For Maritime
School use : small purse-seine nets, gillnets, bouke nets, trawlnets, handline gear, repairs equipment, FRP boat building materials, etc.

D. Prefabricated installation for research and training activities: a prefabricated installation will be raised, in order to relieve the working space constraints which hamper the SFA's activities and promote smooth research and training activities. Figure 2 indicates the scale of the installation, which totals 153 m2, and includes a research room, a training room, a storeroom, toilets, and a washroom. The installation will be made of material suitable for conducting research and training activities. Both the research and the training rooms will be equipped with air-conditioning units. In the Project, lockers in which to store equipment supplied are also provided.

4-4-2 Modernization of the Fishing Industry

A. Inboard engines and engine spare parts:

inboard engines:	12 Hp engines	48 units
	27 Hp engines	16 units
	37 Hp engines	11 units
	56 Hp engines	3 units
spare parts:	a two-year supply of spare parts, with stern assembly equipment and FRP boat outfitting equipment	

B. Fishing gear and equipment:

Small fish-finders:	46 units
Electric fishing reels:	59 units
Small magnetic compasses:	78 units

Fishing gear:	handline equipment	7,984 sets
	trawling lines	3,984 sets
	vertical longlines	1,328 sets
	trevally gillnets	6 sets
	beach-seine nets	7 sets
	macquerel gillnets	20 sets
	shark gillnets	4 sets
	FADs	5 sets

C. Communication and Safety Equipment:

Single Side Band transmittor receiver	3 sets
Life buoys	28 sets
Flares	28 sets
Life jackets	332 sets

D. Prototype fishing boat:

Prototype boats:	Overall length 6m, horse power 12 Hp	2 units
Moulds:		2 units

4-4-3 Strengthening of the Machinery Maintenance System

A. Maintenance and Repairs Equipment:
hand tools, battery charger, acetylene gas cutter, electric cutting machine, tap and dice, grease gun, etc.

B. Equipment maintenance complex: for the maintenance of Project equipment, a complex in which the storing, control and maintenance of spare parts and fishing gear can be effected is included under the Project. This complex is a prefabricated installation which englobes a maintenance room, a storeroom for spare parts, a storeroom for fishing gear and a fishing gear assembly room. As indicated in Figure 4, total area is 250 m^2. In addition a movable 1

ton crane is fixed to the ceiling and the assembly room's outside wall is waist-high to allow for ventilation.

4-4-4 Improvement of the fish distribution system

A. Polystyrene box moulding machine for the transportation and handling of fish: a box moulding machine is included in the Project to promote the development of chilled fish exportand help improve fish handling and preservation. The equipment consists of the two parts of the machine (for the box's main body and the lid), the boiler, the pre-foaming machine, the treatment tank and compressor.

B. Room for the moulding machine: minimum space of 80 m^2 in which to place and operate the machine will be available in a prefabricated installation. See Figure 5.

4-5 Implementation Plan

4-5-1 Implementation Schedule

The progress schedule of the Project is given below.

Table 5. Time schedule of work

Stage of work \ Month	1	2	3	4	5	6	7	8	9	10	11	12
Conclusion of E/N	▽											
Detailed Design	▨	▨										
Tender			▨	▨								
Approval of Drawing				▨	▨	▨						
Manufacturing of Equipment					▨	▨	▨	▨	▨	▨		
Sea Transportation								▨	▨	▨	▨	
Installation									▨	▨	▨	
Training and Guidance												▨
Delivery												▽

4-5-2 Matters taken in charge by the Government of Japan

Design execution and supervision of the work shall be undertaken by a Japanese consultant. A Japanese company shall be responsible for the manufacture, procurement, transportation installation and handing over of the equipment. After conclusion of the Exchange of Notes referring to the Grant Aid Program the Consultant shall settle the contract for consulting services with the SFA (the executing agency of the Government of Seychelles). A period of 2 months is necessary in view of design execution and the relevant work shall subsequently be carried out against a background of consultations with the Seychelles authority concerned. Upon completion of the execution design, the contractor shall be selected through a bid to be carried out by the executing agency. Bid prices shall be examined and the successful tenderer shall conclude the contract for services with the executing agency after confirmation as to the appropriateness of the offer. Tendering will take approximately 1.5 month.

After conclusion of the contract between the Government of Seychelles and the successful bidder and verification of the contract by the Government of Japan, the manufacture of Project equipment shall begin. Prior to executing the contracted services however, the contractor should obtain the approval of the Consultant with regards to work drawings and subsequently carry out equipment manufacture accordingly. The procurement and manufacture of the equipment in Japan will take approximately 5 months and, upon inspection by the Consultant, it shall be shipped to Seychelles. Sea transportation and customs clearance should take about 1.5 month. After arrival in Seychelles, part of the equipment will be installed at the prescribed sites by the contractor. With a view to equipment reception and the erection of the prefabricated installations, the contractor should dispatch the necessary personnel. The Consultant should go to Seychelles to attend the installation and test operation of the equipment and

confirm that the totality of the equipment has been handed over to the executing agency without omissions. Installation work, test operations and guidance as to usage should take approximately 3.5 months. The Project covers a period of 12 months after conclusion of the Exchange of Notes.

4-5-3 Matters taken in charge by the Government of Seychelles

The executing agency for the Project is the Seychelles Fishing Authority. The SFA shall undertake to promote and manage the Project in cooperation with the Seychelles Marketing Board and the Maritime School of the Polytechnique. In addition, the Government of Seychelles shall be responsible for establishing budgets to cover its alloted share of the works. Prior to Project implementation the Government of Seychelles should complete all preparations related to the erection of the prefabricated research room, maintenance complex and moulding machine room before the delivery of the equipment, so as to allow the contractor to perform his functions as promptly as possible. These preparations include the levelling of ground, foundation work, the supply of electricity, water and drainage. The equipment supplied shall be exempt from tax and measures shall be taken to ensure a smooth reception and management of the said equipment.

4-6 Cost to be borne by Seychelles for Project implementation

1) research installation	71,200 Rp
2) maintenance complex	130,000 Rp
3) moulding machine installation	47,000 Rp
	248,200 Rp

4-7 Estimate of Operational Costs

An estimate of the cost of running the various equipment supplied under the Project is given below.

