

5.4 Basic Plan of Vessels

5.4.1 Coastal Fisheries Training Vessel

(1) Design of principal particulars

An overall length of 9.0 m is adopted to cover speed reduction caused by increase of resistance of ship form under water line which is a defect of a deep skeg type.

Principal dimensions of this vessel is shown below.

Principal dimensions

Overall length	Approx. 9.00 m
Length (registered in Japan)	Approx. 7.50 m
Breadth (moulded, registered)	Approx. 2.20 m
Depth (moulded, registered)	Approx. 0.70 m
Gross tonnage (international)	Approx. 3.4 ton
Main engine (diesel)	Approx. 45 HP x 3200 rpm
Capacity	
- ice hold/fish hold	Approx. 1.75 m ³
- fuel oil tank	Approx. 200 lit
- freshwater tank	Approx. 100 lit
Complement	3 persons
Cruising range	Approx. 100 n miles
Regulated navigable area	Coastal area
Speed	
- max. trial speed	Approx. 9.0 knots
- service speed	Approx. 8.0 knots

(2) General arrangement

- To adopt a sunken forecastle at bow to keep good seaworthiness
- To arrange cofferdam, store, ice hold, fish hold, engine room, and steering gear room from bow
- To arrange wheel house and engine casing at the upper port of engine room
- To arrange fuel oil tank and oil pressure tank in engine room
- To arrange one (1) oil pressure type line hauler and three (3) hand reels at upper deck as fishing equipment

(3) Hull construction

As this vessel is used for coastal fishery training, hull construction is to be moulded using light and strong materials such as FRP single or sandwiched construction to reduce weight as much as possible. Taking into consideration the concentrated stress to the hull construction, specification for the construction is adopted as follows.

Shell	: FRP single or laminated construction
Deck	: FRP single or sandwiched construction
Bulk bed	: Plywood covered with FRP
Engine seat	: FRP construction with core material of hard plastic
Deck store	: FRP single construction
Rib, beam and stiffener	: FRP hut-sectioned construction
Shoe piece and rudder	: Welded steel plate (zinc galvanized)
Stern tube	: High strength brass casing
Ice hold and fish hold	: FRP construction with heat prevention by polyurethane foam

(4) Mechanical and electrical equipment

1) Wheel house

- Floor : FRP single construction with skid proof finishing
- Bulk head and ceiling : Polyester gel coat finishing
- Equipment : Wheel console, control stand of main engine, navigation lights control panel board, fish finder, magnetic compass, clock, and clear view screen, etc.

2) Ice hold and fish hold

Plywood of inner wall is covered with FRP to prevent water seepage into polyurethane layer

3) Engine room

High speed type engine with a electrical starting system is to be adopted for a main engine to secure wider working space in the engine room. One generator (DC 24V) and one oil pressure pump are to be adopted and driven from fore part of main engine.

4) Electrical equipment

Two sets of batteries with DC 24 V are adopted for starting main engine and lights.

5) Equipment

Equipment and specification	Quantity
a) Deck part	
- Steering apparatus: manual (oil pressure type)	1 set
- Anchor (Danforth type) and cable for anchor	1 set
- Navigation equipment	1 set
- Life saving fire fighting	1 set
- Miscellaneous	1 set
- Deck implement	1 set
b) Fishing equipment part	
- Net hauler: oil pressure type	1 set
- Hand reel	3 sets
- Pipe for hand line	1 set
c) Ventilation and lighting part	
- Scuttle (engine room) B.C 150 mm	2
- Square window (wheel house): light alloy	5
- mechanical ventilation DC 24V x 90W	1 set
- Clear-view screen	1 set
d) Engine part	
- Main engine 4 cycle diesel engine, 45 HP x 3200 rpm, freshwater cooling system, electric starting system	1 set
- Main engine remote control: panel board type	1 set
- Reversing and reduction system: Hydraulic, multi-disc wet type	1 set
- Propeller: manganese bronze, 3-blade solid type fixed pitch	1 set
- Stern tube	1 set
- General service pump driven by main engine with clutch 1.5 inch, 100-250 lit	1
- Bilge pump: electric power	1
- Oil pressure pump driven by main engine with clutch	1
- Fuel oil tank: 200 lit	1
- Oil tank: 100 lit	1
e) Electric part	
- Generator driven by main engine: 1 kw	1
- Battery for starting main engine: DC12 - 120 AH	2
- Battery for general use: DC12-150 AH	2
- Electric panel	1
- Lighting	
Navigation lights: DC 24V	1 set
Portable light: DC 24V x 60 W	1 set
Room light: DC 24V	1 set
f) Navigation equipment	
- Magnetic compass: Diameter of 100 mm	1
- Clock	1
- Fish finder DC24V Frequency, 50KHz	1 set

5.4.2 Extension Vessel

(1) Design of principal particulars

An overall length of 17.0 m is adopted to satisfy the minimum space such as deck for fishing and fishing training, crew room, fish hold, engine room, etc. taking into consideration existing oceanographic conditions. The widest breadth of approx. 4.8 m is to be adopted to keep ample stability. Sunken forecastle with ample flare at bow is to be adopted to keep good seaworthiness.

Principal particulars of this vessel is shown below.

Principal dimensions

Overall length	Approx. 17.00 m
Length (registered in Japan)	Approx. 14.80 m
Breadth overall	Approx. 4.70 m
Breadth (moulded, registered)	Approx. 4.50 m
Depth (moulded, registered)	Approx. 1.80 m
Gross tonnage (international)	Approx. 31 ton
Main engine (diesel)	Approx. 240 HP x 1900 rpm
Capacity	
- ice hold/fish hold	Approx. 8.0 m ³
- fuel oil tank	Approx. 3400 lit
- freshwater tank	Approx. 1000 lit
Complement	7 persons
Cruising range	Approx. 500 n. miles
Speed	
- max. trial speed	Approx. 9.9 knots
- service speed	Approx. 9.0 knots

(2) General arrangement

- To adopt completely extended one layer deck type and sunken forecastle at bow
- To arrange cofferdam, store, ice hold, fish hold, engine room, steering gear room and store from bow
- To arrange store, companion for crew space, wheel house, galley, toilet and engine casing at the upper deck
- To arrange fuel oil tank and oil pressure tank in engine room
- To arrange one line hauler cum net hauler at fore part as an area for gill netting and bottom long line and two sets of outrigger for trolling, two sets of davit for bottom long line and five sets of hand reel at after part as an area for a pole line.

(3) Hull construction

Hull construction is to be moulded by using light and strong materials such as FRP single or sandwiched construction to reduce weight as much as possible. Taking into consideration the concentrated stress to the hull construction, specification of the construction is adopted as follows:

Shell	: FRP single or laminated construction
Deck	: FRP single or sandwiched construction
Bulk head	: Plywood covered with FRP
Engine bed	: FRP construction with core material of hard plastic or steel plate
Deck house	: FRP single or sandwiched construction
Rib, beam and stiffener	: FRP hut construction with core wood
Shoe piece and rudder	: Welded steel plate (zinc galvanized)
Stuffing box	: Steel plate or FRP construction
Stern tube and	: FRP construction, bearing of synthetic rubber
Fish hold	: FRP construction with heat prevention by polyurethane foam

(4) Mechanical and electrical equipment

1) Wheel house

- Floor : FRP single construction covered with vinyl mat
- Bulk head and ceiling : Plywood insulated by glasswool
- Equipment : Wheel console, control stand of main engine, navigation light control panel board, SSB type radio telephone apparatus and receiver, fish finder, radar, satellite navigation system, magnetic compass, clock, barometer, clear-view screen, etc.

2) Crew space

- Floor : Plywood
- Bulk head : Finishing by polyester gel coat
- Ceiling : Finishing by plywood with heat prevention by glasswool
- Space : Two beds and Japanese mat provided with four lockers and two electric fans

3) Toilet

Floor, wall and ceiling : FRP finishing and to provide one toilet bowl

4) Galley

- Floor : FRP single construction with skid proof finishing
- Wall and ceiling : Polyester gel coat finishing, wall near cooking range to be covered by stainless plate
- Equipment : Stainless sink, cooking range, cup-board, mushroom ventilator

5) Store

- Floor : Wood flooring and to provide wooden shelf

6) Ice hold/fish hold

Plywood of inner wall is to be covered with FRP to prevent water seepage into polyurethane layer.

7) Engine room

Main engine is to be 4-cycle diesel engine with an electric starting system. One generator (AC 225 V) is to be driven by auxiliary engine, and one generator (DC 35V) for electric charge and oil pressure pump is to be driven from the fore part of main engine.

8) Electrical equipment

One generator (AC 225 V, 15 Hz, 15 KVA, 22.5 HP) is to be adopted. One generator (DC 35, 3 KW) for charging a battery for starting main engine is to be driven by main engine. Two batteries (24V, 200 AH) for electric charge are to be adopted. Electricity (DC 24V) for general lights, radio and electric ventilator is to be supplied from main generator.

9) Equipment

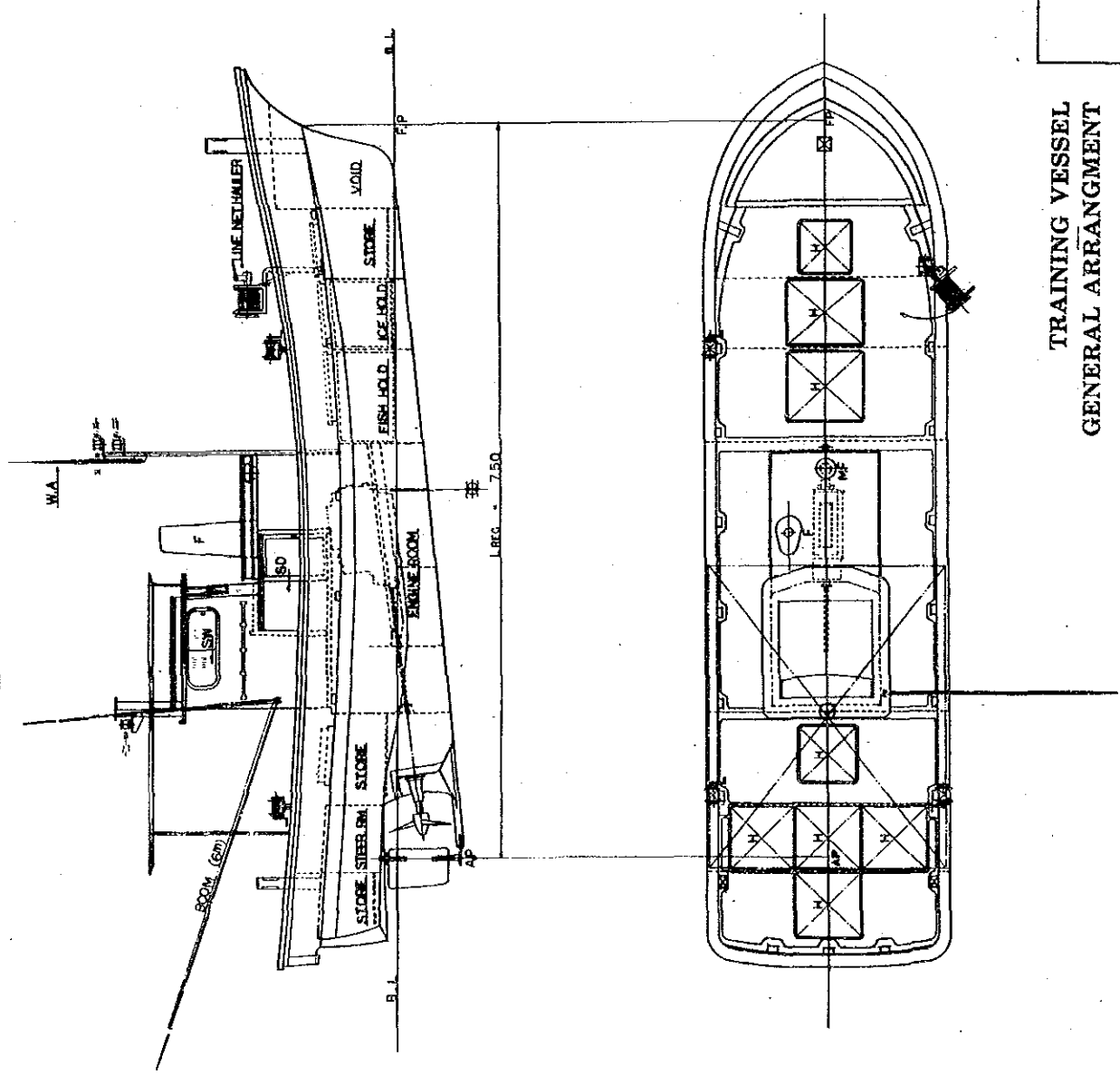
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Equipment	Outline of Specification	Quantity
a) Deck part		
- Steering apparatus:	manual, oil pressure type	1 set
- Anchor and cable:	(Anchor: Danforth type)	1 set
- Navigation tools:		1 set
- Life saving fire fighting:		1 set
- Miscellaneous:		1 set
- Deck implements:		1 set
b) Fishing equipment part		
- Line/net hauler	oil pressure type	1 set
- Capstan	oil pressure type	2 sets
- Troll winch	oil pressure type	2 sets
- Hand reel		5 sets
- Trolling rod	stainless, 10 m	2 sets
- Hand pump for drain suction from fish hold		1
- David for bottom long line		2 sets
c) Ventilation and lighting part		
- Scuttle (galley, wheel house)		6
- Scuttle (sky light)		2
- Square window (wheel house) light alloy		5
- Mechanical ventilation DC 24 V x 0.24 KW (engine room, galley and crew space)		1 set each
- Clear-view screen DC 24V, 300 mm		1 set
- Natural ventilation (engine room, crew space) Gooseneck ventilator, light alloy (galley, toilet)		4
Mushroom ventilator, light alloy		2
d) Engine part		
- Main engine	4 cycle diesel engine, 240 HP x 1900 rpm, freshwater cooling system, electrical starting system	1
- Main engine remote control panel board type		1
- Reversing and reduction system Hydraulic, multi-disc wet type		1
- Intermediate shaft and propeller shaft SUS		1 set
- Propeller	manganese bronze, 3-blade solid type fixed pitch	1 set

Equipment	Outline of Specification	Quantity
- General service pump	driven by main engine with clutch 1.5 inch, 100-200 lit	1 set
- Bilge pump	driven by main engine	1
- Drainage pump		1
- Freshwater pump (Galley)		1
- Manual bilge (toilet)		1
- Sprinkler and circulation pump		1
- Freshwater tank	FRP 1000 lit	1 set
- Fuel oil tank	FRP 1700 lit	2 sets
- Oil pressure oil tank	steel	1
- Oil pressure tank unit	for fishing equipment driven by main engine	1 set
- Oil pressure pump unit	for wheel driven by main engine	1 set
e)	Electric part	
- Generator	AC225V, 50 Hz, 15 KVA	1
- Engine for starting generator	Diesel engine, 22.5 HP	1
- Generator for electric charge	AC-DC drip proof type 3V, 3KW, driven by main engine	1
- Battery of generator	DC24, 200 AH for electric charge	2
- Electric panel	AC225V, DC24V	1
- Lighting equipment		
	Navigation lights DC 24V	1 set
	Deck lamp DC 24V	1 set
	Room light DC 24V	1 set
f)	Navigation equipment and radio part	
- Magnetic compass		1 set
- SSB type radio telephone apparatus and receiver (including radio)	Power: 150 W Frequency: 11 channel, 2-9 MHz Power source: DC 24V Antenna: Whip type	1 set
- Fish finder	Frequency: 50 KHz Power source: DC24V	1 set
- Clear-view screen	Centre motor: DC24V	1 set
- Radar	Range: 48 n.miles Power source: DC24V	
- Satellite navigation system		1 set

5.4.3 Basic Design Drawings of Vessels

Drawings of basic design on this project are shown as follows.



