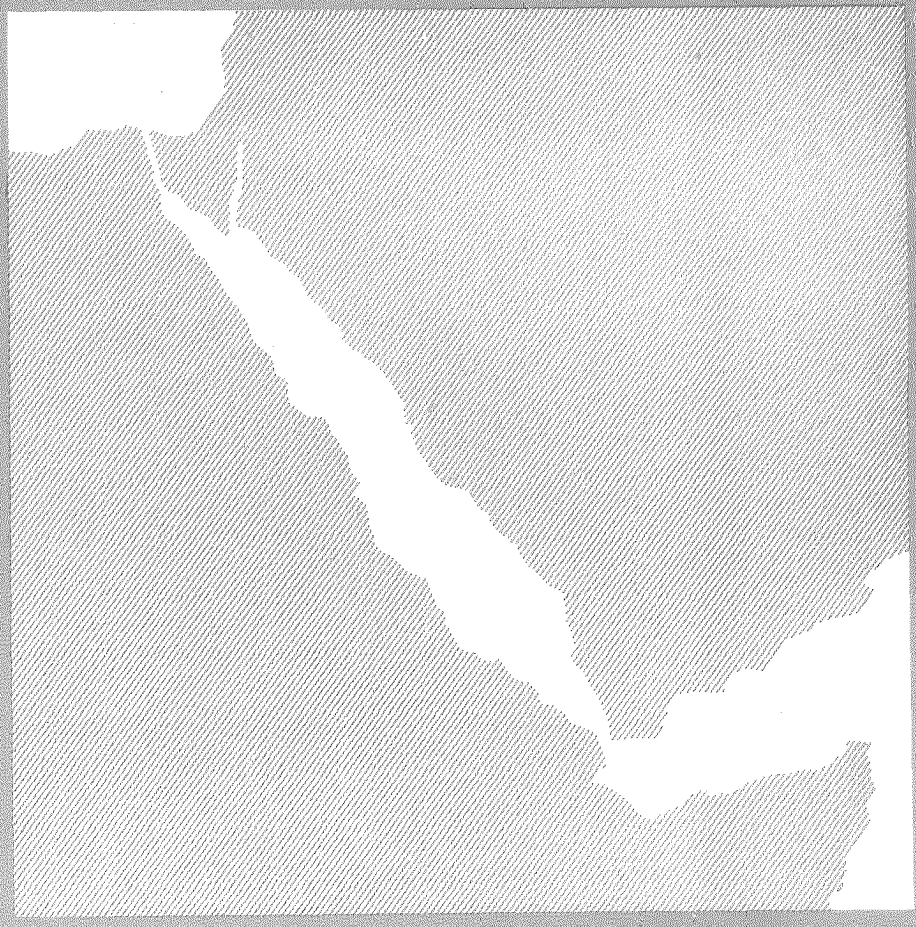
RAB/81/002

DEVELOPMENT OF FISHERIES IN AREAS OF THE RED SEA AND GULF OF ADEN

FISHERY STATISTICS IN DJIBOUTI
AN EXPANDED PLAN OF DEVELOPMENT



UNITED NATIONS DEVELOPMENT PROGRAMME
FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

FISHERY STATISTICS IN DJIBOUTI
AN EXPANDED PLAN OF DEVELOPMENT

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

PROJECT FOR DEVELOPMENT OF FISHERIES IN AREAS OF
THE RED SEA AND GULF OF ADEN
Suez, January 1984

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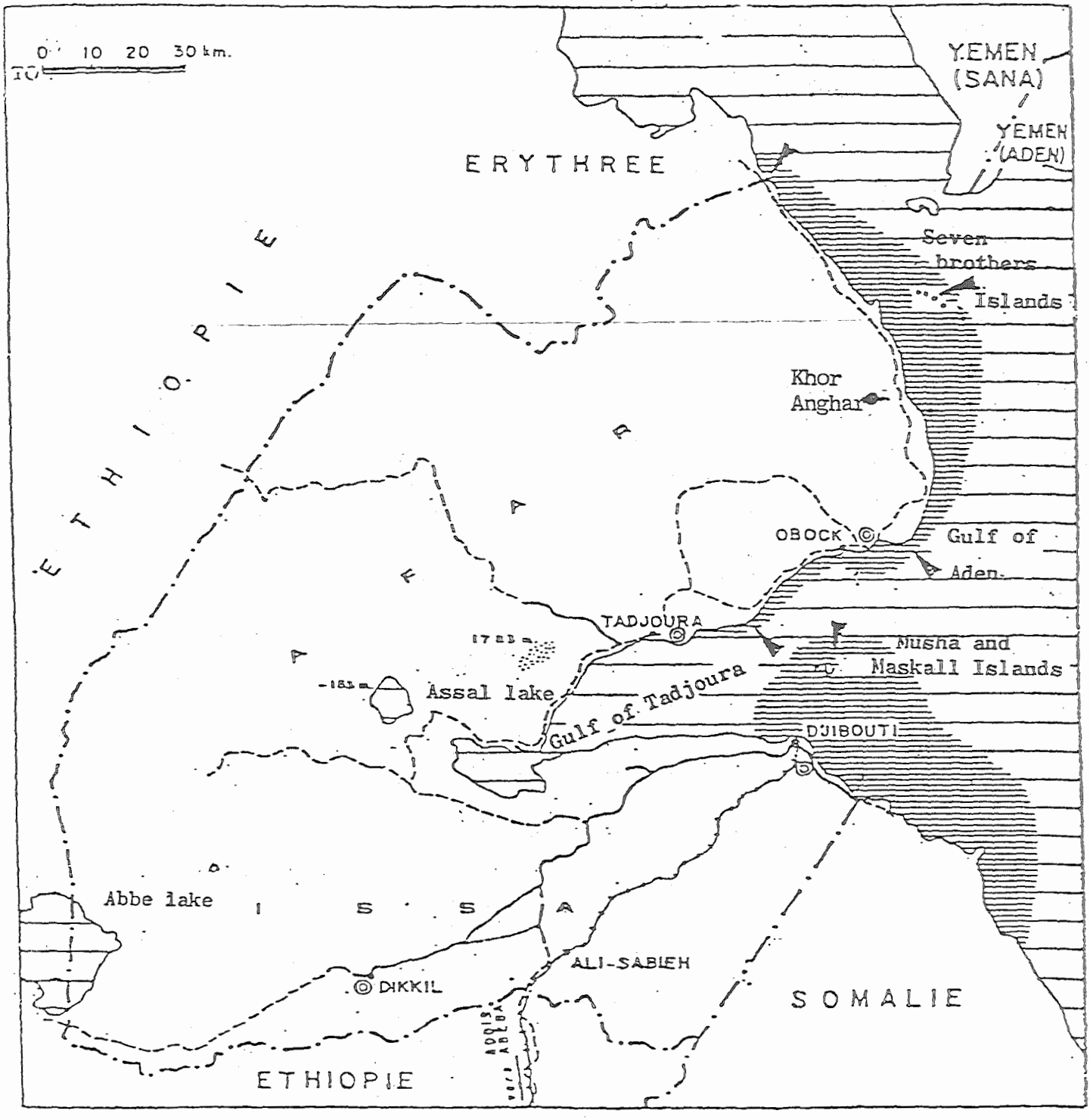
Map of the Republic of Djibouti



