

2) Fish Landing by the Industrial Fishery

a) Landing Statistics

Fishery companies are required to report, through the inspector's office, to DGP on monthly production, export and domestic sales records. Regarding the export products, export documents are submitted to the Central Bank and INP in relation to export permit or quality control. Based on these data, UNEPE prepares production statistics on the industrial fishery sector. This statistics represent therefore the catch landed by the industrial fishery. It should also be noted that it may partly include the catch by the artisanal fishery.

b) Landing Volumes

Following table shows the fishery production by the industrial fishery, the primary data of which are reported by fishery companies.

Table 2-3-13 Fishery Production by the Industrial Sector
(unit:1000 metric tons)

Year Average	1981	'82	'83	'84	'85	'86	'87	'88	'89	'90
Total	667	331	905	1518	1019	679	872	682	390	782
Small pelagic	546	201	734	1257	770	416	603	479	146	575
Others	121	130	171	261	249	263	269	203	244	207

Source: UNEPE, statistics book (table #17, etc.)

(5) Fishermen

Fishermen are required to obtain a fishing permit from DGP to practice fishing. Based on the records of the "personal" fishing permits, UNEPE prepares statistics on the numbers of artisanal fishermen.

Table 2-3-14 Fishing Permits given to Artisanal Fishermen

Inspector Offices	1981	'82	'83	'84	'85	'86	'87	'88
Esmeraldas	316	393	836	229	389	400	457	617
Limones	69	174	98	180	26	167	65	48
(Cojimies)				20	19	48	15	
Manta	542	547	591	550	345	552	743	460
Puerto López		201	179	13		406	470	229
Bahia	109	222	-	250	277	843	325	184
Salinas	211	457	770	100	411	406	631	622
Playas	85	49	49	232	608	1038	309	340
Posorja	166	213	531	118	375	867	208	218
(Puna)	247	381	185	186				
(Guayaquil)	292	20	66	590	412	991	816	528
Pto. Bolivar		310	230	109	246	364	600	72
(Puerto Jeli)		50	42	37	20	33		
Galapagos		121	36	102	116	137	246	142
Chanduy	43	162	86	26	2	252	276	262
Emgabao	n.a							
(Babahoyo)	178		98	110	54	98	306	219
Total	2258	3300	3797	2852	3300	6602	5467	3941

Source: Inspectorias de Pesca, UNEPE

Note: Offices in parenthesis are those not shown in the newest list of Inspectorias de Pesca (1991)

According to the study by Fallows, et al. (1990), the numbers of artisanal fishermen in Ecuador are estimated as following table.

Table 2-3-15 Artisanal Fishermen by Fallows (1990)

Province	Number of Fishermen
	persons
Esmeraldas	5130
Manabi: North	910
: South	3500
Guayas and El Oro	6030
Galapagos	n.a
National Total	17250

Source: INP, working report (1991)

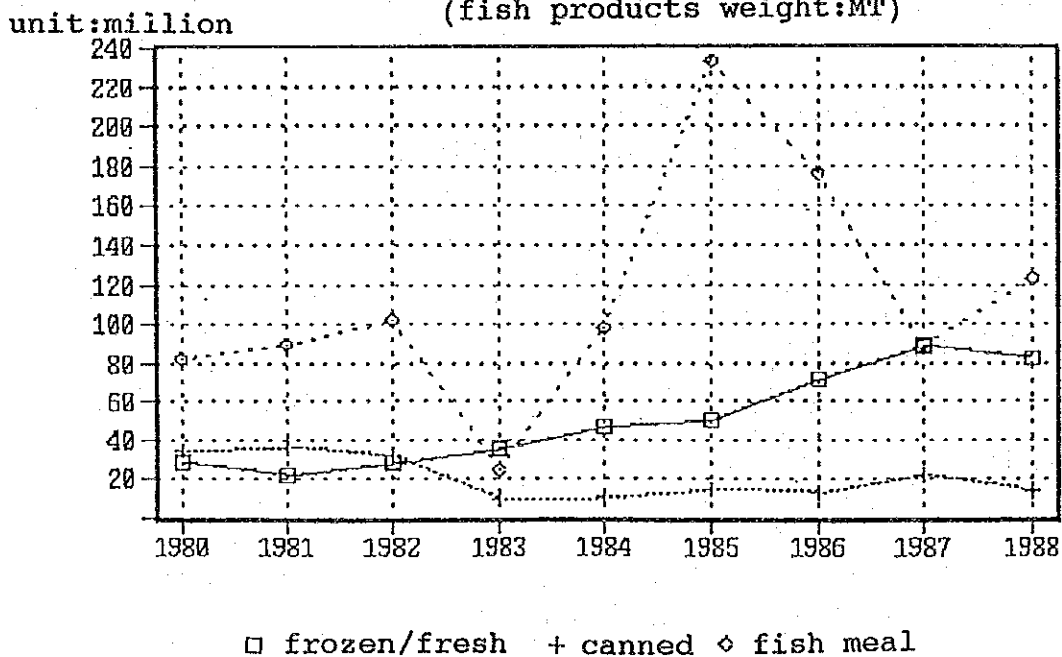
2.3.2 Export of Fishery Products

In 1988, the export volume of fishery products in Ecuador is 220,000 tons; of this volume, one quarter is frozen shrimp. Following that, the frozen or canned tuna has a big volume. In recent years the export of fresh white meat fish has increased. (Table 2-3-16) Usually, these export commodities are transported to Guayaquil or Quito and exported to United States, Canada or Europe. Otherwise, they are exported by ship from Guayaquil, Manta or Esmeraldas. Sometime, they are exported by land to the countries in Latin America such as Mexico, Colombia etc. In 1988, the export amount of fishery products is 449 million of US dollars; of this amount, about three quarters depend on the export of frozen shrimp. (ref. Table 2-3-17) The export amount of the fishery in this year is 24% of the total export amount of Ecuador. The fishery sector is expected to contribute to the acquisition of foreign currencies, coupled with the low level of oil price in recent years.

The exports of frozen shrimp began from the early 1980's, which volume has increased favorably until now. The price of frozen shrimp fluctuates depending on the export markets conditions. But, when the price goes down to some extent, the demand of frozen shrimp tends to grow up and the condition of the international market will have revised.

The export of frozen tuna has a tendency to decrease, while the export of fresh or canned tuna increases. According to the interview survey in the study area, fresh tuna in excellent quality is sold directly to the ship from Japan or it is sold to Japan via New York. These transactions increase the export of fresh tuna. The tuna in low quality will be used as raw material for canned one. From 1986, the export of fresh white meat fish increased; however the export will not grow up to great extent, since the resources of demersal fish have not so much allowance.

Fig.2-3-3 Exports of Fishery Products
(fish products weight:MT)



2.3.3. Domestic Consumption of Fishery Products

(1) Consumer's preference

Form of fresh white flesh fish such as Croaker, Rock-Cod, Reef-cod and Snapper is preferred by the consumer and sold to internal markets by higher prices. Small size white flesh fishes often supplying as by-catch of shrimp trawler are accepted by the low income families, and these fishes are used as a cheaper nutritional animal protein. Recently, this small fish consumption increased especially in the rural area of highland.

Preference of consumers by fish species

Fish Species	% of Weight	Species	% of Weight
Dorado	10.6%	Sharks	8.7%
Flat Fish	8.4%	Snapper	6.7%
Frigate Mackerel	6.1%	Rock Cod	5.3%
Corker	5.4%	King Mackerel	5.1%
Reef-Cod	4.6%	Swordfish	4.1%
Grouper	3.3%	Mullet	3.4%
Dogfish	3.8%	Catfish	2.9%
Pomfret	1.9%	Jack mackerel	1.9%
Miscellaneous less than 1.9%	17.8%		

Mackerel was not well known by the local consumer until introduced to markets by EPNA (Empressa Pesquera Nacional) on form of fresh as a human consumption, volume of consumption is still in small quantity on form of frozen mackerel.

Frozen fish is not popular yet in the Ecuadorian internal markets.

In Guayaquil, consumption of beheaded and boneless frozen fish increased remarkably because of its easy preparation of dish for family. Removed head and bones are selling to fish meal plant as cheaper raw materials of fish meal.

Large shrimp caught by artisanal fishermen is selling to shrimp processor for export and medium size shrimp is selling to local tourist hotel and restaurant following to preference of the buyers.

Canned fish is preferred by the consumer, above all canned mackerel and sardine are placed as cheaper protein supply sources, and consumed chiefly in rural areas of coastal region.

(2) Per Capita Consumption of Fishery Products

Using the fishery statistics by INP and the population statistics, per capita consumption of fishery products in Ecuador between 1980 - 1988 is estimated by the following formula:

$$S = (L - M - E) / P$$

where S : Supply of Fishery Products of Food Uses
 L : Fish Landing Volume
 M : Fishery Products of Non-food Uses
 E : Exports of Fishery Products of Food Uses
 P : Population

Per capita fish consumption depends largely on the tendency of fish landing which may be affected by El Nino phenomenon. As shown in Fig.2-3-18, it fluctuates between 8 - 16 kg/year with a cycle of 2 - 3 years.

Based on the statistics of Ecuador in 1984 - 1986, after the minor change on the fishery products volume of non-food uses, per capita consumption is calculated by FAO with the upper formula. Per capita consumption is 13.5 kg/year in average between 1984 - 1986. (The value of our results is 12.4 kg in average at the same period.)

Per capita consumption from 1986 varied in less than 10 kg. Fishery products volume of food uses including export volume fluctuated around 200,000 tons, while the population increased gradually. Therefore, per capita consumption will not grow up immediately. It means the value '13.5 kg' by FAO is hardly acceptable.

However, it is not actual that the value remains in the similar level. The value will be recovered up to the same level in 1983, when the fish landing was the least in 1980 - 1988. Therefore, in this project per capita consumption of fishery product of 10 kg/year is adopted for the facilities planning.

Table 2-3-18 Fish Consumption per Capita

Year	Landing Volume (MT)	Non-food (MT)	Exports (MT)	Supply for Food (MT)	Population (x 1000)	Per Capita (Kg/Year)
1980	565,061	383,210	90,633	91,218	8,123	11.2
1981	751,623	534,242	86,857	130,524	8,361	15.6
1982	667,027	473,117	86,991	106,919	8,606	12.4
1983	331,085	182,832	60,999	87,254	8,857	9.9
1984	904,909	692,564	76,075	136,270	9,115	15.0
1985	1,517,606	1,315,093	88,369	114,144	9,378	12.2
1986	1,019,304	811,337	112,336	95,631	9,647	9.9
1987	679,335	447,101	149,408	82,826	9,923	8.3
1988	871,985	654,467	129,970	87,548	10,204	8.6

2.3.4 Collection and Distribution System of Fishery

(1) Merchant

In Ecuador, majority of marine products caught by the artisanal fishermen is handled at the fishing villages and distributed to consumer markets and exporters through the merchants (fish-broker and wholesaler).

The merchants play an important role for the commercialization of fishery products of the artisanal fishermen. All the merchants are authorized and licensed by the Government authority. The licenses are issued and given every year to the merchants.

1) Merchant

On the statistical data and existing report published by the authorities, types of the merchant work as intermediate trader between producer and consumer are not mentioned.

According to information collected by the study team on the field survey, these merchants can be classified into three types of merchants working in commercialization of products caught by artisanal fishermen.

a) Independent merchant

This type of merchant works on free from processing enterprises for the exports or large wholesaler in the large consumer markets such as Quito and Guayaquil etc. under self-financing.

Large size fish collected by some independent merchants are transported to consumer markets and sold to engaged clients such as hotels, restaurants and other institutional organizations. Small size fish and popular species of fishes are directly sold to final consumer at the public markets.

b) Merchant engaged with processing enterprises for the export or the large wholesalers in the large cities.

This type of merchants are working as brokers on commission basis under instruction given by processing enterprises or large wholesalers on purchasing price and quantity.

c) Wholesaler

This type of merchants are working as wholesaler in the large urban areas and connected with retailers in the markets, free markets and fish monger in the large city including other small city, and also dealing with other wholesaler for transaction of fishery products between city and city. Also selling fish to hotels, restaurants, military forces, and hospitals etc. on large volume.

2) Role of Merchant

Merchants supply the ice and baits to the artisanal fishermen and the value of these items are settled accounts at the time of fish caught by fishermen.

Certain merchants give a credit as for purchasing fuel (gasoline) and approve buying or repairing vessel and engine etc. as an advance payment on purchasing contract for obtaining fish. Concerning the fishing operation carried out by the artisanal fishermen, the merchants give some remarkable credits or advance payment to the fisherman and these measures largely affect the price of transactions between the fishermen and merchants, and to the distribution of the fish catches.

On the other hand, white flesh fish distributed to the internal markets are realized by the effort of merchant (wholesaler) buying at Caraguay of Guayaquil or other landing villages.

3) Purchase Price by Merchant

The prices at landing place vary depending with:

- Whether fish to be used for the export or consuming in local markets.
- Whether fishermen have received supply of ice and baits and/or not.
- The size of fish and species.
- Quality of fish. (used ice and/or not)
- Good timing of landing and or not.

The price sold at the landing place by first negotiation agreed between merchants and fishermen is fixed as existing standard price. But, enterprises contract in advance on fixed prices with fishermen for secure quantity of raw materials before fishing operation

These price is revised every week for enterprises based on information gathered by the person responsible to purchasing at landing place employed or appointed by the enterprises.

There is no existing official statistic data on fish prices between fishermen and merchants or enterprises. The different prices (margin) for commercialization of fish between fishermen and merchants and merchant and consumer are roughly minimum 50%. In the case of popular species of fishes being normally more than 100%.

The ratio of margins on commercialization of fish in local market is estimated at 250, 350 S/. per pound with variety of fishes such as Snapper, Crocker, Rock cod, Dolphin fish, Sharks, Dogfish, Mako Shark etc. and 500 to 600 S/. per pound other variety of such as Yellowfin Tuna, Swordfish etc.

Fish Price at the Landing Places & Consumer Market
(unit:S/./lb)

The price by species at the Landing Places & Consumer Market

Name of Species	Price at Beach January 1991		Price at Guayaquil January 1991
	For Export	For Local	
Corvina (Croaker)	1,500	800	1,200
Pargo (Snapper)	1,050-1,500	800	1,200
Dorado (Dolphin)	140 - 250	50	400 - 500
Picudo (Swordfish)	500 - 550		900
Albacore (Yellowfin Tuna)	1,500	350	800
Robaro (Jew Fish)		550	900 - 1,200
Tibron (Shark Meat)		250	500
Lenguado (Flounder)		600	1,000

Source: Collecting at field survey

(2) Markets

1) Markets for Fresh Fish

The fish catches by the artisanal sector at the study area are estimated at 23,000 tons per average year. (refer to 2.4) These fish are composed of large pelagic and demersal fish, and used for food mostly. Food fish are destined to exports and domestic consumption. Exports-oriented fish are processed at the fishing companies in Manabi and exported from Guayaquil and Manta. Recently, Dolphinfish, Yellowfin Tuna, Snappers and Croaker etc. are exported by air in the form of fresh fish. These fish are caught by artisanal fishery mainly. The increase of exports means the demand in exports market and stimulates the diversification of the fish products by the artisanal sector.

Main domestic markets are Manabi Province (Manta, Portoviejo, Jipijapa etc.), Guayaquil and the plateau region including Quito. Present conditions of the main consumer markets are as follows.

a) Guayaquil

Major fish supply sources of this city are the port of Salinas located in Punta Santa Elena (peninsular) with other places such

as Manta, Pto. Lopez and Pto Boliver. By large population and location close to main fish landing places, Guayaquil has been formed as an important city for consuming fishery products in Ecuador and large fish sales points such as Carlos Guevara Moreno market concentrate there.

Fish are brought into the market all day, but usually large volume of fish are brought into the market early in the morning and most of the transaction ends before 7 AM. Small pelagic fish and tuna species are carried into the market late in the afternoon and sold next day by the merchants from landing places or beaches.

Usually, sales of fish by merchants are carried out early in the morning. Hospitals, military forces, hotels, restaurants, etc. buy fish at wholesale market. Of course, these institutional organizations often receive supply of fish directly from the landing places.

All seventeen (17) markets and sixteen (16) free markets in Guayaquil city sell fish. Sales place of some market install only wooden tables and there is no protection of sun light for fish and often fish there are laying on wooden plate, plastic boxes or news paper are directly placed on the ground, which causes the increased stage of decomposition as a waste.

High quality fish are sold in the city at self-service systems such as enterprises (super market) of Supermaxi, Mi Comisariato, El Conquistador, La Favorita, these organizations are selling only high quality fishes by various form of presentation. But, the quantity sold at these places is not so large.