TRAINING VESSEL
GENERAL ARRANGMENT

5.5 Basic Plan of Equipment

5.5.1 Equipment Plan

The equipment of the Project is roughly divided into two categories; one related to fisheries and the other for improvement of fishing village infrastructure. The equipment related to fisheries was examined on its appropriate kind and quantity which is essential for activities of Fisheries Division. As for the equipment for improvement of fishing village infrastructure, the equipment necessary for the relevant purpose was examined and selected taking into consideration the present conditions of roads and technical level of road maintenance, etc.

The equipment was selected based on following criteria.

- 1) Kind and quality of equipment to be determined taking into consideration the scale, function, activities of the objective facilities.
- 2) Mechanical equipment with simple structure and high durability to be selected taking into consideration the level of operation and maintenance in the recipient side.
- 3) As for sensitive equipment against salty air or seawater, the equipment with high anti-corrosion and water resistant to be selected.
- 4) To take into consideration the possibility of procurement of spare parts and consumable in the objective site.

5.5.2 Equipment List

Selected equipment with its designed quantity based on the above described criteria is shown in Table below.

LIST OF EQUIPMENT

1. EQUIPMENT RELATED TO FISHERIES
(1/5)

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No.	Equipment	Q'ty	No.	Equipment	Q'ty
<u>A. COMMUNICATION AND SAFETY EQUIPMENT</u>			15)	Radial drilling machine	1
(1) Communication Equipment			16)	Blacksmiths hammer	2
1)	Hand talkie type	17	17)	Ball-pen hammer	2
2)	Main receiver	1	18)	Manual spray gun	1
3)	Accessory	1 set	19)	Measurement apparatus	1 set
(2) Distress Signal		10 set	20)	Flaring tool set	2 sets
<u>B. Outboard Engine</u>			21)	Pipe wench set	2 sets
	15 HP	38	22)	Chain tong	1
	25 HP	38	<u>C. Equipment for Maintenance of Boat and Engine in Workshop</u>		
1)	A/C Welding machine set	1 set	23)	Screw extractor set	1 set
2)	Chain block	2	24)	Tinners scissors	2
3)	Engineering workbench	2	25)	Straight shank drill set 1mm~10mm	2 sets
4)	Engineering vice	2	26)	Hydraulic oil jack	1
5)	Heavy duty battery charger	2	27)	File set	2 sets
6)	Hydrometer to check batteries specific gravity	1	28)	Tread chaser adjustable tap wrench	1
7)	Portable generator	1	29)	Safety equipment for grinding (including wheel dresser, safety goggle and face shield)	1 set
8)	Portable air compressor	2	30)	Safety equipment for welding (including welding goggle, shield lens and cotton gloves)	1 set
9)	Heavy duty pipe bender	1	31)	Metric tap and dies set	1 set
10)	Oxy-acetylene welding torch set	1 set	32)	Oil gun	1
11)	Hack saw assembly and blades	1 set	33)	Plier set	1 set
12)	Bench grinder	2	34)	Torque wrench	1
13)	Disc grinder	1	35)	Oil stone	7
14)	Portable electric drill	1			

(3/5)

(4/5)

No.	Equipment	Q'ty	No.	Equipment	Q'ty
36)	Wire cutter	1	3)	For HONDA Model BF-100	4 sets
37)	Wire Brush	6	4)	For YAMAHA Model 30A.M	1 set
38)	Engineering chisel set	4 sets	(3)	For Inboard Engine	
39)	Chipping hammer	6	1)	For YANMAR Model 30m30Y-EC	1 set
40)	Shifting spanner	2 sets	2)	For YANMAR Model 20m20Y EC	3 sets
41)	Nose mask	1 box			
42)	Grease gun	2	<u>E. FISHING GEAR AND TACKLES</u>		
43)	Gasket sealer	4	1)	Trolling jig	2,390
44)	Wooden work tool set	1 set	2)	Feather (9 colors)	300 boxes
46)	Electric planner	1	3)	Soft lure (Squid type)	700
47)	Special tools for YANMAR diesel engine For 20m20v For 30m30v	1 set 1 set	4)	Soft lure (Octopus type)	1,950
48)	Metric and A.F. (inch) combination tool set	1 set	5)	Swivel	12,450
49)	Machining lathe with propellor shaft up to 3 m	1	6)	Hook	5,200
50)	Hydraulic press	1	7)	Fishing line	379 coils
51)	Overalls	2 doze	8)	Clip (1,000 pcs/box)	48 boxes
52)	Safety boots	12 pair	9)	Clip pressor	3
			10)	Sinker	1,500
			11)	Floating gill net	
				1/2 inch	6 sets
				1 inch	6 sets
				2 inch	16 sets
				3 inch	16 sets
				4 inch	16 sets
			12)	Vertical line	16 sets
			13)	Hand reel	16
			14)	Bottom long line	7 sets
			15)	Pole & line set	52 sets
<u>D. SPARE PARTS</u>					
(1)	For Diesel Generator Engine				
1)	For YANMAR Model YTB-10T	1 set			
(2)	For Outboard Engine				
1)	For TOHATSU Model M40C-361	1 set			
2)	For TOHATSU Model M25B-346	1 set			

□ 2. EQUIPMENT FOR IMPROVEMENT OF
FISHING VILLAGE INFRASTRUCTURE □
(1/3)

(5/5)

No.	Equipment	Q'ty	No.	Equipment	Q'ty
16)	Marine torch floating type	1 doze	<u>A. ROAD REPAIR & MAINTENANCE MACHINE</u>		
17)	Weather gear	4 doze	1)	Motor grader	1
<u>F. OTHERS</u>			2)	Vibration roller	1
1)	Fuel tank 20 ℓ	12	<u>B. TRANSPORTATION VEHICLE</u>		
2)	Thermal check equipment	1 sets	1)	Pickup truck 0.5 ton	1
3)	Fish finder	4	2)	Water tank trailer 3 ton	2
4)	Insulated fish box 90 ℓ 160 ℓ	20 20	<u>C. VEHICLES REPAIR & MAINTENANCE EQUIPMENT</u>		
<u>G. TRANSPORTATION VEHICLE</u>			(1) Hand Tools		
1)	Pickup truck	2	1)	Mechanical tool set	2 sets
2)	Forklift 1 ton 2 ton	1 1	2)	Wheel changing equipment	1 set
3)	Tractor 45 HP	2	3)	Clutch aligning tool	1 set
4)	Motorcycle 100 cc	4	4)	Trolley creeper	4
			5)	Electric drill 1/2 inch 3/8 inch	2 2
			6)	Hand grinder 4 inch 8 inch	2 2
			7)	Air line and air gun	2 sets
			8)	Brake adjustment tool	2 sets
			9)	Brake pipe flaring tool	2 sets
			10)	Hole saws set	2 sets
			11)	Inspection lamp	4
			12)	Circlip plier	5 sets
			13)	Hollow punch	3 sets
			14)	Pin punch	3 sets

(2 / 3)

(3 / 3)

No.	Equipment	Q'ty	No.	Equipment	Q'ty
15)	Stock dies 3mm ~20mm	2 sets	10)	Spot welder set	1 set
16)	Tap 3 mm~20mm	2 sets	11)	Vice	1
17)	Reamer 1/2 ~1/8 inch	2 sets	12)	Blacksmith anvil	1
18)	Impact screwdriver	2			
19)	Hydraulic puller set	2 sets	(3)	Equipment for Measurement & Test	
20)	Socket rench set	2 sets	1)	Front end wheel alignment gauge	1 set
21)	Soldering iron	2 sets	2)	Camber castor gauge	1 set
22)	Oil pourer	3	3)	Nozzle tester	1
23)	Distilled water dispenser	3	4)	Battery tester	1
24)	Funnel	3	5)	Hydrometer	1
25)	Hacksaw	4	6)	Oil pressure vaccum gauge	1 set
26)	Hammer small	4	7)	Circuit tester	1
	big	2	8)	Engine tune up tester	1
27)	Blacksmith tongs	2	9)	Straight edge	1
(2)	Light Machinery		10)	Hand held tachometer	1
1)	Degreasing tank	1			
2)	Forge	1			
3)	Guillotine hand operated	1			
4)	Pipe bender (manual)	1			
5)	Porter power	1			
6)	Power hacksaw	1			
7)	Air grease gun	1			
8)	Gas welding set	1 set			
9)	Electric welding set (Portable)	1 set			

6. IMPLEMENTATION PLAN OF THE PROJECT

6. IMPLEMENTATION PLAN OF THE PROJECT

6.1 Organizations for Implementation of the Project

The Fisheries Division in the Ministry of Commerce and Natural Resources shall be responsible for the implementation of this project. The detail design and supervision of construction will be undertaken by the Japanese consultants. The construction works will be undertaken by Japanese construction firm on contract with the Government of Tuvalu. Local construction firms will also be participating in some of the construction works.

6.2 Undertakings of Both Governments

The undertakings by the Government of Japan and the Government of Tuvalu for the implementation of this project is indicated below.

(1/2)

Items	Japan	Tuvalu
1. Securing of land		0
2. Clearing the site		0
3. Construction of road within the site	0	
4. Construction of building		
1) Improvement of Funafuti Fisheries Centre	0	
2) Construction of Vaitupu Fisheries Centre	0	
3) Upgrading of channel	0	
5. Facilities for construction		
1) Electricity		
a) Distribution line to the site		0
b) Wiring within the site and switch board	0	
2) Drainage		
a) Drainage within the site	0	
3) Communication		
a) Wireless communication	0	
4) Furniture		
a) Furniture (chairs, desks, etc.)	0	
b) Furnishings (carpets, curtains, etc.)		0
6. Machinery		
1) Fisheries related machinery and equipment	0	
2) Equipment for improvement of fishing village infrastructure	0	

Items	Japan	Tuvalu
7. Vessels		
1) Coastal fishing/training vessel	0	
2) Extension vessel	0	
8. To bear the commissions to Japanese foreign exchange bank for the banking services based on the B/A (Banking Arrangement)		0
9. Import/custom clearance		
1) Transportation cost to Tuvalu	0	
2) Tax exemption/custom clearance		0
3) Transportation within Tuvalu	0	
10. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into Tuvalu and stay therein for the performance of their work		0
11. To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant		0
12. To bear all the expenses other than those to be borne by the Grant, that are necessary for the construction of facilities as well as for the transportation and the installation of the equipment		0
13. Proceedings for construction and related approvals		0

6.3 Implementation Plan

6.3.1 Implementation Principle

The followings are the implementation principles considering that the project is to be implemented by the Grant Aid of Japanese Government.

- To intend to implement the construction smoothly in reasonable working conditions suitable to the social condition of Tuvalu.
- To maintain cordial relationship through consultation among the Fisheries Division, Consultant and Contractor.

6.3.2 Consideration Items on the Implementation

Since Tuvalu is newly developing islands in the tropics, and its population is small, the following items will be considered.

- There are insufficient stocks of construction materials and also procurement of materials takes time. Hence before the construction investigations should be carried out on the procurement methods.
- Since other countries assistance is being implemented at the same time, there would be labour shortage. Adequate investigation should be carried out before implementation.
- Life style in Vaitupu is traditional compared to that in Funafuti. During construction cordial relationship should be maintained and their local customs be respected.
- There is a possibility of shortage of water, electricity and aggregate. Adequate counter- measures should be investigated.
- Adequate supervision is necessary as the quality of labour is not so skilled. Particularly Vaitupu channel and pier construction requires strict supervision.

6.3.3 Plan of Construction and Supervision

(1) Construction Plan

This project consists of provision of machinery, equipment, vessels, architectural and civil works for Funafuti and Vaitupu. Consideration items for construction plan are as follows.

- Machinery, equipment, training and extension vessel

Transportation of these facilities to Tuvalu takes time. Arrangement should be made with the shipping firm and manufacturers so as to minimize time loss during delivery and to maintain construction schedule.

Strict inspection should be implemented before shipping in Japan.

- Architectural and civil works

Adequate survey and investigation should be carried out before planning the implementation schedule as the transportation of materials takes considerable time.

As Vaitupu has no wharf or pier, landing methods for the heavy machinery and equipment should be planned in consideration of time and cost required. The sea condition between January and March is bad. Thus the timing of landing is kept away from this season.

Construction of channel at Vaitupu is considered to require large quantity of concrete, and hence procurement of cement and its transportation and storage should be investigated.

(2) Supervision Plan

The items to be considered for the supervision plan are listed below.

- Architectural and civil works

Upgrading of slipway and jetty requires underwater works. Guidance of expert in this field from Japan is necessary.

Civil works largely depends on tidal fluctuation and wave conditions. Supervision schedule should be carefully planned.

Since construction of channel at Vaitupu is considered to require large scale of concrete works, underwater works and

blasting works, sufficient quality control and supervision are required during construction. Hence necessary experts are to be timely dispatched from Japan.

For smooth implementation of construction there should be sufficient consultation and discussion among the consultants, Fisheries Division and other related agencies from detailed design (D/D) phase.

6.3.4 Procurement of Construction Machinery and Materials

Construction materials and machinery required for architectural and civil works and its transportation method are indicated below.

Items	Japan	Tuvalu	Transportation method	Remarks
1) Construction materials	-	0	-	Applying the standard of materials in Tuvalu
2) Construction machinery				
- crane truck	0	-	ship	It is cheaper to bring from Japan than to lease from third country.
- others	-	0	-	
3) Civil works machinery				
- dump truck	0	-	ship	It is cheaper to bring from Japan than to lease from third country.
- concrete mixer	0	-	ship	
- others	-	0		
4) Cement	-	0	-	It is cheaper to bring from Japan than to procure in Tuvalu

6.3.5 Construction Plan by Government of Tuvalu

(1) Improvement of Funafuti Fisheries Centre

As the proposed construction site is on public land, it can be procured. At present there is an old storage on 19 m² area. This store will be demolished and demolishing work will be undertaken by the Government of Tuvalu before the implementation. During the construction, temporary office, store and working yard are required. It is rather difficult to locate them in the narrow area of the site. The Tuvaluan

Government should make space available across the road opposite the proposed construction site. Electrical wiring from the transformer to the main distributor panel should be made available before the completion of construction.

(2) Vaitupu Fisheries Centre and Upgrading of Channel

As the proposed sites are on public land and on the outer reef, it can be procured. Three small houses and some coconuts trees are on the site. The houses will be demolished and the trees cleared by the Tuvaluan Government before the main construction commences. Dynamites for blasting work should be stored in safe place. For this purpose the Government should provide land for the storage.

