

2-4 Project Implementation Setup

2-4-1 Organization

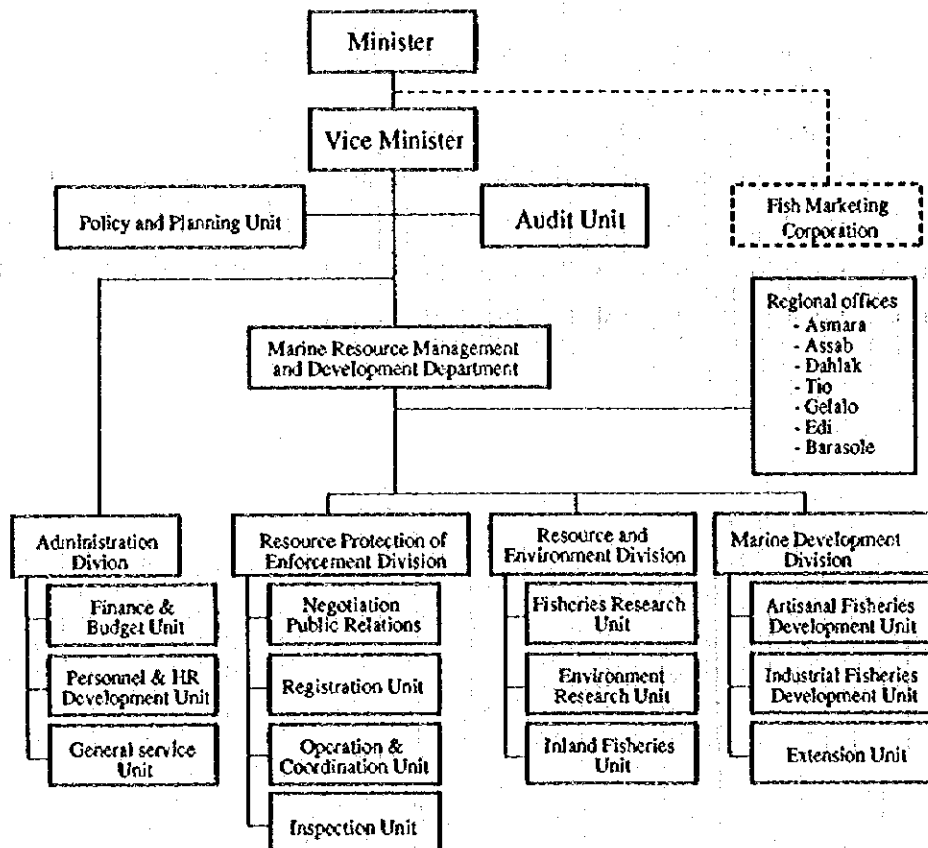
The implementing agency for the Project is the Ministry of Marine Resources (MMR). The MMR, which acts as the ministry in charge of the development and management of marine resources including fisheries resources, is responsible for the following areas in its role of aiding the social and economic development of Eritrea:

- The compilation of plans for fisheries development and management in Redrain Sea waters,
- Duties involving marine resource management and effective utilization such as the implementation of resource surveys, resource utilization monitoring, the issue and control of fishing permits, and the negotiation and implementation of fisheries agreements, and so on,
- The examination, setting and execution of fishing seasons, fishing waters and fishing tackle laws, etc. to ensure the management of the fisheries sector,
- The collection and analysis of fisheries materials, and the compilation of statistical data,
- The setting and management of marine preservation zones.

The MMR Headquarters is in Massawa, and there are branch offices in Asmara and Assab and permanently stationed offices in Dahlak, Tio and Gelalo, each carrying out the above duties. The MMR is currently in the process of advancing organizational structuring and fostering its staff. The following shows the present organization of the MMR and also its current staff numbers and planned staff numbers.

Department	Present staff	staff to be increased	Planned staff
Minister	1	0	1
Ministerial Support Unit	0	4	4
Policy and Planning Unit	3	6	9
Marine Resource Management Department	0	3	3
Resource Protection and Enforcement Division	41	7	48
Resource and Environment Division	21	27	48
Marine Development Division	32	24	56
Administration Division	40	19	59
Regional branch offices and liaison			
Asmara	15	4	19
Dahlak	7	4	11
Tio	3	7	10
Assab	30	29	59
Gelalo	20	0	2
Edi	0	2	2
Barasole	0	2	2
Total	194	138	332

Ministry of Marine Resources Organization Diagram



The main implementing departments for the Project are the Policy and Planning Department, the Fisheries Development Section and the Assab Branch Office. The Fisheries Development Section provides guidance to fisheries operators and fishermen, fosters fishermen's organizations and implements and manages various fisheries development projects with the aim of developing and promoting the fisheries sector in Eritrea. The Assab Branch Office, which is in charge of Dankalia State in the southern part of the country, is responsible for regional administration, providing guidance to fishermen and conducting various fisheries surveys. In addition, the Assab Branch Office is also responsible for the site implementation of the fisheries development project (MMR/FAO project) being carried out in Assab through the cooperation of the UNDP, UNCDF and FAO.

2-4-2 Staffing

Initially, the MMR will directly manage the facilities providing necessary staff and funds, with the Assab Fisheries Cooperative eventually becoming the managing body of the Project facilities after training and guidance in management of the facility by the MMR. During the preliminary stage, the training of the Assab Fisheries Cooperative will take place and when the cooperative becomes capable of managing the facilities, the MMR will transfer management of the facilities to the cooperative.

The MMR will form a Project Team consisting mainly of members from the Policy and Planning Department, the Fisheries Development Section and the Assab Branch Office, to provide direct guidance and supervision on the implementation and running of the Project. The Assab Fisheries Cooperative shall be made the operating body to run the Project facilities under the guidance and supervision of the MMR Project Team.

The Policy and Planning Department Manager, who will be the chief of the Project Team, has had many years of experience in aiding the implementation of the MMR/FAO project in the role of project manager, and he has ample experience and qualifications to act as Project Team leader in carrying out the implementation of and guidance for the Project. Moreover, many of the staff of the Fisheries Development Section and Assab Branch Office have been involved in fisheries projects in Massawa and Assab, and so it is expected that a highly qualified Project Team can be formed.

The MMR is currently organizing and fostering the Assab Fisheries Cooperative via its activities in the current MMR/FAO project, and it is expected that this cooperative will have gained an organizational base and the ability to provide leadership to local fishermen in the Assab area by the time the Project facilities are ready to commence services. Furthermore, the bolstering of staff through recruitment of personnel from the MMR/FAO project staff and the Fisheries Distribution Public Corporation (under the management of the MMR) is also possible.

Chapter 3. Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

A study was carried out to investigate the feasibility of Project implementation. Because the country has only recently gained its independence, domestic industry has not had enough time to sufficiently develop. This means that domestically procurable construction materials are limited, and almost all such materials need to be imported. Except for only a minor portion, the construction materials and machinery, etc. required for Project implementation need to be imported from third-party countries. Moreover, with regard to the building market in and around Assab, most work is being advanced in the area of restoration and new construction of small-scale buildings such as housing and offices, etc., and the new construction of large buildings such as hotels and public facilities, etc. has yet to be commenced following independence. In the area of civil works, the improvement of the road network has been commenced with the aid of a loan from the World Bank, however, the necessary construction machinery and so on for this is again being imported from abroad. In view of this situation, the number of construction companies in Assab which can independently maintain set quality and other conditions in the advancement of work are limited.

In view of these circumstances, the contents of the Project were designed in such a manner to match the work methods, scale of facilities and specifications, etc. with the local conditions so as to enable utilization of the local construction companies. Moreover, care was taken to reduce the risk of prolonged work due to delays through ensuring that Japanese construction companies provide guidance.

The works schedule was divided into two phases for facilities construction reasons. With regard to the personnel to be dispatched from Japan, a general foreman and civil engineering and construction chief engineer shall oversee the whole works process and, according to necessity, pile driving and ice plant specialist engineers, etc. shall be dispatched to ensure a high level of works precision. Concerning that equipment which will require maintenance following the handing over of the facilities, it will be necessary to provide ample technical guidance to the local counterpart during the period of equipment installation and trial running, and so on.

The implementing agency in Eritrea is the Ministry of Marine Resources, however, because the Ministry of Construction will act as the works execution supervisory agency during the implementation period, the execution plan shall be designed and implemented in accordance with the construction rules and procedures for inspection and supervision in Eritrea. Therefore, from the time of facilities design documents and drawings confirmation,

applications for the proper documentation, etc. shall be made to the Ministry of Construction and the local public body (Assab City) via the Ministry of Marine Resources, and intermediate inspections during works execution plus a final inspection upon completion of the works shall be undertaken.

3-1-2 Implementation Conditions

The tough natural conditions and construction working environment in the Project area will make execution problems prone to occur, and the following points, in particular, will require special attention.

1) Construction Materials Procurement

It will be necessary to import the construction materials from overseas, mainly from third-party countries, however, with regard to the ships entering port in Assab, because the number of services from Japan is limited, it will be necessary to provide ample time for the selection of materials, confirmation of quantities and ordering, etc. in accordance with the state of work progress.

2) High Temperature Countermeasures

Because the temperature in Assab reaches as high as 50°C from June to September and warm winds blow from the inland desert, ample attention will need to be paid to the curing of concrete and mortar. If sufficient care is not taken, there is a risk that, following the completion of construction, concrete strength and durability will be reduced and finished mortar surfaces will crack and peel.

3) Transportation and Storage of Construction Materials

Some of the construction sites are located far away from the central Project site of Assab. All of the construction materials will have to be transported by land from Assab City, however, the transportation situation is poor. Moreover, due to the poor materials storage conditions during the works period in terms of high temperature and sea winds, etc., care will need to be taken with regard to the storage of the materials during transportation and the implementation period.

4) Labor and Safety Management Countermeasures

In view of the high daytime temperatures and the fact that the local laborers have a poor nutritional intake, efforts will need to be made in order to prevent work accidents and injuries by allowing rest times according to necessity and providing guidance in the area of safety. Moreover, due to the fact that the local construction companies have no

experience of marine construction works, ample care will be required to prevent the occurrence of accidents caused by winds and waves, etc.

3-1-3 Scope of Works

With regard to the division of works execution, the facilities to be constructed within the Project site shall all be constructed by the Japan side. The specific works areas of the Japan side and the Eritrea side are as follows:

(Work to be borne by the Eritrea side)

Electricity supply extension works: from the nearest main transmission lines to the lead-in panel of the power receiving room to be newly constructed

Water supply extension works: from the existing lead-in points on the site to the water inlets within the Project facility site

Exterior works: improvement of the access roads to the Project sites and structuring of the existing MMR facilities

(Work to be borne by the Japan side)

The Japan side shall be responsible for procuring equipment and materials, providing consultant services and carrying out all other Project implementation works not stated above.

3-1-4 Consultant Supervision

With regard to the implementation of the Project, in accordance with the Japan Grant Aid Scheme implementation procedure, the Japanese consultant shall, under the recommendation of JICA, conclude a contract with MMR, the Project implementation agency, for the detailed design and supervision of the Project implementation, and obtain the verification of the Government of Japan.

During the period of detailed design, accurate design shall be carried out through the detailed site survey, etc., and care shall be taken to ensure that no delays occur during the works execution period. Moreover, as this is the first time that Eritrea receives grant aid from Japan, it will thus be necessary to ensure the MMR and other related agencies have full understanding of the implementation procedures through giving ample explanation to the related personnel.

With regard to the tendering process, consultations shall be held with the MMR on items relating to the selection of tenders and the tender process under the guidance of JICA, and the work shall be advanced in a manner so as to ensure that proper tendering is carried out.

During the execution period, permanent engineers shall be dispatched to the sites in order to manage and supervise the works. Moreover, according to necessity, it will be necessary for the dispatched specialists to travel to the capital of Asmara where the related ministries and agencies are located, Massawa where the MMR Head Office is located and Assab which is the main Project site, and coordinate work with the MMR and related agencies and also carry out administrative work and site supervision. This work shall be carried out upon first giving ample consideration to the extremely poor communication and transport conditions between Assab and Asmara and Massawa. Moreover, with respect to the FRP fishing vessels and special facilities such as the ice plants for which the permanently stationed engineer may find it difficult to manage, specialist supervisory engineers shall be dispatched from Japan on a short-term basis to manage and supervise the equipment works, carry out inspections and perform trial runs, and so on.

3-1-5 Procurement Plan

With Eritrea having only recently gained its independence, the domestic industrial sector is still in the reconstruction stage and imports are relied on to provide all construction equipment and materials. Therefore, the construction materials planned for domestic procurement are limited to sand and stone. All other construction materials shall basically be imported from third-party countries upon carefully considering quality and specifications and ensuring that the materials meet with designated standards. Similarly, with respect to construction machinery, it is thought that the general machinery for ordinary land civil engineering and building works can somehow be procured locally, however, as the local procurement of marine civil engineering work vessels, etc. is impossible, such items shall be imported from third-party countries.

In determining the procurement of equipment and materials, priority was given to the local procurement of those items which meet the required specifications in consideration of the future maintenance of the facilities. As for the other materials and equipment, upon giving basic consideration to durability and quality levels, etc., it was decided to procure items made in Japan.

3-1-6 Implementation Schedule

The first stage of the implementation schedule consists of three months for the implementation design, six months for manufacture and procurement and two months for transportation. The second stage is scheduled to consist of four months for implementation

3-1-7 Obligations of Recipient Country

The items which need to be borne by the Eritrea side in implementation of the Project are listed below.