—·— International frontier

——— Road

– – – – Unpaved Road

——— Railway

© Airport

ABSTRACT

The paper evaluates the existing status of fisheries statistics in Djibouti and describes the type of data that are needed for economic evaluation of fisheries and biological/stock assessment studies.

A phased plan of development of an adequate statistical system extending over a period of three years is proposed. The system is based on regional concepts and uniform definitions of statistical items to facilitate inter and intra country comparability of the collected fishery data. The methods of collection of data are furnished; the facility requirement by way of man-power and equipment is examined. The cost estimate for running the three year programme is worked out and the potential benefits are indicated.

1 - INTRODUCTION

The project for Development of Fisheries in Areas of the Red Sea and Gulf of Aden has given a high priority to establishment of an adequate statistical system in the member countries. Statistical training courses have been organised at national level and pilot sample surveys have been undertaken in selected landing sites. Some information on fishing activities and their intensities over space and time is also available with the member countries. It is now possible to prepare a plan for establishment of a statistical system to generate diversified marine fisheries data in Djibouti.

2 - BACKGROUND INFORMATION

The coastline of Djibouti is about 242 km along the Gulf of Aden with a narrow continental shelf ranging from 1.9 kms to 24.2 kms in width. The Republic of Djibouti has a population of 450,000(1980), around 60% of whom live in the capital city of Djibouti. The fishermen population is estimated at 300. They operate from Djibouti (250), Tadjourah (10), Obock (40).

Fishing is mostly carried out by traditional houris of 5 - 10 m long fitted with out-board engines of 6 to 10 hp. Some few are bigger boats of 12 - 15 m long. Hand lines and Gill nets are mostly used in fishing.

The Department of Live Stock and Fisheries under the Ministry of Agriculture & Rural Development is responsible for fisheries development. A Fishermen's co-operative functions in Djibouti. In 1983 it had 200 members of which some 100 are not engaged regularly in fishing. The Higher Institute for Scientific and Technical Research located in Djibouti has a Marine Research Unit. At present they are engaged in conducting some experiments relating to mariculture development.

The RAB/81/002 has got a field station in Djibouti for stock assessment studies.

The Bureau of Planning has got a Department of Agricultural Statistics. In near future an agricultural census will be conducted in the Republic. A national Project "Assistance technique a la planification et a statistique," (Dji/81/008) is in operation for the period 1982-86.

3 - EXISTING STATUS

The Fishermen's Co-operative issues 'sales slips' to its members based on which the individual fishermen is paid for the catches brought to the co-operative. These "slips" indicate the name of the fisherman, area of fishing, the variety of fishes brought to the co-operative, actual weight and value. These "slips" form the source documents for the compilation of statistical data relating to the commercial varieties of fishes passing through the co-operative. Shrimps and crabs are not generally brought to the co-operative. These are directly sold by the fishermen to the local central market and also to the restaurants. The recorded statistics by the co-operative during 1980 and 1981 came to 313 tonnes and 260 tonnes

respectively. It is believed by the co-operative that this constitutes 80% of the total landings in the Republic.

The field station of RAB/81/002 collects biological data from the landings brought to the co-operative according to the programme of work of the Stock Assessment Section.

The observations made and experiences gained by the author through field visits to a few landing sites, fishing villages and fish markets around the capital city of Djibouti are furnished below.

i - Escale

This landing site is situated near the Central Market of Djibouti. After the landing site at the co-operative, it is the most important landing site. Being located in the vicinity of the Central Market many fishing units land their catches here, specially during the market time. Apart from the local fishermen some few fishermen from Somalia also land their catches in this landing site to get higher prices for their fish in the nearby central market. Observations were made at the landing sites of Escale and Central Market for three consecutive days. The total daily landings by estimation are compared with those recorded at the co-operative society. The data run as follows:

	Landings in kg	
Date	Escale & Central Market	Co-operative society
09.12.82	445	1,012
10.12.82	152	568
11.12.82	172	416
Total	769	1,996

It shows that an appreciable quantity of fish passes through Escale and direct central market. This is not recorded at present.

ii - Doralle.

