-friendly aquaculture with participation of fishers.								
1) Select experimental sites and examine facilities suitable for them	Based on the consensus of stalkholders, experimental sites of aquaculture in the Project are determined, and types of facilities to be installed are examined considering the natural environment of the sites.						DGPA	INSTM, APIP, UTAP, AVFA
2) Procure necessary equipment and farm input for experimental aquaculture	Procure necessary equipment such as materials for net cage (iron-pipe or polyethylene frame, net, rope, sinkers, etc), and farm input such as seed, feeds and other consumables.						DGPA	
3) Carry out experimental aquaculture	Experimental aquaculture is carried out with vigorous participation of fisherpersons						DGPA	UTAP,INSTM
4) Compile the results into technical reports	Results of experimental aquaculture are compiled into technical reports for examination of feasibility of aquaculture						DGPA	INSTM
3.3 Carry out experimental activities of seafood processing and introduce the techniques to fishers.								
1) Examine and determine alternative fish processing methods	Based on the consumer's need and availability of unutilized fish materials, alternative fish processing methods are examined and determined.						DGPA	AVFA/CFPP,GIPP
2) Carry out experimental food processing	Experimental seafood processing is carried out using currently unutilized fishes.						GIPP	UTAP

3.4 Carry out promotion of fisheries products to local consumers.				
	1) Held seminars for fishers	In order to desseminate food processing techniques, technical seminars are held for fishers.	AVFA	DGPA/GIPP
	2) Carry out promotion activities on value-added fisheries products.	In order to desseminate information on value-added fisheries products for the public, promotion activities are proposed and carried out.	DGPA	AVFA
3.5 Elaborate action plans with ownership of fishers' groups and governmental bodies to diversify income source of fishers.				
	1) Held workshops for fisher's groups	By reviewing the activities such as aquaculture and food processing, action plans to diversify income source are elaborated by fisher's groups, other professional groups and governmental bodies through workshops.	DGPA	UTAP,GIPP
	1)Discuss and elaborate action plans by governmental bodies	Action plans to support fisher's groups to diversify their income source are elaborated by governmental bodies concerned.	DGPA	INSTM,UTAP, AVFA
4. Technical exchanges with neighbouring countries are promoted to practice the coastal fisheries resource management.				
4.1 Make a plan for technical exchanges (e.g. seminars and information exchange) with neighbouring countries on coastal fisheries resource management.				
	1) Plan the outline of technical exchanges.	Contents of seminars and other activities to share the techniques are determined, and informed to neighbouring countries.	DGPA	INSTM, AVFA
4.2 Carry out technical exchanges with neighbouring countries.				
	1) Held seminars and other activites	Implementing seminars and other activities to exchange techniques to the neighbouring countries.	DGPA	INSTM, AVFA
4.3 Feedback the views of participants of technical exchanges to enrich the Models of coastal fisheries resource management.				
	1)Summarize the putput of the seminar and make a feedback report	Outputs of seminars are summarized and make a feedback report to enrich the Model.The report includes suggestions to activities to be conducted in the future.	DGPA	INSTM, AVFA

PROJECT DOCUMENT

PROJECT FOR
SUSTAINABLE MANAGEMENT OF COASTAL FISHERIES RESOURCES
IN THE REPBULIC OF TUNISIA

(DRAFT)

March 2005

Ministry of Agriculture and Water Resources of Tunisia
Japan International Cooperation Agency (JICA)

THE PROJECT FOR SUSTAINABLE MANAGEMENT OF COASTAL FISHERIES RESOURCES IN THE REPBULIC OF TUNISIA

Ex-ante Evaluation Document

Abbreviations

Ex-ante Evaluation (Technical Cooperation Project)

10th March, 2005

Japan International Cooperation Agency (JICA)

1. Project name

Project for Sustainable Management of Coastal Fisheries Resources in Tunisia

2. Cooperation outline

(1) Project objectives and outputs:

The Project aims at formulation of a method and implementing framework of sustainable coastal fisheries (resource-management-type fisheries) with participatory approach in order to stabilize and sustain small-scale fisher's livelihood. The target area of the Project is the southern coastal zone of Tunisia where demersal fish resources have seriously decreased by fishing pressure of large-scale trawl vessels and by destruction of seagrass bed. The Project approaches include 1) restoration of seagrass bed as nursery grounds of fisheries resources, 2) demersal fish stock enhancement by releasing hatchery-raised juveniles and 3) creation of supplementary income source of fishers during the period of fishing control.

Activities to improve and develop the necessary technologies and methodologies for the fulfillment of resource-management-type fisheries are to be carried out intensively during the first three years of the Project. In the fourth and fifth year, cooperation among fisher's organization, local residents and governmental organizations is to be strengthened through the trial activities of the resource-management-type fisheries In addition, inter-regional technical exchanges will be promoted with neighbouring countries such as introduction of the Project activities in seminars.

(2) Project duration:

Five years (From 2005 to 2010)

(3) Total project budget (Japanese side):

About 350 million yens

(4) Implementing organizations

[Supervision]

- General Direction of Fisheries and Aquaculture (DGPA), Ministry of Agriculture and Water Resources

[Fry Production / Rehabilitation of seagrass bed]

- INSTM, National Institute of Marine Sciences and Technologies (INSTM), Ministry of Scientific Research, Technology and Capacity Building
- Local offices (CRDAs) of Ministry of Agriculture and Water Resources

[Training/Extension for Fishers (Aquaculture and Food Processing)]

- Fisheries Professional Training Centre (CFPP), Agriculture Training and Extension

Agency, Ministry of Agriculture and Water Resources

- Local offices (CRDAs) of Ministry of Agriculture and Water Resources

[Fisher's Organization]

Tunisia Agriculture and Fisheries Union (UTAP) and other fishers

(5) Japanese organization in cooperation

Ministry of Agriculture, Forestry and Fisheries

(6) Target beneficiaries and their scope

1) Target area

Southern coastal zone (from Monastir to Gabes)[1]

2) Direct beneficiaries

-About 1200 coastal fishers who use the coast of the Project target waters

＊Including members of UTAP and the Inter-professional Association of Fishing Product (GIPP)

＊＊Breakdown of the beneficiaries: about 4 waters (3 onshore and 1 offshore waters) x about 300 people

-About 45 of CFPP personnel

-About 5 of INSTM personnel

-Staff of concerned CRDAs

3) Indirect beneficiaries

-About 22,000 fishers who rely on their livelihood in the southern coastal zone

-Governmental officials in the fisheries sector in the neighboring countries

[1] Project management and coordination are carried out mostly in Tunis, while Project activities such as rehabilitation of seagrass bed, aquaculture are carried out in the southern coastal zone mainly by local offices of each implementing organization.

3. Need for cooperation

(1) Present condition and problems

Tunisia has steadily experienced socio-economic development so far. On the other hand, economic gap between urbanized northern region and rural southern region has become widened, and alleviation the regional economic gap is a priority issue of the Tunisian government.

The southern region of Tunisia is desert area where salt-water lakes are scattered. Therefore, people's livelihoods have been mainly sustained by capture fisheries and small portion of olive cultivation. However recently, overfishing and destruction of seagrass bed have been caused by some large-scale trawl fishing vessels and consequently demersal fisheries resources have dramatically decreased in the region. Livelihoods of some 22,000 fishers and those who engage in related industries are threatened by the rapid decrease of fish catch in the southern coastal zone. A recent research shows that the coastal fisheries production had decreased from 46,082 tons in 1989 to 26,000 tons in 2000. About 90% of seagrass bed in Gabes Gulf is estimated to be diminished, which is known as "cradle of the Mediterranean Sea" and has fostered fisheries resources. Accordingly, rehabilitation of seagrass bed and restoration of demersal fish resources are indispensable for people in the southern coastal areas to continue coastal fisheries and to sustain and stabilize their livelihoods.

Seagrass bed in the Gabes Gulf is considered to be spawning and nursery grounds of the whole coastal fisheries resources not only for Tunisia but also for the southern Mediterranean countries. Thus, their rehabilitation and stabilization of fisheries resources widely contribute to the countries along the Mediterranean coasts, especially to the northern African countries.

The Government of Tunisia has prepared the 10th Five-year National Economic Development Plan (2002-2006) and the 10th Agricultural Development Plan (2002-2006) with high priority on balancing fishing efforts and exploitable resources quantity, and administrated a series of restrictive regulations concerning fishing operations and fishing efforts. Nevertheless, few tangible results have been attained because cooperation system among fisher's organization, local people and the governmental organizations is insufficient and no practical action has been taken to rehabilitate the environment of fishing grounds. In addition, the restrictive regulations are not complied due to the lack of practical measures to supplement the fishers' income against the fishing control, such as assuring supplementary income sources to sustain fishers' livelihoods.

