

Basic Design Study Report
on
The Village Fisheries Equipment Improvement Project
in
The Republic of Vanuatu

January 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

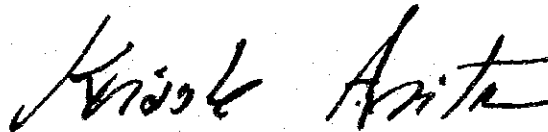
In response to the request of the Government of the Republic of Vanuatu, the Government of Japan decided to conduct a Basic Design Study on the Village Fisheries Equipment Improvement Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Vanuatu a study team headed by Dr. Keiji NASU, Research Counsellor, Resources Division, Research Department, the Fisheries Agency, from 25th September to 16th October, 1985.

The team had discussions on the project with the officials concerned of the Government of Vanuatu and conducted a field survey. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Vanuatu for their close cooperation extended to the team.

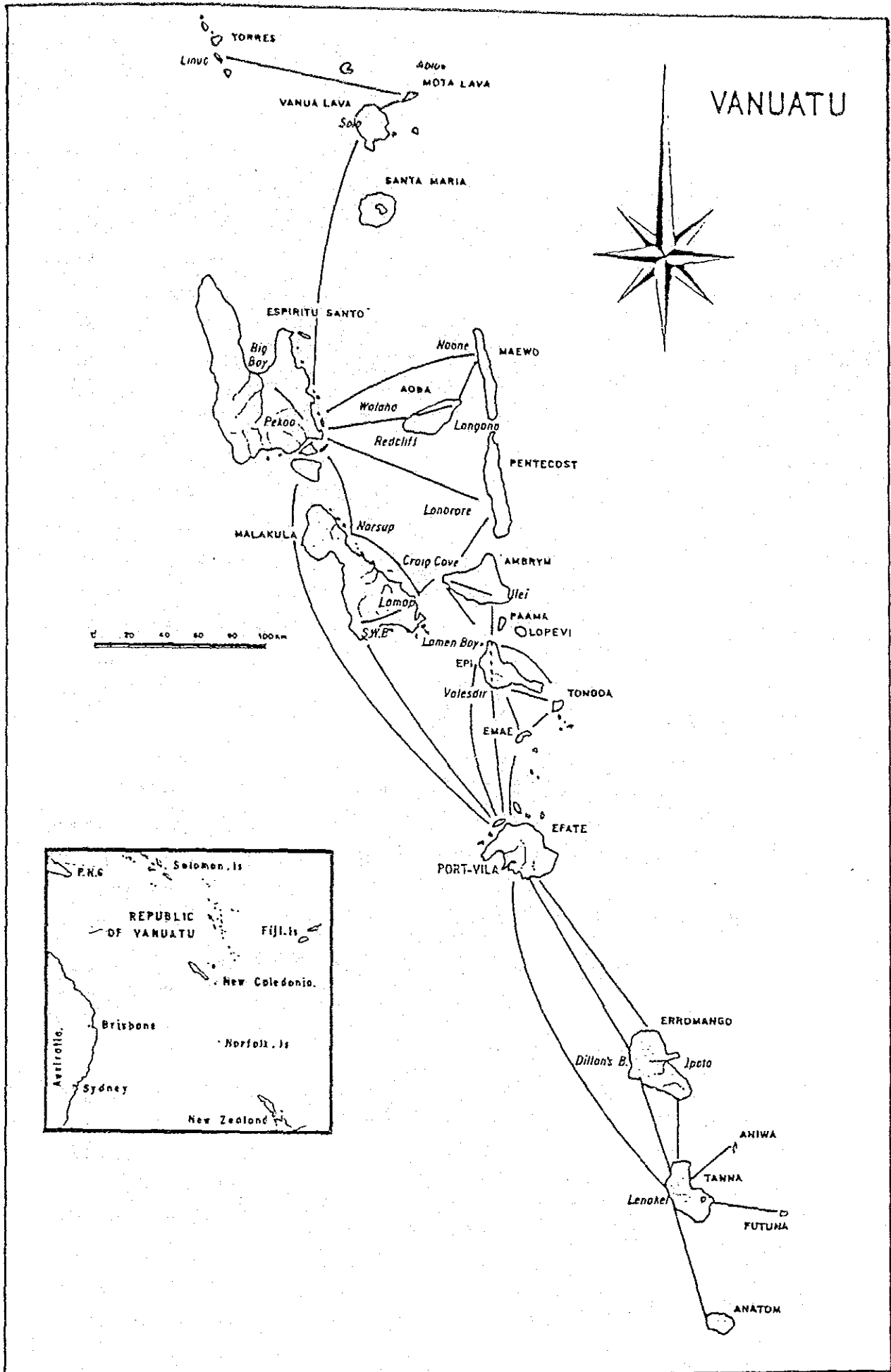
January, 1986



Keisuke ARITA

President

Japan International
Cooperation Agency



SUMMARY

Since its independence in 1980, the Republic of Vanuatu has endeavored consistently so as to establish a sound domestic economy, based on foreign aid. Economic development based mainly on the improvement of productivity in the rural areas, focusing mainly on the promotion and development of the primary industry, was pursued in the First National Development Plan implemented from 1982 to 1986. Particularly in the farming, forestry and fishery fields, the target has been the reduction of imported foodstuff through the establishment of the self-sustenance in terms of food, and the narrowing of the economic gap between urban and rural areas through the promotion of local industries. The industry of Vanuatu, which is a country surrounded by the sea, consists mainly of self-sustained type agriculture, and its fishery used to be fundamentally limited to catches for private consumption, by using traditional canoes, and modern fishery dealing with skipjack and other varieties used to be quite limited. In reality however, in the sea areas surrounding the country there are abundant fishery resources, as mentioned in the report presented by the FAO, etc., in connection with the matter, and in this regard the Government of Vanuatu has drawn up the Fishery Development Plan with the purpose of accomplishing the targets of the National Development Plan, and the Village Fishery Development program (VEDP) is being implemented as a concrete means for realizing the said target.

The VFDP is being implemented since 1982, with the purpose of organizing the coastal fishermen, improving the productivity by modernizing the fishery techniques, and supplying the people with inexpensive protein of good quality, by retooling the distribution mechanism of fishery products, and by taking other appropriate applicable measures at hand, and as things now stand it is attaining results that surpass the goals defined at the beginning. On the other hand, however, the rapid expansion of scale and diversification of contents surpassing the expectations are bringing about

shortage in the funds and materials required for a smooth implementation of the plan, and as a consequence they are obstructing the satisfactory promotion and development of the plan. Under the circumstances, the Fisheries Department of the Ministry of Agriculture, Forestry and Fisheries of the Government of Vanuatu has prepared the Village Fisheries Equipment Improvement Project, which consists of furnishing equipment required for promoting, perfecting and expanding the VFDP in a further effective way, and has asked the Government of Japan for a grant-in-aid aimed at providing the required equipment. In response to that request, Japan International Cooperation Agency (JICA) has implemented the relevant Basic Design Survey with the purpose of examining the significance of this project, the appropriateness of its contents and the particulars of the materials and equipment required for implementing the project.

The VFDP is aimed at realizing a well balanced development of the production and distribution sectors of the fishery, and consists of establishing Fishing Units, at various places of the country, selling the coastal demersal fish caught by the fishermen in the Units, and selling the surplus catch to the Port Vila Fisheries Ltd.

The total number of Fishing Units organized under the auspices of the VFDP at the time of the field survey carried out in October 1985 was mounting to 67, and it was confirmed that the program is progressing satisfactorily. Four years have elapsed since the beginning of the VFDP, which has enjoyed generous support of the local population, but it must be borne in mind that some problems are coming to the fore. Equipment of the distribution sector is not succeeding at keeping pace with the expansion of the production sector, in view of the interest taken by the fishermen in the production sector instead of the distribution sector within the context of the people-oriented implementation policy of the VFDP, the shortage of financial resources for introducing distribution facilities,

etc. Under the circumstances, fishermen are not being granted sufficient marketing routes for their marine products, and the production activities of the existing Fishing Units are being hindered as a consequence. Furthermore, strengthening of the support services provided by the Government (Fisheries Department of the Ministry of Agriculture, Forestry and Fisheries) to the existing Fishing Units scattered throughout the country is badly needed. The VFDP has rendered meritorious services in converting coastal fishery into an interesting business in Vanuatu, a country in which subsistence economy is deeply rooted, at the continuous development of this program is very significant, but as things now stand a some revision is being needed in the implementation course of the programme, so as to realize a balanced development in the production, distribution and support sectors.

Therefore, the implementation policy adopted so far, focusing mainly on the quantitative expansion of the VFDP, is revised in this project in such a way to realize the qualitative upgrading of the program to convert it into a key plan related to the livelihood stabilization and economic strengthening of Vanuatu, by paying particular attention to: (1) keeping unchanged the position of the establishment of new Fishing Units as central policy of the program, (2) strengthening the system for distribution and sales of marine products, and (3) strengthening the support services to the fishing units.

The project is drawn up in correspondence to the development of the VFDP until the end of 1987, and sets the undermentioned targets for the 3 items mentioned above, by taking into consideration the state of things of the fishery resources, the state of things of the demand of marine products and the state of things of the support of local fishermen to the VFDP.

(1) Establishment of new Fishing Units

New Fishing units will be established at 39 places.

(2) Strengthening of the distribution and sales of marine products

Nine medium-scale and 8 small-scale Fish Marketing Stations will be established at various parts of the country in correspondence to the sales associations of the Fishing Units, so as to stimulate the production will of the existing and new Fishing Units located nearby by securing stable routes for marketing their catches to urban areas. On the other hand, the supply of marine products to the urban areas will be expanded, and their small-scale export will be promoted by strengthening the distribution and sales functions of the Port Vila Fisheries, Ltd., which is the only organization of the country for distribution of marine products.

(3) Strengthening of the support services to the fishing units

The system for technical extension and education of the fishermen will be improved, the repair service of equipment corresponding to the increasing number of Fishing Units will be strengthened, and the transportation capacity of fuel, equipment, parts, etc., will be expanded through the establishment of 4 new extension service offices, so as to contribute for a smooth implementation of the VFDP.

The project referring to the materials and equipment required for implementing this project, compiled on the basis of the field survey and analysis of the relevant data and information, is outlined in the followings.

- 1) Apparatuses, equipment and the like required for expanding the Fishing Units.

Name	Q'ty	Purpose	Installation/ allotment place
Outboard engines	40 units	Expansion of Fishing Units	Fishermen of VFDP
Inboard Diesel engines	9 units	"	"
Fishing gear and apparatuses	1 set	"	"

- 2) Apparatuses, equipment and the like required for strengthening the distribution and selling system of marine products.

Name	Q'ty	Purpose	Installation/ allotment place
Small-sized block ice machines	9 sets	Expansion of distribution system	Association of VFDP
Small-sized freezer	1 set	Expansion of storage capacity	Port Vila Fisheries Ltd.
Small-sized ice machine	1 set	Expansion of storage capacity	Port Vila Fisheries Ltd.
Fish processing machinery	1 set	strengthening of sales capacity	"

- 3) Apparatuses, equipment and the like required for strengthening the supporting to the Fishing Units.

Name	Q'ty	Purpose	Installation/ allotment place
Small-sized repair service boat	1 unit	Repair of equipment and apparatuses of Fishing Units	Fisheries Department
Small-sized extension service boats	4 units	Extension of fishery techniques	Extension service
Work vehicle	1 unit	Transportation of apparatuses and materials	Fisheries Department
Small-sized prefabricated warehouses	4 units	Storage of fishing gear and apparatuses	Extension service offices

The necessary cost required to realize the provision of aforementioned apparatuses and equipment mounts to 1,150,000 Vatu to be borne by the Government of Vanuatu. The implementation of the project takes 12.5 months. The executive entity of the Government of Vanuatu in charge of the matter is the Fisheries Department of the Ministry of Agriculture, Forestry and Fisheries, and there is no reason for concern in view of the results attained so far in connection with the implementation of the VFDP. Furthermore, concrete implementation measures are being prepared in connection with the manpower and raising of funds, and the preparations for implementing this project are progressing with no delay at all.

The catch is expected to expand by approximately 200 tons, and the number of workers engaged annually in fishery is expected to increase by approximately 20,000 man days in total in 1987 as a result of the smooth operation of this project. Furthermore, the quantity of marine products handled by the Port Vila Fishery Corporation will increase by approximately 100 tons, making it possible to supply cheap and good quality protein of marine origin to the people of Vanuatu. In addition, the implementation of this project will expand the export of marine products, which is being carried out in small

scale at the present time, contributing as a consequence for obtaining foreign currency. As can be seen, the implementation of this project in Vanuatu will not only contribute to the promotion of the primary industry in remote islands, which are behind in economic terms, but also help promoting the economic independence, which is one of the priority targets of the nation. The grant-in-aid to be provided this time by the Government of Japan is regarded as particularly significant, because it is expected to contribute conspicuously for the attainment of the said goals.

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1. INTRODUCTION.

The Republic of Vanuatu has been promoting an economic development policy aimed at establishing a sound domestic economy under the 1982-86 National Development Plan. In particular, the development of the fishery sector is closely related to key aspects of the Plan, such as narrowing the gap of economic differentials between the various regions of the country, effective utilization of natural resources, development of human resources, economic independence, etc., and furthermore it is arousing much expectation in view of the geographical conditions of the country, which consists of a group of islands in the Pacific Ocean. Especially the development of coastal fishery has been given priority because it brings about direct benefits to the population through the industrial development in remote islands, creation of employment chances, production of food, etc., and the Fishery Department of the Ministry of Agriculture, Forestry and Fisheries has been promoting the Village Fisheries Development Program (VFDP) since 1982, for coastal fisheries development.

Three years have elapsed since the start of the VFDP, and as a matter of fact it has contributed conspicuously to the promotion of coastal fishery in the country. In other words, it has succeeded in increasing the number of workers engaged in fishery, has expanded the catch. Furthermore the distribution of main products is also increasing year after year. On the other hand, modern techniques for fishing have been introduced through direct guidance of foreign instructors, and furthermore the ability regarding maintenance and control of fishing apparatuses and equipment, such as engines, fishing boats, fishing equipment, etc., is taking root among fishermen. In reality however, it must be borne in mind that the rapid progress of the VFDP surpassing the initial expectations has brought about shortage in the funds required for purchasing apparatuses and materials indispensable for the operation of

the plan, and furthermore there are delays in the introduction of distribution facilities necessary for the production. Furthermore, the available manpower and facilities are not sufficient to provide appropriate technical extension to fishermen scattered throughout remote areas, and under the circumstances there are concerns regarding the future operation of the project.

Such being the case, the Government of Vanuatu has requested the Government of Japan a grant-in-aid for the provision of apparatuses and equipment required for invigorating the VFDP.

In response to that request, the Government of Japan decided to carry out a basic design survey to identify the current state of things of the VFDP in the Republic of Vanuatu, to judge the appropriateness of providing apparatuses and equipment, and to determine the scope and scale of the cooperation to be provided by the Government of Japan.

This report summarizes the results of the analyses and studies carried out in Japan, on the basis of data and information collected during the field survey.

2. BACKGROUND

2-1 Outline of the Republic of Vanuatu

2-1-1 People and economy

The Republic of Vanuatu consists of approximately 80 islands scattered throughout the South Pacific, extending from latitude 13°S to 22°S, and longitude 166°E to 172°E. This chain of islands is located 1,750 km to the north-east of the Australian continent, and its total area amounts to 12,189 km².

The country has an estimated population of 128,000 as of 1982, which is growing with an annual average demographic growth rate of 3.2%, and people under 15 years account for approximately a half of the total population. According to the census carried out in 1979, the population of the Republic of Vanuatu has the following composition.

- Melanesians and Vanuatuans	93.7%
- English and French	2.3%
- People of the South Pacific islands	1.0%
- Chinese and Vietnamese	3.0%

Approximately 18% of the population is concentrated in urban areas, and the remainder is living in rural villages scattered along the coast of the various islands.

The capital city of the country is Port Vila located in the Efate Island, but the largest island of the country is Espiritu Santo, and it is also an important one from the economic standpoint.

The currency is the Vatu (VT), and the exchange rate is US\$1 = 101 VT as of October 1985.

The Republic of Vanuatu was under the joint government of the U.K. and France since 1906, being called New Hebrides, and it is a new country that became independent from the said rulers in 1980.

The agriculture has been the main economic activity of the country, because generally speaking it is endowed with abundant fertile land, and as a matter of fact arable land accounts for 45% of the national territory. In particular, the production of copra occupies an important position within the national economy. The agriculture of the country is self-sustained and only products surpassing the household consumption needs are put on the market. Under such circumstances the realization of the market economy (currency economy) is difficult in rural farming villages.

It is estimated that the Gross Domestic Product (GDP) per capita of Vanuatu amounted to US\$650 as of 1982 (World Economy Memorandum).

Vanuatu has a chronic adverse balance of trade, and the exports of the country in 1984, consisting mainly of copra, mounted to 4.395 billion VT, which is outnumbered by far by the imports, which consist mainly of foodstuff, fuel, vehicles and machinery that amount to 6.631 billion VT. The said imbalance is covered with economic aid from overseas, but the sum of the aids provided by the U.K. and France, the former colonial rulers, is decreasing after the independence, and this tendency is expected to become more conspicuous after 1985.