6.4 Implementation Schedule

The implementation of this project is to be carried out in four phases taking into consideration following factors;

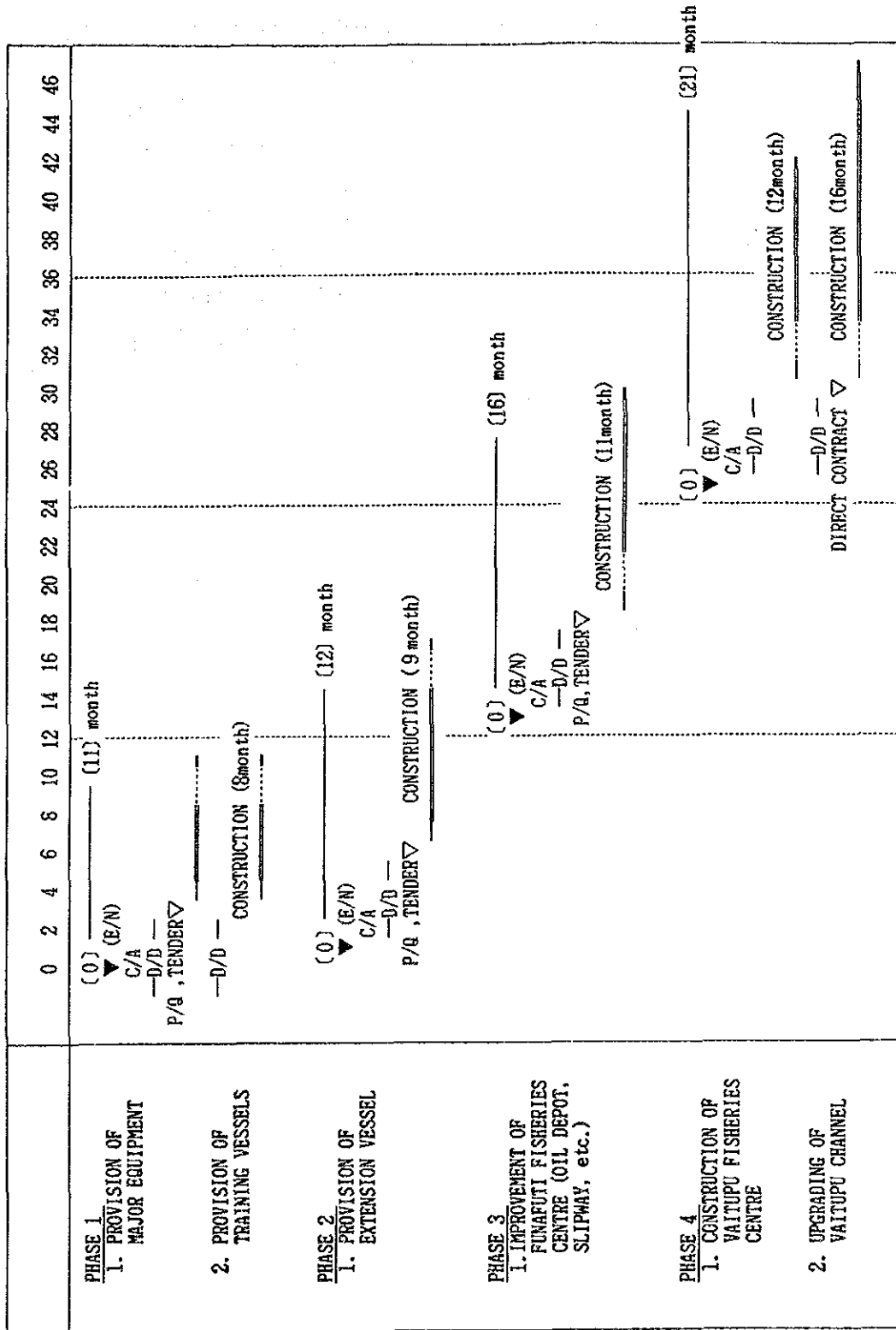
- 1) The proposed sites are located on two islands; Funafuti and Vaitupu that are widely separated, and hence the schedule has to be phased out by island.
- 2) The contents of the project are divided into provision of equipment and construction facilities.

The Project contents in each phase are shown in table below.

Phase	Items
Phase 1	Machinery, equipment, training vessel
Phase 2	Extension vessel
Phase 3	Funafuti architectural and civil works (jetty, slipway, fuel depot, etc.)
Phase 4	Vaitupu architectural and civil works (Construction of fisheries centre, upgrading of channel, etc.)

The overall implementation schedule is indicated in the following table.

IMPLEMENTATION SCHEDULE OF FISHING COMMUNITIES DEVELOPMENT PROJECT



Remarks; (E/N); Exchange of Note, C/A; Consultant Agreement, D/D; Detailed Design, P/Q; Pre-qualification
 ; Shipping ——— ; Preparation — ; Inspection & Hand over

6.5 Portion of Project Cost by Government of Tuvalu

The portion of the construction cost to be borne by the Government of Tuvalu is estimated at A\$38,670. The portion of each phase detail and schedule of the portion is shown below.

Unit; A\$				
Phase 1	Phase 2	Phase 3	Phase 4	Total
7,100	5,400	7,250	18,920	38,670

7. OPERATION AND MAINTENANCE PLAN

7. OPERATION AND MAINTENANCE PLAN

7.1 Operation and Maintenance Organizations

The facilities and equipment provided in this project will be mainly operated and maintained by the Fisheries Division and Island Council except for the equipment for the improvement of fishing village infrastructure that will be managed by the Public Works Division. Most of the facilities and equipment will be maintained and managed by the present organizational system, but the extension vessel and Vaitupu Fisheries Centre will require a new organizational system. The personnel required for the extension vessel have been prepared before the provision as indicated in the extension unit of organization chart (Fig.2.1).

The planned Vaitupu Fisheries Centre is not shown in the organization chart. This centre will be under jurisdiction of the Fisheries Division and it will require a manager from the Fisheries Division and another person who will be in charge of sales and other activities will be employed from Vaitupu.

The budget for the Fisheries Division is usually decided by the government based on the annual fisheries plan. The facilities and equipment provided in this project will require certain amount of operation cost and this cost will be calculated in this report. The operation cost is to be allocated from the recurrent budget of the Fisheries Division.

7.2 Operation and Maintenance Plan

The main facilities and equipment that are important in the operation and maintenance will be indicated below.

(1) Facilities and Equipment in Funafuti Fisheries Centre

1) Operation and Maintenance Plan and Cost

The operation and maintenance work and their costs of the facilities and equipment are as indicated below.

a) Repair of facilities and equipment

- Painting of jetty

The jetty is to be painted once in three years with one layer of paint. The cost of painting including materials and labour is estimated to be A\$ 3,570.

A\$ 3,570

- Painting of the building (exterior)
The exterior of the building will be painted once in three years. The cost is estimated to be A\$ 880.

A\$ 880

- Water-proof painting
The roof of the building will be painted with water-proof paint once in five years because the paint durability is five years. The cost is estimated to be A\$2,200.

A\$2,200

- Replacement of parts of machinery
Parts for the following machinery will be replaced once a year starting from the third year of operation. The cost of replacements are as follows:

Water pump	A\$ 290
Oil pump	A\$ 140
Vehicles	A\$ 220
Other machinery	A\$ 380

Total	<u>A\$1,030</u>
-------	-----------------

b) Fuel cost for vehicles

Fuel cost of diesel, gasoline and engine oil for forklift, tractor and motorcycle are as indicated below. The fuel cost of pick-up truck which is provided for replacement of existing truck is not included here.

Diesel: 780 lit x @ A\$0.53 = A\$ 420
Gasoline: 160 lit x @ A\$0.63 = A\$ 100

Total	A\$ 520
-------	---------

2) Revenue

Additional revenue from the operation of provided facilities and equipment is not expected.

(2) Vaitupu Fisheries Centre

1) Operation and Maintenance Plan and Cost

The operation and maintenance works and their cost of the facilities and equipment provided in this project are as indicated below.

a) Repair of facilities and equipment

- Painting of building (exterior)

The whole exterior of the building will be painted once in three years. The cost is estimated to be A\$ 590.

A\$ 590

- Water-proof painting

The whole roof of the building will be painted with water-proof paint once in five years. The cost is estimated to be A\$2,500.

A\$2,500

- Replacement of parts of machinery

Parts for the following machinery will be replaced once a year starting from the third year of operation. The cost of replacements are as follows:

Water pump	A\$ 290
Oil pump	A\$ 140
Ice making machine	A\$ 250
Generator	A\$ 170
Vehicles	A\$ 200
Other machinery	A\$ 120

Total A\$1,170

A\$1,170

b) Fuel cost for generator and vehicles

- Generator

Fuel consumption of diesel generator

2 lit/hour x 14 hours x 200 days = 5,600 lit

Fuel cost

5,600 lit x A\$0.53 = A\$2,968

A\$2,968

- Vehicles

Fuel cost of pick-up truck, forklift, tractor and motorcycle is A\$ 540.

A\$ 540

c) Labour cost

There will be a manager and another staff assisting the manager in repair and sales at the Vaitupu Fisheries Centre. The transport of fish shall be done mainly by fishermen. The annual labour cost is as follows:

Manager (1 person)	A\$3,630	
Assistant (1 person)	A\$1,120	
<hr/>		
Total	A\$4,750	<u>A\$4,750</u>

2) Revenue

The revenue is mainly from sales of ice and the commissions from selling fish. The unit prices of ice and commission are assumed to be the same as that of in the Funafuti Fisheries Centre.

a) Sale of ice

Daily 240 kg of ice shall be produced for 200 days/year and income from sales is as follows:

$$240 \text{ kg/day} \times \text{A\$}0.12/\text{kg} \times 200 \text{ days} = \underline{\text{A\$}5,760}$$

b) Commission

50 percent of the daily catch is expected to be sold at the centre and this is expected to bring an annual commission for 200 days/year as follows:

$$120 \text{ kg/day} \times \text{A\$}0.25/\text{kg} \times 200 \text{ days} = \underline{\text{A\$}6,000}$$

$$\underline{\text{Total Revenue} = \text{A\$}11,760}$$

Consequently the first four years operation of the Centre can be financially surplus at approx. A\$ 1,700 in each year. However it will be deficit when the expenditure for water proof painting work (A\$ 2,500/time) emerges once in five year.

(3) Coastal fishery training vessel

The coastal fishery and training vessel will be managed under the Share Fishing Scheme. The cost and benefit evaluation of this vessel under the Share Fishing Scheme is calculated as follows.

1) Fuel consumption

According to the fishing log maintained by the Fisheries Division, a trip (to and fro) to fishing grounds takes about two hours and the running of the engine for fishing operations takes about six hours. Based on this operational hours the fuel cost is computed.

Fuel consumption per day	: 30.6 liters
Diesel price per liter	: A\$ 0.53
<hr/>	
Fuel cost per day	: A\$ 16.2

2) Fish catch

The fish catch can be considerably increased with the coastal fishing training vessel in comparison to the present fishing vessels of the Fisheries Division as the training vessel has improved facilities (echo sounder, line hauler, etc.) and it is provided with vertical line, long line, and larger fish store for long preservation of fish. Besides it also has increased the safety and power to pursue after fish. An average catch of 50 kg per day is assumed for calculation based on the fishing records of SPC with insufficient hooks and fishing gear. The amount of catch is slightly more than that of Fisheries Division's boat No. 2; an average of 44 kg per day.

3) Revenue and expenditure

Fish catch value: 50 kg x A\$ 1.20/kg	= A\$ 60.0/day
Fuel cost :	A\$ 16.2/day
<hr/>	
Revenue less fuel cost	A\$ 43.8/day
- Revenue share of fishermen is	A\$ 21.9 /year(A\$ 7.3/person)
- Revenue share of Fisheries Division for vessel, gear and maintenance is	A\$ 21.9/year

Fishing frequency is expected to increase due to the safety of the vessel. Even if the frequency of fishing is assumed to be 15 days a month which is same as the present level, it is expected that a fisherman could earn about A\$ 1,314 a year under Share Fishing Scheme. On the other hand, annual revenue share of Fisheries Division for fishing gear and maintenance of vessel is expected to be A\$ 3,942/year.

The maintenance cost of vessel and fishing gear are computed as follows:

a) Maintenance cost of vessel

- For the first three years at 0.1% of the cost of the training vessel

$$A\$90,000 \times 0.001 = A\$ 90$$

- From fourth year onwards at 0.5% of cost of the training vessel

$$A\$90,000 \times 0.005 = A\$ 450$$

b) Maintenance of fishing gear (at A\$ 0.1 of 1 kg of fish catch)

$$50 \text{ kg} \times A\$0.1/\text{kg} \times 15 \text{ days/month} \times 12 \text{ months} = A\$ 900$$

The total maintenance cost even after fourth year onwards amounts to A\$1,350, and with the 50% revenue share of A\$ 3,942, it is possible to pay for the cost of the maintenance of the vessel and fishing gear.

(4) Extension Vessel

The annual operation plan for the extension vessel is shown below as mentioned in section 4.3.2.

1) Navigation Schedule

a) Fishing Operations

Deepwater fishing: 8-day trip/voyage x 5 times a year
= 40 days/year (35 fishing days + 5 trip days)

Pelagic fishing : 12-day trip/voyage x 5 times a year
= 60 days/year (55 fishing days + 5 trip days)

b) Extension service : 14-day trip covering two
islands/voyage x 10 times a year = 140 days/year

Based on the above schedule, the operation cost and revenue are as follows:

2) Operation cost

a) Fuel

The unit fuel (diesel) consumption of extension vessel is indicated below.

to and fro; 46 lit/h

fishing operation; 17 lit/h

Fishing operation

Average steaming hours : 21 hours

Number of voyages : 10

Fishing operational hours : 540 hours

(6 hours/day x 90 days)

Total fuel required : 18,840 lit

Extension Service

Average steaming hours : 33 hours

Number of voyages : 10

Total fuel required : 15,180 lit

Total cost of fuel required is shown below.

34,020 liters x A\$0.53 per liter = A\$ 18,030

b) Maintenance cost of vessel

Maintenance works are to be done as follows.

- Periodical inspection : once a year

- Repair works : once a year from the

Anti-corrosion fourth year

painting, replace-

ment of parts

- Other works : as required

The maintenance cost is calculated as follows:

- For the first three years at 0.1% of the cost of the extension vessel A\$ 700
- From fourth year onward at 0.5% of the cost of the extension vessel A\$ 3500

c) Maintenance cost of fishing gear(A\$ 0.1/kg of catch)

$$\underline{10,300 \text{ kg} \times \text{A\$ } 0.1/\text{kg} = \text{A\$ } 1,030}$$

d) Labour cost

The labour required is calculated as follows:

(1) Captain and engineer to be paid as permanent staff

- Captain : A\$3,630/year
 - Engineer: A\$3,630/year x 0.9 = A\$3,270/year
- Total A\$6,900/year

(2) Other crews to be paid on daily basis

- Fishing operation
100 days x 5 crews = 500 man-days
 - Collection service
140 days x 2 crews = 280 man-days
-
- Total = 780 man-days

Total labour cost [(1)+(2)] = A\$10,800/year

Total operation cost per year

A\$30,560 (1st-3rd year)

A\$33,360 (from 4th year onwards)

3) Revenue/Income

a) Fishing operation (Sales of fish)

Deepwater fish : 35 days x 112 kg/day = 3,920 kg

Pelagic fish : 55 days x 116 kg/day = 6,380 kg

Total : 10,300 kg

Income: 10,300 kg x A\$1.20 = A\$12,360

b) Fish transportation freight

3000 kg/trip x 10 trips x A\$0.20 = A\$6000

c) Passenger

14 persons/trip x 10 x A\$ 10 = A\$1400

Total revenue per year : A\$19,760

4) Income-expenditure balance

The income from the sales of fish, freight of fish and passengers is insufficient to cover the cost of fuel, maintenance and labour cost. The annual balance is as follows:

	1st - 3rd year	From 4th year onwards
Revenue	A\$19,760	A\$19,760
Expenditure	A\$30,560	A\$33,360
Balance	-A\$10,800	-A\$13,600

It is unavoidable that the balance is in deficit because the extension vessel is mainly used for public services. However the activities of the extension vessel are expected to have a great impact on the development of the islands' fishery, and it is indispensable for the full operation of Vaitupu Fisheries Centre. So it is necessary to implement the above mentioned schedule by allocating the budget necessary for the operation. The use of extension vessel for outer island development plan is a national policy of Tuvaluan Government. So the operation cost will be allocated even if the income-expenditure balance is in deficit.

7.3 Financial Analysis

The total operating and maintenance costs for the projected facilities and equipment are as indicated in following table.