At present, the fishery products are sold at the limited places of such as markets, free small markets and super-markets, and there are no specialized small scale fish sales shop (so called fish monger)

b) Quito and Other Cities in the highland of the country

Quito is considered as second consumer market of fishery products in Ecuador and major supply sources for the city are Esmeraldas, Manta, and Puerto Lopez etc. Large volume of fresh fish are sold at twenty-two (22) fish markets and fifteen (15) general markets existing in the city, also including self service markets such as super-market as same as existing in Guayaquil, and six shops specially handling fresh fish so called fishmonger.

The form of fresh fish sold at Quito and other cities in the highlands are comparatively different with system observed at Guayaquil. Wholesaler and major merchants are handling fish in ice and keep in good conditions, because of different cold climate in the mountain ranges. The place of retail shops are attractive and under good hygienic conditions, and lower parts of sales stand are covered for protection soil and not observed any waste and bad smell.

Cities, likely, Loja, Cuenca, Riobamba, Ambato, Latacunga, Ibarra, Otavalo, Tulcan etc. receive supply of fish from Puerto Boliver, Guayaquil, Playas, Santa Rosa, Puerto Lopez, Manta and

Jamas and sell through wholesalers by weekly market. Wholesalers and merchants are parking their wagons close to the markets and selling their products by wholesale and or directly to the people.

(3) Problems on the Fish Distribution

1) Fish Handling at the Fishing Grounds and Fishing Boats

Poor on-board handling is a major problem with the artisanal sector, and it is estimated that only 30% of artisanal fishermen use ice on board. Fishermen using small boats do not use ice for fishing activities of short trips (3-4 hours) and for by-catch collection from shrimp trawlers and purse seiners.

The non-availability of ice causes the problems. Sometimes, the fishing boats have to wait the supply of ice.

2) Fish Handling from Landing to Consumer Markets

Since there are not facilities at any of the artisanal landing places, classification by species and weighing volume of catches are done on the beach. The provision of a minimum fish handling spaces for the quality inspection, beheading, gutting and selling procedures would improve matter at a basic level.

The fish carrying by truck usually use wooden boxes, often used zinc-lined with wooden partitions, made specifically for fish carrying. The truck decks are generally open but some of them are provided with a canvas for prevent direct sunlight falling to fish on the load. Thermally insulated trucks are not used for the distribution of fresh fish. This methods are contrasted with the case of shrimp in plastic boxes for prevent damage of shrimp during transportation.

3) Domestic Consumption of Fresh Fish

a) Fish Demand and supply

There are some constraints on the fish consumption as main protein sources.

-Fish supply volume is not stable.

-Fish price is higher compared with meat.

-Generally, fish is not popular compared with meat.

Therefore, fish consumption is in low level even though fish catches are relatively abundant seasonally and price shows low comparatively with meat. Fresh fish is main consumption form, but both the total and per capita domestic consumption volume decrease compared with the year 1982.

b) Quality

Low fish quality is one of the main obstacles to the increase of domestic consumption especially in the coastal area. It is reported that in spite of high demand potential for fresh fish, low quality, supply shortage and high price cause the flagging consumption.

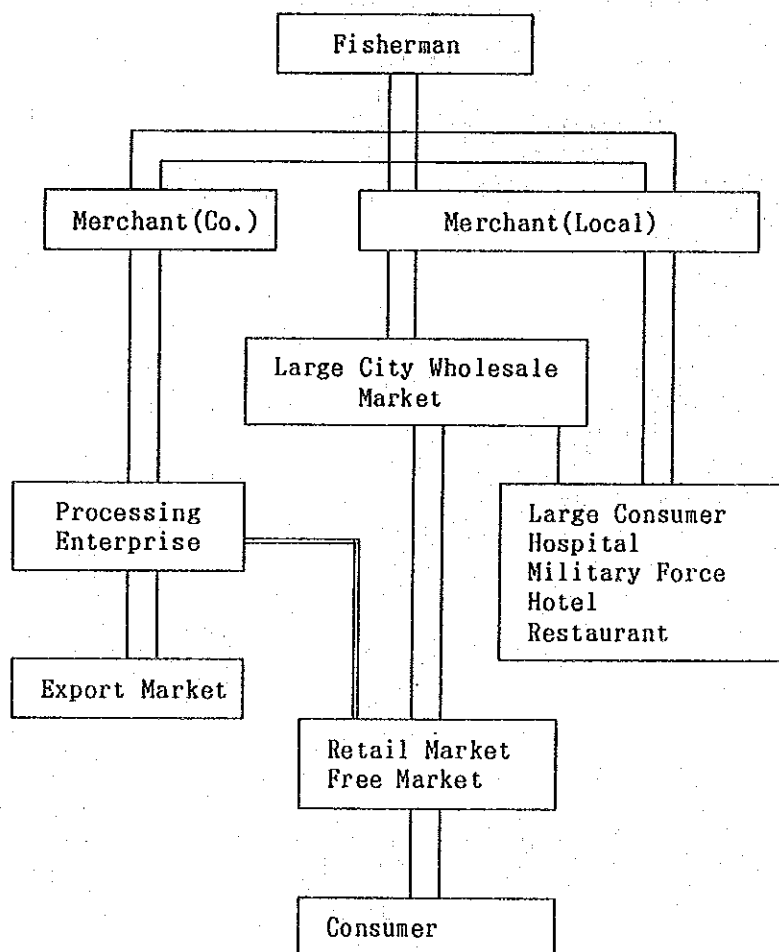
4) Domestic Consumption of Frozen Fish

It is estimated that consumption volume of fresh fish is still in low level and it shares 2-3% of the total.

According to the information of Direction General de Pesca, main species sold at local markets in form of frozen fish are limited to popular species, namely, Sharks, Mackerel, Sardines, Dolphin fish, Croaker and Jack Mackerel, but frozen fish is not popular in the country yet.

Since 1983, the unique enterprise named EPNA has dedicated selling frozen fish at local market exclusively. EPNA is an important user and seller of coastal fish products supplied by the artisanal fishermen.

Marketing Channel for Products of Artisanal Fishermen



2.4 Fisheries in Manabi Province

2.4.1 Fishery Production

(1) Fishing Vessels

1) Artisanal Fishing Vessels

According to the study (Fallows & Contreras, 1990) on the artisanal fishery sector in Ecuador, the numbers of the artisanal fishing vessels in north and south Manabi Province are as shown in the following table.

Table 2-4-1 Number of Artisanal Fishing Vessels
by Fallows & Contreras (1990)

Landing Spots (Beach/port)	Fishing Vessels	
	FRP boats	Wooden boats
(1) North Manabi	(82)	(449)
Cojimies	-	-
Pedernales	-	-
Don Juan	10	40
El Matal	0	30
Cabova	5	10
Canoa	0	10
San Vicente	40	100
Salinas	2	150
Bahia de Caragues	5	50
San Clemente	3	22
San Jacinto	15	7
Crucita	2	30
(2) South Manabi	(669)	(270)
Jaramijó	40	100
Manta	317	24
San Mateo	178	5
Sta. Marianita	30	20
Ligüique	0	6
San Lorenzo	0	15
Las Pinas	3	6
Sta. Rosa	6	6
Pto. Cayo	20	30
Machalilla	13	40
Pto. López	61	10
Salango	1	8
Manabi Province	751	719

Source: Work papers, INP, 1991

According to the above study, the national total of the artisanal fishing vessels excluding Galapagos Province is 6860 vessels. This means that around 14% of the artisanal vessels in the mainland of Ecuador exists in south Manabi. The results of the

above study show likewise that the ratio of FRP vessels to the total is 71% in south Manabi, and 23% in the whole mainland, which suggests some remarkable tendency that the transformation of vessel from wooden to FRP hull in Manabi Province may have more progressed than other provinces. The study also indicates that this transformation concentrates in south Manabi where around 90% of the FRP vessels in the whole province are observed.

In this study by the JICA team, a series of observation on the numbers of fishing vessels has been made in some of the beaches. Following table summarize the results of this observation made so far. The results do not include the fishing vessels that sailed off the beaches at the time of observation.

Table 2-4-2 Number of Artisanal Fishing Vessels Observed by the Study Team (1991)

Landing Spots	No. of Fishing Vessels
Jaramijó	128
Manta	271
San Mateo	102
Sta. Marianita	(95)
Ligüique	3
Sta. Rosa	16
San Lorenzo	0
Pto. Cayo	79 to 92
Machalilla	58 to 62
Pto. López	48 to 96
Total	800 to 865

Note: 1st. observation Dec. 23 to 24, 1990
 2nd. observation Jan. 3 to 4, 1991

2) Industrial Fishing Vessels

According to the fishing permit records in 1990 by the fishery inspector's office at Manta, 90 fishing boats have obtained the industrial fishing permit in its survice district which almost covers the south of Manabi Province. Meanwhile, the office of captania in Manta, a subordinate organization to DIGMER, is in charge of making registration of the vessels of the area from Rio Chico in the north of Manabi to Rio Ayampe in the southern boundary of the province. The captania office keeps registration records of fishing vessels in this area which are classified by the size of vessel; small fishing boats less 5 GT (AI class) and medium or large fishing boats greater than 5 GT (P class).

The classification of fishing boats, AI class and P class, by the captania office corresponds substantially to the category of artisanal and industrial fishing permit respectively. At the time of the study in 1991, the numbers of fishing boats registered under the P class totaled 142 vessels. That means, from

the view point to get the actual numbers of this class of fishing boats, the captania's registration records more cover the targets than the fishing permit records. For the purpose of this study, however, it should be noted that the fishing method practiced by and the management body (individual person or company) of a registered vessel, which can be identified by the fishing permit records, are not obtained by the captania's registration records. The following table shows the numbers of P class fishing vessels by the registration records.

Table 2-4-3 Number of P class Fishing Vessels from Rio Chico to Rio Ayampe (1991)

Districts	No. of Fishing Vessels
Jaramijó	24
Manta	78
San Mateo	0
Sta. Marianita	0
Ligüique	0
Sta. Rosa	0
San Lorenzo	0
Pto. Cayo	0
Machalilla	16
Pto. López	8
Salango	2
Unidentified or Others	14
Total	142

Source :Captania at Manta

Remarks:This table does not include vessels under the examination of registration.

As shown the above table, most of the medium and large fishing boats in south Manabi are observed at Manta and Jaramijó. This may be resulted by the facts that Manta has a port which no other district in the province has, and also that, in this city, many of the land facilities of fishery companies are operated; to be said, by the more developed infrastructure. By the results of the field study, the medium and large fishing boats in Jaramijo usually use the Port of Manta for fish landing and supply working, which also seems to reflect the developed infrastructure at Manta.

3) Transition of Fishing Vessel Numbers

As stated in the previous section, it is difficult to derive useful information on the secular change of the fishing vessel numbers from the available statistics.

From the captania's registration records, building numbers of fishing vessels during past 6 years can be estimated. The results are shown in the following table. The districts serviced by the captania office at Manta, stated previously, covers at

present the southern half of Manabi Province, which is the project area, as well as, in north Manabi, some other districts in the south of Rio Chico. The study by Fallows (1990) includes, among the area from the north of Jaramijó and to the south of Rio Chico, the district of Crucita. At Crucita, 32 vessels of the artisanal fishing boats were observed by that study, which is much smaller than the total numbers of the artisanal fishing boats, around 940 vessels, in south Manabi. Most of the newly registered vessels as shown in the following table can be, therefore, considered to engage in the operation in the project area.

Table 2-4-4 Estimated Building Numbers of Fishing Vessels (unit: vessel)

Year	Category of "AI"	Category of "P"
1985	92	9
1986	163	17
1987	269	7
1988	134	8
1989	138	12
1990	261	19
(under entry)	-	15
Average	176	14.5

Source: Captania in Manta (1991)

Average number of the annual building of the artisanal fishing vessels, class AI, which would obtain artisanal fishing permits, is estimated at 176. This is equivalent to 12% of the present level of the artisanal fishing vessels studied by Fallows (1990). Purpose of building new vessels can be presumed to be either transformation from wooden to FRP hull or new participation to fishing activity, although there exists no information to show the details. In either case, it should be noted that such transformation or promotion has been progressed in the project area at a considerable pace at least during past 6 years.

(2) Fish Landing

1) Landing by the Artisanal Fishery

By a method as described in the previous section; the method to estimate landing volumes from the ratios of the numbers of wooden boats to FRP boats, the landing volumes by the artisanal fishery in south Manabi were estimated as the following table.

Table 2-4-5 Estimated Landing Volumes
by the Artisanal Fishery in South Manabi

Districts	Catch/vessel	Landing Vol.
	Tons/vessel	Tons
Jaramijó	11	1,500
Manta	24	8,200
San Mateo		4,600
San Mateo	22	4,000
Sta. Marianita	19	1,000
Ligüique	11	70
Las Pinas	11	100
Sta. Rosa	11	130
San Lorenzo	11	160
Pto. Cayo	11	550
Machalilla	11	470
Pto. López	22	1,600
Total	-	17,000

Remarks: Catch per boat at Manta and San Mateo is based on the INP study (1990).

2) Landing by the Industrial Fishery

Since the landing volumes by the industrial fishery classified by province or district are not available in the present statistics, an estimation is required to know the present level of landing volumes by this sector in Manabi Province. It is difficult to estimate, dissimilarly to the case of the artisanal fishery, the landing volumes only from the number of fishing boats, because a considerable number of purse seiners is included in large and medium fishing vessels. By this reason, following method was applied.

a) Manta and Jaramijó

The number of medium and large fishing boats in 1990 at Manta and Jaramijó is estimated as 102 vessels. Among these, the landings by most large fishing boats, around 20 vessels, have been recorded by the inspecting office of APM, which has the weighing facilities at the gate of the Port of Manta. By the record kept by APM, the total of such landings in 1990 is 36000 tons. The principal species are tuna and skipjack according to the interview results.

The other 80 vessels are considered, if extrapolating from the number of vessels classified by the fishing methods obtained by

the fishing permit records, to comprise of approximately 50 purse seiners and 30 long liners. If considering, from the results of the interview, that the annual production per boat of these vessels is 1100 tons for a purse seiner and 70 tons for a long liner, then a total production volume is estimated as 57100 tons/year; 55000 tons for small pelagic fish and 2100 tons for other species.

b) Other Districts

Considering that the annual production per boat is likewise 1100 tons for a purse seiner and 70 tons for a long liner, the usual level of production volume by the medium fishing boats at the other districts was estimated. The results including those for Manta and Jaramijó are shown in the following table. As a conclusion, the total production volume by medium and large fishing boats in Manabi Province can be presumed as 135000 tons; 96800 tons for small pelagic fish and 38200 tons for other species.

Meanwhile, as stated in the previous section, the national production of small pelagic fish by the industrial sector in 1990 is 25% of one in the average year. If catch of small pelagic fish in Manabi Province in 1990 can be presumed to be likewise under a bad condition, its production volume, which is estimated as 96800 tons in the average year, is decreased to 24200 tons in 1990. In this case, the total production volume by the industrial sector in the province is estimated as 62400 tons, which is much less than 135000 tons in the average year.

Table 2-4-6 Estimated Production Volumes by the Industrial Sector in Manabi Province in the Average Year

Districts	Total boats	Purse seiner	Long liner	Landing
Manta & Jaramijó	No.	No.	No.	tons/yr.
Large fishing boat	20	(20)	-	36,000
Other boats	80	50	30	57,100
Machalilla	16	16	0	17,600
Puerto López	8	6	2	6,700
Others & Unidentified	16	16	0	17,600
Total	140	108	32	135,000

3) Food Fish and Non-food Fish

According to a study by INP, in the national average, 90% of small pelagic fish in Ecuador is consumed as material for fish meal industry (INP, Boletín Científico y Técnico, vol.X, No.2, 1990). Meanwhile, by the result of the interview with fish transporters at Manta, the ratio of non-food fish is

considered as 80% of total small pelagic fish. This difference of the ratio of food and non-food fish is not inexplicable when considering the present situation that most of the fish meal factories in Ecuador, corresponding to 90% in production capacities, are observed in Guayas Province.

The production volume of food fish in Manabi Province, in case the ratio of food and non-food fish is 2:8 for the utilization of small pelagic fish, is estimated as the following table.

Table 2-4-7 Estimated Food Fish Production in Manabi Province

Descriptions	Artisanal fishery	Industrial fishery	Total vol.
Food fish	tons/yr	tons/yr	tons/yr
Large pelagic and demersal fish	22800	38200	61000
Small pelagic fish	-	19400 (4800)	19400 (4800)
Total	22800	57600 (43000)	80400 (65800)
Non food fish	-	77400	77400
Small pelagic fish	-	(19400)	(19400)

Remark: Figures in parentheses reflect the possible decreased production volumes in 1990.