4-7-1 Small research boat

Bunks are available for 6 persons: 4 crew members and 2 researchers. Furthermore, facilities are available for the training of up to 10 fishermen.

A. Operational arrangements: a plan for operations is drawn below.

Working days per year	Research work 175 days Training work 24 days	
	Total	199 days
Trips per year	Research work 35 trips Training work 12 trips	
	Total 47 trips	
Average trip time	Research work 5 days Training work 2 days	
	Average 4.2 days	
Days of preparatory work	1 day x 47 trips	47 days
Days of maintenance work	1 day x 47 trips	47 days
Days for dry docking	15 days x 1 time	15 days
Engine repairs and others	5 days x 2 times	10 days
Sundays and holidays	60 days x 199/365 days	33 days
Fishing gear maintenance	5 days x 2 times	10 days
Contingency time		4 days
Total		365 days

B. Research work

The research area lies within a 100 mile radius from Mahé Island (up to a maximum of 180 miles). Average cruising speed is of 8 knots per hour. Based on the above, the number of days (hours) of research work is decided as follows.

Field of research	Time required
Round trip	35 trips x 25 hrs 875 hrs
Macquerel driftnets	20 days x 8 hrs 160 hrs
Bottom gillnets	20 days x 8 hrs 160 hrs
Vertical long lines	20 days x 8 hrs 160 hrs
Electric reels	40 days x 8 hrs 320 hrs
Troll lines	20 days x 8 hrs 160 hrs
Other gear (traps for shrimp, crab, octopuss, etc.)	20 days x 8 hrs 160 hrs
Real research time (research - round trip time)	140 days Total 1995 hrs

C. Training work

The 120 fishermen operating schooners shall undergo training organized by the SFA. On average, a training trip shall last two days, enabling each fisherman to participate in 2 training trips per year and be instructed in 6 different ways of fishing. The number of working days spent on training activities is 24 days, or 12 trips. Training grounds extend from Mahé Island to the outer regions of the plateau (about 50 miles). Average boat speed is 8 knots per hour.

Field of training	Time required
Round trip	12 trips x 12.5 hrs 150 hrs
Macquerel driftnets	3 days x 8 hrs 24 hrs
Bottom gillnets	1.5 days x 8 hrs 12 hrs
Vertical long lines	1.5 days x 8 hrs 12 hrs
Electric reels	6 days x 8 hus 48 hrs
Troll lines	1.5 days x 8 hrs 12 hrs
Other gear (traps for shrimp, crab, octopuss, etc.)	4.5 days x 8 hrs 36 hrs
Real training time	18 days Total 294 hrs

D. Crew Organization (research boat)

	Wages	Trip Allowance/day
Skipper	3,000 Rp	50 Rp
Chief engineer	2,500 Rp	40 Rp
Deck-hand A	1,800 Rp	30 Rp
Deck-hand B	1,500 Rp	25 Rp
4 Men:	8,800 Rupees	145 Rp/day

E. Research Boat Operating Costs

Given the above conditions, the costs of running the research boat are estimated as follows.

Wages (crew)	8,800 Rp x 12 mths	105,600 Rp
Allowances (crew)	145 Rp x 199 days	28,855 Rp
Food expenses (crew)	50 Rp x 365 days x 4 persons	73,000 Rp
Food expenses (research team)	50 Rp x 199 days x 2 persons	19,900 Rp
Food expenses (trainees)	50 Rp x 24 days x 10 persons	12,000 Rp
Ice	520 Rp/ton x 1 ton x 35 trips 520 Rp/ton x 0.5 ton x 12 trips	18,200 Rp 3,180 Rp
Fuel expenses	125 Hp x 0.9 x 185/hr/Hp x 2,289 hrs x 0.92 ℓ/g x 4.07 Rp	210,755 Rp
Lubricating oil	125 Hp x 0.9 x 5 g/hr/Hp x 2,289 hrs x 0.92 ℓ/g x 11.05 Rp	15,465 Rp
Maintenance, expendables	Cost of a ship x 3/100	58,065 Rp
Port fee and communications charges		10,000 Rp
Total		554,960 Rp

F. Income from Fish Catch Sales

Research work	140 days x 45 kg/person/day x 4 persons =	25,200 kg
Training work	18 days x 45 kg/person /day x 14 persons x 0.5 =	5,670 kg
		30,870 kg
Average fish price	6.5 Rp/kg	200,655 Rp

G. Estimated Revenue and Expenditure

Government Budget for Operating Expenses US$250,000 x 25% x 6 Rp/US$	375,000 Rp
Income from fish sales	200,655 Rp
Research boat operating costs	554,960 Rp
Profit	20,695 Rp

According to the operational arrangements explained above it is possible to operate the research boat on 25% of the expenses for research provided under the fishing agreement with the E.C.

4-7-2 Small Fishing Boats

Below is a table comparing the performances of outboard engine fishing boats used at present with the prototype inboard engine boats provided under the project.

	Outboard engine boat (small)	Prototype inboard engine boat (small)
Main engine	Gasoline 25 Hp	Diesel 12 Hp
Speed	16 miles/hour	10 miles/hour
Fishing range (Safety limit)	about 15 miles Because of the low reliability of the engine it may be dangerous to fish outside these limits.	about 30 miles With a greater fishing range and improved fishing efficiency, a larger fish catch is expected.
Duration of fishing activities	Boat generally return within the day of departure.	one to two nights
Engine price	6,384 Rupees	13,007 Rupees
Engine lifespan	3 years	9 years
Cruising capacity	2.13 hrs of cruising per day : 2.13 x 16 knots = 34 miles	7.27 hrs of cruising per day : 7.27 x 10 knots = 73 miles
Fuel expenses	25 Hp x 0.7 x 300 g + 0.7 x 2.13 x 4.97 Rp/ℓ = 79.4 Assuming 200 fishing trips per annum : 79.52 Rp x 200 = 15,880 Rp	12 Hp x 0.75 x 203 g + 0.83 x 7.27 x 4.07 Rp/ℓ = 65.13 Assuming 100 fishing trips per annum : 65.13 Rp x 100 = 6,513 Rp

	Outboard engine boat (small)	Prototype inboard engine boat (small)
Fishing equipment	none	Since these can be fitted with fish-finders it is possible to fish in more favorable grounds and raise fishing efficiency.
Fishing gear	handlines	Besides handlines, troll lines and vertical longlines can be used. Troll lines can be utilized while the boat is coming or going. Further vertical longlines can be used along with handlines in places where fish abounds.