BALANCE SHEET

Unit: A\$

Year	0	1	2	3	4	5	6	7	8	9	10
OPERATION COST											
Funafuti Facilities											
Painting of jetty						3,570			3,570		
Painting of building						880			880		
Water proof painting								2,200			
Maintenance of equipment						1,030	1,030	1,030	1,030	1,030	1,030
Vehicle fuel				520	520	520	520	520	520	520	520
Sub-total				520	520	6,000	1,550	3,750	6,000	1,550	1,550
Vaitupu Facilities											
Painting of building							590			590	
Water proof painting									2,500		
Maintenance of equipment							1,170	1,170	1,170	1,170	1,170
Vehicle fuel					540	540	540	540	540	540	540
Generator fuel					5,420	5,420	5,420	5,420	5,420	5,420	5,420
Personnel expense					4,750	4,750	4,750	4,750	4,750	4,750	4,750
Sub-total					10,710	10,710	12,470	11,880	14,380	12,470	11,880
Training Vessel											
Maintenance cost		540	540	540	2,700	2,700	2,700	2,700	2,700	2,700	2,700
Fishing gears		5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400
Sub-total		5,940	5,940	5,940	8,100	8,100	8,100	8,100	8,100	8,100	8,100
Extension Vessel											
Fuel cost			18,030	18,030	18,030	18,030	18,030	18,030	18,030	18,030	18,030
Maintenance cost			700	700	700	3,500	3,500	3,500	3,500	3,500	3,500
Fishing gears			1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030
Personnel expense			10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800	10,800
Sub-total			30,560	30,560	30,560	33,360	33,360	33,360	33,360	33,360	33,360
TOTAL COST		5,940	36,500	37,020	49,890	68,170	55,480	57,090	61,840	55,480	54,890
REVENUE											
Vaitupu Fisheries Centre											
Sales of ice					5,760	5,760	5,760	5,760	5,760	5,760	5,760
Margin of fish sales					6,000	6,000	6,000	6,000	6,000	6,000	6,000
Sub-total					11,760	11,760	11,760	11,760	11,760	11,760	11,760
Training Vessel											
(Fish sales -- fuel cost)/2		23,650	23,650	23,650	23,650	23,650	23,650	23,650	23,650	23,650	23,650
Sub-total		23,650	23,650	23,650	23,650	23,650	23,650	23,650	23,650	23,650	23,650
Extension Vessel											
Sales of catch			12,360	12,360	12,360	12,360	12,360	12,360	12,360	12,360	12,360
Freight of fish transport.			6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Passenger fee			1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
Sub-total			19,760	19,760	19,760	19,760	19,760	19,760	19,760	19,760	19,760
TOTAL REVENUE		23,650	43,410	43,410	55,170	55,170	55,170	55,170	55,170	55,170	55,170
BALANCE		17,710	6,910	6,390	5,280	-3,000	-310	-1,920	-6,870	-310	280

Remarks: 0 year is starting of construction of the 1st phase, and operation begins from next year of provision. Operation cost of the training vessel dose not include fuel cost and personnel cost, which are already deducted from the revenue; 50% of fish sales less fuel cost is paid to fishermen. The cost indicated here is to be allotted from the recurrent budget of Fisheries Division

In comparing every item in the cash flow, the income from the coastal fishery training vessel is high; annually about A\$23,700 is expected. This income is based on the average daily catch of 50 kg. In comparison to the present catch landed by the existing most beneficial Fisheries Division vessel, there is an increase of only 6 kg. It is possible to increase the catch further using the bottom long line, vertical line, echosounder, line hauler, provided in this project. Hence with the implementation of this project the income can be increased.

The operation costs of facilities and labour at Vaitupu Fisheries Centre are covered by the income from sales of ice and commissions from fish sales. The sale of ice for drinking purpose can also be expected. However, in order to have at least 50 percent of the fish catch in Vaitupu to be sold from the Centre, it is necessary to have the fishermen informed clearly of the roles, objectives and the benefits of the Centre. At the same time sales of fish to consumers around the island should be encouraged by means of such as motorcycles.

As for the extension vessel there will be deficit of A\$10,800 - A\$13,600 annually from the operation.

With the operation of the training vessel, the operation cost needed in the first year is about A\$5,900; with the operation of extension vessel, the operation cost in second year and third year each is about A\$37,000; and in fourth year with the operation of Vaitupu Fisheries Centre, the operation cost is about A\$50,000. In the fifth year with the full maintenance cost of the extension cost being incurred, the operation cost required from this year onward is about A\$55,500 - A\$61,800. This operation cost that is indispensable condition should be allocated.

On the other hand the estimated increases in income are about A\$23,700 in the first year; about A\$43,400 each in second and third years and about A\$55,200 from fourth year onwards.

From the fifth year the income balance turns to deficit and it is calculated to be a small deficit of A\$300 - A\$6,700. However, with the implementation of this project, it is expected that the increase in income from the increase in fishing efficiency will balance the operation and income costs. It is considered that the operation of this project is financially viable.

8. EVALUATION OF THE PROJECT

8. EVALUATION OF THE PROJECT

8.1 Benefits of the Project

Present fishing activities have many constraints and problems such as lack of landing facilities, lack of fish distribution centre or training facilities in the outer islands, inadequate supply of repair tools and equipment, etc. The objectives of this Project are to provide a stable supply of fish as a protein source and to build the foundation for future fish export by activating coastal fisheries through upgrading these facilities. Tuvalu has project assistance plans from other countries. Hence the achievement of the objectives by this Project depends greatly on the trend of these assistance programmes. This Project is expected to provide greater benefits in conjunction with these projects, and to induce great effect to the infrastructure for future fisheries development.

The benefits expected on implementation of this project are as follows:

(1) Direct benefit

1) Increase in fish landings and protein supply

Fish is the main source of protein for the people in Tuvalu and the per capita consumption of fish is about 37 kg. This figure is not considered high. According to the survey of the Fisheries Division, the per capita demand has been estimated to about 100 kg of fish. At least the present landing of fish should be doubled in order to meet the per capita demand.

By implementing this Project, increase of fish catch and of fish consumption are greatly expected through improving following points.

a) Increase of fishing frequency by improvement of landing facilities and provision of repair and maintenance tools

Due to lack of tools and spare parts, lot of time is wasted presently in repair work. During the study survey only four of the nine boats of the Fisheries Division were in working condition. There is no data on the repair hours. Based on the annual catch of 17 tons (about 37 kg/boat/day), it is estimated that a boat goes out to fish only 51 days in a year. Assuming that fishing days are 15 days a month, the boat is operated for about three months in a year. There is a remarkable decline in the number of fishing days for four months due to strong westerly winds

and severe sea condition from December to March. Hence it can be attributed that repair work is done during the remaining five months. There is not only time being wasted in repairs but also some of the boats are old. The technology for repair is considerably high because of the presence of a foreign expert on repair and maintenance. However the inadequate supply of tools and long delays in delivery of spare parts are considered to be attributed to the waste of time in repair work. Through the installation and provision of repair tools and spare parts in this project, the time for repair work can be considerably shortened.

Similarly in Vaitupu there are boats that can not go out to fish due to engine problems. There are no landing facilities, and furthermore the wide and shallow outer reef surrounding the island is dangerous to navigation of fishing boats. Fishing is frequently done at night and since it is dangerous to use the existing narrow and shallow channel, fishing days are restricted to dependence on moonlight, tides and wave condition. Fishing days can be increased by the use of beacon lights for safety.

b) Increase in catchability with the provision of fishing vessel, fishing gears, training of fishermen

Bottom long line and vertical line with many hooks have not been introduced yet. With the training and extension of the new fishing methods, the catching rate can be expected to increase. Fish resources are not clearly known, since a practical resource survey has not been carried out. However, despite the present use of primitive fishing gear, lines with one or two hooks, the annual catch of 100 tons and the size of fish is not decreasing; therefore it is believed that the fish resources have hardly been exploited.

The benefits of the fishing vessel to be provided in this project have been discussed in Chapter 6 of this report. It is possible to have more efficient fishing with the line hauler, echo sounder, etc. introduced in this vessel.

2) Increase in added value of fish by preservation facilities

With provision of insulation boxes and installation of an ice making machine in Vaitupu Island, improvement in the freshness and preservation period of fish is expected. Presently in Vaitupu there are no cold storage facilities and the daily catches are consumed within short

period and some are sun dried. In this project the fish catch can be preserved for longer periods and sold to other consumers.

(2) Indirect benefits

The indirect benefits of this project are shown below.

- 1) Increase in fishing effort and activities by the following factors
 - a) Increase in income of the fishermen under the Share Fishing Scheme
 - b) Increase in cash income opportunities for fishermen in the outer islands through the collection service by the extension vessel
- 2) Promotion of self-reliance of among fishermen through increase in income and training
- 3) Development of new fishing ground and fish species of commercial value through survey of offshore fishing grounds
- 4) Development of export potential in fishery products

8.2 Justification of the Project

Fisheries Division, the executing organization for the Project, is responsible for development of fisheries resources which is the greatest natural resources in Tuvalu. Since the history of its activities is short, its progress has been rather moderate than conspicuous. However, being very high the expectations of the Government to the Division's activities, the budget allocation to the Division has been increasing at average annual rate of more than 15% since 1981. Recently, development aids of fisheries sector by donor countries have put the Division's aim on track. The Division presently plans to recruit more or less ten staff within coming three years. And it is actively sending its staff overseas for technical training. In the implementation of this Project, minimum required personnel are a captain and an engineer of the extension vessel and a manager of Vaitupu Fisheries Centre. These staff are scheduled to be recruited according to above mentioned personnel plan.

On the operation and maintenance cost of the Project the Division shall make an effort to obtain the revenue from the operation. It can be judged the possibility of acquiring the expected revenue is high considering the contents of the Project.

The provision of the landing facilities, repair tools, fishing vessels, fishing gear, etc. by the Project will contribute to the increase of fish landings and of domestic protein supply, and activities of Vaitupu Fisheries Centre will play a roll of the pilot project for other outer islands which have not been well developed. Furthermore, through expansion of Share Fishing Scheme and collection service of fishery product by the extension vessel it is expected the Project will sufficiently contribute to increase of cash income opportunity for fishermen, promotion of self-reliance among fishermen, activation of fisheries and future development of export.

Consequently it is judged the implementation of the Project is appropriate.

9. CONCLUSIONS AND RECOMMENDATIONS

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

The Project contributes directly to lessening constraints that are hampering the development of fisheries in Tuvalu. In addition the Project is expected to promote stable supply of fish and from a long term viewpoint to activate export of fishery products. The benefits realized in this Project will obviously contribute to an important role in the development of coastal fisheries in Tuvalu, and hence the grant aid by the Government of Japan is very significant.

9.2 Recommendations

In order to implement and operate the project smoothly and efficiently it is recommended that the Government of Tuvalu prepare accordingly the following important items.

- 1) The Government of Tuvalu should allocate the construction portion cost and operation cost from the recurrent budget before the implementation of the project. On the other hand the revenue from the fish catch of training and extension vessel of this project is almost equivalent to the operation cost. Hence the government should investigate the flexible use of this revenue for smooth operation.
- 2) Since the establishment of the Fisheries Centre in Vaitupu is the first trial for the coastal fishery development in the outer islands, it is necessary that the fishermen in Vaitupu be aware of the objectives and purpose of the centre in order to carry out this plan successfully.
- 3) For the operation and management of the Vaitupu Fisheries Centre and the extension vessel three persons should be recruited. The personnel recruited for the Vaitupu Fisheries Centre should have sufficient knowledge in fishing techniques and fishery management, and as for the extension vessel the personnel namely captain and engineer should have sufficient technical ability and experience. If necessary technical training should be provided.

APPENDIX

APPENDIX

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Appendix 1

1.1 Members of the Basic Design Study Team

1) Basic design study

Name	Speciality (Present Department)
1) Masaru OKAMOTO	Team Leader, fish marketing planner (Deputy Director, International Affairs Division, Fishery Agency)
2) Yoshinori UGAJIN	Fishing port planner (Inspector, Fishing Port Construction Division, Fishery Agency)
3) Kenji ISHIWATA	Project Coordinator (Japan International Cooperation Agency)
4) Tamotsu TOMIYAMA	Fisheries Development Planning (System Science Consultants Inc.)
5) Yukitaka DATE	Architect (System Science Consultants Inc.)
6) Hiroshi YAMAMOTO	Civil Engineer (System Science Consultants Inc.)
7) Hiroshi FUTAMI	Fishing Vessels & Fishing Gears (System Science Consultants Inc.)
8) Teruo YABANA	Cost Estimation (System Science Consultants Inc.)

2) Draft report explanation

Name	Speciality (Present Department)
1) Satoshi KAMISE	Team Leader (Deputy Director, Construction Division, Fishing Port Department, Fishery Agency)
2) Kenji ISHIWATA	Project Coordinator (Japan International Cooperation Agency)
3) Tamotsu TOMIYAMA	Fisheries Development Planning (System Science Consultants Inc.)
4) Yukitaka DATE	Architect (System Science Consultants Inc.)
5) Hiroshi YAMAMOTO	Civil Engineer (System Science Consultants Inc.)

1.2 Study Team Survey Itinerary

1) Basic design study

(1/3)

DATE	ITINERARY	DESCRIPTION
1. Oct. 26 (Mon)	Narita - Nadi	Departure of consultants
2. Oct. 27 (Tue)	Nadi - Suva	Courtesy calls to JICA Fiji Office and Japanese Embassy in Fiji
3. Oct. 28 (Wed)	Nadi - Funafuti	Courtesy calls and meeting with Fisheries Officer and officials of Ministry of Finance and survey of the site of planned Fisheries Centre
4. Oct. 29 (Thu)	Funafuti	Discussion with officials of Planning Division, Ministry of Finance, and Fisheries Officer
5. Oct. 30 (Fri)	Funafuti	Discussion with officials of Public Works Division, Land and Survey Division, and collection of data at Fisheries Division
6. Oct. 31 (Sat)	Funafuti	Collection of data at Fisheries Division and survey of the site
7. Nov. 1 (Sun)	Funafuti	Analysis of data, arrival of Japanese Government members, meeting with Fisheries Officer, and field survey of Funafuti
8. Nov. 2 (Mon)	Funafuti	Meeting with Minister and Secretary of Ministry of Commerce and Natural Resources, and Secretary General and Secretary of Ministry of Finance; Party by the Prime Minister

DATE	ITINERARY	DESCRIPTION
9. Nov. 3 (Tue)	Funafuti - Vaitupu	Discussion with Island Council, field surveys of proposed excavation site and proposed site for community centre
10. Nov. 4 (Wed)	Vaitupu	Field survey of proposed excavation site and existing channel and meeting of team members and officials
11. Nov. 5 (Thu)	Vaitupu - Funafuti (Civil engineer stayed in Vaitupu for field survey)	Meeting to discuss on contents of the minutes
12. Nov. 6 (Fri)	Funafuti (Civil Engineer stay in Vaitupu)	Signing of minutes, and collection of data
13. Nov. 7 (Sat)	Funafuti (Civil Engineer stay in Vaitupu)	Meeting of team members and Japanese Govt. members left Tuvalu
14. Nov. 8 (Sun)	Funafuti (Civil Engineer stay in Vaitupu)	Analysis of data
15. Nov. 9 (Mon)	Funafuti (Civil Engineer stay in Vaitupu)	Collection of data and information from Fisheries Division, Public Works Division, Electricity Authority and Metecrological Office
16. Nov. 10 (Tue)	Funafuti (Civil Engineer left Vaitupu for Funafuti)	Collection of data and information from Fisheries Division and Public Works Division, harbour and fuel depot; Party by Chief Fisheries Officer

DATE	ITINERARY	DESCRIPTION
17. Nov. 11 (Wed)	Funafuti	Land survey of proposed site of Fisheries Centre, interview survey of fishermen and discussion with Fisheries Officer
18. Nov. 12 (Thu)	Funafuti	Land survey of proposed site of Fisheries Processing Centre and further collection of data from Fisheries Division and Public Works Division
19. Nov. 13 (Fri)	Funafuti	Meeting of the team members and courtesy calls to respective offices and ministries
20. Nov. 14 (Sat)	Funafuti - Suva Suva - Nadi - Sydney	Consultant members left Tuvalu Stay in Sydney
21. Nov. 15 (Sun)	Sydney - Narita	Arrival Japan

2) Draft report explanation

(1/2)