In order to solve these problems, this Project aims to propose the desirable fishing styles and management implementation framework to achieve the sustainable use/management of fisheries resources, with participation of fishing communities, so that the fishers' livelihoods be sustained and stabilized as described in 2.(1) above.

(2) Position in the national policy of Tunisian Government

The 10th National Economic Development Plan (2002-2006) set a slogan to achieve balanced economic growth, increase of employment opportunities, balancing of financial situation and promotion of sustainable development. In the 10th Agriculture Development Plan (2002-2006), which was prepared corresponding to the above national plan, indicates in principle of fisheries sector significance of balancing fishing efforts with exploitable fisheries resources. The Project aims at restoration and management of fisheries resources through rehabilitation of seagrass bed and stock enhancement. In this regard, the Project accords with the national policy of Tunisian Government.

(3) Position in Japan's ODA policy and JICA Country Program Implementation Plan

In Japan's ODA policy for Tunisia, priority subjects for cooperation are shown as 1) assistance for raising the level of industry, 2) assistance for water resource development and management, 3) environmental issue. The program indicates significance of cooperation for agro-fisheries sector, which is an important industry of Tunisia, as well as poverty alleviation. In the Tokyo International Conference on African Development (TICAD), Tunisia is positioned as a partner of Japan in order to promote the south-south cooperation in Africa. The Project accords with the Japanese cooperation policy, namely it will contribute for sustainable development of fisheries sector as a major Tunisian industry and for conservation of marine environment. The Project will contribute to promotion of the south-south cooperation, namely it aims at extension of the Project outcomes to neighboring Arab-African countries.

In JICA's Country Program Implementation Plan for Tunisia, 4 priority subjects are indicated such as 1) assistance for raising the level of all the industries, 2) assistance for program on environmental issues, 3) assistance for correction of regional disparities and social development and 4) promotion of south-south cooperation in Africa. The Project is considered to be a supportive program for formulation of fisheries policy and planning in the context of the above 3) assistance for correction of regional disparities and social development.

4. Cooperation framework

(1) Objectives of the project (Outcomes)

1. Project Purpose to be achieved by the end of the Project

Models of coastal fisheries resource management for sustainable use of demersal fish, are developed in the selected project sites, with participation of fishing communities.[2]

<Indicators>

[2] Tunisia will introduce the coastal fisheries resources management model and consisted techniques to neighbouring countries by technical exchanges. The views of participants of technical exchanges will be feedback to the Models, so that the Model be applicable to other coastal waters similar to Gabes Gulf.

1) Meetings are regularly held for co-management between fisher's organizations, local communities and governmental bodies to jointly plan, implement and evaluate the coastal fisheries resource management.

2) Fishers act in self-disciplined manner for rehabilitation of seagrass bed and reservation of coastal fisheries resource.[3]

2. Overall Goal to be achieved after the Project implementation period:

Models of coastal fisheries resource management for sustainable use of demersal fish are adapted around the southern coastal zone of Tunisia, with participation of fishing communities.

<Indicators>

1) The number of coastal waters under the coastal fisheries resource management is doubled* in the southern coastal zone of Tunisia.

Note*) Numerical target shall be set within 2 years time after the commencement of the Project. Waters where fishing communities introduce techniques, methods and resource management systems shall be count as "waters under the coastal fisheries resource management".

2) Fisheries resource recruitment increases around the coastal waters under the comprehensive coastal fisheries resource management.

Note*) Numerical target shall be set after the commencement of the Project.

3) Tunisia prepares plans to continuously hold the seminars for technical exchanges with neighbouring countries.

(2) Outputs and activities:

1. Output 1: Rehabilitation of seagrass bed is demonstrated with participation of fishers in the selected project sites.

<Activities>

1-1 Conduct survey for seagrass bed rehabilitation.

1-2 Plan seagrass bed rehabilitation with participation of fishers. (Artificial reef, etc.).

1-3 Implement the plan with participation of fishers.

1-4 Promote the understanding and cooperation of local communities on seagrass bed rehabilitation.

Note) Seagrass bed rehabilitation will be implemented in about 4 waters. 1 water means 0.5 nautical miles square in dimension. 9 to 12 experimental point with 10 meters square will be set under each water.

<Indicators>

1) Area of seagrass bed is expanded in the selected coastal waters.*

Note*) Numerical target shall be set after the commencement of the Project.

2) Fishers continuously participate in the planning and implementation of the rehabilitation of seagrass bed.

3 To be measured by whether fishing activities are not carried out intentionally around the artificial reefs functioning as nursery areas, whether small juveniles are released even if they are caught, etc. Achievement level is to be evaluated by the number of waters with changes of fishers' behavior.

2. Output 2: Experimental activities of stock enhancement are promoted.

＜Activities>

2-1 Improve fry production techniques.

2-2 Improve fry releasing techniques.

2-3 Develop evaluation methods of fry production and releasing techniques.

<Indicators>

1) The number of released fry is increased.

Note*) Numerical target shall be set after the commencement of the Project.

2) The number of released species is increased.

Note*) Numerical target shall be set after the commencement of the Project.

3) Evaluation manuals on fry production and releasing techniques are made up.

3. Output 3: The plan to diversify income source of fishers is elaborated on the basis of project activities.

<Activities>

3-1 Carry out market research to determine species for aquaculture and food processing from mainly demersal fish.

3-2 Carry out experimental activities of environment-friendly aquaculture with participation of fishers.

3-3 Carry out experimental activities of seafood processing and introduce the techniques to fishers.

3-4 Carry out promotion of fisheries products to local consumers.

3-5 Elaborate action plans with ownership of fishers' groups and governmental bodies to diversify income source of fishers.

<Indicators>

1) The number of fishers participating in seminars and pilot projects of aquaculture and food processing are increased.

2) The plan to diversify income source of fishers is made up by target fishers' groups and governmental bodies.

4. Output 4: Technical exchanges with neighbouring countries are promoted to practice the coastal fisheries resource management.

<Activities>

4.1 Make a plan for technical exchanges (e.g. seminars and information exchange) with neighbouring countries on coastal fisheries resource management.

4.2 Carry out technical exchanges with neighbouring countries.

4.3 Feedback the views of participants of technical exchanges to enrich the Models of coastal fisheries resource management.

<Indicators>

1)Tunisia introduces the coastal fisheries resource management to neighbouring countries several times.

(3) Inputs

1. Japanese side

1) Dispatch of Japanese Experts

<Long-term expert(s) >

Resource Management

Environmental Rehabilitation

<Short-term experts>

Environmental Impact Assessment

Stock Enhancement/ Aquaculture

Small scale marine aquaculture

Releasing technique

Fisheries Food Processing

Others

2) Training of Tunisian counterparts (C/Ps) in Japan

C/P training will be conducted in Japan during the project implementation period (2 to 3 persons per year).

3) Equipment necessary for the project implementation such as seagrass bed rehabilitation, fry production, aquaculture and food processing.

2. Tunisian side

1) Assignment of Counterparts

2) Land, buildings, and facilities, and already-possessed Equipment necessary for project implementation

3) Local budget

Local budget which is necessary to ensure the self-reliant operation and sustainability of the Project, such as maintenance cost of project-related facilities, domestic transportation for Counterparts, etc.

(4) Important Assumptions

- Pollutants in the southern coastal zone are not rapidly increased.
- Red tide is not occurred at the Project site.

5. Results of the five-criteria evaluation

(1) Relevance

This project is evaluated to have high degree of relevance for the following reasons:

The Tunisian government has announced that recovery and sustainable use of fisheries resources be important issues for the development. This Project is to contribute to achieve the national development purposes by establishing the model for coastal fisheries resources management and has high priority in the policy of Tunisian government.

This Project corresponds well to The Country Aid Strategy of Japanese government and The JICA Country Program Implementation Plan which highly prioritize the support for environmental issues, for fisheries sector and for promotion of south-south cooperation in Africa.

In the southern part of Tunisia, fisheries industry has sustained about 22,000 coastal fishers' livelihood as the biggest primary industry, while the agricultural productivity is rather low because of the small rainfall and saline underground water. Those fishers amount to two thirds of total fishers' population (about 36,000 people) in Tunisia and the population is estimated to be three times large if the people who engage in activities such as food processing, fisheries products sales and so on. The comprehensive coastal fisheries resources management in the southern part of Tunisia is expected to impose a great impact on people's livelihood and is evaluated to well match to the people's needs.