It is a landing site 13 km from Djibouti. It has a good beach which attracts tourists specially on week ends. Fishermen in this area do not have any permanent home, they live under a tree or a bush for three months or so and then move to some other near about place. But where ever they live, their fish catches are transported to the central market, Djibouti for sale as there is hardly any local demand. People here collect conch and sea-shells and sell to the visiting tourists. But the people are interested only on shells, the animals living inside the shells are thrown away.

iii- Balbala.

It is a fishing village near Djibouti town and is connected to it by a motorable road. Fishermen here generally go for fishing in the early morning and return by midday. They are members of the Fishermen's Co-operative and land their catches in the Co-operative.

iv - Central market.

The Central Market is the most important fish market in Djibouti city. Inside the market there are 9 fish stalls. Fin fishes are generally sold in these stalls. Some fish mongers purchase fish from the Fishermen's Co-operative and sell in the Central Market at a higher price.

On the pavement outside the market local fishermen sell their catches. Fishermen from the Doralle area bring their catches here.

Thus it is seen that there is no statistics available at the national level, though there is a good system of recording the landing data at the Co-operative. These data also suffer from the coverage error as the crustaceans are seldom brought to the Co-operative and only the marketable varieties of fish are readily sold through it. Over and above, the higher prices of fish at the Central Market may also induce many fishermen to bring their catches to the Central Market.

The available fisheries statistics in Djibouti has developed as a 'by-product' of the "accounting process" in the Fishermen's Co-operative, the main interest being the amount to be paid to the member fisherman who brings the catch. The data needs at the country level by the different ultimate users of the fishery data have not been identified and no attempt has been made to develop suitable methodologies to collect these data.

4 - DATA NEEDS

The type of data to be collected depends on the need of the ultimate users and it can be broadly divided into two categories:

i - Statistics for economic evaluation.

ii - Statistics for biological studies and stock assessments.

4.1 Statistics for economic evaluation.

i - Time division
- a- Month;
- b- Annual.

ii - Space division
- a- Important landing sites;
- b- Coastal length containing few contiguous landing sites;
- c- Whole country.

iii- Fishing establishment/enterprise:
- a- Industrial;
- b- Traditional.

iv - Fishermen population:
- a- Active fishermen by age group;
- b- Population engaged in processing, marketing of fish/ fishery products by sex and age group;
- c- Total fishing population by sex and age group.

v - Fising unit:
- a- Industrial;
- b- Traditional;
- c- Methods of fishing;
- d- Size class by GRT, length H.p., etc..

vi - Fishing effort:
- a- Man-hours;
- b- trips;
- c- Man-power.

vii- Fish catch:
- a- Total and value at retail and wholesale level;
- b- Important commercial varieties and values at retail and wholesale level;
- c- Size composition of commercially important varieties.

ix - Trade statistics:
- a- Import of fish and fishery products by quantity and value;
- b- Export of fish and fishery products by quantity and value.

x - Service facilities:
- a- Cold storage;
- b- Ice factory;
- c- Workshop.

4.2 Statistics for biological studies/stock assessment:

i - Time division:
- a- Trip duration;
- b- Month;
- c- Annual.

ii - Space division:
- a- Fishing area;
- b- Whole country;
- c- Depth range;
- d- Bottom quality.

iii- Fishing unit:
- a- Methods of fishing;
- b- Size class by GRT, length, h.p., etc...

iv - Fishing effort:
- a- Number of fishing units;
- b- Number of trips;
- c- Hours of fishing;
- d- Number of fishing days;
- e- Number of hauls.

v - Fish catch:
- a- Total;
- b- Species composition.

vi - Biological data:
- a- Size composition of selected species;
- b- Sex of selected species;
- c- Maturity of selected species.

(Biological data are generally collected by the biologists based on their programme of work).

5 - GENERAL OUTLINE OF STATISTICAL CONTENT

Before developing the survey methodologies it is essential to enumerate the survey items/statistical items on which the data will be collected. The included statistical items should cater to the needs of the ultimate users of the data and be uniquely defined and classified according to the International Classifications. This will ensure the comparability of the data at the national and international level and alsodiminish the non sampling error while executing the surveys.

5.1 Basic concepts.

5.1.1 Catch

The very fundamental concept in fisheries statistics is catch. It is termed as 'nominal catch' and is given by the live weight equivalent of landings i.e landings on ex-water weight basis. The diagram (Appendix 1) illustrates various concepts commonly used in fishery statistics. Special attention is drawn to the retangles shown at the bottom of the diagram i.e. 'landings' and 'nominal catch'.

5.1.2 Conversion factor.

In Djibouti landings at present take place in fresh condition and as such the conversion factor to convert landings to 'nominal catches' is not necessary. However, in respect of some species, landings may take place in gutted or 'head off' condition. In such cases suitable conversion factors have to be developed.
The next step is to develop statistical standard for species, gear, fishing boat and fishing area.

5.2 Statistical Standard.

5.2.1 Species.

A statistical standard for the commercial species in the Red Sea and Gulf of Aden region has been established (Appendix 2). This has been prepared according to groupings indicated in the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP). The catch statistics in Djibouti should be collected and tabulated as per this classification to ensure the comparability of the data collected in the neighbouring countries.

5.2.2 Gear.

A Statistical Standard for the gear in the Red Sea and Gulf of Aden region (Appendix 3) has also been developed. The landing data in Djibouti should be broken up according to this classification of gear to facilitate the comparison of the parallel data collected in other countries and also in Djibouti in future.

5.2.3 Fishing Craft.

The fishing craft in Djibouti may be classified under the three broad categories:

i - Inboard powered boat.

Sambouks.