DATE	ITINERARY	DESCRIPTION
1. Feb. 3 (Wed)	Narita - Guam	Departure of Team members
2. Feb. 4 (Thu)	Guam - Majuro	
3. Feb. 5 (Fri)	Majuro - Tarau	
4. Feb. 6 (Sat)	Funafuti	Submission draft final report and discussion with Chief Fisheries Officer
5. Feb. 7 (Sun)	Funafuti	Discussion with Chief Fisheries Officer
6. Feb. 8 (Mon)	Funafuti	Explanation of the draft final report to the officials of Ministries of Commerce and Natural Resources, Finance, and Works and Communication
7. Feb. 9 (Tue)	Funafuti	Joint meeting and discussion of the draft final report
8. Feb. 10 (Wed)	Funafuti	Discussion with the respective department officers
9. Feb. 11 (Thu)	Funafuti	Joint meeting and and preparation of minutes
10. Feb. 12 (Fri)	Funafuti - Suva (Japanese govt. members) Funafuti (Consultants)	Signing of minutes and Japanese govt. officials left Tuvalu; consultant team members remained in Funafuti and had discussion with Fisheries Division officers
11. Feb. 13 (Sat)	Suva Funafuti	Preparation of reports by Japanese govt. members Supplementary site survey at Funafuti Fisheries Centre
12. Feb. 14 (Sun)	Suva Funafuti	Preparation of reports by Japanese govt. members Preparation of reports by Consultant members

DATE	ITINERARY	DESCRIPTION
13. Feb. 15 (Mon)	Suva - Nadi - Sydney (Japanese govt. members)	Courtesy call to Japanese Embassy and JICA office in Fiji by Japanese govt. members
	Funafuti - Suva (Consultant members)	Consultant members left Tuvalu
14. Feb. 16 (Tue)	Sydney - Narita (Japanese govt. members)	Arrival Japan
	Suva - Majuro - Honolulu	Courtesy call to Japanese Embassy and JICA office in Fiji by consultant members
15. Feb. 17 (Wed)	Honolulu - Narita (Consultant members)	Arrival Japan

1.3 Name of Members Contacted

1) Basic design study

Organization	Position	Name
1. Embassy of Japan in Fiji	Ambassador Extroadinary and Plenipotentiary Secretary	Toshio Isogai Takumi Uejima
2. JICA Office in Fiji	Director	Yoshio Yoshida
Authorities concerned in Tuvalu		
3. Government Office	Acting Secretary	Feue Tipu
4. Ministry of Commerce and Natural Resources	Minister Secretary	Hon. Lale Seluka Saufatu Sopoaga
5. Fisheries Division	Chief Fisheries Officer	Elisala Pita
6. Land and Survey Division	Chief Lands Officer	Siniala Auenga
7. Ministry for Finance	Secretary	Mike Quartermain
8. Planning Division	Chief Planning Officer Assistant Planning Officer	Gary Wiseman Panapasi Nelesone
9. Ministry for Works and Communications	Acting Secretary	Touaasa Taafaki
10. Public Works Division	Director of Works Civil Engineer Architect	Ian Hatfull Colin Reynolds Carol Quillinam
11. Tuvalu Electricity Authority	Supply Engineer	Laurie C. Scott
12. Meteorological Office	Meteorological Officer	Dave A. Roberts
13. Vaitupu Island Council	Captain Deputy Captain Members	Moupa Fagalelo Tauí Tauí Auega Fou Esan Peelo Sceitupu Setema Mono Manalea
14. Island Executive Office	Executive Officer	Iapesa Vave

2) Draft report explanation

Organization	Position	Name
1. Embassy of Japan in Fiji	Secretary	Takumi Uejima
2. JICA Office in Fiji	Director	Yoshio Yoshida
Authorities concerned in Tuvalu		
3. Government Office	Acting Secretary	Feue Tipu
4. Ministry of Commerce and Natural Resources	Minister Secretary	Hon. Lale Seluka Saufatu Sopoaga
5. Fisheries Division	Chief Fisheries Officer	Elisala Pita
6. Ministry for Finance	Minister	Hon. Kitiseri Lopati
7. Planning Division	Secretary Chief Planning Officer Assistant Planning Officer	David Cottingham Gary Wiseman Panapasi Nelesone
8. Public Works Division	Acting Director of Works Civil Engineer	Tony Prout Colin Reynolds

1.4 Minutes of Discussion

1) Basic design study

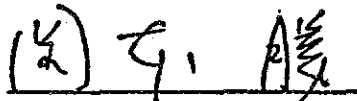
**MINUTES OF DISCUSSIONS
ON
THE FISHING COMMUNITIES DEVELOPMENT PROJECT
IN
TUVALU**

In response to the request of the Government of Tuvalu, the Government of Japan has decided to conduct a basic design study on the Fishing Communities Development Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA despatched to the Government of Tuvalu the Basic Design Study Team headed by Mr. Masaru Okamoto, Deputy Director, International Affairs Division, Oceanic Fisheries Department, Fishery Agency, Ministry of Agriculture, Forestry and Fisheries from October 28 to November 13, 1987.

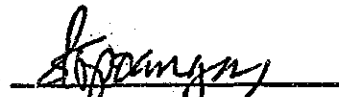
The Team had a series of discussions on the Project with the Officials of the Government of Tuvalu which included Officials from the Ministry of Commerce & Natural Resources (Fisheries Division), Ministry of Foreign Affairs, Ministry of Finance (Planning Division), Ministry of Works and Communications (Public Works).

As a result of the study, both parties agreed to recommend to their respective governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Funafuti, November 6, 1987



Mr. Masaru Okamoto
Leader, Japanese Basic
Design Study Team,
Japan International Cooperation
Agency



Mr. Saufatu Sopoaga
Secretary
Ministry of Commerce
& Natural Resources

ATTACHMENT

1. OBJECTIVE OF THE PROJECT

The objectives of the Project is to contribute to the development fishing community in Tuvalu by constructing various infrastructures equipped with necessary facilities and by installation of equipment.

2. EXECUTING BODY

The responsible and executing organization for the Project is the Fisheries Division, the Ministry of Commerce & Natural Resources which is an autonomous body under the supervision of the Ministry of Commerce & Natural Resources.

3. SITES OF THE PROJECT

The proposed sites of the Project are located at Funafuti Island and Vaitupu Island as shown in Annex 1.

4. REQUEST BY THE GOVERNMENT OF TUVALU

The Japanese Basic Design Study Team will convey the desire of the government of Tuvalu to the government of Japan that the latter will take necessary facilities and equipment as listed in Annex 11 within the scope of the Japanese Economic Cooperation in grant form.

5. MEASURES TO BE TAKEN BY THE GOVERNMENT OF TUVALU

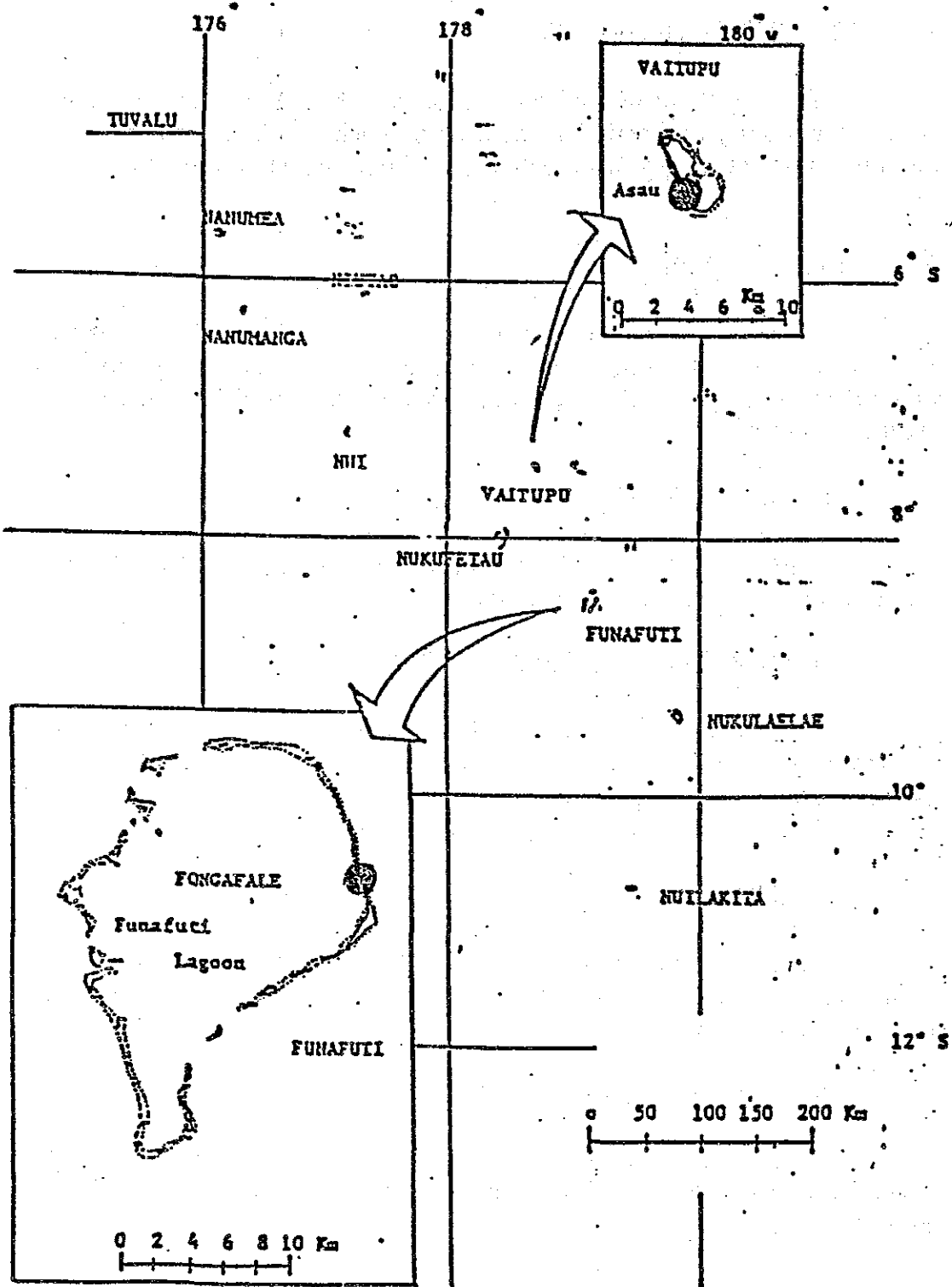
The Government of tuvalu will take the necessary measures in Annex 111 on conditions that the Grant Aid by the Government of Japan is extended to the Project.

6. SYSTEM OF JAPAN'S GRANT AID

Both sides have confirmed that the Japanese Basic Design Study team explained to the Tuvalu side Japan's Grant Aid System and they understood it.

ANNEX I

Location of project site



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● Project sites

ANNEX 11

List of requested facilities and equipment	<u>Funafuti</u>	<u>Vaitupu</u>
1. Training and Modernisation of Coastal Fisheries		
A. Training		
(a) Training Vessels (six, approx. 6-9 metres)	0	v
(b) Extension service vessel (one, approx. 17-19 metre)	0	-
(c) Training facilities and equipment on shore		
(1) Training and meeting room	-	0
(2) Provision of outboard engines, spare parts, tools & fishing gear	0	v
B. Modernization		
(a) Construction of a fuel, oil depot and equipment storage complex	0	0
(b) Upgrading of existing jetty and slipway at Fisheries Station	0	-
(c) Communication and safety equipment	0	-
(d) Workshop	-	0
2. Promotion of Marketing Operations		
(a) Construction of water tanks.	0	0
(b) Equipment for fish handling and marketing		
(1) Insulated fish boxes	0	v
(2) Pick up trucks, forklifts, tractor, motorcycles	0	v
(3) Ice making machine, power unit and cold storage	-	0
3. Improvement of Fishing Village Infrastructure		
(a) Provision of essential equipment and machines for improvement of roads	0	-
(b) Provision of transportable water tanker (approx. 3 tonnes capacity)	0	0
(c) Upgrading of the existing channel	-	0

Note: 0 = provided
v = distributed to Vaitupu

(15)
L1

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ANNEX III

Items

1. To secure a lot of land
2. To clear, level and reclaim the site when needed
3. To construct the gate and fence in and around the site when needed
4. To construct the road
 - (a) outside the site
5. To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities
 - (1) Electricity
 - (a) the distributing line to the site
 - (2) Telephone System
 - (a) the telephone trunk line to the main distribution frame/panel (MDF) of the building
 - (3) Furniture and Equipment
 - (a) general furniture (carpet, curtain, etc.)
6. To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the B/A
 - (1) Advising commissions of A/P
 - (2) Payment commission
7. To ensure unloading and custom clearance at port of disembarkation in recipient country
 - (1) Tax exemption and custom clearance of the products at the port of disembarkation
8. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into recipient country and stay therein for the performance of their work.
9. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant

(3)
9.

B

2) Draft report explanation


**MINUTES OF DISCUSSIONS
ON
THE FISHING COMMUNITIES DEVELOPMENT PROJECT
IN
TUVALU**

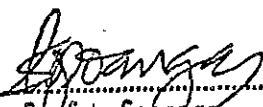
In response to the request made by the Government of Tuvalu for grant aid for the Fishing Communities Development Project (herein after referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Tuvalu the team headed by Mr. Masaru OKAMOTO, Deputy Director, International Affairs, Oceanic Fisheries Department, Fishery Agency, Ministry of Agriculture, Forestry and Fisheries, from 28th October to 13th November, 1987.

As a result of the study, JICA prepared a Draft Report and dispatched a team headed by Mr. Satoshi KAMISE, Deputy Director, Construction Division, Fishing Port Department, Fishery Agency, Ministry of Agriculture, Forestry and Fisheries to explain and discuss it with the relevant officials of the Government of Tuvalu from 6th to 15th February, 1988.

Both parties had a series of discussions on the Report and agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

12th February, 1988


.....
Mr. Satoshi KAMISE
Leader of the Draft Final Team
Japan International Cooperation
Agency


.....
Mr. Saufatu Sopoaga
Secretary
Ministry of Commerce
& Natural Resources

ATTACHMENT

1. The Tuvalu side has in principle agreed to the basic design proposed in the draft final report and appropriate amendments as shown in ANNEX A will be incorporated in the Final Report.
2. The Tuvalu side has understood Japan's grant aid system and reconfirmed the necessary measures to be taken by the Tuvalu side for the realization of the Project shown in Annex III as agreed upon the Minutes of Discussion dated 6th November, 1987
3. The Tuvalu side has confirmed that within its limited resources, the necessary budget including an adequate number of personnel with sufficient knowledge and experience will be provided for the effective operation and maintenance of the Project.
4. The Final Report (10 copies in English) will be submitted to the Tuvalu side within April 1988.

SK

ANNEX A

1. The Tuvalu side agreed with the implementation schedule as summarized below:

Phase I	Provision of equipment and training vessels
Phase II	Provision of extension vessel
Phase III	Improvement of Funafuti Fisheries Centre
Phase IV	Construction of Vaitupu Fisheries Centre, and improvement of the existing channel

2. Both sides agreed to the following modifications:

- (1) provision of equipment and training vessels

- 1) Modification

-1.B; Outboard engines

Thirty eight (38) 15HP and thirty eight (38) 25HP engine to be provided instead of seventy six (76) 25HP.

- 2) Additional

-1.C; Overalls

-1.C; Safety boots

-1.E; Floating marine torches

-1.E; Weather gears

- (2) Improvement of Funafuti Fisheries Centre

P52 f) Radio telephone

The receiving station to be installed in the watchman's accommodation instead of the existing market building.

- (3) Construction of Vaitupu Fisheries Centre, and improvement of existing channel

- 1) Vaitupu Fisheries Centre

- capacity of fuel tanks to be increased:

Gasoline tank: from 2 to 3 tons

Diesel tank: from 1.5 to 2 tons

- 2) Improvement of the existing channel

- Kerb stones and a beacon light to be provided on the landing pier.

