

Table II.1.1 Socio- Economic Indicators (1986-1992)

	1986	1987	1988	1989	1990	1991	Unit: RM 1992
Population (million)	16.1	16.5	16.9	17.4	17.8	17.6	-
Growth rate (%)		2.48	2.42	2.96	2.3		
GDP (Mil RM)	57,752 (100)	60,863 (100)	66,303 (100)	72,079 (100)	79,155 (100)	85,923 (100)	93,264 (100)
Growth rate (%)	1.2	5.4	8.9	8.8	9.8	8.6	8.5
Agriculture	12,348 (21)	13,216 (22)	13,933 (21)	14,767 (20)	14,821 (19)	14,836 (17)	15,070 (16)
Manufacturing	12,111 (21)	13,734 (23)	16,151 (24)	18,089 (25)	21,323 (27)	24,628 (29)	28,207 (30)
Mining	11,571 (20)	11,553 (19)	12,406 (19)	13,456 (19)	14,168 (18)	14,770 (17)	14,627 (16)
Construction	2,354 (4)	2,077 (3)	2,133 (3)	2,380 (3)	2,844 (4)	3,271 (4)	3,712 (4)
Transport/communication	3,851 (7)	4,055 (7)	4,412 (7)	4,859 (7)	5,447 (7)	5,999 (7)	6,578 (7)
Others	15,516 (27)	16,223 (27)	17,259 (26)	18,519 (26)	20,542 (26)	22,410 (26)	25,062 (27)
GDP Per Capita (RM)	3,587	3,689	3,923	4,142	4,447	4,882	-
Growth rate (%)		2.9	6.3	5.6	7.4	9.8	-

Remarks:

- 1) Figures for 1991 are estimates from Economic Report 1991/92 except population.
- 2) Figures for 1992 are forecasts Economic Report 1991/92
- 3) Figures in parentheses refer to percentages.
- 4) In 1978 constant prices.
- 5) Population figures of 1986-1990 are estimates except for 1991 which is based on Population & Housing Census 1991.

Source:

- 1) Economic Report 1991/1992, Ministry of Finance, Malaysia
- 2) Population figure for 1991 from Population & Housing Census 1991, Department of Statistics

Table II.1.2 Achievement and Target in Fisheries Sector

	Production (MT)			Annual Growth Rate (%)	
	1985	1990	1995	5MP (actual)	6MP (target)
Marine	575,000	830,000	984,000	7.6	3.5
(Deep sea)	(18,300)	(100,000)			
Aquaculture	51,000	75,000	113,000	7.9	8.4

Remarks:

- 1) Figures in parentheses refer to share of deep sea landings.
- 2) Productions of 1985 and 1990 are actual.
- 3) Production of 1995 is target in Sixth Malaysia Plan.

Source: Sixth Malaysia Plan (SMP) 1991-1995, GOM

2. Fishery Resources and Fish Production

2.1 Fish Production in Peninsular Malaysia

As shown in Table II.2.1, fish production volume in peninsular Malaysia shows a slight increase from 1987 to 1990. Particularly conspicuous is the rapid growth in fish production on the east coast, in comparison to the west coast where growth in fish production has been at a standstill. Although there are no major changes in the number of fishing boats on both the east and west coasts of the peninsula, as shown in Table II.2.2, it is notable that on the east coast, large motorized fishing boats have increased rapidly and small fishing boats have decreased. As indicated in Table II.2.3, the number of non-motorized fishing boats is decreasing substantially and are being replaced with motorized boats.

Fishing boat owners are aggressive in investing in modernized equipment for their vessels and the use of new technology such as hydraulic net rollers, installation of refrigeration pipes within fish storage facilities, Global Positioning System (GPS) mechanisms for maintaining safety standards during navigation, and oval-type otter boards are becoming prevalent. The number of fishermen is decreasing as result of modernized equipment (Table II.2.4).

2.2 Fish Production in the East Johor

Kuala Sedili, Mersing, and Endau located in east Johor developed into fish landing sites because they are located along the rivers flowing into the South China Sea. Near these landing sites, there are good fishing grounds with dense shoals of fish which are suited to offshore fishing and the level of the fishing industry is high in this area.

Growth in fish production was low from 1988 to 1990. In addition, as shown in Tables II.2.5 to II.2.7, the total number of fishing boats has remained the same. However, large fishing boats of 70 tons have increased rapidly. Despite the increased investment in large fishing boats, the efficiency in fish catch has dropped; and many of the boat owners expressed their concern that the volume of their fish catch did not cover the expense invested in the boats.

2.3 Fish Production in the Mersing District

(1) A Summary of the overall area of Mersing

The total fish landing volume of east Johor in 1990 was approximately 75,000 MT (Table II.2.1). The fish landing volume of the Mersing district comprised about 60 percent of this total volume or 45,050 MT (Table II.1.8).

In the Mersing district fish is landed at the three fishing bases; two located on the Endau and Mersing Rivers and third at Penyabong on the coast. Tables II.2.9, II.2.10, and II.2.11 show separate data on fishing gear, fishing boat gross tonnage, monthly fish landing volume for 1990 of all three fishing bases. As indicated in these tables, fish landings are concentrated at Endau. The lean season is during the monsoons which are from December to March and the peak season runs from March to October for all three fishing bases.

Trawling is the main form of fishing carried out in the Mersing district, followed by purse seine fishing. Artisanal fishing is also carried out on a small scale, in addition to other traditional forms of fishing using gill nets, dip nets, rod and line, and cages.

The fish landing volume drops due to the monsoons which hamper the operation of small fishing boats. Most petty fishermen catch high priced fish and in contrast, the fish catch of large fishing boat operators using trawl nets and purse seines mostly consist of abundant, low priced fish. The coexistence of these two types of fishing in this district is prominent.

(2) Penyabong

Penyabong is a fish landing site which is supported by petty fishing unlike Mersing and Endau, and it is mainly composed of small class A fishing boats (under 25 tons). In 1990 the fish landing volume was about 1,063 MT and comprises only about two percent of the total fish landing volume of the Mersing district (Table II.2.9).

In many instances, traditional petty fishing takes advantage of the ecological fluctuations and distribution of the fish during spawning, growth, and migration; and fishing is carried out during the non-monsoon months. In contrast, fishing is permitted during the monsoon season for small trawlers, in order to protect the petty fishermen who can not use traditional fishing gear during this period. However, a major drawback to class-A trawlers is the over fishing of resources and it is believed that trawling is potentially damaging to production of coastal fishery resources.

(3) Mersing

Although the traditional form of petty fishing is also popular in Mersing, as in Penyabong, modernized fishing is flourishing in Mersing. Fishing boats utilizing GPS mechanisms, hydraulic net drums, and oval-type otter boards have been introduced within the past two to three years. The port at Mersing is also the arrival and departure point for tourist boats visiting Tioman and the other offshore islands. These tourist boats have been given priority to the jetty on the Mersing River and there is a tendency to discourage fishing boats from using the jetty. In addition, fishing boats larger than 70 tons must utilize the high tides when departing or arriving due to the shallow and narrow river mouth, thus decreasing fishing efficiency. Therefore, trawlers using the Mersing fish landing site are no larger than 40 tons. Fishing boats larger than 70 tons land their fish on the Endau River. Due to these natural constraints on boat tonnage, Mersing is a suitable base for small and medium size fishing boats (Table II.2.10).

(4) Endau

The fish landing site at Endau is concentrated along the Endau River bordering Johor and Pahang state. The completion of a connecting bridge across these two states has given the region access to the markets in Singapore and Kuala Lumpur by way of the highway which runs through the east coast of peninsular Malaysia. With such an access to these two large markets, the sale of fish landed at this site is guaranteed. The mouth of the river is wide and deep in comparison to the sites at Kuantan and Mersing which makes Endau suitable as a fishing port; and in recent years Endau River has begun to develop as a fishing base for large fishing boats (see Table II.2.11).

2.4 Fish Species in the east coast and Mersing District

The major species of fish landed on the east coast of peninsular Malaysia are not only round scad and sardine caught in large quantities, but also high priced fish such as cuttle fish as well. On the east coast the former are caught by purse seines and the latter is harvested by trawling nets.

In classifying the major species of fish according to fishing boat tonnage (Table II.2.12), only 15 percent of the top ten fish species landed are caught by fishing boats of 10 tons or less, engaged in petty fishing. However, 40 to 50 percent of the top ten fish species listed in the table are harvested by large fishing boats of 10 tons or more. Hence, the larger boats determine the fish species harvested. In analyzing the ratio of the top ten fish species which comprise the entire fish crop, approximately 90 percent is landed by trawlers and about 100 percent is harvested by purse seiners. In the Mersing area where trawling is the

major form of fishing, the primary fish species harvested are thread fin, cuttle fish, yellow banded scad and prawns.

2.5 Fishing Effort

There are major differences in fishing effort according to fishing method, boat tonnage, season, etc. General trends in fish catch volume of the Mersing District are shown in the following page.

Fishing Effort According to Tonnage (1991)

	Class A	Class B	Class C	Class C2
Trawl				
Trips/year	124.0	35.0	38.4	34.0
Days/trip	1.0	5.1	5.7	6.5
Days/year	124.0	179.0	219.0	221.0
Purse seine				
Trips/year	104.0	97.0	114.4	-
Days/trip	1.1	1.2	1.3	-
Days/year	114.0	116.0	148.0	-

Source: DOF, Mersing

In contrast to purse seiners, the number of days out at sea by trawlers are longer. The greater the tonnage, the longer the number of days out at sea, whereas size is irrelevant in the case of purse seiners, where fishing expeditions are one day trips.

2.6 Trash Fish and Quality Control of Fish

(1) Trash fish

The key to developing the fishing industry is to reduce the volume of trash fish and increase the volume of food fish. The ratio of trash fish in the fish landing volume of the Mersing district in 1990 is given in Tables II.2.14 and II.2.15; and a summary is shown below according to trawlers and purse seiners.

	Class A	Class B	Class C	Class C2
Trawlers	74.3%	60.8%	65.5%	59.9%
Purse seiners (east coast)	0.3%	0.0%	0.0%	4.6%

In contrast to purse seiners whose ratio of trash fish is insignificant, the ratio is 60 percent of the total fish catch volume for boats using trawling nets in the study area. The underlying cause for this phenomenon is that trawling is an indiscriminate form of fishing

which catches all the fish in complete disregard for the special characteristics of the fishing grounds.

Prohibiting trawling in shallow coastal waters (within 12 miles), protects the fish during hatching, spawning, and maturation stages. Moreover, the trash fish ratio of class-A trawlers is high because of poorly selected fishing gear.

An analysis of trash fish species brought to a fish meal plant in Endau, harvested by a class-A boat, was carried out in this survey. The species and percentage are listed in Table II.2.16. About 40 percent of the trash fish identified in the analysis are under-sized in commercial value in comparison to fish landed by trawlers listed in Table II.2.13. As shown in Photo II.2.1, the fish is undersized. The species identified are marine catfish, cuttle fish, goat fish, selar scad, yellow trevally and ray. The under-sized species identified in the photographs are Kerisi, and other economically valuable fish. These under-sized fish in the trawl catch further illustrates the indiscriminate fishing of small and juvenile fish.

(2) Quality control of fish

Improvements in fish quality lies in the handling methods used on board the fishing boat. By constructing a fish pond on the deck of the boat and sorting the fish according to species and size and storing them in fish boxes at low temperatures is a better handling method. In addition, fish must be washed carefully and immediately upon harvesting, and kept in sea water. Upon entering the port, the deck must not be washed down with river water, as this will contaminate the fish.

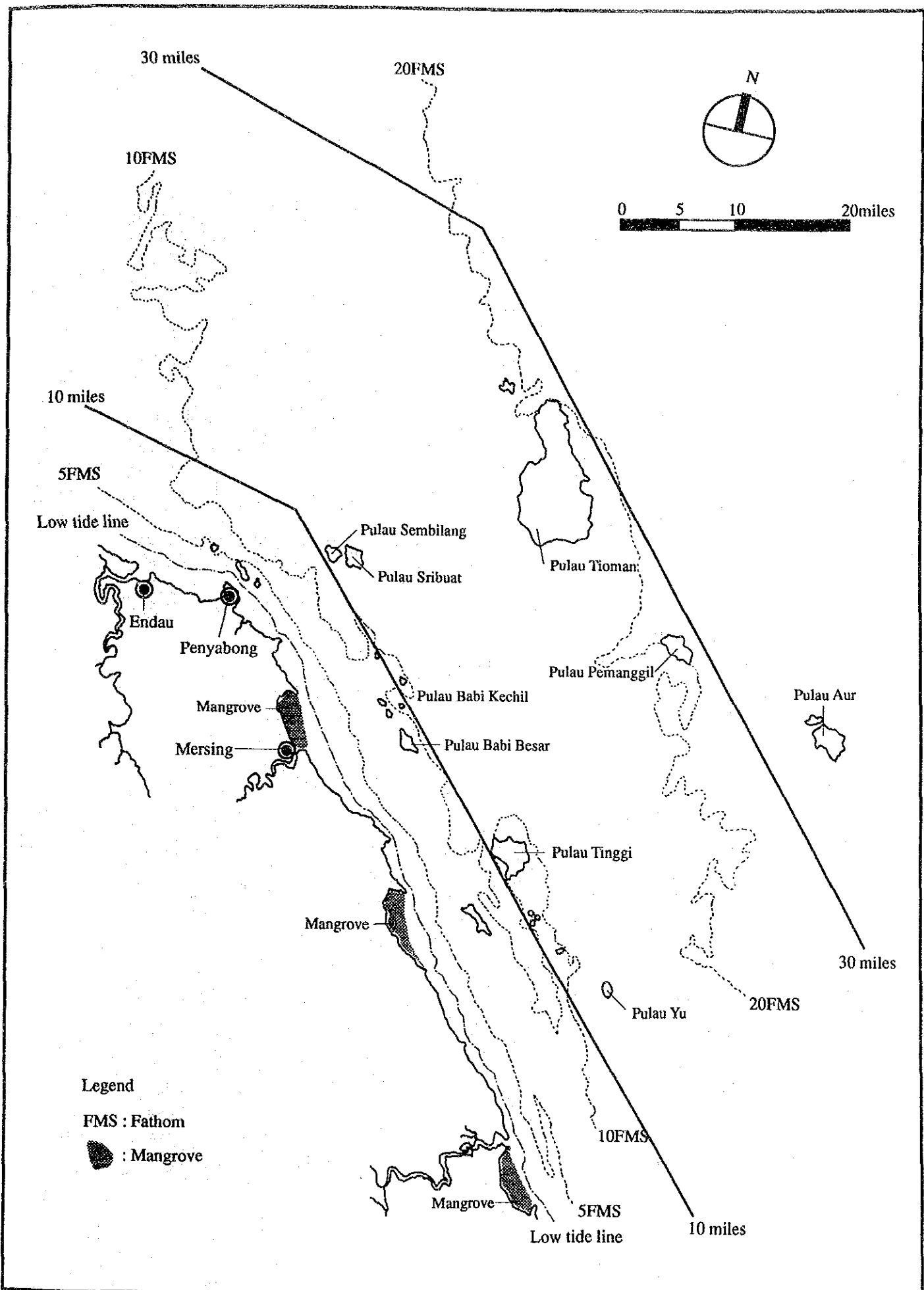


Fig. II.2.1 Map of Fishing Ground in Mersing District

GOVERNMENT OF MALAYSIA
 THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF
 FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA
 JAPAN INTERNATIONAL COOPERATION AGENCY

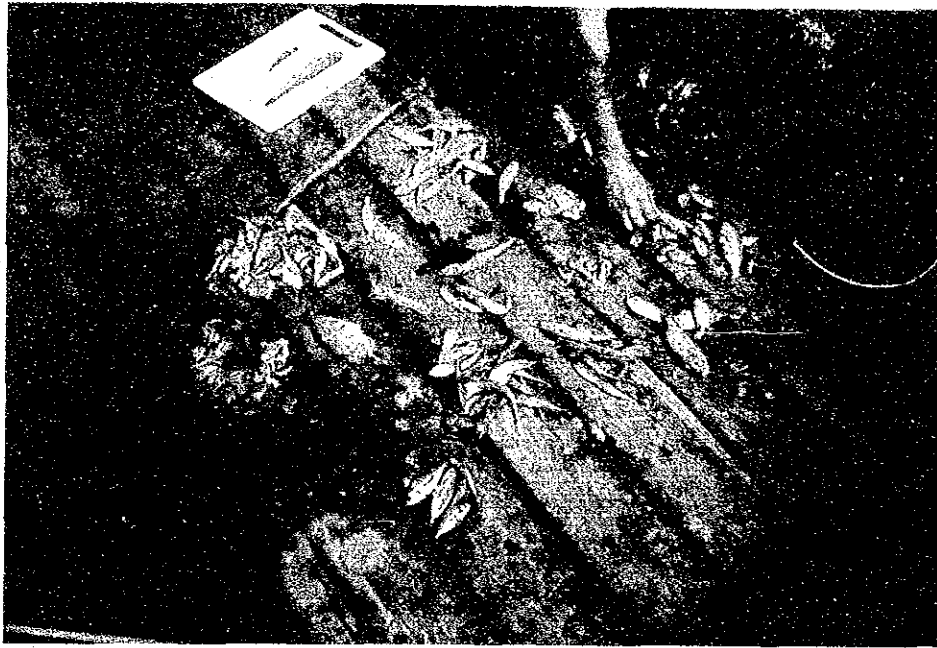


Photo II.2.1 Trash Fish Sampled in Study Area

Table II.2.1 Marine Fish Landings in Peninsular Malaysia (1986 - 1990)

Area	Unit: 1000 MT				
	1986	1987	1988	1989	1990
1. West Coast	324	500	430	489	510
2. East Coast	122	241	264	258	309
(1) East Johor	-	36	68	77	75
(2) Others	-	205	196	181	234
Total	446	741	694	747	819

Remarks: Including trash fish.