2-1-2 National Development Plan

The Government of Vanuatu has established the policy of economic independence by availing itself of the opportunity of the political independence occurred in 1980, and in this connection it is aiming at invigorating the domestic economy through the promotion of the production sector with development

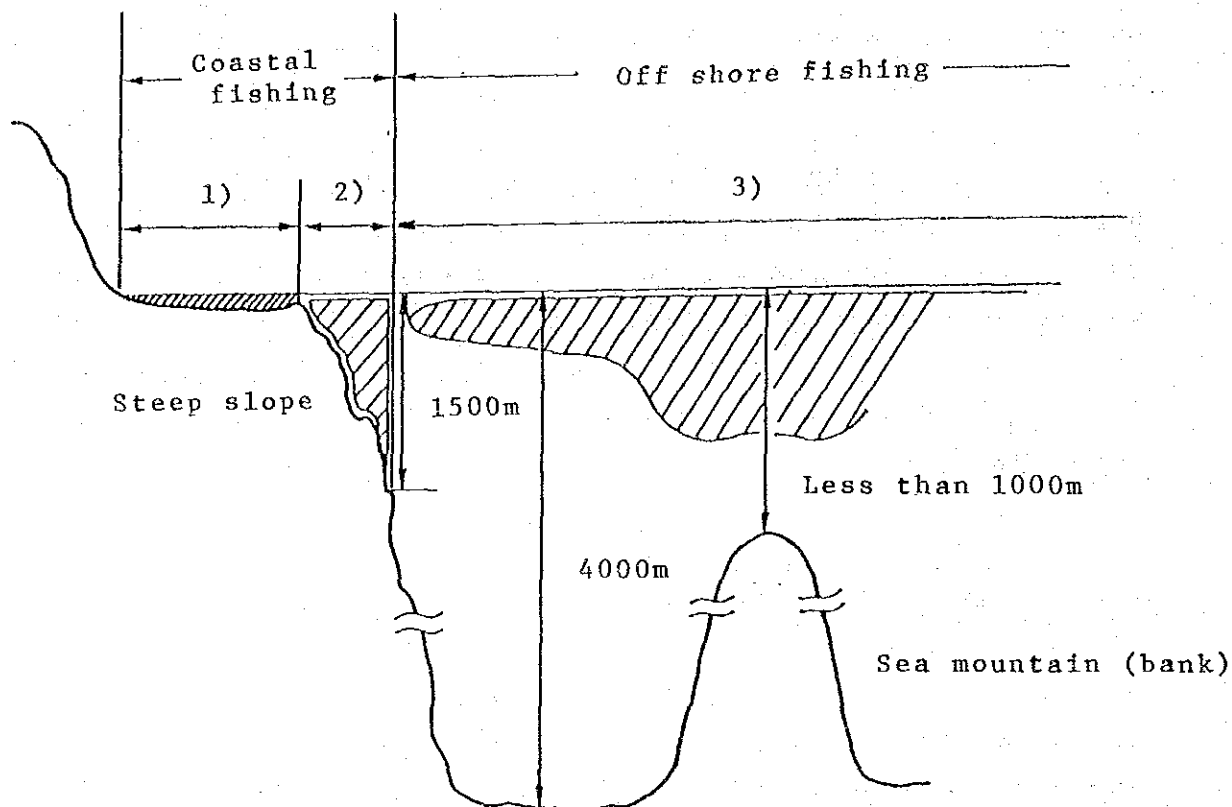
of the abundant unutilized natural resources as a course for future economic development. Furthermore, efforts have been made so as to develop the domestic agriculture and fishery, to promote the self-sustenance of food, which accounts for a substantial portion of the imports. When realized, it would contribute to improve the unfavourable situation of the trade balance.

Under these circumstances, the Government of Vanuatu has drawn up the First National Development Plan in 1982. The said plan focuses mainly on the development of the rural areas, and in particular, emphasis is put on the development of the primary production sector. That being so, the development of fishery is regarded as an important part of the plan in question.

2-2 Outline of the fishery

Due to geographical characteristics ^{*1} that Vanuatu is an islands country formulated by volcanos, fisheries of Vanuatu consists of coastal fisheries and off-shore pelagic fisheries except fisheries in continental shelf. Coastal fisheries can be divided into two types: a) traditional self-sufficient fisheries in reefs and b) VFDP's organized fisheries for catching bottom fishes on steep slopes outside of reefs. Off-shore pelagic fisheries are fully operated by joint venture companies covering scopes of work such as buying (import) of fishes from foreign fishing vessels, and their processing and re-export. Therefore, national interest on deep-sea fishing is still low and accordingly supply of fish protein distributed from it to Vanuatu national is also low.

*1 Fishing ground in Vanuatu is divided as shown in figure below.



- 1) Shallow water region inside of reefs
- 2) Steep slope region out side of reefs, with rapid ups and downs
- 3) Bathy-pelagic region where average depth is 4,000 m with scattered banks (depth at top of bank is less 1,000 m)

Since Vanuatu imported about 800 tons of fisheries products in 1984, selfsustenance of fisheries products are not still attained.

Fisheries Yields in Vanuatu is shown in Table 1.

Table 1. Fisheries Yields in 1984

1. Catch in coastal fisheries

Fishes	1,021 tons
Shells	805
Lobster	493
Octopus	72
Freshwater prawns	12
<hr/>	
TOTAL	2,403

2. Catch in off shore pelagic fisheries

Re-exported quantity 3,930 tons

3. Exports and imports

Molluscs and crustaceans	17.2 tons
Canned fish	795.5
Others	4.7
<hr/>	
TOTAL	817.4

According to the 1985 Report of the Fisheries Department.

Then, coastal fisheries is important in terms of participation of Vanuatuans.

2-2-1 Current state of coastal fisheries and potential of the coastal fishery resource development

Agriculture has traditionally been the main production activity in Vanuatu, and fishery did not develop as a main occupation. Fishery used to be practiced as inside the reefs by the farmers of the vicinal villages in self-sustenance scale. The said kind of fishery was carried out by using mainly canoe and simple apparatuses such as fish-hooks, gill nets, fish spears, etc., and shells have been caught besides fishes. The catch consisted mainly of reef fish^{*1} and pelagic fishes such as horse mackerel, sardine, etc., coming into the reefs, and as a matter of fact this kind of fishery accounts for 95% (approximately 2,300 tons) of the catch recorded in 1984.

Of the said kinds of reef fish, in connection with demersal fish with long living history have a risk of exhaustion of resources due to intensification of catch caused by demographic growth in various regions, but on the other hand, small-sized fish with shorter living history and pelagic fish are presumed to have no problem of exhaustion of resources due to the intensification of catch, in view of the current fishing methods.

On the other hand, the steep slopes outside the reefs are widely known as fishing ground of demersal fish and pelagic fish in most of islands countries of tropical areas. Vanuatu is no exception, and results of surveys and test fishing carried out in the 1970-1981 period by the South Pacific Commission (SPC) and the Office de la Recherche Scientifique

*1 Generic name of fishes living inside the reefs. The market value is relatively low because they are sometimes contaminated with Shiguatera toxin in view of their diet. In general, they have beautiful color.

Outer-Mer (ORSTOM) of France located in New Caledonia, and in the 1979-1980 period by the Food and Agriculture Organization (FAO) of the United Nations have proved that there are abundant resources of snappers, groupers and shrimps in this area.

Furthermore, the maximum catch rate of 8.2 kg/fishingline/hour and the maximum sustainable yield (MSY) of 300 to 700 ton/year ever recorded in the South Pacific area were attained at the vicinity of Vanuatu. The Fisheries Department estimates however, that the MSY^{*1} can be raised to the level of 1,000 ton/year, in view of the operational results attained in the VFDP.

In addition, the catch of pelagic fish, particularly skipjack, which is a high-grade migratory fish, is increasing concurrently with the popularization of the trolling fisheries outside the reefs in the recent years. It must be borne in mind however, that these skipjack shoals are unstable in view of their migratory habit. That being so, if skipjack are retained shoals within the economic water area of Vanuatu by installing fish aggregating devices at appropriate water areas, it will be possible to catch considerable quantities of pelagic fish including skipjack. By the way, the South Pacific Fishing

*1 Strictly speaking, the MSY is defined as the maximum yield that can be caught without exerting influence on the fish resources when a given fishing gear is introduced, calculated by taking into consideration such factors as growth rate and mortality rate, immigrated and emigrated quantity reproduction, etc., of a single kind of fish. In this case however, this parameter is used in the narrow sense of the word, meaning the maximum quantity of fish that can be caught without exerting influence on the fish resources, without specifying the fishing method and the kind of fish.

Company has purchased in the past 10,000 tons of skipjack from foreign fishing boats, and the said fish are presumed to be caught in the economic water areas of Vanuatu.

Under the circumstances, it can be said that fishery resources outside the reefs have excellent potential of development.

2-2-2 Current state of the large-scale fishery

As things now stand, large-scale off shore fishery in the Vanuatu is carried out by foreign vessels, mainly fishing boats of Taiwan. Tuna (70%), skipjack(20%) and other kinds of fish (10%) are purchased in their totality by the South Pacific Fishing Company (SPFC) located in the Espiritu Santo island, and they are re-exported to Japan, USA and other countries after being frozen and processed. The SPFC is a jointventure with Japanese private firms accounting for 90% of the capital and the Government of Vanuatu for the remaining 10%, and its establishment dates back to 1957.

As can be seen from Table 1, the quantity of frozen fish exported by SPFC in 1984 mounts to 3,930 tons, and that quantity surpasses by far the catch of Vanuatu during that year. On the other hand, the number of Vanuatuans working in the company on the occasion of the survey carried out in October 1985 was approximately 100, and it plays an important role in connection with the creation of employment in the country.

2-2-3 Outline of the Fishery Development Plan

The Government of Vanuatu has pointed out the importance of the fishery sector within the First National Development Plan (1982-1986), and has drawn up the Fishery Development Plan (1982-1986) at the same time.

The Fishery Development Plan is backed by the development potentiality of fishery resources in the water areas of the country, and proposes the following development targets.

1) Coastal fishery

- Improvement of the infrastructure and furnishing of training facilities so as to make fishery an attractive occupation for Vanuatuans.
- Production of fresh fish in quantity sufficient to meet with the domestic demand.
- Development of fishery for small-scale export.

2) Offshore fishery

- Improvement of the infrastructure for development of tuna resources within the 200 nautical mile sea area.
- Construction and development of tuna processing facilities.

3) Administration

- Recruitment of manpower in sufficient quantity for coping with the needs of guidance and extension of modern fishery techniques.

- Establishment of an appropriate fishery legislation.

4) Survey (research)

- Estimation of the quantities of the main fishery resources.

For the purpose of accomplishing the aforesaid objects, the Fishery Development Quinquennial Plan comprises the 4 undermentioned programs, and these programs consist of concrete executive projects.

1) Program 1 Promotion of coastal fishery

This program consists of 7 projects, ie., training of fishermen, village fishery development, construction of boats, preservation of fish, transportation of fishes and their delivery to the market, development of new fishery, and installation of fish aggregating devices.

2) Program 2 Promotion of offshore (oceanic) fishery

This program consists of 2 projects, namely, test operation of skipjack fishery and purse seine fishery.

3) Program 3 Development of government institution services

This program consists of 5 projects, ie., appropriate manning of the Vanuatu Fisheries Department, administrative and support services, expansion of the head office of the Fisheries Department, reinforcement of the fleet of the Fisheries Department, and establishment of an appropriate fishery legislation.

4) Program 4 Survey (research)

This program consists of 7 projects ie., airborne survey by ORSTOM, acceptance of marine biologists of ORSTOM, live bait survey, fishery survey in the sea mounts, tuna processing research, construction of Trochus shell (material for production of buttons) hatchery, and survey of deep-sea shrimps.

Of the 4 programs of the said development plan, the Government of Vanuatu is attaching special importance to the promotion of the coastal fishery, and the fact is reflected in the budgetary aspect as well.

Table 2. Budget of the Fishery Development Plan

(Unit: Million VT)

Program	1982	1983	1984	1985	1986
Coastal fishery development	61	53	49.4	148.8	38
Pelagic fishery development	1	10	0	0	0
Research & development	8	10.9	11	4.6	2.6
TOTAL	70	73.9	60.4	153.4	40.6

Note: Figures referring to 1982 and 1983 are actual results, and figures referring to 1984 to 1986 are planned sums.

2-2-4 Coastal Fisheries Development Plan

Based on the Fishery Development Quinquennial Plan, the Government of Vanuatu has attached particular importance to the promotion of coastal fishery, and the projects of various kinds related to the matter have been implemented for approximately 4 years, since 1982.

(1) Training of fishermen

The training of fishermen of the country started in 1980, with the Fisheries Department making use of personnel of the SPC, when the fishery resource survey in the sea areas of Vanuatu was carried out by the SPC. At the beginning the training was related only to fishing methods for catching demersal fish but later on it was extended to other fishing gear for development of pelagic fish, such as trolling and the like. Furthermore, such subjects as fishing boat operation method, knowledge related to safety on the sea, marine product handling method, etc., have been introduced in the curriculum, and the technical level of the fishermen has been upgrading as a result.

(2) Village fishery development

The VFDP was planned as a concrete project for coastal fishery development plan. Such improvements as organization of fishermen,^{*1} conversion from the traditional rudimentary fishery within the reefs to demersal fish catching in the steep slopes outside the reefs, establishment of fisheries product marketing routes, etc., have been realized as a result of the smooth implementation of the VFDP, and benefits such as increasing catch, increasing cash income for the fishermen, etc., have been attained as a consequence.

*1 Vanuatunans engaged in coastal fishery are not fishermen in the strict sense of the word, because their main trade is agriculture and fishery is merely a subsidiary activity, but they are named "fishermen" in this report for the sake of convenience.

(3) Construction of boats

Such measures as dispatch of trainees to overseas for acquiring shipbuilding techniques, technical guidance in the country by foreign shipbuilding engineers, and subsidies by the Government of Vanuatu for purchasing fishing boats appropriate for the use in the villages are being taken in this connection, and as things now stand the totality of the small-sized fishing boats being used in the country are constructed in the shipyard located in the Espiritu Santo Island.

(4) Preservation of fish

The catch is kept fresh by using ice, and the fishermen are able to supply catches with high market value to the consumers. At the present time there are 3 ice machines installed in the villages, and the Fisheries Department intends to install more equipment of this kind in the future. Fish boxes made of insulating material are utilized when using ice. Furthermore, the number of villages equipped with refrigerators and freezers is increasing, and the means for maintaining the freshness of the fish is improving rapidly. As a result, the quantity of marine products being shipped to markets in urban areas is increasing considerably.

(5) Transportation of the fish and their delivery to markets

The reliance on transportation vessels equipped with cold storage facilities or air lines is essential for transporting fish between the various areas of the country, since it consists of 80 separate islands. As things now stand, the Port Vila Fisheries Ltd., which takes charge of the distribution of fish, is securing the smooth operation of fish marketing system by lowering the freight of marine products based on an agreement with Air Melanesia.

(6) Development of new fishery

It is estimated that there are abundant resources of lobster in the country, and the transportation of live lobster to Port Vila has become easier by the equipment of storage facilities and expansion of the means of transportation, and as a consequence, lobster fishery has become an important income source for fishermen. Furthermore, the export of lobsters is increasing as well.

(7) Installation of fish aggregating devices

The installation of fish aggregating devices was started based on the idea of gathering pelagic fish by anchoring rafts, so as to catch fish gathered around this device by using fishing hooks and live bait. As things now stand, fishermen are using floating fish aggregating devices installed by the Fisheries Department.

As can be seen, the coastal fishery of the country is advancing steadily toward modernization concurrently with the implementation of the Fishery Development Plan.

2-2-5 Fishery policy

An appropriate fishery policy and the accompanying services are indispensable for a smooth implementation of the Fishery Development Plan comprising the coastal fishery development plan.

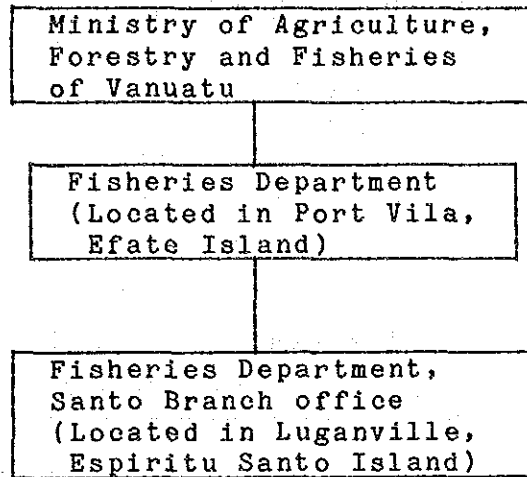
Vanuatu has no history of full-scale fishery, and as a matter of fact the Government did not have any fishery policy until very recently.

The Fisheries Department of Vanuatu was established in 1979, with cooperation of the UNDP, and at the present time it belongs to the Ministry of Agriculture, Forestry and Fisheries.

(1) Organization and manpower

In addition to the head office located in Port Vila, the Fisheries Department has a branch office located in Luganville.

ORGANIZATION



The Fisheries Department has the following staff (as of October 1980), and the personnel is increasing every year.

Occupation	No. of personnel	
Director of Fisheries	1	
Executive officer & counterpart to Director	1	
Deputy Head and Assistant to the Director	1	
Fisheries Officer	6(*1)	Government funded staff
Fishing Master	1	
Fishery Technician	2	
Fishermen	4	
Typist	2	
Driver, Store Keeper	1	
TOTAL	19 persons	

Occupation	No. of personnel	
Planning officer (VFDP)	1	
Fisheries Research officer	1	
Manager (Fishing Boat Construction Project)	1	Externally funded staff from foreign countries(*4)
Technical advisor (Fishing Boat Construction Project)	1	EFD, VSO, CUSO, TCO, ORSTOM, France, Holand, etc.
Boatbuilder	1	
Boatbuilding trainee	4	
Village Fisheries Advisor	7 ^{*2}	
Fisheries officer in training	2 ^{*3}	
Fisheries trainees	2	
TOTAL		20 persons

Note:

- *1 Of this personnel, one heads the Espiritu Santo Branch, one assists the planning officer, and the other four take charge of the fishery training.
 - *2 Residents at the villages as VFDP Village Fisheries Advisors.
 - *3 Working as fishery advisor of the Espiritu Santo Branch.
 - *4 EDF (the European Development Fund)
- VSO (Voluntary Service Overseas)
- U.K.: Overseas Aid & Cooperation
- CUSO (Canada University Student Overseas)
- Canada: Overseas Aid & Cooperation
- TCO (Technical Cooperative Overseas)
- U.K.: Overseas Technical Cooperation
- ORSTOM (Refer to section 2-2-2).

(2) Budget

The budget of the Government of Vanuatu for funding the activities of the Fisheries Department in 1985 mounts to 10.667 million VT, and the personnel expenditures account for 8.73 million VT which is a considerable portion of the total sum. The budget is increasing at an annual rate of approximately 15% since 1982, and in 1986 it is expected to mount to approximately 19.04 million VT.

Besides the budget of the Government of Vanuatu, the Fisheries Department is receiving a multitude of direct financial aids of various kinds from foreign countries.

(3) Contents of the activities

The contents of most of the activities carried out by the Fisheries Department refer to coastal fishery development, particularly the implementation, control and operation of the VFDP, which is the concrete means for realizing the said development, and as a matter of fact it may safely be said that these activities reflect the position of the coastal fishery development within the Fishery Development Plan. Besides, it takes charge of other activities such as research and development, preparation of the development projects of the country in the fisheries sector, control and operation of pelagic fishery, operation of vessels for training and test fishing, etc., and in addition it is also responsible for the regulation of the activities of foreign fishing boats in the high sea of Vanuatu, protection and control of marine resources, determination of the fishery charges, as well as statistical processing related to fishery in general and survey and other studies related to technical problems, etc., controlling therefore all subjects related to fishery in general in Vanuatu.