- Appropriate lighting to be provided

1.5 List of References

(1/3)

Title	Source	Year
1. General		
1) Fishery Country Profile :Tuvalu	Food and Agriculture Organization (FAO)	1986
2) Tuvalu International Trade 1984	Ministry of Finance	1987
2. Development Plan		
1) Third Tuvalu Development Plan (1978-1980)	Government of Tuvalu (GOT)	1978
2) Draft of Fourth Tuvalu Development Plan (1987-1990) - Chapter on Fisheries only -	GOT	1987
3) Tuvalu Development Fund Estimates	GOT	1980-1987
4) Tuvalu Fisheries Review	Australian International Development Assistance Bureau (AIDAB)	1986
5) Tuvalu Fisheries Development Program (Draft)	AIDAB	1987
3. Fisheries		
1) Fisheries Division - Annual Report -	Fisheries Division	1980-1987
2) Fisheries Statistics	Fisheries Division	1985-1986
3) Fisheries Statistics - Tuvalu -	FAO	1987
4) The Development of Deep Bottom Fishing in the Tropical Pacific	South Pacific Commission (SPC)	1980
5) The Deep Sea Fisheries Development Project in Funafuti, Tuvalu	SPC	1982

(2/3)

Title	Source	Year
6) Report on the South Pacific Commission Outer Reef Fisheries Project in Funafuti, Tuvalu	SPC	1978
7) Development of Small Scale Pole and Line Fishing Around Funafuti	United Nation Development Program (UNDP)	1985
8) First Quarter Report on the Progress of the Craft Evaluation Project and Shore Fishing Scheme	Fisheries Division	1987
9) Fishing Log of Share Fishing Vessels	Fisheries Division	1987
10) Fish Sales Log of Fish Processing Centre	Fisheries Division	1987
11) Draft Result of Questionnaire to Fishermen in Funafuti	Fisheries Division	1987
12) Organizational Chart of Fisheries Division	Fisheries Division	1987
4. Construction		
1) Stock Catalogue for 2nd half 1987 and 1st half 1988	Government Store Division	1987
2) Cost Estimate of Construction of New Fisheries Office	Public Works Division	1987
3) Proposed Drawings of Fishing Communities Development Project	Ministry of Commerce and Natural Resources	1987

Title	Source	Year
5. Natural Conditions		
1) Tide Table - Funafuti -	Meteorological Division	1987
2) Register of Rainfall - Funafuti, Vaitupu -	Meteorological Division	1978-1987
3) Tropical Cyclones in the Southwest Pacific	United Nations	1981
4) Technical Report (Draft), Funafuti Sea and Swell Observations	United Nations	1986
5) Tuvalu Lagoon Bed Resources Survey	AIDAB	1985

Appendix 2

TABLE 2.1 POPULATION OF TUVALU BY ISLAND (1968-1985)

	Population				Growth Rate(%) (1979-1985)	Projection	
	1968	1973	1979	1985		1990	2000
Funafuti	826	871	2120	2810	4.8	3952	4585
Vaitupu	876	948	1273	1231	-0.5	1487	1634
Naumea	1076	977	844	879	0.7	909	941
Nanumanga	585	587	605	672	1.8	733	800
Niutao	796	907	866	904	0.7	971	1007
Nui	569	569	603	604	0.0	606	607
Nukufetau	646	620	626	694	1.7	824	898
Nukulaelae	354	343	347	315	-1.6	268	247
Niulakita	54	65	65	74	2.0	92	102
Total	5782	5887	7349	8204	1.9	9941	10296

Source; Planning Division, Ministry of Finance

TABLE 2.2 ESTIMATED GROSS DOMESTIC PRODUCT FOR TUVALU (1981-1985)

	1981	1982	1983	1984 Provisional	1985 Provisional
Agriculture and Livestock	155,426	168,675	252,732	318,599	245,389
Fishing	172,570	83,245	156,720	170,000	299,567
Manufacturing	47,500	52,000	63,000	85,540	108,081
Electricity	-	-	65,000	64,439	91,790
Construction	354,100	407,000	307,000	344,480	480,857
Trade Hotels & Restaurants	1,458,400	810,000	1,044,000	1,081,646	560,853
Transport	-546,832	-442,654	-366,560	-203,450	-118,389
Communications	-	132,000	154,000	135,306	158,882
Banking & Finance	64,799	84,000	115,000	128,271	200,000
Real Estate & Ownership of dwellings	101,970	121,779	129,220	131,135	138,891
Govt. Services	1,775,484	1,804,331	1,953,047	2,020,703	2,227,135
Community Services	78,100	82,000	88,000	96,800	132,903
Domestic Services	8,000	8,000	8,000	8,000	8,000
Import Duties	439,100	422,000	484,600	565,562	500,000
GDP (at market price)	4,108,616	3,932,375	4,434,159	4,947,123	5,034,457
Population (de facto)	7,877	8,112	8,200	8,215	8,229
Per capita GDP (at market price)	522	460	541	602	612

Source; Planning Division, Ministry of Finance

TABLE 2.3 IMPORTS TO TUVALU (1982-1984)

Unit: A\$

Items	1982		1983		1984	
	VALUE	%	VALUE	%	VALUE	%
1. Food and live animals chiefly for food	647848	22.4	815732	27.5	965027	24.4
2. Beverages and tobacco	130620	4.5	157387	5.3	164551	4.2
3. Crude materials, inedible, except fuels	97376	3.4	116512	3.9	54722	1.4
4. Mineral fuels, lubricants and related materials	484525	16.8	415071	14.0	461758	11.7
5. Animal and vegetable oils, fats and waxes	6882	0.2	7744	0.3	14753	0.4
6. Chemicals and related products	187818	6.5	205157	6.9	198990	5.0
7. Manufactured goods classified chiefly by materials	553348	19.1	502285	16.9	870741	22.0
8. Machinery and transport equipment	464299	16.1	365019	12.3	588033	14.9
9. Miscellaneous manufactured articles	263237	9.1	303453	10.2	554407	14.0
10. Commodities and transactions not classified elsewhere	54424	1.9	75949	2.6	76245	1.9
TOTAL IMPORTS	2890377	100	2964309	100	3949227	100

Source: Tuvalu International Trade, 1984
 Statistics Office, Ministry of Finance, Tuvalu
 February 1987

TABLE 2.4 IMPORT TO TUVALU OF FOOD AND LIVE ANIMALS IN 1984

Items	Value (\$A)
1. Live animals chiefly for food	1014
2. Meat and meat preparations	234772
3. Dairy products and birds' eggs	71208
4. Fish, crustaceans and molluscus and preparations thereof	13842
5. Cereal and cereal preparations	369368
6. Vegetables and fruit	55987
7. Sugar, sugar preparations and honey	87626
8. Coffee, tea, cocoa, spices and manufactures thereof	44828
9. Feeding stuff for animals (excluding unmilled cereals)	9311
10. Miscellaneous edible products and preparations	77071

Source: Tuvalu International Trade, 1984
 Statistics Office, Ministry of Finance, Tuvalu

TABLE 2.5 NATIONAL ACCOUNTS DATA (1979-1984)

Unit: A\$1000

	1979	1980	1981	1982	1983	1984
Exports	1251	659	2125	852	779	1432
Imports	1953	3062	2529	4147	2855	3844
Balance of Trade	-696	-2403	-404	-3295	-2076	-2412
Balance of Payments						
Goods + Services	-1422	-3565	-1723	-4292	-3394	-3841
Official Aid			2543	1250	495	2659
Current Account						
Balance			2543	1250	495	2659

Source: Australian International Assistant Bureau

TABLE 2.6 EXPORT (FOB) FROM TUVALU (1979-1983)

Unit: A\$1000

	1979	1980	1981	1982	1983 (Provisional)
Philatelic sales	1041	605	2107	1077	587
Copra	163	28	19	17	61
Fish	-	-	-	191	250
Beche de mer	5	4	-	-	-
Handicraft	-	-	1	-	2
TOTAL EXPORTs (FOB)	1209	637	2127	1285	900

Source: Third Development Plan (1984-1987)

TABLE 2.7 SUMMARY OF REVENUE-EXPENDITURE ACCOUNTS OF MINISTRY OF COMMERCE AND NATURAL RESOURCES, AND FISHERIES DIVISION (1988-1987)

Unit: A\$

	Ministry of Commerce & Natural Resources			Fisheries Division		
	Total Revenue	Expenditure	Balance	Revenue	Expenditure	Balance
1981	63,178(46,206)	146,261	-83,083	8,183	27,756	-19,573
1982	174,500(146,800)	142,326	32,174	10,000	37,019	-27,019
1983	183,010(206,000)	188,651	-5,641	15,000	39,542	-24,542
1984	NA (212,881)	NA	NA	NA	NA	NA
1985	562,882(403,421)	189,614	373,268	10,457	42,701	-32,242
1986	422,071(398,000)	191,547	230,524	7,350	51,220	-43,870
1987	551,550(498,000)	235,713	315,837	21,000	67,286	-46,280

Note: Figures in parentheses indicate the revenue from licensing foreign fishing vessels. These figures are included in the total revenue.

NA : Not available

Source: Tuvalu Development Estimates, 1985, 1986, 1987
Third Development Plan, 1984-1987
Sectorial Overview - Fisheries- Tuvalu, 1987

TABLE 2.8 SUMMARY OF DEVELOPMENT BUDGET FOR FISHERIES (1983-1987)

Unit: A\$

	1983 Actual	1984 Actual	1985 Actual	1986 Revised	1987 Estimate
Fisheries Sector	132,500	187,670	355,364	528,870	755,870
Percent of Total Budget	5.2	3.5	10.1	9.5	7.9
Other Sectors	2,554,288	5,299,982	3,532,155	5,580,357	9,511,780

Source: Tuvalu Development Fund Estimates 1985, 1986, 1987

**TABLE 2.9 NATIONAL FISHERIES DEVELOPMENT PROGRAMMES IN TUVALU
(DATA ON NOVEMBER, 1987)**

1. VESSELS

Contents		Donor C/A	Amount A\$	1/D	U/I	S/D	U/P
Inshore Fishing Vessels x3 (1979)		UNDP	40,260	0			
Inshore Diesel Launch x1 (1982)		New Zealand	10,000	0			
Diesel Launch (1985) x1		Canada	9,000	0			
Research and Fisheries Training Vessel (1982) x1		Japan	1,500,000	0			
Inshore Vessels x3		Canada	40,260		0		
Inshore Vessels ¹⁾ x5		Japan	350,000			0	
Atoll Fisheries Research and Training Vessel ¹⁾ x1		Japan	81,000			0	
Oceangoing Fisheries Research Extension Vessel ¹⁾ x1		Japan	228,000			0	

Remarks 1); Programmes/projects are related to the present project requested.

2. EQUIPMENT AND GEARS FOR FISHING VESSELS (including FAD)

(1/2)

Contents		Donor C/A	Amount A\$	1/D	U/I	S/D	U/P
Fishing Tackle, Pickup Truck, Boat Equipment and FAD (1986)		Korea	70,000	0			
Fishing Equipment (Tackle) (1984)		W. Germ	2,000	0			
Safety Equipment (Distress Radio Telephone, etc.) (1985)		Canada	16,000	0			
Vessel Equipment (1982) (Navigational Equipment)		United Kingdom	minor work	0			
Fisheries Equipment (Engines, Spareparts, Echo Sounder, Welding Machine, etc.) (1985)		UNDP	34,000	0			
FAD Materials (1986)		Canada	1,900	0			

(2/2)

Contents	Donor C/A	Amount A\$	1/D	U/I	S/D	U/P
FAD Materials (1983)	United Kingdom		0			
Equipment in support of JICA Experts on Te Tautai (1983)	Japan	92,000	0			
FAD Programme	Aust	40,000				0
Safety, Communication, Training Equipment, FAD, etc.)	USAID	58,000		0		
Fishing Boat Equipment, Fishing Tackles, etc.)	Japan	25,000				0

Remarks 1); Programmes/projects are related to the present project requested.

3. FACILITY AND EQUIPMENT

Contents	Donor C/A	Amount A\$	1/D	U/I	S/D	U/P
Fisheries Jetty and Slipway (1985)	New Zealand	67,000	0			
Mechanical Workshop (1985) (For Maintenance)	New Zealand	9,500	0			
New Fisheries Office Project (1987)	(*)	51,000	0			
Boat Repair and Engine Maintenance Workshop	Canada	55,000		0		
Fuel Depot and Equipment Store	(*)	25,000				0
Upgrading of Fisheries Jetty	New Zealand	20,000				0
Fishery Programme	USAID	175,000				0

Remarks 1); Programmes/projects are related to the present project requested.

(*); Programmes/projects are carried out by domestic fund.

4. RESEARCH, SURVEY AND EQUIPMENT

(1/2)

Contents	Donor C/A	Amount A\$	I/D	U/I	S/D	U/P
Baitfish Survey & Small Scale Pole and Line Fishing Trials (1986)	UNDP	20,000	0			
Fisheries Statistical Programme (1986)	SPC	2,000	0			
Regional EEZ Delineation (1983)	Aust		0			
Fisheries Resources Survey (1986)	Japan	250,000	0			
Artisanal Fishing Craft Evaluation (Phase 1)(1986)	Aust	97,130	0			
Appointment of Fisheries Commercial Manager/Advisor (1987)	Aust	164,000	0			
UNDP Fisheries Development Project (1985)	UNDP	150,000	0			
Survey of Ciguatoxic Fish Poisoning in Tuvalu	NZ	24,000			0	
Technical Assistance for Fishing Technique	Japan	150,000			0	
Craft Evaluation Project (Phase II)	Aust	400,000			0	
Appointment of Commercial Advisor	Aust	180,000		0		
Tuvalu Fisheries Statistical Programme	Aust	40,000				0
Deep Bottom Fishing Trials	SPC	50,000				0
Fish Aggregating Patterns around FAD	SPC	50,000				0
Delimitation of Exclusive Fishing Zone (Phase II)		250,000				0
Fisheries Mechanic Position	UNDP	30,000		0		

(2/2)

Contents	Donor C/A	Amount A\$	I/D	U/I	S/D	U/P
Fisheries Mechanic Position	USAID	10,000	0			
Can Factory F/S	New Zealand	5,000	0			
Fisheries Community Development Project (Nukufetau & Nanumea) ¹⁾	Aust	49,000	0			
Fisheries Assistance	UNDP	120,000		0		
Fisheries Statistical Programme	USAID	8,000		0		
Fisheries Communities Development Project (Funafuti & Vaitupu) ¹⁾	Japan	N.A.		0		

Remarks 1); Programmes/projects are related to the present project requested.