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.2 Number of Licensed Fishing Boats in Peninsular Malaysia (1987-1990)

Area	Unit: Boats			
	1987	1988	1989	1990
1. West Coast	15,840	15,209	17,347	16,997
2. East Coast	6,298	6,132	6,132	6,140
(1) East Johor	1,555	1,555	1,533	1,520
(2) Others	4,743	4,577	4,599	4,620
Total	22,138	21,341	23,479	23,137

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.3 Fishing Boats by Type of Engine in Peninsular Malaysia (1986-1990)

Type of Engine	Unit: Boats				
	1986	1987	1988	1989	1990
Non-powered	986	886	749	806	779
Out-board	4,861	6,430	5,832	7,146	7,029
In-board	14,626	14,882	14,760	15,507	15,326
TOTAL	20,473	22,198	21,341	23,459	23,134

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.4 Number of Fishermen with Licensed Boats in Peninsular Malaysia (1986-1990)

Race	Unit: Persons				
	1986	1987	1988	1989	1990
Malays	34,269	33,815	32,386	35,907	34,719
Chinese	21,357	21,643	21,367	22,443	21,364
Indians	3,826	5,120	4,530	4,230	3,718
Total	59,452	60,578	58,283	62,580	59,801

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.5 Number of Licensed Fishing Boats with In-board Engine in Peninsular Malaysia
(1988-1990)

Boat type	Tonnage	Unit: boats		
		1988	1989	1990
Class A	25 tons less	12,486	13,095	12,964
Class B	25 to 40 tons	1,015	1,069	1,041
Class C	40 to 70 tons	943	932	897
Class C-2	70 tons up	316	411	424
Total		14,760	15,507	15,326

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.6 Number of Licensed Fishing Boats with In-board Engine in East Coast (1988-1990)

Boat type	Tonnage	Unit: boats		
		1988	1989	1990
Class A	25 tons less	4,388	4,278	4,170
Class B	25 to 40 tons	289	308	322
Class C	40 to 70 tons	306	311	320
Class C-2	70 tons up	149	218	231
Total		5,132	5,115	5,043

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.7 Number of Licensed Fishing Boats with In-board Engine in East Johor (1988-1990)

Boat type	Tonnage	Unit: boats		
		1988	1989	1990
Class A	25 tons less	633	609	605
Class B	25 to 40 tons	107	110	111
Class C	40 to 70 tons	176	175	165
Class C-2	70 tons up	37	44	69
Total		953	938	950

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.8 Marine Fish Landings by Fishing Gears in Mersing District (1990)

		Unit: tons						
Gears	Area	Jan	Feb	March	April	May	June	July
Trawl	Penyabong	113	93	88	36	49	52	54
	Mersing	880	635	960	881	1,000	913	977
	Endau	1,727	1,217	2,388	2,304	2,563	2,653	2,761
	Sub-Total	2,720	1,945	3,436	3,221	3,612	3,618	3,792
Purse-seine	Penyabong	0	0	0	0	0	0	0
	Mersing	46	89	129	81	111	57	113
	Endau	23	107	196	125	145	81	163
	Sub-Total	69	196	325	206	256	138	276
Artisanal	Penyabong	2	1	9	23	23	19	20
	Mersing	26	42	158	175	169	153	172
	Endau	0	1	5	11	114	98	51
	Sub-Total	28	44	172	209	306	270	243
Total		2,817	2,185	3,933	3,636	4,174	4,026	4,311

Gears	Area	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Trawl	Penyabong	74	71	77	140	76	923
	Mersing	789	1,041	988	1,131	683	10,850
	Endau	2,411	2,817	3,518	2,324	1,596	28,199
	Sub-Total	3,274	3,929	4,583	3,595	2,355	39,972
Purse-seine	Penyabong	0	0	0	0	0	0
	Mersing	122	136	175	46	0	1,104
	Endau	261	300	357	109	0	1,867
	Sub-Total	383	436	532	155	0	2,971
Artisanal	Penyabong	15	14	14	0	0	140
	Mersing	227	200	220	44	54	1,640
	Endau	17	17	14	0	0	327
	Sub-Total	259	231	248	44	54	2,107
Total		3,916	4,596	5,363	3,794	2,409	45,050

Remarks: Including trash fish.

Source: DOF, Mersing 1991

Table II.2.9 Marine Fish Landings at Penyabong by Type of Boats and Fishing Gears (1990)

Unit: MT

Gears	Boat Tonnage	Jan	Feb	March	April	May	June	July
Trawl	10 tons less	41.3	37.2	40.0	9.7	19.8	30.0	19.4
	10 to 25 tons	72.0	55.6	47.6	26.6	29.6	21.8	34.4
	Sub-Total	113.3	92.8	87.6	36.3	49.4	51.8	53.8
Other Fishing Gears								
	Drift Net	-	-	0.0	4.6	5.4	4.0	4.6
	Spanish Mackerel Gill Net	-	-	5.9	9.0	8.1	7.9	5.0
	Hook & Lines	1.9	1.4	3.0	6.8	7.6	4.9	6.4
	Push Scoop Net	-	-	-	1.2	0.8	0.8	2.6
	Cage Type Pot	-	-	-	1.2	1.0	1.1	1.3
	Sub-Total	1.9	1.4	8.9	22.8	22.9	18.7	19.9
Total		115.2	94.2	96.5	59.1	72.3	70.5	73.7

Gears	Boat Tonnage	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Trawl	10 tons less	29.7	24.9	27.7	54.3	35.4	369.4
	10 to 25 tons	44.0	46.4	49.3	85.8	40.3	553.4
	Sub-Total	73.7	71.3	77.0	140.1	75.7	922.8
Other Fishing Gears							
	Drift Net	3.1	1.7	-	-	-	23.4
	Spanish Mackerel Gill Net	3.9	3.5	4.2	-	-	47.5
	Hook & Lines	7.7	8.0	9.6	-	-	57.3
	Push Scoop Net	-	-	-	-	-	5.4
	Cage Type Pot	0.8	0.9	-	-	-	6.3
	Sub-Total	15.5	14.1	13.8	0.0	0.0	139.9
Total		89.2	85.4	90.8	140.1	75.7	1062.7

Remarks: Including trash fish.

Source: DOF, Mersing 1991

Table II.2.10 Marine Fish Landings at Mersing by Type of Boats and Fishing Gears (1990)

		Unit: tons						
Gears	Boat Tonnage	Jan	Feb	March	April	May	June	July
Trawl	10 tons less	127	100	107	14	20	25	21
	10 to 25 tons	324	236	174	155	148	84	147
	25 to 40 tons	145	128	351	387	492	440	468
	40 to 70 tons	95	76	140	143	160	152	152
	70 tons up	188	94	188	182	180	193	188
	Sub-Total	879	634	960	881	1,000	894	976
Purse seine	25 to 40 tons	-	-	38	20	21	8	20
	40 to 70 tons	46	89	91	61	90	49	93
	Sub-Total	46	89	129	81	111	57	113
Other Fishing Gears								
	Gill Net	-	-	45	29	27	23	32
	Mackerel Gill Net	-	-	35	48	40	45	30
	Hook & Lines	26	-	59	73	64	61	56
	Push Scoop Net	-	27	20	20	7	11	34
	Cage Type Pot	-	15	-	-	8	8	8
	Pukat-kisa	-	-	-	-	23	5	10
	Sub-Total	26	42	159	170	169	153	170
Total		951	765	1,248	1,132	1,280	1,104	1,259

Gears	Boat Tonnage	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Trawl	10 tons less	31	39	39	132	88	743
	10 to 25 tons	132	162	197	261	138	2,158
	25 to 40 tons	316	505	548	423	222	4,425
	40 to 70 tons	144	154	172	134	110	1,632
	70 tons up	166	180	33	182	125	1,899
	Sub-Total	789	1,040	989	1,132	683	10,857
Purse seine	25 to 40 tons	31	42	45	-	-	225
	40 to 70 tons	91	94	129	46	-	879
	Sub-Total	122	136	174	46	0	1,104
Other Fishing Gears							
	Gill Net	43	43	31	-	-	273
	Mackerel Gill Net	45	40	57	-	-	340
	Hook & Lines	77	80	96	44	54	690
	Push Scoop Net	53	31	28	-	-	231
	Cage Type Pot	10	6	7	-	-	62
	Pukat-kisa	-	-	-	-	-	38
	Sub-Total	228	200	219	44	54	1,634
Total		1,139	1,376	1,382	1,222	737	13,595

Remarks: Including trash fish.

Source: DOF, Mersing 1991

Table II.2.11 Marine Fish Landings at Endau by Type of Boats and and Fishing Gears (1990)

		Unit: MT						
Gears	Boat Tonnage	Jan	Feb	March	April	May	June	July
Trawl	10 tons less	13	11	18	10	20	30	19
	10 to 25 tons	43	33	38	35	40	37	59
	25 to 40 tons	332	265	644	500	636	587	599
	40 to 70 tons	741	609	1,039	1,161	1,295	1,386	1,424
	70 tons up	599	299	596	597	573	613	659
	Sub-Total	1,728	1,217	2,335	2,303	2,564	2,653	2,760
Purse seine	10 to 25 tons	-	-	11	10	13	7	13
	25 to 40 tons	-	-	56	30	42	17	40
	40 to 70 tons	23	107	128	85	90	57	109
	Sub-Total	23	107	195	125	145	81	162
Other Fishing Gears								
	Mackerel Gill Net	-	-	-	-	2	12	6
	Hook & Lines	-	1	5	11	10	10	13
	Pukat-kisa	-	-	-	-	102	76	31
	Sub-Total	0	1	5	11	114	98	50
Total		1,751	1,325	2,535	2,439	2,823	2,832	2,972
Gears	Boat Tonnage	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
Trawl	10 tons less	30	25	22	19	13	230	
	10 to 25 tons	66	74	79	60	27	591	
	25 to 40 tons	404	642	696	488	281	6,074	
	40 to 70 tons	1,312	1,427	1,547	1,120	821	13,882	
	70 tons up	599	649	1,175	637	426	7,422	
	Sub-Total	2,411	2,817	3,519	2,324	1,568	28,199	
Purse seine	10 to 25 tons	17	29	31	28	-	159	
	25 to 40 tons	61	84	68	-	-	398	
	40 to 70 tons	182	188	259	81	-	1,309	
	Sub-Total	260	301	358	109	0	1,866	
Other Fishing Gears								
	Mackerel Gill Net	2	1	2	-	-	25	
	Hook & Lines	15	16	12	-	-	93	
	Pukat-kisa	-	-	-	-	-	209	
	Sub-Total	17	17	14	0	0	327	
Total		2,688	3,135	3,891	2,433	1,568	0	30,392

Remarks: Including trash fish.

Source: DOF, Mersing 1991

Table II.2.12 Fish Landings by Species, by Size of Trawlers and Purse Seiners in East Coast of Peninsular Malaysia (1990)

Local name	English name	Boat Tonnage					Total
		10 tons less	10 – 25	25 – 40	40 – 70	70 tons up	
Selayang	Round Scad	1	4,742	4,942	14,229	10,276	34,190
Sotong Biasa	Squid	741	4,941	3,661	2,906	3,192	15,441
Selar Kuning	Yellowbanded Scad	769	1,941	3,293	4,894	2,681	13,578
Kerisi	Threadfin Fish	650	1,934	2,670	1,912	3,112	10,278
Kembong	Indian Mackerel	75	1,617	2,150	4,047	1,466	9,355
Tambang	Fringe Scale	0	1,170	1,476	3,976	515	7,137
Sotong Katak	Cuttle Fish	768	1,047	1,841	1,430	1,954	7,040
Selar	Selar Scad	62	1,091	1,513	2,163	1,032	5,861
Pari	Ray	462	1,039	1,071	1,003	642	4,217
Aya	Longtail Tuna	1	1,071	514	1,126	988	3,700
Lain-Lain	Others	19,094	30,829	32,563	34,670	36,654	153,810
Total		22,623	51,422	55,694	72,356	62,512	264,607

Remarks: Trash fish is included in others (lain-lain).

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.13 Fish Landings by Species, by Size of Trawlers in East Coast of Peninsular Malaysia (1990)

Local name	English name	Boat Tonnage					Total
		10 tons less	10 – 25	25 – 40	40 – 70	70 tons up	
Sotong Biasa	Squid	741	4,864	3,609	2,858	3,172	15,244
Kerisi	Threadfin Fish	650	1,934	2,670	1,912	3,112	10,278
Ikan Campur	Mixed Fish	298	1,514	1,795	1,663	4,246	9,516
Sotong Katak	Cuttle Fish	768	1,047	1,841	1,430	3,172	8,258
Selar Kuning	Yellowbanded Scad	759	709	1,938	1,670	1,654	6,730
Pari	Ray	462	1,039	1,071	1,003	642	4,217
Duri	Arius Catfish	231	354	670	528	749	2,532
Jenis Udang	Shrimps	557	1,222	341	206	112	2,438
Biji Nangka	Goatfish	13	775	566	182	601	2,137
Lain-Lain	Others	2,587	5,045	5,099	4,326	5,663	22,720
Ikan baja	Trash Fish	15,393	21,592	23,177	24,057	23,760	107,979
Total		22,459	40,095	42,777	39,835	46,883	192,049

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.14 Fish Landings by Species, by Size of Purse Seiners in East Coast of Peninsular Malaysia (1990)

Local name	English name	Boat Tonnage					Total
		10 tons less	10 – 25	25 – 40	40 – 70	70 tons up	
Selayang	Round Scad	67	4,742	4,887	14,203	9,960	33,859
Kembong	Indian Mackerel	0	1,584	1,956	3,809	1,045	8,394
Tambang	Fringe Scale	10	1,170	1,466	3,970	506	7,122
Selar Kuning	Yellowbanded Scad	0	1,232	1,355	3,224	1,027	6,838
Ikan Campur	Mixed Fish	22	271	1,153	3,663	632	5,741
Selar	Selar Scad	0	988	1,355	1,881	446	4,670
Aya	Longtail Tuna	0	1,070	511	1,123	966	3,670
Ikan Baja	Trash Fish	0	30	3	25	719	777
Cincau	Hardtail Scad	0	24	180	244	38	486
Bawal	Pomfret	0	4	10	134	195	343
Lain-Lain	Others	65	212	41	245	95	658
Total		164	11,327	12,917	32,521	15,629	72,558

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.15 Species Composition of Fish Landings in Mersing District (1986-1988)