By the above table, the production volume of food fish in Manabi Province is estimated as around 80000 tons in the average year and, in the "trough" year like 1990 when the production of small pelagic fish is under the ordinary level, it is estimated to fall to less than 70000 tons.

Meantime, the artisanal fishery in some districts also produces small pelagic fish, though in a very low level. As shown in table 2.2.1-12, even in case of Manta where the catch of small pelagic fish is reported, the ratio of it is less than 1 % of the total. An example is also shown in San Mateo that no small pelagic fish is reportedly produced. Although there is no information to evaluate the total production volume of small pelagic fish in the artisanal sector in Manabi Province, it is presumed to be 200 tons/year at the most. The above table does not, therefore, count the catch of small pelagic fish by the artisanal fishery, which is considered to have no influence on the above evaluation for the production level of the food fish.

4) Comparison of Landing and Consumption

The fishery production volumes in the nation and Manabi Province that are previously stated in this report are based, both in the

artisanal and industrial fishery, mostly on the estimation from the study results by INP on the artisanal sector, fishing permit records, and fishing boats registration records.

In addition to these reports and records, other two official records or statistics are available; one is the record of fishery products exportation invoice submitted to the inspector's office in Manta by fishery companies in Manabi Province, and another is one of the UNEPE's statistics which describe the national domestic sales volumes of the fishery products produced by fishery companies. Based mainly on these data, exportation and consumption volumes of fishery products are estimated and compared with the estimated production volume of food fish.

a) Exports by Fishery Companies in Manabi Province

Many of the fishery companies in Manabi Province have their production facilities in Manta and Montecristi, an inland city adjacent to Manta. These companies produce mainly tuna and sardine can and frozen fish, and export to the international market with North America as the major destination. Based on the records on exportation invoice in 1990, the export volumes in raw fish basis are estimated with production yield ratio of 80% for fresh fish, which is shipped with head/tail and guts removed, 80% for frozen fish, and 40 to 60% for canned fish. The results are shown in the following table.

Products	Raw fish weight (MT)
Fresh fish	6863 tons
Frozen fish	14897
Canned fish	31079
Total	52839

The above table does not include frozen shrimp, which is one of the principal export products in Ecuador, by the reason that in Manabi Province most of the shrimp is produced by aquaculture firms near in Bahia de Caraquez in the northern Manabi, and that the number of shrimp trawlers is only a few.

b) Domestic Sales by Fishery Companies

UNEPE prepares the national statistics on the volume and amount of the domestic sales of fishery products based on the reports submitted by fishery companies. There is no available data on the domestic sales classified by provinces. By a working paper by UNEPE (1991) on the 1990 domestic sales, however, it can be estimated that the domestic sales by fishery companies in the province of Esmeraldas and El Oro are few, and that most of the sales have origins in the province of Manabi, which occupies 25% of the total, and in Guayas.

Based on the national total of the domestic sales in 1990, the sales volume by the companies in Manabi Province is estimated by

assuming its ratio in the national total as 25%. To estimate the weights of raw fish, the same production yields are used as the export volumes.

Products	Raw fish weight (MT)
Fresh fish	216 tons
Frozen fish	154
Canned fish	3212
Total	3582

c) Estimated Local Consumption

The above estimations are made on the fishery products for export and domestic sales which are supplied by fishery companies. The products for domestic sales can be divided to those distributed outside the province and to those consumed inside the province. Since the portion consumed inside the province is considered generally much smaller as far as the products by companies, it is necessary to estimate otherwise the volume of consumption of fish of the origin anywhere in the province but not in the fishery companies. As an estimated volume of such local or self consumption, if using a national average consumption volume per capita (10 Kg), following result can be obtained;

Population in Manabi (1026 thousands) x 10 Kg = 10260 tons

d) Total of Export and Consumption

From the above estimates, around 67000 tons are given as a total of the export and domestic consumption of food fish in 1990 of the origin in Manabi Province. Following table summarizes the estimates of food fish production and consumption including export;

(Unit: Thousands tons)

Descriptions	Average year	1990
Estimated production	80	less 70
Estimated consumption	-	67

As other portions of consumption that are not covered by the above table, there may exist one which is not of the fishery companies origin but distributed to the outside of the province, and one which is abandoned or used as no-food material due to the deterioration of fish. And it should also be noted that the fish consumption per capita in Manabi Province which has the long coastal line may be larger than the national average. The above evaluation on the consumption which does not account these factors can be, therefore, underestimated to a extent that the factors may give.

As indicated in the previous table, the estimation on the production and consumption volume are shown in the almost same level. From the above consideration, however, it should be noted that the evaluation on the production volume may be underestimated to some extent, but also that at least it is not overestimated.

(3) Artisanal Fishermen

1) Artisanal Fishermen

According to the study by Fallows and Contreras (1990), the numbers of the artisanal fishermen in Manabi Province are estimated as shown in the following table.

Table 2-4-8 Number of Artisanal Fishermen
in the Province Manabi
by Fallows & Contreras (1990)

(1) North Manabi	(912)
Cojimies	-
Pedernales	-
Don Juan	100
El Matal	80
Cabova	22
Canoa	60
San Vicente	200
Salinas	80
Bahia de Caragues	80
San Clemente	90
San Jacinto	50
Crucita	150
(2) South Manabi	(3500)
Jaramijó	500
Manta	700
San Mateo	750
Sta. Marianita	250
Ligüique	15
Las Pinas	20
Sta. Rosa	40
San Lorenzo	40
Pto. Cayo	150
Machalilla	400
Pto. López	500
Salango	150
Total	4,412

Source: Work papers, INP, 1991

Total number of fishermen in the project area, if based on the fishing permits record, is estimated as 689 persons. As this total is considered to be an underestimate when compared with

the fishing vessel numbers, this study will take the above study results by Fallows (1990). As indicated in another study by Fallows (1990), the number of the vessels engaged in the artisanal fishery in the project area is estimated as 939. Both of these study results give 3.7 persons as an average number of fishermen per vessel. Number of crews that appears in the fishing permit record is mostly 3 persons in case of lancha. 3 to 4 fishermen including worker(s) on shore are considered to work for one fishing vessel of lancha and panga class.

2) Financial Aid for the Artisanal Fishermen

There are two official institutes in Manabi Province which provide the financial aid for the artisanal manufacturers and producers; Banco Nacional Foment (BNF) and Fundacion Manabita de Desarrollo y Estudios Tecnicos (FMDET). Although these aids cover also other sectors than fishery, it is reported that, in the number basis, the artisanal fishermen receive almost all of the loan accommodated by the Manta branch office of BNF and around a half of the loan by FMDET.

According to the Manta branch office of BNF, around 400 loans have been accommodated by this office during the past five years. The amount of a loan in the first half of 1991 is 10 millions Sucre to 15 millions Sucre. The present system by BNF provides a loan of 30 millions in the maximum amount with the interest rate of 40% to 50%. The applicant is screened subject to some conditions including those that the OAL of fishing boat to own does not exceed 14 meters and the total amount of liquid assets does not exceed 60 millions Sucre. The objectives of loan are stipulated to include fishing boat, engine and fishing gear and materials.

The financing by FMDET has been implemented in July, 1990 under an agreement with the Ministry of Social Welfare. During this one year until the time of this study, July, 1991, the financing under this agreement has accommodated around 850 loans with the average amount of 600 thousands Sucre. The agreement has expired in one year. The objectives of loan were to finance the operation and management expense to procure the materials for production and maintenance. The newest interest rate was 48% and the repayment term was 12 months. The conditions for the financing include the member registration in FMDET and the completion of the training course for the financial management of fishery and for the banking. The new agreement is planned at present to provide 600 loans with the average amount of 4 millions Sucre.

2.4.2 Collection and Distribution System of Fishery in Manabi Province

(1) Activities of Merchants in Manabi Province

Throughout fish landing places of artisanal villages in Manabi province, these merchants come from Manta, Jipijapa, Portoviejo, Guayaquil and Sierras of highland towns of the Republic. Usually merchants have a good trading relationship with boat owners. Some of boat owners have a license as a merchant.

Merchants generally don't given any credits but many supply fuel to boat owners, and in case, ice is provided to the fishermen when fishes are used for export purposes. In general, merchant does not pay fair prices but artisanal fishermen have no way of obtaining market information particularly about prices at consumer markets by species and size.

Merchants visit the village but not every day. For instance, some of villages in Manabi province have no access paved road to the consumer markets during rainy season, then, if the merchants do not arrive and the villages have no way of preserving their catch then these catches are consumed by families of fishermen or become lost without available ice for preserving fishes from decomposition.

Number of Merchants visiting each landing place

Landing Place	Merchant	
	Local	Others
MANABI PROVINCE (SOUTH)		
Jaramijo	30	20
Manta	30	50
San Mateo	10	20
Sta. Marianita	2	?
Liquique	5	1
Sta. Rosa	4	6
San Lorenzo	3	1
Puerto Cayo	5	4
Machalilla	20	20
Puerto Lopez	100	?
Others	63	14
Total	272	136
Nation Wide other than S.MANABI	732	321
Grand Total	1,004	457

Source: Direction General de Pesca

(2) Distribution of the Fish Catch

Actually, all artisanal fishermen's villages in Manabi Province, have not any port facilities at beaches for unloading fish catches.

Fish catches are handled by following ways (by gear and size of fish):

-Large size fish caught by bottom or floating longlines:
More than one day operation, fishes are beheaded and devising on board after harvested and brought back to the shore without ice. Within one day operation, fishes are not beheaded and gutted on board and brought back to the beach and the treatment is carried out on the beach.

-Bottom fish caught by bottom set gill nets (Croaker, Black Seabass, Grunt, Catfish, and shrimp etc.):
Fishes bring back to shore without removing fish from gill nets and removing from nets on shore with their families. In general, fish landing place of fishermen villages does not have any suitable facilities for weighing fish and hygienic place for handling such food products.

In general, the large species such as Yellowfin Tuna, Bigeye Tuna, Shark, Swordfish, and Dolphin fishes were beheaded and gutted at the landing beach. Small fishes are transport to the local markets with by catch fishes of shrimp trawler. These transportation is carried out during the night and arrive at sales place at dawn.

Vehicles (Trucks) used by merchants are usually medium size truck and crushed ice are used for protection of fish quality during transportation. In case of long trip, truck is covered by canvas with planking. If the consumer markets located close to landing place, merchants do not use ice for preservation of fish.

Usually, the merchants from local or neighboring areas buy fish directly from the fishermen and sell fish at areas close to their residents and countryside using bicycle, motorcycle and or by walking.

According to the information from Britannica Mission (EEC), recently, some of cooperative official did try to marketing by their own channel in response to a general feeling that the prices paid by merchants to fishermen did not reflect with the true market value of the fish, but this measure had not continued long time and failed because of poor market information and lack of financial management.

(3) Constraints of Marketing

Following matters has been constrained marketing for products of artisanal fishermen;

1) Artisanal fishermen are not provided any facilities necessary for loading and unloading of their fishing products, for fishing gears and for supply of fuel , neither adequate capacity of fish preservation at landing place when they have good catches.

2) In the local fish markets, lack of equipment for preservation of fish has affected the supply of high quality bottom fish to the consumer, which is major constraint for the increase of fish demand.

3) In general, fish prices are expensive, especially fresh fishes are so much higher than frozen fishes.

4) Like sharks, Dolphin fish, Jack Mackerel, Catfish, Jew fish, and Rayfish etc. are relatively abundant and prices are shown very low seasonally. But these fishes can not be supplied constantly because of the lack of the preservation equipments. Furthermore, there is not adequate organization of promoting the consumption of these types of fishes for medium and low income population.

2.5 Present Conditions at the Study Area

2.5.1 Study Area

(1) The Study area extends from Jaramijo which is located east of Manta city in Manabi Province, to Puerto Lopez includes 10 fishing villages. (Jaramijo, Manta, San Mateo, Santa Marianjta, Liguique, San Lorenzo, Santa Rosa, Puerto Cayo, Machalilla and Puerto Lopez) (Fig. 2-5-1)

Topographic maps of the study area are shown in Fig. 2-5-2 (1)-(6)

2.5.2 Natural Conditions

(1) Coastal Area

Southern coastline of Manabi including the study areas is categorized into 10 different sectors characteristically. The followings are the principal characteristics on the coast with very active processes.

1) The Sector Crucita-Manta(26 km)

Cliffs with medium or low heights and plain beaches composed of fine or medium sand appear alternately except at the punta Jaramijo, where beaches of gravel and rocky platform can be seen. The rip currents are noticeable at the punta Jaramijo and Manta. At the fishing port in Manta, sedimentation has accumulated. Currently, it is only accessible for small craft. The sediment of the deep water docks also seems to be significant judging from the turbid conditions of the water during the rainy season.

2) The Sector Manta-Rio de Canas(40 km)

High cliffs with steep slopes continue along the coastline. Small rivers occasionally interrupt the high cliffs, and at the river mouths the small plain spaces are dotted. The alluvial valleys have also steep slopes. The sediment of cliffs and valleys are abundant. The fractures of the rocks of the cliffs contain abundant gypsum and are very plastic. Therefore, together with the winter rainfall it causes mudflows and land slides. Sometimes they create rocky points in which small beaches develop. Housings of the fishermen are built using the small spaces at the river mouth and valleys.

3) The Sector Rio de Canas-Puerto Cayo(17 km)

The coast areas are formed by coastal plain or low level hills. The rip currents are frequent. The small coastal lagoons are blocked by coastal barriers that are overflowed at spring tides.

4) The Sector Puerto Cayo-Rinconada(58 km)

The many sub-vertical and high cliffs are located along the coast, and they are interrupted by the alluvial valleys. The cliffs are highly eroded and numerous caves undercut by the wave attacks can be observed. The coastal lagoon of Ayampe is the largest one in the sector, and sup-

plied by fresh water of rivers and occasionally sea water overflowed the thin coastal barriers. At Machalilla, Puerto Lopez and Salango, the arched coastal areas, sheltered by the cape, are used for fishing activities.

(2) Natural Conditions at the 10 Fishing Villages

Natural conditions at the 10 fishing villages are summarized as follows.

Natural conditions of Manabi change in some places. At the north of Manabi, long and wide beaches continue, but at the south of Manabi, beaches and hinterlands are narrow and steep cliffs appear except Manta and San Lorenzo.

The wave conditions are severe at Santa Marianjta, San Lorenzo and Pto Cayo because these sites face the Pacific Ocean.

Sea bottom slopes are gentle except Santa Marianjta and Liguique. Sea bottom materials are fine or medium sand at all the study area because of the rivers at the sites. Sometimes these rivers bring the much discharges. Especially, the discharges caused by El Nino in 1982-1983 are big volume. The discharge volume of Burro river at Manta is estimated to be 375,900 m³.

Tides at Manta are semi-diurnal, and tide differences are to be around 3.0 m. According to the visual observations, the wave heights at the sites facing the Pacific Ocean, that is, Santa Marianjta, Liguique, San Lorenzo and Santa Rosa, are higher than 1.5 m and wave periods are almost 10-20 sec.

Average current velocity is found to be around 7.95 cm at the surface. Sand drifts are estimated not to be large by judging the origins and volumes of the sand drift at Manta, Pto. Cayo and Pto. Lopez. The rainfalls are little at Manabi, but occasionally the El Nino causes the much rainfalls. Predominant wind direction is between the south and the southwest throughout the year and winds are strong in the summer season (July-November) by the records by the meteorological stations at Manta and Machalilla.

1) Meteorological Conditions at Study Sites

Meteorological conditions are listed below for each site (Jaramijo, Manta, San Mateo, Santa Marianita, Liguique, San Lorenzo, Santa Rosa, Puerto Cayo, Machalilla, Puerto Lopez).

Wind velocity of study sites is about 3 m/sec. Precipitation of study sites are about 400-500 mm/year in normal year and 1500-2000 mm/year in El Nino strong event.

Meteorological Conditions

Site Item	Jaramijo	Manta	San Mateo	Santa Marianita	Lingique
Wind (:m/sec)	3.0	3.0	3.0	3.0	3.0
Precipitation (:mm/year)					
(normal year)	300-500	300-500	300-500	300-500	300-500
(El Nino strong event)	1500-2500	1500-2500	1500-2500	1500-2500	1500-2500

Site Item	San Lorenzo	Santa Rosa	Puerto Cayo	Machalilla	Puerto Lopes
Wind (:m/sec)	3.0	3.0	3.0	3.0	3.0
Precipitation (:mm/year)					
(normal year)	300-500	300-500	300-500	300-500	300-500
(El Nino strong event)	1500-2500	1500-2500	1500-2500	1500-2500	1500-2500

2) Foreshore Conditions at Study Sites

Foreshore conditions are listed below for each site. The coastal areas at Jaramijo, San Mateo and Lingique are very narrow, and only small spaces are highly utilized for residential areas of fishermen mainly with few exceptions.