5. AQUACULTURE PROJECTS

Contents	Donor C/A	Amount A\$	I/D	U/I	S/D	U/P
Introduction of Trochus for Funafuti Lagoon	UNDP	10,000		0		
Trochus Project (Phase I) (Phase II)	New Zealand	15,000 100,000		0		0
Consultancy: Feasibility of Milkfish Farms in Vaitupu	UNDP/ ARDU	100,000				0
Introduction of Giant (Survey) Clam Shells (Experiment)	UNDP	(U\$6,500) 100,000			0	0
Experimental Seaweed (Phaze 1) Culture Project (Phaze 2)	New Zealand	10,000 15,000		0		0

6. PROCESSING AND MARKETING PROJECTS (FUNAFUTI)

Contents	Donor C/A	Amount A\$	I/D	U/I	S/D	U/P
Market Building (1987)	United Kingdom	142,000	0			
Refrigeration Equipment (Small Freezer Cabinets and Refrigerator) (1986)	W.Germ	3,000	0			
Fish Market Equipment Project (Fish Storage Equipment, Ice Machine, Smokers, Packaging Equipment, etc.) (1987)	Aust	200,000	0			
Ice Making Machine and (500 kg/day) (1987)	Aust	12,600	0			

7. OTHER PROJECTS

Contents	Donor C/A	Amount A\$	I/D	U/I	S/D	U/P
Refrigeration Equipment (Cabinet Freezers, Scales) (1983)	W.Germ	3,375	0			
Refrigeration Equipment (Chillers, Smoker, etc.) (1986)	United Kingdom	NA	0			
Solar Ice Making Plant (Field Testing)(1986)	UNDP	4,000	0			

8. ECONOMIC COOPERATION

Contents	Donor C/A	Amount A\$	I/D	U/I	S/D	U/P
Working Capital for Pole and Line Vessel (1983)	United Kingdom	160,000	0			
Management of 'Te Tautai'	Aust	52,000			0	
Accountable Cash Grant for Fishing Tackle, Tools and Spares	Aust	30,000			0	
Recurrent Costs for Fish Processing and Marketing Centre, Funafuti (1987)	Aust	92,000		0		
	United Kingdom	25,000		0		
Marketing of Seafood Products	Aust	25,000			0	

Note: C/A: Country/Agency;
 I/D: Projects Implemented;
 U/I: Projects Under Implementation;
 S/D: Projects Submitted but not approved;
 U/P: Under Preparation

9. LONG TERM PROJECT LIST FROM PERIOD 1987-1990

1. Promotion of Small Scale Industries
2. Application of Solar Chiller and Ice Maker
3. Feasibility Study for a Two Boat Pole and Line Operation
4. Establishment of 500 Tonne Freezer for Tuna
5. Commissioning of Freezer Vessel
6. Surveillance and Enforcement Programme
7. Computer Centre
8. Storage Facilities for NAFICOT and Fisheries Division

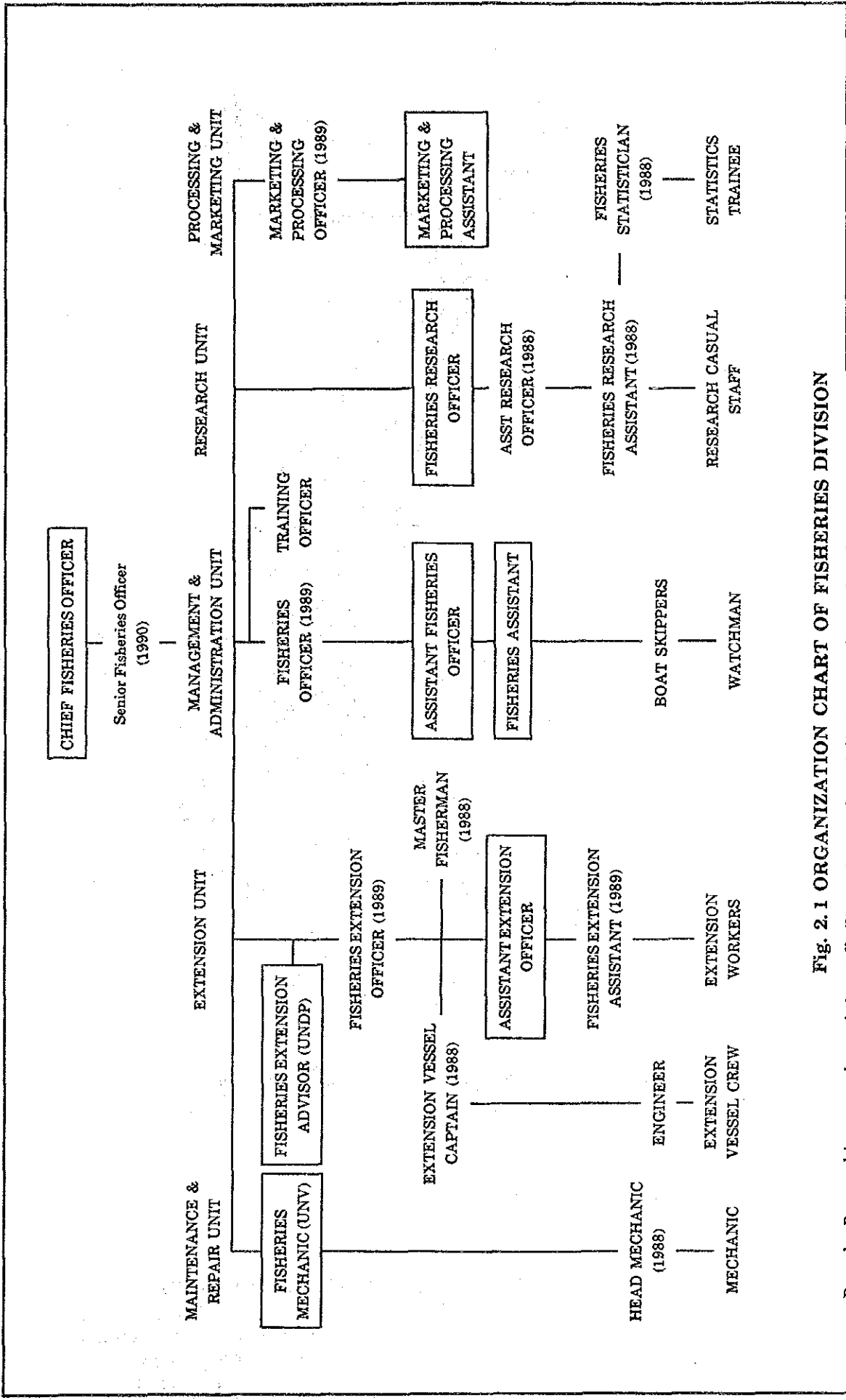


Fig. 2.1 ORGANIZATION CHART OF FISHERIES DIVISION

Remarks: Personnel in square show existing staff. Figures in parentheses indicate expected year of employment.
 UNV - United Nations Volunteer, UNDP - United Nations Development Programme