Local name	English name	1986	1987	1988
Kerisi	Threadfin Fish	-	1,788	1,967
Sotong	Squid	1,081	1,546	1,700
Selar Kuning	Yellowbanded Scad	834	1,249	1,311
Udang	shrimps	578	905	950
Aya	Longtail Tuna	1,003	826	909
Kembong	Indian mackerel	845	691	725
Tanbang	Fringe Scale	629	709	638
Tenggiri	Spanish Mackerel	405	234	246
Cincaru	Hardtail Scad	-	420	441
Ikan Baja	Trash fish	2,786	3,316	7,461
Total		8,161	11,684	16,348

Source: Annual Fisheries Statistics 1990, DOF, 1991

Table II.2.16 Species Composition of Trash Fish Caught by Class-A Boats (1992)

Local Name	English Name	Scientific Name	Weight (kg)	Percent
Duri	Marine catfish	Tachysurus spp.	15.11	16%
Baji			10.93	12%
Ubi	Lizard fish	Sarida spp.	8.27	9%
Gelma	Jew fish	Sciaena spp.	8.27	9%
Lidah	Sole fish	Cynoglossus spp.	13.21	14%
Togok	Flounder	Psettodes spp.	10.55	11%
Sotong Katak	Cuttle fish	Sepia spp.	4.85	5%
Biji Nanka	Goat fish	Upeneus spp.	5.32	6%
Pari	Ray	Gymura spp.	3.61	4%
Kebasi	Gizzard shad	Anodontosoma spp.	5.13	5%
Pelata	Selar scad	Selar spp.	2.00	2%
Gerut	Grunter	Pomadassys spp.	2.47	3%
Selar Kuning	Yellow scad	Selaroides leptolepis	2.85	3%
Kunyit	Snapper	Lutianus vitta	1.62	2%
Cermin	Horse mackerel	Caranx spp.	0.86	1%
Total			95	100%

Source: Field survey Phase 2 (The Feasibility Study on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, Oct. 1992)

3. Fish Marketing and Distribution Survey

3.1 Fish Distribution Pattern

(1) Fish landings in east Johor

In east Johor, there are three LKIM complexes at Endau, Mersing and Kuala Sedili, and several private jetties. Based on the data and information compiled from the log and record books of LKIM complexes, marine fish (excluding trash fish) landed at the private jetties and LKIM complexes for three years (1989-1991) are summarized in Table II.3.1. The landing volume in the Endau area ranged from 10,452 MT in 1989 to 14,506 MT in 1991. In 1990, about 54 percent (15,647 MT) of the total landings (28,721 MT) in East Johor were landed in Endau; followed by about 30 percent (8,530 MT) in Kuala Sedili and about 16 percent (4,544 MT) in Mersing.

Of the total landings of 28,721 MT in east Johor in 1990, about 23,365 MT (82%) were landed at private jetties and the remaining 5,356 MT (18%) were landed at the LKIM complexes. Of the total volume of 15,647 MT landed in Endau, 14,497 MT (93%) were landed at the 16 private jetties.

(2) Destination of fish landed in east Johor

The volume and destination of the fish landed at the complexes and private jetties in east Johor are summarized in Tables II.3.2, II.3.3 & II.3.4. Approximately 50 percent of fish landed in East Johor were exported to Singapore; about 22 percent were consigned to other states, including Kuala Lumpur, and the remaining (28%) were distributed within the state. In 1990, 14,107 MT (49%) of the total landings of 28,721 MT were exported to Singapore and 5,730 MT (20%) were consigned to other states. The remaining 8,884 MT (31 %) were distributed within Johor State, of which about 45 percent (3,983 MT) were consigned to Johor Bahru. Almost all the fish exported to Singapore were fresh and chilled.

(3) Import /export of fish through Johor Bahru

a) Exports

The total export volume to Singapore from Malaysia from 1989 to 1991 according to PPD, is shown in Table II.3.5. Singapore's imports of fish and fishery products from Malaysia have increased from 47,785 MT in 1989 to 47,923 MT in 1990 and 49,776 MT in 1991. Out of the volume of 47,923 MT exported to Singapore in 1990, 36,103 MT (75%) passed through Johor Bahru, according to recorded data

by LKIM. The remaining 11,820 MT (25%) appears to have also passed through Johor Bahru; however, it was not recorded by LKIM due to inadequate enforcement of this illegal movement of fish.

b) Imports

The import of fish and fishery products to Malaysia from Singapore are shown in Table II.3.6. In comparison to the export volume, the corresponding figures for the total volume of imported fish from Singapore are comparatively small. However, there has been a steady increase recently in import volumes that rose from 10,838 MT in 1989 to 13,727 MT in 1990 and 15,242 MT in 1991. About 45 percent of this volume passed through Johor Bahru. The ratio of monthly fish imports according to destination is shown in Table II.3.7. Only a small share of the imported volume is directly earmarked for Johor Bahru. The rest is consigned to various other destinations such as Pontian, Kuala Lumpur, Parit Buntar, Penang, Melaka, etc. In 1989, out of 5,731 MT imported, only 548 MT (9.5%) was earmarked for Johor Bahru. The corresponding share of imported fish to Johor Bahru during 1990 was 580 MT (9%). Penang and Kuala Lumpur have substantial shares of the remaining volume.

c) Exported and imported fish products in Malaysia

Exported and imported fish products are divided under four major groups, namely live, fresh, frozen and processed. The share of each category in the 1991 export/import data is given in Table II.3.8.

Of the total export volume (35,876 MT) in 1991, fresh fish accounted for 25,919 MT (72%). Fresh fish accounted for 4,280 MT (61%) of the total import volume of 7,019 MT. The volume of imported processed fish was quite low, being less than 1 per cent (29 MT) of the imported fish volume. However, the share of exported processed fish was four percent (1,436 MT).

(4) Fish marketing and distribution system

a) Fish marketing system in Endau

The existing marketing and distribution system at the private jetties and the LKIM complex is shown in Fig. II.3.1. There are two main parties, namely the primary wholesalers (PWS) at the production area and the terminal wholesalers at the consumption area who play an important role in fish marketing. The PWS are categorized into jetty owners who are boat owners as well as agents for non-jetty

owners, and individual boat owners who market their own catch. The fish landed are handled primarily through direct consignment by the PWS to wholesale markets in Singapore, Johor Bahru and Kuala Lumpur. Auctions are conducted only at the LKIM complex by the AFA but not on a daily basis. Daily cash trading is also conducted at the LKIM complex and private jetties. In 1990, 13,099 MT (84%) out of 15,647 MT landed at Endau were directly consigned and the remaining 2,548 MT (16%) were handled through auction and by daily cash trading.

b) Fish marketing system in Kuantan LKIM complex

The marketing system existing at the Kuantan LKIM complex is introduced here for comparison, as shown in Fig. II.3.2. There are 18 agents (including the AFA as agent) conducting auction. Fish marketing at the Kuantan complex was already in progress by private jetty owners before the construction of the LKIM complex. About 60 percent of the fish were auctioned and the remaining (40%) were directly consigned. After the construction of the complex, most of the landings at the private jetties except that of purse seiners, are auctioned at the complex. As a result, 80 percent of the fish landed pass through the auction and the rest (20%) are consigned directly (mainly fish earmarked for processing). In 1991, 10,112 MT of fish were handled at the complex (Fig. II.3.2), of which 2,124 MT (21%) were consumed locally; 5,561 MT (55%) were destined for wholesale markets outside Pahang state and 2,427 MT (24%) were exported.

3.2 Price and Cost Analysis

(1) Fish pricing mechanism

In addition to factors such as supply and demand, origin, and quality, various key points like supply of credit to producers and wholesalers in the production area under the current marketing system, also make a cumulative impact on the pricing and profitability of the operation. Another related issue is the grading of fish for pricing. Grading is not yet standardized. The most simplistic grading is done at the producer level and fish is classified into three grades (A, B & C) by species and fish size. However, at the terminal wholesale level the grading is considerably more refined, and the fish price reflects the appropriate quality. For example, black pomfret (bawal hitam) at the primary level is graded in three sizes namely large, medium and small. But at the terminal level, there are four sizes - extra large, fairly large, medium and small. In contrast, there may not be any grading and prices may be fixed at landing points.

A survey was conducted to determine the price and linkage of credit ties on fish marketed from the production area (Endau/Mersing) to the consumption area (Singapore and Johor Bahru). The methodology employed was to trace a tagged box of fish from Mersing/Endau to Jurong and Tampoi wholesale markets and to study the bill of sales of wholesalers or fish dealers at the production area.

The relationship between the fishermen (boat owners) in the production area and the wholesalers in the consumption area is characterized by six marketing channels.

	Credit-Tie	Non Credit-Tie
(1) Boat Owner/Jetty Owner - Wholesalers	Case 1	Case 2
(2) Non Jetty Owner/Boat Owner -Wholesaler (Fish marketed by jetty owner)	Case 3	Case 4
(3) Non Jetty Owner/Boat Owner -Wholesaler (Fish marketed by himself)	Case 5	Case 6

Remarks: Refer to Fig. II.3.3 for details.

The following linkages in the area of credit are summarized below.

1) Linkage-1: Linkage with Credit (Fig. II.3.3)

Boat owners who are private jetty owners and agents consign their fish as well as the fish of other boat owners using the jetty, at a commission ranging from 7 to 10 percent of the wholesale price in the consumer market. These agents have credit with the wholesalers at the wholesale market in the consumption area and have established linkage for fish marketing. They consign fish to wholesalers with whom they have credit ties, as well as wholesalers without credit ties. The price offered by the wholesaler with credit ties is slightly higher than the one offered by the other wholesaler. The wholesaler with credit ties has the priority to receive fish for the credit he has extended to the boat owner for investment and fishing operations. The wholesaler with credit ties deducts his credit service (debt service) from the sales, in addition to the 7-10 percent commission of the wholesale price. The maximum credit deduction is 20 percent of the total sales and the amount varies according to the terms of credit such as payment period and credit amount, as well as on the volume and quality of fish traded on that day. Some examples of wholesale fish prices offered by creditors and non-creditors in Jurong (Singapore) and Tampoi (Johor Bahru) are shown in Table II.3.9. The jetty owner may also consign the fish entrusted to him by other boat owners, to his credit-tied wholesaler. However, the price offered is that of linkage 2.

2) Linkage-2: Linkage with no credit (Fig. II.3.3)

This linkage is similar to the above with the exception that boat owners or agents do not have credit with the wholesaler in the consumer market. However, they have established their linkage in marketing and the fish price offered to them is lower than the wholesaler with credit ties. They are also careful in selecting their wholesalers in the consumption area so as not to dump and depress the fish price. Therefore, they depend on daily market information before determining the destination. A commission ranging from 7 to 10 percent of the sales is deducted by the wholesaler.

3) Linkage-3: A-Boat Linkage with credit (Fig. II.3.4)

This linkage is only seen at the production area. Some fishermen of class-A boats are paid the same day by fish traders who have given them full or partial credit.

In this linkage the agents or wholesalers at the production area offer full or partial credit to A-boat fishermen. These agents buy fish at low price from the boat owners with full credit, and for those with partial credit, they offer a fish price based on the previous day's price. Some examples of wholesale fish prices offered to A-boat owners with full and partial credit are shown in Table II.3.10. For the partial credit extended, the agents deduct about 20 percent from the total fish sales. However, for full credit, the agents do not deduct any commission from the total sales, as the prices offered are very low.

Local fish traders or agents prefer to extend credit to class-A boat owners, due to the risk factor stemming from high operation cost of class B, C & C2 fishing boats.

(2) Price and cost analysis

Generally, ex-vessel price or producer's price of fish directly consigned is known only the next day, based on the wholesale price at the consumption area. Ex-vessel price is also established on the same day for fish traded on a daily cash basis, which is based on bilateral negotiations between producers and primary wholesalers or agents, and by auctions implemented by LKIM at their complexes. Wholesale prices at the consumption market are usually decided by three different ways as specified below:

- a) By bargaining through bilateral negotiations - prices are fixed on the spot.
- b) Based on Singapore market prices and local wholesale prices of the previous day.

- c) Without prefixing prices, but sell on consignment basis - price paid back on the basis of sales price in the Singapore market from which the Singapore wholesaler deducts his profit margin. This system is depended on a long term arrangement and mutual trust and loyalty.

Cost/income analysis, i.e. cost and income between ex-vessel price and wholesale price, was done at the fishing and marketing stages in order to grasp some of the characteristics in pricing.

1) Fishing stage

The fishing operation cost of boats was analyzed based on an interview survey of boat owners and operators and it is shown in Table II.3.11. The production cost (fishing cost) varies from about RM0.50/kg to RM1.00/kg of the total fish landing, depending on the type of boat and fishing method. However, in terms of food fish, the cost varies from RM0.64/kg to RM1.20/kg. In the case of class A/B trawlers, the estimated fishing cost is about RM1.20/kg and RM0.90/kg for class C/C2 trawlers. The fishing cost per unit catch of food fish decreases with an increase in boat tonnage.

2) Marketing stage

Price and cost analysis of selected fresh/chilled fish from the production area (Endau/Mersing) to the consumption area (JB and Singapore) is shown in Table II.3.12. The marketing channel of fish by wholesalers who are jetty owners/boat owners or non-jetty owner is shown in Fig. II.3.3. The costs incurred from the landing stage to the consumption area as shown in Table II.3.12, are a) handling and marketing costs, b) commission of primary wholesaler, c) commission of terminal wholesaler and d) jetty rental (non-jetty owner), e) credit service (in case of credit ties).

The handling and marketing is done by the jetty-boat owner. The non-jetty boat owner may entrust his catch to the jetty owner or market it himself. The handling and marketing cost (includes packing, labor, transport) of a box is usually fixed; it is about RM 31 to Singapore, RM25 to Johor Bahru, and RM28 to Kuala Lumpur.

The producer's income or the ex-vessel price is the wholesale price minus the marketing. The producer's income depends not only on the fishing cost and fish species, but also on the type of credit ties with the wholesalers in the consumption area, and the marketing channel (whether marketed through an agent or marketed

himself). The result of the cost analysis is shown in Table II.3.12. For example, the producer's price per kg of thread fin bream (Kerisi), marketed to Jurong wholesale market, was RM1.23, when marketed by jetty-boat owner to a wholesaler with credit ties and RM1.58 to a wholesaler without credit ties in the consumption area. The producer's price was RM1.39 for the non-jetty owner marketing his fish through the jetty owner (as agent). However, when a non-jetty boat owner marketed his own catch, he fetched RM1.18 from a credit tied wholesaler and RM1.53 from non-credit wholesaler. Although the credit tied wholesaler offered a better wholesale price than the latter, the producer price or ex-vessel price obtained from the wholesale price of a non-credit wholesaler, minus the respective expenses was better. The low ex-vessel price is due to the credit service which is a maximum of 20 percent.

3.3 Fish Marketing Survey in Singapore

Currently about 50 percent of the fish landed in east Johor are consigned to Singapore due to its proximity and in particular fresh and chilled fish fetches a higher price in the Singaporean market. This has been one of the underlying factors of an efficient and effective marketing and distribution system in Singapore. A survey was conducted to review the situation of the Singapore market.

(1) Supply/demand

Annual fish production has been consistently falling over the past several years (Table II.3.13), and the catch has declined by more than 50 percent from 26,219 MT in 1984 to about 13,100 MT in 1991. This trend is due to the EEZ declaration by neighboring countries, declining fishing operations, and the high cost of labor. The demand for fish is also on the rise as the result of a growing population of 2.7 million and heavy tourist traffic (about 300,000 - 400,000). A per capita income of US\$13,600 per annum and a GDP growth rate at 6.7 percent also signify the growing trend in consumption.

(2) Supply

1) Fresh/chilled fish

The amount of fresh and chilled fish supply to Singapore is stable, at an average of about 110,000 MT per year. Of this supply, Malaysia and Indonesia contribute about 35 percent each and Thailand accounts for about 20 percent. Only about 10-15 percent of the total requirement is met by the small local marine fishery industry.

2) Imports

Singapore is a net importer of fish and fish products. The import volume has steadily increased as summarized in Table II.3.14, from 165,008 MT in 1989 to 197,300 MT in 1991. In 1990, the neighboring countries of Malaysia and Thailand contributed about 47,923 MT (26 %) and 22,107 MT (12%) respectively, of the total import volume of 182,419 MT.