(Items to be borne and conveniences to be provided by the Government of Eritrea)

- 1) The securing of construction sites and the removal of obstacles from land and sea sites
- 2) The construction of a corridor to link the existing marine facilities in Assab to the Project facilities
- 3) Electricity and water supply extension works
- 4) The exemption of customs and tariff charges on materials and equipment to be imported for use in the Project
- 5) The exemption of all domestic taxes on Japanese nationals during the period in which they provide their services and the equipment and materials
- 6) The exemption of authorization for Project implementation required by the Japanese staff and the conferment of any other rights
- 7) The effective maintenance and operation of the facilities to be constructed and equipment to be provided under the Project

(Items to be borne by the Japan side)

- 1) The procurement of all equipment and materials and labor required for the construction of facilities
- 2) The marine and land transportation of equipment and materials to be imported, and the bearing of export insurance premiums
- 3) The provision of consultant services such as the aiding of the implementation plan and tendering and also management and supervision, etc.

The construction costs to be borne by the Eritrean side for facilities in the Project are estimated as follows.

Costs to be borne by the Eritrean side:

Electricity and water supply extension works	approx. 150,000 Birr
<u>Exterior work surrounding the facility</u>	<u>approx. 90,000 Birr</u>
Total	approx. 240,000 Birr

3-2 Operation and Maintenance Plan

(1) Operation Organization and Staffing Plan

Under the guidance of the MMR, an operating body shall be organized for the Project facilities. The operating body shall be centered around the local fishermen's cooperatives in Assab and shall be boosted by the engineers and the specialist knowledge and experience of the project staff, distribution and sales personnel, accounting staff and freezer technicians, etc. who are receiving guidance under the MMR/FAO project currently under implementation. The operating body shall be composed of the following staff members.

Manager	(1): Overall administration and operation
Production responsibility	(1): Production management, landing promotion, collections, supplies
Distribution and sales responsibility	(1): Sales of fresh and frozen fish, market development, sales promotion
Accounts responsibility	(1): Accounts and general affairs
Freezer technician	(1): Operation and maintenance of freezer equipment
Plant manager	(1): Fresh and frozen fish production
Operators	(8): Plant work, fish treating, freezer and refrigeration work, ice-making work
Freezer watchmen	(2): Freezer watching and maintenance
Drivers	(3): Vehicle driving

With respect to sales and distribution, staff shall be recruited from among the sales and distribution personnel of the old MMR organization of the Distribution Section, the existing Fisheries Distribution Public Corporation or private companies. Similarly, with respect to the freezer technicians, staff shall be recruited from among the technicians, etc. of the MMR, and the Massawa and Asmara refrigeration facilities and the ice-making plants of the Fisheries Distribution Public Corporation.

(2) Operation and Maintenance Plan

The main mechanical equipment within the Project facilities will be the ice-making and refrigeration equipment. The running of this equipment is indispensable to the operation of the Project, and it will be necessary for the operation and maintenance of such equipment to be performed without fail under the person responsible for freezer operation. The equipment operation will be made simple through the minimizing of compressor revolutions and the provision of safety stop devices, etc., and the frequent dismantling and touching up of the machinery will not be necessary. However, efforts shall be made to carry out the following points in equipment operation and maintenance.

- Definite operations in accordance with operation instructions shall be carried out, as will the checking and verification of daily check items.
- Operating diaries shall be maintained to keep a record of the daily operating conditions.
- The cleaning and tidying up of machinery, equipment and work areas shall be carried out.
- Brine concentration checks in the ice-making machine shall be carried out every day and particular attention shall be paid to the continuous maintenance of proper brine concentration levels.

The required expendable materials will be refrigerating machine oil, refrigerants and salt, etc. to act as the raw material for brine. Refrigerating machine oil replacement shall be carried out at least once each year and the replacement quantity shall be 60 liters each time. Refrigerant refilling is hardly necessary at all providing that machine dismantling is not carried out and leaks do not occur, however, one 40 kg cylinder (equivalent to 25% of the total amount used) shall be included as a backup supply. The required salt for maintenance of brine concentration levels is estimated at around 600 kg/year, which is equivalent to roughly 20% of the total quantity of salt in the brine. The replacement parts required for the opening up and maintenance of compressors are piston rings, oil rings and packing, etc., however, such parts will hardly be required at all during the first one or two years of operation. The cost of the above-mentioned expendable items is estimated to be between 10,000 and 15,000 Birr.

When the maintenance and repair costs for facilities water supply and power equipment and vehicles, etc. are added, it is estimated that the maintenance and repair cost will come to 200,000 Birr per year.

As can be seen from the trial estimation of the income and expenditure balance shown in the appendix, the operation of the Project facilities will, in balance terms, be possible providing that the design landing loads are achieved and sold off, however, it will take

some time (three years is set for the Project) to achieve this landing and sales target, and thus budget support will be necessary during that period. It is necessary for the MMR (Project implementing agency) to provide operation guidance and also prepare a budgetary backup system in advance of the Project implementation.

Chapter 4. Project Evaluation and Recommendations

4-1 Project Effect

The Project is intended to improve the means of fish distribution, which is an important issue in promoting fisheries in the Project area, and provide support to the local fishermen. Implementation of the Project will result in 1) the establishment of fish landing and distribution facilities, and 2) the provision of fisheries production equipment and the development of fisheries support means (supply of ice and water, etc.). Through the operation of the Project facilities and equipment under the guidance of the implementing agency, the following effects are expected to be realized.

- 1) **Improved hauling capacity and the creation of employment opportunities for local fishermen through the provision of fisheries production equipment.**

Due to shortage of fishing boats and equipment due to aging of boats and engines and return of fishermen who had fled the country, many fishermen have been unable to fish. This situation is true for approximately 240 or half of the 470 fishermen living in the Project area. The boats, engines and equipment to be supplied by this project along with the existing 66 boats and the 7 boats to be constructed under the FAO project will bring the total number of boats operating in the area to 103, guaranteeing 80% (approx. 360 fishermen) of the local fishermen the opportunity to fish.

The number of boats mentioned above is close to the number of boats in the Massawa region (117 boats), and therefore the implementation of the Project is predicted to increase the catch in the target area to the same level as the Massawa region.

- 2) **Advancement of fish market and sales routes development and the promotion of distribution and sales through the utilization of fish landing and distribution facilities and means.**

Currently there are no landing and distribution facilities in the target area; the catch must be brought to shore on the beach and the catch cannot be marketed or stored. Due to the difficulty in marketing, the level of catch remains low hindering the development of sales routes, creating a vicious cycle of low catch and low sales. The Project will realize the sale of fish to the Assab market by constructing landing, ice making, freezing and cold storage and providing transportation of fish, capacity to supply ice and other materials. It will also facilitate to develop marketing of the products to Adis Ababa and neighboring countries.

- 3) The boosting of local fishermen production activities and promotion of more landing through the provision of fisheries support measures in unison with the encouragement of the selling of the landed fish.

The local fishery industry and local landings of fish will be promoted by both putting effort into expanding sales routes, and providing support services to fishermen such as engine repair and supplies of ice, fuel, water and fishing gear. With these measures and efforts, it is anticipated to increase the annual catch of 50 tons to the same level as currently in the Massawa region (310 tons/year). This increase is estimated as follows.

- Assab: The Assab Fisheries Complex will increase the catch from 50 tons/year to 192 tons/year.
- Barasole: The fisheries station in the Project will allow landings and transportation of fresh fish to Assab, and approximately 72 tons/year of fresh fish will be landed and transported to the Assab Fisheries Complex.
- Ras Terma: Where currently, only a seasonal fishing camp to catch fish for drying from October to May, the fisheries station will allow landing and shipping of approximately 50 tons/year of fresh fish to the Assab Fisheries Complex.

- 4) The increased supply of fish to local residents through encouragement of local landing and the improvement of distribution and selling functions.

Currently 45 to 50 tons/year of fish are consumed in the Assab region, an average of 1 kg/person/year. The consumption level is half for inhabitants of Massawa region.

There is a potential demand for fish as a food source. The increase of catch along with the MMR's guiding the development of retail sales routes in the regions will promote the steady supply of fish to local residents. It will be possible to increase by 50% to approximately 68 tons/year (approx. 1.5 kg/person/year).

The specific measures to counter the existing issues and their expected effects are given in the following table.

Current Conditions and Problem Points	Project Countermeasures	Extent of Project Effects and Improvement
<p>1) Fisheries Production</p> <ul style="list-style-type: none"> • Deterioration and insufficient quantities of production equipment such as vessels, engines and fishing tackle • Procurement of ice is impossible. This makes the storage of caught fish on vessels difficult and thus limits operating ranges. • There are no landing facilities or equipment for refueling and supplying ice and water. As a result, much labor and time is required for landing and refilling work. <p>Because of the above-mentioned restrictions, local fisheries production is low and locally landed hauls are small.</p> <p>2) Distribution and Selling</p> <ul style="list-style-type: none"> • There is no fish distribution and selling route. Due to the poor means of fish storage, the shipping and selling of fish cannot be done. <p>Moreover, in the regional fishing villages, the poor means of transportation make it almost impossible to ship fresh fish to Assab.</p> <ul style="list-style-type: none"> • As a result of the poor means of fish storage and transportation, the distribution and selling of the fish is difficult. <p>Consequently, the areas of market development and sales route preparation are not being advanced.</p> <p>These poor conditions in the field of distribution further limit the fisheries production activities and reduce the supply of fish products to local residents.</p> <p>Moreover, the selling and export of fish to external markets is also restricted.</p>	<p>In connection with the MMR/FAO projects already implemented in the Project area (Assab), the Project will remedy the current situation in the following way.</p> <ul style="list-style-type: none"> • Fishing vessels, engines and fishing tackle will be provided. These items of equipment will be distributed to the local fishermen via the fishing cooperatives under the guidance of the MMR. • Facilities and equipment for supporting fisheries activities and boosting landed fish distribution and selling functions will be provided to the central Project site of Assab and other main fisheries centers. <p>a) Assab Fisheries Complex</p> <ul style="list-style-type: none"> • Landing jetty • Freezer, refrigeration and ice making facilities • Transportation and distribution equipment • Workshop <p>b) Regional Fisheries Stations</p> <ul style="list-style-type: none"> • In connection with the Fisheries Complex in Assab, Barasole and Ras Terma will be made into centers for the collection of landed fish and refueling, etc. of fishing vessels in order to support the fishing activities of the local fishermen. 	<p>Through the provision of fisheries production equipment, in unison with the fishing vessels scheduled to be built under the MMR/FAO project, the fish catching capacity of the Project sites will increase. Moreover, employment opportunities will be secured for the local fishermen.</p> <p>Through operation of the Assab Fisheries Complex and the regional stations, fisheries production and local landing will be improved. In addition to the central landing base of Assab, fish landing and collection will also become possible at Barasole and Ras Terma.</p> <p>It is intended to raise the current landed quantity from 40-50 tons/year to approximately 310 tons/year, which is the same level as at Massawa.</p> <p>As a result of market development, distribution route preparation and sales promotion, the following fish distribution effects are expected.</p> <ul style="list-style-type: none"> • Supply of fresh fish to residents in the Assab area: This will be increased by roughly 50% from the present 40-50 tons/year to 68 tons/year. • Sales to markets outside the Project areas (Addis Ababa): A sales volume of approximately 240 tons/year is forecast. <p>These sales efforts, together with the fisheries support activities, will raise the productive motivation of the local fishermen and thus lead to improved operating and landing levels within the Project areas.</p>

In addition to the above-mentioned expected effects of Project implementation, the implementation of the Project under Japan's Grant Aid Scheme is considered to be appropriate in view of the following points.

- 1) The direct beneficiaries of the Project are the coastal fishermen, who are at the bottom of the economic ladder. Moreover, the local residents of Assab will also directly benefit in that they will receive an improved food supply.
- 2) The Project will not only benefit fisheries production, but will also contribute to an improved standard of living for the local residents as a whole.
- 3) The Project is in line with the policies of the Government of Eritrea to restore the socio-economy and promote industry, and, moreover, it will make a major contribution to the promotion of fisheries through allowing the effective utilization of the country's fisheries resources.
- 4) The Project facilities are not designed to be profit-making, but will provide a public welfare service in that they will benefit the local fishermen (direct beneficiaries) and distribution sector personnel and also contribute to the improved dietary intake of the local residents.
- 5) Design of the facilities has given ample consideration to their impact on the local natural environment by maintaining the current level of sea water circulation within the landing facility waters, preventing marine pollution within the said waters and leaving the beaches used for recreation by the local residents untouched.

4-2 Recommendations

In addition to leading to the aforementioned expected beneficial effects, the Project will contribute to improving the standard of living for the local residents and also aid local revitalization. For these reasons, implementation of the Project is considered to be significant.

In carrying out the Project, it will be necessary to take the following measures in order to secure effective management of the project and realize the effect and maximize the Project effect.

(1) Bolstering and Development of Fisheries Cooperatives and Fostering of Project Operation Staff

The Project facilities are planned to be run by an operating body composed mainly of the local fisheries cooperatives in Assab, under the guidance and supervision of the MMR. The organization and development of fisheries cooperatives, which is being carried out under the MMR/FAO project currently being implemented, needs to be further

encouraged in preparation for the start of operation of the Project facilities. Moreover, with regard to the Project staff, mechanics, other technicians and freezer operators, etc. who will receive guidance under the Project, their guidance and development is required in consideration of the management and operation of the Project facilities. Furthermore, in the specialist areas of fish distribution and sales and freezer equipment operation and maintenance, etc., it is necessary to bolster the operating staff setup by widely searching for personnel in as far a field areas as Massawa and Asmara.

(2) **Guidance, Supervision and Support from the MMR**

As was mentioned in the preceding paragraph, the MMR must strive to develop and strengthen the Project operating body and staff, and also take the responsibility of providing guidance, supervision and support for the operation activities. It will take a certain amount of time for the operating body to become financially independent, and the MMR will have to provide total support in terms of staff and budget, etc. during this initial period. Unlike other projects carried out in the past, this Project will not include the provision of an operating fund. The MMR will have to become aware of this and take the support budget measures required in preparation for Project implementation and operation.