As shown above the prototype fishing boat outperforms the current outboard engine boat with regards to safety, catch per unit effort and economic profitability.

4-7-3 Moulding machine

On their outside the boxes measure 300 x 400 x 600 mm while on the inside the dimensions are 230 x 330 x 530 mm, with a 35 mm thickness. The actual volume of polystyrene is (300 x 400 x 600) - (230 x 330 x 530) = 31,773 mm^3. The expansion rate of the polystyrene beads being 50 times, the quantity of raw materials necessary to produce one box, assuming a specific gravity of 0.92, is: 31,773 ÷ 50 x 0.92 = 590 g/box. The price of polystyrene beads being of 14 Rps/kg, the cost of raw materials for one box is of 0.59 kg x 14 = 8.3 Rupees.

The box moulding machine supplied under the Project is of a relatively simple type and one round of operations takes 15 minutes. Consequently: 4 box/hour x 8 hours = 32 boxes can be produced every day.

Operating expenses: these are estimated on the basis of the above information.

Electricity bill				Rp
1) pre-foaming machine	1.5 kw	1 hr	1.5 kw	
2) blower (for polystyrene beads)	0.4 kw	0.2 hr	0.08 kw	
3) water pumps (for cooling)	3.7 kw	2 hrs	7.4 kw	
4) compressor	3.7 kw	3 hrs	11.1 kw	
5) ligthing	0.4 kw	7 hrs	2.8 kw	
			22.9 kw	
22.9 kwh/day = (0.5 kwh; basic electrical power + 22.4 kwh over basic electrical power)/day				
1.54 Rp x 0.5 kwh + 1.38 Rp x 22.4 kwh = 31.8 Rp/day				
200 days of operation				6,300
Fuel costs				
boiler; light oil 10 ℓ/hr x 8 hrs/day = 80 ℓ/day 80 ℓ/day x 200 days x 2.1 Rp/ℓ				33,600
Water				
for the pumps; 20 ℓ/operation/machine x 4 operations/hour x 8 hours x 2 machines = 0.96 ton/day				
for the boiler; 0.5 tons/day 1.5 ton/day x 200 days x 30 RP/ton				9,000
Wages				
1 person x 1,300 Rp/person/month x 12 months				15,600
Raw materials				
8.3 x 6,400 boxes				53,120
Total				117,680

Accordingly, polystyrene boxes can be manufactured at a cost of 117,680 Rp ÷ 6,400 boxes = 18.4 Rp/box. At present, the SMB is importing boxes from France at a cost of 20 Rp per box, so that operating with such a machine is only barely more economical. Nevertheless, should the demand for such boxes increase and with improved use of the moulding machine, the time required for one operation can be reduced from 15 minutes to 7 minutes. The cost of producing one box can then be cut down to 12 Rupees.

CHAPTER 5

PROJECT EVALUATION

CHAPTER 5 PROJECT EVALUATION

The aim of the Project is to modernize the coastal and offshore fishing industry and stimulate fish production, the causes of whose stagnation are identified as being: 1) the aging of the working population, 2) the antiquity of fish production methods, 3) the seasonal variations in fish catch size and 4) the inadequacy of the support system. The cumulative effect of these factors is enough to discourage the entry of the younger generation into the industry. Against such a background, the Project's policies with a view to developing the coastal and offshore fishing industry are to A. strengthen research and training activities B. modernize the fishing industry C. strengthen the machinery maintenance system and D. improve the fish distribution system.

The effects of the Project are evaluated below.

A. Research and Training Activities: Seychelles has in the past relied on cooperation with foreign countries to actively survey natural fisheries resources. The aim of these surveys was essentially to protect the natural environment and gather information about fish caught by foreign fleets. Consequently, little was done with the intention of developing Seychelles' fish production. Until recently, fishing activities had been completely overshadowed by developments in tourism. In the absence of positive action on the part of the government, the fisheries industry had been largely left behind. With the establishment in 1984 of the SFA and the provisions of the National Development Plan, efforts have started being made in this sector.

   For small-scale and conservative fishermen it is particularly difficult to operate in rich but distant fishing grounds or develop new fishing gear by themselves. Such conservative working conditions do not present a good

picture of the fishing industry to young people. As a result, the aging of the working population has become a major problem. Further, the existence of demersal fish resources in waters in the peripheral region of the plateaus is known but at the moment these are but dormant resources. The SFA has for some time been occupied with developing such resources but the condition and configuration of its research boat are such that, even though researchers are available, survey activities are insufficient. Under these conditions the new research boat, research facilities and equipment, if provided under Japan's Grant Aid Programme, will prove a sizeable improvement. The search for new fishing grounds, the trial of new fishing gear, the development of new species and the exploitation of untouched natural resources would then be effected and this should contribute to the development of the fishing industry. The research boat being new at the time of delivery its maintenance cost should be lower than that of the present one. Efficient use of the boat supplied through the Project will allow 35 trips per year for research work, 12 for training purposes in which a total of 120 fishermen will participate.

The training programme of the SFA will ensure that local fishermen will not be cut off from the benefits accruing from its research activities. Despite having a highly original education system Seychelles has no training facilities for fishermen. To offset this the SFA consequently began a small-scale training programme under the current National Development Plan. Yet because of space constraints training sessions are organized informally on board the research boat. For these reasons, a training installation and lecture equipment such as slides and a VTR are included under the Project. 450 fishermen will receive training over two years.

One of the problems affecting the fisheries industry is the aging of the fishing population. However, even if the training of local fishermen takes place under the Project, there remains the insufficiency of basic training with regards to the young. Consequently, besides the training equipment destined to the SFA, the supply of training equipment to the Polytechnic's Maritime School will enable it to implement its training activities. This should make a significant contribution to the nurturing of a new generation of fishermen.