These measure 12 - 15 m in length and are equipped with 35 - 50 h.p. diesel engine. Generally five fishermen work in a sambouk. (At present there are only 3 - 4 sambouks in Djibouti .

ii - Out-board powered boat.

Houris.

These are planked canoes of 4-10 m in length fitted with outboard engines of 6 - 15 h.p. The crew size ranges from one to three.

iii- Non powered boats.

a- Sambouks (if any).

b- Houris.

5.2.4 Statistical sub-areas (Fishing areas)

The marine waters of Djibouti are divided into the following statistical sub-areas :

i - Waters off the coastal points at the border of Djibouti/Ethopia and Tadjoura ($11^{o}47'N$) on the northern coast of Djibouti;

ii - Waters off the Djibouti coastline between the points west of Tadjoura ($11^{o}47'N$) and west of Khor Ambadu ($11^{o}34'N$);

iii- Waters off the coatline between Khor Ambadu ($11^{o}34'N$) and Djibouti/Somali border including waters around Musha and Maskali islands.

These sub-areas can be suitably modified when sufficient data on the spatial distribution of the important marine resources in Djibouti waters are accumulated.

5.3 Development of survey system

5.3.1 Current Statistics.

5.3.1.1 The Fishermen's Co-operative.

The present system of the collection of data will continue. However, the recordings of the data will be suitably modified to conform to the established statistical standards with respect to species, gear and fishing areas. For the proper identification of the statistical items relating to species and gear the manuals brought out by the Project RAB/81/002 will be made use of.

5.3.1.2 Other landing sites

For the time being the fishery data will be collected only at Escale and Central Market in Djibouti. The survey details are indicated below.

Objectives

The objective of the survey as to estimate the total monthly landings at Escale and Central Market by gear and species/species groups along with the effort expended to obtain the catch.

Coverage

All fishing units that land at Escale landing site. In the Central Market, however, the fish which pass through the Co-operative landing site and Escale which have been covered by complete enumeration/sample survey,are therefore, omitted. Care should be taken to avoid duplication

of recordings. Generally, fishermen from Doralle and other nearby places come by road to the Central Market and sell their fish on the pavement outside the market. (After a few days field work it whould be easier to locate and idenfity these fishermen).

Design

The period of estimation is a calendar month. The primary sampling unit is a day. The selection of sampling days is done in the following way. A month contains 4 or 3 complete weeks (Sunday to Saturday). Two randomly selected complete weeks will be allotted to Escale landing site, while one ramdomly selected week will be allotted to the Central Market landing site. On each day of the selected week, data will be collected at the designated landing site by actual observations and weighing of catches for each type of fishing unit separately as per Fishery Survey Form 1 (Appendix 4). As only a few fishing units land during a day, it should be possible to cover all the landing units during a day of observation.

Landings take place in the forenoon; it starts at 0600 hours and continues till 1100 hours, though the favourable tide often decides the time of landings. It is, therefore, essential that field staff must be at the landing site from 0600 hours to 1200 hours and collect the data.

Method of Estimation

Let observations be made on d days out of D days in a month in a landing site (d= 14 for Escale, while d= 7 for Central Market). Let Y_j be the catch (effort) on the jth. day of observation by a particular type of fishing unit. Then the estimated catch (effort) for the month by the particular type of fishing unit:

$$\hat{Y} = \frac{D}{d} \sum_{j=1}^{d} Y_j$$

The estimated variance of $\hat{Y}$

$$V(\hat{Y}) = \frac{D(D-d)}{d(d-1)} \left[\sum Y_j^2 - \left(\sum Y_j \right)^2 / d \right]$$

Estimates will be built up for each type of fishing unit separately.

By adding the monthly estimates of landings (effort) by each type of fishing units landed and their corresponding variances, the total monthly estimated landings along with its variance will be obtained for Escale and Center Market landing sites.

Instruction for field work.

The necessary instructions for field work are given in Appendix 5.

Work programme.

Based on the survey design a work programme for the field staff will be prepared at the office. This will be given to the field staff well in advance. The programme will be adhered to strictly. Field inspection by the supervisory staff will also be arranged based on this programme. A sample work programme is appended (Appendix 6)

5.3.2 Marketing Statistical Surveys.

The main objective of the Marketing Statistical Surveys is to collect information on the following:

i - Marketed volume of fish by methods of disposition;
ii - Prices of fish at wholesale and retail level and the value of the marketed volume;
iii- Origin and destination of the marketed items with respect to mode of transport.

Survey method.

The method of collection of data greatly depends on the sturcture and organisational aspect of the markets, facilities available and disposition pattern of fish landings. In Djibouti fish generally sells fresh and the Central Market is the most important market. The Marketing Statistical Survey will be launched in this market. Based on the objectives stated above data will be collected through direct observations and interviews with the fish sellers in the market on three randomly selected days in a week. Weekly and monthly time series for market inflows and prices etc.. will be prepared.

5.3.3 Trade Statistics.

Imports and exports of fish and fishery products take place through the established official channel. These statistics will be transcribed from the official records of the concerned ministries in Djibouti. The unofficial transaction, if any, could be covered while undertaking the continuing surveys for the current statistics and Market Statistical Surveys.

5.3.4 Infrastructure facilities

The information will cover the number, the capacity and the existing level of utilization of the service facilities like cold storage, ice factory, workshops etc.. available in Djibouti. These data will be collected at a point of time (say, once in three years). Some of these data are already available with the Fishermen's co-operative society. These will be supplemented through ad-hoc ivestigations.

6 - IMPLEMENTATION

The implementations of the programme of work for establishment of an adequate statistical system in Djibouti should be undertaken in the following sequential stages:

i - Develop statistical standards;
ii - Organise the data collections systems covering current statistics and market data;
iii- Collect informations on trade statistics and infrastructure facilities.