Foreshore Conditions

Site Item	Jaramijo	Manta	San Mateo	Santa Marianita	Lingique
Foreshore Width (:m)	20	100	0	10	35
Shore Length (:m)	200	3000	200	1000	250
Foreshore Slope	1/14	1/19	1/23	1/7	1/7
Foreshore Material (grain size: mm)	0.2	0.2	0.2	0.3-0.4	0.3
Geology	sand	sand	sand/rock	sand/gravel	sand
River	yes	yes	yes	yes	yes

Site Item	San Lorenzo	Santa Rosa	Puerto Cayo	Machalilla	Puerto Lopes
Foreshore Width (:m)	25	40	70	40	50
Shore Length (:m)	1000	3000	3000	2000	3000
Foreshore Slope	1/11	1/14	1/14	1/5	1/11
Foreshore Material (grain size: mm)	0.2	0.2-0.3	0.2-0.3	0.4	0.2
Geology	sand	sand	sand	sand	sand
River	yes	no	yes	yes	yes

note: Foreshore Width is width in H.W.L.

3) Sea Conditions at Study Sites

Sea conditions are listed below for each site. According to the visual observations, wave heights at Jaramijo, Manta, Machalilla and Puerto Lopez are smaller than the other sites. Above 4 sites are sheltered by the horns or breakwaters, while the other sites are exposed to the wave attacks directly.

Sea Conditions

Site Item	Jaramijo	Manta	San Mateo	Santa Marianita	Lingique
Tide Range (:m)	3.0	3.0	3.0	3.0	3.0
Wave Height (:m)	0.3-0.5	0.5	0.5-1.0	1.0-1.5	1.5-2.0
Wave Period (:sec)	20-10	20-10	20-10	20-10	20-10
Wave Direction	NW	NW	NNW	NW	WNW
Current Direction	E	E	E	N	N
Current	little	little	little	little	little
Sand Drift	little	little	little	little	little

Site Item	San Lorenzo	Santa Rosa	Puerto Cayo	Machalilla	Puerto Lopes
Tide Range (:m)	3.0	3.0	3.0	3.0	3.0
Wave Height (:m)	2.0-2.5	1.5-2.0	1.0-1.5	0.5	0.5-1.0
Wave Period (:sec)	20-10	20-10	20-10	20-10	20-10
Wave Direction	SW	SW	W	W	WSW
Current Direction	N	N	N	N	N
Current	little	little	little	little	little
Sand Drift	little	little	little	little	little

4) Sediment Discharge at Study Area

There are many rivers at study area. Main rivers of study area are shown in Fig.2-5-3. Water currents are not observed except rainy season, but, these rivers cause the sediment discharges by El nino. Sediment discharges are listed below for each site. These rates of sediment discharges are calculated by following formula.

$$\text{rate of sediment discharge} = c * \text{catchment area}$$

This coefficient (c=0.00014) is calculated based on total volume of sediment discharges from Manta and Bravo rivers. The rate of sediment discharge is assumed to be equal to accumulation volume of seabed from 1965 to 1989.

Sediment Discharge

Site Item	Jaramijo	Manta	San Mateo	Santa Marianita	Lingique
Sediment Discharge (:m3/year)	6,000	46,000 (Rio Manta) 8,000 (Rio Bravo)	3,000	3,000	1,000

Site Item	San Lorenzo	Santa Rosa	Puerto Cayo	Machalilla	Puerto Lopes
Sediment Discharge (:m3/year)	3,000	-	42,000	10,000 (Panteros) 3,000	42,000 (Buenavista) 4,000

note: Sediment Discharge = C * Catchment Area
 where C: Coefficient (=0.00014)

5) Sand Drift at Study Area

The sand drifts at Jaramijo, Manta, San Mateo, Puerto Cayo, Machalilla and Puerto Lopez were studied. The volume and directions of sand drifts at these sites are illustrated in fig.2-5-4 together with sediment discharges. These figures of sand drift at each sites are calculated by using the experimental formula. Manta and Puerto Cayo sites have serious problems regarding sediment discharge. Puerto Lopez site seems not to be serious, because this site is located upper side of sand drift.

2.5.3 Socioeconomic Conditions

(1) Population

The present condition regarding population at the study area is shown in Table 2-5-1(1), Fig.2-5-5. The total population is 154,963 and occupies the 11% of the total population at Manabi province. Among these population at the study area, Manta shares the 79%, and Manta area including Jaramijo, Manta and San Mateo shares up to 85% of the study area. The annual growth rate of the study area after the year 1982 is high rate of 3.1%, and in 2005 the population will reach to 283,000. (Table 2-5-2) Above all the population in Manta will increase largely, while the population in the rural areas will have little change in the future.(Fig.2-5-6) The population increase have to be absorbed in the urban areas without new industrial activities.

(2) Artisanal Fishermen

The artisanal fishermen at the study area are shown Table 2-5-1(2) based on the census of the year 1990. This table shows the total number of the artisanal fishermen to be 3,345.

2.5.4 Present Condition of Fishing Villages and Fishing Activity

General features of 10 fishing villages are described as follows. These descriptions are based on the results of reconnaissance survey and information obtained during investigations.

(1) Jaramijo

1) Present Conditions of Fishing Village

a) Location and Environment:

Jaramijo is 10 km north from Manta. The access is by two paved roads, one from Manta and the other from Crucita. The village is surrounded by hills. There are many houses built by bricks, concrete, and wood neighboring the beach. This situation limits the available area for fishing activity.

b) Socioeconomic Factors:

Jaramijo has about 7,000 inhabitants. There are four primary schools and a high school. Fishing is the main source of employment. The village has also a little tourism and some restaurants. Water comes from Manta, Montecristi or Portoviejo and electricity comes from mains. There is a shipyard where 8 middle scale fishing boats are now under building. Jaramijo's community is not so well organized. There is a CPA which has 35 members. The activity of CPA is ordinary.

c) Shore Conditions:

At low tide, the beach is 80m wide with a landing place of 200m long.

d) Major Constraints and Development Options:

The main problem is the instability of marketing. The lack of marketing causes lower prices of fish catches. Fishermen need to have an artisanal fishing port to make the artisanal fishery active.

2) Fishery Activity

a) Fishery Production:

According to the study by Fallows et al. (1990), exist 40 FRP and 100 wooden artisanal fishing boats. The registered number of the industrial fishing boats (P class) is 24 vessels. Major fishing method is floating or bottom long line used with 150 to 200 hooks. Pinchagua (Clupeidae) is used as bait. Regular fishing operation time is night. Major species caught in Jaramijo is pargo (Lutjanidae), corvina (Sciaenidae), murico (Serranidae) and pinchagua. There is no fishing port facilities, and the fishing boats are moored several hundreds meters off the shore line. Landing of catch and supply of consumables for the industrial fishing boats are made in the Port of Manta, adjacent to Jaramijo.

b) Distribution:

Fish caught by fishermen are brought back to the beach and

gutted, and all the guts are sold to the fish meal plants. Sardines caught by small scale purse seiner are sold to fishermen's colleagues to use them as a bait who are operating bottom long line or others.

Fish caught by the fishermen are chiefly white flesh fish and collected by the merchants. The price sold to merchant, for instance, a piece of about 6kg of croaker is as shown 5,000 S/.. The merchants take fish to Manta for factories to be exported, or to other cities as Portoviejo and Guayaquil.

(2) Manta

1) Present conditions of Fishing Village

a) Location and Environment:

Manta is located at northwest of Portoviejo, 37 km away from it, connected by a good paved road. Manta commercial port was built 15 years ago; there are -5 m deep wharf for fish products handling and another wharves for general cargoes, parking and string areas. There is the fishing port neighboring the commercial port, called "La Poza" (it is now sedimented).

The water area between commercial port and fishing port is sheltered by breakwater of commercial port, and is used for anchorage for small sail and fishing boat. At the both sides of the port, there are beaches called "Murcielago" and "Tarqui", These beaches are used as recreational zones by tourists and residents.

Manta also has an airport, which is sometimes used for international lines. There are daily flights to Quito and twice a day to Guayaquil.

There are two rivers "Manta" and "Burro" which join before they flow into the sea at the fishing port. During the rainy season, the Burro's river overflows affect the surrounding neighborhoods of Tarqui Parroquia on occasion.

b) Socioeconomic Factors:

According to the CRM Regional Statistics of Manabi in 1990, Manta has 157,913 inhabitants. It has several big buildings and also well modern houses and downtown. There are several high schools, technical institutes and a university that offers different careers. There are also hospitals, clinic, health houses and all the utilities of such as electricity, telephone, fresh water and sewerage.

Fishing is one of the important activities in the sector of Manta. Among others there are several manufactures such as metal-mechanics, ship builders, processing factories for agriculture products, ice making plants, canning factories etc.

Manta has the council office with a Major as a legal repre-

sentative authority. Adding the Fishing Assistant Secretary's office, there is the office of the harbor master police of migration and foreigners and some consulates. The Central Bank of Ecuador and Banco de Fomento have branches in Manta.

c) Shore Conditions:

The Port Authority manages the commercial port. Manta Port exports the tuna products, around 90% of the country's, using fishing wharf that handles over 1,000 TNR (tons). The landing by artisanal fishery is done using Tarqui beach. Some kinds of fish catches are preserved in freezers of the companies. There are several mechanics workshops which can repair out-board motors.

d) Major Constraints and Development Options:

One of the necessities of the port is a fuel container which once was near the sea and now is out of order. Although there are the ice factories in the city, ice supply is not enough.

Currently Manta has a problem of sea-water pollution in Tarqui beach caused by the discharges of sewage that comes through the Manta river from the pond. This pond has a big area as a reservoir with shallow depth, and sewage water from the city system is gathered for a fine treatment; then the purified water is discharged to the sea. But the capacity of cleaning system is not enough. The Municipal Council is now studying to remove this sanitary problem.

2) Fishery Activities

a) Fishery Production:

DGP maintains Subdireccion Regional de Pesca in Manta for Manabi Province as well as Inspectoria de Pesca. DIGMER has also a captania office in Manta. According to the study by Fallows et al. (1990), exist 317 FRP and 34 wooden artisanal fishing boats. The registered number of the industrial fishing boats (P class) is 78 vessels. These fishing boats are moored in the adjacent closed area of the commercial port. The artisanal fishing boats are composed of mostly lancha or panga and include several FRP small barcos.

Tarqui beach, extending around 3km in the east side in Manta, is used for the landing of catch by the artisanal fishing boats. Fish species that were observed at the time of the field survey were mostly large pelagic fish, which corresponds with the results of the landing survey by INP. Landing is usually made early in morning but observed still in late afternoon.

Most of the industrial fishing boats land catch in Wharf No.1 and No.2 in the Port of Manta. Since the crown height of the wharf is too high, landing and supply by the fishing boats of the depth less than 2 meters force difficult works. For compensating this, several small derricks are installed on the Wharf No.1.

b) Distribution:

Most of fish and shrimp caught by artisanal fishermen is sold to processing companies (Packing and Exporting), fish and shrimp are packed and frozen for export markets. More than 80 per cent of which are exported to overseas and rest catches consumed in local markets. Tuna and sardine are processed to the can for both national and foreign markets. Fish catches bought by the merchants are sold at other cities, such as Porto Viejo, Guayaquil, Quito and other cities in the highland.

(3) San Mateo

1) Present Condition of Fishing Villages

a) Location and Environment:

San Mateo is 12km away from Manta and linked by asphalted road (double way). The road stops outside the village and the village streets are now under construction. Fishermen's houses are built close to the beach, and this limits the area available for landing. The width of sandy beach is very narrow.

b) Socioeconomic Factors:

The village has about 1,400 inhabitants. The village has both a primary school and a high school which function in the same place with different schedules.

Fishery is the only important source of employment, fishery occupies 90% of the No. of economically active population. Fresh water comes from Manta by tank lorry. Electricity is from the main national system. It has a health center with a full-time doctor, dentist and auxiliary nurse. Also there is a private doctor.

There is an office of Port Authorities which fishermen occasionally use for getting fishing boat licenses. CPA's activity is very positive. There are two CPAs. One was formed in 1971 and now has 48 members. The original motivation was to get credit for boats. The meeting is held regularly. There is another new CPA called "Iro. Diciembre." Its original motivation is the development of fishery and giving some help to the fishermen to buy boats, outboard engines, freezers and fishing gear etc.

c) Shore Conditions:

There are no paved road to the sea. The concrete ramps that were built a few years ago are now occupied with boats, fishing materials, and vehicles.

The terminals are basic buildings with weighing scales and ice boxes for storing fish catches. No ice is produced in San Mateo, and it is brought-in from Manta and Portoviejo. There is a new gas station which is working from July 1990 and it sells gasoline 180 S/./litter. There are two small outboard motor repair stores in the village, and also there

is a store which sells spareparts, but fishing gear is available in Manta.

d) Major Constraints and Development Options:

One of the main problems is the loss of village road in the wet season, but this is going to be solved by paving the roads. The supply of ice and water are big problems to be solved.

At present, there are few job opportunities for young people within the community. Fishing environment has to be improved to introduce the new technology.

2) Fishery Activities

a) Fishery Production:

San Mateo is well known as one of the landing spots of large pelagic fish. Major species are tiburon (Alopiidae, Lamnidae), dorado (Coryphaenidae), picudo (Sphyrnaeidae) and albacora (Scombridae). According to the Fallows et al. (1990), exist 178 FRP and 5 wooden artisanal fishing boats. The industrial fishing boat (P-class) is not registered. Six sailing barcos were observed by the study team. Most of the FRP fishing boats in San Mateo are reported to have fish storage box onboard called "vivero" (warren) with dimension of 1500L, 1200W and 800H mm for keeping catch with ice. Major fishing method is long line. Trammel net and small type purse seine are also reported to be used. Long line is reportedly practiced with over 200 hooks attached in 10 to 25m interval.

Fishing sail is set in one to three days term and in case of a few days trip, 4 to 6 pieces of 65kg block ice are loaded onboard together with 2 to 3 plastic fuel tanks of around 30 ltrs capacity. There is no fishing port facilities. The fishing boats are moored several hundreds meters off the shore line, and the front beach is used for landing and supply for these boats.

b) Distribution:

To prevent spoilage of fish from harvest to landing place, fishes are gutted on board and stored with crushed ice if the fishing grounds located more than one day of distance by navigation. However, problem is the space to hold fish on board with such small panga or lancha in order to bring back the maximum fish volume. If there is no time and enough space for gutted at offshore, gutting shall be carried out on beach where there are no fresh waters. The guts and heads are sold to fish meal plants.

Most of the fish caught by the artisanal fishermen is sold to enterprises through the merchants for exportation. Fish catches are distributed to the markets in the surrounding area chiefly Manta, Porto Viejo, Guayaguil and others. The merchants carry the fish by trucks covered with crushed ice

to the marketing areas, processing and packing plants. A little quantity of catches is used as diet for family and also for five small restaurants located in the village.

(4) Santa Marianita

1) Present Conditions of Fishing Village

a) Location and Environment:

Santa Marianita is 6km away from San mateo by an unpaved road, and 18km from Manta. The village is 2km long along the coast.

Unpaved road to the village can be used in the dry season but in the rainy season it becomes not accessible, and then they have to travel by boat to San mateo. There is a road service of maintenance that repairs the roads to the village.

b) Socioeconomic Factors:

Population is under 1,000, and most of them are fishermen. The village has 2 primary schools and 2 churches. Water comes from Manta by tank lorry, and electricity comes from the mains.

Fishery is the most important source of employment. Women on the south part of the village work to extract gypsum from the mountains. At the first day of each month, officers from the navy visit the village to grant the fishing licenses.

c) Shore Conditions:

Landing is done on the beach. The fishing boats are located under a covering of branches (ramada). The width of beach is narrow.

Under the covering branches at the beach there are containers made of concrete to store the fish with ice blocks. There are no motor repair work shop, nor spare-parts stores, and they have to go to Manta. Fuel is sold by the merchants who go to the village for buying the fish catches. Otherwise fishermen have to go to the gas station in San Mateo to buy the fuel.

d) Major Constraints and Development Options:

The main necessities of the fishermen in Santa Marianita are the instability of marketing and the storing rooms to conserve the landings. Another requirement is the access to the village in the rainy season, because that is the only way to get basic necessities, such as fresh water, fuel and food.