(3) Demand

1) Consumption

According to 1989 FAO data, the per capita consumption of fish and fishery products in Singapore was 26.3 kg per year. It is possible that the consumption level is much more than this since imports from Indonesia are not recorded. According to data obtained from the Primary Product Department (PPD), the per capita consumption of fish as live/ fresh/chilled/frozen was 17.6 kg in 1991, based on the total population and about 300,000 tourists. The corresponding figure for dried and salted products was 2.21 kg and for prepared/canned products, 1.55 kg. The consumption of fish and fishery products from 1981 to 1989 for different products are given in Table II.3.15. The general preference is for fresh and chilled fish, and among the finfish species, the most preferred are thread fin, pomfret, groupers, breams, Spanish mackerel, etc. There is an increasing trend for other items like frozen products as well as cured shell fish and fish preparations.

Details of imports originating and passing through Johor Bahru (1989-91) are given in Table II.3.8, based on the data obtained from Malaysia (LKIM, JB). In 1991, the total quantity was about 35,900 MT, mainly fresh fish originating from the east coast of peninsular Malaysia.

2) Exports

Exports of fish and fishery products from Singapore have increased from about 115,698 MT in 1989 to 127,601 MT in 1990 and 144,846 MT in 1991 (Table II.3.16). Exports to Malaysia have remained stable, at an average of 10 percent; however, in the case of Thailand, it has increased from 7,572 MT (6.5%) in 1989 to 16,624 MT (11.5%) in 1991.

Exports are almost entirely re-exported, and the most important export item is prawn and shrimp either fresh, chilled or frozen. Another important item is frozen tuna and in 1990, about 67,000 MT of tuna were exported, contributing to about 53 percent of the export volume.

(4) Fish markets and marketing

The entire wholesale activity in Singapore is carried out at two separate fishery complexes. Of these Jurong Fish Market is the largest, and the other, Punggol Fish Market is relatively smaller.

1) Jurong Fish Market (JFM)

The JFM is located in the southwestern part of Singapore Island and it was commissioned in 1969. The total market floor encompasses to 8,850 m². There are 104 authorized wholesalers in this market, and the wholesale activity begins at 3 A.M. and ends at 6 A.M. daily. During these hours, 3000 to 4000 authorized fish buyers (retailers, processors and institutional buyers) visit the market. Although there is no mandatory auction system, some traders do follow the auction system. Most deals are made through bargaining between the fish traders and buyers.

There are three ice plants located next to the fish market which supply ice to fish merchants as well as fishing vessels. About 200 to 300 MT of fish are handled daily at JFM, and these are either landed by local fishing vessels or imported from abroad by land, sea and air.

Besides live, fresh/chilled products, frozen fish is also sold through JFM. Cold storage facilities with a capacity of about 25,000 MT are located in the vicinity of the market.

JFM is also a major transshipment port for frozen tuna caught by long liners from the Indian ocean.

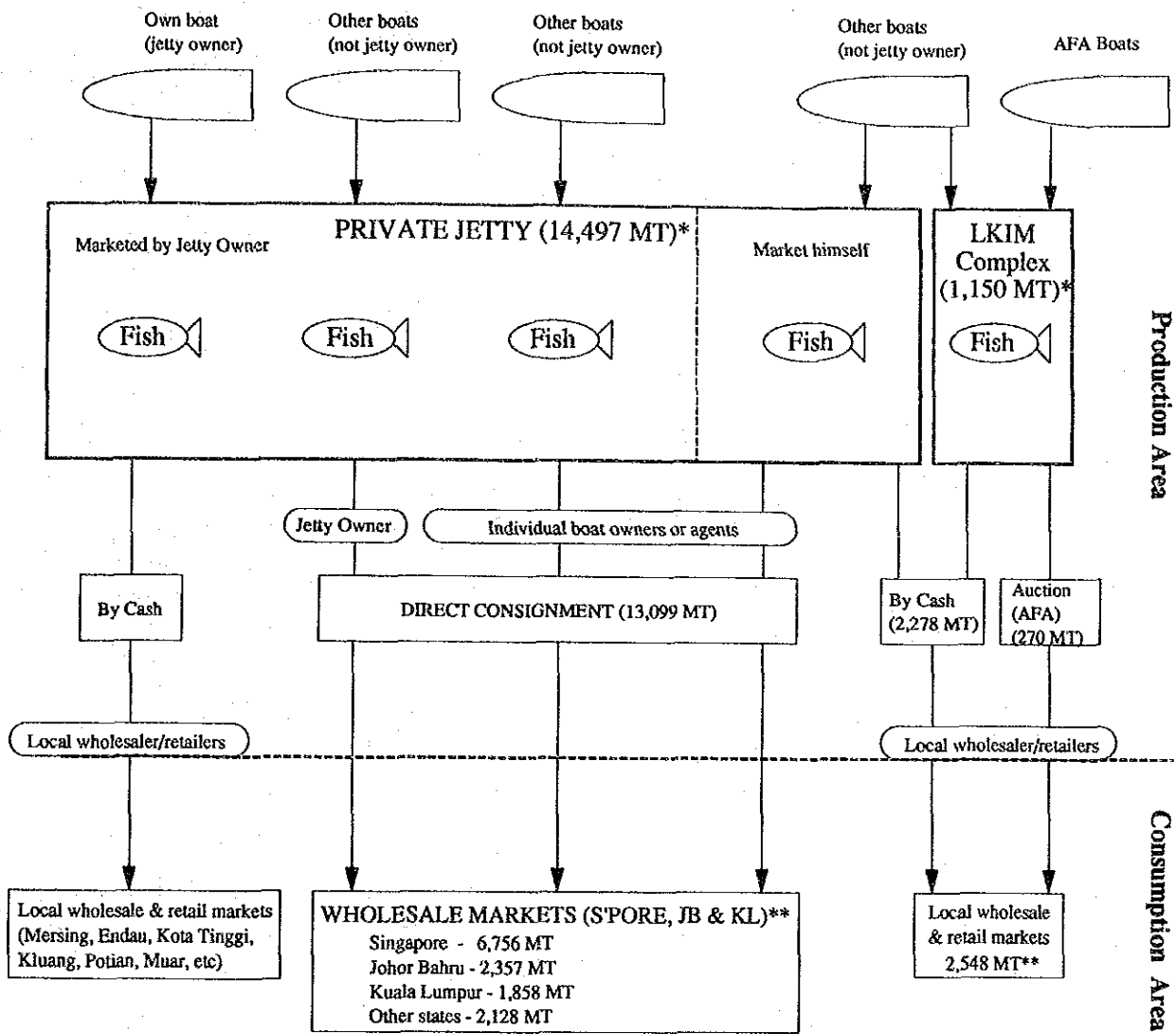
2) Punggol Fish Market (PFM)

Punggol Fish Market is smaller than JFM and was constructed in 1984. PFM is located on the northeastern coast and has a jetty of 150 meters. Most of the local trawlers unload their catch at this jetty. Adequate bunkering facilities are available for fishing vessels at the jetty, and there are 16 fish merchants, who are vessel owners or agents at the market to handle the catch of the fishing vessels. Marketing of fish is mainly through bilateral bargaining. Fish buyers are mainly retailers from the residential areas in the eastern part of Singapore. About 60 MT of fish are handled daily at this market. PFM is also a major landing place for cultured fish produced in net cages in the sea around Changgi, Punggol, Tampines and Pulau Tekong.

3) Marketing channel and distribution system

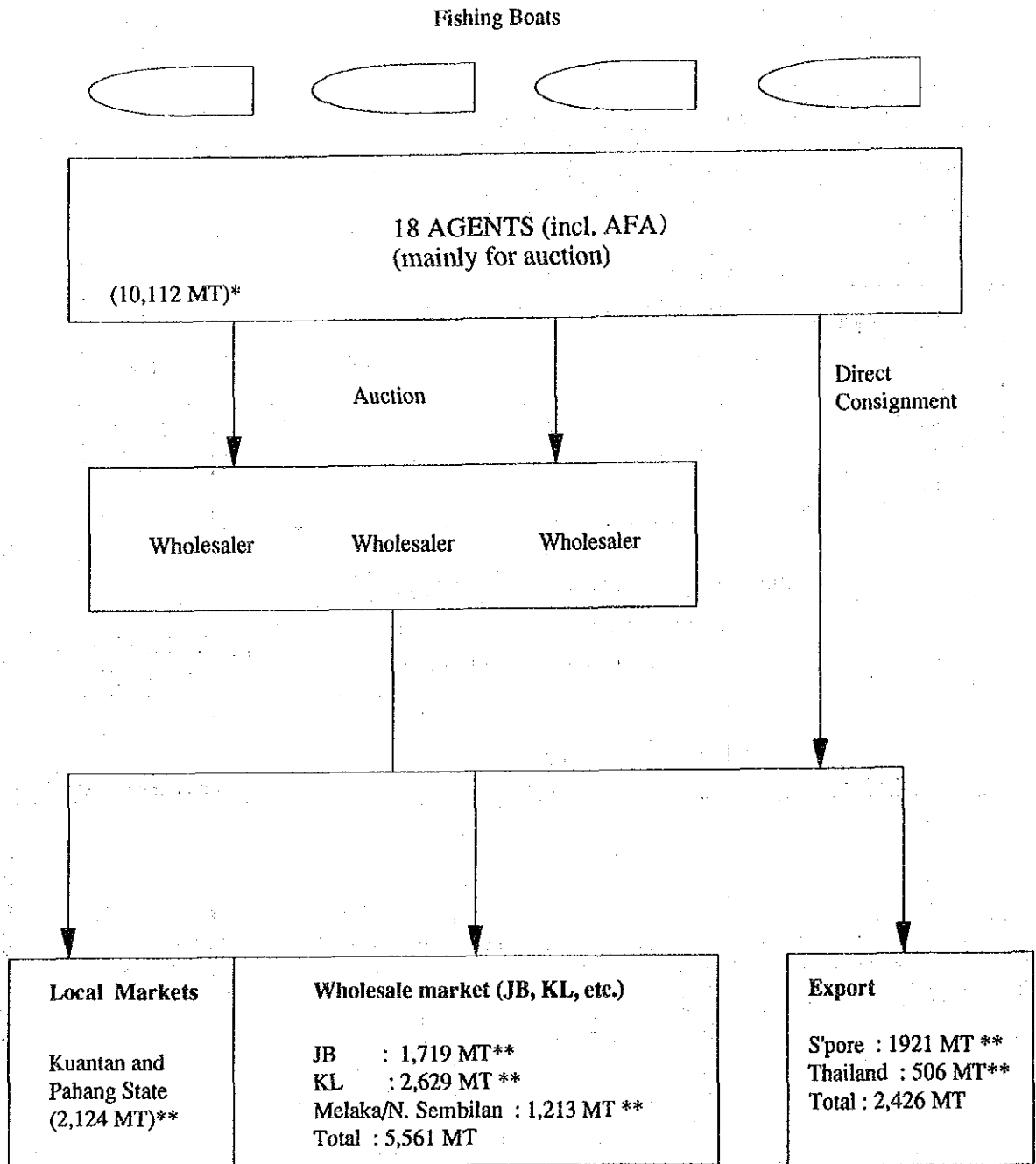
The fish markets are managed by the government round the clock for the whole year, to ensure efficient distribution of fish and fishery products. The trade in chilled and fresh fish involves 120 licensed fish merchants and 1,810 fish importers licensed by the PPD.

A general outline of the market flow/linkage with regard to fish and chilled fish distribution in Singapore, is shown in Fig. II.3.5; and this pattern applies for both local and imported fish. The distribution pattern of Malaysian products and consignments imported by land through Johor Bahru is shown in Fig. II.3.6. The sale of fish is entirely in the hands of the private sector and business at the wholesale level is mostly carried out in cash payment. In some cases, merchants may extend credit to their regular buyers.



Remarks: 1) * refers to volume of fish landed in Endau area (private jetties and LKIM complex) in 1990:
 2) ** refers to destination of fish landed in Endau area by direct consignment, auction and cash dealing.
 Source: 1) Log/Record Book of LKIM, Endau 1992
 2) LKIM Annual Report 1990, LKIM HQ
 3) Field Survey Phase 1 & 2 (The F/S on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, April/Oct., 1992)

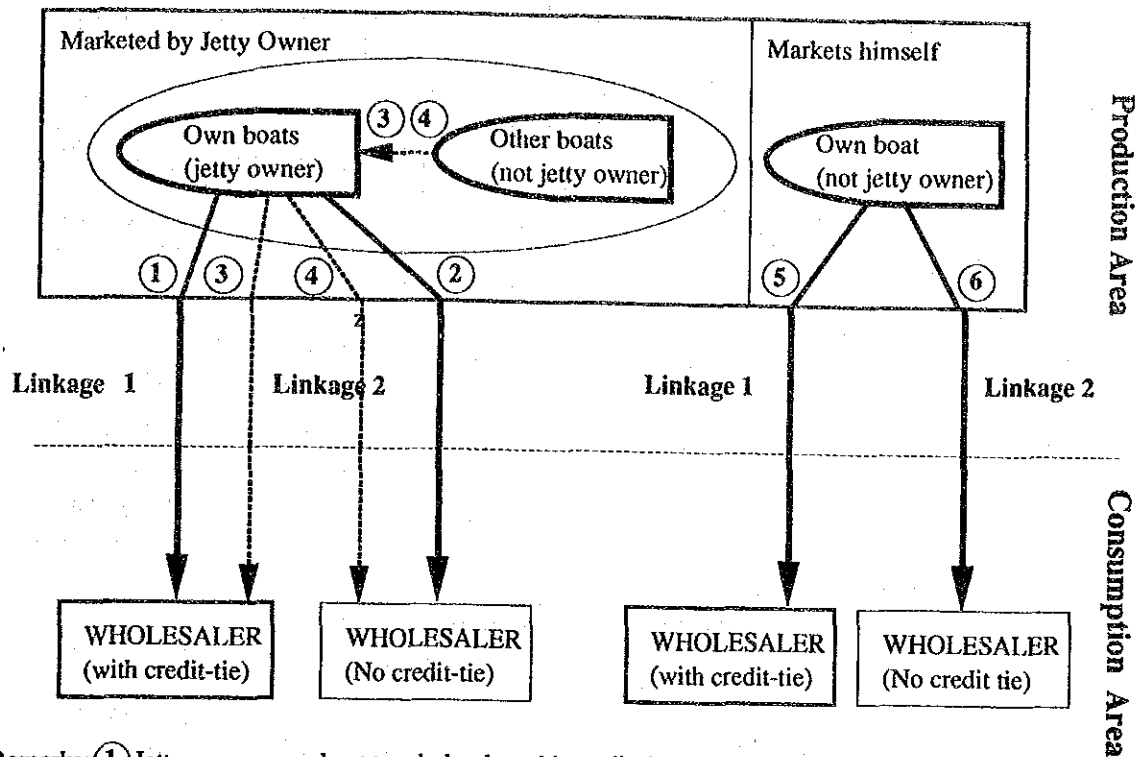
Fig. II.3.1 Existing Fish Marketing System at LKIM Complex and Private Jetties in Endau



- Remarks: 1) * - refers to total volume of fish landed in 1991.
 2) ** - refers to destination of fish landed in 1991.
 3) Unauctioned fish are directly consigned.
 4) Boat owners who are agents do consign directly part of their landings

Source: LKIM, Kuantan 1992

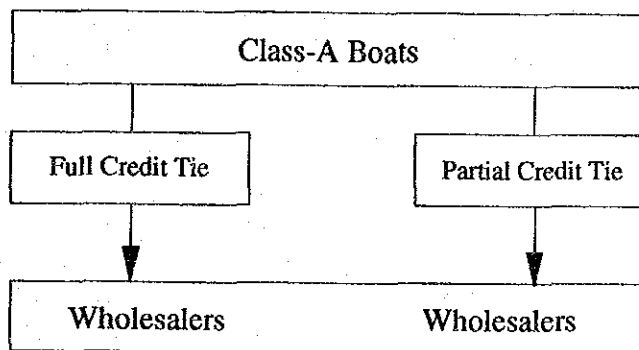
Fig. II.3.2 Existing Fish Marketing System in Kuantan



- Remarks:
- ① Jetty owner-own boat to wholesaler with credit tie. - Linkage 1
 - ② Jetty owner-own boat to wholesaler with no credit tie. - Linkage 2
 - ③ Not jetty owner-own boat to wholesaler with credit tie (marketed by jetty owner)- Linkage 2
 - ④ Not jetty owner-own boat to wholesaler with no credit tie (marketed by jetty owner) - Linkage 2
 - ⑤ Not jetty owner-own boat to wholesaler with credit tie (marketed himself) - Linkage 1
 - ⑥ Not jetty owner-own boat to wholesaler with no credit tie (marketed himself) - Linkage 2
- denotes marketing by the jetty/boat owner.
 - - denotes marketing entrusted to jetty owner.