6.1 First year

The statistical standards have already been developed. The next step is to organise the data collection systems covering current statistics. The first year will be completely devoted for streamlining the recording systems in the Fishermen's Co-operative and launching the proposed sample survey at the landing sites of Escale and Central Market.

A manual incorporating the methods of scrutinising and processing the data will be prepared. The field staff will be trained in the collection of data as per the newly designed survey plan and the data processors will also be trained in analysis and compilation of data.

6.2 Second year

The data collected during the first year will be documented; the continuing surveys covering current statistics will be undertaken on routine basis. The statistics available during the first year of survey will be sent to the ultimate users of the data for their comments on the adequacy of the available data. Based on their comments and the experiences gained during the first year of work, the necessary modifications, if any, will be introduced in the survey plan.

During the second half of the second year the Marketing Statistical Survey will be introduced in the Central Market. The data will be scrutinised and analysed to form the weekly and monthly time series for market in flows and prices etc.. Two local staff (one in statistical surveys, the other in computer data processing) will be sent abroad on 6 month fellowships.

6.3 Third year

Computarization.

For the first two years data will be processed manually. By this time the method of collection of data will be finalised and the layout of the statistical tables in which the various fisheries data will be available to the ultimate users will be given a final format. At this stage the processing of field data will be done through computers. The completed survey forms will be the source documents and the format of these forms should be amenable to automatic data processing. An annual Fisheries Bulletin for Djibouti will be published. The computer print outs will form the various tables of the Bulletin. The Fisheries Bulletin will thus be a by-product of the computarization of processing of field data. It will also reduce the time lag between the collection of field data and the publication of results; the processed data will be available to the ultimate users well in time.

Consolidations of survey programme

During the third year the survey programmes will be institutionalised to facilitate smooth running at the planning and implementation stage. In situe training programmes will be established to impart training to the new recruits at the various positions in the field as well as in the office. The technical contents of the survey systems will be documented in the form of handbooks which will be used in the training programmes.

Derived Statistics

During the third year attempt will be made to compile trade statistics showing the import and export of fish in Djibouti for the last two years. These data when matched with the corresponding catch estimates generated through the newly established survey will produce a balance sheet on supply of fish and fishery products in Djibouti. The perspectives of future local requirements and the possibilities for the expansion of the internal and external trade in fish may also be examined. In addition, data on the infrastructure facilities will be up dated.

7 - ORGANISATIONAL SET UP

The Headquarters of the proposed statistical system should be located to facilitate the administration and management of the system. It should also be cost efficient and function in close collaboration with the ultimate users of these data. The Bureau of Planning is endevouring to upgrade the Agricultural Statistics in the Republic. To effect ease in the administration the Headquarters of the proposed Fishery Statistical System should be located at the Bureau of Planning. The system will promise cost efficient by integration at the processing level with other field surveys that might be conducted by the Bureau. The Fishery Statistics Section should, therefore, be developed as a part of the Agricultural Statistics Department and function in close collaboration with the Planning Section, the Department of Livestock and Fisheries and the Higher Institute for Scientific and Technical Research.

The proposed Fishery Statistics Section should be adequately manned and equipped both at office and field level for proper delivery of goods. The facilities which are likely to be required and the job description of the personnel are indicated below.

7.1 Manpower

7.1.1 Headquarters

Officer-in charge (Statistics)

The officer will be responsible for fishery statistics in Djibouti. He should have adequate background and experiences in Statistical Science. The officer will execute the plan of collection of the diversified fishery data as incorporated in the paper; and supervise the work of field and processing staff; have the data processed and published in the Annual Statiscal Bulletin. Based on the data collected annotated quarterly and annual reports will be prepared by the Fishery Statistics Section. The officer should, however, be helped and guided by an International Expert in Fishery Statistics at least in the initial years of the implementation of the expanded programmes.

The officer-in-charge (Fishery Statistics) will be helped by the data processing staff and field staff as indicated below.

Data Processing Staff

The field staff will scrutinise the collected data and pass on to the processing staff for analysis and compilation Initially the data will be processed by using desk calculators by one person. The work will be computerised during the third year.

7.1.2 Field Staff

The manpower requirement is as follow:

For collection of current statistics-	2
For collection of market data and other statistics - (During the 2nd half of the second year)	1
Total	3

7.2 Equipment

The equipment necessary is as follow:
During the initial two years when the processing of the collected data will be done manually two scientific desk calculators will do the job while during the third year the data will be processed by buying compter's time from other agencies.(Initially the volume of the collected day will not justify requisition of a computer by the Fishery Statistics Section).

For the statistical enumerators spring balances of suitable range will be necessary. They will also be provided with field note books to record the observed data and also small plastic boards fitted with a clip.

7.3 Other facilities

Transport

For conducting field work the field staff and supervisors should be provided with transport.

Incentives

Generally fish landings commence early in the morning and the field enumerators have to be present at the landing site at that time. This is a regular job and difficult to perform on a continuing basis. Hence the enumerators should be provided with an incentive by way of paying some extra money. This should improve their performances.