2) Fishery Activities

a) Fishery Production:

According to the study by Fallows et al. (1990), exist 30 FRP and 20 wooden artisanal fishing boats. The industrial fishing boat (P class) is not registered. Main species are picudo, dorado and albacora. Long line with around 120 to

250 hooks is dominant fishing gear in this district. Box type fish hold (vivero) was observed in some lanchas. There is no fishing port facilities. Most of the fishing boats are placed on the beach. For landing and supply, the front beach is used.

b) Distribution:

Fish brought back to the beaches are preserved sometimes in the "viveros" with crushed ice or directly loaded on truck of merchants and covered by crushed ice for transport to consumer markets or processing enterprises. There are labors who work for gutting fish at the beach getting about 500 S/., and also some labors who work for carrying big fish from beach to truck of merchants getting 200 S/. for each fish. According to information gathered from fishermen, fish price offered by the merchants are not good for the fishermen, because of the lack of preservation facilities. For instance, present price of Dolphin fish offered by merchant is only 50 S/./pound despite of 150-200 S/./pound in other village to consumer market and lack of preservation facilities forced to selling fish with this lower price.

(5) Liguique

1) Present Conditions of Fishing Village

a) Location and Environment:

Liguique is 12km away from Santa Marianita and 30km at the southwest of Manta. Its access is by a dusty ground road. The village is situated on the top of a small hill. The access to the village is possible only in dry seasons, and in the rainy season the village is isolated.

b) Socioeconomic Factors:

The village has 300 inhabitants. There is a primary school and a church. There is a pipeline of 2.5cm of diameter that brings water from the a mountain of Pacoche to Liguique. Currently, water is very limited because the rainy season is delayed (Drought) and they bring water from San Lorenzo. Liguique is a small community where everyone knows each other. they get together and do many jobs for the village but they do not have CPA.

c) Shore Conditions:

There is only ballasted road that goes to the landing place. Sandy beach is very narrow and steep.

d) Major Constrains and Development Options:

Water comes by the same old system of Santa Marianita (from the mountains of Pacoche), the main problem is the access to the village in the rainy season. People have to go out the village to buy all other provisions at Manta before the rainy season. Otherwise they have to go to San Mateo by boats. This causes the same situation with the fishery, because the vehicles can not take the fish out in the rainy season. So,

they need a freezer or a storage room to preserve the capture.

Liguique has high emigration level due to the absence of job.

2) Fishery Activities

a) Fishery Production:

According to the study by Fallows et al. (1990), only 6 wooden artisanal fishing boats were observed. The industrial fishing boat (p class) is not registered. By the team's latest study, 4 FRP fishing boats were observed. Ice for catch is not usually used onboard in lanchas of Liguique. Principal species are picudo, albacora, corvina, sierra (Scombridae), and dorado. Fishing boats are placed on the beach, where landing and supply are done.

b) Distribution:

Fish caught by fishermen are brought back to the beach and gutted and beheaded at landing place and sold to the merchants who bring the block ice and fuel from the outside of the village. Fishes are carried to Manta by their trucks covered with crushed ice due to the lack of storage facilities and no other way for storage in the village.

(6) San Lorenzo

1) Present Condition of Fishing Village

a) Location and Environment:

San Lorenzo is 5km at southwest of Liguique and 35km from Manta. It has an unpaved road that goes through the mountains and the coast near the San Lorenzo cape. The access is available only in the dry season, because in the rainy season it is muddy, and inaccessible.

b) Socioeconomic Factors:

The population is under 1,000. There is a number of houses but 1/3 of them are empty, because the level of emigration is very high. Only 30% of the inhabitants are fishermen and the rest does agriculture and commerce. The village has a primary school, and a health center with a full time doctor. Water comes from the old system from Pecoche's mountains.

San Lorenzo community is active, and there is a CPA that started from December 1990. The licenses for fishing and for the boats are obtained at Manta or Santa Marianita.

c) Shore Conditions:

There are no ice making plants and the merchants bring the ice when they buy the capture and take it to Manta. Fuel is also brought by them from Manta.

d) Major Constraints and Development Options:

The main necessity is the construction of an ice making plant

and cold room for the storage of the fish catches.

2) Fishery Activities

a) Fishery Production:

According to the study by Fallows et al. (1990), only 15 wooden artisanal fishing boats were observed. No industrial fishing boat (P class) were registered. Main species are picudo, dorado, albacora, corvina, and perela (Serranidae). Bongo is considered here more economic way of fishing practice than lancha with outboard engine. Because of the lack of storage facilities, fuel oil has to be transported from Manta or San Mateo and this increases the operation costs to fishermen. By the team's estimate, the difference of price is considered 20% to 30% more. Ice for catches usually not used onboard in San Lorenzo. The fishing boats are landed on the sheltered beach behind the Cape of San Lorenzo, where catch landing and supply are also made.

b) Distribution:

Fish caught by fishermen bring are brought back to the beach and gutted and beheaded at landing place and sold to 4 merchants who brings block ice and fuel from the outside of the village almost every day. Fish carried to Manta by their trucks covered with crushed ice due to lack of storage facilities and no other way for storage in the village.

In the rainy seasons, fish catches are transported to Manta by sea because of the interruption of the road. The fish prices largely depend on the merchants.

(7) Santa Rosa

1) Present Conditions of Fishing Village

a) Location and Environment:

Santa Rosa is linked to San Lorenzo by an unpaved road of 7km. It is 42km away from the south of Manta. Some houses are built on the hills, some houses on the valleys. There is also another access road along Rio Cana. This road can be used only in the dry season.

b) Socioeconomic Factors:

Santa Rosa has about 400 habitants. There is a primary school and a church. About 20% of the activity population do the agriculture besides fishing. They produce coffee, banana and other products. Water comes by the mountains of Rio Cana from a pipeline of 1" of diameter, electricity comes from the mains.

c) Shore Conditions:

Landing is down on the beach. Merchants go to the beach for buying fish catches by trucks, and they bring ice blocks and fuel from Manta.

d) Major Constraints and Development Options:

The main problem in the village is the access road in the rainy season. Facilities used for fishery such as ice plant, gas station, a workshop to repair the outboards motors are also needed.

2) Fishery Activities

a) Fishery Productions:

According to the study by Fallows et al. (1990), exist 6 FRP and 6 wooden artisanal fishing boats. No industrial fishing boat (P class) was registered. Main catches are perela, cabezudo (Branchiostegidae), corvina, dorado and tiburón. Fishing boats of Sta. Rosa and other districts set sail sometimes to the fishing grounds near Plata Island, which can be sighted from the beach of Sta. Rosa. The fishing boats of Sta. Rosa are placed on the beach while idling, where landing and supply are also made.

b) Distribution:

Fish caught by the fishermen are chiefly white flesh fishes, they sell it to the merchants. Fishermen does not use ice from catch to the landing, the gutted fish are transported to Manta or other cities by their trucks covered by crushed ice. Most of catches are brought into Manta and supplied to different fish plants. A small part of catches is transported to Portoviejo, Guayaquil and others. White flesh fish prices as Reef-Cod are shown price of 400 S/./kg., Croaker 1,000 S/./kg. and King Mackerel 1,400 S/./kg. at the time of survey.

(8) Puerto Cayo

1) Present Condition of Fishing Village

a) Location and Environment:

Pt. Cayo is 26km away from Jipijapa and 71km from Portoviejo. The access is done by a paved road from Jipijapa to Pto. Cayo.

b) Socioeconomic Factors:

Pt. Cayo has about 4,000 inhabitants. Pto. Cayo has two primary schools and a high school. Water comes from the source of Cantagallo (mountains) or from Jipijapa and Portoviejo by tank lorry. Electricity comes from the mains.

The surroundings are not good for agriculture, and fishing is the most important source of employment. The tourism industries is growing rapidly and there are some restaurants. People from Jipijapa and Guayaquil have their houses there to go for holidays. There are two blocks; one is the old Cayo where there are many housing built by people who come from Jipijapa, Guayaquil and other cities for holidays. There is a CPA and its activity is good.

c) **Shore Conditions:**
At low tide the beach is about 100m wide. The landing is done at the beach.

d) **Major Constraints and Development Options:**
The important problem is the instability of the market and fishing port to do the fishing activities efficiently.

2) Fishery Activities

a) **Fishery Productions:**
According to the study by Fallows et al. (1990), exist 20 FRP and 30 wooden artisanal fishing boats. No industrial fishing boat (P class) is registered. Principal species are tiburon, dorado and corvina. Good catch is usually made during the period of November to May. there is no fishing port facilities, and landing and supply are made on the front beach.

b) **Distribution:**
Usually, fishing result of catch by fiber-glass reinforced plastic boats shows about 150-200kg per day operation, and shows that good result is about 600 kg. The fishing boats do not take any ice block for preserving their catches owing to narrow spaces on board and they go fishing by 3 or 4 members per boat. The fish are gutted on the beach and transported by the merchants to other city likely Jipijapa, Portoviejo and Guayaquil.

(9) Machalilla

1) Present Conditions of Fishing Village

a) **Location and Environment:**
Machalilla is linked to Jipijapa by a good paved road (double way) of 45km long and from Puerto Lopez by a paved road of 11km long. The streets in the village are not paved. The village is located in a wide valley, at which the streams appear only in the rainy season. To the east there are small hills and behind them there are some agricultures. The village is known by tourists because of the National Park of Machalilla, a place archaeological and touristic, managed by the Government.

b) **Socioeconomic Factors:**
Machalilla has 2,600 inhabitants. Most of the people are fishermen. Machalilla has four primary schools and a high school. There is a park, a church and a Parish house. There are also a hotel and a restaurant. The village has no sewerage. Electricity comes from the mains and water comes from wells and transported by pipelines to the village. There is an office of the harbor master from Manta. The fishermen get their licenses over there. The fishermen don't have CPA.

c) **Shore Conditions:**
The road to the beach is good. There is ;not a gas-station,

but between Puerto Lopez and Machalilla (besides the road) a gas station is under construction. There are no workshops to repair outboard motors or any spare parts store.

d) Major Constraints and Development Options:

The main necessity is to have fresh water. There is a project to provide water to Machalilla taking it from the Ayampe river.

There is also a project of sewerage. The fishermen need to have a freezer to store catches and maintain the level of prices. they also have the necessity of an urban plan for the village.

2) Fishery Activities

a) Fishery Productions:

According to the study of Fallows et al. (1990), exist 13 FRP and 40 wooden artisanal fishing boats. The registered number of the industrial fishing boats (p class) is 16 vessels. These barcos are moored off a few hundreds meters from the shore line. Most of them are of over 15m in overall length, and from fishing gear outfittings, some are considered to be engaged mainly in purse seine. According to one of the owners of these barcos, all of these barcos are equipped with echo sounder. there is no fishing port facilities, and landing and supply are made on the front beach.

Main species are "white fish" (demersal fish including sharks), pinchagua, caballa (Scombridae), sierra, pampano (Carangidae), jurel (Carangidae), albacora and dorado. Purse seine, long line and trammel net are major fishing methods. For example, net construction of the purse seine is of around 500m in lengthwise and 40m in depth wise with mesh size of one inch. Fishermen in Machalilla set sail usually late in afternoon and return to the beach in midnight.

b) Distribution:

Fish catches are sold to merchants at the beach. Fish catches after gutting process at the beach are loaded on the truck and brought to the consumer markets. In Machalilla, a most important buyer is the factory called "Sardina Real" from Guayaquil who is producing canning products. Some part of catches is directly selling to the fish meal factory in Salango not through merchants. Large fishes caught by bottom long line and gill nets are sold at Portoviejo, Guayaquil and other cities.

(10) Puerto Lopez

1) Present Conditions of Fishing Village

a) Location and Environment:

Pto.Lopez is located 56km southwest of Jipijapa, having a good paved road that goes via Pto.Cayo and Machalilla and it continues to the Province of Guayas. The village is 90km

southwest of Manta. It is built in a large valley between the hills, and is facing the wide bay. There is a headland to the west of the village which gives some protection to the anchoring fishing boats offshore. There are four principal paved streets.

b) Socioeconomic Factors:

Pto.Lopez has about 8,300 inhabitants. Fishermen occupy 25% of the economically active population but tourism is also a growing industry. Pto. Lopez is neighboring the National Park of Machalilla. The village has a hotel, many restaurants and stores.

There are two primary schools, four private schools, one fishing technical high school, a health center with a doctor, a dentist and an auxiliary nurse full time. The water supply comes from a fountain and electricity from the mains. There are the police office, the registration office, the fire station and the Army office.

Pto.Lopez has an office on the fishing licenses. There are three CPAs and have 18, 18, 28 members, respectively. And their activities are very positive.

c) Shore Facilities:

At low tide the sandy beach is about 100m wide and access to the beach is by unpaved roads.

There is not a gas station, but merchants bring fuel to sell at the beaches; there is motor repair workshops but no spare parts store. The merchants transport the capture in trucks with chopped ice from the beach to the consumer markets at the south of Manabi. At the center of the village there is an ice factory but the quantity is not enough. there is not a freezer, nor a cold room in the village.

d) Major Constraints and Development Options:

The fishing activities and marketing seem quite well organized, although ice supplies are not sufficient.

Besides the construction of an artisanal fishing port, the shipyard to construct bigger ships which can go 200 miles offshore, and a cold room within the boat to preserve the fish catches are needed.

There is a project of a shipyard construction in Pt.Lopez with a capacity to build 400 vessels/year, which is going to provide the necessities of the Ecuadorian fishermen. The project's name is SPAMPANI and it has assured the financial part with a Spanish agreement. Its cost is about 35 million dollars.

2) Fishery Activities

a) Fishery Productions:

According to the study of Fallows et al. (1990), exist 61 FRP

and 10 wooden artisanal fishing boats. The registered number of the industrial fishing boats (P class) is 8 vessels. These barco class fishing vessels are moored a few hundreds meters off the beach. By the fishing permit records, these barcos, composed of purse seiners and long liners, are operated not by enterprise but by individual management bodies. There is no fishing port facilities, and landing and supply are made on the front beach.

White fish is reported to be main species and also large pelagic fishes are caught mainly in rainy season. Long line, trammel net and purse seine are practiced. In case of long line, fishing sail is usually set by three times per week and 4 to 6 pieces of 65kg block ice are loaded onboard. It is reported larger barcos are loaded with over 20 pieces of block ice.

b) Distribution:

Most of fish caught by artisanal fishermen are brought back to the landing beach without ice within 24 hours operation. But more than one day operation, they take 4 to 6 ice blocks of 65kg for preserving good quality condition of white flesh fishes. The merchants charge the value of ice on fish value for getting those catches. All those fishes are transported by merchants to different cities of the country covered with crushed ice. Shark fins are commercialized at higher price by the merchants but meats offered at lower price. The merchants coming from other cities and of the village take the fishes to Manta, Jipijapa, Portoviejo and Guayaquil etc. where they have good connected buyers.

(11) Fish Catches Destinations and Transportation

Fish catches landed at 10 fishing villages in the study area are collected by the merchants and distributed to various destinations after sorted into domestic and exports use.

The main destinations of the domestic use products coming from the 10 fishing villages are Manta, Portoviejo, Jipijapa, Guayaquil and Quito including highland area. According to the field survey, it is actual that the supply routes to those consumption places are complicated.

The fish products for domestic consumption are generally distributed as per the demands, the only exception being that most of the products from the 3 southern villages is mainly consumed in Jipijapa.

With regard to exports, the exports products from 3 northern fishing villages and 4 central fishing villages are mainly sent to Manta, while the products from 3 southern villages are sent to both Manta and Guayaquil.

The distribution routes for domestic consumption and exports use products are shown in the following diagram:

Guayaquil and Jipijapa are the consumer markets as well as the exports bases. The transportation by roads are available from

each fishing villages to consumer markets except Santa Marianita, Liguique, San Lorenzo and Santa Rosa. Sometimes, in the rainy season, the road between San Mateo and Santa Rosa becomes inaccessible because of the unpaved road. The distances from the fishing villages to consumer markets and exports bases are shown in Table 2-5-3.

(12) Cooperatives of Fishermen

According to MICIP's information, 101 Cooperative Pesqueras Artesanales (hereinafter referred to as 'CPA') had been formed in the artisanal sector between 1974 and 1988, and 2,413 fishermen joined to those CPAs.