B. Modernization of the Fishing Industry: the acquisition of fishing gear being particularly difficult, the resulting obsolescence of fishing gear and equipment constitute one of the causes behind the stagnation of the fishing industry. Accordingly, the use of inboard engines is planned under the Project. At present 90 % of Seychelles fishing boats are powered by engines and 28 % of these are equipped with inboard engines. Under the Project this figure will rise to 43%. The use of the electric drive afforded by these engines will allow the use of electric reels, fish-finders, etc. and greatly raise fishing efficiency. In particular fish-finders should greatly ameliorate the activities of fishermen who until now have relied on experience and intuition in order to find fish schools. The diffusion of such equipment is thought to be important.

To this day the change to inboard engines has been largely undertaken by large fishing boats. Smaller fishing boats were seen as lacking in economic power and inappropriate for being equipped with such engines. They were therefore ignored in the modernization plans. Consequently the model of two small fishing boats and their moulds were included under the Project's plan for the equipment of small boats with such engines. The economic and financial aspects of

this Plan for the modernization of small boats is mentioned above in the Estimate of Operational Costs.

In addition, the supply of new fishing gear (with a high development potential) is programmed under the Project. This will promote the smooth management of the fishing industry and it will pave the way for the introduction of new fishing techniques. Further, people associate danger and poor working conditions with a fishing occupation. This is one of the reasons for the lack of participation of young people in the industry.

To alleviate this problem, safety equipment shall be provided under the Project, to be distributed to the fishing population on an assistance basis and this should serve as the first step towards the establishment of a safe working environment. The number of fishermen considered under the plan for the modernization of the fishing industry is 332, or approximately 26 % of the total workforce. In addition, about 75% of all coastal fishermen can conveniently obtain the necessary equipment from the SFA.

The increase in fish catch allowed by the Project's implementation is estimated below. The SFA estimates the present coastal fish catch at 5.6 kg per hour per fisherman. Under Project implementation, the increase in the volume of fish caught can be related to the following factors.

1) With the enlargement of fishing grounds, areas presenting a good fish resources potential can be exploited.

2) With the modernization of gear and equipment fishermen can tap deep sea fish resources.

3) With the combined use of handlines, vertical longline, and trolling, fishing activities will be amplified. In particular this third factor is expected to give rise to the following improvements with regards to fish catch.

vertical longline: (five fishing hooks per line) Bait must be changed every 30 minutes. Assuming a 15 hour operation and a catch of 1 kg of fish for every 3 bait changes, we obtain a catch rate of 10 kg/15 hrs = 0.66 kg per hour.

trolling: based on the Estimate of Operational Costs (for small fishing boats) we can estimate the fish catch rate as follows: If we assume that 1 kg of fish can be caught for every 1 hour of travelling time we can arrive at a catch rate of 7.27 hours x 1 kg ÷ 15 hours = 0.48 kg/hour.

Therefore, we reach a total of 1.14 kg/hour of additional fish caught with joint use of the above equipment. The 332 fishermen considered under the plan for the modernization of the fishing industry should then catch an estimated average of 6.74 kg/hour (or a 20 % increase in fish caught). If we simply examine the effect of the use of fishing lines under smooth implementation of the Project, we reach a quantity of 1.14 kg/hour x 15 hours x 100 trips x 332 fishermen = 568 additional tons of fish caught. The present fish distribution mechanism, which can accomodate the current production of 4,300 tons or the 1978 production of 5,400 tons should manage to absorb such as increase in fish catch size.

The Project's plan for the introduction of prototype fishing boats will allow small-scale Seychellois fishermen to fit their boats with inboard engines. These can be hypothetically compared with the current small fishing boats (Minimahé) from an economic point of view.

	small fishing boat	prototype fishing boat
Equipment investment		
Hull (depreciation 9 years)	15,000 Rp	30,000 Rp
Outboard engine (depreciation 3 years)	6,153 Rp	
Inboard engine (depreciation 9 years)		13,846 Rp
Total	21,153 Rp	48,846 Rp
Operations	daily return to port 200 days per year 5 hours of fishing per day	2 days (overnight stay) 100 trips per year 15 hours of fishing per day
Working expenses		
Fuel costs (operational costs estimate)	15,880 Rp	6,513 Rp
Lubricating oil		500 Rp
Fishing gear expendables	3,600 Rp	12,000 Rp
Wages	45,600 Rp	55,200 Rp
Ice		5,000 Rp
Refitting expenses	2,115 Rp	2,370 Rp
Total	67,195 Rp	81,583 Rp
Fish catch size	5.6 kg/man/hour 11,200 kg/year	6.74 kg/man/hour 20,220 kg/year
Income Average fish price 6.5 Rp/kg	72,800 Rp	131,430 Rp

We can derive Financial Internal Rates of Return from the above information:

for small fishing boats (Minimahé)	15.0 %
for the prototype fishing boats	63.7 %

With such a high Internal Rate of Return for the prototype fishing boat, the programme is evaluated as financially viable.

C. Machinery Maintenance System: reflecting the high standards of Seychelles' education system, fishermen can currently perform the day-to-day maintenance of outboard engines. However, it is necessary to use a repair workshop situated in Victoria when more important repairs need to be done. The SFA's present facilities being situated at a distance from roadways, transportation is problematic and this is likely to hamper the effective maintenance and management of the large quantities of equipment supplied under the Project. The establishment of a maintenance workshop for the maintenance of gear and equipment is indispensable in order for the development of the fishing industry to take place.

D. Fish Distribution System: notwithstanding the fact that it is an island country, Seychelles' fish distribution system is comparatively well developed. On the other hand, there is room for a qualitative improvement of fisheries products and, in this respect, the need for amelioration of the distribution system figures strongly. At present, the majority of fishing boats are not equipped with ice boxes so that fish cannot be properly stored after being caught.

In recent years, exports of marine products have risen (550 tons in 1985) and the volume of these exports made up over 10% of total fish landed. Of this, 100 tons per annum are exported chilled in polystyrene boxes to Europe. There is little competition from other countries and the European market is stable. Therefore, opportunity for

expansion exists and, accordingly, the supply of a polystyrene box moulding machine is planned under the Project. This should have beneficial effects on the development of exports and the handling of fish by fishermen.