Source: Field Survey Phase 2 (The F/S on the Pilot Project for Improvement of FMDS in Malaysia, Oct. 1992)

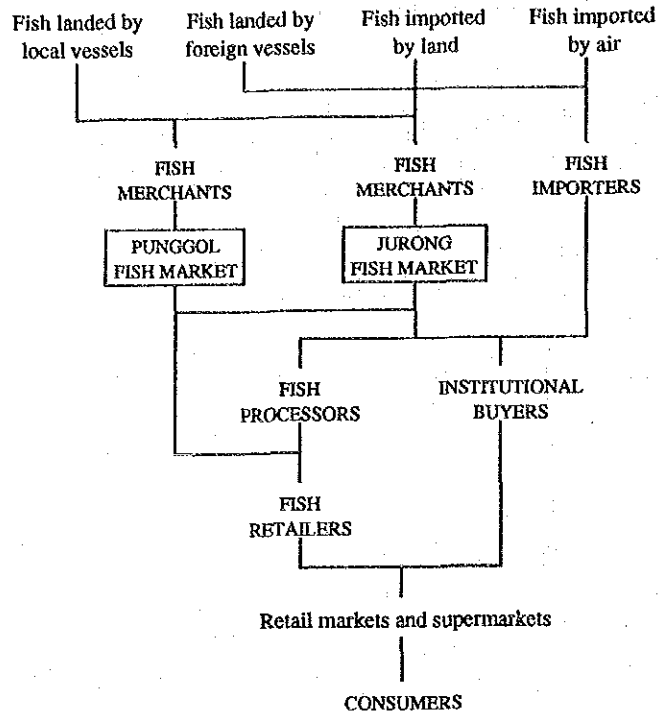
Fig. II.3.3 Fish Marketing Channels and Linkages of C/C2 Boats with Credit & Non-credit Tied Wholesaler in Consumption Area



- Remarks:
- 1) Full credit tie refers to boat owners who have taken investment capital for boat, gear and maintenance
 - 2) Partial credit tie refers to boat owners who have taken credit for fuel, ice and other expenses.

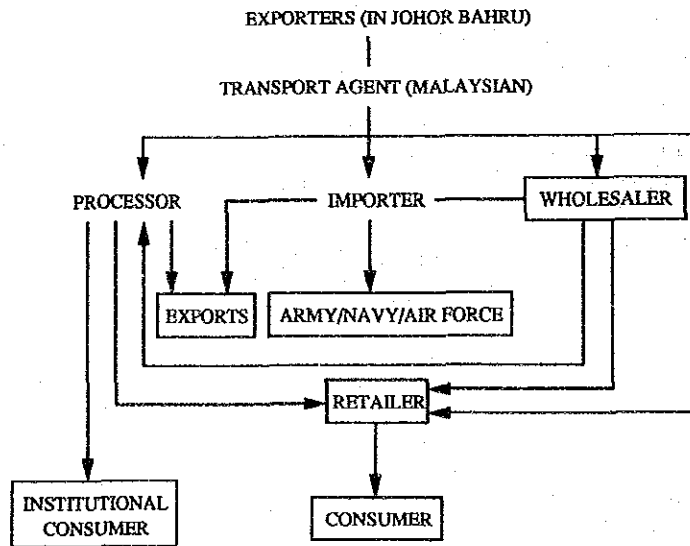
Source: Field Survey Phase 2 (The F/S on the Pilot Project for Improvement of FMDS in Malaysia, Oct. 1992)

Fig. II.3.4 Fish Marketing Channel and Linkage of A-Class Boats with Full/Partial Credit



Source: PPD

Fig. II.3.5 The Pattern of Marketing of Chilled and Fresh Fish in Singapore.



Source: INFOFISH

Fig. II.3.6 Distribution Channel for Fish Imported into Singapore via Johor Bahru

Table II.3.1 Marine Fish Landings in East Johor (1989-1991)

1989				Unit:MT
Area	Private Jetty	LKIM Complex	Total	
Endau	9,575	877	10,452	
Mersing	3,281	1,873	5,154	
Kuala Sedili	5,286	2,201	7,487	
	18,142	4,951	23,093	

1990				Unit:MT
Area	Private Jetty	LKIM Complex	Total	
Endau	14,497	1,150	15,647	
Mersing	2,834	1,710	4,544	
Kuala Sedili	6,034	2,496	8,530	
	23,365	5,356	28,721	

1991				Unit:MT
Area	Private Jetty	LKIM Complex	Total	
Endau	13,204	1,302	14,506	
Mersing	2,412	2,188	4,600	
Kuala Sedili	6,752	2,999	9,751	
	22,368	6,489	28,857	

Remarks: 1) Endau complex began operation in April 1989.

2) Trash fish is excluded.

Source: Log/Record Books of LKIM Complexes, 1992

Table II.3.2 Destination of Fish Landed in East Johor (1989)

Destination	Origin			Unit: MT
	Endau	Mersing	Kuala Sedili	Total
1) Export				
Singapore	4,130	2,303	4,567	11,000
2) Johore State				
Johor Baru	1,597	678	1,191	3,466
Kota Tinggi	102	357	216	675
Kluang	399	451	199	1,049
Batu Pahat	350	302	119	771
Local	877	375	258	1,510
Sub-total	3,325	2,163	1,983	7,471
3) Other State				
KL	895	315	408	1,618
Others	2,102	373	529	3,004
Sub-total	2,997	688	937	4,622
Total	10,452	5,154	7,487	23,093

Remarks: Trash fish is excluded.

Source: Record Book and Monthly Report of LKIM Complexes, 1992

Table II.3.3 Destination of Fish Landed in East Johor (1990)

		Origin			Unit: MT
Destination		Endau	Mersing	Kuala Sedili	Total
1) Export					
	Singapore	6,756	1,943	5,408	14,107
2) Johore State					
	Johor Baru	2,357	586	1,040	3,983
	Kota Tinggi	348	270	247	865
	Kluang	729	488	228	1,445
	Batu Pahat	331	218	136	685
	Local	1,140	292	474	1,906
	Sub-total	4,905	1,854	2,125	8,884
3) Other State					
	KL	1,858	446	494	2,798
	Others	2,128	301	503	2,932
	Sub-total	3,986	747	997	5,730
Total		15,647	4,544	8,530	28,721

Remarks: Trash fish is excluded.

Source: Record Book and Monthly Report of LKIM Complexes, 1992

Table II.3.4 Destination of Fish Landed in East Johor (1991)

		Origin			Unit: MT
Destination		Endau	Mersing	Kuala Sedili	Total
1) Export					
	Singapore	7,584	1,891	5,851	15,326
2) Johore State					
	Johor Baru	1,385	742	1,175	3,302
	Kota Tinggi	344	79	293	716
	Kluang	357	613	244	1,214
	Batu Pahat	122	59	146	327
	Local	195	146	634	975
	Sub-total	2,403	1,639	2,492	6,534
3) Other State					
	KL	1,825	631	628	3,084
	Others	2,694	439	780	3,913
	Sub-total	4,519	1,070	1,408	6,997
Total		14,506	4,600	9,751	28,857

Remarks: Trash fish is excluded.

Source: Record Book and Monthly Report of LKIM Complexes, 1992

Table II.3.5 Export to Singapore from Malaysia through Johor Baru (1989-1991)

	Unit: MT		
	1989	1990	1991
Through JB	32,397 (68)	36,103 (75)	35,875 (72)
Not through JB	15,388 (32)	11,820 (25)	13,901 (28)
Total Exports	47,785 (100)	47,923 (100)	49,776 (100)

Remarks: "Not through JB" is the difference between total exports and "through JB".

Source: 1) Total exports from PPD, 1992

2) Through JB from LKIM (JB), 1992.

Table II.3.6 Import to Malaysia from Singapore through Johor Baru (1989-1991)

	Unit: MT		
	1989	1990	1991
Through JB	5,731 (53)	6,318 (46)	7,018 (46)
Not Through JB	5,107 (47)	7,409 (54)	8,224 (54)
Total Imports	10,838 (100)	13,727 (100)	15,242 (100)

Remarks: "Not through JB" is the difference between total imports and "through JB".

Source: 1) Total imports from PPD, 1992

2) Through JB from LKIM (JB), 1992.

Table II.3.7 Share of Destinations in Fish Imports from Singapore through Johor Baru (1989,1990) (1/2)

1989						Unit: MT
Months	Johor Baru	Pontian	Kuala Lumpur	Parit Buntar	Penang	Total
January	36.3	34.5	130.8	113.9	261.8	577.3
February	25.5	17.5	65.3	31.9	148.6	288.8
March	37.7	24.7	99.9	50.1	211.8	424.2
April	26.3	42.5	92.0	59.5	257.8	478.1
May	29.5	28.3	67.6	88.4	242.3	456.1
June	32.1	33.6	63.8	72.3	216.8	418.6
July	35.7	38.9	56.5	67.3	189.6	388.0
August	50.9	29.4	46.7	63.5	241.8	432.3
September	52.9	43.1	74.1	79.0	170.5	419.6
October	79.4	63.8	99.3	109.4	371.8	723.7
November	70.6	50.9	101.2	80.8	253.0	556.5
December	71.6	67.2	56.5	100.7	271.6	567.6
Total	548.5	474.4	953.7	916.8	2,837.4	5,730.8
Share (%)	(9.57)	(8.28)	(16.64)	(16.00)	(49.51)	(100)

Source: LKIM (JB), 1992

Table II.3.7 Share of Destinations in Fish Imports from Singapore through Johor Baru (1989,1990) (2/2)

1990						Unit: MT
Months	Johor Baru	Pontian	Kuala Lumpur	Parit Buntar	Penang	Total
January	59.4	69.2	93.8	87.5	240.5	550.4
February	53.0	67.4	21.3	59.7	243.2	444.6
March	38.1	80.2	89.6	75.6	186.7	470.2
April	36.8	72.0	81.8	68.7	252.4	511.7
May	54.0	63.3	139.1	170.4	470.7	897.5
June	49.2	107.4	92.2	76.0	307.2	632.0
July	74.5	81.9	55.4	109.3	207.7	528.8
August	54.1	73.2	37.8	120.5	273.0	558.6
September	51.8	38.5	41.8	82.0	273.9	488.0
October	48.6	23.4	31.7	126.4	169.1	399.2
November	28.0	25.1	31.9	104.5	170.3	359.8
December	32.2	22.9	73.9	95.1	253.3	477.4
Total	579.7	724.5	790.3	1,175.7	3,048.0	6,318.2
Share (%)	(9.18)	(11.47)	(12.51)	(18.61)	(48.24)	(100)

Source: LKIM, JB, 1992

Table II.3.8 Export and Import of Fish and Fishery Products to/from Singapore through Johor Bahru (1991)

	Unit: MT	
	Export	Import
Live	6,178 (17)	27 (0.4)
Fresh	25,919 (72)	4,280 (61)
Frozen	2,343 (6)	2,683 (38)
Other Processed Products	1,436 (4)	29 (0.4)
Total	35,876 (100)	7,019 (100)

Source: LKIM (JB), 1992

Table II.3.9 Wholesale Price of Selected Fish Linked with Credit/Non-Credit Ties at Tampoi and Jurong Wholesale Markets Linked (Sept. 1992)

Date Sept. 18	Date: Sept. 21								Unit: RM/kg
	Tampoi		Jurong		Tampoi		Jurong		
	Credit	No Credit	Credit	No Credit	Credit	No Credit	Credit	No Credit	
Yellow trevally	1.30	1.00	1.20	0.90	1.20	1.00	0.90	0.90	
Threadfin bream	2.00	1.30	2.00	1.50	1.00	0.80	2.30	2.10	
Spanish mackerel	5.50	5.20	3.80	3.00	4.20	3.80	4.00	3.00	
Horse mackerel			6.00	4.80			4.00	3.60	
Hardtail	2.00	1.80	2.20	2.00	1.80	1.50	2.80	1.80	
Mackerel	2.30	2.00	3.60	3.20	2.00	1.80	3.50	3.20	
Squids	4.20	3.50	4.20	3.50	3.50	3.20	4.20	4.00	
Ray	3.00	2.50	3.60	2.50	3.00	2.50	3.60	2.80	

Remarks: The wholesale price refers to medium size fish except those in shaded area refer to large size fish.

Source: Field survey Phase 2 (The Feasibility Study on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, Oct. 1992)

Table II.3.10 Purchasing Price of Some Selected Fish from Class-A Boats at Consumption Area (Sept. 1992)

Unit: RM/kg

	Full Credit	Partial Credit
Grouper	7.00	12.50
Spanish Mackerel	6.00	7.00
Selar scad	1.00	1.80
Thread bream	1.50	3.00
Hardtail scad	1.50	1.80
Sweetlip	2.50	4.00
Threadfin	5.00	7.00
Queen fish	0.70	1.00
Snapper (Remong)	2.50	3.00
Rabbit fish	2.00	4.00
Snapper (Tanda)	3.00	4.50
Ray	0.80	1.80
Squid	2.50	5.50

Remarks: 1) Full credit (100%) refers to boat owners who have taken investment capital for boat, gear and maintenance.

2) Partial credit refers to boat owners who have taken credit for fuel, ice and other other expenses not related to fishing.

Source: Field survey Phase 2 (The Feasibility Study on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, Oct. 1992)

Table II.3.11 Fishing Operation Cost Per Trip of Fishing Boats By Class (1992)

Unit:RM

Items	A (T)	A(O)	B (T)	C (T)	C2 (T)	B (PS)	C (PS)	C2 (PS)
Fuel	50	50	1,600	2,480	2,970	840	900	1,040
Ice	30	40				200	400	400
Food	20	30	120	150	150	80	150	300
Gas	-	-	-	-	-	50	50	85
Unjang	-	-	-	-	-	100	100	250
License (Gear/Engine)	-	-	3	19	125	1	5	36
Repair/Maintenance (boat)	10	-	30	42	42	30	42	42
Fishing gear (Depreciation)	38	-	175	320	400	85	90	90
Depreciation (boat)				322	650		87	350
Total	148	120	1,928	3,333	4,337	1,386	1,824	2,593
Average fish catch (MT)	0.31	0.20	3.14	5.23	8.02	1.32	2.64	4.00
Food fish (MT)	0.12		1.62	3.40	5.21			
Trash fish (MT)	0.19		1.52	1.83	2.81			
Operation cost (RM/kg)	1.19	0.60	1.19	0.98	0.83	1.05	0.69	0.65

Remarks: 1) Class A (0-9.99 GRT & 10-24.9 GRT); Class B (25-39.9 GRT); Class C (40-69.9 GRT); Class C2 (>70GRT)

2) Depreciation cost excluded for A/B boats as they are old.

3) Operation cost/kg of fish refers to food fish.

4) Shares of trash fish are 60% for class A; 51 % class B; 35 % for class C and C2.

5) Gas and unjang refer to items for purse seiners.