Manabi Province has 24 CPAs legally recognized and 688 members, of these CPAs 9 CPAs being in the study area. (Table 2-5-4)

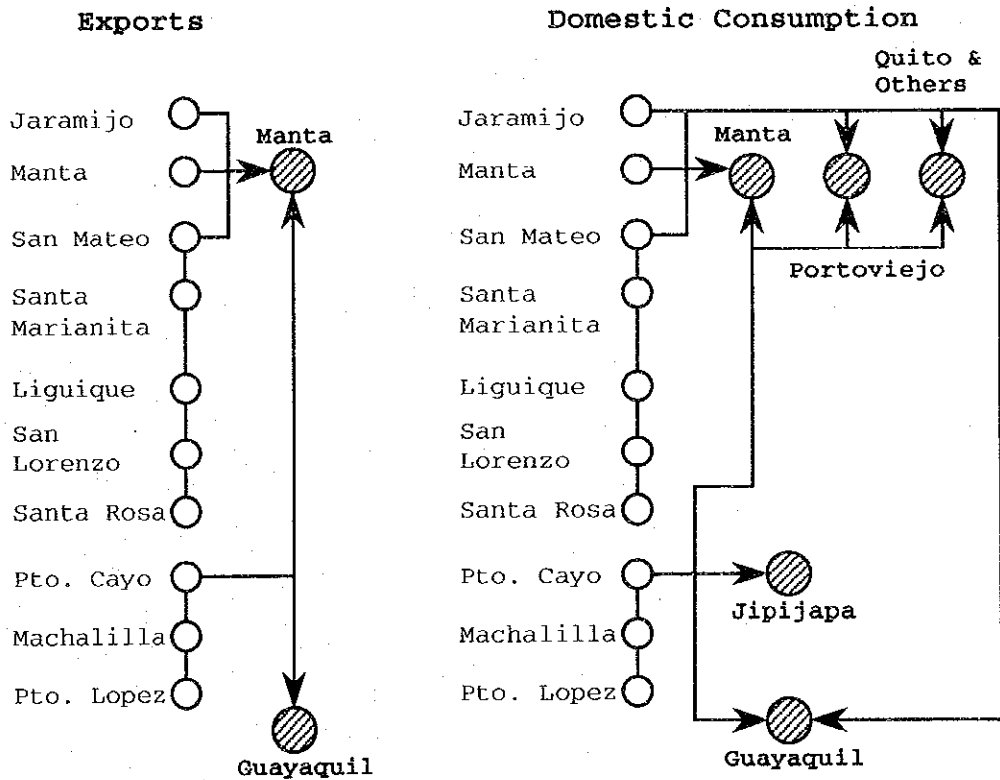
But, among these CAPs, only several CPAs are currently active, and only 10% or more of fishermen are associated with CPAs.

According to the hearings, the reasons are such as:

- a) Some fishermen are afraid of dependency to CPAs.
- b) Others do not want to deliver the quota to the CPAs funds necessary for the equipment used commonly.

MICIP promotes to organize CPAs and gives CPAs various assistance such as technical training, administrative seminars and orientations, etc., except financial aid.

Ministry of Social Wellbeing also plans to organize artisanal fishermen positively in the view point of upgrading the fishermen's livings.



Distribution Route

2.5.5 Fishermen's Household Management

As stated in the previous section, one of the features of the fishery situation in the project sites is that, except Manta, there exist no substantial fishery infrastructure such as fish landing, conservation and other production supporting facilities. Especially in case of Ligüique, Santa Rosa and other isolated districts, there are no oil supply facilities nor ice making plant. As these lack of supplies make the expenses for oil and ice higher than other districts, the introduction of large-sized vessel and utilization of ice have been less progressed than more facilitated other districts. Another feature is that large difference in the number of barcos exists among some of the sites even under the same conditions. For example, San Mateo and Machalilla have not remarkable difference from the aspects of infrastructure and natural conditions, Machalilla holds much more barcos of a large size than San Mateo.

Such regional difference by the sites can be presumed to appear also as the different conditions to affect the fishery management by fishermen's households. In order to make more detailed study, Manta and San Mateo from the north and Machalilla and Puerto López from the south were selected among 10 project sites, all of which holds large number of fishing vessels. Based on the results by the socioeconomic survey for the fishermen's household which has been carried out with this study, these four sites were given the further examination on the regional difference in the household's management for the fishery production.

Target interviewees have been selected subject to two conditions; 1) the head of a household engaged in the artisanal fishery and, 2) for assessing fishermen's attitude to a planned fishing port, the owner of fishing vessel or the master fisherman. Total number of the sampled households was 155 samples; 50 in Manta, 30 in San Mateo, 25 in Machalilla, and 50 in Puerto López. Among these 155 households, 91% samples have been found to have the ownership of fishing vessel(s).

Due to the sampling method employed for this study with the conditions mentioned above, the socioeconomic survey does not include the fishermen who are not a ship owner nor a master fisherman; they account for the majority of the total working population in the fishery production sector. It should be noted therefore that regional features in the fishermen's households stated in this section may not show a general view of the socioeconomic situations surrounding the fishermen and fishery production in these project sites.

(1) Fishing Methods

Fishing methods have been interviewed with the principal species targeted. It is observed that, in Manta and San Mateo located in the vicinity of Manta, the long line operation by lanchas is active, and that in Machalilla the purse seine fishery is more active than in other sites.

By another study, it has been found that most of the purse seiners in Machalilla are owned by the individuals who obtain the industrial fishing permit. In this socioeconomic survey, the households engaged in the purse seine have been sampled, which accounted for around 80% of the total samples in Machalilla. With the study on the fishing permit records, number of the purse seiners is estimated as 30% or less of the total of fishing vessels in this site. Following study results in this section do not therefore outline the general fishery view of Machalilla. However, useful information on the fishery management body in an individual level has clearly been derived.

Table 2-5-5 Fishing Methods

Districts	Major Fishing Methods	ER
Manta	Long line targeted to large pelagic fish. Gill net in part.	96%
San Mateo	Mostly long line for large pelagic fish. Pole and line in part.	100%
Machalilla	Mostly purse seine aimed to small pelagic fish.	88%
Pto.López	Selected by aimed species. Mostly gill net and long line. Partly purse seine.	100%

Remarks: ER(Enumerated ratio) means a ratio of effective answers to a total sample number in the sites

(2) Landing Volumes

Annual landing volumes, with breakdowns divided to domestic consumption and abandoned portion, have been interviewed. In all of the districts, the principal species are albacora, dorado, picudo, and tiburón. Most of the households also catch demersal species such as corvina, lenguado and bagre. In Machalilla where the households operating purse seine are sampled to a large extent, the principal species are small pelagic fish such as pinchagua, carita, etc.

Table 2-5-6 Average Annual Landing Volume and Others

Descriptions	Manta	San Mateo	Machalilla	Pto.López
Landing volume (ER)	31,674 Kg 100 %	42,080 Kg 100 %	959,260 Kg 100 %	58,549 Kg 100 %
Domestic consumption (ER)	871 100 %	485 100 %	2,172 100 %	919 100 %
Abandoned (ER)	901 20 %	489 34 %	- 0 %	- 0 %

Remarks: Interviewed results for 1990.

The above table shows much larger landing volume in Machalilla than in other three districts. The difference seems simply to be of difference of fishing method that dominates in the surveyed districts. As the principal species is small pelagic fish in Machalilla and large pelagic fish in other districts, it is difficult to compare them from the aspect of landing volume. Meanwhile, domestic consumptions show a remarkable difference by the districts. Average numbers of the family members are 7 persons in all of the four districts. In general it can hardly be explained such a remarkable difference of fish consumption per capita in fishing villages, especially where, in this case, the sampled households are located in the same area, south Manabi Province. The study results shown here therefore are almost unexplicable, but one possibility should be that the answers to a question made as "consumo domestico" may include considerable volumes given to and consumed by the relatives of the sampled households.

(3) Buyers of Catch

The buyers who had bought during past two years the catch fished by the sampled households have been interviewed. The results of this survey show the consignment is made to middleman or wholesaler in all cases. There is no case that indicates the direct consignment to the retail markets. The results are classified by the numbers of the interviewees to mention single trader; plural traders; not to name but reply just "varios" or "comerciantes", and are shown in the following table.

Table 2-5-7 Buyers of Catch

Descriptions	Manta	San Mateo	Machalilla	Pto.López
Single trader	42 %	63 %	16 %	54 %
Plural traders	10	33	8	18
Not specified	48	3	76	24
(Enumerated ratio)	100 %	100 %	100%	96 %

San Mateo shows the highest ratio (63%) in the group of the households that mentioned single trader, and Machalilla shows the lowest (16%). Such difference shown in a form of consignment should be noted.

(4) Gross Fishery Income

The above features in the fishery production or difference in the management scale of fishery result in a large gap in the amount of fishery income. As indicated in the next table, an average annual gross fishery income of the sampled households in Machalilla is markedly larger than in other districts. This does not result from the regional difference but from the difference

of fishing operation or the scale of fishery management as stated previously; in Machalilla many households sampled practice the purse seine.

Table 2-5-8 Average Annual Gross Fishery Income
(Unit: thousand Sucres)

Descriptions	Manta	San Mateo	Machalilla	Pto.López
Gross fish- ery income	33,418	50,900	204,622	33,320
Enumerated ratio	100 %	100 %	100 %	98 %

Remarks: Includes estimate based on annual landing volumes.
US\$ = 920 Sucres (January 1991)

(5) Fishery Expenditure

Such gap in the gross fishery income also turned out to the difference in the fishery expenditure. Production costs and depreciation expenses for fishery relevant assets have been interviewed. Question on the production cost covers crew's share, maintenance costs, rents for boat and cold storage, fuel oil cost, consumable fishing gear, ice expence, interest, insurance, and other miscellaneous expenses. The results of the study are shown in the following two tables.

Table 2-5-9 Average Annual Fishery Expenditure
(Unit: thousand Sucres)

Descriptions	Manta	San Mateo	Machalilla	Pto.López
Production cost	13,121	16,603	83,447	21,365
Enumerated ratio	62 %	60 %	73 %	60 %
Depreciation	1,159	N.A	3,734	718
Enumerated ratio	94 %	0 %	96 %	88 %

Table 2-5-10 Breakdown of Production Cost
(Unit: thousand Sucres)

Descriptions	Manta	San Mateo	Machalilla	Pto.López
Crew's share	5,195 39.0%	6,669 40.2%	61,196 73.3%	10,480 49.1%
Hull maintenance	562 4.3%	790 4.8%	1,458 1.7%	378 1.8%
Machinery maintenance	530 4.0%	923 5.6%	2,043 2.4%	431 2.0%
Rents	3 0.0%	360 2.2%	0 0.0%	800 3.7%
Fuel oil	2,920 22.3%	5,169 31.1%	5,680 6.8%	4,107 19.2%
Lub. oil	1,158 11.6%	1,668 10.0%	2,098 2.5%	1,420 6.6%
Fishing gear consumables	669 5.1%	712 4.3%	1,985 2.4%	1,398 6.5%
Ice	737 5.6%	0 0.0%	4,244 5.1%	1,054 4.9%
Interest	-	-	2,450 2.9%	-
Insurance	-	-	327 0.4%	-
Others	987 8.1%	311 1.8%	1,966 2.5%	1,297 6.2%
Total	13,121 100.0%	16,603 100.0%	83,447 100.0%	21,365 100.0%

From the study results on the breakdown of the production costs, all of the districts show higher ratio of crew's share and fuel oil cost. As far as the above table indicates, fuel and lubricant oil costs and ice expenses which are susceptible to the availability of infrastructure, do not show the regional difference so much, contrary to the prediction. Less ratio of the fuel oil cost in Machalilla may result from use of diesel engine in the purse seiners.

It seems that there exists some difference, by household or districts, in a sharing way of catch proceeds between a vessel owner and crews. According to an owner of lanchas in Manta, he shares equally with the crews the rest of the proceeds from

which fuel oil cost is deducted. The sharing ratio is considered to depend on the regional customs or whether an owner engages in fishing onboard. Estimated sharing ratios by the districts are shown in the following table, which are based on the results of the socioeconomic survey.

Table 2-5-11 Estimated Sharing Ratio
(Unit: thousand Sucres)

Descriptions	Manta	San Mateo	Machalilla	Pto.López
A. Gross fishery income	33,418	50,900	204,622	33,320
B. Fuel oil cost	2,920	5,169	5,680	4,107
C. Lubricant oil	1,518	1,668	2,098	1,420
D. A-(B+C)	28,980	44,063	196,844	27,793
E. Crew's share	5,195	6,669	61,196	10,480
F. Sharing ratio (E x 100/D)	18%	15%	31%	38%

From the above gross fishery income and fishery expenditure, net fishery income and the ratio of expenditure to gross income were estimated. The results are shown in the following table.

Table 2-5-12 Net Fishery Income and the Ratio of
Expenditure to Gross Fishery Income
(Unit: thousand Sucres)

Descriptions	Manta	San Mateo	Machalilla	Pto.López
Annual net fishery income	19,138	(34,297)	117,441	11,237
Expenditure ratio to gross income	43%	(33%)	43%	66%

The gap of net fishery income between Machalilla and Puerto López, as shown in the above table, extends to around ten times. This may directly reflect the difference in the scale of the fishery management. In this socioeconomic survey, assets and liabilities have been also interviewed, but enumerated ratio of interview on savings and debts were generally low. Disposable income could not be obtained therefore in most of the sampled households including such "high income" households as shown in Machalilla. It is hardly possible to evaluate the level of disposable income or amount of assets by these study results, although as indicated in the level of income and expenditure, it is most probable that financial abilities of the households in Machalilla that practice the purse seine are considerably higher than those in Machalilla or other districts that practice other fishing operations.

(6) Households Expenses

The following table shows the average of numbers of family members, amounts of income tax, and household expenses. Enumerated ratio for numbers on family member and households expenses is almost 100%, and one for tax is 77%.

Table 2-5-13 Average Households Expenses and Others
(Unit: thousand Sucres)

Descriptions	Manta	San Mateo	Machalilla	Pto.López
Family member	7 persons	7 persons	7 persons	7 persons
Annual income tax	32	40	178	38
Annual households expenses	1,463	619	2,587	1,962

As shown in the above table, in Machalilla where the largest average of the net fishery income is shown, the average amount of tax and households expenses are also highest among all of the districts. Meanwhile, in San Mateo, despite its relatively high gross fishery income, the average of households expenses shows a remarkably low amount. If these survey results on the income and expenditure describe the actual situation as expected, it may be possible that the methods of to borrow and repay debts or loans in San Mateo are different with those in other districts, and that by this reason which may lead to the lowered average disposable income directly or indirectly, when considering that San Mateo shows the highest ratio in the group of the households that mentioned single trader and that enumerated ratio on the depreciation was zero.

Minimum monthly wage for the private sector in Ecuador has been revised to 48,000 Sucres in January 1991. It should also be noted that an opinion was reported in a newspaper to claim that the monthly households expenses in the urban area were estimated at least 160,000 Sucres and to say that the revised minimum wage was still not enough.

(7) Improvement of Production Facilities and Others

In the socioeconomic survey, opinions of the head of the households was sampled on what is required at present to increase the fishery income. The choices of answer were not prepared in the questionnaire to know the opinions as widely as possible. The results are shown in the following table.

In the four districts, strong hopes were observed for the improvement or expansion of production facilities such as fishing vessels, engine and fishing gear. Following this, opinions to

expect the financial support were also observed. It may be an interest of a further study that in Machalilla a higher ratio for further expansion of the production facilities were observed where more households practice the purse seine than other districts.

There are some regional difference in the ratio of negative answers which do not show any opinion nor wish for increase of the fishery income.

Table 2-5-14 What is Required or Expected to Increase the Fishery Income

Descriptions	Manta	San Mateo	Machalilla	Pto.López	Total
To improve or enlarge;					
Fishing vessel:					
FRP boat	3 %	0 %	0 %	0 %	3 %
Enlargement	1	1	5	14	21
Others	4	0	0	1	5
Engine	2	1	1	3	7
Fishing gear	1	0	5	4	10
To expect or reform;					
Finance	1	3	5	3	12
Distribution	0	1	0	0	1
Fishing port	1	0	0	2	3
Others	1	1	0	0	2
No opinions	19	12	1	6	38

Remarks: Percentages are derived by dividing applicable answers by total sample numbers. Fractions down decimal point are rounded.

(8) Manta and Puerto López

As far as the sampled households are concerned, there seems not to exist a remarkable difference in the scale of fishery management between Manta and Puerto López. However, in the ratio of fishery expenditure to gross fishery income, a considerable gap is observed between these two districts; that is to say, Manta is 43% and Puerto Lopez is 66%. This gap is examined in this section, assessing three factors, crew's share, fish price and fuel oil cost which are presumed major conditions to bring out the gap.

a) Crew's share

The average sharing ratio of the proceeds for crew in Puerto López is estimated as 38%. This is much higher than the ratio 18% in Manta. This difference should be noted from an aspect of socioeconomic or regional custom features. It is however not possible to rationalize any way to directly lower the sharing ratio, which apparently decrease the ratio of fishery expenditure

in the households managing fishery production.

b) Fish prices

Based on the results of the socioeconomic survey, prices of fresh fish sold from the sampled households to the fish traders are discussed. Prices of three principal species during 1990 are shown in the following table in the form of averaged maximums and minimums and also of standard variations of minimum prices.