Coordination of the measures mentioned above should bring about the modernization of coastal and offshore fisheries, an improvement of the economic conditions of fishermen and the average age of men occupied in fishing activities should be lower than at present.

Equipment supplied under the Project has been chosen to match the current technical level of these fishermen and no problems are expected in connection with its efficient utilization. Furthermore it ought to be mentioned that despite its relatively recent establishment (in 1984) and hence its short history, the SFA is already engaged in preparations with regards to foundation work and it is actually bringing together the support structure to enhance the development of the fisheries industry.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

The Coastal Fisheries Development Project of the Republic of Seychelles is expected to bring about the effects and benefits mentioned in the chapter on Project Evaluation. The equipment and materials necessary for the accomplishment of the objectives proposed under the Project, 1) strengthening of research and training activities, 2) modernization of the fishing industry, 3) strengthening of the machinery maintenance system, and 4) improvement of the fish distribution system, are expected to be used in an effective way by the SFA through coordination of the objectives. The Coastal Fisheries Development Project will, through its implementation, promote cooperation. However, it is not simply a key programme limited to the fisheries sector of Seychelles. Wider contributions include increased employment opportunities and the earning of foreign exchange through a rise in exports of fisheries products, together with broader socio-economic benefits. Under such circumstances it is concluded that Japan's Grant Aid Programme is of deep significance to a Project which can do much toward fostering the growth of Seychelles' fishing industry.

Seychelles is a small country situated in the Indian Ocean but the skipjack and tuna resources that exist within the country's 200 mile Exclusive Economic Zone and the international character of the people predispose Seychelles' fishing industry to assuming the main role in the region.

In particular the following recommendations are made for the sake of the smooth implementation of the Project.

1) Section 4-5-3 of the present report pointed out the measures to be taken by the Government of Seychelles. In order to execute the site preparations and foundations without hindrance it is necessary to secure the required budget and take the applicable measures in advance.

2) There are no problems pertaining to budget requirements for implementation purposes. However, great quantities of equipment will be supplied and the Manning Plan covering this equipment may prove inadequate. Its enlargement is therefore considered to be essential.

3) A European Community expert is currently offering advice with regards to the operation of the research boat but his departure is fixed for September 1987. The equipment supplied under the Project was carefully selected so as to reflect the technical level of Seychellois fishermen and local conditions. Similarly the research boat was chosen on the basis of such considerations, so that the SFA should have no problems vis-à-vis its operation. Nevertheless, advice provided so as to strengthen the development of fishing methods and other areas such as the management of the research boat would accentuate the Project's impact. In consequence Seychelles presented a request for technical cooperation to the Japanese Government.

APPENDIX

APPENDIX

MINUTES OF DISCUSSIONS ON THE COASTAL FISHERIES DEVELOPMENT PROJECT IN THE REPUBLIC OF SEYCHELLES

In response to the request of the Government of the Republic of Seychelles, the Government of Japan decided to conduct a Basic Design Study on the Coastal Fisheries Development Project (hereinafter called "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Seychelles a study team headed by Mr. Hideki TSUBATA, Fishing Boat Inspector, Fishing Boat Division, Oceanic Fishing Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries from the 8th to the 29th December 1986.

The team had a series of discussions on the Project with the officials of the Republic of Seychelles headed by Mr. Philippe MICHAUD, the Managing Director of the Seychelles Fishing Authority (SFA), and conducted field survey on Mahe, Praslin and La Digue.

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.

Victoria, the 19th December 1986

Hideki TSUBATA
Leader of the Mission
JICA

Philippe MICHAUD
Managing Director
SFA

Emmanuel Faure
Principal Secretary, Planning and
Economic Cooperation Division
Department of Planning and External Relations

ATTACHMENTS

1. The title of the Grant Aid Project is "the Coastal Fisheries Development Project".

2. The objectives of the Project are to develop coastal fisheries by encouraging a younger workforce to enter the fishing industry. In order to achieve such a labour structure in the industry facilities have to be modernized and training and research work have to be enhanced.

3. The Seychelles Fishing Authority (SFA) is the executing agency of the Project and will be responsible for the equipment and facilities acquired under the Japanese Grant Aid.

4. The Japanese Study Team will convey to the Government of Japan the request of the Government of Seychelles for the Project to be implemented so that the necessary measures may be taken to ensure cooperation in implementing the Project and the provision of equipment listed in Annex 1 within the scope of the Japanese Economic Cooperation Grant Aid Programme.

5. The Government of Seychelles has understood the Japanese Grant Aid System as explained by the Team. This system requires that a Japanese consulting firm be used as principal consultant and Japanese firms be used for the implementation of the Project.

6. Provided that Grant Aid is extended by the Government of Japan for Project implementation, the Government of Seychelles will take the necessary measures listed in Annex 2.

7. Ten final reports in English on the Project will be submitted to the Government of the Republic of Seychelles by the end of April 1987.

ANNEX 1

The equipment required by the Government of Seychelles for the Project is listed in order of priority below:

1. A research boat with equipment

2. Research and training equipment, and facilities for their accommodation

3. Inboard engines and spare parts

4. Fishing gear and equipment

5. Equipment for communication and safety

6. New prototype fishing boat(s)

7. Tools and materials for mechanical maintenance, and facilities for their accommodation

8. Post harvest equipment

ANNEX 2

The list of necessary measures to be taken by the Government of Seychelles is the following

1. To carry out necessary site preparations and foundations for the installation work.

2. To arrange the installation of appropriate facilities for the distribution of electricity, water supply drainage and other incidental facilities before the commencement of the works.

3. To ensure prompt unloading, tax exemption and customs clearance at Port Victoria in Seychelles and the prompt internal transportation of the equipment provided under the Project.

4. To appoint an appropriate Project manager who will manage and expedite Project activities in the course of Project implementation.

5. When the equipment provided under the Project mentioned in Annex 1, Sections 3,4,5 is sold or leased to the fishermen involved in the Project, the Government of Seychelles shall take necessary measures to ensure that :

   (1) The eligible fishermen participating in the Project are identified.