(3) **Increasing the Demand for Fish and Developing new Sales Routes**

The Project is centered around supporting fisheries activities and promoting fish distribution and sales. Distribution route development is not the direct responsibility of the MMR, however, it will need to provide guidance to the citizens of Assab on fish cuisine in order to spread the consumption of fish, and also develop fish stores, traveling fish retailing and other means of selling fish off to citizens. Furthermore, guidance will need to be provided to the Fisheries Public Corporation, which is independent of the MMR, and the private sector marine product distribution companies in order to develop new marine product markets in and sales routes to Addis Ababa and other surrounding countries.

(4) **Refueling Equipment**

The refueling of fishing vessels has been determined to be an important factor in attracting fish for landing to the Project facilities. The production and supply of ice, fuel and water at the Project facilities is necessary, however, with regard to equipment for refueling, the Government of Eritrea and the MMR shall carry out installation with the cooperation of local fuel companies.

In addition to the installation of refueling equipment, the setting of a special fuel price for the fisheries sector will be necessary. Because fuel can be obtained at less than half

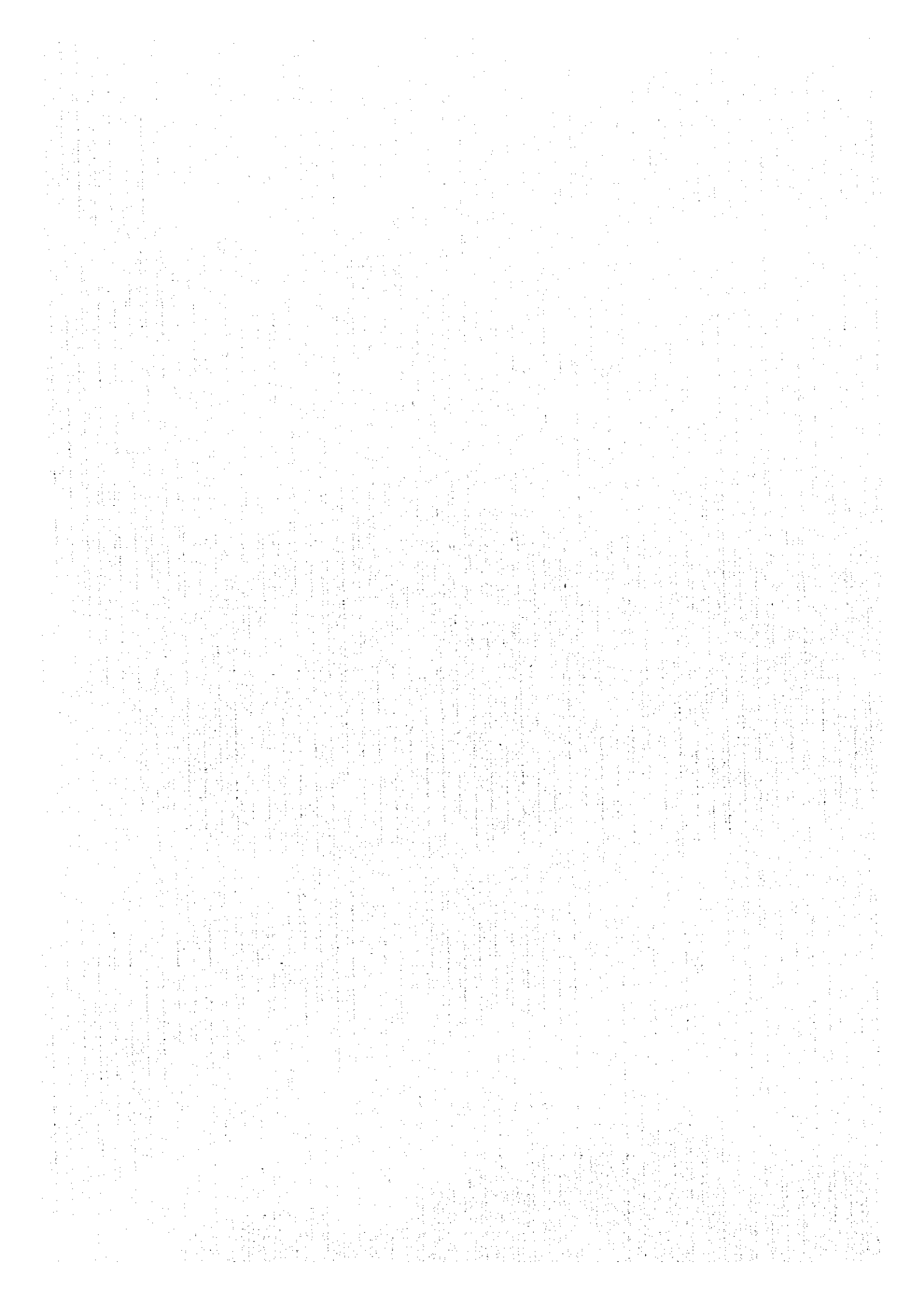
the price of that in Assab in countries on the opposite side of the Red Sea, it is thought that many fishing vessels land their fish and take on fuel in these countries. In order to promote locally based fisheries and encourage the local landing of fish, in addition to the development of fish markets and development of distribution routes, the setting of a special fuel price for fishing vessels will be necessary to raise the level of motivation of the local fishermen. This is required not only for the sake of the Project but also for the promotion of the coastal fisheries sector in the whole of Eritrea. It is desired that the MMR make arrangements with the related agencies and fuel companies and immediately ensure the realization of a cheap supply of fuel.

(5) Management and Running of Funds from the Sale of Fisheries Production Equipment

The fishing vessels, engines and fishing tackle, etc. to be introduced under the Project will be sold to the fishermen in the Project areas via the Assab fishing cooperatives and under the guidance and supervision of the MMR. In conducting the sale of the equipment, the MMR shall provide guidance to the cooperatives on the setting of suitable prices, repayment schedules and money retrieval methods, and the cooperatives shall make sure this is carried out without fail. The money from sales shall be used as a revolving fund and managed and run for the renewed procurement of engines and parts, etc. and the promotion of the coastal fisheries sector in general.

Appendices

- I. Member List of the Survey Team**
- II. Survey Schedule**
- III. List of Persons Concerned**
- IV. Minutes of Discussion**
- V. Natural Conditions for Designing**
- VI. Estimate of Operation Cost**
- VII. References**



I. Member List of the Study Team

(1) Team for Field Survey

Syunichiro Aono	Team Leader	Assistant Director of Policy Planning Div., Fisheries Policy Planning Dept. Fisheries Agency
Nobuhiko Hanazato	Coordinator	Second basic design study Div., Grant aid study & Design Dept. Japan International Cooperation Agency (JICA)
Yasuhide Koumoto	Technical Advisor	Chief of 2nd Section, Construction Div., Fishing Port Dept. Fisheries Agency
Kazumi Iida	Fisheries Development Planner (Chief Consultant)	Overseas Agro-Fisheries Consultants, Co., Ltd.
Masami Tsuchiya	Architect/Facility Planner	ditto
Kazumi Uetana	Port Civil Engineer	ditto
Akio Nagoshi	Environment Engineer/ Natural Conditions Surveyor	ditto
Takeaki Hoshino	Quantity Surveyor	ditto

(2) Team for Explanation of the draft final report

Shinichi Nakamura	Team Leader	International Cooperation Div., Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries
Satoru Watanabe	Coordinator	Third Regional Div., Planning Dept., International
Kazumi Iida	Fisheries Development Planner (Chief Consultant)	Overseas Agro-Fisheries Consultants, Co., Ltd.
Masami Tsuchiya	Architect/Facility Planner	ditto

II. Survey Schedule

(1) Field Survey Schedule

No.	Date	Activities
1	Aug. 6 (Sun)	Departure to Rome
2	7 (Mon)	Meeting with FAO, Rome
3	8 (Tue)	Meeting with Embassy of Japan and JICA office, Addis Ababa
4	9 (Wed)	Meeting with JICA office. Survey on marketing of fish in Addis Ababa
5	10 (Thu)	Addis Ababa to Asmara
6	11 (Fri)	Asmara to Assab. Survey in Assab. Visit to Dankalia Provincial office
7	12 (Sat)	Survey in Barasole and Ras Terma. Visit to Assab municipal office
8	13 (Sun)	Assab to Massawa
9	14 (Mon)	Meeting with Ministry of Marine Resources (MMR) Visiting MMR/FAO project facilities in Massawa
10	15 (Tue)	Meeting with MMR. Signing of the Minutes
11	16 (Wed)	Massawa to Asmara. Visit to Macro Policy and Ministry of Foreign Affairs
12	17 (Thu)	Meeting with MMR. Survey in Asmara (Official members left Asmara for Addis Ababa)
13	18 (Fri)	Visit to Ministry of Construction to Collect information Survey of marketing of fish in Asmara (Official members visited the Embassy of Japan/JICA office to report)
14	19 (Sat)	Survey in Asmara. Preparation of Site-survey
15	20 (Sun)	Asmara to Assab (Official members arrived at Tokyo)
16	21 (Mon)	Survey in Assab, visiting Assab municipal office and office of public works, electricity and water
17	22 (Tue)	Survey of project site and collection of data from MMR office and FAO Project office Site-survey
18	23 (Wed)	Meeting with Fishery Cooperatives and fishermen. Collection of data/estimates for construction work.
19	24 (Thu)	Survey on public facilities in project site with engineers of the Assab water/electricity office Collection of data/estimates for construction work
20	25 (Fri)	Visit to Assab port authority Collection of data/estimates for construction work
21	26 (Sat)	Survey of the project sites in Barasole and Ras Terma
22	27 (Sun)	Survey of the fishing villages in the south area
23	28 (Mon)	Hearing and collecting data/information on public works Collection of data/estimates for construction work
24	29 (Tue)	Hearing and collecting data/information from the Public works office Collection of data/estimates for construction work
25	30 (Wed)	Meeting with Fishery Cooperatives Collection of data/information from Port Authority and Shipping office
26	31 (Thu)	Survey on marketing fish in Assab Sampling of sea water and sea bottom soil (One consultant member left Assab for Japan through Addis Ababa)

No.	Date	Activities
27	Sep. 1 (Fri)	Site-survey in Assab project site
28	2 (Sat)	Site-survey in Assab project site (Three consultant members left Assab to Asmara)
29	3 (Sun)	One consultant member, facilities planner continued site-survey in Assab
30	4 (Mon)	Site-survey (Three consultant members left Asmara for Japan through Addis Ababa)
31	5 (Tue)	Site-survey, supervising local surveyors Collection of data/estimates from local constructors
32	6 (Wed)	ditto
33	7 (Thu)	ditto
34	8 (Fri)	ditto
35	9 (Sat)	Site-survey. Supervising local surveyors for boring survey
36	10 (Sun)	ditto
37	11 (Mon)	Site-survey. Supervising local surveyors for boring survey Collection of data/information from MMR and local constructors
38	12 (Tue)	ditto
39	13 (Wed)	ditto
40	14 (Thu)	ditto
41	15 (Fri)	Final meeting with MMR office, Assab
42	16 (Sat)	Left Assab for Addis Ababa
43	17 (Sun)	Addis Ababa to Frankfurt
44	18 (Mon)	Frankfurt to Tokyo
45	19 (Tue)	Arrived at Tokyo

(2) Explanation of Draft final report

No.	Date	Activities
1	Nov. 12 (Sun)	Tokyo → Frankfurt
2	13 (Mon)	Frankfurt → Asmara
3	14 (Tue)	Visited Macro Policy, Ministry of Foreign Affairs and Ministry of Marine Resources (MMR)
4	15 (Wed)	Asmara → Massawa, Explanation of the draft report and discussion with MMR
5	16 (Thu)	Discussion with MMR
6	17 (Fri)	Massawa → Asmara, Signing of the Minutes with MMR
7	18 (Sat)	Survey in Massawa and Asmara
8	19 (Sun)	Asmara → Addis Ababa
9	20 (Mon)	Reported the result to Embassy of Japan and JICA office, Addis Ababa
10	21 (Tue)	Visited Addis Ababa Fish Marketing Corporation and Ministry of Agriculture
11	22 (Wed)	Addis Ababa to Frankfurt
12	23 (Thu)	Left Frankfurt
13	24 (Fri)	Arrived at Tokyo

III. Persons interviewed by the survey team

Mr. Saleh Meky	Minister of Marine Resources
Mr. Kifle Woldeslassie	Head of Policy and Planning Division, Ministry of Marine Resources (MMR)
Mr. Yosief Kahsay	Head of Marine Development Division, MMR
Mr. Woldeab Fessahaye	Head of License and Enforcement Division, MMR
Ms. Lia Tesfai	Liaison Officer, MMR, Asmara
Mr. Tekeste Adhanons	Representative of MMR, Assab
Mr. Tesfaldet Yohanes	General service coordinator, MMR, Assab
Mr. Berhare Abrehe	Director, Macro Policy and International Economic Cooperation
Mr. Teame Tewldebrham	Head, International Economic Cooperation, Macro Policy
Mr. Ogbai Habtemicael	Director, Asia-Australia Division, Ministry of Foreign Affairs
Mr. Andom Kebedom	Head, Asia desk, Ministry of Foreign Affairs
Mr. Seyum Russon	Head, Contract Administration office, Ministry of Construction
Mr. Tesfamicael Sheriffo	Vice Governor of Dankalia Province
Mr. Osman Biluh	Mayor, Municipality of Assab
Mr. Mr. Yosef Kidane	Head, Technical Department, City council of Assab
Mr. Tareke	Water Supply Service, Assab
Mr. Ghebremichael	Water Supply Service, Assab
Mr. Samuel Barhawe	Eritrean Electric Authority, Assab
Mr. Mohamed Said Jasir	Port Master, Port Authority, Assab
Mr. Solomun	Port Engineer, Port Authority, Assab
Mr. Seiichi Etoh	Snr. Fisheries Development Advisor, FAO
Mr. Nico Oldenberg	Expert of fishing boat construction, Assab Project, FAO
Mr. Moug Tho	Expert of engines, Assab Project, FAO

Mr. Omer Kissim	Chairman of Assab Fishery Cooperatives
Mr. Moinul Islam	Cooperative and credit officer, UNDP/FAO Project, Massawa
Mr. Netsereab Tewolde	Cooperative and credit officer, UNDP/FAO Project, Massawa
Mr. Yamane Gebreጄlassie	Eritrean Marine Products Corporation, Asmara
.....	
Dr. Tamre Teka	General Manager, Addis Ababa Fish Production & Marketing Corporation
.....	
Dr. Yashuhisa Kato	Director, Fishery Policy and Planning Division, FAO.
Mr. Bonzon Alan	Fishery Planning Analyst, FAO
Mr. Teuluscher Frans	Fishery Industrial Officer (Processing), FAO
Mr. Turner Jeremy	Fishery Industrial Officer (Boat building), FAO
Mr. Seneviratne Ranjit	Project Operation Officer, FAO
.....	
Mr. Yasuhiro Hamada	Ambassador, Embassy of Japan in Ethiopia
Mr. Yoichi Sakai	Second Secretary, Embassy of Japan in Ethiopia
Mr. Hiroshi Matsutani	Resident Representative of JICA, JICA Ethiopia Office
Mr. Minoru Yoshimura	Assistant Resident Representative, JICA Ethiopia Office

IV. Minutes of Discussion

Minutes of Discussions
on
the Basic Design Study
on
the Artisanal Fisheries Development Project
in
the Southeast of Eritrea

In response to a request from the Government of Eritrea, the Government of Japan conducted a Preliminary Study on the Artisanal Fisheries Development Project in the Southeast of Eritrea (hereinafter referred to as "the Project") in March 1995. After the assessment of the data and information obtained through the study, the Government of Japan decided to conduct a Basic Design Study on the Project, and entrusted the study to the Japan International Cooperation Agency (JICA).