2-2-6 Fish marketing system

When the fish marketing system to be established by taking into consideration the profitability of an insular country, in which ordinary simple means of transportation are not available, it is often hindered by many obstacles in most of the cases. In Vanuatu however, it may safely be said that fish marketing system consisting mainly of the Port Vila Fisheries Ltd. (Corporation), is functioning in an effective way. The start of the Port Vila Fisheries Ltd. dates back to 1983, when marketing facilities were constructed in the Efate Island and in the Espiritu Santo Island with grant-in-aid of the Government of Japan. The marketing facilities (known as Natai) constructed in Port Vila, Efate Island, started the operations as a Fishery Corporation possessed by the Government of Vanuatu, and on the other hand the facilities (known as Santo Fish) constructed in Luganville, Espiritu Santo Island, became a subsidiary institution of the Fisheries Department, which took direct charge of its operation. In reality however, Santo Fish did not succeed in gathering the quantity of marine products required for carrying out commercial operation, and its distribution facilities were annexed to the Port Villa Fisheries Ltd. and the said situation has continued until now. As things now stand, the Port Vila Fisheries Ltd. is an institution possessed by the Government of Vanuatu, but it has self-supporting accounting system, and it has obligation to depreciate.

(1) Staff

The personnel of the Port Villa Fisheries Ltd. consists of one New Zealander manager (2-year contract, with extension of contract being negotiated as of October 1985), and 17 Vanuatians. The said staff is taking charge of the operation of the Corporation, but the volume of work is increasing and there are plans for increasing the personnel in the near future.

(2) Contents of the work

As things now stand, the Port Vila Fisheries Ltd. is the only institution for distribution of marine products in Vanuatu, and it is also the only exporter of fresh fish, excluding the foreign capital firm (SPFC). This corporation purchases marine products from participants of the VFDP, ordinary fishermen, the Fisheries Department (catch obtained as a result of training, survey and test operation) and from the South Pacific Fishing Company (SPFC), stores them in its storage facilities, retails the products to the local people and foreign residents, and wholesales them to hotels and restaurants. Furthermore, the corporation produces ice with its ice machines and sells it to fishermen, and the relevant profits account for an important portion of the income of the corporation.

Furthermore, concurrently with the development of demersal fishery on the steep slopes outside the reefs, this Port Vila Fisheries Ltd. is exporting fresh fish, mainly red snapper and other varieties with high market value, to Hawaii, New Caledonia, Australia and New Zealand, in annual quantities mounting to approximately 4 tons (1984).

(3) Administrative system

This fishery corporation is supervised by a board with consisting of officers of the various ministries, because it is a subsidiary institution of the Government of Vanuatu. The members of the board are as follows.

Chairman	First Secretary, Ministry of Agriculture, Forestry and Fisheries
Vice Chairmen	Second Secretary, Ministry of Finance, Commerce, Industry and

Tourism
General Manager, the Development
Bank
Director of the Fisheries
Department, the Ministry of
Agriculture, Forestry and
Fisheries
Manager of the VFDP,
Ministry of Agriculture, Forestry
and Fisheries
Officer of the Industry
Department, the Ministry of
Finance, Commerce, Industry and
Tourism
Secretary
Fisheries Economist, the
Ministry of Agriculture, Forestry
and Fisheries

(4) Turnover

The number of commodities handled by this corporation in 1984 surpasses 30, and the quantity of marine products sold totals 87,000 kg. The daily average arrival of fish is 345 kg (21 working days per month), but sometimes it surpasses 500 kg and during peak days it may reach 800 kg.

It is estimated that the total annual sales mounted to 25.86 million VT in 1984, and the pre-depreciation profit was 3.68 million VT. The corporation produces two types of ice, flake ice and block ice, and the daily total production averages 600 kg.

(5) Small-scale export

The exports, consisting mainly of red snapper and other high-grade fish and live lobster, totaled approximately 4 tons in 1984. Demersal fishery is developing in Vanuatu at the present time, and the increasing catch of

high-grade fish is expected to make it possible to expand the exports to as much as 10 tons in the near future.

2-3 Village Fisheries Development Program (VFDP)

2-3-1 Background of the VFDP

Vanuatu used to be traditionally a farming country, but results of surveys on marine resources in the nearby sea areas carried out by international institutions and the like since about 1970 are arousing the interest on development of fishery resources. In other words, fishery used to be practised so far almost exclusively for home consumption scale, but now the market value of marine products is beginning to be recognized concurrently with the development of pelagic fishery on the steep sloped outside the reefs. The demand of the farmers for modernization of fishery required for developing pelagic fishery, which occurred under the said circumstances, and the demand to the government for appropriate cooperation regarding the distribution of marine products were decisive factors that compelled to the planning and implementation of the VFDP.

2-3-2 Establishment and object of the VFDP

In 1982 the Government of Vanuatu gave top priority to the promotion of the coastal fishery in its Fishery Development Plan, and in this connection it decided to draw up and implement the VFDP as a concrete measure for realizing the proposed targets. The VFDP is composed of 3 parts:

- 1) Increase of the fishery yield consisting mainly of demersal fish living on the steep slopes outside the reefs;
- 2) Promotion of the distribution and sales of surplus marine products through the retooling of the fishery distribution system including the construction of facilities for storage of marine products; and,

- 3) Establishment of an appropriate system for supporting the operation of the programme as a whole.

The VFDP aims at accomplishing the 3 points mentioned below through its smooth operation.

- 1) Expansion of the supply of marine products to meet increasing demand of protein food.
- 2) Expansion of employment in the provinces and creation of cash income for the farmers.
- 3) Improvement of the trade balance through substitution of imported marine products.

Furthermore, the realization of the said objectives will contribute to narrowing the gap of economic differentials between the various islands of the country.

2-3-3 Organization and operation mechanism

The organization and operation mechanism of the VFDP are shown in Figure 1. This scheme is based on the conception of the Fishery Department regarding the VFDP, and discrepancies from the original conception due to shortage of funds and manpower, have appeared as the program implementation have proceeded (Refer to section 2-3-5).

The Fisheries Department is in charge of the planning and implementation of the VFDP. Fishermen composing the Fishing Units have charge of the actual operation of the programme under the guidance and control of the Fisheries Department, and the association of the Fishing Units and the Port Vila Fisheries Ltd., which is a subsidiary institution of the Government, take charge of the sales and distribution sectors of the VFDP.

Fields of Function

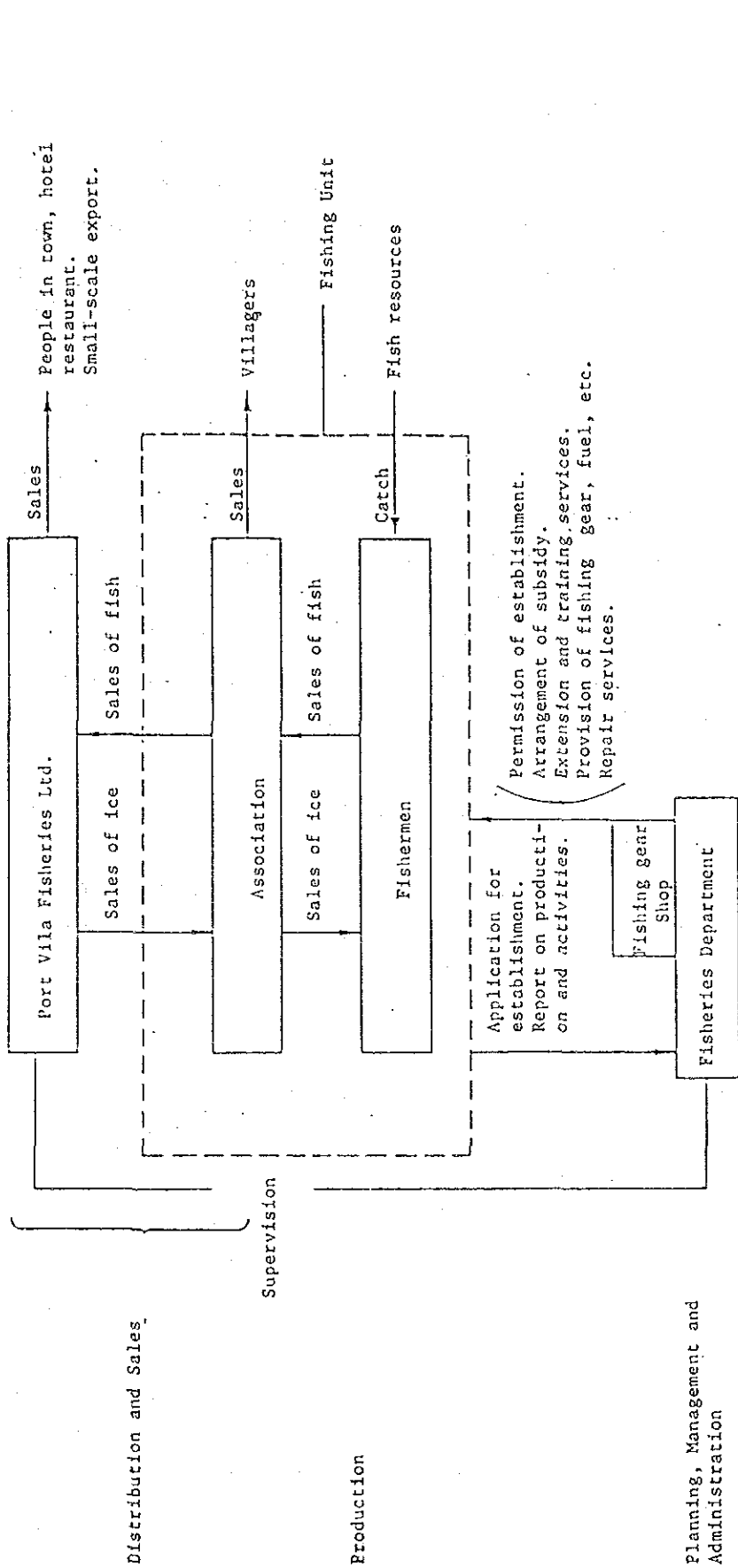


Figure 1 : Organization and management of VFDP

(1) Fisheries Department

The activities of the Fisheries Department related to the VFDP covers a wide variety of fields, such as technical guidance for operation of Fishing Units, maintenance and repair of equipment and apparatuses included in the VFDP, training of fishermen, sales of fishing gear and tackles, supply of tax-free fuel, etc.

(2) Fishing Units

The Fishing Units are the main components of the VFDP, and they consist of the fishermen in charge of the production sector, and the associations which purchase the marine products caught by the fishermen and take charge of the sales and distribution of the said products.

Each Fishing Unit has the obligation of reporting in details the number of operating days, catch, fishing gear used, fuel consumption, sales, quantity of marine products distributed, etc., to the Fisheries Department.

(3) Port Vila Fisheries Ltd.

The Port Vila Fisheries Ltd., which is the only institution of Vanuatu for sales and distribution of marine products, takes charge of the sales and distribution sector of the surplus marine products of the VFDP. This corporation has the obligation of purchasing the totality of the surplus catch brought by the VFDP, and it is the organization which secures the profit of the Fishing Units of the VFDP. This corporation sells the marine products purchased from the Associations to the consumers of the urban areas, and furthermore exports them in small scale.

The expansion of the market of marine products at the vicinity of the villages in which the Fishing Units are

located is difficult, because the self-sustenance economy is still the fundamental scheme prevailing therein. On the other hand, in the markets of the urban areas consisting mainly of the Port Vila, which were developed within the context of the VFDP, and in the export market, there is a lot of room for expanding the sales of fresh highgrade fish caught by the Fishing Units. Such being the case, the development and expansion of the market of marine products by the Port Vila Fisheries Ltd. will encourage the production at the fishery units, and therefore the Port Vila Fisheries Ltd. will play a key role in the future development of the VFDP.

2-3-4 Financial resources

(1) Operating fund of the VFDP

The operating fund of the VFDP consists mainly of the financial aid provided by the European Development Fund (EDF) to the Government of Vanuatu, supplemented by the funds provided by the National Treasury of Vanuatu (portion of the Fisheries Department allocated to the VFDP) and contributions of the fishermen (owned capital and funds financed by the Vanuatu Development Bank). The VFDP was planned in 1981 with an implementation period of 3 years starting in 1982, with a budget of 36.50 million VT, including aids of the EDF. In reality however, the demand of the fishermen to the VFDP surpassed by far the initial expectation, and the implementation period of the programme was extended to 4 years and the financial plan of the programme was revised, because it evidenced great potentialities of development since the beginning. Under the circumstances, the programme was reorganized in the form of the Phase I consisting of the first year of implementation and the Phase II consisting of the remaining 3 years, and the budget of the Phase II was revised. The budget and the financial resources of the VFDP are shown in the followings.

Financial resources	Initial budget (1982 to 1984) (Million VT)	Results of Phase I (Million VT) 1982	Budget of Phase II After Revision (1982 to 1985)
Government of Vanuatu	---		2,370
EDF	1,865	1,360	4,815
Financial aid Operation fund			1,550 3,265
Contribution of fishermen	1,785		2,128
TOTAL	3,650	1,360	9,313

At the present time the VFDP is being implemented with budget of the revised Phase II.

The VFDP is the core plan for promotion of coastal fishery, which is being given top priority within the scope of the Fishery Development Plan, and all other plans being implemented with the purpose of developing coastal fishery are related either directly or indirectly with the VFDP (e.g. plan for construction of fishing boats required in the VFDP being implemented with financial aid of Canada, dispatch of Village Fisheries Advisors (VFA) which is being implemented with financial aid of various countries, etc.). Such being the case, it may safely be said that the VFDP is maintaining and developing its current activities thanks not only to its direct operating funds, but also to the financial cooperation of the various countries supporting the said subsidiary projects.

(2) Funds for establishment of Fishing Units

The fisherman or a group of fishermen that intends to establish a new Fishing Unit must raise at least 10% (normally 20 to 25%) of the required fund in cash, in the form of self-owned capital. The Government of Vanuatu

provided 50% of the required funds within the context of the subsidy for the VFDP, and the remaining 25 to 40% are financed as loans by the Vanuatu Development Bank of for the sake of economic development of farmers of provincial areas. In principle, the financing of the Vanuatu Development Bank consists of 4% annual interest rate and 3-year reimbursement. Loan reimbursed by a Fishing Unit is used to finance the establishment of other Fishing Unit.

The Fisheries Department advises the fishermen to limit the Fishing Unit establishment fund to 1 million VT, so as to prevent overburdening of the fishermen with reimbursing the loan.

When a Fishing Unit becomes unable to continue its operation due to various reasons, and furthermore it has remnant debt to the Development Bank, the Fisheries Department will be entitled to confiscate the equipment and apparatuses of the Fishing Unit in question. (The relevant regulations prohibit the repayment of the reimbursed funds). The confiscated equipment and apparatuses will be repaired by he Fisheries Department and will be utilized by other Fishing Units.

Government subsidies to Fishing Units are applicable only on the occasion of their establishment, and the subsequent renovations accompanying the depreciation of the equipment and apparatuses must be done by effort of the Fishing Units. The basic idea of the VFDP is to realize the future independence of the Fishing Units from the protection of the Fisheries Department, so as to realize the production, distribution and sales are carried out in an economic way.

2-3-5 Current state of the VFDP

(1) State of activities of the Fishing Units

1) Fishing Units

The number of Fishing Units of the VFDP is increasing satisfactorily, with 11 in 1983, 20 in July 1984 and 34 in December 1984, and concurrently the annual production is evolving proportionally, mounting to 96.3 tons in 1984 (Table 3, Figure 2).

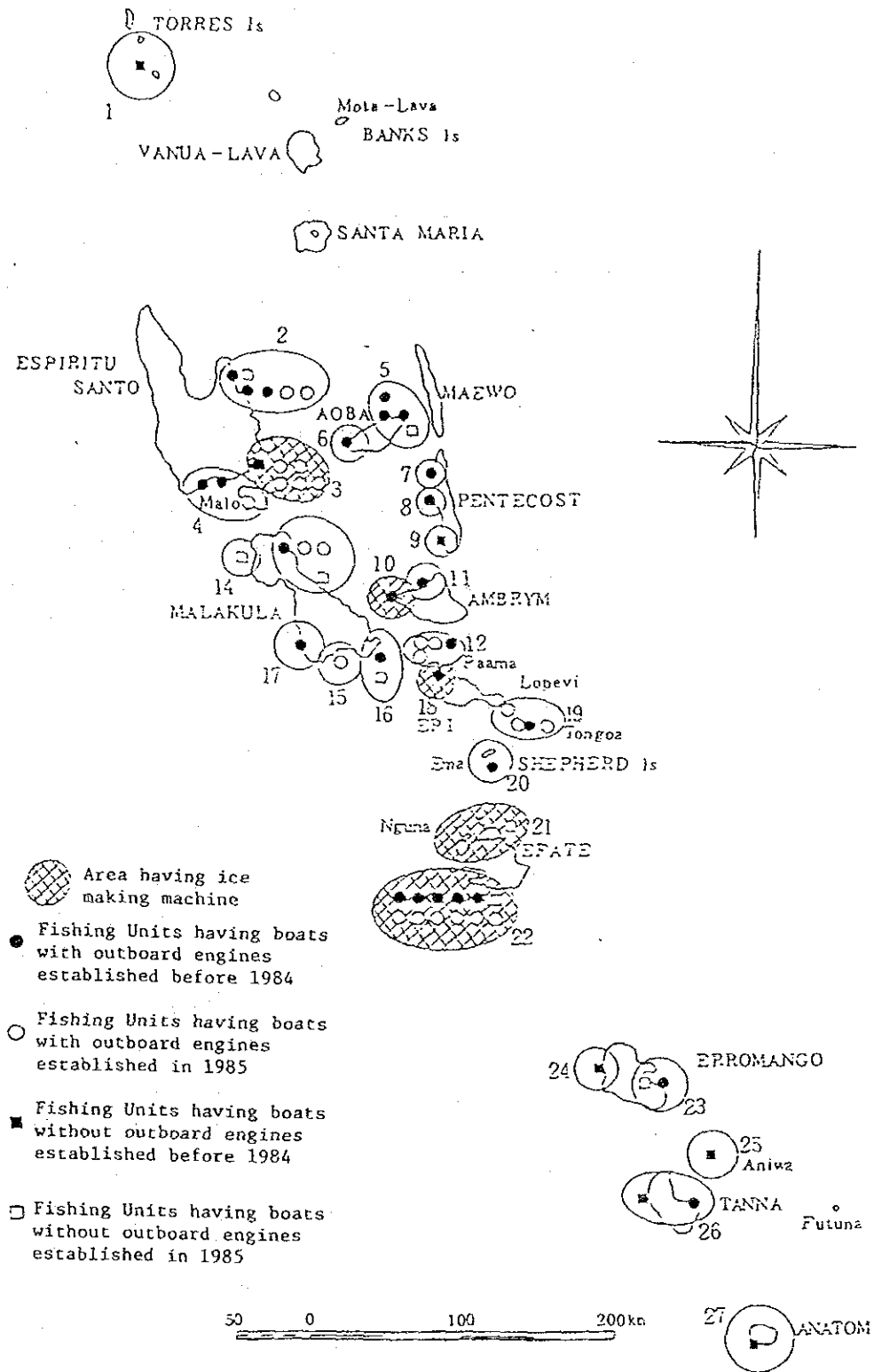
The number of Fishing Units as of October 1985 mounts to 67 (with 53 of them possessing fishing boats equipped with outboard engines), and furthermore more than 50 applications for participating in the Fishing Units of the VFDP from all over the country are mainly to be examined at the present time. Refer to Figure 2 for the location of the existing Fishing Units. Of the 67 Fishing Units existing at the present time, barely 5 possess more than one fishing boat equipped with outboard engines, and more than 90% of the total are Fishing Units consisting of one fishing boat equipped with outboard engines possessed and operated jointly by the people of a village.