8 - ESTIMATED COST (US $)

	Total	1st.year	2nd.year	3rd.year
A PERSONNEL				
INTERNATIONAL STAFF				
1. Fishery Statistician (P-5)	330,000	110,000	110,000	110,000
2. Systems Programmer (P-4) (3m/m)	15,000	-	-	15,000
Subtotal	345,000	110,000	110,000	125,000
NATIONAL STAFF				
1. Officer-in-charge (Fishery Statistician) @ $ 500 p.m.	18,000	6,000	6,000	6,000
2. Data processor @ $ 200 p.m.	7,200	2,400	2,400	2,400
3.a) Statistical enumerators (2) (current Statistics) @ $ 200 p.m.	14,400	4,800	4,800	4,800
b) Statistical enumerator (Market Survey & other statistics) @ $ 200 p.m. for 18 months	3,600	-	1,200	2,400
Subtotal	43,200	13,200	14,400	15,600
Component total	388,200	123,200	124,400	140,600
B OTHER COSTS				
1. Duty travel	5,000	2,000	2,000	1,000
2. Incentives for enumerators (20%)	3,600	960	1,200	1,440
3. Equipment and supplies	20,000	5,000	5,000	10,000
4. Vehicles (2)	20,000	20,000	-	-
5. Reporting	10,000	2,000	4,000	4,000
6. Drivers (2) @ $ 100	7,200	2,400	2,400	2,400
7. Fellowships (2 for 6m) @ $ 775 p.m.	9,300	-	9,300	-
8. Miscellaneous	5,000	2,000	2,000	1,000
Component total	80,100	34,360	25,900	19,840
PROJECT TOTAL COST	468,300	157,560	150,300	160,440

9 - PROJECT OPERATION

During the extended phase of the Project RAS/81/002, the implementation of the planned proposals can be executed through the Regional Project. This will reduce the financial commitment to the international staff and some travel costs. The national Government will bear the cost of the national staff and also the other cost which cannot be met through the Regional Project.

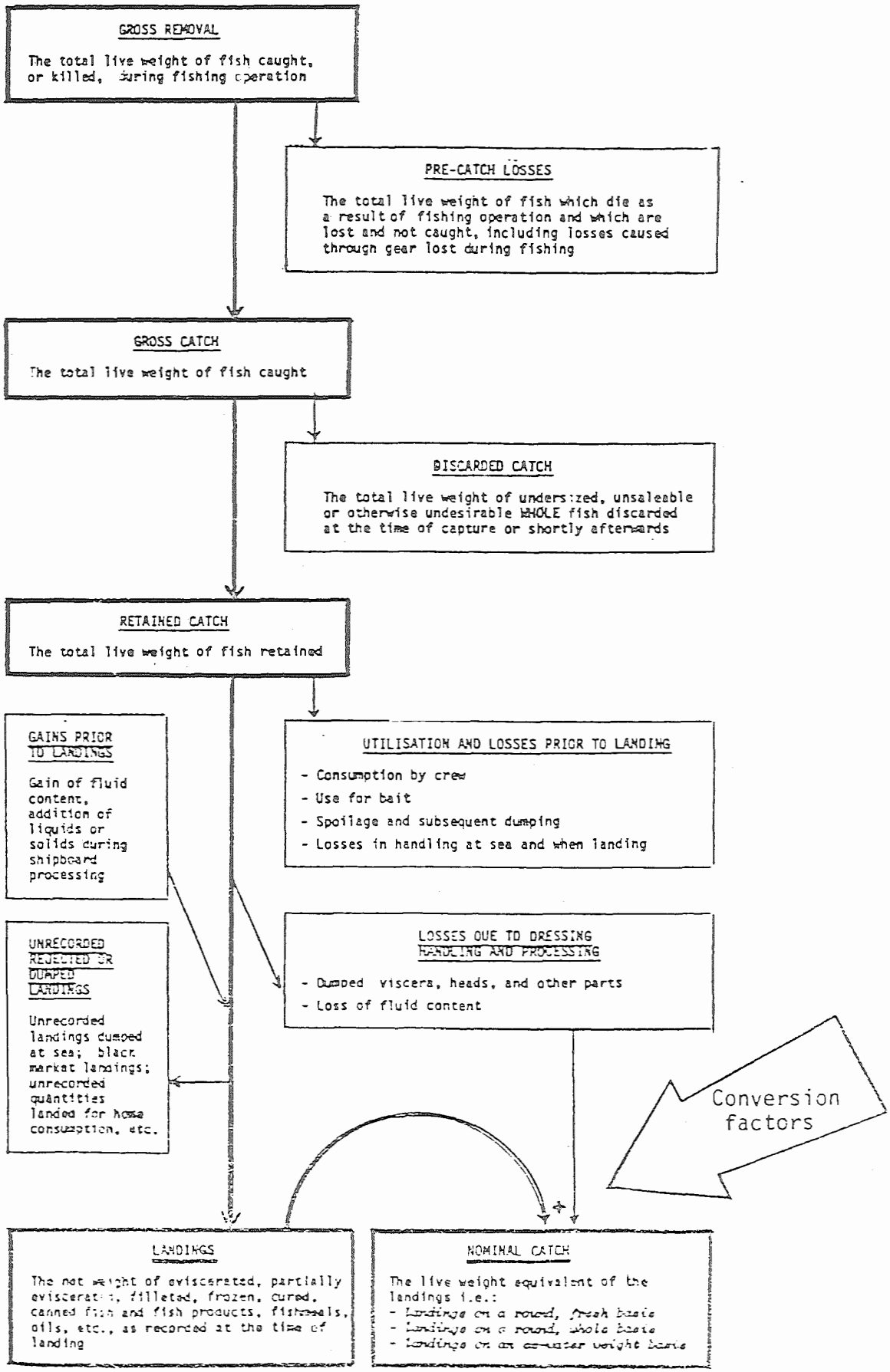
10 - CONCLUSIONS

The Statistical System will generate the diversified marine fishery data with a known level of accuracy based on objective survey methods and uniform definitions of survey items. The data will be available to the ultimate users on timely fashion. Hopefully, this will lead to better understanding of the marine fishery in Djibouti. It will also help in better planning and evaluation of marine fishery projects and play an important role in the day to day decision process for the development and management of fisheries resources in Djibouti.