The Gabes Gulf is likened to "the cradle in the Mediterranean Sea" because it functions to reproduce fisheries resources. On the other hand, over the last decades, the Gabes Gulf experiences remarkable decrease in its coastal resources production. The cooperation targeting this area has high priority and necessity.

The Project aims to increase fisheries resources by fry production, release and aquaculture as well as to introduce the measures to diversify fishers' income source for supplementing their income due to the regulations on fishing operation, fishing efforts, etc., otherwise fishing regulations shall not be complied. This approach enables fishing communities to practice fisheries resources management with sustainability and matches to both the development purpose of Tunisian government and the needs of coastal fishers.

In Japan, rehabilitation of seagrass bed has been successfully demonstrated in the coastal water such as the Seto-naikai. The techniques and experiences gained from the past practices shall be fully utilized in this Project.

(2) Effectiveness

This project is evaluated to have high effectiveness due to the following reasons.

This Project aims at environmental recovery of the fishing grounds by rehabilitation of seagrass bed and increase of fisheries resources by fry production and release, etc. The Project also tries to introduce the supplementary fishers' income source such as aquaculture and food processing for supplementing their fishing income. These activities shall be planned, implemented and evaluated with the cooperation between fishers' groups and governmental bodies, so that co-management system for comprehensive coastal fisheries

resources management would be formed. This comprehensive approach enables to establish a practical and sustainable management system involving fishing communities.

The latter half of the Project, Tunisia will introduce the coastal fisheries resources management system which would be partly proved its efficiency in the Project target area to neighbouring African countries, by technical exchanges like seminars. Those technical exchanges enrich the models to be applicable to other waters with similarities of the Gabes Gulf, by feeding back the views of participants of technical exchanges. This approach leads to the model with large applicability to other sea waters.

(3) Efficiency

This project is expected to be implemented efficiently for the following reasons.

Japan and other international donors have implemented international cooperation activities in the fisheries sector concerning the research and human resources development. Tunisian organizations in fisheries sector are able to utilize its organizational resources such as techniques, knowledge, human resources and facilities developed by the past cooperation. These resources are also expected to be utilized to result in effective achievement of the Project outputs.

Japanese experts will be dispatched mainly in the former half of the Project. The Project activities will be done mainly by Tunisian counterparts who develop their capacity through the Project activities. This allows the Project to be implemented cost efficiently.

This project is expected to be efficient in terms of inter-regional impacts in the neighbouring countries with smaller inputs, by introducing the coastal resources management model by south-south cooperation.

(4) Impacts

This project is expected to impose great impacts for the following reasons.

This Project aims to establish a practical and sustainable resources management system involving fishing communities. In the process of establishing the model, collaboration among governmental organizations for research, training and extension and fishers' groups shall be strengthened and co-management system be formed. These collaboration for co-management is expected to ensure the achievement of overall goal that the management model will be widely adapted.

Both government and fishers have strong needs for sustainable fisheries development by resources management. In addition, Project implementing organizations have branches which enable the models to be widely extended within the country. These will enhance the country-wide adoption of the model.

Rehabilitation of fishing grounds and sustainable fisheries resources management are the common issues that many coastal countries aim at and all the Mediterranean countries

should cooperatively wrestle. This Project is expected to contribute to the development of human resources in fisheries sector such as administrative personnel and researchers in the neighbouring countries. After the project, those key persons are expected to play important role to adopt the resource management model formed in this Project to neighbouring Arab and African countries.

The Gabes Gulf functions to reproduce demersal fisheries resources as "the cradle in the Mediterranean Sea". The rehabilitation of the Gabes Gulf would possibly stabilize and increase the productivity in the Mediterranean Sea, which result in restrains of resource decline in other Mediterranean countries.

(5) Sustainability

This Project is expected to have high sustainability for the following reasons.

Sustainable fisheries development is crucial both in Tunisia for internal food supply and for revenue source of foreign currency by export of fisheries products. Tunisian policy is expected to assure the sustainability of this Project as the Tunisian government has put priority on sustainable fisheries development in the 9th and the 10th Agricultural Development Plan.

Legal framework for resources management has been prepared, that is institutional framework to sustain the extension of the resource management model is assured.

This Project will be implemented with strong ownership of Tunisia by utilizing its human and organizational resources and Japanese government will give technical support to reinforce the Tunisian efforts. It is expected for Tunisia to continuously commit the activities to maximize the Project outputs even after the Project with its ownership.

Project implementing organizations such as AVFA, INSTM and UTAP have already exchanged a memorandum to promote fisher's participation in the process to adopt the coastal fisheries resources management model. These organizations are expected to continuously play main roles to commit the activities to promote the resources management model.

6. Consideration for poverty reduction, gender and environmental issues

This Project is expected to impose positive impact on gender by motivating women to involve in the activities such as small-scaled aquaculture and food processing.

Rehabilitation of seagrass bed and coastal fisheries resources management is to impose negative impact on marine environment.

7. Applying lessons from similar projects in the past

This project is the first JICA's technical cooperation for rehabilitation of seagrass bed.

Tunisia has positively transfer the outputs of Japan's technical cooperation in the fisheries field to neighbouring Arab and African countries. Through this Project, Tunisia's ownership would be enhanced as a leading country for inter-regional technical cooperation.

In the case of regional development projects implemented in the past for concerning irrigation, people's participation was limited in the process of planning, implementation and evaluation, which hindered communities from being empowered to continue the development activities. From this lesson, this Project employs participatory approach of all the main stakeholders, especially fishers' groups, to enhance the ownership of them.

8. Evaluation plans

(1) Midterm evaluation: 2.5 years from the start of the project (2007)

(2) Final evaluation: Half a year prior to the end of the project (2009)

(3) Post Evaluation: 3 to 5 yeas after the end of the project(2013-2015)

Appendixes1: Preliminary examination on the target production/release number and size of juveniles in the Project

Appendixes1: Preliminary examination on the target production/release number and size of juveniles in the Project

Table Preliminary examination on the target production/release number and size of juveniles in the Project

Species	Fry production	Fry release	
		Marking by removal of pelvic fin	Marking with tag
Thicklip grey mullet (*Chelon labrosus*)	200,000 (2cm)	100,000 (5cm)	2,000 (10cm)
European seabass (*Dicentrarchus labrax*)	100,000 (2cm)	50,000 (5cm)	2,000 (10cm)
Gilthead seabream (*Sparus aurata*)	100,000 (2cm)	50,000 (5cm)	2,000 (10cm)
Sharpsnout seabream (*Diplodus puntazzo*)	50,000 (2cm)	30,000 (5cm)	2,000 (10cm)
Common seabream (*Pagrus pagrus*)	10,000 (2cm)	5,000 (5cm)	1,000 (10cm)
Common dentex (*Dentex dentex*)	10,000 (2cm)	5,000 (5cm)	1,000 (10cm)

Abbreviations

	French	English
ANPA	Agence Nationale de Protection de l'Environnement	National Agency for Environmental Protection
APIP	Agence des Ports et Installation de Pêche	Fishing Port Management Agency
AVFA	Agence de la Vulgarisation et de la Formation Agricole	Agriculture Training and Extension Agency
CFPP	Centre de Formation Professionnelle des Pêches	Fisheries Professional Training Centre
CRDA	Commission Régionale de Développement Agricole	Regional Agriculture Development Commissions
DGCI	Direction Générale de la Coopération Internationale	General Direction of International Cooperation
DGPA	Direction Générale de la Pêche et de L'Aquaculture	General Direction of Fishery and Aquaculture
DT	Dinar Tunisien	Tunisian Dinar
GIPP	Groupement Interprofessionnel des Produits de la Pêche	Inter-professional Association of Fishing Products
HACCP		Hazard Analysis and Critical Control Point
ICCAT		International Commission for the Conservation of Atlantic Tunas
IFREMER	Institut Francais de Recherche pour l'Exploitation de la Mer	French Research Institute for Exploitation of the Sea
INSTM	Institut National des Sciences et Technologies de la Mer	National Institute of Marine Sciences and Technologies
JCC		Joint Coordination Committee
TAC		Total Allowable Catch
UTAP	Union Tunisienne de L'Agriculture et de la Pêche	Tunisian Agriculture and Fisheries Union

1. Introduction

Coastal fishery in Tunisia has been prosperous for a long time. However in recent years the coastal fishery resources tend to decline due to high fishing pressures represented by shrimp trawl fishing, and simultaneously the seagrass bed that support reproduction of fishery resources are going to be deteriorated. This is conspicuous in the southern part of the country rather than the northern parts, the south forms arid lands and the people depend largely on coastal fisheries, while agro-fisheries modernization, such as irrigated agriculture, inland aquaculture, etc., has been pushed forward in the north.