Table 3. Evolution of the number of Fishing Units and resulting expansion of yield

	1983	Jul. 1984	Dec. 1984	Oct. 1985
No. of Fishing Units	11	20	34	67
(*)	--	--	(6)	(14)
Annual production by the VFDP	49,092 kg	--	96,318 kg	---

(*) Fishing Units equipped only with canoe.

Figure 2 : Area having existing Fishing Units



The Fisheries Department stipulates the fulfilment of some conditions as requirement for establishment of Fishing Units, but on the other hand importance is attached to the will of farmers of provincial areas in the basic conception of the VFDP, and such being the case the establishment of some Fishing Units have been authorized even when it does not meet the totality of the requirements, if the unit in question is regarded as useful for promoting the coastal fishery. In particular, when the distribution system stipulated in the context of the VFDP is taken into consideration, the accessibility of the Fishing Unit in question to air routes for distribution of marine products is a geographic condition regarded as indispensable for the expansion of the marketing routes to the urban areas (this is one of the conditions stipulated by the Fisheries Department). After 4 years of implementation of the VFDP however, there are many Fishing Units that are irregular in view of the said requirements.

2) State of marketing function for fisheries products

As things now stand, there are just a few Fishing Units with satisfactory balance between the production sector and the distribution sector, and as a matter of fact most of the existing Fishing Units are too much biased to the production sector in view of the shortage of financial resources of the VFDP and the insufficiency of the supporting system (manpower, repair/maintenance of equipment, etc.) which is indispensable for a satisfactory operation of the distribution equipment (ice machines, etc.), in addition to the interest of the fishermen focusing almost exclusively on the production sector.

The state of things of the existing Fishing Units as of October 1985 are summarized in the following.

1.	Fishing Units consisting of fishing boats equipped with outboard engine and marketing equipment:	
	Ice making machine	3 units
	Gas burning type cold store	9 units
2.	Fishing Units consisting exclusively of fishing boat equipped with outboard engines:	41 units
3.	Fishing Units consisting of canoes:	7 units
4.	Other Fishing Units without any equipment:	7 units
	Total	67 units

3) Effects of marketing equipment for increase of production

The total annual yield attained by the 34 Fishing Units of the VFDP in 1984 mounted to 96,318 kg, which corresponds to an average yield of 2,833 kg per Fishing Unit. The annual yields of the two Fishing Units equippd with block-ice machines during the same year were 7,864 kg and 6,231 kg, respectively, which represent 2.8 times and 2.2 times of the average yield, and on the other hand the average annual yield of Fishing Units equipped with absorption type small-sized cold store mounted to 3,701 kg, which is 1.3 times the average yield of all Fishing Units.

On the other hand, the trading area of Associations which are not equipped with storage facilities is restricted to the village, because the long-distance transportation of marine products is impossible. Under the circumstances, the purchasing prices from the fishermen is restricted at a low level so as to prevent excessive production of fish, and on the other hand the selling price to the village tends to be expensive, obstructing as a consequence the growth of the Fishing Unit. As can be seen, the necessity

of introducing distribution facilities in the VFDP is obvious for the sake of promoting the coastal fishery of the country.

4) Fishing equipment

At the beginning, fishing boats used in the Fishing Units of the VFDP were 5-meter western style fishing boats equipped with outboard engines and 8.6-meter western style fishing boats, both made in foreign countries, but the number of 7.4-meter small-sized fishing boats constructed in domestic shipyards is increasing, concurrently with the strengthening of the domestic shipbuilding capacity.

These western-style fishing boats of the VFDP, constructed in domestic shipyards, have larger width and depth and are shorter in length compared with Japanese coastal fishing boats that are used mainly for net fishing, and as a matter of fact their dimensional ratio is more appropriate to the sea conditions prevailing at the vicinity of Vanuatu. In other words, the sea areas of Vanuatu are facing the ocean and have more severe wave conditions, and the shape of the said boats is more appropriate for securing the safety when operating under the said conditions. Furthermore, for the sake of safety the regulations state that these fishing boats must have fire-fighting equipment always at hand and a small-power auxiliary outboard engine for emergency use (normally the main propulsion engine has 25HP and the auxiliary propulsion engine for emergency use has 8 HP), but in reality it is difficult to install two outboard engines in every fishing boat in view of the insufficiency of financial resources.

Thanks to the introduction of western-style fishing boats in the VFDP, it became possible to catch fish living in the steep slopes outside the reefs, such as red snappers

and groupers, as well as pelagic fish such as skipjack, tuna, etc., which used to be difficult with the conventional canoes.

Red snappers and groupers are caught with fishing hooks in fishing grounds with depths of the order of 150 m, but the fishing gear wears out very rapidly because the bottom of the sea has conspicuous undulations.

Skipjack and tuna are caught with trolling lines, but home-made artificial bait is also used in some cases. Anyway the catching efficiency of these fishing methods is low.

(2) Activities of the Port Vila Fisheries Ltd.

The total turnover of the VFDP mounted to 96,318 kg in 1984, with 55% of that total consumed in the various villages, and the remaining 45% sold to the Port Vila Fisheries Ltd.

On the other hand, the Port Vila Fisheries Ltd. sold 87 tonnes of marine products in 1984, with 43.3 tonnes, corresponding to approximately 1/2 of that total, being supplied by the VFDP. Of the supplied quantity, 37 tonnes were transported by aircraft from the Fishing Units of the various islands of the country. The Port Vila Fisheries Ltd. has provided a stable market of marine products to the Fishing Units of the VFDP. The support provided by the Corporation in connection with the distribution of marine products plays an important role for the satisfactory operation of the VFDP. Of the said support activities, the small-scale export business has a particularly close relationship with the development of the VFDP. The small-scale exports of the Port Vila Fisheries Ltd. amounted to 4,000 kg in 1984. Most of the exported marine products consist of catch supplied by the VFDP. The fundamental difference between catch of fishing boats of Fishing Units of the VFDP and other catch is the

fact that fishing boats of the VFDP are developing varieties of fish such as red snappers, groupers, skipjack, etc., with high value in overseas markets, on the steep slopes outside the reefs thanks to the installation of outboard engines in the said boats. Under the circumstances, it may safely be said that if these high-grade fish should be supplied in a stable way and without loss of quality from these fishing grounds to the processing center of the Port Vila Fisheries Ltd., under the auspices of the VFDP, there would be possibility of realizing substantial expansions in the export of marine products. As things now stand, the Port Vila Fisheries Ltd. is considering it possible to expand the exports 10 t within a short-range of the order of 5 years.

The destinations of the current exports are Australia, Hawaii, New Caledonia, etc., and samples have been sent on test basis to Japan as well. Aircraft are used frequently as means of transportation for small-scale exports, and the containers are polystyrene foam insulating boxes. At the present time the containers are imported from New Zealand, but there are problems such as long term of delivery, expensive price, etc. Furthermore, the processing machinery, packing machinery, etc., required for carrying out the exports are not sufficient.

(3) Supporting system by Fisheries Department

1) Administrative and technical guidance for Fishing Units

The Fisheries Department dispatches foreign technical advisors that provide technical guidance for operation of the Fishing Units, and as things now stand (October 1985) there are 7 resident technical advisors in 7 villages.

Foreign Village Fisheries Advisors (*VFA)

Organization & country of origin	Current personnel	Expected personnel	Personnel expected to come in '86
CUSO (Canada)	3	8	
VSO (U.K.)	3	1	1
Holland	2	--	
EDF (EEC)	--	15	3
TOTAL	7	24	4

*VFA: Village Fisheries Advisors (fishery technical advisors)

Fishing Units that are suspected of problems regarding business operation of fishing work are given guidance and advice by dispatching technical advisors as needed. Only 3 Fishing Units, out of the total of 67, were forced to stop their operation because the situation did not improve in spite of the said countermeasures, and generally speaking the technical guidance of the Fishing Department regarding the operation of Fishing Units is bringing about satisfactory results.

2) Maintenance of equipment and materials

The maintenance of equipment and apparatuses used in the VFDP is being carried out by the Maintenance section of the Fisheries Department, but the tools and equipment for maintenance are not sufficient.

Furthermore, the Fishing Units are scattered throughout the various islands, and in many cases they are located at inconvenient geographic positions. Under the circumstances, the maintenance and repair service of the equipment and apparatuses

is not sufficient in view of the shortage of manpower of the Fisheries Department and other adverse factors.

3) Training of the fishermen

Training of fishermen of the VFDP refers mainly to the acquisition of fishing techniques, maintenance and inspection of the outboard engines, etc., and is carried out in the Fisheries Department by training officers and fishery officers of the Department. Each training course has duration of approximately 1 month.

The number of fishermen participating in the training mounted to 45 in 1983, and furthermore, an advanced training course was held in 1984. Fishermen with sufficient experience in the VFDP participated in the advanced course. Participants of the training courses are taught sophisticated fishing techniques and marine product processing techniques. At the present time the same training course is being given in the Espiritu Santo Branch as well. As things now stand, the Fisheries Department has 5 fishing boats for training, but one of them will be scrapped at the end of 1985 because it is timeworn.

Fisheries Department has been promoted fishing methods using fish aggregating devices as a part of extension services.

The sea area of Vanuatu is located on the migration route of pelagic fishes such as skipjack and tuna, but in reality they are merely passing-away shoals because there are only small reefs in this area in view of its topographic characteristics, and the shoals suited for trolling line fishing are inexistent in this sea area. That being so, the

Fisheries Department is making efforts for forming fishing grounds of skipjack, yellow-fin tuna, ordinary tuna, etc., for the VFDP by making artificial fish aggregating devices installed at depths of 240 to 1150 meters.

Fifteen artificial fish aggregating devices have been installed so far, but most of them were lost on the occasion of the typhoon occurred in 1985, and at the present time there are only 5 of them at their original places. Although seasonal factors exert influence on the fish-gathering effect of the artificial fish aggregating devices, 181 kg to 100 kg of catch were attained day after day on the occasion of the fishing tests carried out at the vicinity of these reefs, being therefore confirmed their efficiency.

4) Sales of fishing gear

The fishing gear shop attached to the Fisheries Department head office has excellent control of the equipment and apparatuses, and the saled ledger has a perfect record of data.

As for the inventory at hand and the financial resources however, both are insufficient. Under the circumstances, the shop is being forced for waiting the accumulation of the proceeds up to a sizable sum for ordering the next lot of fishing gear and tackles, and this is obstructing the fishing activities of the VFDP.

(4) Price mechanism of the distribution of marine products within the VFDP

Associations of the Fishing Units purchase fresh fish from the fishermen at 120 VT/kg in average, and sells it

to the village people at 150 VT.

Surplus fish that can not be sold at the villages are brought to Port Vila and are sold to the Port Vila Fisheries Ltd. In the Espiritu Santo Island for example, the Santo Fish shop of the Fisheries Ltd. located in Luganville purchases fresh fish from the Fishing Units, which do not require transportation cost (freight and ice cost) at 150 VT/kg in average and sells it to consumers of marine products in Luganville at 170 VT/kg. However, in the case of the Port Orly Fishing Unit, located at approximately 50 km from Luganville, the transportation of 1 kg of fresh fish to the Santo Fish shop requires an additional transportation cost of 15.5 VT (7.5 VT of ice and 8 VT of freight). That being so, for the Fishing Unit of Port Orly, it is more advantageous to sell marine products within the village instead of selling it to the Fisheries Ltd. In reality however, the Fishing Unit is being forced to sell its surplus marine products to the Port Vila Fisheries Ltd. because the market within the village is limited. Surplus marine products of associations located in islands other than Efete and those of the Santo Fish shop located in Luganville are transported to the Natai shop of the Port Vila Fisheries Ltd. located in the capital city, by using aircraft.

The transportation cost by aircraft is 30 VT/kg of fresh fish for most of the country, excluding some northern islands. The storage containers possessed by the Fishing Units are returned free of charge to the airport after the airlift of the marine products. The relevant freights and arrangements are stipulated in the agreement between the Port Vila Fisheries Ltd. and Air Melanesia, and this airlift system is of great convenience for the distribution of marine products of Vanuatu.

The Natai shop of the Port Vila Fisheries Ltd. located in

the Efate Island purchases fresh fish at an average price of 200 VT/kg, and sells it at an average price of 280 VT/kg to the consumer of the urban area of Port Vila, by marking up the storage and sales expenses.

As can be seen, the fresh fish price rises gradually from the village and middle-scale city the capital city, and the transportation expenses are conveniently absorbed within the said price escalation mechanism.

The main distribution routes and the price mechanism of fresh fish are shown schematically in Figure 3.

2-4 History and contents of the request

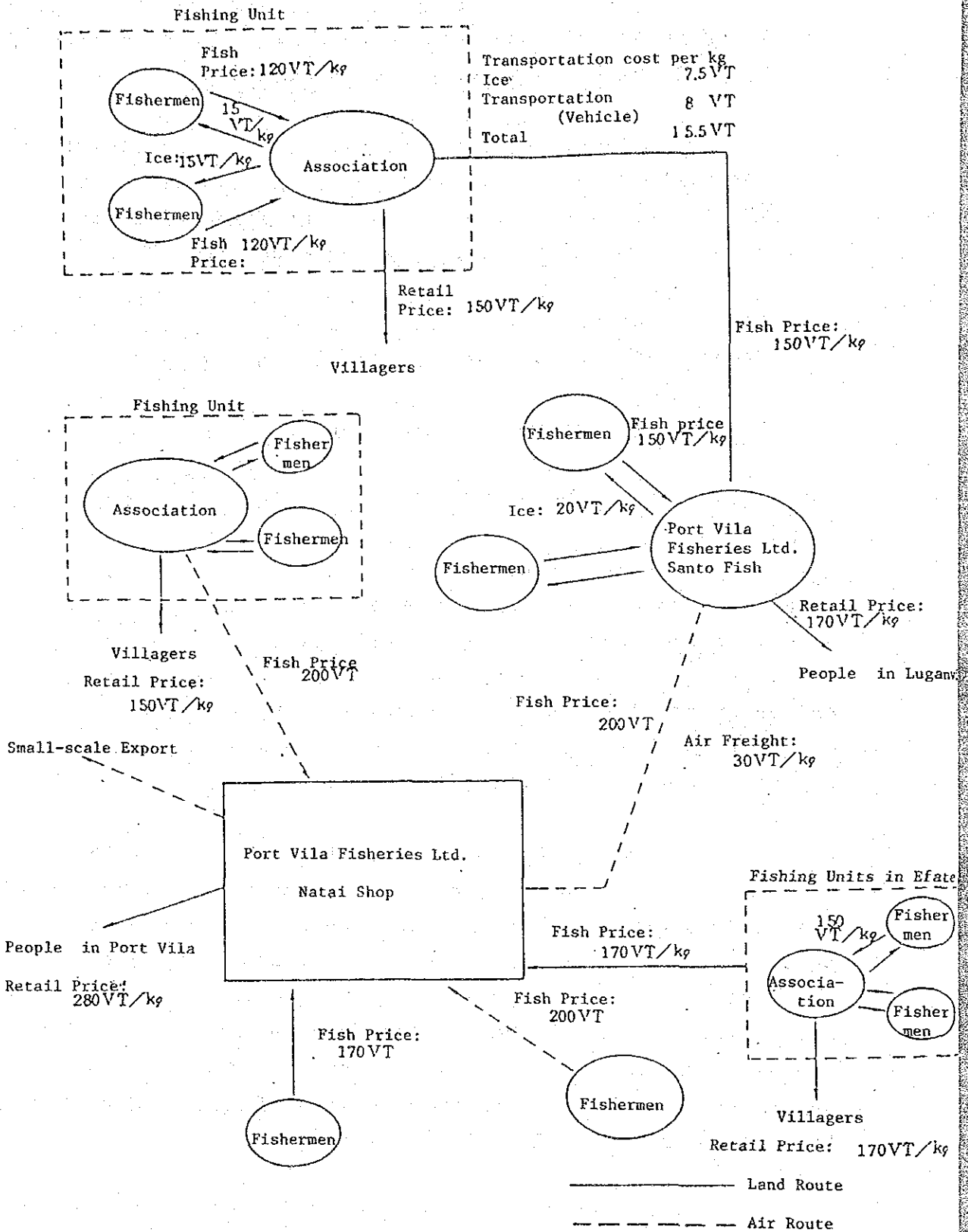
2-4-1 History of the request

Three years have elapsed since the start of the VFDP which was promoted by the Government of Vanuatu, and it may safely be said that positive results have been attained in a steady way. On the other hand, however, the rapid expansion and progress of the program, surpassing by far the initial expectation, has brought about some problems that require an urgent solution, as mentioned before.

Progresses have been made in connection with the availability of human resources and transfer of technology, thanks to the presence of fishery experts and volunteers hired on the basis of aids from foreign countries, but on the other hand, other problems, particularly the shortage of equipment and apparatuses, have come to the fore concurrently with the expansion of the program, and they are becoming serious obstacles to the satisfactory operation of the program and the realization of the objectives.

Under the circumstances, the Government of Vanuatu has drawn up the Village Fishery equipment improvement Project, which has the purpose of expanding and further substantiating the VFDP, and in this connection it has requested a grant-in-aid to the Government of Japan in 1985.

Figure 3: Price mechanism of fish



2-4-2 Contents of the request

The equipment and apparatuses requested by the Government of Vanuatu for solving problems of the various fields related to the VFDP are listed in the followings.