   (2) The equipment is sold at a reasonable price.

(3) The money raised by such a sale or lease is deposited in a special revolving fund in an account of the Government of Seychelles or of the SFA.

(4) The above-mentioned fund is utilized for the purpose of developing fisheries and the maintenance of the equipment provided under the Japanese Grant Aid Programme.

(5) The way in which the fund is utilised will be reported to the Government of Japan in advance.

APPENDIX II MEMBERS OF THE SURVEY TEAM

Team Leader	Mr. Hideki TSUBATA	Fishing Boat Inspector, Fishing Boat Division, Oceanic Fisheries Dept, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries.
Project Coordinator	Mr. Itaru HAMAKAWA	2nd Basic Design Study Division, Grant Aid Planning & Survey Dept, JICA.
Fisheries Development Planner	Mr. Yasuhisa KATO	Overseas Agro-Fisheries Consultants Co., Ltd.
Fishing Gear and Methods Expert	Mr. Yoshibumi KIHARA	ditto
Fishing Boat Equipment and Expert	Mr. Kazunori TANAKA	ditto

APPENDIX III SURVEY SCHEDULE

Date	Week day	Location	Survey Contents
12/ 8	Mon	Tokyo-in flight	Departure
	Tue	London-in flight	Arrival in London, transit
10	Wed	Nairobi	Courtesy calls to the Japanese Embassy and the JICA Kenya Office
11	Thu	Nairobi-Mahé	Arrival in Seychelles
12	Fri	Mahé	Talks with SMB and SFA officials
13	Sat	Mahé-Praslin	Field survey on Praslin, La Digue (boatyards)
14	Sun	Praslin-Mahé	Field survey on Praslin Island (boatyard, fishermen, SMB office)
15	Mon	Mahé	Courtesy call to the Department of Planning and External Relations, talks with SFA officials
16	Tue	"	Talks with SFA officials, visit ot the boatyard
17	Wed	"	Talks with SFA officials, inspection of fishing port facilities, refrigerator etc.
18	Thu	"	Visit and talks at the Poly-technic, talks with SFA officials
19	Fri	"	Preparation of the Minutes of Discussions, courtesy call to the Ministry of National Development, SFA officials, signing of the Minutes
20	Sat	"	Team discussion
21	Sun	"	Survey boat and SADs inspection Team leader and Project Coordinator depart from Mahé
22	Mon	"	Talks at the SFA

Date	Week day	Location	Survey Contents
23	Tue	"	Talks at the SFA, visit to the boatyard, talks with SMB officials
24	Wed	Mahé	Talks at the SFA, Mr. Kato leaves Mahé, Team discussion, Mr. Kato reports to the JICA Kenya office and departs from Nairobi, Mr. Kihara and Mr. Tanaka hold final talks at the SFA and depart from Mahé
27	Sat	in flight-Copenhagen	
28	Sun	Copenhagen -in flight	
29	Mon	inflight-Tokyo	Survey team arrives in Japan

APPENDIX IV COOPERATIVE OFFICIALS IN THE STUDY

Ministry of National Development

Mr. Jacques Hodoul	Minister

Department of Planning & External Relations

Mr. Emmanuel Faure	P.S. Planning & Economic Cooperation Division
Mr. Calyxte D'Offay	P.S. External Relations Division
Mrs. Maryse Roberts	Staff
Mr. Brian Julie	Staff

Seychelles Fishing Authority

Mr. Glenny Savy	Chairman
Mr. Philippe Michaud	Managing Director
Mr. Joel Nageon	Director of Resource Management Division
Mrs. Ghislaine Lablache Carrara	Director of Research Division
Mr. Pierre Woodcock	Staff
Mr. Mathiot Antoine	Staff
Mr. De San Michel	Expert
Mr. Parker David	Expert
Mr. Verghese George	Indian Ocean Marine Ltd Manager

Maritime School of the Polytechnic

Mr. Jean Claude Faquet	Vice President

Seychelles Marketing Board, Fisheries Division

Mr. Bob Doughty	Staff

Others

Mr. Charles Pool	Managing Director CIMA GLASS
Mr. Jean-Pierre Hallier	Representatives of ORSTOM
Mr. Gregoire C Payet	Shipbuilding Yard in La Digue

Embassy of Japan in Kenya

Mr. O. NAKANO	First Secretary
Mr. ISHIGAMI	"