In order to cope with such situation, the Government of Tunisia (GOT), which pursues "change into alternative fisheries", requested the Government of Japan (GOT) a technical cooperation project related to coastal fishery resource management including technical transfer on "purse-seine fishery" as one of alternatives.

However, exclusive economic zone of Tunisia has already been adjusted by agreement with the neighboring countries adjacent in the Mediterranean Sea, and shift to offshore fishing and its expansion may lead to a dispute in the General Fisheries Council for the Mediterranean. In addition, further development of trawl and purse-seine fisheries may bring about increase of fish-catch of bluefin tuna, although Tunisia has been utilizing almost totally the fishing quota of this species established by the International Commission for the Conservation of Atlantic Tunas (ICCAT) every year.

For these reasons, the GOJ recognized that the recovery of demersal fish resources and sustainable fishery resource management were the essential issues in the Tunisian water, and accordingly appropriate themes for the technical cooperation project. The GOJ dispatched the preparatory study teams to Tunisia two times, the first from 23 March to 2 April in 2004 and the second from 27 June 27 to 17 July in 2004. The teams conducted necessary field survey and undertook project formulation together with the GOT, and strengthen mutual understandings with relevant organizations as well as the GOT.

This project document compiled comprehensively the results and information obtained through the field survey and discussion between Japanese and Tunisian sides in order to explain significance and relevance of the project, to provide the details for the project stakeholders and also to contribute for the project management after implementation of the project.

2. Background of Project Implementation

2.1 Socio-economic Context

Tunisia is located in the coast of Mediterranean Sea of north Africa with the land of 164,154km^2 and population of 9,780,000 in the year 2002. It is moderately developed country with per capita GNP of US 2,150 dollars in 2002, and has been shown relatively high rates of annual economic growth as about 5% since 1990's. Around 80% of the nation is considered as the middle class, and the poverty rate is approximately 4%. In the past several years, Tunisia is often referred as an "excellent" country by international financial agencies in terms of success in the structural adjustment programs.

The main export product of Tunisia is crude oil followed by minerals, handicrafts and farm products, such as internationally famous olive oil, fishery products, etc. In particular, the agriculture-fishery sector on which about a half of population rely is considered to be the most important socio-economic sector from such two aspects as domestic food supply and acquisition of foreign exchange by export.

In Tunisia that has achieved thus socio-economic development, the direction of technical cooperation shall be contemplated for the project pursuing short-term improvement of productivity, but for the project to be a model for neighboring countries regarding global issues. In the fishery sector, technical cooperation which is in line with the "Code of Conduct for Responsible Fisheries" launched by the Food and Agriculture Organization (FAO) and international fishery agreements such as ICCAT would be beneficial for medium-term and long-term development in Tunisia.

2.2 Description of the Sector: Fishery and Aquaculture

1) Fishing ground

Tunisia has a coastline of more than 1,300km and a continental shelf of about 80,000km^2. Many islands such as La Galite, Le Galiton, Zembra, Zembretta, Kuriat, Kerkennah and Djerba are distributed in the continental shelf from the north to the south, where good fishing grounds are formulated. Fishing grounds of Tunisia are generally distinguished by three, namely the north fishing ground from Algerian border to Borj Kelibia lighthouse, the central fishing ground from the Borj Kelibia lighthouse to Ras Kapoudia, and the south fishing ground from Ras Kapoudia to Libya border as shown in Figure 2.1, according to the regulation No.4 on the fishing activities, 28th September 1995.

Fishery development is relatively restricted in the north fishing ground due to narrower continental shelf and unfavorable weather conditions affected by strong north winds retrieving high waves. On the other hand, the central and south fishing grounds possess larger continental shelves, and they become a center of fishing industry in Tunisia. The Gabes Gulf in the south fishing ground, which this technical coopereation project mainly focuses on, is regarded as the most important nursery ground of fish juveniles in the Mediterranean Sea where indigenous seagrass (*Posidonia oceanica*) had grown well in wider areas. However, since the fishery resources in this sea area tend to decrease remarkably in recent years, the advanced programs are strongly required for conservation as well as wise-use of coastal fishery resources.

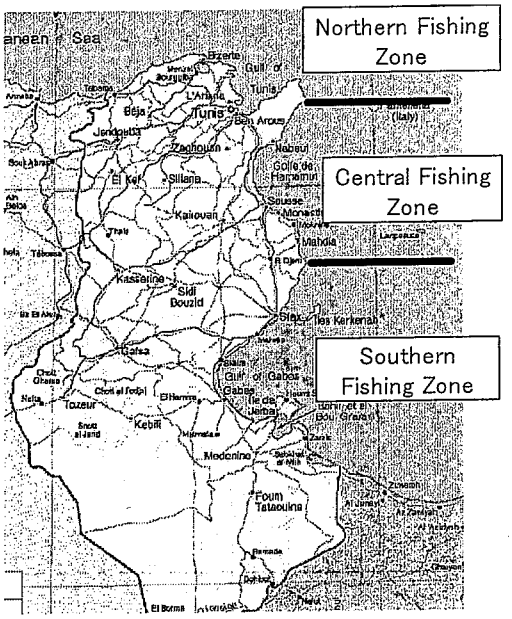

Figure 2.1 Fishing zones of Tunisia

2) Fishery and Aquaculture Production

Fishery and aquaculture production in Tunisia is 94,784 tons in 2003 (equivalent to 305,860,000 DT), among which 10,920 tons are produced in the north fishing ground, 41,729 tons in the central fishing ground, and 41,856 tons in the south fishing ground (Table 2.1). Majority of the production is achieved in the central and south fishing grounds. There are three major types of fishing method, i.e., coastal fisheries (gill-net, long-line, coastal purse-seine without light lure, octopus pots, fish trap, etc), bottom trawl and off-shore purse-seine using light lure. These productions are 26,208 tons (27.7%), 26,183 tons (27.6%), and 35,729 tons (37.7%) respectively. Other types of fishing include tuna purse-seine, surface trawl, lagoon fishery which is carried out in specific lagoons applying a concession system, collection of shellfishes like short-naked clam and mussel, sponge collection by diving, coral collection and spiny lobster fishing.

Fishery production trend from 1989 is shown in Figure 2.2 by fishing type. Total fishery production is comparatively stable fluctuating moderately between 83,636 tons in 1995 and 98,628 tons in 2001. On the other hand, when focusing on each fishing type, coastal fishery production has continuously declined year by year from 46,082 tons in 1989 down to the level of 26,000 tons after 2000.

Table 2.1 Fishery production of Tunisia by governorate by fishing type in 2003

Unit: ton

Governorate	Number of fish landing monitoring sites	Fishing types											Total
		Coastal fishery	Bottom Trawl	Surface Trawl	Purse Seine with light	Tuna Purse Seine	Lagoon Fishery	Aqua-culture	Shell collection	Sponge collection	Coral collection	Spiny lobster fishing	
Jendouba/Beja	8 sites	693	698	0	191	0	0	452	0	0	0.06	11	2,045
Bizerte	11 sites	1,865	2,025	0	1,731	0	272	63	90	0	1.64	44	6,092
Ariana	2 sites	232	0	0	0	0	32	0	0	0	0	0	264
Tunis/Ben Abrous	5 sites	756	1,365	357	0	0	32	0	8	0	0	0	2,518
Northern fishing ground	**26 sites**	**3,547**	**4,087**	**357**	**1,923**	**0**	**336**	**515**	**98**	**0**	**2**	**55**	**10,920**
Nabeul	12 sites	1,628	1,224	1,231	9,030	152	0	64	0	0	0	0	13,330
Sousse	6 sites	1,141	1,443	0	658	20	0	903	0	0	0	0	4,165
Monastir	6 sites	2,588	322	0	7,369	65	0	15	0	0	0	0	10,358
Mahdia	3 sites	2,522	4,844	0	5,912	461	0	138	0	0	0	0	13,877
Central fishing ground	**27 sites**	**7,880**	**7,832**	**1,231**	**22,969**	**698**	**0**	**1,120**	**0**	**0**	**0**	**0**	**41,729**
Sfax	10 sites	5,369	13,800	0	730	845	0	0	282	17	0	0	21,043
Gabes	3 sites	1,371	3	0	5,809	42	0	0	120	0	0	0	7,345
Medenine	9 sites	8,041	460	0	4,299	137	287	125	105	14	0	0	13,468
Southern fishing ground	**22 sites**	**14,781**	**14,263**	**0**	**10,838**	**1,024**	**287**	**125**	**507**	**31**	**0**	**0**	**41,856**
Freshwater aquaculture in other governorates	7 sites	0	0	0	0	0	0	280	0	0	0	0	280
Total	82 sites	**26,208**	**26,183**	**1,588**	**35,729**	**1,722**	**623**	**2,039**	**605**	**31**	**2**	**55**	**94,784**