- (1) Equipment and materials required for expanding the Fishing Units.

Name of the equipment and apparatuses	Quantity
a) Outboard engines, 8HP and 25 HP	100 units
Special spare parts for the said outboard engines	2 sets
b) Inboard diesel engine sets	25 sets
c) Fishing gear and marine chandlery	
- For Fisheries Department Head Office	3 sets
- For Fisheries Department Branch Office	2 sets
- For Extension Service Offices	9 sets

- (2) Equipment and materials required for improving fish marketing function

- 1) Equipment and materials required in the existing association

Name of the equipment and materials	Quantity
a) Small-sized block ice machines, water storage tanks and ice crushers	23 sets
b) Small-sized box freezers	46 units
c) Generators	23 units
d) Emergency generators for box freezer	3 units
e) Small-sized absorption-type refrigerators	12 units
f) Heat insulating fish boxes	300 boxes 500 boxes
g) Radio telephone	23 units

2) Equipment and materials required at the
Port Vila Fisheries Ltd.

Name of the equipment and apparatuses	Quantity
a) Outdoor type small-sized flake ice machine	3 units
b) Outdoor type small-sized cold store	1 unit
c) Manual operation type small-sized polystyrene heat insulating fish box moulding machine	1 set
d) Vacuum sealer	1 unit
e) Hand-held type small-sized powered strapping tool	2 units
f) Electric and bimetal type fish body thermometers	2 units each
g) Heat insulating fish box for collecting use	50 units
h) Digital type platform scale for arriving goods, equipped with totalizing and recording functions	1 unit
i) Mechanical platform scale	1 unit
j) High pressure hot & cold water fish box washing machine	2 units
k) Small-sized electric saw for frozen fish	1 unit
l) Digital retailing scale equipped with cash register function	2 units
m) Cold store showcase for retailing	2 units
n) Pump and piping materials for live lobster tank	1 set

(3) Equipment and materials required for strengthening the supporting services of the Fisheries Department

- 1) Equipment and materials required for installing the extension service offices

Name of the equipment and materials	Quantity
a) Small-sized extension service boat	6 units
Outboard engines for lending	10 units

Name of the equipment and materials	Quantity
b) Prefabricated small-sized warehouses	9 units
c) Small-sized generator	9 units
d) Radio telephone	9 units
e) Motor cycle	9 units
f) Absorption type refrigerator	9 units
g) Calculators and safety box	9 units each
h) Hand bearing type compass	9 units

2) Fish aggregating device

Name of the equipment and materials	Quantity
a) Fish aggregating device	6 sets

3) Equipment and materials required for improving the repair, maintenance and supply capacities

Name of the equipment and materials	Quantity
a) Small-sized repair service boat	1 unit
b) Outboard engines for lending	2 units
c) Hand tools for mechanical and wood-working use and small-sized powered tools	11 sets
d) Small-sized powered tools and general purpose lathe	2 sets
e) Special tools for engine maintenance work	2 sets
f) Fuel injection test pump	3 sets
g) High-pressure hot water and cold water washing machine	2 units
h) Pontoon pier	2 units
i) Truck with a crane	2 units

4) Equipment and materials for education
and training of VFDP fishermen

Name of the equipment and materials	Quantity
a) Small-sized fisheries training boat	2 units
b) Outboard engines for the Fisheries Department	50 units
c) Portable type echo sounder	4 units
d) Radar	1 unit
e) Speed meter for training boat	2 units
f) Parts list, manuals, educational movies, engine cutting model, etc.	1 set

5) Other equipment and materials

Name of the equipment and apparatuses	Quantity
a) Scanning receiver	2 units
b) Surface sea water thermometer	2 units
c) Recording type anemometer	2 units
d) Barometer	2 units

3. FISHERIES EQUIPMENT IMPROVEMENT PROJECT

Regarding the Village Fisheries Equipment Improvement Project which was planned by the Government of Vanuatu, the Government of Vanuatu requested cooperation of Japanese Government for the implementation of the said Project. Japan International Cooperation Agency executed the basic design survey for the part of the project which Japanese Government could cooperate for the Project. This chapter explains the adequacy of the Project and the scale of the Project.

3-1 Objective of the Village Fisheries Equipment Improvement Project

Examining the activities developed so far under the auspices of the VFDP, it is obvious that the promotion of the production activities went too far ahead, and on the other hand the promotional measures regarding the distribution and sales of marine products are lagging behind. Furthermore, the support system is not sufficient to cope with the current state of development of the VFDP.

Under the circumstances, it is concluded that the balanced development of the undermentioned aspects is indispensable for realizing a satisfactory progress of the VFDP from now on.

- 1) Enlargement of the Fishing Units (production activities)
- 2) Improvement of the distribution and sales of marine products
- 3) Strengthening of the supporting system by the Fisheries Department

The Village Fisheries Equipment Improvement Project aims at furnishing equipment and apparatuses required for realizing the said objectives, and therefore providing overall cooperation to the future activities of the VFDP.

In reality however, the VFDP does not have clearly defined target values such as increase in fisheries production because the main theme of the program itself is the improvement of the livelihood of the local farmers through the fishery, with priority given to the will of the farmers, and as a matter of fact it is a people's-will-led type (bottom-up) development program. That being so, this project will be supposed to implement at the end of 1986, and the equipment and apparatuses required in connection with the expansion of the business under the auspices of the VFDP will be furnished within 1 year after its implementation, i.e., until the end of 1987.

3-2 Outline of the Village Fisheries Equipment Improvement Project

3-2-1 Basic line of reasoning

(1) Revision of the VFDP concept

The basic component of the VFDP is the Fishing Unit, which has both production and distribution functions. The establishment of these Fishing Units in the various islands makes it possible not only to expand the output of marine products of coastal fishery but also to distribute surplus catches to urban areas. Four years have elapsed since starting the implementation of the VFDP, but it must be pointed out that the establishment of "complete type" of Fishing Units as they ought to be is not progressing satisfactorily, and in reality units having exclusively production function are being established in succession. A "complete type" of Fishing Unit ought to have both

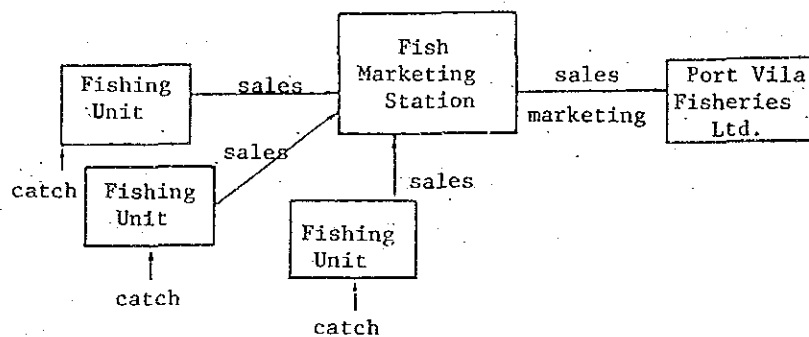
roduction and distribution functions, but the following problems must be solved for establishing them.

- 1) It is necessary to improve public means of transportation, to expand airlines, and to realize the regular operation of vessels equipped with cold storage or freezing storage facilities.
- 2) As things now stand, part of the initial investment of installing storage facilities is subsidized by the Government of Vanuatu, but the burden is very heavy in view of the fragile financial capacity of the local people.
- 3) There is chronic shortage of technically qualified personnel for carrying out the maintenance and repair of equipment.

Under the circumstances, it is presumed that in the future the establishment of "complete type" of Fishing Units will be possible beginning from areas in which the said problems are solved. In reality however, there is great expectation of the local farmers regarding the expansion of the VFDP, and the establishment of new Fishing Units can not be interrupted, but on the other hand it is very difficult to make it compulsory for the new Fishing Units to be fully equipped with both production and distribution functions.

Under the circumstances, the stopgap measure of temporary character for mitigating the problem calling for immediate solution is proposed in the followings. A fish marketing station equipped with ice-making machine was established in the northern part of the Efate Island in August 1985. Then, various nearby Fishing Units equipped exclusively with outboard engine fishing boats began to make good use of the ice-making machine of this marketing station, and the said units became able to forward their catches to the

Port Vila Fisheries Ltd. This example is quite illustrative, and the establishment of fish marketing stations equipped with distribution and sales functions at areas satisfying the geographic conditions for sales and distribution of marine products, so as to realize a symbiosis with Fishing Units specialized in production function, seems to be a realistic solution for the current problems, and a scheme acceptable for the local fishermen. An illustrative representation of the proposed measure is shown in the following figure.*1



At the beginning the VFDP was drawn up by assuming the establishment of "complete type" of Fishing Units equipped with both production and distribution & sales functions, as mentioned in section 2-3-3, but in reality these units differentiated in 4 distinct forms. Under the circumstances, confusion becomes unavoidable when these

*1 Even when the means for distribution and sales are improved up to some extent by taking the said countermeasures, Fishing Units located at places that do not satisfy conditions for establishment of fish marketing stations at nearby areas will be left behind this scheme, and they will remain unable to secure routes for stable marketing of surplus marine products. After the implementation of this project it will be indispensable to consider some countermeasure or other to secure means for distributing the catches of the said remote Fishing Units.

distinct forms are given the generic name "Fishing Units". To avoid possible confusion, entities under the auspices of the VFDP are classified in 2 types, in conformity with the revision in the basic conception of the VFDP, with those specialized in production by operating outboard fishing boats defined as Fishing Units, and those taking charge of the distribution and sales functions and operating storage facilities (ice-making machines or absorption type refrigerators) defined as small- and medium-scale Fish Marketing Stations.

(2) Strengthening of the Fishing Units
(production activities)

Symptoms of overfishing due to demographic growth and the consequent overdevelopment are beginning to appear in the coastal fishery (fishery inside the reefs) of Vanuatu. Therefore, from the standpoint of fishery resources, it is recommendable to keep from implementing further production expansion plans in the fishing grounds of the sea areas inside the reefs, so as to secure the said fishery resources and foodstuff of the local people. Under the circumstances, the modernization of the fishery under the auspices of the VFDP, and the exploitation of the fishery resources of the sea areas of the steep slopes outside the reefs, which remained unutilized until the present time, results into enlarging the scope of the coastal fishery of Vanuatu, contributing as a consequence not only to the plan for increasing the output of marine products, but also for satisfying the increasing demand of marine products in the urban areas by supplying the surplus fish.

When considering the future establishment of new Fishing Units, it is desirable to make the selection by giving priority to farmers able to ship their surplus production to urban areas, i.e., those one satisfying the undermentioned conditions, because if not, the raising of

self-owned funds and the reimbursement of the loans contracted for purchasing fishing boats equipped with outboard engines and other equipment required for establishing the Fishing Unit anew may result into an overburden for farmers that do not have means for shipping their catches to the urban markets.

- 1) Farmers of the vicinities of cities
- 2) Farmers living at the vicinity of airports
- 3) Farmers living in areas equipped with storage facilities

In reality however, the VFDP has been implemented based on the primordial idea of paying as much regard as possible to the will of the people of each area, and as a consequence in the actual selection process the aforementioned criteria used to play merely a secondary part taken into consideration only for the sake of reference. Therefore, in this project importance is attached to the actual state of things, i.e., the selection method adopted so far by the Fisheries Department is respected as it is, and no restriction is imposed in particular on the location of the Fishing Units.

- (3) Improvement of the distribution and sales of marine products

Examining the activities carried out so far under the auspices of the VFDP, it is undeniable that the whole development process is strongly biased to the production sector, with the activities related to the distribution and sales of marine products lagging behind. As for the causes of the said imbalance, it may safely be said that it was too premature to burden both production function and distribution & sales function to the local fishermen (Fishing Units), in view of their fragile economic and technical foundations, and this is an aspect with a lot of

room for improvement. Therefore, this project proposes to strengthen the functions for distribution and of marine products turned out under the auspices of the VFDP, by examining the contents of the equipment and apparatuses requested by the Government of Vanuatu, and by constructing Fish Marketing Station of three distinct levels mentioned in the followings.

1) Large-scale Fish Marketing Station

Port Vila Fisheries Ltd. will be categorized into this large scale station concept.

The Station should be able to cope with the arrival of quantities of marine products expected to increase concurrently with the development of the VFDP, and should be provided with the required equipment and facilities.

2) Midium-scale Fish Marketing Station

The operational entity, establishment procedure and financial plan of these Stations should be the same as those of conventional Fishing Units (Associations), but they should be equipped with small-sized ice making machine and other required accessory equipment and facilities, and should carry out the distribution and sales of marine products (provincial areas and urban areas). In other words, they should be units specialized in distribution and sales of marine products.

3) Small-scale Fish Marketing Station

The Station should be the same as the aforementioned medium-scale Fish Marketing Station in connection with most of the characteristics, with exception of the fact of using absorption type refrigerator.

By the way, the small-and medium-scale Fish Marketing Stations should be located at places appropriate for distribution of marine products from the standpoint of economic operation. The Fisheries Department should make efforts so as to realize these Stations through consultations with farmers of the areas in which they are to be located.

(4) Strengthening of the supporting services of the Fisheries Department

A further substantial support service by the Fisheries Department should be provided to the Fishing Units (production activities) and the small- and medium-scale Fish Marketing Stations for the VFDP to develop still more. The undermentioned support services will be strengthened thanks to the implementation of this project.

1) Strengthening of the technical extension and support services

The Fisheries Department has plans for establishing 9 extension service offices to be used as bases for technical extension activities such as guidance for improving fishing gear and methods, introduction of new fishing methods, correct handling of catches, as well as other activities for upgrading the livelihood of the fishermen, such as economic operation of the VFDP and other related aspects.

2) Strengthening of the repair and logistical capacity

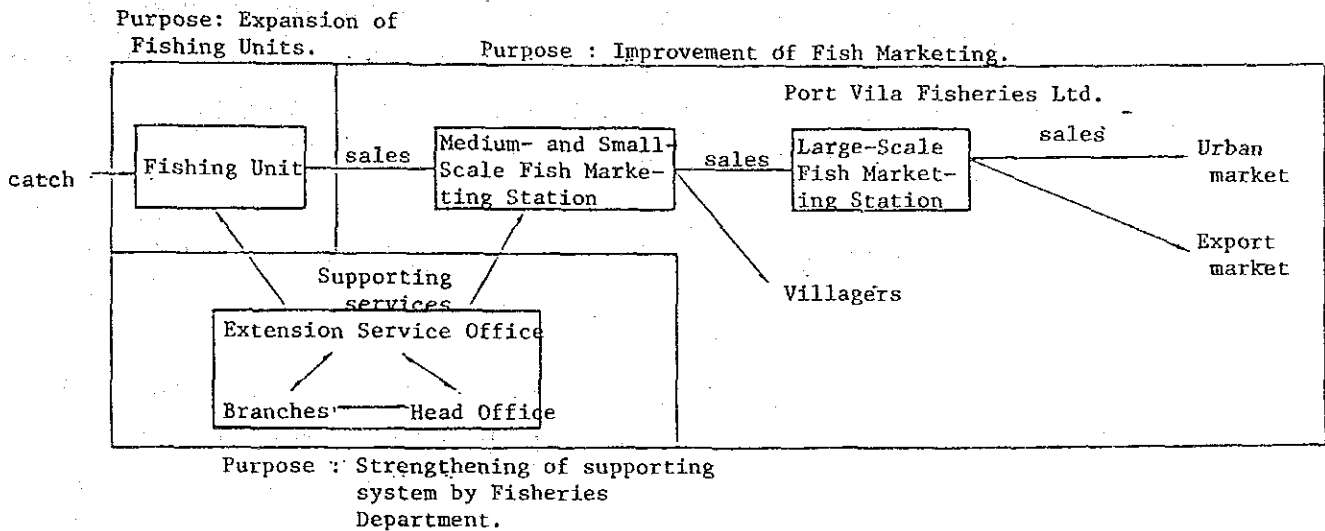
Services of various kinds provided to the fishermen will be expanded and strengthened by establishing a systematic scheme related to the inspection, maintenance and repair of equipment of various kinds used under the auspices of the VFDP. Logistic capacity related to the supply of fishing gear,

tackles, fuel oil and the like will be strengthened as well.

3) Strengthening of the fishermen training functions

The education and training functions being provided by the Fisheries Department to the fishermen will be strengthened as well.

Based on above basic line of reasoning, expansion of fish production, improvement of fish marketing system and strengthening of supporting services, which are attained under successful operation of the Project, are mutually interrelated as follows.



3-2-2 Determination of scale and study of appropriateness of the Village Fisheries equipment Improvement Project

The scale of the equipment and materials required by the scale of activities to be developed under the auspices of the VFDP until the end of 1987, and the appropriateness of this project are examined by focusing on the 3 points to be improved in this connection, expansion of the production, promotion of the distribution and strengthening of the supporting services. The undermentioned points are taken into consideration for carrying out this study.

1. The equipment and apparatuses to be introduced this time should not surpass by far the technical level of those ones used at the present time under the auspices of the VFDP.
2. The equipment and apparatuses to be introduced this time should be urgently required ones.
3. The equipment and apparatuses to be introduced this time should be utilized to their maximum, and should bring about excellent improving effects.
4. The scale and the appropriateness of the project is examined by dividing it in 3 parts, but a systematic interaction between the production field and distribution field should be taken into due consideration, and the VFDP should be operated satisfactorily from a global standpoint, with good balance of the two fields.
5. The equipment and facilities to be introduced should not require excessive running cost.
6. Depending on the types of equipment to be introduced, it is necessary to take into consideration securing the technical personnel handling them at the initial phase of their introduction.