JICA sent to Eritrea a Basic Design Study Team headed by Mr. AONO Shunichiro, Assistant Director, Policy Planning Division, Fisheries Agency, which is scheduled to stay in the country from August 10 to September 15, 1995.


The team held a series of discussions with the concerned officials of the Government of Eritrea, and conducted a field survey at the study area.

As a result of discussions and field survey, both sides agreed to recommend the main items described in the attached sheets to the respective governments, and to make effort to realize the smooth implementation of the Project .

The Team will proceed to further works and prepare the Basic Design Report.

Massawa, August 15, 1995


AONO SHUNICHIRO
Leader
Basic Design Study Team
JICA


SALEH MEKY
Minister
Ministry of Marine Resources

ATTACHMENT

1. OBJECTIVE

The objective of the Project is to enhance production and marketing capacity of the artisanal fisheries in the southeastern coast of Eritrea by constructing onshore facilities and providing relevant equipment, hence to contribute to socio-economic development of the Project area.

2. PROJECT IMPLEMENTING AGENCY

Ministry of Marine Resources (MMR)

MMR shall be fully responsible for management and operation of the project.

3. PROJECT SITE

The proposed sites of the Project are located in the southeastern coast which are shown in Annex-1(a) and Annex-1(b).

1) Fishing port in Assab

The project site for the fishing port is located adjacent to the MMR complex in Assab.

2) Satellite stations

The project sites for the satellite stations are located in the following two (2) villages; Barasole and Ras Terma of Denkalia Province, along the southeast coast of Eritrea.

3) Equipment Supply

It is the fishing villages southward from Barasole up to boundary line of the Republic of Djibouti along the coastline of Eritrea, where such equipment as fishing gears will be supplied to fishermen.

4. MAJOR ITEMS REQUESTED BY THE ERITREAN SIDE

As a result of the series of discussions, the items listed in Annex-2 are requested by the Eritrean side.

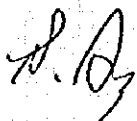
However, the final component of the Project will be decided after further studies.

5. JAPANESE GRANT AID PROGRAM

The Eritrean side has understood the system of Japanese Grant Aid Program explained in Annex-3.

6. NECESSARY MEASURES TO BE TAKEN BY THE ERITREAN SIDE

The Eritrean side will take necessary measures described in Annex-4 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.



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7. COUNTERPART FUND

In case the fishing equipment provided under the Japanese Grant Aid are sold or leased to the fishermen, the Government of Eritrea shall take necessary measures as follows:

- 1) to inform the Government of Japan of the selling & leasing schedule of such equipment;
- 2) to ensure that such equipment be used by the fishermen properly and effectively for their own fishing operation;
- 3) to deposit, in local currency, the amount generated from such sale and lease in a suitable account of the Government of Eritrea as a counterpart fund;
- 4) to utilize the counterpart fund for the purpose of the fisheries development in Eritrea or maintenance of such equipment; and
- 5) to report to the Government of Japan on the use and balance of the counterpart fund.

8. OPERATION AND MAINTENANCE

The plan for the management / function of the fisheries cooperatives is shown in Annex-5.

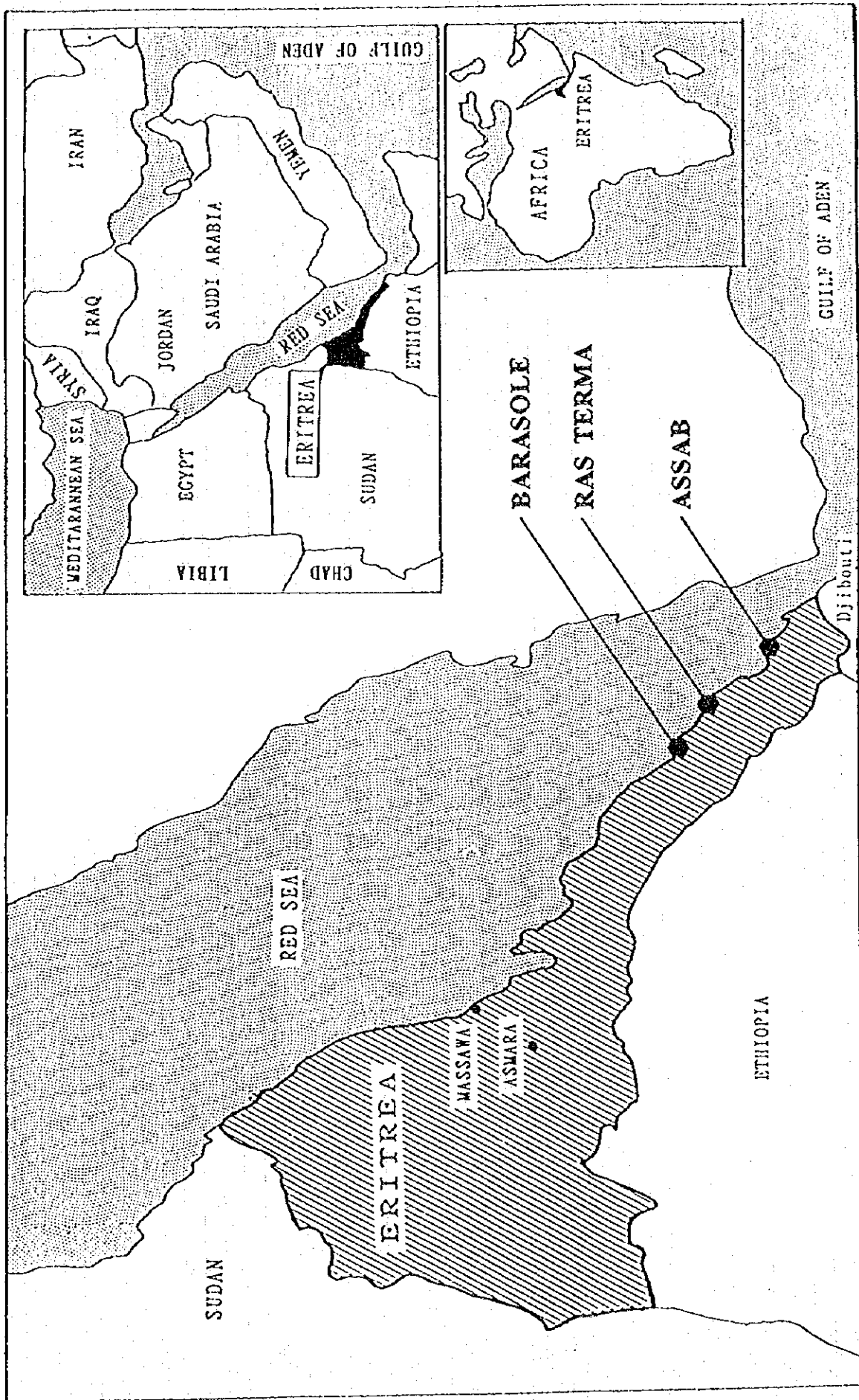
MMR will provide sufficient funds to support the fishing cooperatives in operation and maintenance of the project facilities / equipment until they can generate their own funds.

9. FURTHER SCHEDULE OF THE STUDY

- 1) The team will proceed to further studies in Eritrea until September 15, 1995.
- 2) Based on the results, JICA will prepare a Draft Basic Design and dispatch a team in the end of October 1995 in order to explain and confirm the contents.
- 3) Upon acceptance of the Draft Basic Design by the Eritrean side, JICA will complete the Basic Design Report and forward it to the Eritrean side by January 1996.

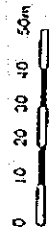
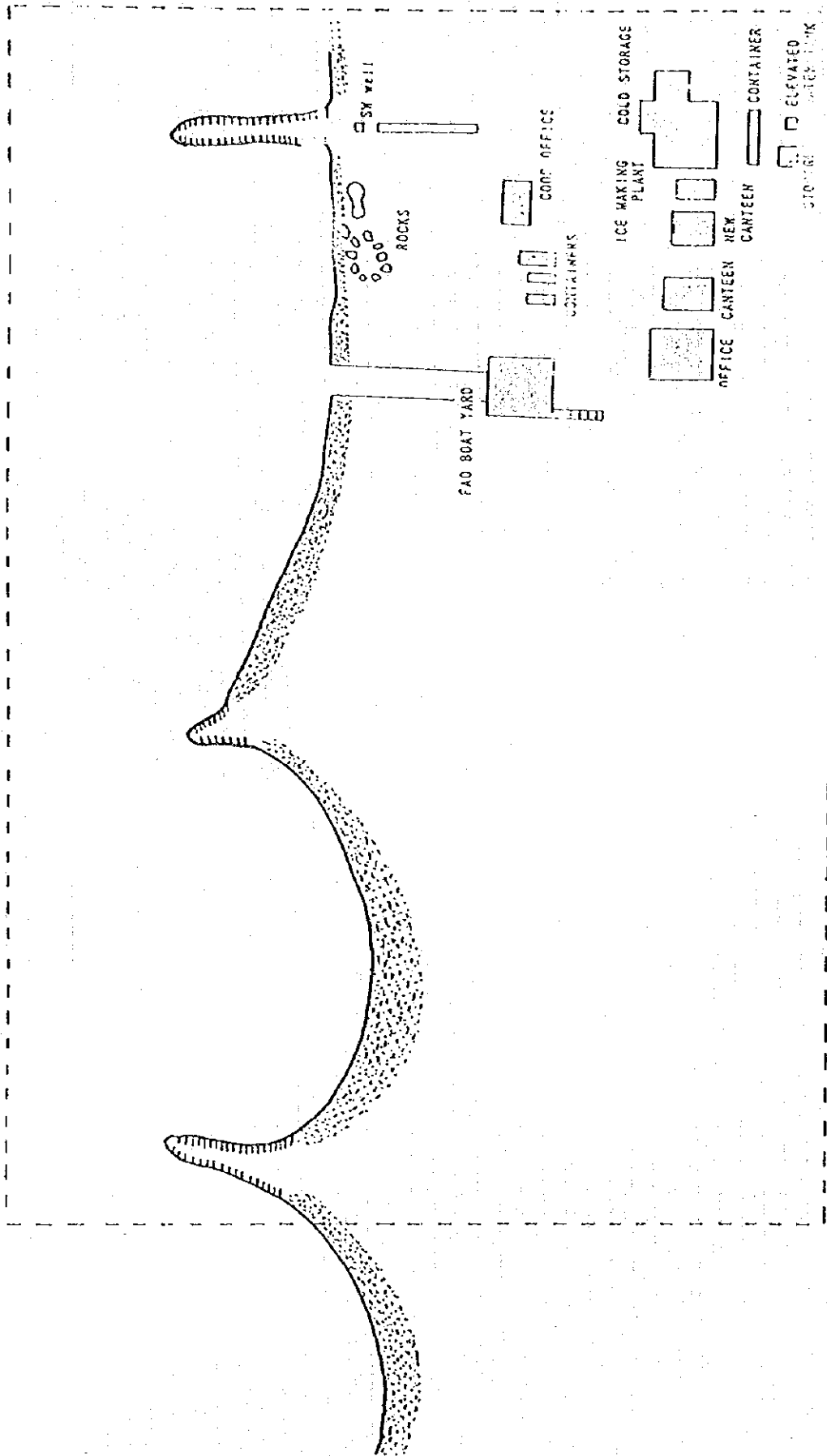
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LOCATION OF THE PROJECT SITE
(Assab site)

Annex-1(b)



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MAJOR ITEMS REQUESTED BY THE ERITREAN SIDE

The major items requested by the Government of Eritrea.

A. Facilities Construction

1) Fishing harbor in Assab

Following facilities are requested to be constructed adjacent to the MMR complex in Assab.