Source) DGPA statistics

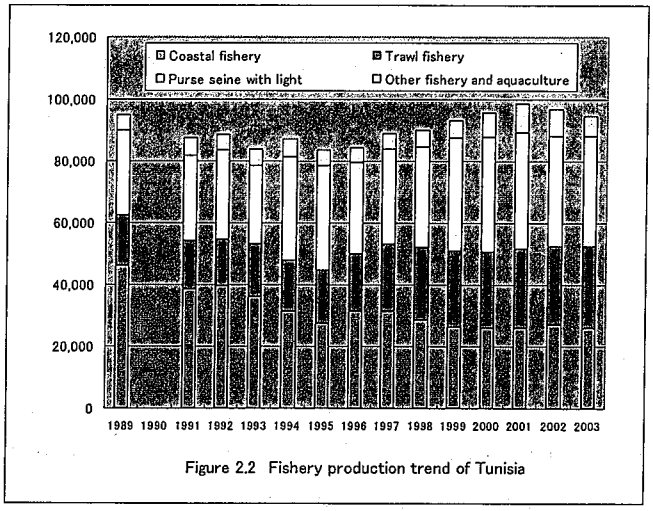

Figure 2.2 Fishery production trend of Tunisia

Aquaculture production is 2,039 tons in 2003, of which around 60% is produced by seawater aquaculture (mariculture). At present, commercial-scale aquaculture is carried out for European sea bass (*Dicentrarchus labrax*) and sea bream (*Sparus aurata*) in concrete tanks in Sousse and in net cages in Zarzis. Several other companies also involve in the small-scale aquaculture of those species. In Bizerte Lake northern area of the country, small-scale culture of mussel and oyster is carried out by the hanging method for export to European markets. Recently, fattening of blue fin tuna has been started in net cages off Mahdia, and gathers interests from private sector. However, mariculture of Tunisia is relatively small in scale among countries in Mediterranean Sea, and the number of aquaculture farms is limited.

Freshwater aquaculture in Tunisia means mainly propagation activities by stocking fish juveniles in man-made reservoirs or lakes and wetlands scattering in the north and central regions of the country. Target species are the species of mullet, carp, barb, catfish and black bass, etc. Tilapia culture using hot spring water is also conducted in the inland area of the govenorate of Gabes.

3) Fishing Port

Forty one (41) fishing ports, which are registered for the following two categories, have been developed in Tunisia.

- Large-scale fishing ports: All types of fishing vessels such as trawl vessels, tuna purse-seiners, sardine purse-seiners and coastal fishing vessels can be harbored. Equipped with modern facilities necessary for fishing activities, which include ice-making facilities and auction hall having inspection and quality control functions according to HACCP. There are 10 large-scale ports in nationwide such as Tabarka, Bizerte, La Goulette, Kelibia, Sousse, Monastir, Mahdia, Sfax, Gabes, and Zarzis.

- Small-scale fishing ports: Those are small-scale harboring facilities functioning for improvement of coastal fishery activities. In this category, there are 23 coastal fishing ports and 8 shelters that are smaller than fishing ports.

4) Number of fishermen

The number of fishermen is 53,538 in 2003 in Tunisia, among which 36,075 or 67% are coastal fishermen (Table 2.2). Large number of fishermen lives in the southern region particularly in the governorates of Sfax and Medenine where coastal fishery activities are pronounced. Total number of fishermen does not change largely in the past 10 years (it was 52,450 in 1998 with 36,329 coastal fishermen).

The General Direction of Fishery and Aquaculture (Direction General de la Cooperation Internationale: DGPA) estimates fishery-related population around 100,000 including the number of persons engaging in fish processing, ice-making, shipbuilding, production and sales of fishing gears, etc in addition to actual fishermen.

Table 2.2 Number of fishermen in 2003

Governorate	Coastal fishery	Bottom trawl	Sardine fishing*	Tuna purse-seine	Others	Total
Jendouba/Beja	462	70	45		232	809
Bizerte	3,880	324	572		36	4,812
Ariana	223					223
Tunis/Ben Abrous	1,041	225			25	1,291
North sub-total	**5,606**	**619**	**617**	**0**	**293**	**7,135**
Nabeul	925	216	1,212		108	2,461
Sousse	745	96	40		86	967
Monastir	2,632	72	560	15	5	3,284
Mahdia	3,562	1,007	1,170	112		5,851
Central sub-total	**7,864**	**1,391**	**2,982**	**127**	**199**	**12,563**
Sfax	12,389	4,335	232	646	1,500	19,102
Gabes	2,032		650	120	3,000	5,802
Medenine	8,184	45	474	30	29	8,762
South sub-total	**22,605**	**4,380**	**1,356**	**796**	**4,529**	**33,666**
Freshwater aquaculture in other governorate					174	174
Total	**36,075**	**6,390**	**4,955**	**923**	**5,195**	**53,538**

Remarks *: purse- seine with light
Source) DGPA statistics

5) Export and Import

Tunisia exports 14,607 tons of fish or 15.4% of total fish catch in 2003. When converted to the value, it is equivalent to 146,580,000 DT or 47.9% of the total, which is the 2nd foreign exchange earner among agriculture products following the olive oil. Main export products consist of fish species with high-value, such as octopus, squid, shrimp, tuna, etc., and more than 90% of them are exported for the European market.

On the other hand, Tunisia imports fishery products of 27,059 tons or about two times of its export in volume. Import items are mainly frozen tuna as material for canning and several fish species for domestic market such as mullets and goat fishes. Thus, the import value is only 44,300,000 DT which is less than one third of export value.

2.3 National Strategy

The 10th five-year national economic development plan (2002-2006) is presently implemented in Tunisia. This plan set a slogan to achieve balanced economic growth, increase of employment opportunities, balancing of financial situation and promotion of sustainable development, even if the world economy tends to slow down and competition in the world market is intensified.

The Ministry of Agriculture, Water Resources and Fisheries has prepared the10th agricultural development plan corresponding to the said national development plan. Fishery-related development strategy in this agricultural development plan is "to achieve the balance between fishing efforts and exploitable fishery resources". In other words, the strategy gives priority for the promotion of pelagic fishery (or blue fish fishing) and aquaculture, and to a minor degree for trawl-fishing. The pelagic fish resources are believed abundant and exploitable. Thus the strategy of development of pelagic fish fishing is to exploit the potentialities within the existing stock level, namely to increase the production by extra 20,000 tons in 2006, allowing an exploitation rate of 68% of the stock comparing to the estimated 45% in 2001. Furthermore, the fisheries sector has been given a quite particular attention by the authorities from the perspective of export promotion and is expected the production enhancement during the 10th development plan by 26.5% from 98,000 tons in 2001 to 124,000 tons in 2006.

Basic policies of the fisheries sector in the 10th agriculture development plan are as follows.

1) Rationalization of Fishery resource Management

Appropriate management of fishery resources is to be conducted, and the exploitable

fishery resources and fishing efforts shall be balanced considering local characteristics. In particular, fishing pressure of trawl fishing shall be reduced in the central and south fishing grounds. On the other hand, pelagic fishery resources shall be more exploited in all fishing grounds taking into necessary consideration on the resources conservation, such as appropriate arrangement of fishing fleets

2) Consolidation of Scientific Research

Scientific knowledge and information shall be accumulated in order to achieve balanced management of fishery resources. Technically, fishing activities in coastal and offshore areas are encouraged by developing selective fishing methods and fishing gear adoptable for different fishing environments.

3) Aquaculture Development

Selection of aquaculture sites and technical development shall be addressed not only for the domestic aquaculture promotion but also for strengthening competitiveness in the international market.

4) Integration and Competitiveness of the Sector

The plan pursues not only increase of fish catch but also a series of functional enhancement of the sector regarding distribution/transportation, refrigeration/preservation, communication, export, etc. More specifically, infrastructure of fishing ports and the service system shall be developed. About fishery resources and fishing ground which are not exploited well, it is possible to explore them together with foreign countries.