(1) Establishment of new Fishing Units

Figure 4 shows the evolution of the number of Fishing Units established under the auspices of the VFDP. The expected number of Fishing Units after October 1985 is extrapolated on the basis of actual records collected on the occasion of the field survey carried at that time, and is shown with broken lines. According to the figure, it is estimated that 35 new units will be established from October 1985 to the end of 1986, followed by 39 additional units until the end of 1987. Under the circumstances, it

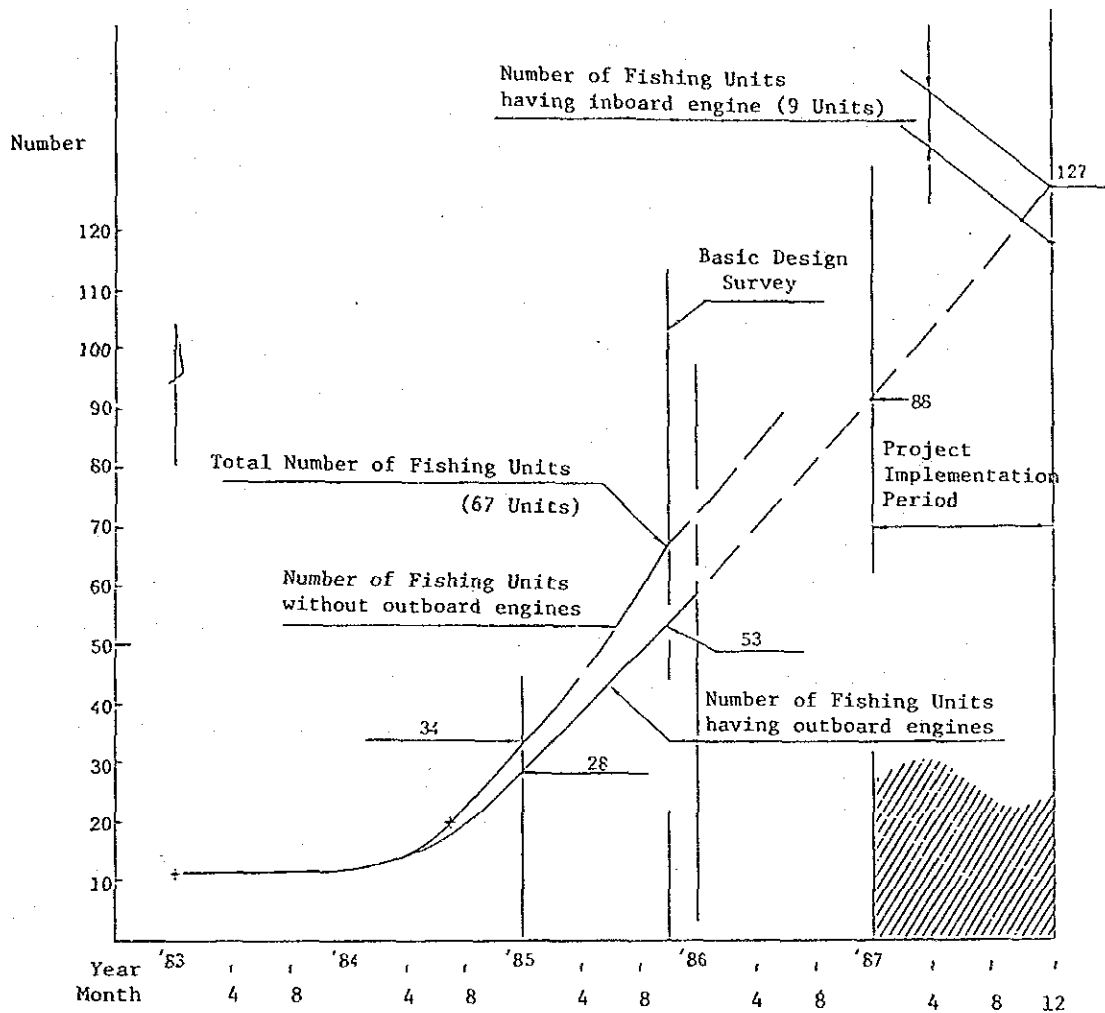


Figure 4 : Trend of increase of Fishing Units

will be examined if this growth trend will remain unchanged and if it will be realized within the context of the future development of the VFDP.

- 1) The establishment of new Fishing Units under the auspices of the VFDP is progressing satisfactorily, backed by the great expectations local farmers are placing on the development of this program, and there is no problem for selecting the fishermen groups to take charge of the 35 Fishing Units to be established anew in 1986 and the additional 39 in 1987, because there is a rush of applications for participataing anew in the VFDP.
- 2) As for the fishery resources, it is estimated that the shoals of demersal fish alone, living in the steep slopes outside the reefs, mount to 1,000 tonnes/year and it may safely be said that there is sufficient room for further development even after adding the output of the aforesaid new Fishing Units to the approximately 100 tonnes/year catch recorded in 1984 under the auspices of the VFDP, because resources of migratory pelagic fish must be taken into consideration in addition to the demersal ones.
- 3) As for the domestic market of marine products, the quantity handled by the Port Vila Fisheries Ltd. Natai Shop in 1984 was 87 tons/year, which corresponds to an annual quantity of barely 6 kg of fish protein per capita, and it is unquestionable that there is sufficient room for absorbing the increases brought about by the development of the VFDP. Furthermore, it must be borne in mind that the said figures refer to the urban area of Port Vila alone.
- 4) Fishing boats used under the auspices of the VFDP are being built at the wooden shipyard located in the

Espiritu Santo Island. (Aid mounting to 7.5 million VT provided by Canada is being used as revolving fund for shipbuilding). This shipyard has an annual capacity of approximately 50 ships, and approximately 60 to 80% of its output, corresponding to 30 to 40 ships, is being used under the auspices of the VFDP. Therefore, it is perfectly possible for this shipyard with the current capacity to build 21 ships in 1986 and 39 in 1987 for use by the fishing units.

Therefore, it is concluded that there is no factor within the said conditions that could obstruct the realization of this growing trend. That being so, the financial aspect related to the implementation of this project is examined in the followings.

As things now stand, the Fisheries Department possesses 15 outboard engines and has ordered 24 more for coping with the establishment of new Fishing Units in 1986. These 39 outboard engines will be sufficient to equip approximately 20 fishing boats, because each fishing boat has 2 engines.

Furthermore, the owned fund of the fishermen to be collected by selling these 39 outboard engines (1/2 of the outboard engine price) will make it possible to purchase approximately 20 new outboard engines, which will allow the Fisheries Department to equip approximately 10 fishing boats. Therefore, this capital turnover scheme will allow the Fisheries Department to procure approximately 70 units of new outboard engines until December 1986, which will be sufficient to equip 35 fishing boats. As can be seen, it will be possible to procure the outboard engines of the 35 fishing units to be established anew until the end of 1986 by using independent financial resources of the Fisheries Department.

It must be borne in mind however, that the Fisheries Department has not succeeded yet at securing the financial resources for importing equipment required for establishing new Fishing Units in 1987.

By the way, if equipment for establishment of 39 new Fishing Units (outboard engines and the like) should be provided under the auspices of this project, it would be possible to accomplish the establishment of 127 Fishing Units at the end of 1987, and this scheme seems perfectly pertinent. Furthermore, the Fisheries Department has plans for building 9 inboard engine fishing boats by the end of 1987. The maintenance and control of inboard engine boats is easier and their operation cost is cheaper compared with inboard ones, and the experimental introduction of a few boats of this kind aiming at their future popularization under the auspices of the VFDP seems perfectly plausible.

Under the circumstances, the provision of equipment for establishing 39 new Fishing Units in 1987 (30 units equipped with outboard engine fishing boats and 9 units with inboard engine boats) will be included within the scope of this project.

As for fishing gear, they are badly short, and as a matter of fact some of the existing Fishing Units are being forced to suspend their operation for 2 or 3 months until the arrival of new fishing gear. That being so, the provision of fishing gear for 1 year use of 127 Fishing Units to be established until the end of 1987 to operate will be included within the scope of this project, so as to benefit the existing Fishing Units as well.

The locations of these Fishing Units to be established anew can not be specified accurately

because they will be determined by the request of local fishermen, but it is eagerly desired that the establishment of Fishing Units (39 Fishing Units) of fishermen living at the vicinity of small- and medium-scale Fish Marketing Stations mentioned later be given priority, because these Fishing Units and Marketing Stations will have symbiotic life with close mutual dependence.

Furthermore, when the occurrence of unaboidable consequences of the demographic growth in provincial areas, such as the appearance of landless peasants, collapse of the subsistence economy, etc., are taken into consideration, it will be indispensable to encourage the development of the fishery as main occupation in order to increase job opportunities in the areas in question. In this connection, it is necessary to consider the priority development of fishery in specific areas of the country.

(2) Improvement of the distribution and sales of marine products

The output of marine products is expected to increase concurrently with the increasing number of Fishing Units. Under the circumstances, market development is indispensable to encourage the production will of the fishermen and to secure a satisfactory operation of the fishery as a business. In reality however, the development of large-scale consumption market in areas where the subsistence economy is firmly rooted is quite difficult. Therefore, the improvement of the distribution mechanism is urgent so as to make it possible to realize the market develop-in urban areas and overseas, because they have the demand required to absorb the increasing output of marine products of the VFDP. Three kinds of measures must be taken for the sake of market development:

- 1) sales of marine products in the various provincial

areas of the country, 2) sales of surplus of fish in urban market, and 3) development of overseas markets. The measure 1), 2) can be realized by establishing small- and medium-scale fish marketing stations, and the measures 2) and 3) can be realized by upgrading the functions of the Port Vila Fisheries Ltd. (large-scale fish marketing). The operation of small- and medium-scale Fish Marketing Stations will be taken charge by organizations of fishermen groups under the auspices of the VFDP, in the same way as in the case of Fishing Units. The appropriate scale of each kind of Fish Marketing Station is examined in the followings.

1) Large-scale Fish Marketing Station (Port Vila Fisheries Ltd.)

The more Fishing Units are established the more catches they will turn out, resulting consequently into increasing quantities of surplus marine products. Furthermore, the distribution of marine products will be activated further as a consequence of the introduction of ice-making machines and other equipment mentioned later in the small- and medium-scale Fish Marketing Stations, and that will result into an increasing arrival of goods at the Port Vila Fisheries Ltd. Under the circumstances, Port Vila Fisheries will be required to make further efforts to strengthen its facilities for fish products gathering, reception, industrialization, storage and sales, in addition to the expansion of both domestic and overseas markets, so as to cope with the increasing quantities of marine products to be handled. Under the circumstances, appropriate equipment will be required to cope with the increasing volume of work to be carried out at Port Vila Fisheries Ltd.

Furthermore, the expansion of overseas markets plays a

key role for the development of the VFDP, as mentioned in 2-3-5.

The small-scale exports of the Port Vila Fisheries Ltd. mounted to 4 tonnes in 1984, and it has plans for expanding the annual exports to 10 tonnes within the 5-year period starting in 1985. That being so, equipment for export packing of various kinds and other related items must be included in this project in order to promote the exports of marine products.

2) Medium-scale Fish Marketing Stations

So far, the development of the VFDP has been too much based to the promotion of the production sector, and there has been no increase in the distribution of marine products to the urban areas due to the insufficiency of distribution facilities in provincial areas. The installation of distribution facilities (ice-making facilities) at strategic points of the country will exert strong impact on the output of marine products, because they will improve the distribution mechanism from the production centers to the consumption centers of large urban areas, stimulating as a consequence the production will of the Fishing Units. Therefore, the installation of these facilities is a crying need. The establishment of these medium-scale Fish Marketing Stations is a kind of financing project based on credit of the Vanuatu Development Bank and subsidy of the Government, in the same way as in the case of Fishing Units, but the selection of their locations must be considered with care, with careful examination of the problem from the economic standpoint, with particular attention paid to the undermentioned aspects, because they will be a huge financial burden for fishermen groups taking charge of their operation.

1. The economic operation of the Fish Marketing Stations is closely related to securing the largest possible quantity of marine products within the scope of the existing distribution mechanism of the VFDP.
2. Recruitment of personnel able to provide control and guidance related to the maintenance and operation of the facilities in question, at least during the initial phase (2 to 3 years), is indispensable for a satisfactory operation of these Marketing Stations, because there is no sufficient operation experience of distribution facilities in provincial areas.
3. The distribution of marine products relies on airlines because Vanuatu is an insular country. Therefore, when the distribution standpoint is taken into consideration, the location of the Fish Marketing Stations at the vicinity of airports and the availability of airlines for transportation of marine products is a "sine qua non" condition.
4. Only certain kinds of demersal fish, such as red snappers, groupers and the like have high market values in urban areas and overseas. Outboard engine fishing boats are indispensable for catching these high-grade fish. Under the circumstances, areas equipped with outboard engine fishing boats and engaged in the development of fishery resources of steep slope sea areas outside the reefs can be regarded as more advanced in terms of coastal fishery compared with other areas. In particular, when there are more than one outboard engine fishing boats in a specific area, it is presumed that the relevant fishery resources and other

pertinent characteristics were surveyed and regarded as promising by the Fisheries Department.

The number of Fishing Units, which was 34 at the end of 1984, increased by 33 in 1985, totaling 67 Units in activity as of October 1985 when the field survey was carried out (of the said total, 53 Units are equipped with outboard engine fishing boats). The location of these Fishing Units is shown in Figure 2.

These 67 Fishing Units can be grouped in 27 areas, in terms of proximity to each other and possibility of mutual exchange. It is presumably possible for Fishing Units of the same area to share the same distribution facilities.

The output of marine products of the various Fishing Units of the VFDP as of 1984 shown in Table 4 are rearranged in terms of the 27 areas, and furthermore the output of each area as of end of 1985 is estimated by multiplying the increase in the number of outboard engine fishing boats^{*1} in each area during 1985 with the average annual catch of each outboard engine fishing boat. (Table 5)

The location of the medium-scale Fish Marketing Stations is examined in the followings, based on the said table.

*1 The 8 canoes allotted in 1985 are not included in this calculation because their destinations are unknown, but anyway they do not exert influence on the selection of sites for establishment of small- and medium-size Fish Marketing Stations.

Table 4

LOCATION, MARINE PRODUCTION OF FISHING UNITS AND VOLUME SELLING TO PORT VILA FISHERIES LTD IN 1984

No.	Name of Fishing Units	Location of Fishing Units	Marine Production (Kg)	Turnover (VT)	Volume selling to Port Vila Fisheries Ltd.		Percentages of volume selling to Port Vila for total production (%)	Percentage of turnover selling to Port Vila for total value (%)
					(Kg)	(VT)		
1	Loh Island	Torres	1,436.2	492,855	1,436.2	492,855	100	100
2	Remre	Port Olry	20,309.3	2,397,427	5,071.0	1,092,520	25	46
3	Sam Wass	Hog Harbour	2,208.8	212,266	--	--	--	--
4	Willie Wass	Hog Harbour	888.8	90,645	32.5	9,800	4	11
5	Santo Fishd	Luganville	13,203.5	2,222,628	13,203.5	2,222,628	100	100
6	Pelvigl	Tangoa Is	53.3	7,709	--	--	--	--
7	Wahirisi	Tangoa Is.	1,377.5	145,279	--	--	--	--
8	Lolopuepue	Ambae	600.2	70,928	--	--	--	--
9	Saigo Wantaem	Lolowai	1,211.0	111,088	--	--	--	--
10	Jackers	Lolowai	4,931.5	480,516	--	--	--	--
11	Daliure	Vilakalaka	2,688.9	320,148	--	--	--	--
12	V.R.T.T.	Lamalanga	4,811.2	554,144	--	--	--	--
13	Association V.V.	Melsisi	695.3	77,031	--	--	--	--
14	Takaroi	Wali-Bay	964.5	166,580	--	--	--	--
15	Wuro	Craig Cove	6,230.5	777,707	--	--	--	--
16	Roune	Linbul	3,504.5	343,300	--	--	--	--
17	Paama	Tahi	5,414.6	687,991	1,928.5	338,943	36	49
18	Ranevanu	Uripiv Is.	473.5	89,285	323.5	57,755	68	65
19	Maskelynes	South Malakula	770.0	117,377	770.0	17,377	100	100
20	South west Bay	Malakula	281.5	50,435	281.5	50,435	100	100
21	Moki	Lamen Bay	7,863.8	1,052,040	3,196.7	569,349	41	54
22	Koroliko	Panita	5,946.2	811,720	181.0	31,425	3	4
23	Emae		146.0	62,420	146.0	62,420	100	100
24	Potiet	Port Vila	1,650.5	233,372	1,650.5	233,372	100	100
25	Fatu Rere	Port Vila	3,682.4	785,636	3,682.4	785,636	100	100
26	Mele I	Port Vila	527.0	142,991	527.0	142,991	100	100
27	Vixen	Port Vila	192.8	35,555	192.8	35,555	100	100
28	Mele II	Port Vila	294.0	45,930	294.0	45,930	100	100
29	Ipota	Erromango	598.5	290,530	589.5	290,530	100	100
30	Dillions Bay	Erromango	39.5	5,610	39.5	5,610	100	100
31	Aniwa		79.5	14,370	79.5	14,370	100	100
32	Tom Nalawas	North Tanna	782.5	117,970	--	--	--	--
33	Shingiau	Waisisi	1,821.7	240,918	--	--	--	--
34	Aneityum		654.0	380,736	654.0	380,736	100	100
	Total		96,317.9	13,635,146	43,279.6	6,980,237	36	51

Table 5

SITE SELECTION FOR ESTABLISHMENT OF SMALL- AND MEDIUM-SCALE FISH MARKETING STATIONS

*1 Area	Name of location	Output of marine products in 1984	*2 No. of boats		Assumed output of marine product in 1985	*3 Rank	*4	*5	*6	*7	*8	*9
			'84	'85								
3	Luganville	13,204 kg	1	6	43,444 kg	1	○	○	○			
22	Port Vila	6,347 kg	5	6	36,587 kg	2	○	○	○			
21	North Efate	-	0	2	10,080 kg	6	○	○	○			
18	Lamen Bay	7,864 kg	1	0	7,864 kg	7	○	○	○			
10	Craig Cove	6,231 kg	1	0	6,231 kg	9	○	○	○			
2	Port Olry	23,401 kg	3	2	28,441 kg	3	—	○	○	○	○	○
12	Tabi	5,415 kg	1	3	12,975 kg	4	—	○	○	○	○	○
19	Panita	5,946 kg	1	2	10,986 kg	5	—	○	○	○	○	○
5	Lolowai	6,743 kg	3	0	6,743 kg	8	—	○	○	○	○	○
13	Uripiv Is.	474 kg	1	2	5,514 kg	10	—	○	○	○	○	○
7	Lamalanga	4,811 kg	1	0	4,811 kg	11	—	—	○	—	—	—
4	Tangoa Is.	1,431 kg	2	1	3,951 kg	12	—	○	○	○	○	○
11	Linbul	3,503 kg	1	0	3,503 kg	13	—	—	○	—	—	—
6	Vilakalaka	2,689 kg	1	0	2,689 kg	14	—	○	○	○	○	○
26	Waisisi	2,604 kg	1	0	2,604 kg	15	—	○	○	○	○	○
15	South malakula	-	0	1	2,520 kg	16	—	—	○	—	—	—
1	Torres	1,436 kg	0	0	1,436 kg	17	—	○	—	—	—	○
9	Wali-Bay	965 kg	0	0	965 kg	18	—	○	—	—	—	○
16	Maskelynes	770 kg	1	0	770 kg	19	—	○	—	—	○	○
8	Melsisiy	695 kg	1	0	695 kg	20	—	—	○	—	—	—
27	Aneityum	654 kg	0	0	654 kg	21	—	○	—	—	—	○
23	Ipota	499 kg	1	0	499 kg	22	—	○	○	—	—	○
17	South west Bay	282 kg	1	0	282 kg	23	—	○	○	—	—	○
20	Emae	146 kg	1	0	146 kg	24	—	○	○	—	—	○
25	Aniwa	80 kg	0	0	80 kg	25	—	○	—	—	—	○
24	Erromango	40 kg	0	0	40 kg	26	—	○	—	—	—	○
14	North west Malakula	-	0	0	-	27	—	—	—	—	—	○

- *1. Area number for the area having Fishing Units designated in Figure 2.
 *2. Number of fishing boats with outboard engines.
 *3. Area having existing ice machines.
 *4. Access to airport.
 *5. Area having Fishing Units with outboard engine fishing boats.
 *6. Availability of Village Fisheries Advisors (VFA).
 *7. Candidate area for sites of Medium-scale Fish Marketing Stations.
 *8. Candidate area for sites of Small-scale Fish Marketing Stations.