Jetty, Causeway, Breakwater, Slipway
 Fish market shed
 Refrigeration complex (Ice plant, Fish storage, Freezer)
 Engine repair shop
 Fuel and water supply system
 Fishing gear storage, Administration office, Cooperative office
 Fishermen's locker

2) Fishing village facilities

Following facilities are requested to be constructed in the two fishing villages, Barasole and Ras Terma. As Assab becomes the center of the fish collection, those fishing villages play the role of satellite stations.

(a) Barasole

Storage chilled by ice with office
 Jetty
 Water supply system (Truck, water tanks, etc.)
 Fuel depot

(b) Ras Terma

Storage chilled by ice
 Water storage
 Fuel depot

B. Equipment supply

1) Assab fish harbor complex

For transportation and marketing of fish, the following equipment is requested to be provided for the Assab fisheries complex and be operated by MMR and the fishermen's cooperative.

Refrigerated truck:	10ton (Number will be determined after the study)
Insulated truck:	2.5ton (Number will be determined after the study)
Marketing equipment:	Scale, cart, office equipment, etc.
Fish or Insulated fish box:	1 lot
Service car:	4WD, double cab
Service truck:	Heavy duty type, 6ton with crane

2) Equipment for Fishermen's Cooperative

The following equipment is requested to be supplied for the fishermen in the Project area. The equipment will be sold to the fishermen through the cooperatives. A revolving fund will be established with the sales money paid by the fishermen and will be utilized for the purpose of the fisheries development in Eritrea or maintenance of the equipment.

Fishing boat:	FRP, inboard engine, Approx. 10m long, 30 nos.
Engine:	Outboard engine 110 nos. Inboard engine 10 nos.
Spare parts for engine:	Inboard and outboard
Work shop tools:	1 unit
Fishing gear:	Nets, twine, line, rope
Mobile workshop:	1 unit (Trailer type)
Radio equipment:	2 unit (for Ras Terna and Barasole station)

JAPANESE GRANT AID PROGRAM

3. Japan's Grant Aid

3-1 Japan's Grant Aid System

(1) Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

Application Study	(Request made by a recipient country) (Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of	(The Notes exchanged between the Governments Implementation of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

(2) Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereafter referred to as "the Study"), conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

a) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.

b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.

c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

d) Preparation of a basic design of the Project

c) Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA select (a) firms(s) based on proposals submitted by interested consulting firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA. The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

(3) Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed. However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However the prime contractors, namely, consulting constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means

persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of the Recipient Country

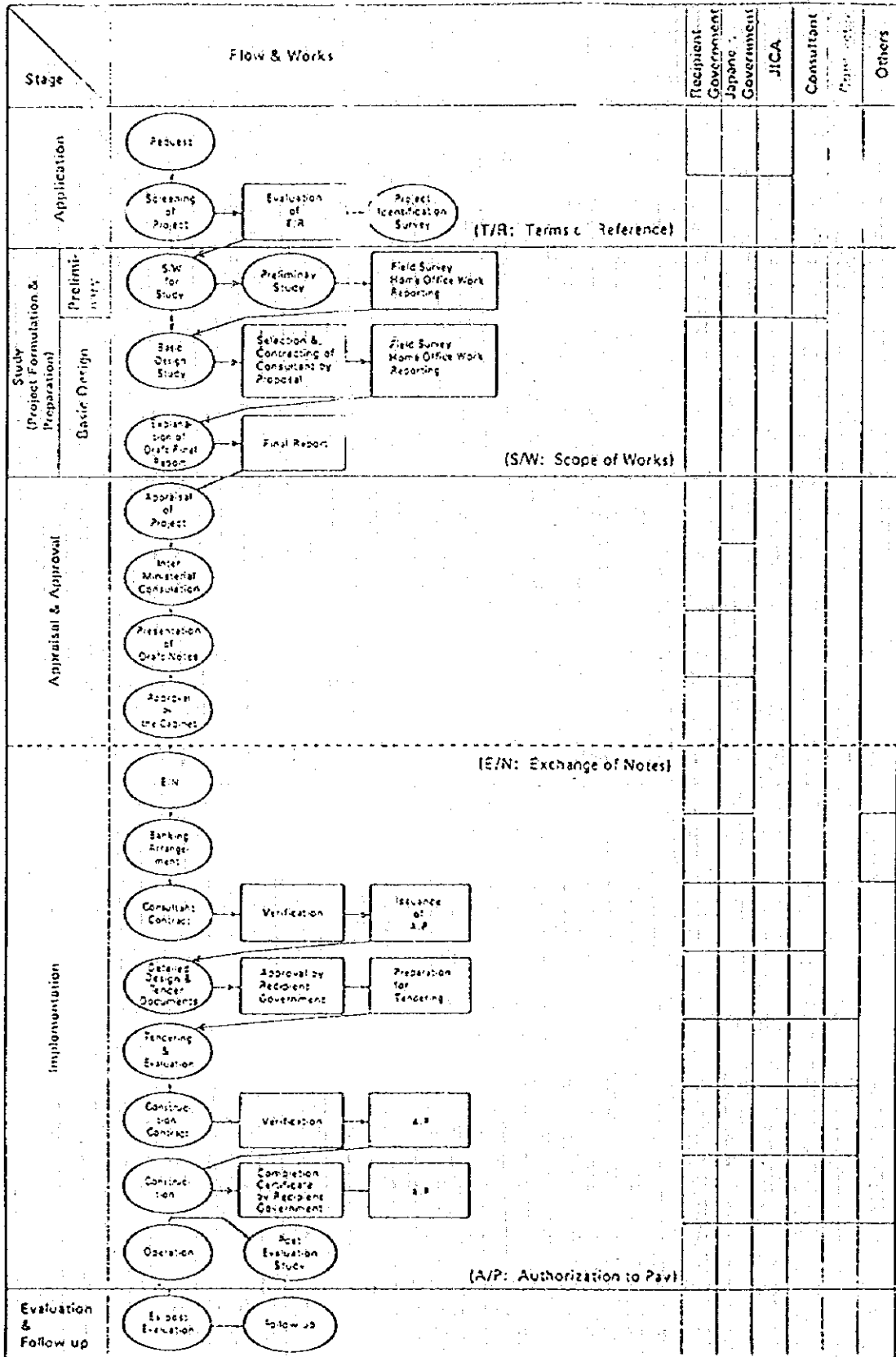
In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- (7) "Proper Use" The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- (8) "Re-export" The products purchased under the Grant Aid should not be re-exported from the recipient country.
- (9) Banking Arrangements (B/A)
 - a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
 - b) The payments will be made when payment requests are presented by the bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

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3-2 Grant Aid Procedure



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NECESSARY MEASURES TO BE TAKEN BY THE ERITREAN SIDE

Following necessary measures should be taken by the Eritrean side on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land necessary for the excursion of the Project, such as the land for construction, temporary officials, working areas, storage yards and others.
3. To clear the sites prior to the commencement of the construction.
4. To provide on site power supply, water supply and other facilities necessary for the execution of the Project before the commencement of construction work.
5. To demolish existing structure according to the construction schedule which will be provided in the later stage .
6. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission.
7. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Eritrea and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
8. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Eritrea with respect to the supply of the products and services under the verified contracts.
9. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into Eritrea and stay therein for the performance of their work.
10. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
11. To maintain and use properly and effectively the facilities and equipment provided under the Project.
12. To coordinate and solve any issues related to the project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

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Annex 5

MINISTRY OF MARINE RESOURCES

Co-operative institution development programme

1. Co-operative Institution Development:

Under technical assistance of the Semhar Fisheries Rehabilitation Project (supported by the UNCDF and UNDP with FAO as cooperating agency and executed by the Ministry of Marine Resources of GOE), efforts are continued to organize artisanal fishermen operating in Semhar and Dankalia coastal regions. The objective as committed by the project is to set up institutional arrangements for extending credit and input services required by the artisanal fishing industries and also to sustain such facilities for supporting local fishing endeavours in the long run.

So far, 14 primary cooperative societies has been organized covering 23 fishing villages in Dahlak islands and along the coastline of Massawa. These primary cooperatives are federated into a secondary cooperative namely the Semhar Fishery Co-operative Society which has been functioning since December 7, 1993.

The membership of the co-operative organization is 417 being registered in the primaries and has a capital of Birr 40,000 (contributed by members in the form of savings/ shares and the process is continued) by now.

The secondary co-operative is managed by a Board of Directors (Managing Committee) which has representation by each of the primary cooperative societies.

The organization of the cooperative institution consists of three functional units :

Co-operative Administration: staffed by an Executive officer, (Co-operative and Credit Officer) to manage overall operations of the cooperative institution.

Finance and Credit unit: staffed by an Accountant and two Cashiers to deal with all financial operation including credit.

Technical Services Unit: staffed by an Administrative Officer (to be recruited) to manage operations of ice plants, cold storage, fuel station and landing jetty.

The staff members in the respective fields are trained by the Technical Assistance (Co-operative & Credit) of the project.

A similar co-operative and credit extension programme has been

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implemented in Assab area in which a secondary co-operative namely the Dankalia Fishery Co-operative Society was established (on November 2, 1994) with 7 primaries covering 11 fishing villages in dankalia region. Total membership is 316 and the society has a capital of Br 6,650 contributed by members.

2. Credit Extension

The project has started implementing a credit extension-scheme in June 1994 which involved an investment plan financed by UNCDF (United Nations Capital Development Fund) of about US\$ 800,000 (excluding MMR inputs which includes fishing gear, FRP fishing boats and outboard motors supplied to co-operative for distribution to members under credit arrangements) to procure necessary fishing inputs and distribute these inputs to fisherman members in credit through the co-operative institution.

Under technical guidance of the project, the following credit lines has been instituted in the co-operation organization.

- Short-term Credit (6-12 months) for small scale investments on fishing business and other income generating activities.
Maximum credit Bir 10,000
Minimum credit Bir 2,500
- Medium-term credit (15-35 months) for investments on fishing inputs and equipments (Boat, net, outboard motors, etc.)
Maximum credit: Bir 50,000
- Long-term credit (40-60 months) for investments in fishing input and equipments (large fishing boats, inboard engines, and outboard engines).
Maximum credit: Bir 200,000

A flexible credit modality has been adopted to encourage (to make access) fisherman members in order to participate in the credit extension programme. Precisely, the norms and conditions of the credit extension programme are:

Eligibility:

Eligibility for applying for loans will rest on the following criteria.

- To be a member of the co-operative society.
- To be a permanent resident of the village.
- To be a citizen of Eritrea.
- To be professionally and financially competent for use as well as repayment of the loan.

Loan proposals:

Loan applications are filed by the members through their respective primary co-operative managing committees (credit committees) and are finally processed at the secondary co-operative society credit committee.

Scrutiny and appraisal of loan application:

The managing committee of the primary cooperatives are responsible for scrutiny and appraisal of the loan application at the preliminary stage of processing.

Based on the recommendations made by primary cooperative managing committees, the secondary co-operative makes final appraisal in order to approve or reject loan applications.

Security and collateral requirements:

While recommending the loan application, the management of the primary cooperative stands guarantor for the loanee member.

In addition, the applicant will provide one personal guarantor for the loan from his village.

No physical security of tangible assets are required but the asset(s) provided by loan serves as security.

Down payments.

Three months advance payment of loan instalments for a loan is encouraged but it is optional depending on the financial capacity of individual loanee member.

Service charges

A 7% p.a. service charge is charged on loans.

Repayment and recovery.

Repayment schedule of loan is determined according to amount of loan approved and as per credit line in which the loan is to be disbursed.

However, the repayments which include principal and service charges are equalized into monthly instalments. The loanee members are required to pay instalments every month.

Loan is collected through the primary co-operatives (Secretary of primary co-operative) and also the field extension worker based in the fishing villages are responsible to recover and collect loan monies from the members.

Arrears control:

For consecutive default of loan repayments up to two months, the loanee member as well as the primary co-operative managing committee is kept informed through notices served by the secondary co-operative.

In case of default for three consecutive months (unless there are genuine problems of marketing, catch or break-downs) the secondary co-operative will repossess the assets provided by loans.

Refinancing:

In case of genuine loss of assets or major break-downs, the

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secondary society considers refinancing to the loanee by rescheduling the loan repayment period.

The institutional credit scheme which is a new concept to local fishing communities is accepted in general by the fishermen members. The programme is increasingly becoming popular as more members are attracted by its services. Even the poorest section (who are not capable to provide any physical security for formal institutional credit) of the local fishing communities are beneficiaries from the credit extension programme.

The programme so far, has achieved to disburse about Birr 1.2 million to co-operative members as loan (in kind which includes fishing boats, fishing gears, outboard motors, rope, lead sinker, float, ice boxes and mending twines).

The recovery of loan (according to evaluation of December 1994) was 92%.

The problem which tends to affect repayment of loans is mostly marketing of fish in the domestic markets while other related problems such as loss of assets or mechanical break-down of equipments are insignificant.

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On

Minutes of Discussions
on
the Basic Design Study
on
the Artisanal Fisheries Development Project
in
the Southeast of Eritrea
(Explanation on the Draft Basic Design)

In August 1995, the Japan International Cooperation Agency (JICA) dispatched the Basic design Study Team on the Artisanal Fisheries Development Project in the Southeast of Eritrea (hereinafter referred to as "the Project") to the States of Eritrea. After the assessment of the data and information obtained through the study, JICA has prepared the Draft Basic Design on the Project.

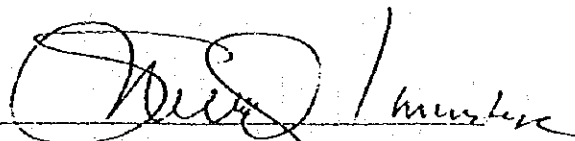
In order to explain and consult the Government of the States of Eritrea on the components of the Draft Basic Design, JICA sent to the States of Eritrea a Study Team headed by Mr. Shinichi NAKAMURA, office of the Overseas Fisheries Cooperation, Fisheries Agency, which is scheduled to stay in the country from November 14 to 19, 1995.