Along the above policy, the President admitted in March 2001 the comprehensive project regarding aggressive fishery development of pelagic fish resources such as sardines and mackerels and promotion of their utilization. This is called "Presidential project". The project involves various components including reinforcement of 100 fishing vessels for sardines, establishment of relevant supporting facilities such as ice-making plants and freezing/processing plants and low temperature transportation system, training for fishermen, and promotion of pelagic fish consumption, etc. Regarding new construction of fishing boats having total length of 15m, more than 400HP and on-board refrigeration facilities, a subsidy equivalent to 20-30% of total construction costs are to be given.

2.4 Prior and On-going Project/Assistance

2.4.1 Assistance from the Japanese Government

1) Grant Aid Cooperation

Although the general grant aid project of Japan is not implemented for Tunisia since per capita GNP is comparatively high, fishery grant and cultural grant aids have been launched from 1997 and 2001, respectively.

The past fishery grant aids are summarized as follows:

Title	Date of E/N and amount	Outline
Construction of Fishery Research Vessel	September 1997 JY 841 million	Construction of a research vessel (HANNIVAL) for fishery resource survey and provision of relevant equipment like fishing gear. Handed over on March 1999.
Construction of Fishery School in Bizerte	December 1999 JY 672 million	Construction of a fishery school for grow-out of captains for off-shore fishing, and provision of training equipment. Completed on March 2001.
Development of Fishery School in Mahdia	June 2001 JY 789 million	Construction of fishery training vessels (AMILCAR) and improvement of class room equipment. Handed over on March 2003.

2) Technical Cooperation Project

The Japanese Government had carried out two technical cooperation projects to the Fisheries Professional Training Centre of Mahdia (Centre de Formation Professionnelle des Peches en Mahdia: CFPP Mahdia; former National Fishery Development Center in Mahdia) with the purpose of re-education of instructors and improvement of training level of the center as follows:

- "The National Fishery Center Project: from 1 July 1978 to 31 December 1981 (3.5 years)
- "The Fisheries Training Project in Mahdia in Tunisia": from 1 August 1998 to 31 July 2001 (3 years)

In "The Fisheries Training Project in Mahdia in Tunisia" starting from 1998, four long-term and four short-term experts were dispatched and equipment necessary for the project activities was provided from Japan, and a total of 15 counterparts were trained in Japan under the project purpose "to improve the facilities and strengthen the capacity of Fisheries

Professional Training Centre of Mahdia (CFPP)".

3) South-South Cooperation

In the fishery sector, the Japanese Government is supporting inter-regional symposiums for African countries hosted by the Tunisian Government.

2.4.2 Cooperation from Other Donors

Major on-going donor-assisted fishery projects are shown by Tunisian implementing agencies as follows.

1) DGPA

- Cooperation package in agriculture sector by the World Bank: In fishery sub-sector, such programs are involved as general survey on fishery activities, project for stabilization of management, project for fisheries structure improvement, etc are included. For instance, basic survey on rational fishing season, minimum capture size, etc., which will be discussed by the tripartite technical committee composed of fishermen, administrators and research institutions. Project budget is 500,000 DT.
- Project for improvement of fishery statistics by FAO: Approximately 60,000 US dollars
- Freshwater aquaculture development project by UNDP: UNDP side: 250,000 DT, Tunisia side: 300,000 DT, Total: 550,000 DT

2) INSTM

- Monitoring of environmental ecology in the Sicily Strait by FAO: 300,000 DT
- Monitoring of coastal lagoons by the EU: 64,000 DT
- Construction of aquaculture research center and training for researchers by IFREMER of France: 2,500,000 DT (completed)
- Joint research with France, Belgium, Britain, Canada, etc.:

3) AVFA

- Fishery training project by Spain: 700,000 DT

3. Problem to be Addressed and the Current Situation

3.1 Institutional Framework for the Sector

3.1.1 Governmental Organization

1) Ministry of Agriculture and Water Resources

Administration of the agriculture and fisheries sector is governed by the Ministry of Agriculture and Water Resources. The organizational chart of the Ministry is shown in Figure 3.1. Under the Minister, two Vice-Ministers who are responsible for water resources and fisheries, and environment, respectively), Chief Cabinet, General Secretary and General Inspector are arranged, and practical administrative work is implemented by nine (9) General Directions in the headquarters and the 24 Regional Agriculture Development Commissions (Commission Regionale de Developpement Agricole: CRDA) in each governorate.

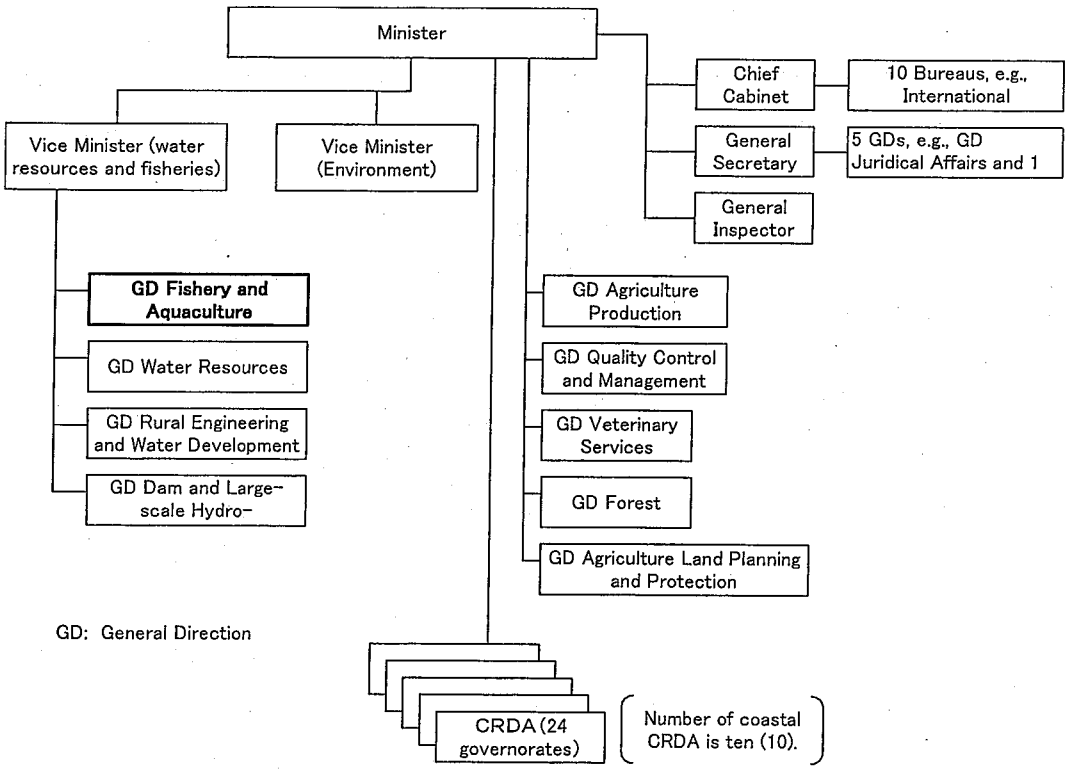

Figure 3.1 Organization chart of the Ministry of Agriculture, Water Resources and Fisheries

The General Direction of Fishery and Aquaculture (Direction General de la Peche de L'Aquaculture: DGPA) under the Vice-Minister of Water Resources and Fisheries is responsible for overall fisheries administration. Relevant programs at regional level are implemented by the CRDAs and their fishery branches. The organizational chart of DGPA is shown in Figure

3.2. There are three Departments and four Under Departments. The Department of Fishery Promotion will be responsible for this technical cooperation project.

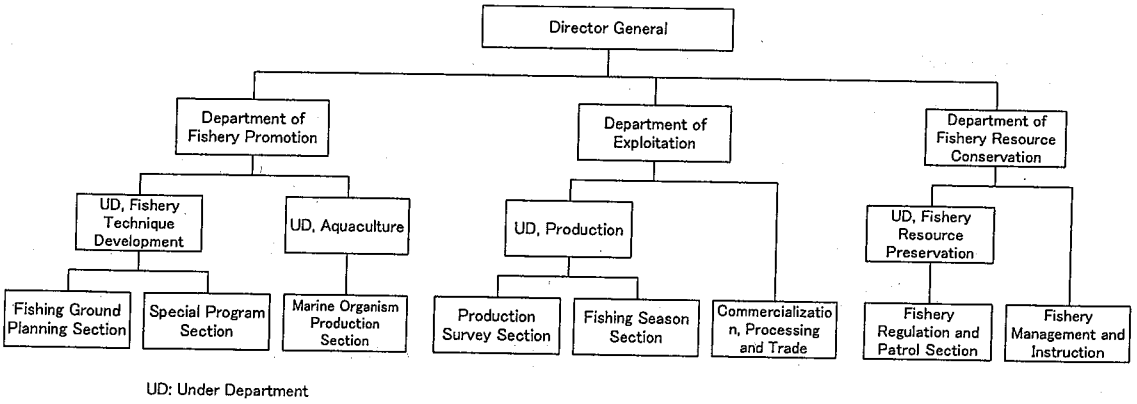

Figure 3.2 Organization chart of the Direction General of Fishery and Aquaculture

In the fisheries administration in Tunisia, independent public organizations and external agencies are established in addition to DGPA, and they play important roles for implementing their tasks. Such major organizations involved in the fisheries-related projects under supervision of the Ministry are shown as follows.