THE FISHING COMMUNITIES
 DEVELOPMENT PROJECT
 IN TUVALU

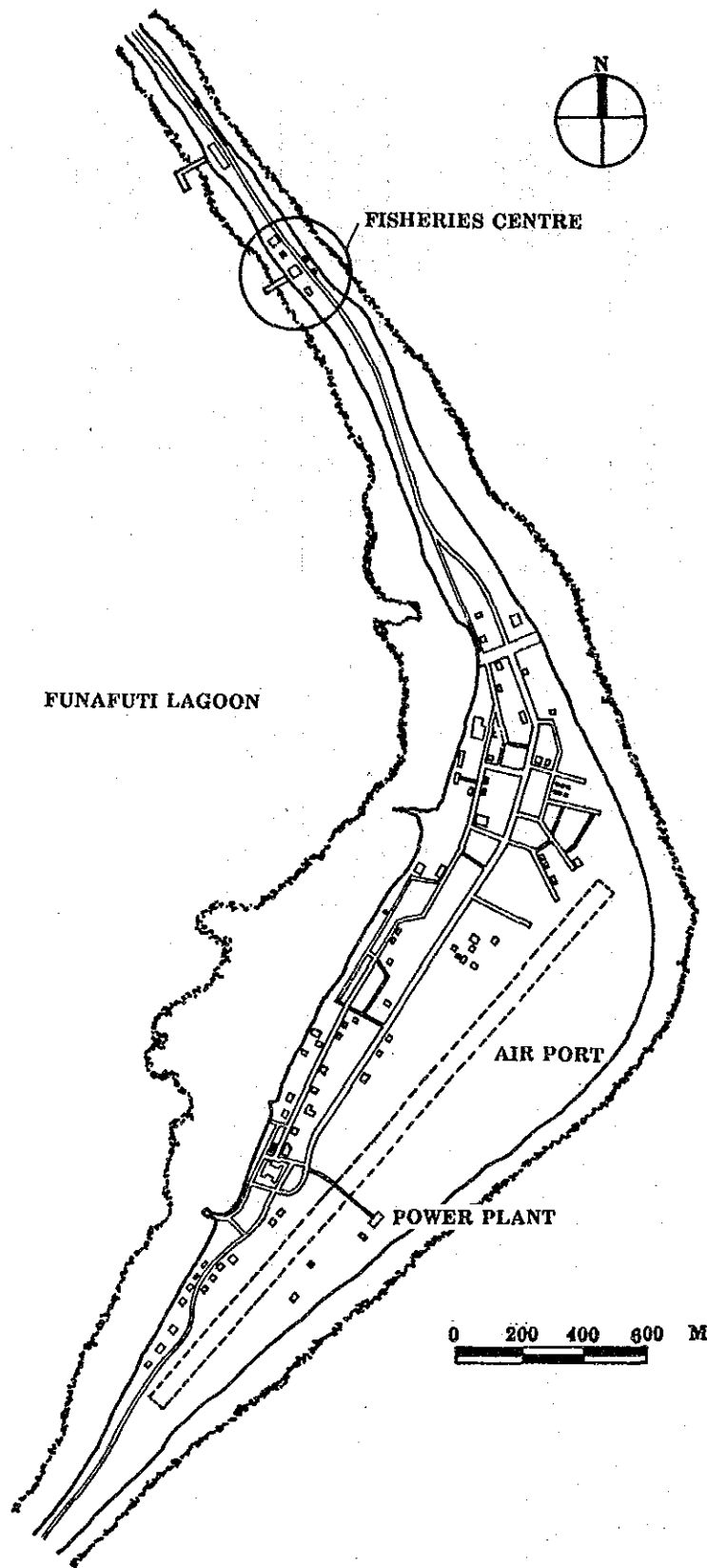


FIG. 3.1 OVERVIEW OF FUNAFUTI FONGAFALE ISLAND

**THE FISHING COMMUNITIES
DEVELOPMENT PROJECT
IN TUVALU**

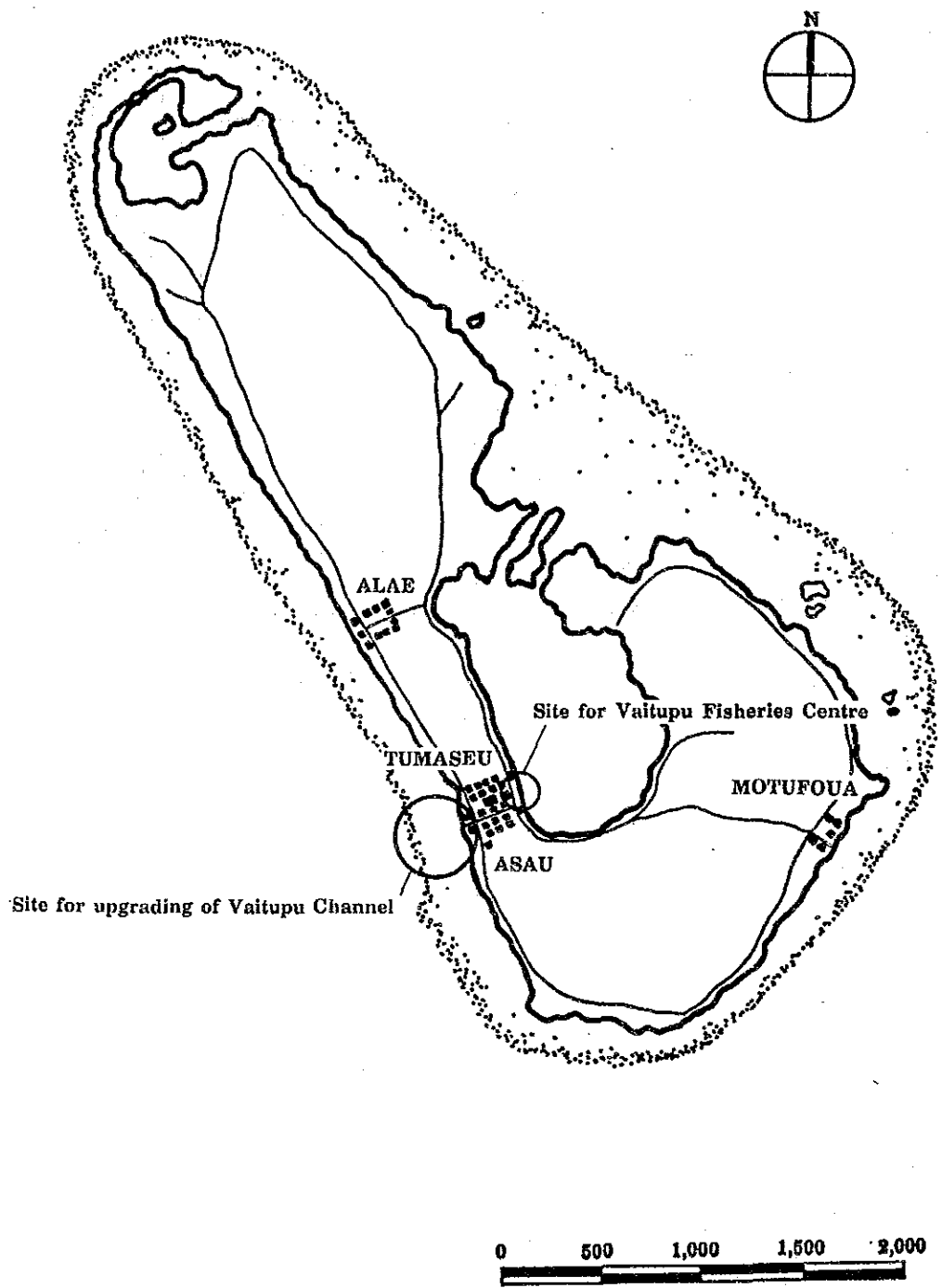


FIG. 3.3 OVERVIEW OF VAITUPU ISLAND

THE FISHING COMMUNITIES
DEVELOPMENT PROJECT
IN TUVALU

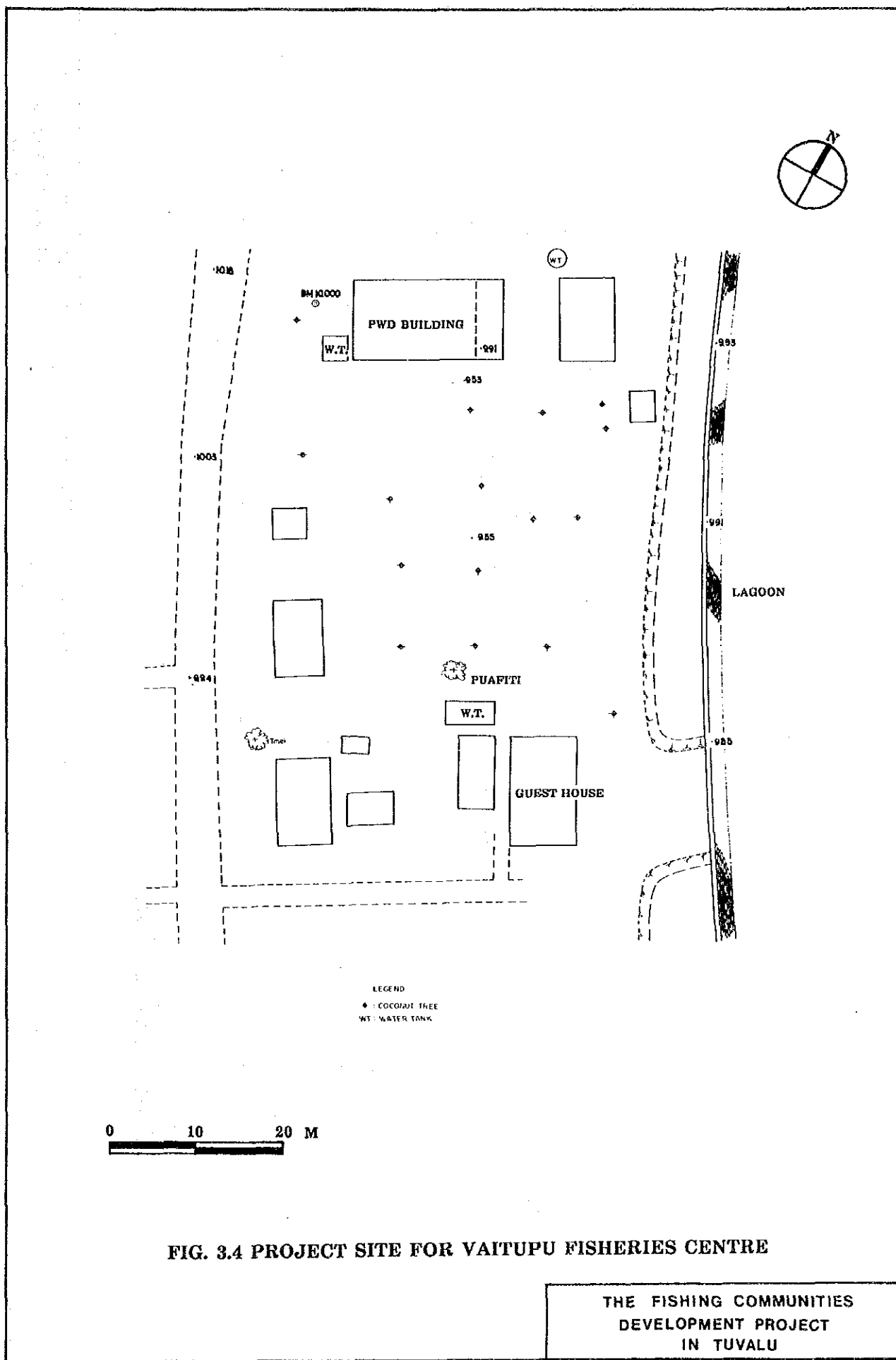


FIG. 3.4 PROJECT SITE FOR VAITUPU FISHERIES CENTRE

THE FISHING COMMUNITIES
DEVELOPMENT PROJECT
IN TUVALU

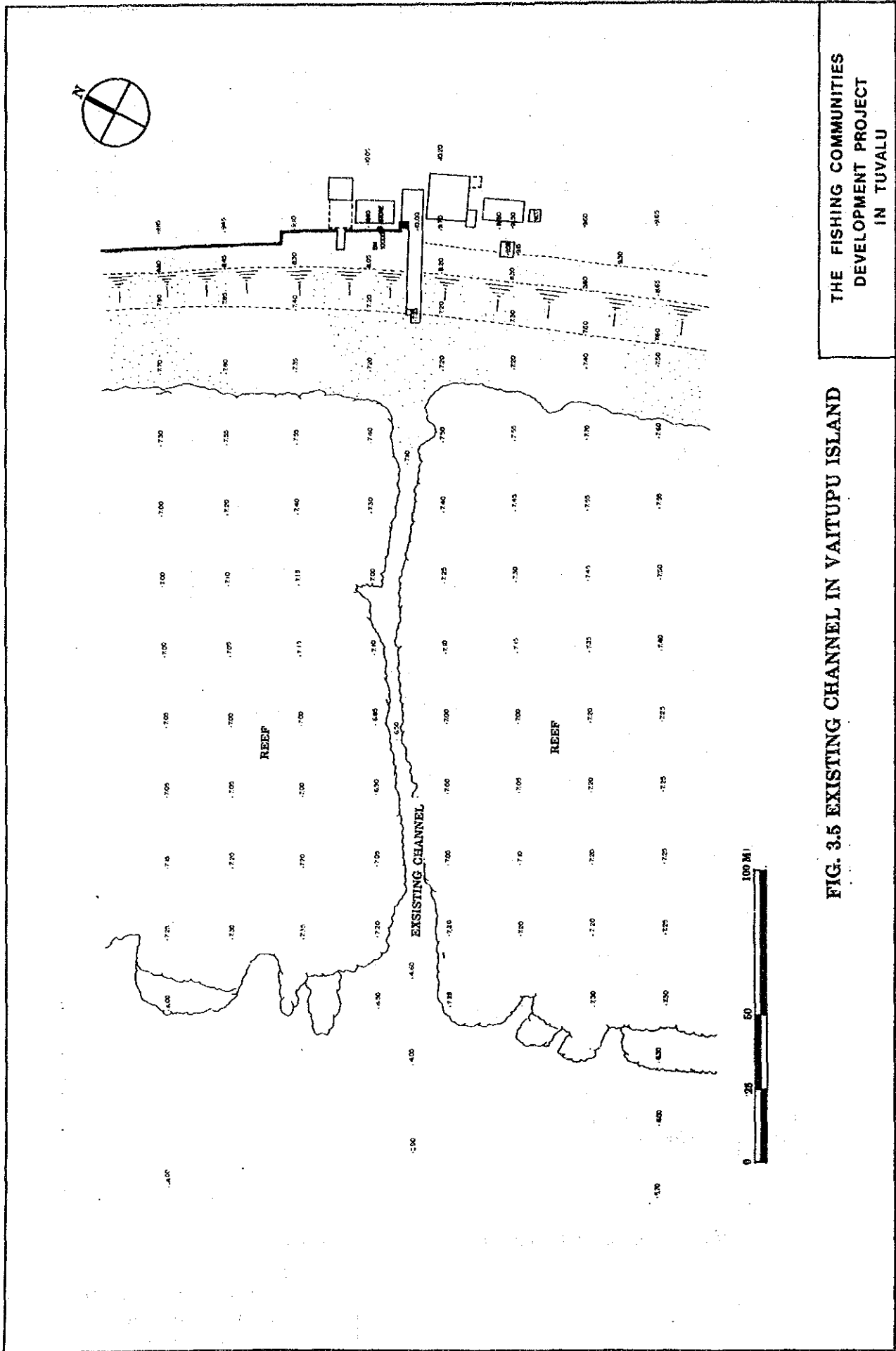


FIG. 3.5 EXISTING CHANNEL IN VAITUPU ISLAND

THE FISHING COMMUNITIES
DEVELOPMENT PROJECT
IN TUVALU

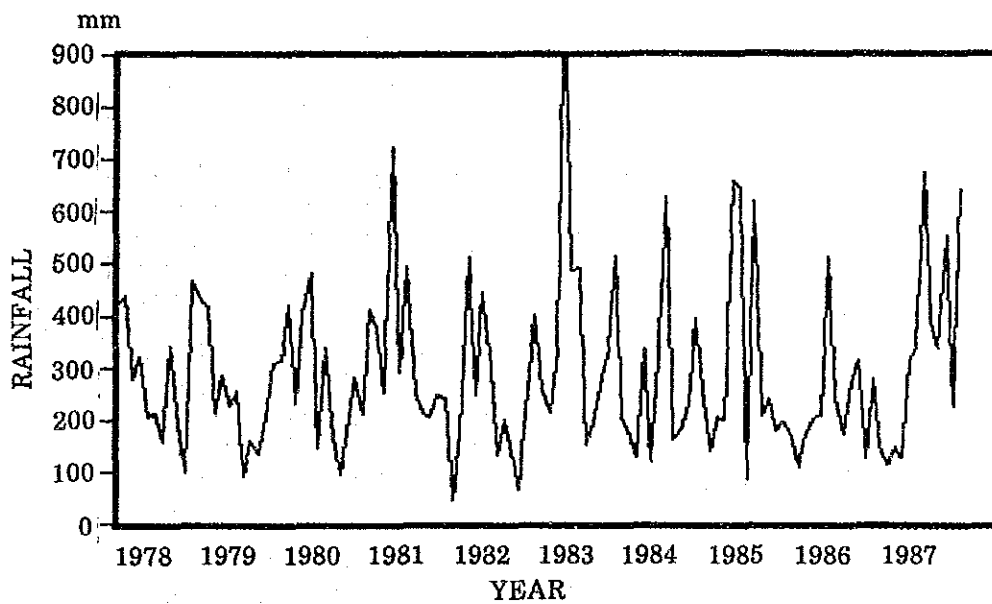


FIG. 3.6 MONTHLY RAINFALL IN FUNAFUTI (1978-1987)

Source; Meteorological Division

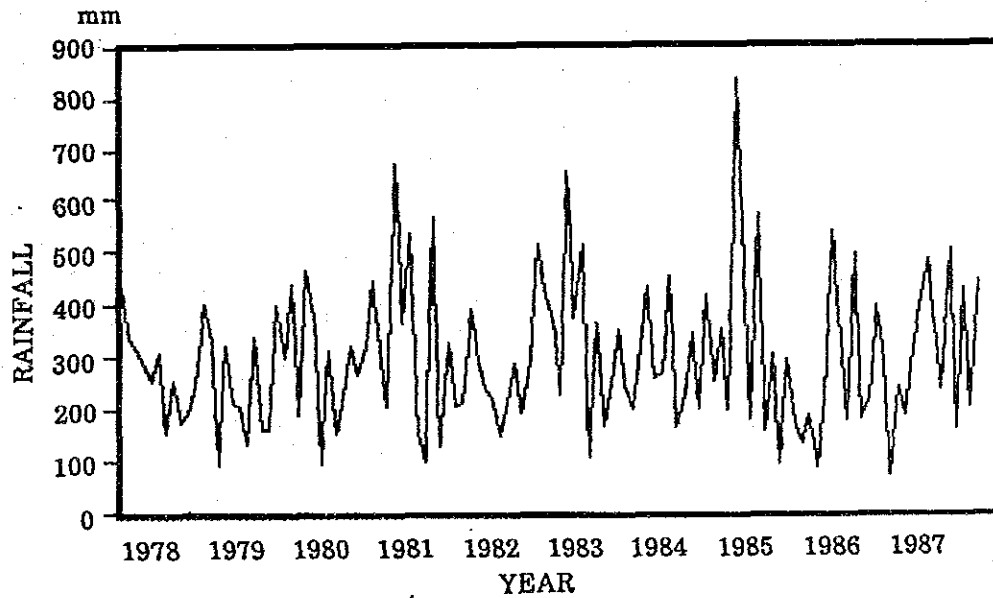
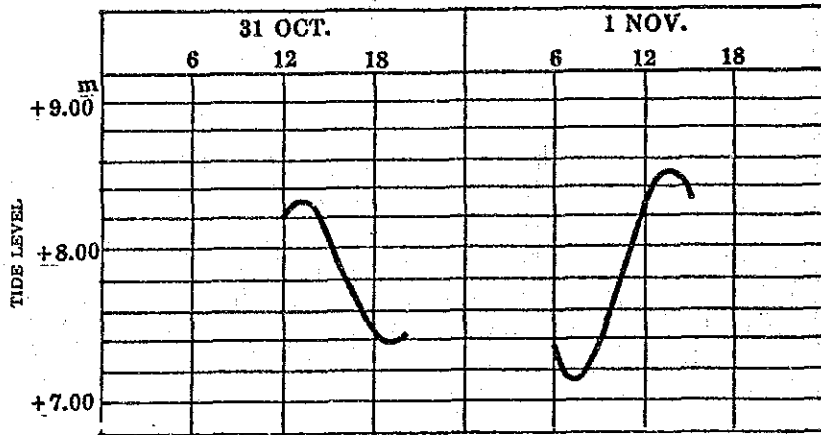


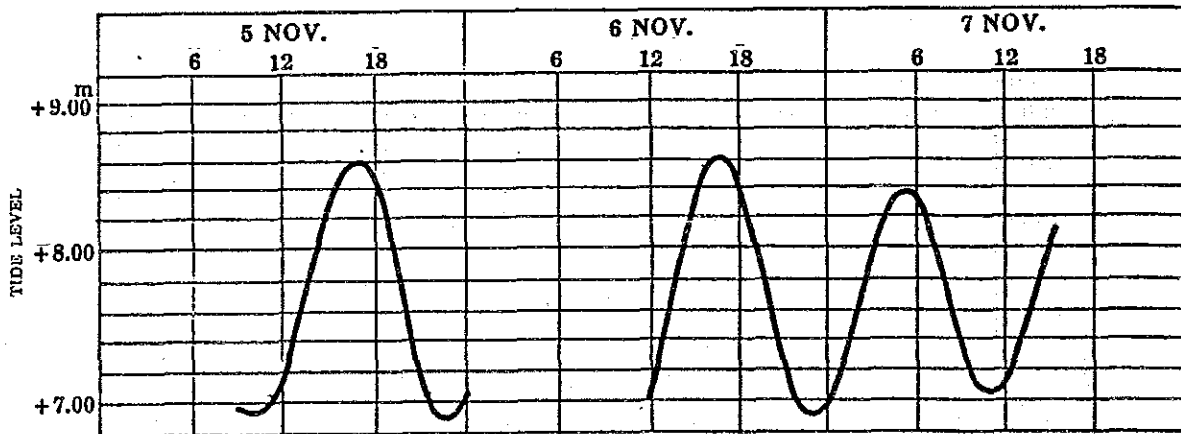
FIG. 3.7 MONTHLY RAINFALL IN VAITUPU (1978-1987)

Source; Meteorological Division

THE FISHING COMMUNITIES
DEVELOPMENT PROJECT
IN TUVALU



OBSERVED TIDE FLUCTUATION IN FUNAFUTI
(AT THE SITE OF IMPROVEMENT OF FUNAFUTI FISHERIES CENTRE)



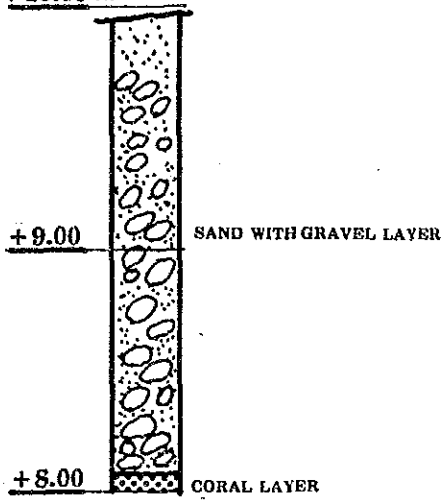
OBSERVED TIDE FLUCTUATION IN VAITUPU
(AT THE SITE OF UPGRADING OF VAITUPU CHANNEL)

Remarks : Datum line for the tide level was temporarily established
as the bench mark for the land survey

FIG. 3.8 OBSERVED TIDE FLUCTUATION IN FUNAFUTI AND VAITUPU

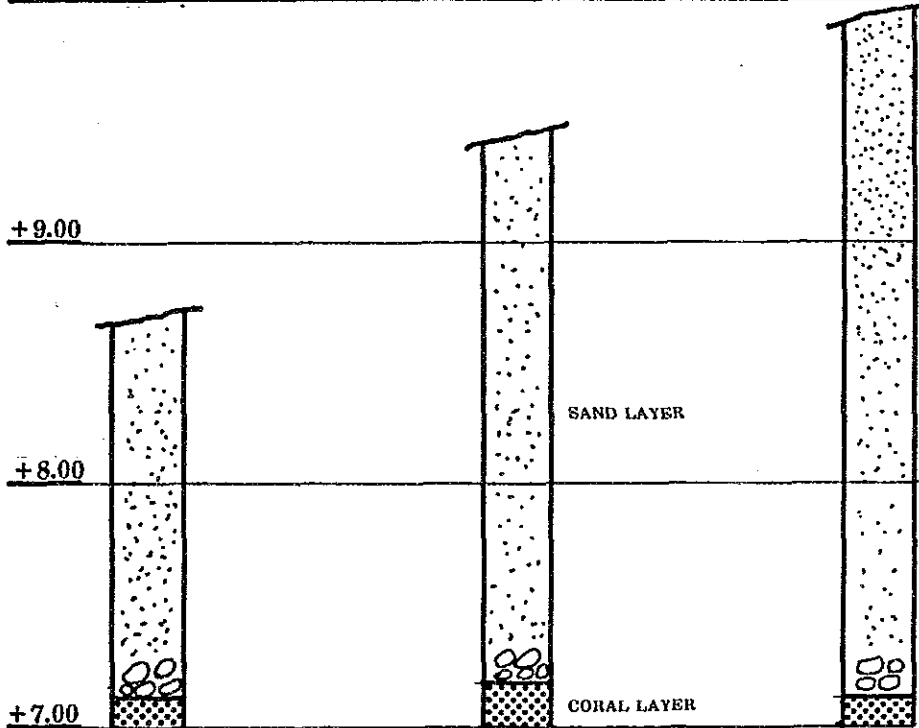
THE FISHING COMMUNITIES
DEVELOPMENT PROJECT
IN TUVALU

BM +10.00 m



SOIL PROFILE
(AT THE SITE OF IMPROVEMENT OF FUNAFUTI FISHERIES CENTRE)

BM +10.00 m



SOIL PROFILE
(AT THE SITE OF UPGRADING OF VAITUPU CHANNEL)

FIG. 3.9 SOIL PROFILE AT THE SITES IN FUNAFUTI AND VAITUPU

THE FISHING COMMUNITIES
DEVELOPMENT PROJECT
IN TUVALU

JICA