The national staff will work shoulder to shoulder with the international experts for a period of three years. This will develop local expertise in the field of marine fishery statistics. The national staff will be capable of looking after the statistical needs of the country when the international help fades away.

APPENDIX 1

DIAGRAM SHOWING BASIC CONCEPTS



APPENDIX 2

STATISTICAL STANDARD FOR SPECIES IN THE RED SEA AND GULF OF ADEN REGION

Statistical Item	Family / Genus Name	Scientific Name
GROUP 24 :	SHADS, MILKFISHES, ETC.	
Milkfish	Chanidae	Chanos chanos
GROUP 33 :	PERCHES, BREAMS, SNAPPERS, ETC. (Redfishes, Basses, Congers, etc.)	
Groupers	Serranidae	Examples: Ephinephelus summana
		E. areolatus
		E. Tauvina
		E. microdon
		E. chlorostigma
		Variola louti
		Cephalopholis sp.
		Plectropomus maculatus
Croakers	Sciaenidae	Example: Otolithes sp.
Snappers	Lutjanidae	Examples: Lutjanus lineolatus
		L. gibbus
		L. bohar
		L. argentimaculatus
		Pristipomoides typus
Grunts	Pomadasyidae	Examples: Pomadasys hasta Pomadasys opercularis
Sweetlips	Pomadasyidae	Example: Plectorhynchus pictus
Red Mullets	Mullidae	Examples: Mulloidichthys flavolineatus, Upeneus sp.
Parrot fishes	Scaridae	Examples: Scarus harid
		S. ghobban

APPENDIX 2 (Contd)

STATISTICAL STANDARD FOR SPECIES
IN THE RED SEA AND GULF OF ADEN REGION

Statistical Item	Family / Genus Name	Scientific Name
GROUP 33 (contd.) :	PERCHES, BREAMS, SNAPPERS, ETC. (Redfishes, Basses, Congers, etc.)	
Emperors	Lethrinidae	Examples: Lethrinus harak
		L. Mahsena
		L. nebulosus
Sea Breams	Sparidae	Examples: Argyrops spinifer
		Mylio bifasciatus
Threadfin Breams	Nemipterus spp.	Example : Nemipterus japonicus
Lizard fishes	Synodontidae	Examples: Saurida undosquamis
		S. tumbil
Pony fishes	Leiognathidae	Example: Leiognathus sp.
Moharras	Gerreidae	Example: Cerres oyena
Seacatfishes	Ariidae	Example: Arius thalassinus
Therapons	Theraponidae	Example: Therapon jarbua
Rabbit fishes	Siganidae	Example: Siganus rivulatus
Squirrel fishes	Holocentridae	Example: Holocentrus spinifer
Surgeon fishes	Acanthuridae	Example: Acanthurus sp.
Unicorn fishes		Naso unicornis
GROUP 34 :	JACKS, SCADS, MULLETS, GARFISHES, ETC.	
Jacks	Carangidae	Examples: Caranx sexfaciatus
		C. ignobilis
		Alepes djeddaba
		Carangoides bajad

APPENDIX 2 (Contd)

STATISTICAL STANDARD FOR SPECIES
IN THE RED SEA AND GULF OF ADEN REGION

Statistical Item	Family / Genus Name	Scientific Name
GROUP 34 (contd.) : JACKS, SCADS, MULLETS, GARFISHES, ETC.		
Rainbow runner	Carangidae	Elagatis bipinnulatus
Bigeye scad	"	Selar crumenophthalmus
Hardtail scad	"	Megalaspis cordyla
Golden toothless trevally	"	Gnathanodon speciosus
Queen fish	"	Scomberoides lysan
Talang Queen fish	"	S. commersonianus
Pompanos	"	Example: Trachinotus blochii
Scads	"	Example: Decapterus maruadsi
Horse mackerel	"	Trachurus indicus
Grey Mullets	Mugilidae	Example: Valamugil seheli
Dolphin fishes	Coryphaenidae	Example: Coryphaena hippurus
Needle fishes	Belonidae	Example: Tylosurus crocodilus
Barracudas	Sphyraenidae	Examples: Sphyraena jello S. barracuda
GROUP 35 : HERRINGS, SARDINES, ANSHOVIES, ETC.		
Herrings/Sardines	Clupeidae	Examples: Herklotsichthys punctatus
		Sardinella gibbosa
		S. Longiceps
Anchovies	Engraulidae	Example: Stolephorus sp.
GROUP 36 : TUNAS, BONITOS, BILLFISHES, ETC.		
King fish	Scombridae	Scomberomorus commerson

APPENDIX 2 (Contd)

STATISTICAL STANDARD FOR SPECIES
IN THE RED SEA AND GULF OF ADEN REGION

Statistical Item	Family / Genus Name	Scientific Name
GROUP 36 (contd.): TUNAS, BONITOS, BILLFISHES, ETC.		
Spanish mackerel	Scombridae	Scomberomorus guttatus
Auxis spp.	"	Example: Auxis thazard
Eastern little tuna	"	Euthynnus affinis
Skipjack tuna	"	Katsuwonus pelamis
Thunnus spp.	"	Examples: Thunnus albacares
	"	Thunnus alalunga
	"	Thunnus tonggol
Dogtooth tuna	"	Gymnosarda unicolor
Oriental bonito	"	Sarda orientalies
Sailfish/billfish	Istiophoridae	Example: Istiophorus sp.
Sword fishes	Xiphiidae	Example: Xiphias sp.
GROUP 37 : MACKERELS, SNOEKS, CUTLASSFISHES, ETC.		
Indian mackerel	Scombridae	Rastrelliger kanagurta
Cutlassfishes/ Hairtails	Trichiuridae	Trichiurus haumela
GROUP 38 : SHARKS, RAYS, CHIMAERAS, ETC.		
Sharks	Carcharhinidae etc.	Example: Carcharhinus sp.
Rays	Dasyatidae	Example: Dasyatis sp.
GROUP 42 : SEA SPIDERS, CRABS, ETC.		
Crabs	Portunidae	Example: Lupa pelagica
GROUP 43 : LOBSTERS, SPINY LOBSTERS, ETC.		
Spiny lobsters	Palinuridae	Example: Palinurus sp.