- Agriculture Training and Extension Agency (Agence de la Vulgarisation et de la Formation Agricole: AVFA)

  AVFA is an implementing agency of vocational training in the agriculture and fisheries sector. It consists of a secretariat and five departments which supervise a total of 40 training centers in Tunisia. As for fishery and aquaculture training, the Department of Fishery Training is responsible for administrating the eight fishery training centers (CFPPs) namely Tabarka, Kelibia, Ghar el Melh, Bizerte, Mahdia, Sfax, Gabes, and Zarsis. As mentioned in 2.4 of this document, major facilities and equipment of the CFPP Bizerte and CFPP Mahdia were provided by fishery grant aid cooperation of Japan, and in addition project-type technical cooperation projects of Japan were carried out in the CFPP Mahdia.

- Fishing Port Management Agency (Agence des Ports et Installation de Peche: APIP)

  APIP was established in 1992. It has branches in the governorates along the coastline, and manages a total of 41 fishing port facilities including 10 large-scale fishing ports, 23 coastal fishing ports, and eight shelter ports[1]. The Sfax branch of APIP

[1] Construction of these fishing ports is done by the Department of Fishery Promotion, DGPA.

experienced installation of artificial reef in terms of sinking scraped trawl vessels in 2003.

- Inter-professional Association of Fishing Products (Groupement Interprofessionnel des Produits de la Peche: GIPP)

  GIPP was established in 1995 with an ultimate mandate of contribution to the development of fishing and aquaculture in Tunisia through regulating marketing mechanisms, export promotion, improving production, carrying out development projects and management assistance. Most of the projects are undertaken together with DGPA.

- Tunisian Agriculture and Fisheries Union (Union Tunisienne de L'Agriculture de la Peche)

  UTAP was established as a national-level union of farmer's and fishermen's organizations in 1950. UTAP formulates an organizational network among the governorates up to the district level, and it becomes a focal point of project implementation through FAO, IFAD, World Bank, WFP, etc.

2) Ministry of Higher Education, Scientific Research, and Technology

The National Institute of Marine Sciences and Technologies (Institut National des Sciences et Technologies de la Mer: INSTM) in the Ministry of Higher Education, Scientific Research, and Technology is responsible for basic research and technology development regarding fisheries and aquaculture. INSTM is widely recognized as the most authoritative institution about oceanography and marine fisheries in Tunisia. The mandates of INSTM are scrutinized as follows.

- To conduct programs of research, studies and prospections concerning directly or indirectly, marine sciences and technologies in order to develop fisheries, aquaculture and to protect marine environment.
- To transfer scientific and innovative technical skills to professionals in public and private sectors.
- To provide high education through doctoral school training and supervise postgraduate students in Marine Sciences and Technologies.
- To extend marine culture through the museum Dar El Hout and the specialized library of oceanology.

About facilities, there are nine local stations in addition to the headquarters in Salammbo, i.e., Khereddine, La Goulette, Monastir, Sfax, Gabes, Zarzis, Mahdia, Bizerte, and Tabarka. INSTM has a research vessel Hannibal which harbors at the Sfax station.

At INSTM, marine research is carried out under the following four laboratories.

- Laboratory of marine living resources (Biology and ecology of marine organisms, stock assessment of exploitable resources, fishing techniques)
- Laboratory of marine biodiversity and biotechnologies (Aquatic biodiversity, protected and invasive species, marine ecosystems, marine biotechnologies, quality of fishing products and aquatic ecotoxicology)
- Laboratory of Aquaculture (Marine and freshwater pisciculture, shellfish culture, seaweed culture, monitoring of fish stock in dams)
- Laboratory of aquatic environment (Circulation of water masses, lagoon ecosystems, modelization and geographical information systems: GIS)

3.1.2 Fishery Laws and Regulations

1) Territorial waters and no-fishing area

The territorial waters of Tunisia are set up basically within 12 miles from Algerian border to Libyan border and the same from the neighboring islands as shown in Figure 3.3.

According to the international law, the 200 mile Exclusive Economic Zone (EEZ) is to be declared outside the territorial waters. But, due to the short distance with the neighboring countries the categories of waters are determined through adjustment among the relevant countries. The border of continental shelf that had already been agreed with Italy on 20 August 1971 is shown in Figure 3.3. Today the water inside this border is considered as actual EEZ of Tunisia.

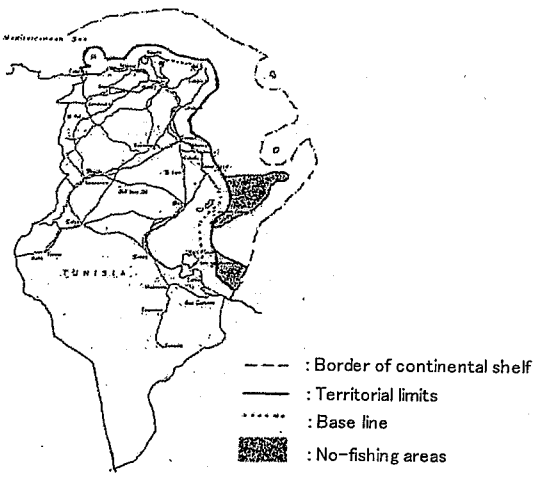

Figure 3.3 Water category and no-fishing areas of Tunisia

No-fishing areas are also shown in Figure 3.3. In addition to these areas, some fishing methods are prohibited operation in shallow waters as shown below.

Fishing method	Prohibited waters
Trawl fishing (general)	shallower than 50m in depth
Shrimp trawl of the Gabes Gulf	shallower than 30m in depth
Purse-seine with light	shallower than 35m in depth
Trammel net	shallower than 20m in depth

2) Laws on fishing season and others

Closed seasons for specific coastal fisheries or species are launched as shown in Table

3.1. Apart from closed season, there are various fishery regulations such as regulations on the mesh size of fishing net and minimum allowable size of fish to catch, and they are noticed to the public. It shall be noted that additional involvement for trawl fishing operation is forbidden from the view to regulate the total fishing efforts.

Table 3.1 Closed seasons for specific coastal fisheries or species

Fishing type or species	Closed season
Spiny lobsters, lobsters and slipper lobsters	From 16 September to 28 February
Bivalves	From 15 May to 30 September
Shrimp trawl	From 1 June to 30 July, and from 16 October to 15 November
Sponge fishing by scuba diving	From 1 April to 30 May
Fisheries in Bibane Lagoon	From 1 February to 31 March

Remarks) The duration of those closed seasons is reviewed annually by specific evaluation commissions.

3.2 Analysis of the Current Situation and Problem

1) Environment of fishing grounds is deteriorated.