As a result of discussions, both sides agreed to recommend the main items described in the attached sheets to the respective governments, and to make effort to realize the smooth implementation of the Project.

Asmara, November 17, 1995

中村 慎

SHINICHI NAKAMURA
Leader
Basic Design Study Team
JICA



SALEH MEKY
Minister
Ministry of Marine Resources

ATTACHMENT

1. OBJECTIVE

The objective of the Project is to enhance production and marketing capacity of the artisanal fisheries in the southeastern coast of Eritrea by constructing onshore facilities and providing relevant equipment, hence to contribute to socio-economic development of the Project area.

2. PROJECT IMPLEMENTING AGENCY

Ministry of Marine Resources (MMR)

3. PROJECT SITE

The proposed sites of the Project are located in the southeastern coast which are shown in Annex-1.

4. DRAFT BASIC DESIGN

The Eritrean side has in principal agreed to the components of the Draft Basic Design proposed by the Team, with some changes agreed during the meetings. These amendments are shown in Annex-2, and will be incorporated in the Basic Design.

5. JAPANESE GRANT AID PROGRAMME

The Eritrean side has understood the system of Japanese Grant Aid Programme explained in Annex-3.

6. NECESSARY MEASURES TO BE TAKEN BY THE ERITREAN SIDE

The Eritrean side will take necessary measures described in Annex-4 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

7. COUNTERPART FUND

In case the fishing equipment provided under the Japanese Grant Aid are sold or leased to the fishermen, the Government of Eritrea shall take necessary measures as follows:

- 1) to inform the Government of Japan of the selling & leasing schedule of such equipment:
- 2) to ensure that such equipment be used by the fishermen properly and effectively for their own fishing operation:

- 3) to deposit, in local currency, the amount generated from such sale and lease in a suitable account of the Government of Eritrea as a counterpart fund:
- 4) to utilize the counterpart fund for the purpose of the fisheries development in Eritrea or maintenance of such equipment: and
- 5) to report to the Government of Japan on the use and balance of the counterpart fund.

7. OPERATION AND MAINTENANCE

Operation/management of the Project is carried out as mentioned in Annex-5.

8. DEVELOPMENT OF OVERSEAS MARKET

The Eritrean side will develop and establish marketing channels to Ethiopia and the other foreign countries in cooperation with public and private sectors until the completion of the Project.

9. ALLOCATION OF BUDGET AND PERSONNEL

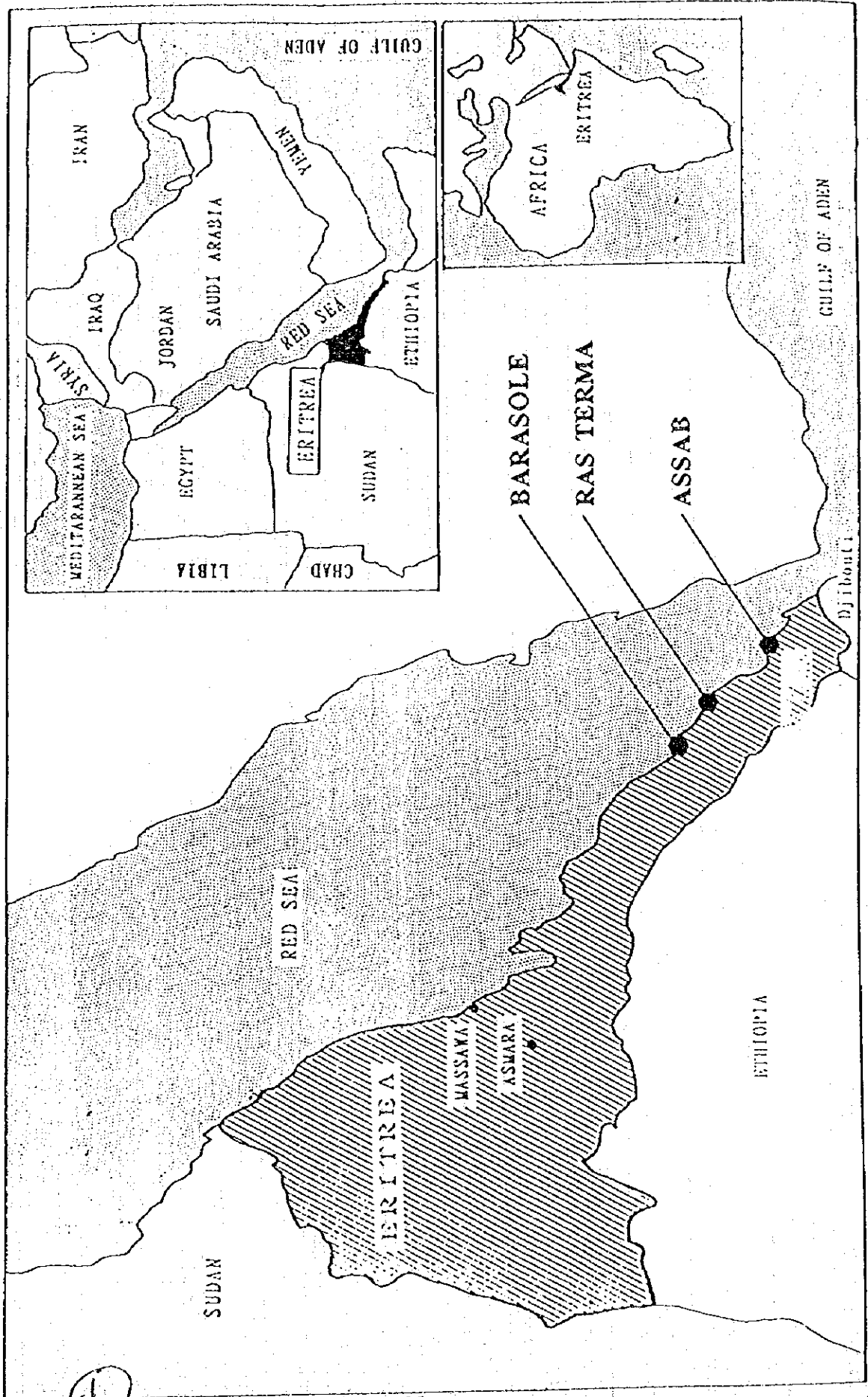
The Eritrean side will allocate the necessary budget and personnel for execution of the Project.

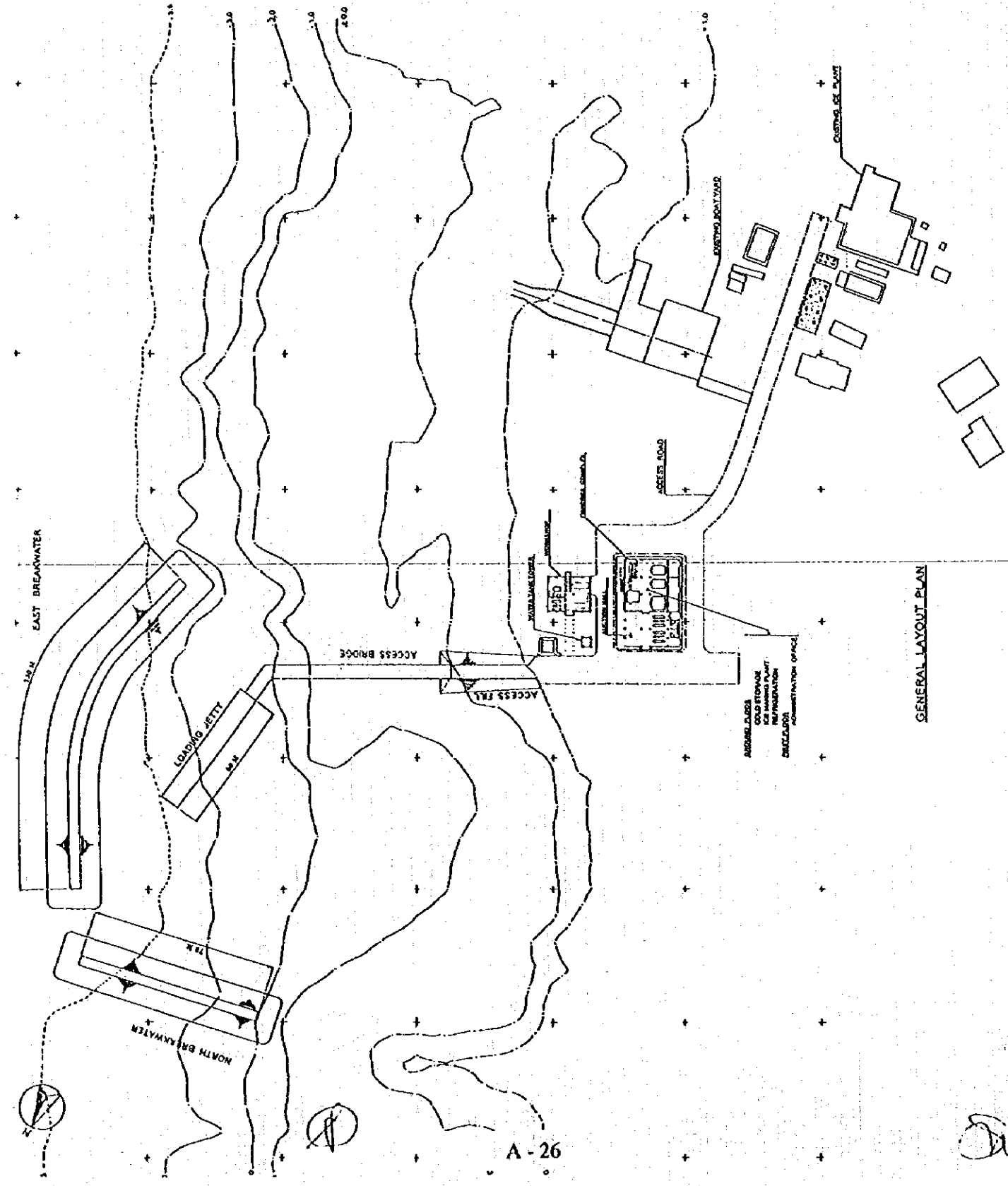
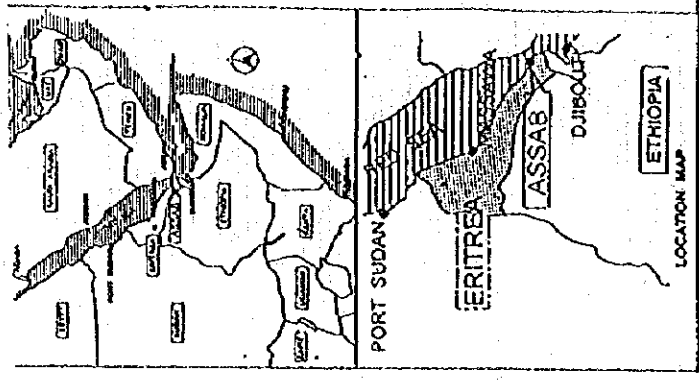
10. FURTHER SCHEDULE OF THE STUDY

JICA will complete the Basic Design Report and forward it to the Eritrean side by January 1996.

(SP)

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AMENDMENTS OF DRAFT BASIC DESIGN

1. Ras Terma Fishery Station

A building is to be provided for the station, instead of a tent.



JAPANESE GRANT AID PROGRAM

3. Japan's Grant Aid

3-1 Japan's Grant Aid System

(1) Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

Application Study	(Request made by a recipient country) (Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

(2) Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereafter referred to as "the Study"), conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

a) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.

b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.

c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

- d) Preparation of a basic design of the Project
- e) Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA select (a) firms(s) based on proposals submitted by interested consulting firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA. The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

(3) Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

- 3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed. However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.
- 4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However the prime contractors, namely, consulting constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means

persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

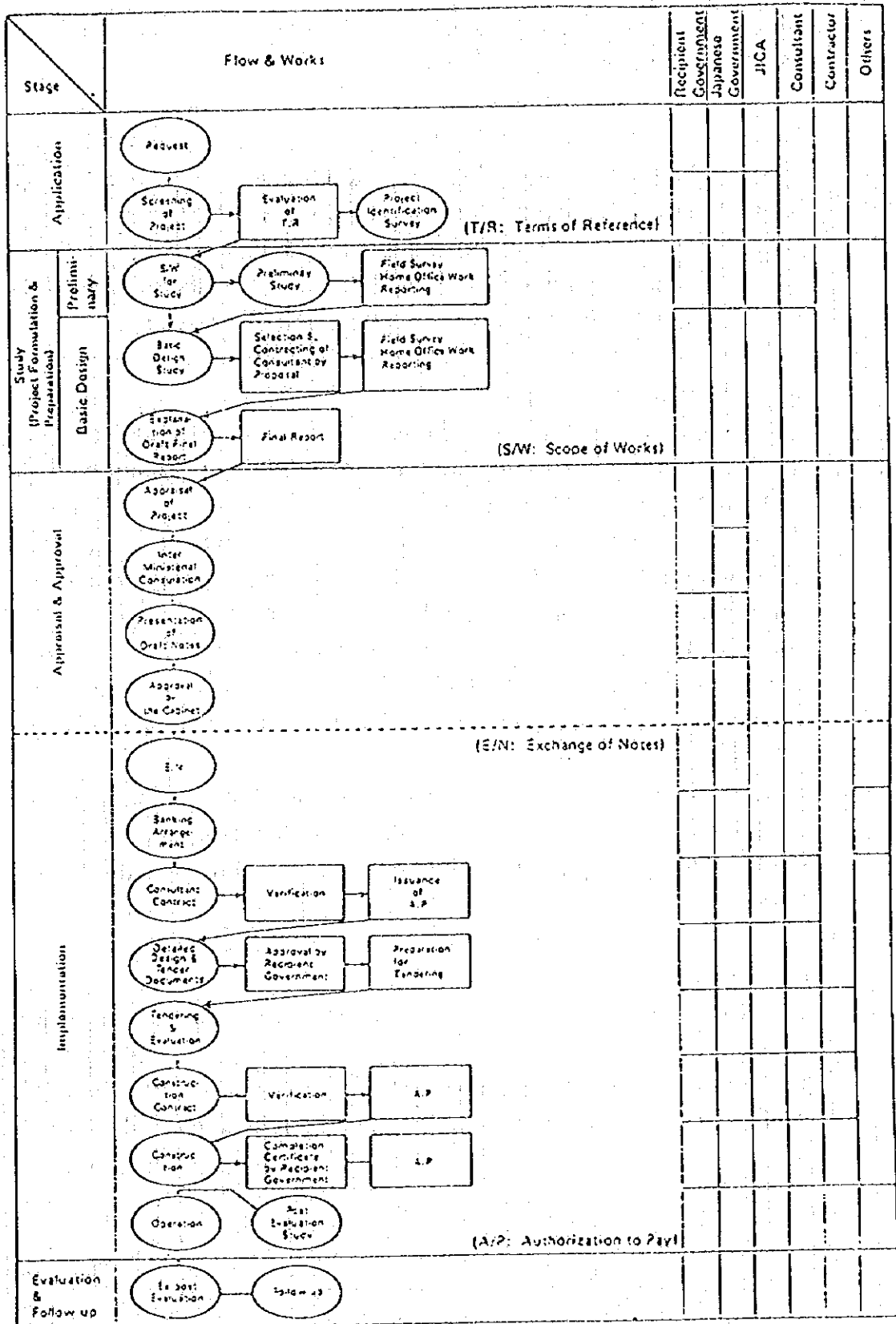
6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- (7) "Proper Use" The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- (8) "Re-export" The products purchased under the Grant Aid should not be re-exported from the recipient country.
- (9) Banking Arrangements (B/A)
 - a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
 - b) The payments will be made when payment requests are presented by the bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.