Source: Field survey Phase 2 (The Feasibility Study on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, Oct. 1992)

Table II.3.12 Cost Analysis of Selected Fish Marketed to Singapore & Johor Bahru based on Credit/Non-Credit Tie (Sept. 1992)

Kerisi	Date: Sept. 18 (Jurong Wholesale Market)					Date: Sept. 18 (Tampoi Wholesale Market)					Unit:RM	
	A. Consumption Area	Marketed By Jetty Owner			Market himself		Marketed By Jetty Owner			Market himself		
		Status with wholesaler	CT	NCT		CT	NCT	CT	NCT			CT
		1	2	3&4	5	6	1	2	3&4	5	6	
	Wholesale price/kg	2.20	2.10	2.10	2.20	2.10	2.00	1.80	1.80	2.00	1.80	
	Wholesale price of One Box (100 kg)	220.00	210.00	210.00	220.00	210.00	200.00	180.00	180.00	200.00	180.00	
	Deduct credit service (20%)	44.00	0.00	0.00	44.00	0.00	40.00	0.00	0.00	40.00	0.00	
	Deduct commission (10%)	22.00	21.00	21.00	22.00	21.00	20.00	18.00	18.00	20.00	18.00	
	Balance	154.00	189.00	189.00	154.00	189.00	140.00	162.00	162.00	140.00	162.00	
	B. Production Area											
	Deduct Marketing/Transport Cost	31.00	31.00	31.00	31.00	31.00	25.00	25.00	25.00	25.00	25.00	
	Deduct Commission (10%)	0.00	0.00	18.90	0.00	0.00	0.00	0.00	16.20	0.00	0.00	
	Jetty rental	0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	5.00	5.00	
	Balance	123.00	158.00	139.10	118.00	153.00	115.00	137.00	120.80	110.00	132.00	
	Producer price	1.23	1.58	1.39	1.18	1.53	1.15	1.37	1.21	1.10	1.32	
	Squids											
	A. Consumption Area											
	Status with wholesaler	CT	NCT		CT	NCT	CT	NCT		CT	NCT	
		1	2	3&4	5	6	1	2	3&4	5	6	
	Wholesale price/kg	4.20	3.50	3.50	4.20	3.50	4.20	3.50	3.50	4.20	3.50	
	Wholesale price of One Box (100 kg)	420.00	350.00	350.00	420.00	350.00	420.00	350.00	350.00	420.00	350.00	
	Deduct credit service (20%)	84.00	0.00	0.00	84.00	0.00	84.00	0.00	0.00	84.00	0.00	
	Deduct commission (10%)	42.00	35.00	35.00	42.00	35.00	42.00	35.00	35.00	42.00	35.00	
	Balance	294.00	315.00	315.00	294.00	315.00	294.00	315.00	315.00	294.00	315.00	
	B. Production Area											
	Deduct Marketing/Transport Cost	31.00	31.00	31.00	31.00	31.00	25.00	25.00	25.00	25.00	25.00	
	Deduct commission (10%)	0.00	0.00	31.50	0.00	0.00	0.00	0.00	31.50	0.00	0.00	
	Jetty rental	0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	5.00	5.00	
	Balance	263.00	284.00	252.50	258.00	279.00	269.00	290.00	258.50	264.00	285.00	
	Producer price	2.63	2.84	2.53	2.58	2.79	2.69	2.90	2.59	2.64	2.85	
	Mackerel											
	A. Consumption Area											
	Status with wholesaler	CT	NCT		CT	NCT	CT	NCT		CT	NCT	
		1	2	3&4	5	6	1	2	3&4	5	6	
	Wholesale price/kg	3.60	3.20	3.20	3.60	3.20	2.30	2.00	2.00	2.30	2.00	
	Wholesale price of One Box (100 kg)	360.00	320.00	320.00	360.00	320.00	230.00	200.00	200.00	230.00	200.00	
	Deduct credit service (20%)	72.00	0.00	0.00	72.00	0.00	46.00	0.00	0.00	46.00	0.00	
	Deduct commission (10%)	36.00	32.00	32.00	36.00	32.00	23.00	20.00	20.00	23.00	20.00	
	Balance	252.00	288.00	288.00	252.00	288.00	161.00	180.00	180.00	161.00	180.00	
	B. Production Area											
	Deduct Marketing/Transport Cost	31.00	31.00	31.00	31.00	31.00	25.00	25.00	25.00	25.00	25.00	
	Deduct commission (10%)	0.00	0.00	28.80	0.00	0.00	0.00	0.00	18.00	0.00	0.00	
	Jetty rental	0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	5.00	5.00	
	Balance	221.00	257.00	228.20	216.00	252.00	136.00	155.00	137.00	131.00	150.00	
	Producer price	2.21	2.57	2.28	2.16	2.52	1.36	1.55	1.37	1.31	1.50	

Remarks: (A) The numbers under "Marketed By Jetty Owner" and "Market Himself" denote the followings;

- 1) Jetty owner-own boat to wholesaler with credit tie.
- 2) Jetty owner-own boat to wholesaler with no credit tie.
- 3) Not jetty owner-own boat to wholesaler with no credit tie (marketed by jetty owner).
- 4) Not jetty owner-own boat to wholesaler with credit tie (marketed by jetty owner).
- 5) Not jetty owner-own boat to wholesaler with credit tie (marketed himself).
- 6) Not jetty owner-own boat to wholesaler with no credit tie (marketed himself).

(B) Marketing/transport costs vary by destination; RM31 for S'pore, RM25 for JB and \$28 for KL.

(C) Status with wholesaler: CT = Credit Tie; NCT = No Credit Tie.

Source: Field Survey Phase 2 (The Feasibility Study on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, Oct. 1992)

Table II.3.13 Local Production and Import of Fresh/Chilled Fish of Singapore (1984-1991)

Unit: MT			
Year	Local Production	Import	Total Supply
1984	26,219	ND	
1985	23,904	ND	
1986	20,500	89,000	109,500
1987	15,300	96,800	112,100
1988	12,200	96,200	108,400
1989	12,220	105,800	118,020
1990	13,500	94,500	108,000
1991	13,100	98,900	112,000

Source: PPD

Table II.3.14 Imports of Fish and Fish Products to Singapore from Malaysia, Thailand and other Countries (1989-1991)

Unit: MT			
	1989	1990	1991
Malaysia	47,785 (29%)	47,923 (26%)	49,776 (25%)
Thailand	26,202 (16%)	22,107 (12%)	25,050 (13%)
Other countries	91,021 (55%)	112,389 (62%)	122,474 (62%)
Total Imports	165,008 (100%)	182,419 (100%)	197,300 (100%)

Source: PPD

Table II.3.15 Consumption of Fish and Fish Products in Singapore (1981-1989)

Unit: kg/person/year									
Product Form	1981	1982	1983	1984	1985	1986	1987	1988	1989
Fresh finfish	12.5	13.1	11.7	7.8	7.2	8.5	9.4	9.3	6.3
Fresh shellfish	4.2	4.4	3.0	1.8	0.6	0.8	0.8	0.8	1.8
Frozen finfish	0.0	0.0	0.1	0.1	0.1	1.5	2.1	2.2	2.5
Frozen shellfish	0.1	0.2	3.4	6.4	9.2	8.7	8.0	7.8	6.1
Cured finfish	0.7	0.7	0.6	0.7	1.1	1.1	0.7	0.4	0.3
Cured shellfish	0.1	0.2	0.2	0.4	0.5	0.6	0.5	0.7	0.7
Canned finfish	3.0	3.3	2.9	3.1	2.5	2.5	2.2	2.5	2.5
Canned shellfish	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2
Finfish preparations	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.5
Shellfish preparations	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0

Source: PPD

Table II.3.16 Exports of Fish and Fish Products from Singapore to Malaysia, Thailand and other Countries (1989-1991)

Unit: MT			
	1989	1990	1991
Malaysia	10,838 (9%)	13,727 (11%)	15,242 (11%)
Thailand	7,572 (7%)	10,963 (9%)	16,624 (11%)
Other countries	97,288 (84%)	102,911 (81%)	112,980 (78%)
Total Exports	115,698 (100%)	127,601 (100%)	144,846 (100%)

Source: PPD

4. Fish Marketing Information System (FMIS)

4.1 Summary of Existing FMIS

(1) Public system

1) Characteristics of the public FMIS

There are two information systems disseminating data on fish landing volume, price, etc. in existence in Malaysia today. One is the FMIS under DOF and the other is the FMIS under LKIM. The type of data, data collection method, and data flow are shown in Fig. II.4.1.

2) Comparison of the DOF and LKIM information systems

As shown in Fig. II.4.1, although both the DOF and LKIM collect data on fish landing volume, their collection methods differ. As a result, some differences in their statistical data can be discerned.

The data collection method employed by the DOF is to select a sample fishing boat in a specific fish landing area and to monitor its fishing activities for a one month period. Based on these findings, the fish landing volume of one boat/one month is multiplied by the number of registered fishing boats in that landing area, in order to calculate the total fish landing volume for one month. According to this method, statistical data on fishing landing volume according to fish species is available.

In contrast, at LKIM the number of fish boxes the fish trader ships to the wholesale market is reported to the LKIM complex, after the trader has finished his transactions at either the LKIM complex or the private jetty. The total number of fish boxes recorded for one month is multiplied by the average weight of one fish box and this value is the total fish landing volume for one month. Since the statistical data here is collected according to fish boxes per unit, the total fish landing volume represents all species and therefore, fish landing volume according to fish species is unclear.

In an analysis of actual data, the fish landing volume of east Johor in 1990 was 75,269 MT according to DOF records. Since this figure also includes trash fish, its ratio of the total fishing landing volume was estimated at 50 percent. Based on this figure, the fish landing volume of food fish was calculated at approximately 37,600 MT.

Concurrently, LKIM data on the fish landing volume of food fish for the same area in 1990 was 28,721 MT, a figure that is 24 percent lower than the DOF estimate. Moreover, in a comparison of 1989 data, DOF shows a food fish landing volume of 38,500 MT for east Johor, while LKIM has only recorded a volume of 23,093 MT, a 40 percent lower estimate than DOF.

In a comparison of data collection methods, DOF has used the landing volume of fishing landing sites as the total fish landing volume, whereas LKIM has applied the distribution volume to wholesale markets, as the total fish landing volume. DOF collects its data by monitoring the fish catch. Another underlying cause as to the lower LKIM figure may be due to omissions by fish traders in reporting to the LKIM complex, the number of fish boxes shipped out.

All fishing boats which are registered with the DOF are subject to monitoring for data collection purposes. The sampling methods of DOF are objective, since data is collected under uniform conditions throughout the nation. In addition, CPUE values calculated according to DOF data, are reliable as real values, since the boat owner is closely scrutinized in follow-up surveys, etc. DOF data is highly accurate and therefore, it was concluded that use of DOF data on fish landing volumes for the entire nation was reliable.

In view of the data collection method employed by LKIM, their data base is highly reliable in grasping fish flow volume and distribution price, and the volume of fish transported from the fish landing sites to other areas.

(2) FMIS of the private sector

The FMIS in the private sector is made possible with the cooperation of LKIM, AFA, fishing boat owners, chief fishermen, and fish traders. An outline of the fish marketing information network is given in Fig.II.4.1.

Portable telephones are used as a means of communication for class B, C, and C2 type fishing boats when they are at sea, but class A fishing boats do not have any means of communication. This is due to the fact that one fishing operation for class B, C, and C2 boats are usually more than five days long, whereas fishing operations for class A boats are only one day. Therefore, they do not have the need to exchange information. Telephones are widely used at both the fish landing sites and at the wholesale markets.

The use of facsimile machines is prevalent within the publicly run FMIS, however, they are not commonly used the FMIS in the private sector. Wireless radios are also not used, due to their high cost and sophisticated operation.

Before fish is landed, information is exchanged on fishing and weather conditions, on emergencies, etc. among the fishing boats at sea. Fishing boats currently having portable telephones, seldom use them due to high calling rates, poor connections due to obstructing islands, and distances that surpass the dialing range of the telephone.

As they draw nearer to the fishing port on their return trip, the fishing boats will relay information on the expected date and time of their arrival, fish catch volume, and fish species to their designated contact at the fish landing site (fishing boat owner, fish trader, etc.). In turn, the fish traders will telephone their contacts at each wholesale market to collect information on the supply and demand of the market, estimated fish price, etc., whereupon they will determine the destination of the fish catch after its landing.

After the fish have been landed (normally the next day), the fish trader, fishing boat owner, etc. at the fish landing site will be handed a detailed statement on wholesale prices from each wholesaler.

In the study area, the LKIM officer in charge conducts an interview survey of fish traders, boat owners, etc. at the fish landing site, to collect information on wholesale market conditions. However, the findings have not been recorded. In addition, the Endau AFA is also a contributor to this information network since it conducts fish auctions and is a fishing boat operator as well as a fish distributor.

(3) International FMIS

An international FMIS is provided by INFOFISH. INFOFISH disseminates world wide market prices, fish landing volumes and market conditions twice a month, through their publication, "INFOFISH Trade News", to 700 subscribers throughout the world. INFOFISH collects its data from exporters in primary fish markets or in major fish producing countries who are commissioned as contract correspondents by the organization. Each correspondent relays his information to INFOFISH via facimile or telex, which in turn is forwarded by INFOFISH to its subscribers by way of newsletter through the mail or by facimile in urgent cases.

There is no special relevance between the data from INFOFISH, the DOF, and the LKIM.

4.2 Reform Plan of the Existing Public FMIS

(1) LKIM plan

1) Summary of reform plan

In order to achieve a modernized fish production and distribution system and to attain equal distribution of profits between fishermen, distributors, and consumers, a computer network system will be introduced by 1995 to improve the FMIS.

An outline of the FMIS reforms to be implemented by the computer network system is shown in Fig.II.4.2. This computer network system will be composed of two main frame computers in the computer room at LKIM headquarters, which will be tied into a total of 40 personal computers that will be installed at each LKIM complex and LKIM state office (of the 40 personal computers to be purchased, 16 have already been installed as of September 1992). However, although the personal computers at each complex and state office will be used exclusively for FMIS purposes, the main frame computers at LKIM headquarters will be used by the accounting, financial, and personnel departments, in addition to the FMIS.

The two main frame computers and 40 personal computers will all be hooked up to the MAYPAC System, the data communication service of Telekom Malaysia. Data on fish distribution such as fish landing volumes, etc. which is collected by the LKIM complexes and the state offices, will be inputted into their respective personal computers and sent into the main frame computers at LKIM headquarters via the MAYPAC System.

The data which is received by the main frame computers at LKIM headquarters will be saved and analyzed by a packaged analysis program, Statistical Analysis System (SAS), when required. The results will be used to make policy decisions and independent LKIM projections on the fish market.

The data analyzed by LKIM headquarters will be fed back to each LKIM complex and state office, as well as other relevant agencies through the LKIM newsletter, "Teleksikan".

In order to allow an exchange of data to flow between the LKIM complexes and the state offices or between the complexes and the state offices and LKIM headquarters, LKIM is presently studying the introduction of a separate

communication data system, Telita (also provided by Telekom Malaysia), in addition to the MAYPAC system, which will allow data to be exchanged between the three parties. However, data which will be permitted to flow from the main frame computers to the LKIM complexes and state office via the Telita system, will be limited by LKIM.

2) Restrictions in actual implementation of reform plan

a) Shortage of staff members at LKIM headquarters and state offices

There is a potential shortage of staff members who will be required to take charge of data collection and to manage the computer system. In particular, data collection and management of the computerized FMIS at LKIM complexes are undertaken by the managers.

b) Barriers to collecting on-site data

Fish distributors, fishing boat owners, etc. are secretive and reluctant about revealing data on wholesale fish prices, fish landing volume, etc. If such data is openly revealed, its effect on income tax is one of the major reasons for this reluctance. Subsequently, it is extremely difficult to obtain accurate data, particularly on fish price.

c) Barriers to collecting data with LKIM

In the existing data collection system, the LKIM complexes and state offices do not regularly send in their data to headquarters. This is due to a lack of awareness on the importance and necessity of a FMIS by the LKIM complexes and state offices. In addition, it is surmised that they are already inundated with requests for data from LKIM headquarters, and transmissions of data on a regular basis is an added burden.

Furthermore, data content and collection methods by the LKIM complexes and state offices are not comprehensive; and as each complex implements its own data collection methods, the data collected nationwide is not cohesive.

(2) DOF plan

The DOF is in the midst of organizing a computer network system that will connect the main frame computers of the statistics department at DOF headquarters to the personal computers of the DOF state and district offices. Implementation of this system will allow an exchange of statistical data on fish landing volumes, fish price, and export

price, as well as information on policy and market conditions between DOF headquarters and each local office.

The system will be completed and in operation in 1994 and with the assistance of CIDA, a three year Management Control Survey (MCS) is presently underway in its first year. The personal computers which will be installed at each state and district office will be provided by CIDA, in addition to the staff training program.

4.3 Demand for a Public Information System in Production Areas and the Wholesale Market

Daily information on market supply and demand and fish price is vital for class B, C, and C2 fishing boat owners, wholesalers, agents, etc. in their decision making process on the volume and shipping destination of the fish catch. The data is a trade secret which must be obtained swiftly. Subsequently, all of the aforementioned parties already have their own exclusive source of information and a daily public information network is not particularly in demand.