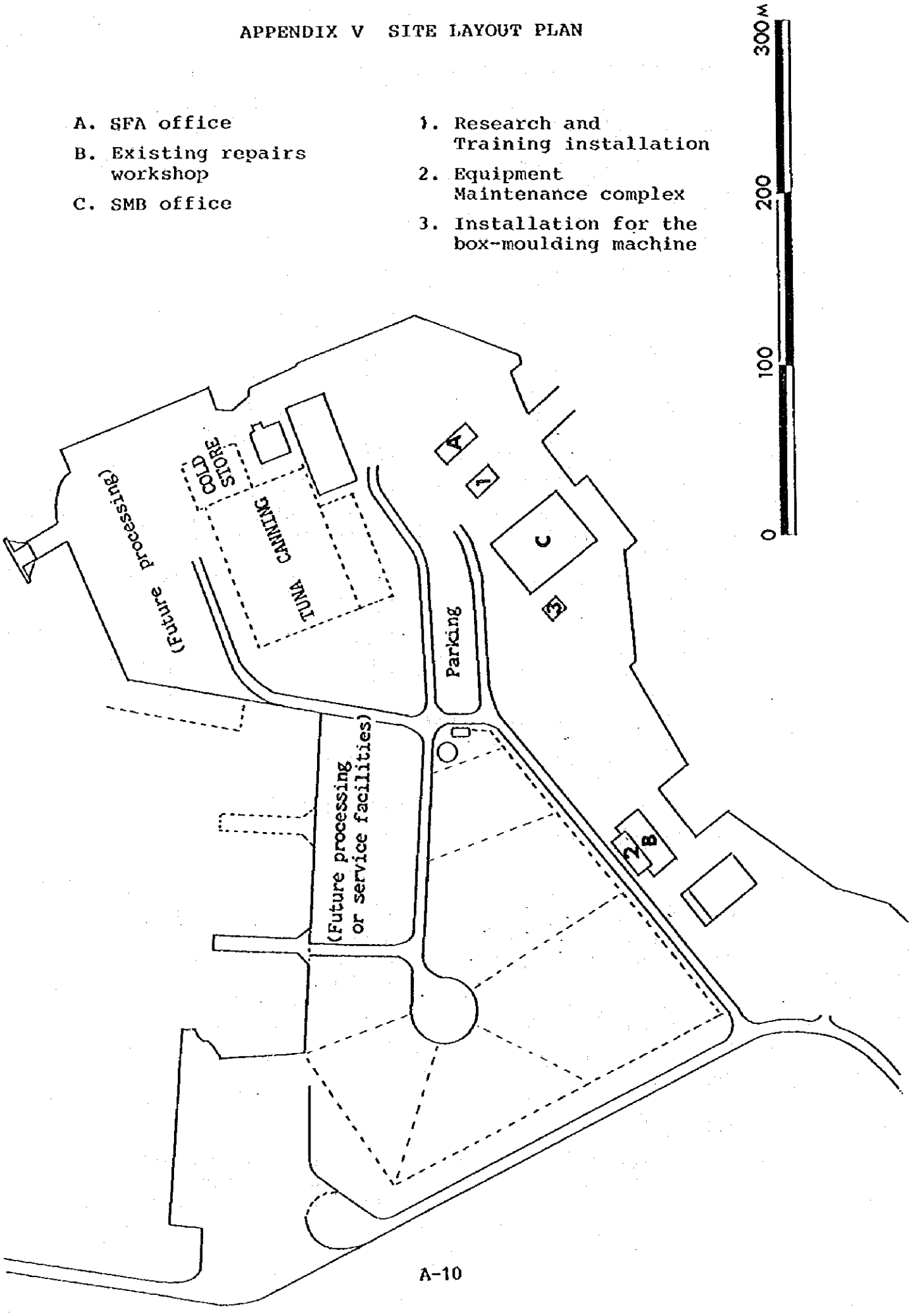
JICA Nairobi Office

Mr. A. Takahashi	Resident Representative
Mr. M. Suemori	Assistant Resident Representative

APPENDIX V SITE LAYOUT PLAN

A. SFA office
B. Existing repairs workshop
C. SMB office

1. Research and Training installation
2. Equipment Maintenance complex
3. Installation for the box-moulding machine



APPENDIX VI LIST OF MAIN FISH SPECIES

Seychelles Name	English	Scientific Name
Bourgeois	Emperor Red Snapper	Lutjanus sabae
Bordemar	Humphead Snapper	Lutjanus coccineus
Vieille Maconde	Brownspotted Grouper	Epinephelus chlorostigma
Vieille Platte	White Blotched Grouper	Epinephelus multionatatus
Vara Vara	Two-spot Red Snapper	Lutjanus bohal
Job Gris	Green jobfish	Aprion virescens
Job Jaune	-	Aphareus rutians
Batrican	Bluespotted Jobfish	Pristipomoides filamentosus
Carangue Balo	Buldger	Carangoides gymnostethoides
Carangue Plate	Yellow Spotted Trevally	Carangoides fulvoguttatus
Thon Jaune	Yellowfin Tuna	Thunnus albacares
Bonite	Bonito	Euthynnus affinis
Kingfish	Kingfish	Acanthocybium solandri
Diable La Voile	Sailfish	Instiophorus platypterus
Espadon	Marlin	Makaira sp.
Capitaine Blanc	Bluelined Large-eye Bream	Gymnocranius robinsoni
Capitaine Rouge	Spangled Emperor	Lethrinus nebulosus
Monsieur Hangard	Tomato Hind	Cephalopholis sonnerati
Babonne	Spotted Coral Trout	Plectropomus maculatus

Seychelles Name	English	Scientific Name
Croissant	Moontail/Sea Bass	Variola Louti
Gueule Longue	Longface Emperor	Lethrinus elongatus
Cordonnier Blanc	Shoemaker Spinefoot	Siganus sutor
Cordonnier Soulefemme	Steamlined Spinefoot	Siganus argentous
Cacatoi Blanc	Yellowscale Parrot	Scarus ghobban
Cacatoi Brun	-	Scarus sp.
Chirurgien	Bleeker's Surgeonfish	Acanthurus bleekeri
Rouget Local		Parupeneus seychellensis
Rouget Taché	Dash-and-dot Goatfish	Parupeneus barberinus
Macquereau Doux	Indian Mackerel	Rastrelliger hanagurta
Macquereau Gros	Big-eye Scad	Selar crumenophthalmus
Becune	Pickhandle Barracuda	Sphyraena jello

APPENDIX VII ORGANIZATIONAL CHART OF THE SEYCHELLES FISHING AUTHORITY

BOARD OF DIRECTORS	MANAGING DIRECTOR	1	ADMINISTRATION CENTRAL SERVICES	ACCOUNTS DIVISION	FINANCIAL CONTROLLER	1	STAFF	4
	DEPTY GENERAL MANAGER	0		COMPUTER DIVISION	DATA PROCESSING SUPERVISOR	1	STAFF	3
	PERSONAL SECRETARY	2		PERSONAL/ADMINISTRATION DIVISION	DIRECTOR	1	STAFF	4
			FISHERIES MANAGEMENT	FISHERIES MANAGEMENT DIVISION	DIRECTOR	1	STAFF	1
				FISHING PORT DIVISION	DIRECTOR	1	STAFF	3
				FISHERIES COORDINATION DIVISION	DIRECTOR	1	STAFF	3
				MAINTENANCE DIVISION	DIRECTOR	1	STAFF	3
				RESEARCH DIVISION	DIRECTOR	1	STAFF	15
			INDIAN OCEAN MARINE LTD.		MANAGER	1	STAFF	4
			FOREIGN EXPERT					3
Sub. total		3				9		43
Grand total								55