3-2 Grant Aid Procedure

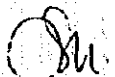


9

NECESSARY MEASURES TO BE TAKEN BY THE ERITREAN SIDE

Following necessary measures should be taken by the Eritrean side on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land necessary for the execution of the Project, such as the land for construction, temporary offices, working areas, storage yards and others.
3. To clear the sites prior to the commencement of the construction.
4. To provide on site power supply, water supply and other facilities necessary for the execution of the Project before the commencement of construction work.
5. To demolish existing structure according to the construction schedule which will be provided in the later stage.
6. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission.
7. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Eritrea and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
8. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Eritrea with respect to the supply of the products and services under the verified contracts.
9. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into Eritrea and stay therein for the performance of their work.
10. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
11. To maintain and use properly and effectively the facilities and equipment provided under the Project.
12. To coordinate and solve any issues related to the project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.



OPERATION AND MAINTENANCE

MMR shall operate, manage and maintain the Project facilities/equipment, providing necessary personnel until the Fishery Cooperatives will become capable enough to manage the facilities. Once the Fishery Cooperatives has enough capability, MMR would transfer the operation and management to the Fishery Cooperatives gradually. The following staff are required to manage the Project.

Manager	(1)
Head, production	(1)
Head, marketing	(1)
Accountant	(1)
Refrigeration engineer	(1)
Head, plant worker	(1)
Workers	(6 to 8)
Mechanic	(2)
Driver	(3)
Staff for Barasole and Ras Terma station	

The Project management unit will carry out the following functions.

- : To facilitate marketing of fish (buying, collecting, transporting fish from the fishermen and marketing)
- : To support the fishermen for their fishing activities (supplying of necessary materials for fishing boats)
- : To manage credit system and credit funds

MMR will form a project advisory body consisting of the following members

- 1) MMR (chair person)
- 2) Representative of UNDP/UNDCF/FAO Project
- 3) Representative of JICA
- 4) Representative of Assab Fisheries Cooperatives
- 5) Municipality of Assab
- 6) Provincial administration
- 7) Provincial council

The Advisory body will meet once a year to discuss on policy matters concerning the project management.

V. Natural Conditions for Designing

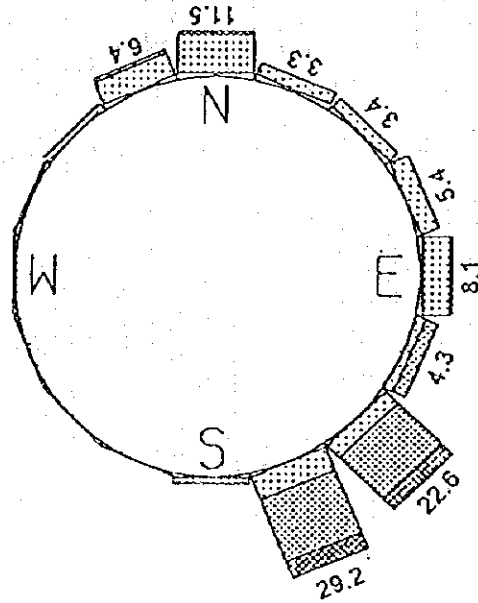
V-1 Frequency of Wind by Direction/Velocity

Frequency of wind by direction / velocity in Assab.
wind data from Assab meteorological station(1990.8 ~ 1995.7).

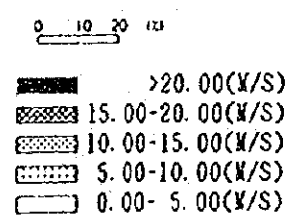
Unit: days

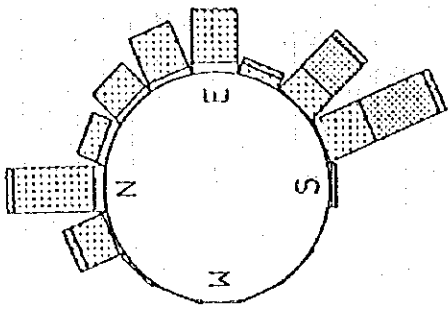
Speed m/s Cal m	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	cal m	BYAR	IYAR	Total	%	Total %	Speed
0.1-1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	2	2	0.60	0.60	0
1.1-2.0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.00	0.60	1.0
2.1-3.0	4	3	2	2	2	0	1	1	0	0	0	0	0	0	0	0	0	2	0	3	0.11	0.71	2.0
3.1-4.0	9	7	7	8	11	0	2	4	2	0	0	0	0	0	0	0	0	15	3	6	0.82	1.53	3.0
4.1-5.0	34	14	15	22	31	2	1	6	0	0	0	0	0	0	0	0	0	186	27	44	7.45	11.94	5.0
5.1-6.0	64	18	14	27	31	3	9	14	0	0	0	0	0	0	0	0	0	215	43	87	11.77	23.71	6.0
6.1-7.0	38	6	12	27	28	9	11	19	1	0	0	0	0	0	0	0	0	184	37	123	10.08	33.79	7.0
7.1-8.0	32	10	8	10	24	9	33	43	6	1	0	0	0	0	0	0	0	217	43	167	11.88	45.67	8.0
8.1-9.0	12	1	2	1	8	6	25	40	2	0	0	0	0	0	0	0	0	108	22	188	5.91	51.59	9.0
9.1-10.0	11	0	0	1	9	14	50	65	3	0	0	0	0	0	0	0	0	170	34	222	9.31	60.90	10.0
10.1-11.0	2	0	1	0	1	7	29	37	2	0	0	0	0	0	0	0	0	82	16	239	4.49	65.39	11.0
11.1-12.0	2	1	0	1	2	14	76	88	4	0	0	0	0	0	0	0	0	188	40	278	10.84	76.23	12.0
12.1-13.0	1	0	0	1	0	8	48	65	3	0	0	0	0	0	0	0	0	126	25	304	6.90	83.13	13.0
13.1-14.0	1	0	0	0	0	4	61	69	7	0	0	0	0	0	0	0	0	143	29	332	7.83	90.96	14.0
14.1-15.0	0	0	0	0	0	4	33	31	3	0	0	0	0	0	0	0	0	71	14	346	3.89	94.85	15.0
15.1-16.0	0	0	0	0	0	1	23	25	2	0	0	0	0	0	0	0	0	51	10	357	2.79	97.65	16.0
16.1-17.0	0	0	0	0	0	0	5	15	1	0	0	0	0	0	0	0	0	21	4	361	1.15	98.80	17.0
17.1-18.0	0	0	0	0	0	1	5	9	1	0	0	0	0	0	0	0	0	16	3	364	0.88	99.67	18.0
18.1-19.0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3	1	365	0.16	99.84	19.0
19.1-20.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	365	0.11	99.95	20.0
20.1-21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	365	0.05	100.00	21.0
SUM	210	60	62	98	148	79	413	533	40	1	2	6	9	14	23	117	11	1826	365		100		
%	11.50	3.29	3.40	5.37	8.11	4.33	22.62	29.19	2.19	0.05	0.11	0.33	0.49	0.77	1.26	6.41	0.60						
0.1~12.0m	208	60	62	97	146	64	237	317	20	1	2	6	9	14	23	115	0	1381					
%	11.39	3.29	3.40	5.31	8.00	3.50	12.98	17.36	1.10	0.05	0.11	0.33	0.49	0.77	1.26	6.30							
Ave./yr.	42	12	12	19	29	13	47	63	4	0	0	1	2	3	5	23		275					

V-2 Wind chart

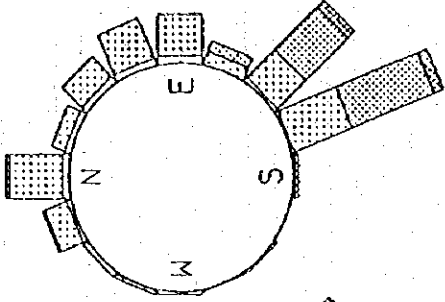


Wind velocity and direction at Assab
(in August 1990 ~ July 1995)

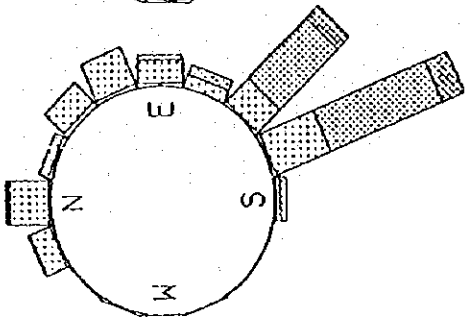




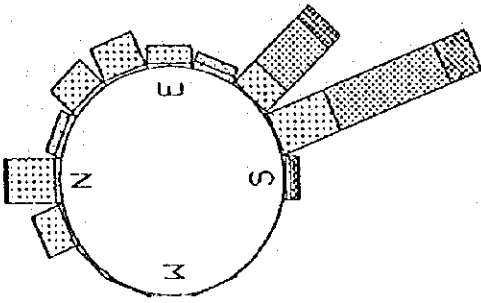
June



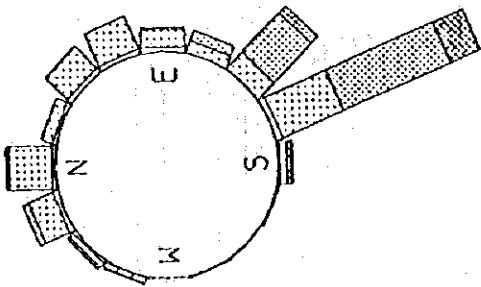
May



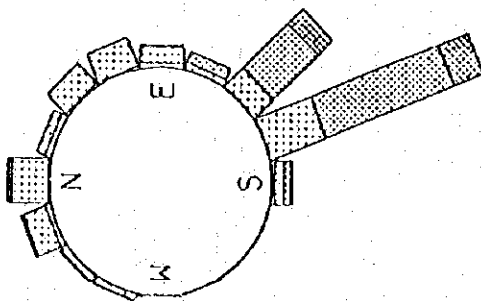
April



March

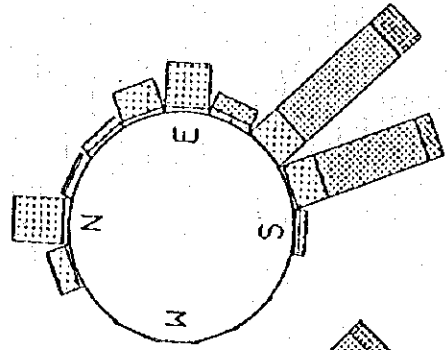


February

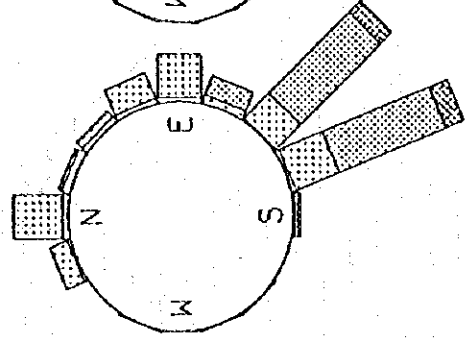


January

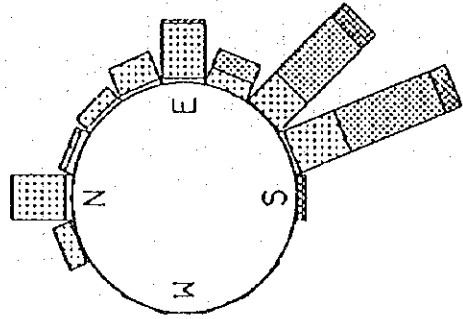
December



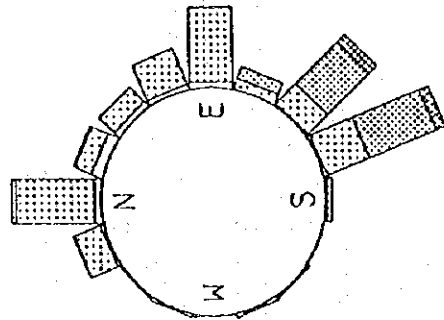
November



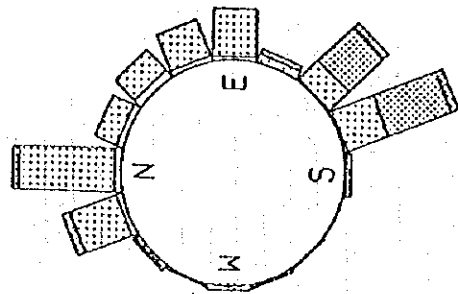
October



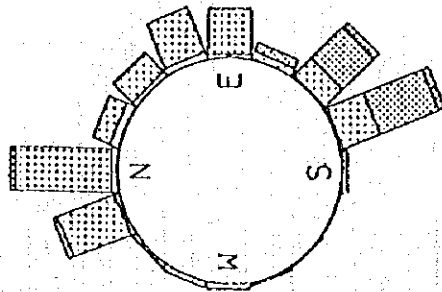
September



August



July



Winds by month (1990 ~ 1995)