Class A fishing boat owners do not have any electronic communication devices aboard their boats and consequently, their demands are greater for improved facilities rather than provision of a market information system. In addition, their fishing operations are made possible due to long-standing relationships with established wholesalers, agents, etc. Hence, they also do not have any need for a daily public information network.

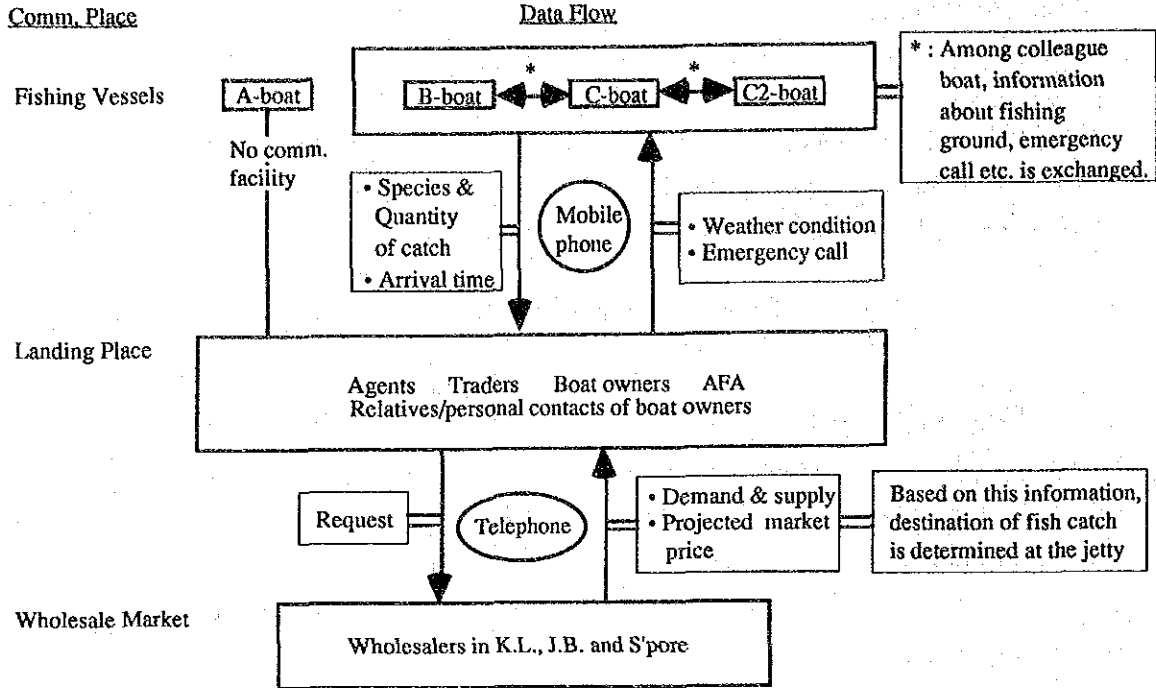
4.4 Limited Introduction of a Public Information System

The introduction of a public information system that will provide daily information on fish transactions would destroy the status quo between the fish traders and the fishermen who are tied to them by credit obligations; and therefore, it is undesirable. The parties who favor this type of intervention are the fisherman and the AFA.

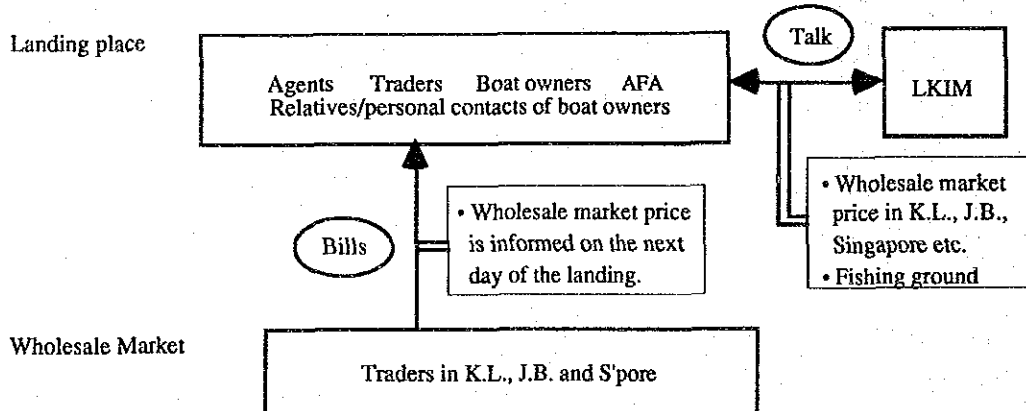
Based on the principles of free competition, it is imperative that a fair fish pricing structure be implemented and income between fishermen and fish traders is fairly distributed. From this point of view, the nationwide FMIS reform plans of DOF and LKIM are not effective.

In view of the present conditions that exist in fish distribution, it would be more appropriate to stimulate the competition by expanding the aforementioned general information system used in the private sector, to include the AFA and general fishermen. Therefore, rather than forcibly adopt the existing public information system, a realistic system which will incorporate locally accepted practices, should be implemented.

[BEFORE LANDING]



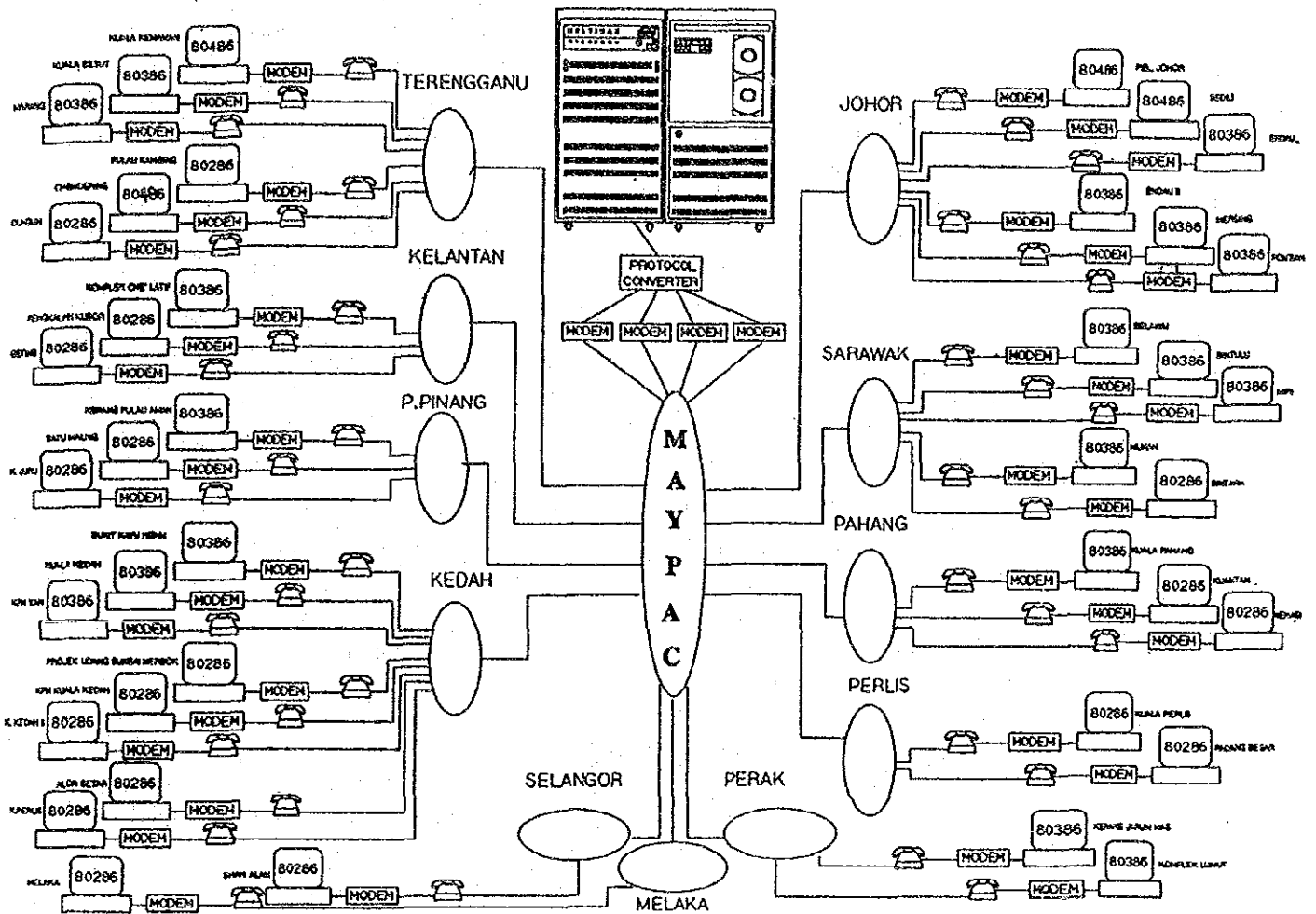
[AFTER LANDING]



Remarks: = People or organization involved
 = Information exchanged
 = Communication method

Source: Field survey Phase 2 (The Feasibility Study on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, Oct. 1992)

Fig. II.4.1 Outline of Informal FMIS (1992)



Source: Field survey Phase 2 (The Feasibility Study on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, Oct. 1992)

Fig.II.4.2 Outline of FMIS Improvement Plan by LKIM

Table II.4.1 Outline of Existing FMIS of LKIM & DOF (1992)

	LKIM	DOF
Types of data collected	<ul style="list-style-type: none"> - Landing price/quantity - Wholesale market price/quantity - Import/export quantity 	<ul style="list-style-type: none"> - Landing price/quantity - Import/export quantity - Wholesale/retail market price/quantity
Data collection point	<ul style="list-style-type: none"> - LKIM investigation centers <ul style="list-style-type: none"> • Landing complexes (20) • Inspection complexes (4) • Inspection centers (10) • Wholesale/retail markets (11) <p style="text-align: center;">(Total = 45)</p>	<ul style="list-style-type: none"> - DOF district offices at fish landing place
Data collection method	<ul style="list-style-type: none"> - Landing price <ul style="list-style-type: none"> • Interview/observation survey • Auction price - Landing quantity <ul style="list-style-type: none"> • Box number reported by traders/agents (fish species are not specified) - Wholesale market price/quantity <ul style="list-style-type: none"> • Interview survey • Reporting system from all traders in the market - Import/export information <ul style="list-style-type: none"> • Custom's statistics • Report from inspection centers 	<ul style="list-style-type: none"> - Landing price/quantity <ul style="list-style-type: none"> • Tracing survey on sample fishing vessels - Import/export information <ul style="list-style-type: none"> • Custom's statistics
Data input flow to HQ, communication equipment, and frequency	<ul style="list-style-type: none"> - From each investigation center to HQ <ul style="list-style-type: none"> • By fax machine • Daily reporting is requested from HQ, however many of the centers are sending weekly or monthly. 	<ul style="list-style-type: none"> - From district office to state office <ul style="list-style-type: none"> • By mail • Monthly - From state office to HQ <ul style="list-style-type: none"> • Mailing a monthly report recorded in format paper or computer floppy disks
Data dissemination/feedback	<ul style="list-style-type: none"> - Teleksikan = monthly newsletter - Data is provided by telephone/paper/fax according to request 	<ul style="list-style-type: none"> - Annual statistics report

Source: Field survey Phase 2 (The Feasibility Study on the Pilot Project for Improvement of Fish Marketing and Distribution System in Malaysia, Oct. 1992)

5. Fish Marketing Related Institution/Organization

5.1 Fisheries Credit

(1) BPM loan to fisheries sector

1) Loans to fishermen

a) Achievement since 1970

During the period from 1970-1991, BPM made a total of 10,500 loans to fishermen in the total amount of RM106.6 million. According to BPM officials, about 80 percent of the loans were made for the purchase or renovation of boats. The 80 percent figure which represents some 8,000 boats is a significant number compared to the total number of 39,541 licensed fishing boats.

b) From 1980 until present

The present BPM lending programs are more conservative than their former ones. Until 1987, BPM participated in a number of subsidized loan programs involving the LKIM and the DOF which were designed to develop the fishing industry through liberal loan terms. The subsidized loan programs resulted in poor loan recoveries and were discontinued. As a result of the low recovery rates, the BPM fisheries portfolio is reported to have only about a 60 percent recovery rate. However, the loans made since the Bank stopped participating in the subsidized loan programs are reported to perform significantly better than the portfolio average. The BPM makes three categories of loans to fishermen; commercial loans, SPKP funded loans, and loans funded by the AJDF.

2) Boats and boat loans

Operating costs of the boat for fishing, primarily diesel fuel, are reported to be about RM2000 per trip (4 or 5 days) for a class-B boat, and RM3000 per trip (8-10 days) for a class-C or C2 boat. Operating costs for the class-A boats are reported to be about RM50 per day (daily trip). The fishing income distribution system--which is used rather than salaries to compensate crew members, is known as the panggalu system.

The BPM does not finance class-A boats due to the limited fishing area available to the smaller boats. RM200,000 is the maximum loan amount on a B boat, and RM300,000 is the maximum loan amount on a C or C2 boat--the construction cost of a C2 boat is reported to be RM500,000. The loan amount is limited to 80 percent of Value, although operating funds can be included in the loan.

Like all commercial loans, the loans must be fully secured and land is the preferred collateral. The loan terms are five years with a different interest rate based on the funding source.

3) BPM-fisherman financing

BPM is well suited to financing boats and is the dominate source of that activity. On the other hand, the BPM is not very active in financing operating expenses other than working capital credit included with boat loans. The principal reason for BPM's lack of involvement in financing operating expenses is that BPM can not be competitive with the traders. The administrative costs of lending--not to mention loan losses--for an institutional lender such as BPM are high, which explains why the BPM has a minimum loan amount. The minimum loan amount of RM2000 is beyond the operational needs of the small boat owner and leaves that particular sector out of BPM's market.

Traders are the dominant source of operating loans because they do not charge interest--they profit by the sale of the fish--and because they are available twenty four hours a day.

BPM management is interested in developing the fishing sector and has approved, but not implemented, a policy which provides for a revolving line of credit which can be extended to fishermen associations. AFA would, in turn, extend loans to its members for any worthwhile purpose including operating expenses. The opportunity for the fishermen's association to succeed in providing operating loans, where the BPM can not, lie in the fact that the association, like the trader can profit from the marketing of the fish which the borrower would be obligated to consign to the association.

4) Private sector credit

The informal credit from the private sector is the primary source of fisherman credit other than BPM financed boat loans. Fuel for boat operations is the major credit need, although personal credit is also extended in the informal sector. The most important source of informal credit for fishermen is from fish traders (towkays), most of whom are Chinese. These traders act as middlemen, purchasing fish at their wharves and selling the fish to wholesalers and retailers. The traders extend credit based on the obligation of the fishermen to sell all or part of the catch to them. Although interest is not charged, the traders profit from the sales margin on the fish which are sold to them in repayment of the loan. Initial interviews with

traders and fishermen revealed that traders often purchase the entire catch; 10 percent of the amount received for the catch is reported to be a normal repayment amount.

(2) Loan to Farmers Association in Mersing

1) Activities

The Farmers Association in Mersing has 1,342 members, the majority of whom produce rubber and palm oil. Forty percent of the members are full-time farmers. The initial membership fee is RM2, plus an annual fee of RM1 and RM10 per year for the purchase of shares in the associations. Association management reported that 80 percent of the members are in default on the purchase of shares. The principal service provided to the membership is the supply of agricultural inputs on credit. The default rate on the credit program is reported to be 10 percent.

The Farmers Association provides credit to its members in the form of agricultural inputs--no cash is provided. The Farmers Association buys the agricultural inputs from the state Farmers Association who receives the inputs from the manufacturers. The local Farmers Association adds 5 percent to their cost of the inputs which it sells to its members.

The inputs are provided to the farmer through a line of credit determined by the Farmers Association based on crop budgets and a visit to the farm. The line of credit for the inputs is opened at the association, which is a combination office and farm supply store, and the farmer takes the inputs as he needs them. The line of credit requires the signature of two guarantors who are association members. The farmer may choose to market his produce through the association, although he is free to market it where he wishes. Repayment terms call for a minimum payment of RM50 each month at 2 percent interest.