APPENDIX VIII COUNTRY DATA

1. Population: Population Growth, Age Group and Demographic Rate of Increase

A. Population Growth

1980	1981	1982	1983	1984	1985
63,261	64,035	64,413	64,335	64,717	65,244

B. Age Composition (1985)

Age Group	Number of Persons	%	Number of deaths
0 - 9	16,085	24.7	78
10 - 19	15,275	23.4	4
20 - 29	13,405	20.5	24
30 - 39	6,118	9.4	17
40 - 49	4,424	6.8	33
50 - 59	4,016	6.2	52
60 - 69	3,172	4.9	75
70 - 70	2,115	3.2	104
80 -	634	0.9	112

C. Demographic Rate of Increase : 14.5 % (1985)

2. Visitor Arrivals

Year	1981	1982	1983	1984	1985
Visitor Arrivals	60,400	47,300	55,900	63,400	72,500
Average length of stay (nights)	9.6	9.7	10.7	10.8	11.0
Purpose of Visit (%)					
Holiday	84.8	82.4	85.3	84.8	86.3
Business	5.7	7.7	7.2	6.9	5.5
Other	9.5	9.9	7.5	8.3	8.2
Visitor origin (%)					
Europe	62.6	63.3	67.6	70.2	75.5
Africa	15.6	15.0	14.4	15.7	11.0
Other	21.8	21.7	18.0	14.0	13.5

3. Value of Imports by Major Commodity, 1981-1985

(Thousand Rupees)

	1981	1982	1983	1984	1985
Food & live animals	101,668	116,535	92,458	108,146	104,013
Beverages & tobacco	14,069	14,338	13,155	11,535	14,289
Crude materials	9,068	9,322	8,152	6,964	6,583
Mineral fuels, etc.	130,394	129,044	148,485	186,368	184,445
Animal and vegetable oils & fats	5,459	6,260	7,188	8,257	7,703
Chemicals	32,710	41,286	33,492	35,999	41,223
Manufactured goods	103,835	106,215	88,311	88,572	94,732
Machinery & transport equipment	122,208	142,521	135,761	115,188	179,376
Miscellaneous manufactured articles	58,885	69,692	64,849	54,821	68,777
Other	10,174	6,109	2,232	2,877	3,511
Total	589,011	641,322	594,082	618,728	704,719

4. Domestic Exports by Main Commodity, 1981-1985

(Thousand Rupees)

	1981	1982	1983	1984	1985
Food					
Fish	4,341	7,300	9,188	10,168	10,557
Shark's fins	72	19	267	343	322
Coconuts	283	297	147	223	298
Cinnamon	1,882	3,049	3,303	1,149	2,516
Cloves	24	-	-	-	-
Beverages & tobacco	59	10	8	26	11
Crude materials					
Copra	17,008	8,850	11,346	8,208	7,557
Guano	406	-	-	-	-
Turtles	520	483	494	75	-
Scrap metal	141	64	164	149	55
Other	59	36	5	11	13
Animal & vegetable oils	-	13	100	720	220
Chemicals	50	-	1	42	-
Philatelic materials	2,319	-	-	-	50
Coconut brushes	53	47	62	18	23
Other	117	51	84	51	100
Total	27,471	20,297	25,250	21,398	21,857

5. Gross Domestic Product by Industrial Origin

(Million Rupees)

Year	1981	1982	1983	1984	1985
Agriculture	44.6	34.9	45.8	43.1	44.0
Forestry	1.3	1.0	1.5	1.4	1.5
Fishing	30.6	26.1	29.6	29.5	31.5
Mining	0.2	-	-	-	-
Manufacturing	74.1	74.8	87.3	90.8	97.2
Handicrafts	9.1	7.8	8.3	9.5	9.7
Electricity	7.7	9.3	11.3	12.5	13.7
Water	3.6	3.3	3.5	6.7	7.7
Building	71.9	55.0	42.8	52.8	57.2
Road transport	159.9	164.9	164.6	169.8	169.7
Water transport	23.7	21.5	25.7	37.9	46.9
Air transport	30.1	29.7	32.0	41.3	48.1
Passenger transport	21.3	17.5	17.3	20.1	23.1
Tour operators	10.0	5.5	5.8	8.4	9.9
Communication and storage	24.7	34.3	39.6	46.8	48.2
Hotels and restaurants	70.5	57.0	61.0	87.7	103.8
Banks	27.9	33.8	28.2	31.4	31.4
Insurance	5.1	7.8	4.6	1.9	2.5
Business services	8.9	8.1	7.1	6.6	7.0
Real estate	14.7	14.0	14.3	12.6	12.9
Ownership of dwellings	59.2	56.7	57.0	58.3	59.9
Producers of Government services	171.0	183.4	170.7	173.6	192.3
Private non-profit institutions	4.6	5.8	7.2	6.0	5.9
Other services	16.6	16.4	20.0	20.5	22.2
Recreation	1.0	1.0	1.4	1.5	1.7
Sub-total	892.2	869.6	886.6	970.7	1,048.0
Net interest payments by banks	-34.0	-29.6	-25.8	-26.0	-26.0
Import duty	113.7	128.2	128.6	129.5	136.7
Gross Domestic Product at current market prices	971.8	968.2	989.4	1,074.3	1,158.7

6. Average Number of Formal Employees by Industry

Year	1981	1982	1983	1984	1985
Agriculture Forestry and Fishing	1,585	1,905	2,086	2,074	2,282
Manufacturing	1,801	1,936	1,743	1,767	1,671
Construction	2,560	2,009	1,408	1,635	1,671
Wholesale and Retail Trade	1,028	1,290	1,182	1,162	986
Restaurants	232	287	260	286	312
Hotels	1,993	1,799	1,732	1,737	1,756
Tourism Related Transportation	640	620	565	547	611
Non-Tourism Related Transportation	1,456	1,424	1,400	1,596	1,645
Government Services					
Public Administration	2,208	2,212	2,218	2,211	2,502
Finance and Business	762	1,055	827	800	814
Social, Community Related	2,998	3,557	3,766	3,705	3,587
Other	320	381	333	372	367
Total	17,583	18,475	17,520	17,892	18,229

Total Registered Job Seekers (1985): Males 4,019
Females 3,442
Total 7,461