Table 2-5-15 Prices of Fresh Fish in Manta and Pto.López (1990, unit: Sucre/Kg)

Districts:	Discriptions:	Albacora	Picudo	Dorado
Manta	:1 Sample numbers	43	41	41
	2 Averaged maximums	3,628	1,040	804
	3 Averaged minimums	1,295	619	279
	4 Standard variation of minimum prices	507	182	83
Pto. López	:1 Sample numbers	29	27	28
	2 Averaged maximums	1,002	679	605
	3 Averaged minimums	753	489	297
	4 Standard variation of minimum prices	558	142	212

As shown in the above, the prices in Manta are higher than in Puerto López except the minimum price of Dorado. In case of Albacora, the maximum price in Manta shows 3 times higher than in Puerto López and minimum price 2 times. Meanwhile, the price of Dorado, fishing season of which is around January to May in both districts, falls down generally in high season and is reported to go down sometimes to 50 or 60 Sucre/Kg. Averaged minimums of the price of Dorado are almost same in both districts, however the standard variation of these is higher in Puerto López than in Manta. The more variations of prices at a period of decline means the more risky management of fishery production.

Such difference of fish prices between Manta and Puerto López seems to be resulted from the conditions of fish distribution which differ between both districts, but not from the conditions of fishery production. Considering there exist no remarkable difference between these two districts on the required time for land transportation to Portoviejo nor to Guayaquil, the readiness in fish distribution or producers' market at the landing spots and the availability of fish conservation facilities are presumed to be major conditions to affect the price difference between these two districts.

c) Fuel Oil Costs

In the socioeconomic survey, annual numbers of fishing trips and consumption volumes of fuel oil per voyage have also been inter-

viewed. Based on these survey results, annual consumption volumes of fuel oil are estimated and shown in the following Table together with estimated fuel oil costs.

Table 2-5-16 Average Fuel Oil Consumption and Cost

Descriptions	Manta	Pto. López
Outboard engine	44 vessels	27 vessels
Diesel engine	3	20
Gasoline consump'n	28,000 ltrs.	30,000 ltrs.
Diesel oil "	20,000	33,500
Gasoline cost	3,025,000Sucres	4,056,000Sucres
Diesel oil "	1,312,000	4,175,000

Based on the above table, unit price of fuel oil in Manta is estimated as 108 Sucre/ltr for gasoline and 65 Sucre/ltr for diesel oil, and in Puerto López 135 Sucre/ltr for gasoline and 125 Sucre/ltr for diesel oil. If these estimates meet the actual price trend, the average unit cost for fuel oil in Puerto López is around 25% and 200% higher than Manta for gasoline and diesel oil, respectively.

It should be noted that the regional difference of the basic materials price for fishery production may greatly affect the fishery management as shown in case of the above two districts, and also that such a regional gap may be removed by developing required economic infrastructures.

2.5.6 Current Problems of Artisanal Fishery

(1) Fishing Industry and National Economy

The agriculture and fishery sector is one of the main industries in Ecuador and its sectorial products occupies the 17% of the total GDP in 1987, of which the fishery sector occupies 4%. In economically active population by sector, the agriculture and fishery sector composes the high shares of 34% of the total, of which the fishery sector composes 8%.

The fishery sector plays the important roll especially in Manabi as well as Ecuador. Its products occupies the 17% of the total GRP and the employment in its sector shares 26% of the total.

The potential importance of the fishery as a regional industry has been increasing over the past few years under the circumstance of a falling oil production level.

Therefore, the fishery in Manabi is requested to contribute to the development of the national and regional economy in Ecuador by providing opportunities for new employment, promoting the exports and regional development, and by increasing average income levels.

1) Increase of the Employment Opportunities

Since 1985 the unemployment rate in Ecuador has remained above 10% and reached 12.3% in 1988. In the past, unemployment concentrated at the local areas but recently unemployment increases in the urban areas. Therefore, it is necessary to promote the employment coping with the increase of the population.

According to the National Socioeconomic Development Plan (1989-1992), Ecuadorian Government is undertaking the policy of the expansion of the economy as one of the strategies to develop the economy, and set the development goal as 3 % of the annual growth rate at the GDP, as 3.8 % at the agriculture and fishery sector.

The agriculture and fishery sector is expected to contribute to the stable growth of the economy. Especially in Manabi, fishery sector is expected to play the roll for the increase of the employment through the development and expansion of the fishery.

2) Increase of the Income

The GDP per capita of Ecuador is 950 US\$ (1988) and decreases since 1985. The average individual income of Ecuador is in low level same as the GDP per capita.

In the National Socioeconomic Plan, the following policies are adopted.

-Progressively to incorporate to the productive activity to the poor population, which has been estimated to be in 55% of the total population, so that at the end of this century it won't be over 25%.

-To improve the access to natural resources and capital to overcome the levels of extreme poverty in the rural populations.

The average individual income in Manabi is estimated only 63% of the average individual income in Ecuador.

The three important sectors in Manabi, agriculture and fishery, commerce and manufacturing occupy about 74% of the total GDP. In manufacturing sector, the value of production per employee as well as the numbers of employees per factory in Manabi is on the second place and is predominant in Ecuador comparing with other provinces.

Assuming the production in commerce as average in Ecuador, the low productivity of the agriculture and fishery causes the low GDP per capita in Manabi. The total amounts of the fishery products are large, but the productivity of the fishery is low level because of its primitive fishing methods.

Therefore, the artisanal fishery in Manabi should promote the upgrade of the productivity and contribute to increase of the individual income in Manabi.

3) Promotion of Exports

Ecuador became an oil exporting country in 1972 and has been exporting shrimp since 1980. Total exports of shrimp and other fishery products amounted to 392 million dollars in 1990, making it the next most valued export to oil and bananas. The annual export value figure for 1990 amounted to 2,714 million dollars, of which oil made up 46%, bananas 17%, shrimp 15%, and coffee 4%. All together these products account for 82% of the total. In 1990, the Ecuadorian exports figure exceeded the import figure by 1,003 million dollars. However as the country is still suffering from a heavy overseas debt, further promotion of exports industries is necessary.

According to the National Socioeconomic Development Plan, the following policies are adopted.

-To set up the basis to overcome the actual dependency of the economy regarding the oil industry.

-To readjust the process of industrialization by selective substitution of imports and to improve the production of exports.

Furthermore, taking into consideration that the fish products by artisanal fishery are consumed increasingly in USA and Europe, the artisanal fishery is expected to contribute the promotion of exports through the stable supply of fish products and the high quality.

4) Regional Development

Emigration is larger than immigration in Manabi. Urban areas such as Guayaquil have constituted the center of attraction for the flow of migrants from Manabi, but recently unemployment increases also in the urban areas.

In the investment program of the National Socioeconomic Development Plan, the projects forming the necessary infrastructures are planned in the view points of the balance of the regional development and the development of the national resources.

The trunk road between Manta, Portoviejo and Guayaquil has been already constructed with branches to fishing villages except Santa Marianita, Liguique, San Lorenzo and Santa Rosa. There are no problems concerning the transportation from fishing villages to consumer markets.

Therefore, the investment to the artisanal fishery sector and the formation of the distribution system incur the construction of the industries concerning the fishery, generate the employment and contribute to the regional development.

(2) Fishing Resources

there are many cases of the fishing activities by the non-licensed fishing boats and it becomes the obstacles for Government administration to carry out the fishery resources control and coordination. Enforcement of the above would require cooperation and dialogue with the fishermen themselves for every aspect of government administration, including resource investigations, the making up of administrative controls and administrative supervision. At the present stage however, an organization to represent the fishermen as a whole, still is not available.

The above factors also make it very difficult to collect basic fishery products data such as the fishing population, the number of boats in operation, catch tonnage and production tonnage, and are preventing any form of concrete legislation from being established on an annual or regional basis. It will be necessary to establish a fishing resource investigation and research body.

It has been pointed out in a previous sea resource survey that control of the development of demersal fishing is necessary. A major survey of pelagic fishing resources has yet to be carried out, but the results of another minor survey suggest that there is still room for further development of pelagic fishing resources.

(3) Production Levels of Fishing Industry

The anchorage area has not been established yet for the artisanal fishing boats. Because of this, the fishing boats tend to anchor (depending on the weather and sea conditions) in the calm areas or land at the beaches, thus monopolizing the surrounding beach area. For example, up to 200 boats usually anchor in the area near the breakwater or neighboring the harbor's waterway in Manta. Although the majority of the boats are small sized fishing boats, there are also a few FRP Barco boats, middle scale wooden boats as well as some long liner and round hall netting boats. Most of these are under five tons (Lancha, Panga) and are used by the artisanal fishermen.

The small scale fishing boats usually land their catch on some natural beach. The middle scale boats do the same as well, although the catches have to be transferred to a small boat for landing. The fish landing requires a lot of human labor and is most inefficient in terms of productivity.

Refueling and replenishing the boats with water are also very inefficient, time consuming operations due to the non-existence of pumping facilities on the natural beaches. Many fishing villages such as Lingique, Santa Rosa, San Mateo and Machalilla even lack refueling and watering facilities near the fish landing places.

Although much of the landing of fish takes place in the morning, it is sometimes carried out during the day (see the boat arrival time chart). The fish are then sorted and gutted on the beach--eventhough there are not the appropriate facilities available--and in some cases are sold on the spot.

Such operations conflict with recreational beach usage in such tourist resort areas as Manta and Puerto Lopez. The operations are also a source of beach pollution in the areas. A general plan for overall beach usage will be necessary to solve this problem.

No measures for the hygienic handling of the fish are taken from the time the fish are caught to the time they are landed. Due to the limited loading space of the fishing boat and the restraint of the ice usage (price, available quantity), the ice is not generally used for transportation of fish between the fishing grounds and the landing places. There are no facilities for the hygienic processing (fresh water washing) of fish on the shore either. This consequently leads to an increase in the fisherman's personal consumption levels of the fish as well as lower selling prices.

Floating longliner fishing by outboard-powered Lancha boats is definitely the most common method of fishing presently carried out in Manabi (especially in the southern part) by the artisanal fishery. Over the past few years fishing has tended to be carried out at the same place and at the same season, largely due to the limitations of the Lancha's sea-going performance. Generally speaking, the artisanal fishery (in other countries in the world) catch small volumes of a wide variety of fish, but most kind of fishing carried out in the area surveyed is limited to small numbers of large marine products such as the common dolphin, marlin and skipjack.

At present, the fishermen of Jaramijo, Manta and San Mateo go as far as the waters off Puerto Lopez or Federnales to fish whenever their catch is insufficient.

(4) The Fishery Products Distribution System

According to the results on the fishing households, the artisanal fishermen sell their fish catches through a specified single

buyer or plural buyers in the cases more than 50% in Manta, San Mateo and Pto.Lopez except Machalilla.

Of those who sell through a buyer (or buyers), 63% of those in San Mateo, 54% of those in Puerto Lopez and 42% of those in Manta sell their catches through the same buyer every time.

The fact that the fishermen have the few choices with the buyers prevents them from taking advantage of a competitive market, causing a loss in potential profits. In San Mateo in particular, fishing households are generally poorer than other villages due to the conditions of brokerage being stricter than in other villages.

Fishermen are under obligation to sell their products to the buyers at a pre-arranged price being provided with fuel, ice and other materials in return. Under the fisherman/ buyer relationship, the fisherman has no way of gaining access to market information such as the preferred size and quality level which prevents an effective matching of supply and demand.

As the fishermen do not have any form of cold storage facilities, they have to depend on the buyer's decision on the selling price and conditions of sale. A certain amount of wastage also occurs due to the irregularity of purchases by the buyers. When this happens, the fishermen have no choice except self-consumption or disposal.

Problems concerning quality control also exist within the distribution stage. In every villages, the fishes are gutted and sold right on the beach. During the process, the amount of ice used is insufficient to maintain the freshness of the fish. The fish is then placed into boxes on the beach and is sometimes stored there if the amount of fish is too small to be transported economically. (This is because of freight is calculated on a per trip basis)

Fish sold on the local market is usually low in quality and freshness. The prices of different lots of the same type of fish also vary depending on the amount supplied. In order to expand national consumption in the future and to maintain a steady supply of fresh fish, it will be necessary to establish a complete and stable system of supply. This may be achieved by promoting consumption through advertising, expanding and establishing the secure distribution routes, and by establishing proper cold storage facilities.

An increase in demand for fishery products in advanced countries will give Ecuador an opportunity to increase the exports of fresh fish caught by the artisanal fishery. The present increase in exports of yellow tuna, merlin and common dolphin to America, Europe and Asia will lead to further demand in the export market for these and other types of fish. The amount of yellow fin tuna exported is now 19 times what was four years ago.

However, under the present distribution system the fishermen

have to rely on the buyers for provisions of ice, which limits the amount of fish that can be sent at any one time. This, and the fact that the catch quantity is irregular, makes it impossible to reserve air freight space, which further makes regular supply difficult to achieve.

(5) Fishery Household Business Operations

The extent of business operations of the fisheries households varied widely according to the results of the social economic survey. Many of the households surveyed shows that the fishermen borrow production facilities (boats, nets) and operational capital from some of the buyers on the condition of paying them back with a regular proportion of the catch.

The artisanal fishermen have available to them an official investment and operational capital financing system on the part of the Banco Nacional de Fomento and the Fundacion Manabita de Desarrollo y Estudios Tecnicos. Although these financial institutions have granted loans on many occasions before, the survey results indicate that the artisanal fishermen are not satisfied with the institution's services due to low loan ceilings and the high rate of interest. The FUMDETEC institution mentioned above even makes the condition that borrowers take a special course explaining in detail the conditions of payment and personal account keeping. This the banks claim is necessary so that the fisheries industries workers have a knowledge of bank accounts and interest prior to the loan being granted. In other words, the existence of such a system suggests a low level of knowledge of banking procedures among the fishing industry workers.

As a means of ending buyer domination of the fishermen, it will be necessary to establish a fisherman's organization capable of selling their fishery products on a joint sales. Most of the CPAs can not provide the kind of services that are expected to them, because many of the present CPAs are suffering from a lack of financial capital and handling facilities.

CHAPTER 2 TEXT FIGURES
TEXT TABLES

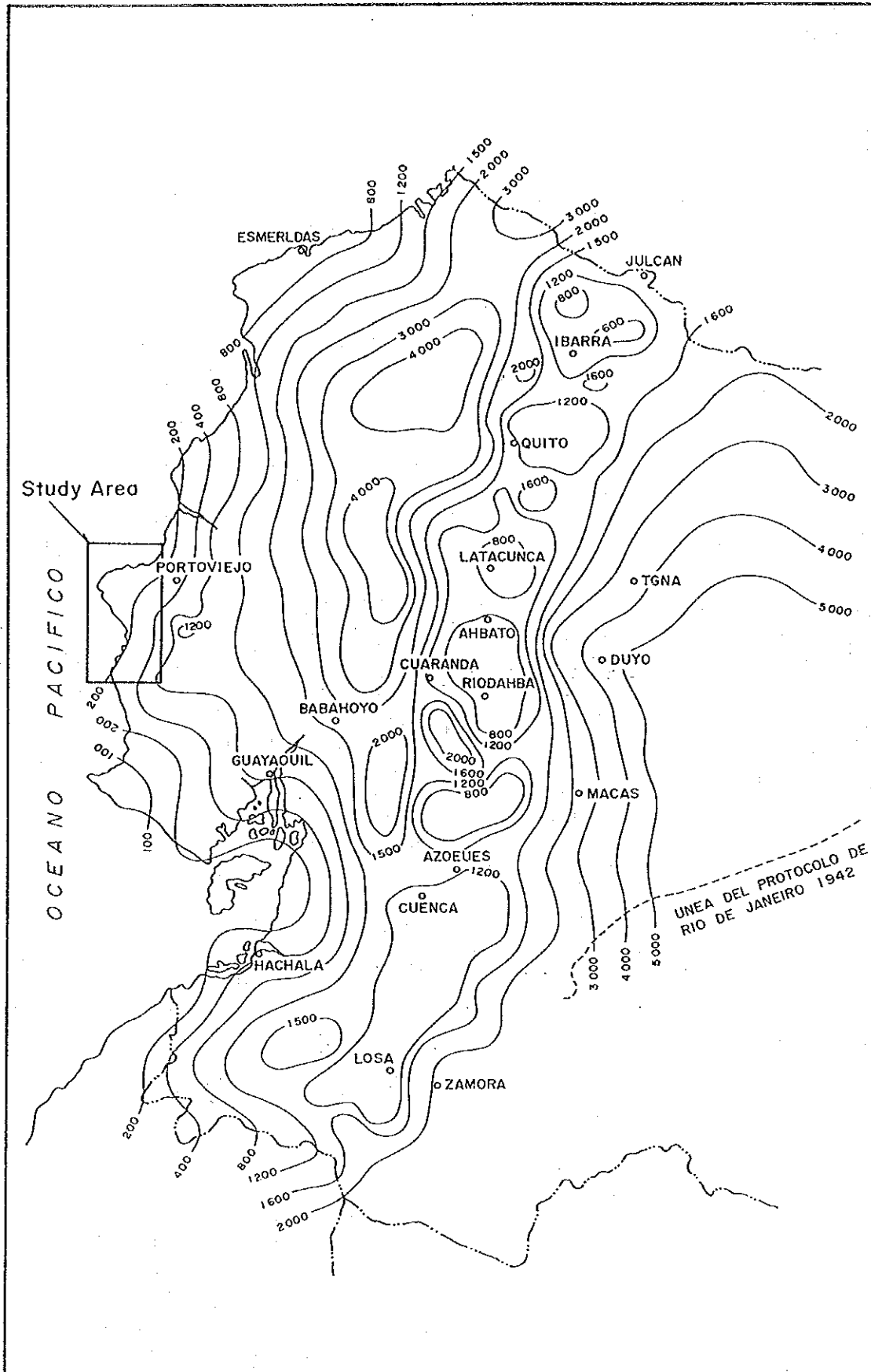


Fig.2-1-2(1) Distribution of Precipitation (1982)