V-3 Frequency of Deep water wave by Direction/Height

Frequency of deep water wave by direction/height of Assab
calculated by SMB method based on wind data. (1990.8 ~ 1995.7)

Unit: days

Fetch /km Wave /m	Unit: days																SVAR (VAR total)	%	Total% WAVE						
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW									
0	176	128	82	63	48	33	19	10	10	10	10	10	10	10	10	10	11	2	2	0.60	0.60	0.0			
0.1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11	0.11	0.1		
0.1<0.2	4	3	2	2	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	15	3	5	0.82	1.53	0.2
0.2<0.3	0	0	0	0	0	0	0	2	10	2	1	1	1	1	1	1	1	1	1	17	3	9	0.93	2.46	0.3
0.3<0.4	9	7	7	6	11	0	1	14	1	1	1	1	1	1	1	1	1	1	1	65	13	22	3.56	6.02	0.4
0.4<0.5	34	14	15	22	31	2	9	62	7	1	1	1	1	1	1	1	1	1	1	215	43	65	11.77	17.80	0.5
0.5<0.6	64	18	14	27	31	3	11	40	2	1	1	1	1	1	1	1	1	1	1	243	49	113	13.31	31.11	0.6
0.6<0.7	0	0	0	0	0	0	9	33	65	3	1	1	1	1	1	1	1	1	1	118	24	137	6.46	37.57	0.7
0.7<0.8	38	6	12	27	28	9	25	125	6	1	1	1	1	1	1	1	1	1	1	307	61	198	16.81	54.38	0.8
0.8<0.9	0	0	0	0	24	0	50	65	3	1	1	1	1	1	1	1	1	1	1	142	28	227	7.78	62.16	0.9
0.9<1.0	32	10	8	10	0	6	29	69	7	1	1	1	1	1	1	1	1	1	1	206	41	268	11.28	73.44	1.0
1.0<1.1	0	0	0	0	8	14	76	66	5	1	1	1	1	1	1	1	1	1	1	159	32	300	8.71	82.15	1.1
1.1<1.2	12	1	2	1	3	7	48	15	1	1	1	1	1	1	1	1	1	1	1	105	21	321	5.75	87.90	1.2
1.2<1.3	0	0	0	1	0	14	61	11	1	1	1	1	1	1	1	1	1	1	1	88	18	338	4.82	92.72	1.3
1.3<1.4	11	0	0	0	1	0	33	0	1	1	1	1	1	1	1	1	1	1	1	56	11	350	3.07	95.78	1.4
1.4<1.5	0	0	0	0	2	8	23	0	2	1	1	1	1	1	1	1	1	1	1	35	7	357	1.92	97.70	1.5
1.5<1.6	2	0	1	0	0	4	5	0	0	1	1	1	1	1	1	1	1	1	1	14	3	359	0.77	98.47	1.6
1.6<1.7	0	0	0	1	0	0	5	0	0	1	1	1	1	1	1	1	1	1	1	6	1	361	0.33	98.80	1.7
1.7<1.8	2	1	0	0	0	2	0	0	0	1	1	1	1	1	1	1	1	1	1	13	3	363	0.71	99.51	1.8
1.8<1.9	0	0	0	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	2	0	364	0.11	99.62	1.9
1.9<2.0	1	0	0	0	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	3	1	364	0.16	99.78	2.0
2.0<2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	364	0.00	99.78	2.1
2.1<2.2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	365	0.11	99.89	2.2
2.2<2.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	365	0.00	99.89	2.3
2.3<2.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	365	0.00	99.89	2.4
2.4<2.5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	365	0.11	100.00	2.5
2.5<2.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	365	0.00	100.00	2.6
2.6<2.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	365	0.00	100.00	2.7
2.7<2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	365	0.00	100.00	2.8
2.8<2.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	365	0.00	100.00	2.9
2.9<3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	365	0.00	100.00	3.0
SUM	210	60	62	98	148	79	413	533	40	1	2	6	9	14	23	117	11	1826	365					100	
%	11.5	3.29	3.4	5.37	8.11	4.33	22.62	28.19	2.19	0.05	0.11	0.33	0.49	0.77	1.26	6.41	0.6								
0.1~1.0m	181	58	59	94	126	29	161	451	30	1	2	6	9	14	16	93									1330
%	9.91	3.18	3.23	5.15	6.90	1.59	8.82	24.70	1.64	0.05	0.11	0.33	0.49	0.77	0.88	5.09									
0.8~1.0m	70	16	20	37	52	15	104	259	16	0	0	1	1	1	1	8	55								655
%	3.83	0.88	1.10	2.03	2.85	0.82	5.70	14.18	0.88	0.00	0.00	0.05	0.05	0.05	0.44	3.01									
Ave./yr.	14	3	4	7	10	3	21	52	3	0	0	0	0	0	2	11									130

V-4 Height of Deep water wave by Wind Direction/Velocity

Direction/Height of deep water wave higher than 1m in wind less than 12 m/s
 and Direction /Height of deep water wave lower than 1m in wind more than 12m/s.

(by S.M.B. method) Wave unit:m

Fetch /km	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
Speed /m	177	128	81.5	63.2	47.8	33.3	19.4	9.6	10.0	10.0	10.0	10.0	10.0	10.0	10.0	139
0.1-1.0																
1.1-2.0																
2.1-3.0																
3.1-4.0																
4.1-5.0																
5.1-6.0																
6.1-7.0																
7.1-8.0																
8.1-9.0	1.12	1.12	1.12	1.12	1.02											1.12
9.1-10.0	1.32		1.29	1.17	1.03											1.32
10.1-11.0	1.52		1.52	1.33	1.16											1.52
11.1-12.0																
12.1-13.0								0.85	0.87							
13.1-14.0								0.93	0.94							
14.1-15.0																
15.1-16.0																
16.1-17.0																
17.1-18.0																
18.1-19.0																
19.1-20.0																
20.1-21.0																
Avg.	1.3	1.1	1.3	1.2	1.2	1.1		0.9	0.9							1.3

V-5 Critical Depth of Sea Bottom Surface Drifting

Deep water wave used for estimation of Critical depth of sea bottom surface drifting

Height $H_o = 1.4m$
 Period $T_o = 4.3sec$
 Length $L_o = 29.0m$

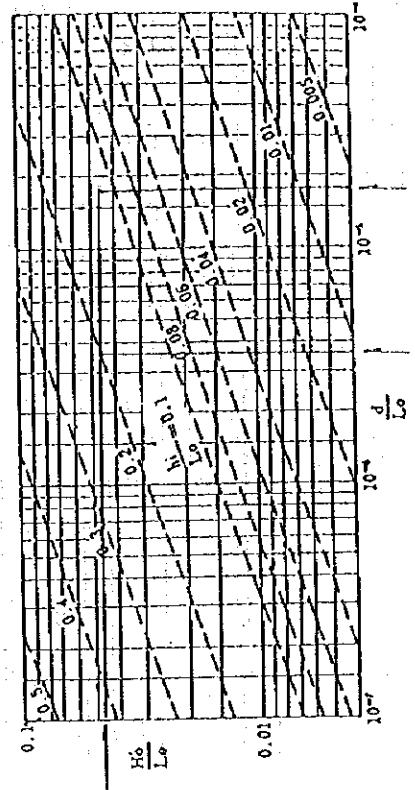
H_o	T_o	L_o	D_i	h/L_o	α	K_r	K_d	$D_i(K_r * K_d)^2$	$\sqrt{\{\Sigma D_i(K_r * K_d)^2\}}$	H_o'
1.4			0.26			0.95	1	0.23		
1.4	4.3	29	0.48	0.08		0.95	1	0.43	0.95	1.33
1.4			0.26			0.95	1	0.23		

Estimation of critical depth of sea bottom surface drifting

H_o	H_o'	T_o	L_o	d	d/L_o	H_o/L_o	h_i/L
1.4	1.3	4.3	29	0.0005	1.73E-05	0.045069	0.123.5
1.4	1.3	4.3	29	0.0001	3.47E-06	0.045069	0.205.8

The depth is estimated with the diagram indicated below.

H_o' Height of adjusted deep water wave 1.3m
 L_o Length of wave 29m
 d Diameter of bottom sand
 h_i Critical depth of sea bottom surface drifting



VI. Estimation of Operation Cost

Artisanal Fisheries Development Project in the Southeast of Eritrea Estimate of Operation Cost

Sales					
Sales of fresh fish		Quantity(kg)	Price(Bir/kg)	Amount(Bir)	
68,000	1.00	68,000	6.30	428,400	
Sales of frozen fish					
240,000	0.95	228,000	12.00	2,736,000	
				Sales of fish	3,164,400
Sales of ice			Price(Bir/kg)		
For fishing boats	For retails		0.30	104,520	
310,000	38,400				
				Sales in total	3,268,920

Expenses					
Purchase of fish from fishermen		Quantity (kg)	Price (Bir/kg)	Amount(Bir)	
		310,000	6.00	1,860,000	
Production cost					
Personnel expenses				373,840	
Electricity				402,711	
Water				5,760	
Fuel oil				55,160	
Wear/tear expenses				100,000	
Maintenance/repair				200,000	
				Production cost	1,137,471
Administration and selling expenses				200,000	
				Total	3,197,471
				Operation income	71,449

Personnel expenses

Salary . Allowance		Person	Bir/month	Amount/year (Bir)	
General manager	1	1	2,800	2,800	33,600
Cheif, operation	1	1	2,400	2,400	28,800
Cheif, marketing	1	1	2,400	2,400	28,800
Accountant	1	1	2,200	2,200	26,400
Refrigeration engineer	1	1	2,200	2,200	26,400
Production chief	1	1	1,700	1,700	20,400
Worker	8	8	500	4,000	48,000
Mechanic	2	2	1,300	2,600	31,200
Driver	3	3	840	2,520	30,240
(Sub total)		(22,820	273,840 Bir/year)
Welfare, allowance					100,000
Total					373,840 Bir/year

Administration and selling expenses

200,000 Bir/year

Electricity charge

Refrigeration facilities						
Freezer	(kw)	Efficiency	Operating hr./day	kw.hr/day	kw.hr/year	Sub-total (kw.hr/year)
Ref. compressor	15.00	0.8	16	192	46,080	
Condensor	2.20	1.0	16	35	8,448	
Cooling unit	2.20	1.0	16	35	8,448	
Defrosting pump	0.40	1.0	1	0.4	96	
Sub total	19.80 kw				63,072	
Sub total/year per room (kw.hr/year)						63,072
Total (kw.hr/year)						126,144
Cold storage						
Ref. compressor	7.50	0.8	18	108	39,420	
Condensor	1.10	1.0	18	19.8	7,227	
Cooling unit	0.80	1.0	18	14.4	5,256	
Defrosting heater	5.00	1.0	2	10	3,650	
Sub total	14.40 kw				55,553	
Ice plant						
Ref. compressor	22.00	0.8	20	352	128,480	
Condensor	2.20	1.0	20	44	16,060	
Brine pump	3.70	1.0	20	74	27,010	
Agitator	0.75	1.0	20	15	5,475	
Water pump	0.40	1.0	4	1.6	584	
Hoist	2.25	1.0	4	9	3,285	
Sub total	31.30 kw				180,894	
Ice crusher	2.00	1.0	1	2	480	480
Ice storage						
Ref. compressor	3.70	0.8	18	53.28	19,447	
Condensor	1.10	1.0	18	19.8	7,227	
Cooling unit	0.80	1.0	18	14.4	5,256	
Sub total	5.60				31,930	
Total for refrigeration facility (kw.hr/year)						395,001
Lighting						
30W x 30	0.90	1.0	8	7.2	2,160	
200W x 5	1.00	1.0	6	6	1,800	

Water pump	0.75kw	0.75	1.0	6	4.5	1,350
Air conditioner	0.5kw x 2	1.00	1.0	8	8	2,400
Total						402,711 kw.hr/year
Unit price						1.00 Bir/kw
Total amount						402,711 Bir/year
Water charge						
	12 ton/day	240 days/year	Quantity/year	2,880 ton/year		
			Unit price	2.00 Bir/ton		
Total amount						5,760 Bir/year
Fuel expense						
Fish collecting truck	260 km/trip 52 liter/trip		5 km/liter 240 trips/year	12,480		
Refrigeration truck	2,000 km/trip 667 liter/trip		3 km/liter 30 trips/year	20,000		
Truck with crane	260 km/trip 52 liter/trip		5 km/liter 50 trips/year	2,600		
Project service car	80 km/day 11 liter/day		7 km/liter 100 days/year	1,143		
Fuel consumption						36,223 liter/year
Unit/price						1.41 Bir/kg
Amount						51,074 Bir/year
Lubricant oil						4,086 Bir/year
Total						55,160 Bir/year
Wear/tear expenses						100,000 Bir/year
Maintenance/repair						200,000 Bir/year

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