- a) Of the Fishing Units located in the 27 areas in question, Santo Fish, Ramen Bey, Port Vila, Craig Cove and North Efate are excluded because they are already equipped with ice-making machine.

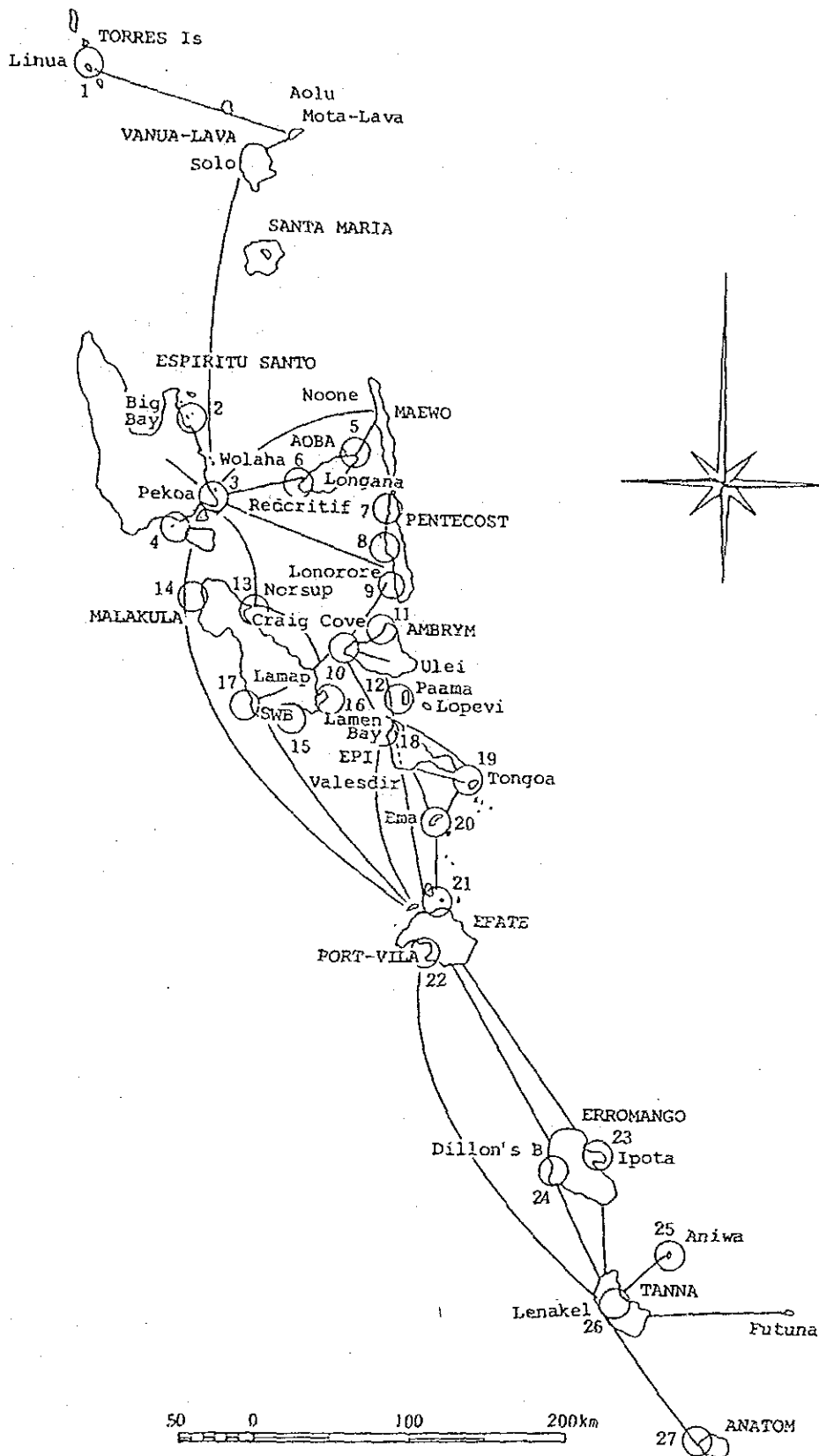
The remaining areas are ordered in terms of estimated output of marine products during 1985, and they are examined one by one beginning from that with largest production.

- b) The distribution stations must be located in areas in which airlines are available for distribution of marine products.
(Figure 5)

There are 12 areas satisfying the conditions b) and c).

- c) On the other hand, the recruitment of 11 foreign technical personnel for the VFDP, available at the end of 1986, has already been confirmed, but 2 of them will be resident at the Santo Branch of the Fisheries Department for control and operation of the repair service boat described later, and therefore 9 of them will be available as VFA (Village Fisheries Advisors) for taking charge of the control and guidance related to the initial phase of maintenance and operation of the medium-scale Fish Marketing Stations.
- d) It is indispensable to secure a sufficiently large quantity of marine products to guarantee the economic

Figure 5: Area having existing Fishing Units and air route



operation of the distribution facilities. Therefore, 9 areas with larger output are selected from among the 12 areas satisfying the conditions b) and c), and are proposed as sites for establishment of medium-scale Fish Marketing Stations. The 9 areas in question are Port Olry, Tahiti, Panita, Lolowai, Uripig Island, Tangoa Island, Vila Kalaka, Waisisi, and Maskelynes. (Table 5).

Therefore, it is regarded as appropriate to include within the scope of this project the provision of 9 units of block ice making machines required for establishing the 9 medium-scale Fish Marketing Stations, as well as other equipment required for their operation. The capacity of the ice-making machines is examined in the next chapter from both technical and economic standpoints, by taking into consideration the economic operation within the context of the fishing scale of the proposed sites.

3) Small-scale Fish Marketing Stations

Small-scale Fish Marketing Stations, characterized by the handling of smaller quantities of marine products, the requirement of smaller investments and easier control and operation compared with medium-scale Fish Marketing Stations, should be established for strengthening the small-scale distribution of marine products. Absorption type refrigerators should be used in these small-scale Fish Marketing Stations, because equipment of this kind is already being used at 7 Fishing Units under the auspices of the VFDP. Accessibility of airlines for making it possible to attain the

future economic independence of the marketing station is an indispensable condition related to the location, because although small in scale the purchase of equipment will require considerable investments.

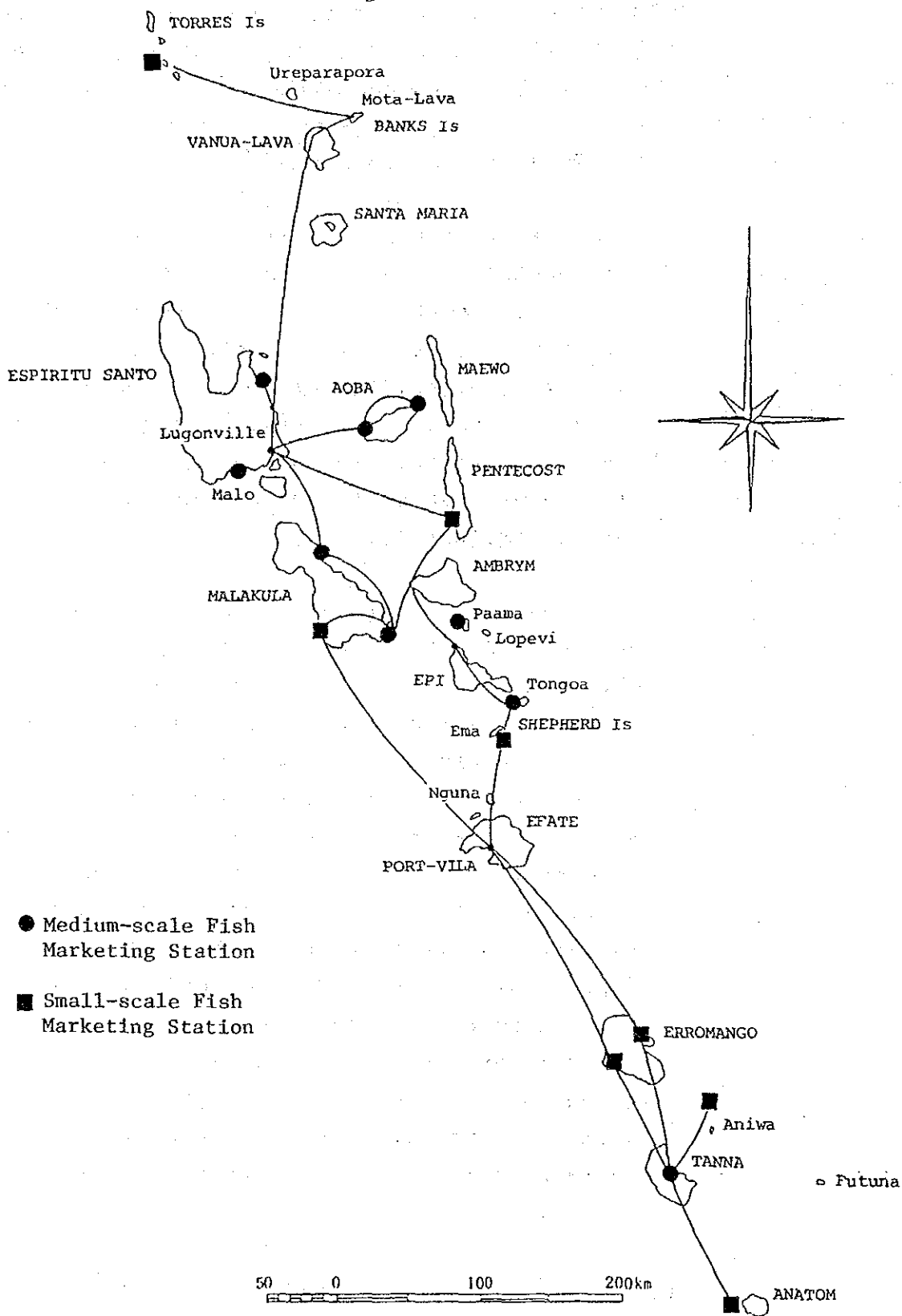
Of the areas listed in Table 5, there are 8 areas excluded from the list of sites proposed for establishment of the medium-scale fish distribution stations, and satisfying the aforementioned conditions, Ipota, South-West Bay, Emae, Torres, Wali Bay, Anatom, Ania and Erromango, and they are proposed as sites for establishment of small-scale Fish Marketing Stations (Figure 6).

Therefore, it is regarded as appropriate to include within the scope of this project the provision of 8 units of absorption type refrigerators required for establishing the 8 small-scale Fish Marketing Stations. The current output of marine products is not taken into consideration in the selection of sites proposed for establishment of small-scale Fish Marketing Stations. The exclusion is based on the fact that if an appropriate distribution route should be secured, the production will of the fishermen would be stimulated and the output of marine products would increase, as mentioned in section 2-3-5 Current State of VFDP. Therefore, the accessibility of airlines is regarded as more important than the current output.

(3) Strengthening of the support services of the Fisheries Department

The Fisheries Department must strengthen further its

Figure 6 : Location map for Small- and Medium-scale Fish Marketing Stations and Air-route



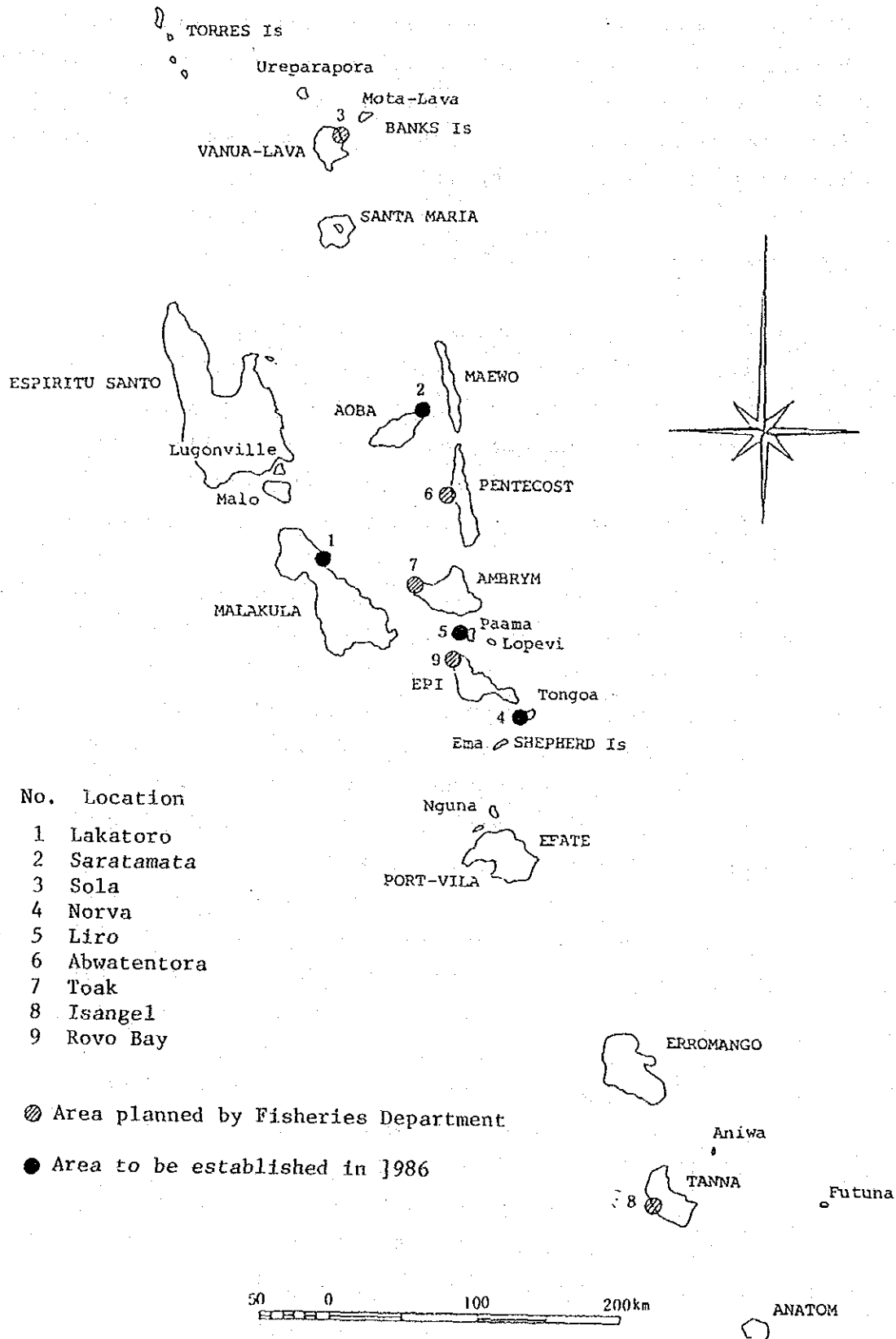
support services to secure a stable operation of the Fishing Units and small- and medium-scale Fish Marketing Stations, and to guarantee still more development for the VFDP. From the functional standpoint, the support services provided by the Fisheries Department to the VFDP can be classified in 3 types.

1) Education and training activities

This part of the support services covers a wide variety of aspects, ranging from technical ones referring to modernization of fishing gear and fishing methods, correct handling of the catch, etc., to economic ones referring to methods for stable operation and profitability of Fishing Units, and requires an ample scope of educational and technical extension activities. Under the circumstances, the Fisheries Department has plans for establishing 9 extension service offices during the 4-year period whose implementation starts in 1986 (Figure 7). In this connection the EC has already decided to provide financial aid amounting to 60 million VT. This aid includes the expenses for construction of the 9 extension service offices and respective lodgings, expenditures for hiring the 9 foreign technical personnel as well as local workers of the Fisheries Department, but on the other hand, it does not take into consideration the extension service boats, the prefabricated warehouses and the equipment required in the technical extension activities. That being so, the Government of Vanuatu requested the inclusion of the said items within the scope of this project. Therefore, the appropriateness of providing the equipment in question to the technical extension offices is examined in the following.

The warehouses mentioned in the request will be used for storing the fishing gear and other materials

Figure 7: Candidate Area for Technical Extension Offices



comprised in this project, and furthermore they will be used as space for middle-scale repair to be carried out within the scope of the repair services to be provided by the Fisheries Department. Therefore, these warehouses must be constructed adjacent to the extension service offices. That being so, these warehouses must be constructed in areas in which the expropriation of the site is finished and the construction of the extension service office is started by the end of 1986. According to the plans of the EC, the implementation of the portion equivalent to 24 million VT, corresponding to 40% of the total sum of the aid, will be implementation of the portion equivalent to 24 million VT, corresponding to 40% of the total sum of the aid, will be implemented in the first year. It is expected that 4 extension service offices will be established by the end of 1986, because the expenditure of each office, including payroll, will mount to 6 million VT.

The extension service offices will play a key role in connection with the maintenance and control of equipment required in the Fishing Units and the medium-scale Fish Marketing Stations planned in this project. Therefore, it is desirable to establish these offices at sites located at the vicinity of the medium-scale Fish Marketing Stations and many Fishing Units located nearby. The relationship between the proposed sites and the existing & planned Fishing Units and other relevant factors is shown in Table 6.

Table 6. Locational relation of sites for Extension Service Offices and Fishing Units

Location		Site for Fish	No. of Fishing
Name of Place	Name of Island	Marketing Sta.	Units with out-board engine fishing boats
Lakatoro	Malakula	0	3
Saratamata	Aoba	0	3
Sola	Banks	X	0
Norva	Tongoa	0	3
Liro	Paama	0	4
Abwatentora	Pentecost	X	1
Toak	Ambrym	X	1
Isangel	Tanna	X	1
Rovo Bay	Epi	X	1

Under the circumstances, equipment required in connection with the activities of the extension service offices should be allocated to 4 areas, Lakatoro, Saratamata, Norva and Liro, in view of the urgent demand of the extension services within the context of the VFDP.