Coastal waters of southern Tunisia, especially the Gabes Gulf, are known not only as good fishing grounds but also as important nursery grounds of fish juveniles where seagrass bed like *Posidonia* and *Caulerpa* develop well. However, the large seagrass bed are said to have diminished since the beginning of 19th century. Zaouali (1993) explains historically this drastic shrinkage by three major reasons (Figure 3.4). It began near the beginning of the 19th century with the sponges fishing. Then, it was accelerated by shrimp trawling which began in

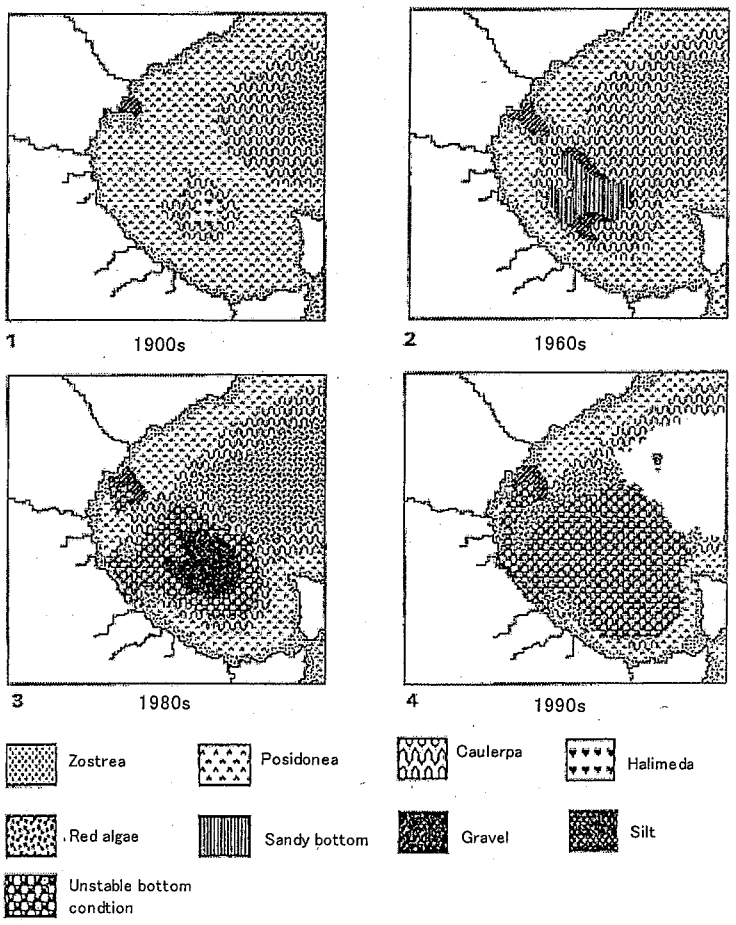

Figure 3.4 Historical schematic regression of the benthic vegetation in the Gabes Gulf (after, Zaouali 1993)

1960s. In 1970s with the development of phosphate exploitation, the new industrial zones around the Sfax and Gabes ports multiplied the phenomena by the intensive phosphor-gypsum discharge and accumulation of polluted sediments.

It shall be stressed that the trawl fishing causes not only direct physical damages on seagrass bed but also on the bottom topography forcing to change into flat in shape, which affect indirectly and negatively the growth of seagrass.

Recent research results of INSTM suggested that almost 90% of original seagrass vegetation in the Gabes Gulf had been lost[2] (Afli & Ben Mustapha, 2001).

Until now, the project focusing comprehensively on the restoration of these seagrass bed algae grounds has not been formulated.

2) Coastal fishery resources are declining.

In the central and south fishing grounds of Tunisia which are the center of fish production, catches per unit effort in both coastal and trawl fishing is decreasing[3] and the size of fish caught becomes smaller. In particular in the Gabes Gulf, demarsal fishery resources like shrimps have been decreased due to high fishing pressures of trawl fishery.

The Tunisian Government declared various regulations in order to restrict the fishing pressure of trawl fishing, e.g., prohibition of new involvement for trawl fishery, set-up of no-fishing area and close season, etc. However, the effect has not been seen conspicuously. Illegal fishing such as the 2-boat type small-scale coastal trawling carrying large-scale engine, which is called "Tartarone Kiss", still prevails. There are significant numbers of fishermen who do not keep the regulations concerning the mesh size of nets and minimum fish size to be caught.

Because of the above disorder in fishing activities associated with the deterioration of coastal environment explained in the above 1), coastal fishery resources tend to decline in the central and south fishing grounds. Conspicuous decrease in fish landing is seen in the governorates from Monastir to Gabes (Table 3.2).

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[2] Seagrass meadow of Posidonia is still quite well present off Zarsis and Biban Lagoon or the southward of Djerba Island (Ben Mustapha and Hattor, 1992).

[3] Based on the oral explanation of a researcher of INSTM, the average fish catch was 500kg per hour on the 1976 survey, but it became 10-20kg per hour in 2000 which is almost one fiftieth.

Table 3.2 Trend of fish landing from coastal fishery by governorate.

Unit: ton, %

Governorate	1998	2000	2001	2002	2003	Increment from 1998 to 2003
Jendouba/Beja	416	509	656	654	693	66.7 %
Bizerte	1,600	1,658	1,798	2,126	1,865	16.6 %
Ariana	204	180	188	203	232	14.0 %
Tunis/Ben Abrous	463	595	641	690	756	63.3 %
North sub-total	**2,683**	**2,942**	**3,283**	**3,673**	**3,547**	**32.2 %**
Nabeul	1,213	1,327	1,321	1,499	1,628	34.3 %
Sousse	922	864	831	853	1,141	23.8 %
Monastir	3,533	3,055	2,562	2,616	2,588	▲ 26.7 %
Mahdia	2,583	2,102	2,461	2,544	2,522	▲2.4 %
Central sub-total	**8,251**	**7,348**	**7,175**	**7,512**	**7,880**	**▲ 4.5 %**
Sfax	7,514	6,404	6,550	6,028	5,369	▲ 28.5 %
Gabes	2,359	1,887	1,348	1,792	1,371	▲41.9 %
Medenine	7,737	7,505	7,703	7,966	8,041	3.9 %
South sub-total	**17,610**	**15,796**	**15,601**	**15,786**	**14,781**	**▲ 16.1 %**
Total	**28,544**	**26,087**	**26,060**	**26,971**	**26,208**	**▲ 8.2 %**

Sources) DGPA

3) Small pelagic fish resources are not developed sufficiently

While coastal fishery resources and offshore tuna resources are declining, it is considered that small pelagic fish resources are still affordable in Tunisian territorial waters.

Resource assessments of small pelagic fishes are conducted by INSTM using the fishery research vessel HANNIVAL donated by the Japanese Government through the fishery grant program. The survey method is to estimate distribution of each fish species in different water columns using eco-sounder, sonar and mid-layer trawler, and then to calculate the Total Allowable Catch (TAC) by multiplying the exploitation rates which were obtained empirically. The results are shown in Table 3.3. The TAC of pelagic fishes is estimated to be 80,000 to 100,000 tons. Current fish catch of purse-seiners using light lure, targeting for small pelagic fishes, is at a level of 35,000 tons (Table 2.1), meaning that there are great potentials to explore those resources. Thus, the Tunisian Government carries out the specific project called "Presidential Project" (refer to 2.3 of this document) concerning exploitation and effective utilization of resources, such as upgrading of fishing vessels and gear, reinforcement of fishing port infrastructures, etc.

Table 3.3 Estimated TAC for small pelagic fish resources

Species	TAC (ton)	
	1998	2000
Sardine	31,000	38,074
Allache	18,700	12,602
Anchois	4,750	5,976
Chinchards	13,200	17,793
Maquereaux	4,850	7,697
Bogue	7,700	11,041
Spicarels	3,000	8,334
合計	83,200	101,519

About blue-fin tuna, the ICCAT arranges the quota for Tunisia around 2,000-2,600 tons a year, and at present the fish catch of this species attains almost the sealing amount in Tunisia.

4) Aquaculture technology at the level of fishermen is not developed.

In Tunisia, marine aquaculture was said to be introduced experimentally in 1970's. Then it has been carried out by some private farms attaining considerable success in business. However, it is not disseminated among fishermen. There is a opinion of fishermen that the measures for fisheries resource management such as extension of closed season would be acceptable when alternative income source like aquaculture is secured. Therefore it is expected to develop aquaculture technology which can be affordable for them.

It is necessary to examine aquaculture methods suitable for characteristics of local marine environment, diversification of the target species for aquaculture [4] and production/supply system of artificial frys, etc.

5) Measures for improvement of fish value such as introduction of fish processing are not taken by fishermen.

More than 100 freezing/refrigeration companies are in operation for exporting shrimps, octopuses, squids, etc at present. In addition, there are approximately 20 canning plants for sardines and tunas. Because the same EU standards on export/import of fishery products will be applied from 2007 in Tunisia, those private processing industries are requested to improve drastically the quality control system so that renovation of facilities is promoted following the HACCP rules.

On the other hand, value-added fishery products have not been considered at the level

[4] Target species for aquaculture is now limited to the two species, European sea bass and sea bream, and their marketing prices for export tend to decline.

of fishermen. Hence, it would be possible to contribute for additional income generation of fishermen, when technical development on fish processing like boil-in-the-bag food is achieved using presently unutilized by-product in trawl fishery or cheap small pelagic fishes and corresponding to local consumer's needs. In this case, considering dietary custom for eating processed fishery products has not been developed popularly among Tunisian people, it is important for fisheries administration to support extension activities about consumption of processed fishery products.