APPENDIX 2 (Contd)

STATISTICAL STANDARD FOR SPECIES
IN THE RED SEA AND GULF OF ADEN REGION

Statistical Item	Family / Genus Name	Scientific Name
GROUP 45 : SHRIMPS, PRAWNS, ETC.		
Shrimps/prawns	Penaeidae	Example: Penaeus sp.
GROUP 57 : SQUIDS, CUTTLEFISHES, OCTOPUSES, ETC.		
Squids	Loliginidae	
Cuttlefishes	Sepiidae	

APPENDIX 3

STATISTICAL STANDARD FOR GEAR IN THE RED SEA AND GULF OF ADEN REGION

Gear Categories:

Surrounding nets

- Purse seine (one boat operated).
- Ring net (one boat operated).
- Ring net (two boat operated).

SEINE NETS

- Beach Seine
- Seine net (not specified).

TRAWLS

- Otter trawls.
- V.-D Otter trawls.

FALLING GEAR

- Cast net

GILL NETS AND ENTANGLINOR NETS

- Set gill net (anchored).
- Drift net.
- Encircling gill net.
- Fixed gill net (on stake).
- Tramel net.
- Combined gill net-tramel net.
- Veranda net.
- Crab gill net.
- Sardine gill net.

Traps.

- Pot.
- Others.

HOCKS AND LINES

- Hand lines (hand operated).
- Set longlines.
- Drifting longlines.
- Trolling lines.

GRAPPLING AND WOUNDING

- Spears
- Harpoons
- Others.

APPENDIX 4

DEPARTMENT OF FISHERIES - DJIBOUTI

Fishery Survey Form

No. 1

Details of Catch and Fishing Effort

Landing Site: ----------

Observer's Name: ----------

Fishing Unit ----------

Date: ----------

Total no. of units landed -------

Serial no.	Manpower employed	Absence from fishing port		Names & distance of fishing ground (km)	Duration of actual fishing	Number of hauls made	Weight of fish landed by local names (kg)													Total	Remarks
		departure	Arrival																		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)

APPENDIX 5

INSTRUCTIONS FOR FIELD WORK

1. The data will be collected for each type of fishing unit comprising boat, gear and crew separately. The fishing unit is generally known by the type of gear used, e.g. handline, gillnet fishing unit.

2. The data will consist of (i) the total number of units landed, their time of landing being recorded in serial order by actual observation, (ii) detail break up of total catch by local vernacular names; (iii) information on fishing ground, manpower, time of departure for fishing, ... etc.

3. The landings take place early morning and continues till 1100 hours, while there are peak hours extending over 2-3 hours. Data will be collected for the whole forenoon (0600 - 1200 hours) by actual observation.

4. It is essential that actual weighing of landings is made. In case landings are heavy, at least two baskets containing species/species group should actually be weighed and the total weight should be determined by multiplying the average weight by the total number of baskets.

5. Whether there is fishing or no fishing, the programme will have to be adhered to rigidly; the field staff should be at the landing site during the whole forenoon on the days of observation. This will facilitate the field supervision by the office staff.

6. Filling up the survey form. There is only one form to be filled in. At the top of the form, the landing site, fishing unit (hand line, gillnet, ... etc), date of observation. Observer's name, ... etc should be entered. The serial number as indicated under column (1) will represent the fishing unit that land. At the top right hand corner of the Form, the total number of units landed will correspond to the figure as entered through the serial numbers under column (1). Under column (4) the time of arrival of each fishing unit of a particular type should be recorded, while the departure time relating to each fishing unit will be obtained through interviewing the fishermen and entered under column (3). Similarly information of fishing ground, fishing time, number of hauls made (if applicable) will be obtained through interview and recorded under columns (5) - (7). Manpower emplyed can be observed and entered under column (2). Columns (8) to (22) are provided for recording the weight of each variety of fish landed in kilogram along with the total catch corresponding to each fishing unit landed. The local names of the fishes under colums (8) to (22) should be written vertically on the space provided for. The remark column (23) is provided for to enter any information having direct bearing to the total landed catch by the fishing unit, e.g. a fishing unit might have sold a part of the catch on the way from the fishing ground to the landing site; due to strong wind or current gillnet fishing unit might not have the normal quantity of catch; a fishing unit might have carried other fishing units catch as well for sale to the market.

APPENDIX 6

WORK PROGRAMME FOR MR. ----------

(Sample only)

MAY 1983

Escale

1st. May - 7th. May
(0600 - 1200 hours)

Central Market

22nd. May to 28th. May
(0600 - 1200 hours)

Escale

15th. May to 21st. May
(0600 - 1200 hours)

JUNE 1983

Escale

5th. June - 11th. June
(0600 - 1200 hours)

Central Market

12th. June to 18th. June
(0600 - 1200 hours)

Escale

19th. June - 25th. June
(0600 - 1200 hours)

JULY 1983

Escale

3rd. July to 9th. July
(0600 - 1200 hours)

Central Market

24th. July - 30th. July
(0600 - 1200 hours)

Escale

10th. July to 16th. July
(0600 - 1200 hours)