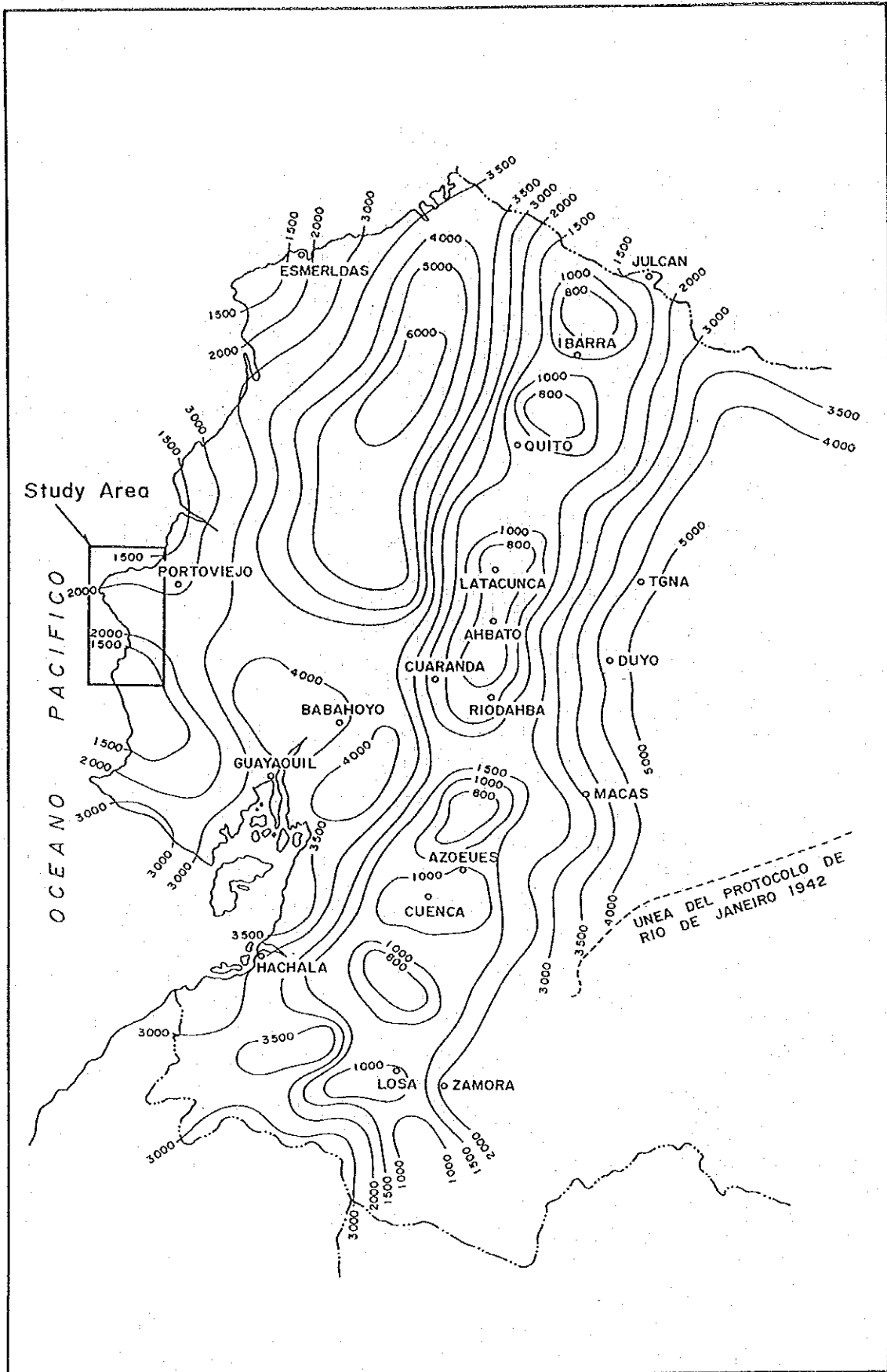


Fig.2-1-2(2) Distribution of Precipitation (1983)

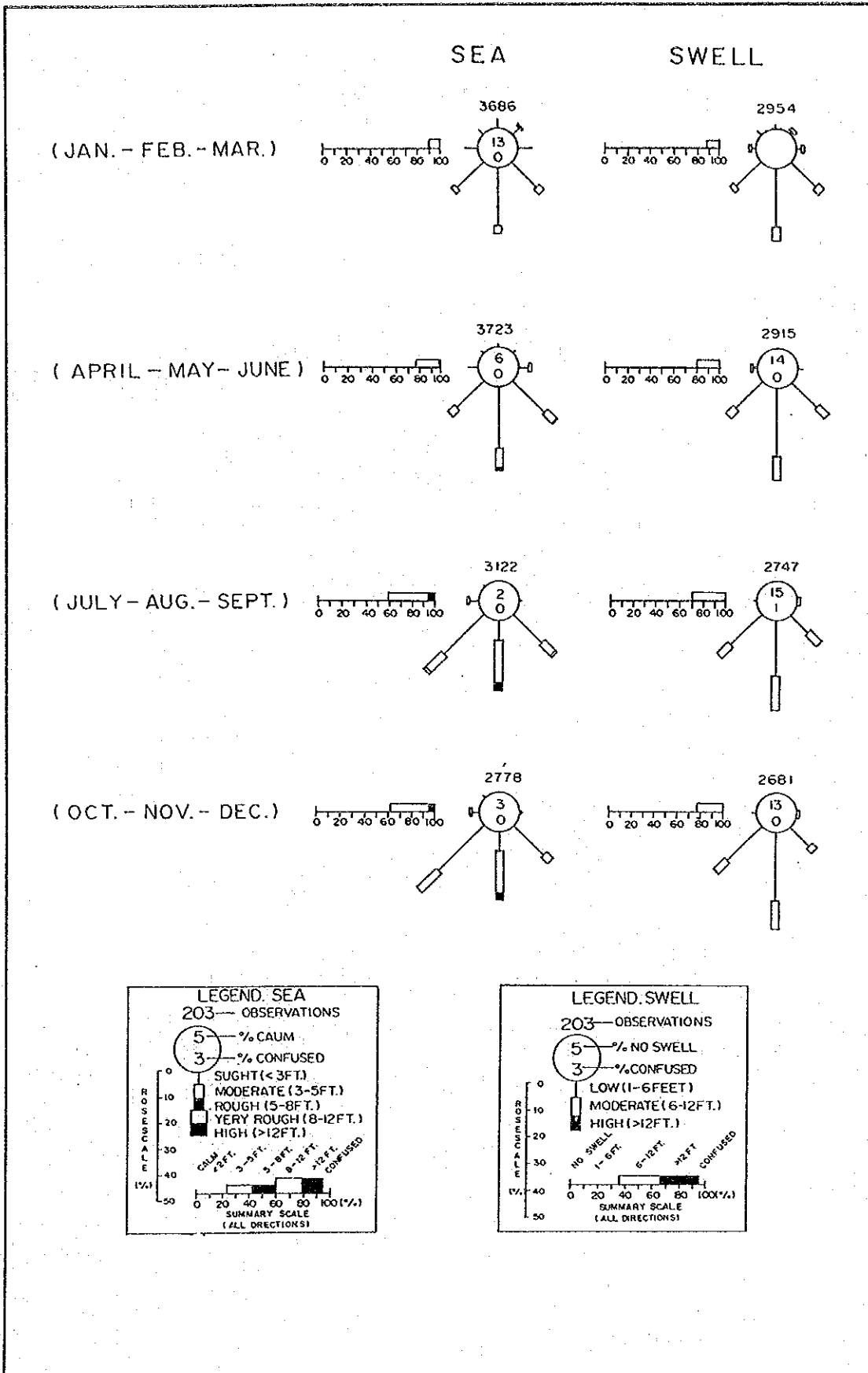


Fig.2-1-4 Wave Height and Direction at Ecuadorian Sea (US Navy)

PRECIPITACION EN GUAYAQUIL

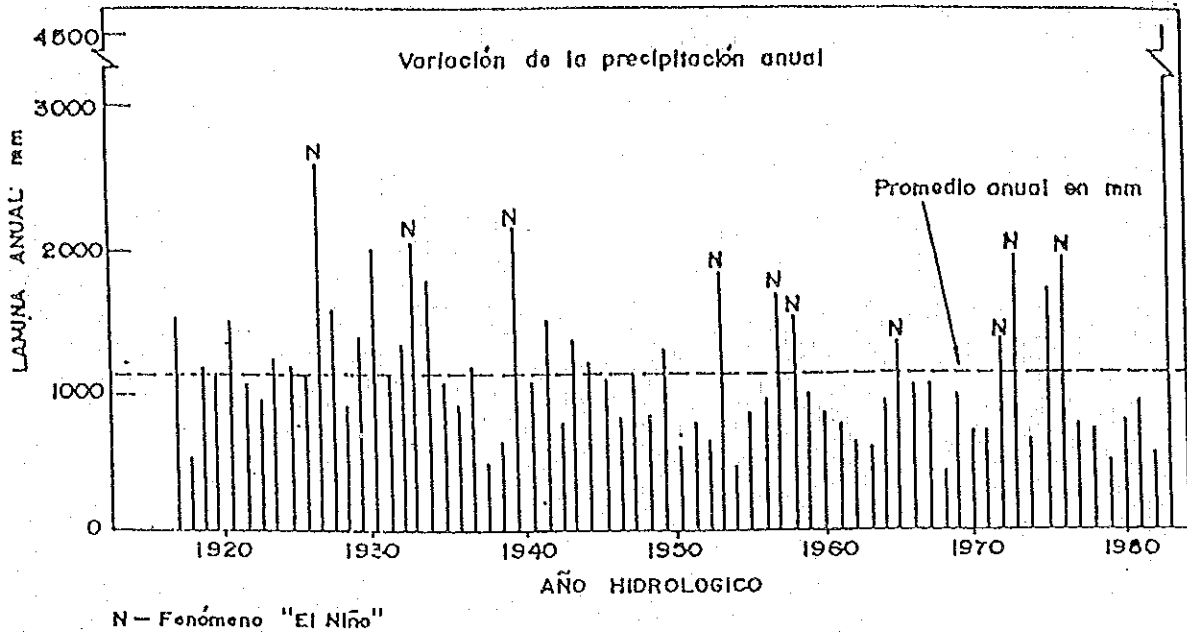


Fig.2-1-5 Precipitation at Guayaquil

N= EL NINO phenomenon years

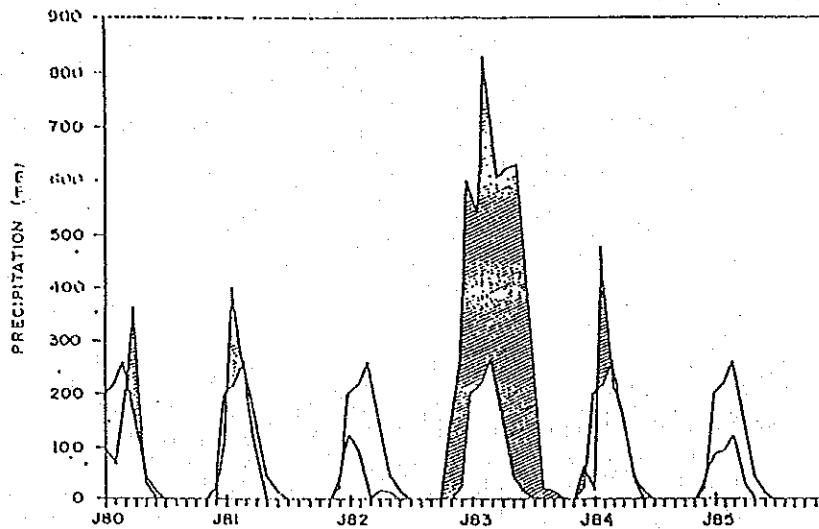


Fig.2-1-6 Deviation of Monthly Precipitation at Guayaquil

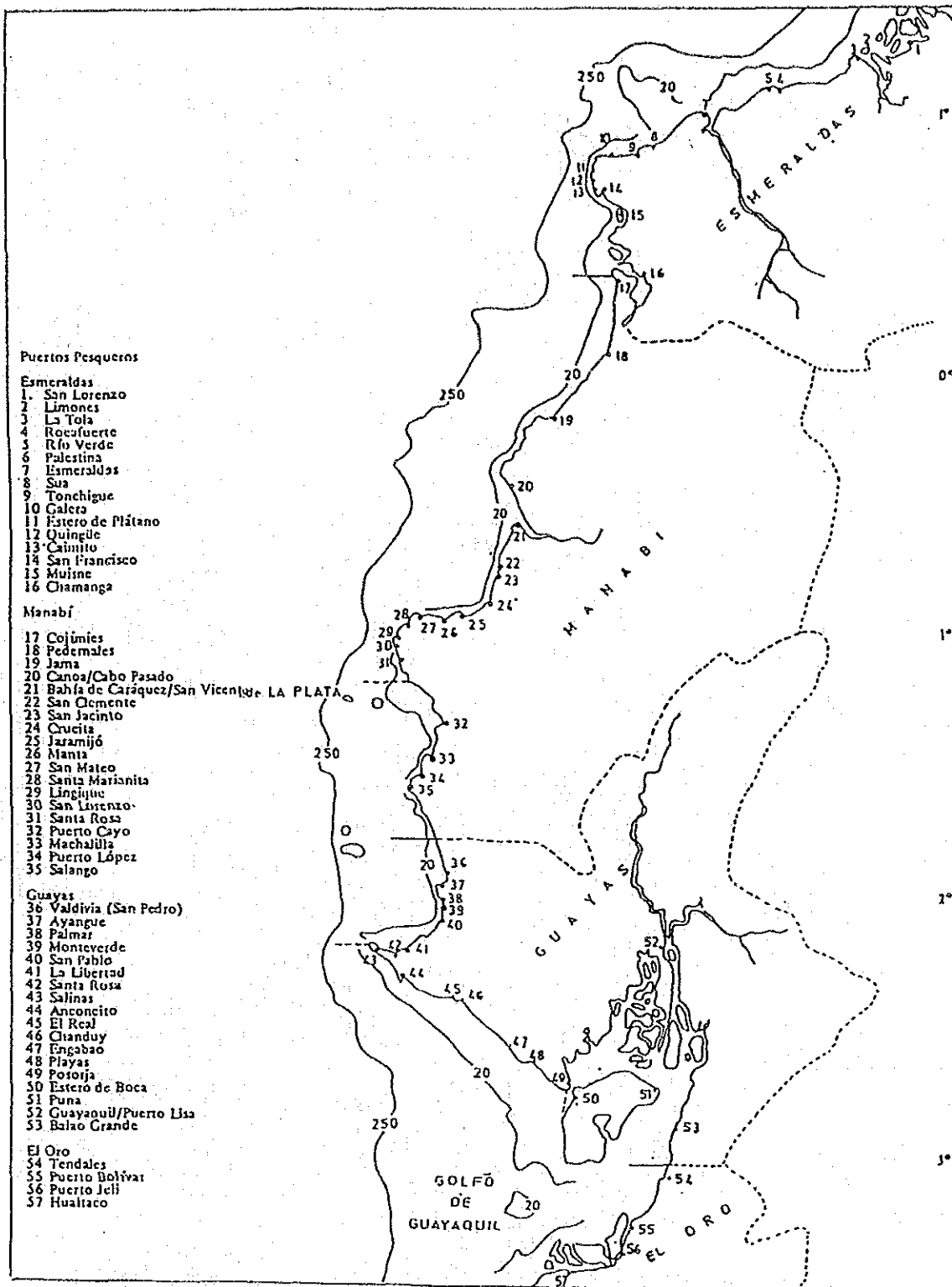


Fig.2-5-1 Principal Artisanal Fishing Ports