2) Equipment repair service

Services related to the repair of equipment should be strengthened in conformity with 3 levels.

a) Small-scale repair service

Maintenance and repair of equipment of the VFDP: substitution of external parts and components, etc., to be carried out in the medium-scale Fish Marketing Statios.

b) Middle-scale repair service

Maintenance and repair of equipment of the VFDP: comprising substitution of internal parts and components with disassembly and assembly of the faulty equipment, to be taken charge by the extension service offices.

c) Large-scale repair service

Maintenance and repair of equipment of the VFDP: comprising the disassembly and assembly of the faulty equipment, substitution of internal parts and components, rehabilitation of the substituted parts and components, etc., to be taken charge by the head office and branch office of the Fisheries Department.

d) Itinerant repair service

The introduction of repair service boats equipped with facilities for medium-scale repair is required when the location of the Fishing

Units of the VFDP scattered throughout the many islands of Vanuatu is taken into consideration.

3) Supply of fishing gear, materials, equipment, fuel, etc.

It is necessary to strengthen the system for supplying fishing gear, tackles, machinical parts, tax-free fuel, etc., required for the Fishing Units and other organizations to operate the VFDP.

Therefore, it is necessary to provide equipment for supporting the transportation of these fishing gear, tackles, parts, fuel, etc., that include heavyweight goods.

3-3 Operation and control plan

3-3-1 Operation plan

This project is regarded as a cooperation in the form of equipment and materials to the part of the VFDP activities to be implemented in 1987 by the Fisheries Department.

Therefore, the operation plan is fundamentally the same as that of the VFDP mentioned in Chapter 2.

(1) Fishing Units

It will be possible to establish 39 new Fishing Units under the auspices of this project. The steps of procedure for establishing these new Fishing Units will be the same as the ones adopted to date in connection with other Fishing Units under the auspices of the VFDP. The applications of the interested parties are examined, and the establishment of the new Fishing Units is authorized by the Fisheries Department. The location of the Fishing Unit will be fundamentally based on the application, but anyway it is desirable to select farmers of areas within the sphere of influence of the existing distribution facilities or areas in which the small- and medium Fish Marketing Stations to be established under the auspices of this project. Furthermore, it is desirable to select farmers of areas blessed with abundant fishery resources for establishing Fishing Units equipped with inboard engine fishing boats. It is expected that the Fishing Units in the Project will take the following operational plan.

- 1) In case Port Vila Fisheries Ltd. or existing ice making facilities or medium- and small-scale Fish Marketing Stations established in the said Project are located at vicinities.
 - a) Fishing Units are specialized in fishing activities. The products are sold to abovementioned marketing facilities.
 - b) Associations without any marketing facilities sell the products to markets in villages. Surplus of the products are sold to abovermentioned marketing facilities.
- 2) In case no marketing facilities exist in the vicinities

a) The product has to sell only to markets in villages. However, numbers of these type of Fishing Units will be decreased taking into account the concept of VFDP. Which aims to improve the fishing methods, to produce high market value fish, to market these fish to urban area, to create cash income for local people and to finally develop coastal fisheries.

(2) Small- and medium-scale Fish Marketing Stations

Nine middle-scale Fish Marketing Stations, and 8 small-scale Fish Marketing Stations will be established under the auspices of this project. From the institutional standpoint, these stations are the same as ordinary Fishing Units, and the procedures for fund raising and other arrangements for their establishment are the same as those of the Fishing Units. The small and medium-scale Fish Marketing Stations function as Fishing Units specialized in distribution and sales, taking charge of the purchase of marine products from Fishing Units engaged in the production sector, as well as their distribution and sales to the villages or to the Port Vila Fisheries Ltd. Especially these medium-scale require huge initial investment, and therefore an economic operation is very important for their success. That being so, special care should be taken when selecting their location, as mentioned in section 3-2.

In addition, following arrangement will be necessary for the establishment of Medium-Scale Fish Marketing Station. Fisheries Department will lend at free of charge necessary equipment for operation of Medium-Scale Fish Marketing Stations at first (at least 1 year) in order to make operators of Medium-Scale Fish Marketing Station convince operation of the system and prepare necessary investment cost. After such trial period. Fisheries Department will formally permit the establishment of the Station.

(3) Port Vila Fisheries Ltd.

Equipment to be installed in the Port Vila Fisheries Ltd. have distinct service lives depending on their types, but efforts should be made for depreciating them within the regular period, so as to make it possible to purchase the new equipment with own financial resources of the Fisheries Ltd. at the epoch of their replacement. In connection with conventional equipment such as flake ice machines, equipment for sales, etc., which the Fisheries Ltd. has operation experience, the personnel in charge of their operation should be selected and allotted from among the existing staff. In connection with new types of equipment, a sufficient operation guidance should be provided on the occasion of the delivery and test operation. The Port Vila Fisheries Ltd. should keep close contact with the small- and medium-scale Fish Marketing Stations, so as to realize a smooth distribution of marine products. In particular, the fish collection scheme should be drawn up with care, and the operation should be carried out in cooperation with the various small- and medium-scale Fish Marketing Stations. Furthermore, efforts should be made to encourage the consumption of marine products, and to deliver fresh fish at low price to the consumers, because the supply of fish will increase as a result of the implementation of this project. As for the exports, the marine products should be processed in conformity with the standards of each destination country by using fish processing machines, and the volume of exports should be increased in steady steps.

(4) Fisheries Department

1) Fisheries Department

The repair service boat to be allocated to the Fisheries Department Espiritu Santo Branch will be operated by their personnel of the Fisheries

Department and the foreign expert. The boat will be sent out for carrying out repair works according to the extent of trouble of equipment of the Fishing Units, and furthermore it will patrol the Fishing Units of remote islands, so as to carry out the inspection, maintenance and supply of parts required therein. The expenses for operating the boat will be covered by the Fisheries Department budget.

Fishermen authorized to establish new Fishing Units will be submitted to training by using the teaching materials and equipment of the boat, and will learn techniques for carrying out simple repairs, inspection and the like of outboard engines and fishing gear. In the future, the Fisheries Department Espiritu Santo Branch will be given power by the head office, so as to play a leading role regarding the maintenance and in the Espiritu Santo Island and in the northern area of the country.

2) Technical extension offices

The 4 extension service offices to be established anew will be staffed by one foreign expert, one Fisheries Department staff and one temporary worker, respectively. The small-sized extension service boats will be allotted to these 4 technical extension offices, and will be used to make periodic visits to the nearby Fishing Units, so as to provide guidance regarding fishing gear and fishing method as well as simple repair of equipment to the fishermen, to carry out the fishing ground survey, to collect fishing statistical data, etc. These boats are designed and constructed for easy operation, maintenance and control, and their use is very simple. The warehouses attached to these extension service offices will be used to store fishing gear, equipment and materials to be used for technical extension, and furthermore part of the space will be used as workshop for repair of outboard engines and other

equipment. The fish aggregating devices will be installed in nearby sea areas by these extension service offices, so as to be used by the Fishing Units. The expenses for operation of these extension service offices will be covered by the budget of the Fisheries Department.

3-3-2 Staffing plan

The manpower required by the various institutions and section for the sake of implementation of this project is shown in the following table.

Institution	Field/Section	Required manpower (persons)	Remarks
Fisheries Department, Espiritu Santo Branch	Operation of repair service boat Repair Section	2	Technical staff
		1	Foreign volunteer
		1	Technical staff
		1	Foreign volunteer
Extension Service Offices (4 places)	Technical Extension With extension service boat in operation	4	Technical staff
		4	Foreign expert
		(4)	Temporary worker
Medium-scale Fish Marketing Station (9 places)		9	Foreign volunteer
Sub-Total		22 22(4)	
Port Vila Fisheries Ltd., Natai Shop & Santo Fish Shop	Freezer Small-sized ice making machine Fish box moulding machine Fish distribution & processing	1	Technical staff
		1	" "
		1	" "
		5	" "
Sub-Total		8	
Total		30(4)	

(1) Fisheries Department

This project as a whole will require 22 new staffs excluding temporary ones. Of that total, 15 persons will be experts and volunteers to be hired from foreign countries, and the Vanuatians to be hired anew by the Fisheries Department will amount to 7 persons. These Vanuatians should be recruited and trained before the arrival of the new equipment and apparatuses, preparing therefore to execute a smooth transfer of the basic operation techniques at the time of the delivery of the equipment and apparatuses in question. In particular, the 4 Vanuatian technical personnel to be allotted to the extension service offices should be college-graduates or have equivalent academic background in view of the contents of the work to be taken charge, and they should be trained to as to become able to execute their duties as local fishery instructors after the future return of the foreign expert to their countries of origin.

The allotment scheme of foreign volunteers and experts should be drawn up by taking into consideration the implementation schedule of this project, so as to realize a smooth transfer of technique on the occasion of the installation and test operation of the new equipment and apparatuses. A particularly important part will be played by the foreign technical personnel in connection with the operation of the small-sized ice machines and the extension service boats. Special care should be taken in connection with the initial operation and use of these equipment and facilities, because they will be closely related with the success of the project itself.

(2) Port Vila Fisheries Ltd.

As for the Port Vila Fisheries Ltd. Santo Shop, 8 additional staffs will be required therein. Personnel experienced in the operation of equipment similar to those

ones to be installed anew should be given priority when recruiting, and if necessary personnel of the Port Vila Fisheries Ltd. Natai Shop should be reallocated, so as to make it possible to carry out the operation on commercial basis immediately after the introduction of the new equipment and apparatuses.

3-3-3 Maintenance and control system

At the epoch of full-scale implementation of this project the number of outboard engines under the auspices of the VFDP alone will surpass 250 units, as a consequence of the increasing number of Fishing Units. That being so, the Fisheries Department will be required to pay special attention to the strengthening of the maintenance and control system to take care of these equipment, so as to realize a satisfactory operation and control of the VFDP. So far, these repair works used to be done by carrying the faulty equipment into the Fisheries Department head office in Port Vila, but the Fishing Units were forced to bear substantial expenses and to suffer time loss due to the said transportation. The prompt repair and maintenance of the equipment are indispensable for the upkeep of a stable business of the Fishing Units and Associations. That being so, it is indispensable to improve the repair and maintenance capacities for the sake of stable development of the VFDP. As things now stand, the repair facilities attached to the Fisheries Department are being utilized in full scale, but in reality they are insufficient to cope with the additional equipment which will be introduced concurrently with the implementation of this project.

Under the circumstances, the Fisheries Department should reorganize the repair system by dividing it in 4 distinct levels and allot the required personnel, so as to cope with the increasing quantity of equipment that will be introduced anew under the auspices of this project.

1. Small-scale repair

Small-scale repair which can be carried out at the Fishing Units and small- and medium-scale Fish Marketing Stations.

2. Middle-scale repair

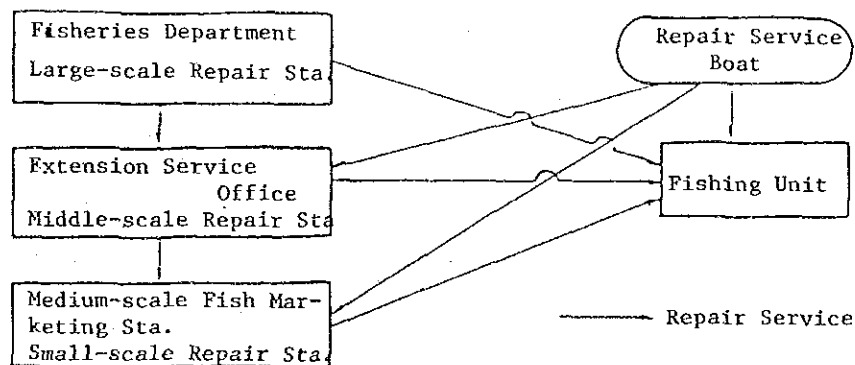
Middle-scale repair which can be done by carrying the faulty equipment into the extension service office.

3. Large-scale repair

Large-scale repair which can be done only at the Fisheries Department head office or branch office.

4. Itinerant repair

Middle-scale repair to be carried out with the repair service boat patrolling the various Fishing Units and small- and medium-scale Fish Marketing Stations.



3-3-4 Distribution pattern of equipment

Equipment planned under the project will be distributed in following three methods.

(1) Sales with Governmental subsidy

Equipment for Fishing Units and Small- and Medium Scale Fish Marketing Stations is distributed as same pattern as the one distributed for existing Fishing Units. The equipment are sold with Governmental subsidy (50% of price of equipment). Namely the equipment are sold out at the

half of CIF equipment cost. The fishermen has to prepare own fund being equivalent to 10% of equipment price and arrange Vanuatu Development Bank loan for the rest (40% of price).

1) Outboard and Inboard Engine

Considering the location of existing Fishing Units, about half numbers of Fishing Units are supposed to be difficult to execute depreciation because of non marketing outlet to urban area.

If the outboard and inboard engines in the said Project are distributed to the area where Small- or Medium-Scale Fish Marketing Stations are not accessible, the same problem will be caused. In this connection Fisheries Department has to pay greater attention for the selection of sites for Fishing Units.

When the focus is transferred from each Fishing Units to Project as a whole, following effects can be envisaged. As Fisheries Department can import and purchase half amount of equipment after receipt of payment which is half of the price of equipment made by Fishing Units and use for establishment of new Fishing Units, after effective usage of these kinds of arrangement, almost same amounts of equipment will be finally settled in VFDP as the indirect effects of the Project.

	Time of Utilization of payment by Fishing Units.					
	1	2	3	4	5	6
No. of Outboard engines provided under the project	70					
No. of outboard engines to be increased due to the usage of Fishing Unit's payment		35	17	8	4	2
No. of outboard engines purchased by Fishing Units after depreciations		35	52	60	64	66
=====	=====	=====	=====	=====	=====	=====
Total		70	69	68	68	68

2) Equipment for Small and Medium Scale Fish
Marketing Station

Since these equipment are also distributed as the same pattern as outboard and inboarded engines, similar effects can be expected. However as the price of the equipment for Medium-scale Fish Marketing Station is expensive, it seems difficult for expected operator to prepare own fund, even 10% of price, at start. Accordingly, Fisheries Department will treat these operator warmly as follows.

Fisheries Department lends necessary equipment at free of charge to these operators. When the operators convince themselves to economically operate these equipment. Fisheries Department sells these equipment to operator in the same manner as outboard engine.

(2) Sales at normal price

Fishing gear included in the Project are sold for fishermen at current price. Although subsidy for fishing gear is provided only for new participants of Fishing Units, subsequent provision of fishing gear will be sold at normal price. Accordingly, most of fishing gear included in the Project is sold at normal price. Collected money due to sales of fishing gear can be utilized for purchasing of new fishing gear. Therefore, the effects of fishing gear provided under the Project will last for at least 5 years, even if 5% of reduction of fund is expected.

(3) Distribution as grant

Equipment to be utilized at Port Vila Fisheries Ltd. and Fisheries Department will be granted to each agency.

Since Port Vila Fisheries Ltd. added up predepreciation profit in 1984, it seems the Fisheries Ltd. can execute depreciation due to increase of fish products to be handled. Accordingly it is expected that the equipment for Port Vila Fisheries Ltd. can be replaced after depreciation period.

On the otherhand, equipment to be provided for Fisheries Department will be fully utilized but can not be replaced in the course of operation. However, it is evaluated that the benefits will be greatly expanded due to utilization of the equipment under the Project.

Distribution pattern and its effects are shown in Table 7.

LIST OF THE PLANNED EQUIPMENT (Table 7)

Objective	Plans	Necessary equipment and materials	Distribution and users	Quantities
[A] Expansion of VFDP in scale				
Expansion of projected fishermen in number.	Establishment 39 fishing units anew in 1987.	Outboard engines Marine inboard engines Fishing gears and marine chandlery	Fishermen under VFDP Fishermen under VFDP Fishermen under VFDP	60 units for 30 boats 9 units for 9 boats For one year use
[B] Improvement of fish marketing function				
Improvement of fish marketing function in fishing units.	Establishment 8 small-scale fish marketing stations. Establishment 9 medium-scale fish marketing stations.	Absorption type refrigerators Small sized block ice machine set	Fishermen under VFDP Fishermen under VFDP	8 sets 9 sets
Increasing capacity of Port Vila Fisheries ltd.	Increasing fish processing capacity at large-scale fish marketing stations.	Outdoor type small-sized cold store. Outdoor type small-sized flake ice machine.	Port Vila Fisheries Ltd. Port Vila Fisheries Ltd.	1 set 1 set
	Increasing capacity of fish collecting, weighing, processing and sales.	Equipment and apparatus used for fish collecting, weighing, processing and sales.	Port Vila Fisheries Ltd.	2 sets
Expansion of exporting market.	Introduction equipment for promotion of small-scale fish exporting.	Equipment and apparatus used for promotion of small-scale exporting.	Port Vila Fisheries Ltd.	1 set

to be continued

Objective	Plans	Necessary equipment and materials	Distribution and users	Quantities
[C] Strengthen supporting services of Fisheries Department				
Strengthen supporting service.	Establishment 4 extension service offices.	Small sized extension service boats	Extension service offices	4 boats.
		Prefabricated warehouse	Extension service offices	4 sets.
		Apparatus for extension service office	Extension service offices	4 sets.
		Fish aggregating	Extension service offices	4 sets.
Increasing capacity of maintenance, repair and supply.	Strengthen 2 large-scale maintenance and repair stations.	Large-scale maintenance and repair tools and apparatus	Head and branch offices of the Fisheries Department	2 sets.
	Establishment 4 middle-scale maintenance and repair stations.	Middle-scale maintenance and repair tools and apparatus	Extension service offices	4 sets.
	Establishment 9 small-scale maintenance and repair stations.	Small-scale maintenance and repair tools and apparatus	Medium-scale fish marketing stations under this project	9 sets.
	Introduction movable station of maintenance and repair services.	Repair service boat	Branch office of the Fisheries Department	1 boat.
	Introduction equipment and apparatus used for transportation, loading and unloading.	Track with a crane	Branch office of the Fisheries Department	1 boat.
		Pontoon pier	Branch office of the Fisheries Department	1 boat.
Increasing capacity of education and training for fishermen under the VFDP.	Introduction equipment and apparatus used for education and training.	Audio and visual education and training equipment and apparatus	Head and branch offices of the Fisheries Department	1 set.