2) Assessment of Farmers Association credit

The Farmers Association Credit program is successful because the loan purpose agricultural inputs, is designed to increase production and income; the agricultural production is predictable; the farmers location is permanent; and farm work requires daily routine tasks. Loan recovery is enhanced by the requirement of a monthly payment and two guarantors. Freedom of marketing is an indication of the soundness of the credit program.

5.2 Fishermen Association (AFA)

5.2.1 Summary of AFA within Study Area

(1) AFA Members

1) Fishermen membership ratio in study area AFA

The membership ratio of the Kuala Sedili, Mersing, and Endau AFAs in 1990 of resident fishermen who fall into category 11(1)A or fishing boat skippers and crew members (DOF data) is shown in Table II.5.2.1. The membership ratio of resident fishermen in the Kuala Sedili AFA is 23 percent, 93 percent in the Mersing AFA, and 28 percent in the Endau AFA. With the exception of the Mersing AFA, the number of resident fishermen who rely on the AFA in the other two areas is exceedingly low.

2) AFA members

AFA members of the three associations in the study area from 1990 to 1991 have been compiled according to race and category and are shown in Table II.5.2.2.

The total number of members for all three AFAs decreased 28 percent from 1,762 members in 1990 to 1,448 in 1991. This drop is mainly due to the large number of fishermen who were automatically disqualified from the Mersing AFA due to a default in membership dues (RM1.00 annually) for two years.

Approximately 75 percent of the racial composition of the three AFAs for 1990 and 1991 was Bumiputra and the other races comprised 25 percent.

3) Composition of member categories

According to the data shown in Table II.5.2.2, as of the end of 1991, 72 percent of the members of the three AFAs was listed in category 11(1)A, professional fishermen (engaged in fishing for more than 120 days per year), 13 percent in category 11(1)B as distributors and processors, 8 percent in category 11(1)C as fishing boat owners and others where 60 percent or more of their income is derived from fishing and fisheries related activities, and 6 percent in category 11(2) as employees of fisheries research centers. As can be deduced from the above, although the ratio of professional fishermen in the AFA far outnumber the other categories, it is an organization where fishermen, fish traders, and fish processors are all found together in one association.

(2) Issues on membership qualifications

A unique characteristic of the AFA membership structure and organization is that it is not comprised solely of professional fishermen, but include members involved in all other aspects of the fishing industry such as service, processing, trading, etc. As a result, there are occasionally members whose interests conflict with those of the association.

If the association is allowed to retain members whose livelihood conflicts with AFA economic activities, particularly in the areas of fish and diesel oil sales, friction between these members and others will evolve. This will in turn, hinder the sound development of AFA activities.

Moreover, these activities are based on the premise of member utilization and activities become viable only with member participation. In view of this fact, the issue of retaining boat owners as AFA members, whose use of association activities is extremely limited, has been pointed out.

An AFA composed of members with conflicting work interests will obscure the nature of the association and it will be difficult to foster a cooperative spirit and awareness which is so vital for a cooperative. Therefore, it is essential to revise the organizational structure, its characteristics, and its membership qualifications, in order to strengthen the AFA as an organization, its economic activities, etc.

(3) Consensus of related parties concerning AFA membership qualifications

1) Consensus of Endau AFA members

In an exchange of opinions with Endau AFA members, the general consensus was that the organizational structure and nature of the AFA should be legally decided and that fishermen would have to simply abide by the law.

With regard to the issue of dividing members into full and associate members, and allowing only those with full membership the right to participate in the actual operation of the AFA, the fishermen were of the opinion that both full and associate members be equally allowed to maintain that right. Therefore, it was concluded that the Endau members were negative on the proposal to divide the members into these two groups. (However, it should be taken into consideration that this gathering included boat owners, crew members, processors, distributors, etc. and due to the highly sensitive nature of the issue, it is not surprising that the overall consensus was negative to this idea.)

2) Consensus of the LKIM

A summary of the conclusions reached in deliberations with LKIM regarding the AFA is given below.

- a) LKIM supported the necessity of reforming the organizational structure of the AFA to one centered on fishermen. This is due to the lack of cooperation from the majority of the fishing boat owners with regard to AFA activities and operations. Many are also nominal members and the need to take measures to prevent them from dominating the association was pointed out.
- b) The proposal to divide AFA members into full and associate members, particularly that of giving fishing crew members associate membership status did not meet with the approval of the LKIM. The purpose of the AFA, according to government policy, was to elevate the economic livelihood and social status of fishing crew members. Subsequently, this proposal was not in line with this policy.
- c) The Fishermen's Communities Development Department in the LKIM is reviewing the following reforms of the organizational structure of the AFA which are possible under the current law.

Fish processors and distributors will be excluded from the existing AFA and a separate association for fish processors and distributors will be set up under the auspices of the AFA law. If there are not enough processors or distributors in that area to establish a regional association, a state association will be created.

In addition, a further change would be to limit AFA membership to fishermen in the 11(1)A category and to establish a separate association based on fishing activity, i.e. for fishermen engaged in offshore fisheries using large boats (Class C, C2) similar to the Japanese bonito and tuna fishing associations.

3) General consensus of relevant Malaysian government bodies

- a) LKIM is against an AFA which is centered on fishing operators and desires an organization which is focused on fishing boat crew members and fishermen engaged in traditional fishing.
- b) LKIM supports the exclusion of distributors and processors from AFA membership.

(4) Organizational and member qualification reform

In order to alleviate rivalry among AFA members, it is necessary to either exclude fishermen with conflicting interests from its membership or lessen their participation in AFA management and operations. Therefore, some reforms in organizational structure and member qualifications are required. In future, the AFA will center its operations around members who fall into the existing category, 11(1)A.

In addition, establishing a separate association for large fishing boats as proposed by the Fishermen's Communities Development Department, will severely reduce the net profit of AFA activities, specifically diesel oil sales, by more than 70 percent, as well as restrict AFA expansion in the area of fish marketing. In conclusion, pursuing this proposal undermines the aim to strengthen the AFA.

Reforms of the organizational structure of the AFA should not be limited to the AFA in the study area, but should be implemented equally for all AFAs throughout the nation. It is desirable that an "AFA Organizational Reform Committee" is set up to review the reforms implemented in the pilot project.

5.2.2 Analysis of Economic Conditions of AFA in the Study Area

(1) Summary of economic activities

The AFA economic activities for 1990 and 1991 in the sale of diesel oil and ice, implementation of the auction, fishing operation by AFA boats, etc. are explained below. (See Table II.5.2.3)

- 1) Profits have dropped at the Endau and Mersing AFAs.
- 2) Sales generated from diesel oil is the largest source of revenue for all the AFAs.
- 3) The operation level of each economic activity differs according to each AFA.
- 4) Profits generated from auctions are exceedingly low and are declining.
- 5) The sale of ice and fish auctions have been completely abandoned by some AFAs.
- 6) Although the Endau AFA has generated high profits by carrying out fishing operations using their own large fishing boats, profits have been declining recently due to over fishing.

(2) Condition of economic activities

1) Diesel oil

The sale of diesel oil is the largest source of revenue for each AFA and

averages about 72 percent of the total net profit for all three AFAs.

The ratio of fishing boats utilizing AFA supplied diesel oil for 1990 and 1991, as shown in Table II.5.2.4, shows that the number and ratio of fishing boats using AFA diesel oil is declining. The number of fishing boats which purchased AFA diesel oil at least once during a one month period for all three AFAs in 1990, averaged 92 boats, whereas in 1991 the average fell to 72 boats.

According to the findings of the interview survey of the Endau AFA, the major cause of this decline is the increase in the number of private jetties in the same area which supply diesel oil. It is significant that in 1989 there were only two fuel supplying jetties, including the AFA, within the area. In 1991 there were nine fuel bases. Another factor indicated was the narrow fuel supply jetty of the AFA and the small capacity of its fuel pump.

Subsequently, under the present circumstances, the AFA is at a disadvantage in the competition against the private jetties in diesel oil sales in the area of both service, price, etc.

2) Fish marketing activities

a) Present conditions in fish marketing by the AFA

As of the end of 1991, only the Kuala Sedili and the Endau AFAs were engaged in fish marketing activities. However, the fish auctions became burdensome for the Kuala Sedili AFA and in January 1992, the organization terminated their auction activities. LKIM has been directly implementing the auctions at Kuala Sedili in lieu of the AFA since that time.

The Mersing AFA participated in fish marketing activities approximately ten years ago, but has not taken up these activities since that time. Subsequently, fish auctions are directly implemented by the Mersing LKIM complex in that area.

Thus as of 1992, the Endau AFA is the only AFA in the study area actively engaged in fish marketing activities. Since fish marketing activities are the crux of any AFA, active participation in this area is an important issue.

b) Structure of fish transactions carried out by the Endau AFA

Among the fish transactions carried out by the Kuala Sedili LKIM are the fish auctions. These auctions are regularly attended by about 20 wholesalers and retailers.

There are about 10 regularly participating retailers at the fish auctions implemented by the Mersing LKIM

The Endau AFA have centered their fish marketing activities on fish auctions and direct consignments. However, although the auctions were terminated in mid-1990, fish sales through direct consignment is still continued to this day. There are about ten fish traders who regularly participate in direct consignment sales with the AFA. However, when the AFA and SFA operated fishing boats land their fish, there about 20 participating fish traders.

In addition, fish harvested by the AFA and SFA operated fishing boats which are earmarked for other areas such as Singapore, Johor Bahru, Kuala Lumpur, etc., are sold through direct consignment.

c) Record of fishing boats utilizing the fish auctions

The characteristics of the fish auctions carried out by the AFA in 1990 and 1991 and the number of recorded fishing boats utilizing these auctions are shown in Table II.5.2.5.

The monthly average number of fishing boats using the auctions in all three areas in 1990 numbered 59 and the monthly sales volume per boat was 327 kg. However, in 1991 the average number of boats was 37 and the monthly sales volume per boat was 340 kg. These figures indicate that the number of boats utilizing the auctions is declining and the sales turnover at the auctions is increasing slightly.

The monthly average fish sales volume per boat is small due to the fact that the majority of the boats utilizing the auctions, practice traditional fishing methods such as hook and line, traps, gill nets, etc., in addition to other factors such as the recent tendency to overfish, increased competition from private jetties, etc.

d) Handling volume of auctions

The total fish landing volume within the boundaries of the AFA, the fish landing volume of the LKIM complex, and the volume and ratio of fish harvests of both the AFA and the LKIM which are sold through the auctions, are given in Tables II.5.2.6 and II.5.2.7.

The volume of fish products within the area encompassed by all three AFAs which pass through the auctions, is only one percent of the total average

fish landing volume of this entire area.

In addition, despite the regulation that 20 percent of the fish landed at the LKIM jetty must be sold through the auction, the average volume handled by the LKIM auctions is merely 6 percent of the total fish landing volume of the three areas under the jurisdiction of the AFAs. Therefore, strengthening LKIM's role in implementing and enforcing the regulation, in order that each fishing boat will abide by this regulation, is desirable.

3) **AFA owned and operated fishing boats**

The fish sales volume and fish price of fishing boats utilizing the Endau AFA auctions from January to August 1992 are shown in Table II.5.2.8.

A notable characteristic of the Endau AFA auctions is that approximately 74 percent of the total volume of fish handled are fish landed by the three fishing boats owned and operated by the AFA, SFA of Johor state, and the former chairman of the Endau AFA, respectively. The remaining 26 percent of the sales volume is comprised from 39 other fishing boats. Moreover, in contrast to the per kilogram fish price of RM2.64 for AFA landed fish, the price of fish landed by other fishing boats was RM1.39 per kilogram. This indicates that other fishing boats are selling only low priced fish through the auctions.

In conclusion, the Endau AFA auctions are in actuality, mainly supported by the three AFA owned fishing boats; and without this mainstay, the auctions would no longer exist. The issue to be addressed by the AFA in the area of fish auctions, is to increase the number of participating fishing boats and the fish handling volume.

5.2.3 AFA Social and Welfare Activities in the Study Area

(1) **Social Activities**

1) **Social welfare activities**

- a) Educational assistance for children of fishermen below the poverty line
 - b) Condolence money in the event of death in fishermen families
- 2) **Administrative services for fishermen and training and guidance in fishing technology**
- a) Assisting fishermen with bank loan applications
 - b) Assisting fishermen with renewing their fishing boat licenses

- c) Sending fishermen to attend lectures on fishing methods, fishing equipment, processing technology, etc.
- 3) Acting agent for various insurance companies
 - a) Compulsory insurance for fishing crew members
 - b) Fishing boat insurance
 - c) Optional insurance for damage compensation
- (2) Achievements in social welfare activities

The nature of the social welfare activities carried out by the AFA differs slightly according to each AFA. Despite the fact that the foremost beneficiary of AFA social welfare activities is the fishing boat crew member, all three AFAs suffer from a shortage of capital. Consequently, they are unable to implement a comprehensive social welfare program at this time. This Project will assist the AFAs to carry out a more comprehensive program in this area.

Achievements of the social welfare activities of each AFA for the fiscal year 1991 are given below.

1) Kuala Sedili AFA

Educational assistance for fishermen's children: A total of RM550 were granted to four children. The total amount of capital available was RM4,786.04.

Death compensation for fishermen families: Not implemented

2) Mersing AFA

Educational assistance for fishermen's children: None

The total amount of capital available was RM21,264.36.

Death compensation for fishermen families: Not implemented

3) Endau AFA

Educational assistance for fishermen's children: A total of RM865 was granted to 72 children. The total amount of capital available was RM13,192.81.

Death compensation for fishermen families: In 1991 RM150 was given to the surviving spouse of one fishermen. The total amount of capital available was RM1,512.88. There were 300 participants in this program as of fiscal 1991.

5.2.4 AFA Management and Operations, Administrative Organization

(1) AFA management and administrative organization

1) Managerial and middle management duties

Seeing to the overall management of the AFA, its economic and social activities, in addition to attending meetings with higher government agencies such as LKIM, DOF, etc., fall completely on the shoulders of the AFA manager. Subsequently, the more active and successful the economic and social activities of the AFA, the more overworked is the manager.

Furthermore, despite the success of the manager's work in the area of economic and social activities, there is no rewarding remuneration for his efforts since he is an LKIM officer. For the AFAs where the aforementioned activities have not been thriving, one possible option is to employ talented managers from the private sector.

In addition to the above, there is a shortage of middle management staff members to assist the manager in his work. At the Endau AFA, middle management staff is comprised of only one assistant manager and two accountants. For the Endau AFA where activities are being carried out on a large scale, a shortage of middle management staff hinders the appropriate management of the organization.

For example, the Mersing Farmers' Association has a staff of 12 members of which six have been sent from LKPM, a government counterpart agency of the LKIM, to fulfill the role of middle management staff.

2) Shortage and training of technical personnel

Due to the shortage of technical personnel at all three AFAs, particularly computer specialists, the AFAs have been unable to fully utilize their computers. Consequently, it has been unable to swiftly and accurately compile data on its management, operation and activities. In addition, progress has not been made in implementing reforms in fresh fish marketing activities, due to the lack of a specialist. It is necessary for the AFA to train and employ a fresh fish marketing specialist, in order to enable the association to aggressively make inroads in this area. Furthermore, it is essential that a vocational training course to foster AFA personnel is established, in order to enable the AFA to effectively pursue and carry out its duties.

(2) Summary of training program for LKIM personnel

The educational program for LKIM officers is carried out by the Human Resources Department. This department operates on an annual budget of RM310,000.

In order to improve the overall ability of its officers, the department has periodically implemented training programs. Ninety such training programs were carried out in 1991 (including nine training programs, nine seminars, etc. sponsored by foreign governments).

The LKIM Training Center, a training facility in Camal Laut, Sepang, was completed in February 1991. The facilities include a dormitory with an accommodation capacity of 108 trainees, a lecture hall (capacity 80), and an overhead projector (OHP) and VTR used for educational purposes. The utilization rate of the center was approximately 60 percent as of 1992.

Training programs cover a wide variety of subjects, including the study of statistics, investment analysis methods, methods on management and operation, fishing technology, technical analysis, management, financial administration and operation of fishermen associations, oyster culture, culture of fish fry, prawn, and other fish species, quality control techniques, computer programming, technical operation of OA equipment using the lotus program, etc. which are essential to the daily operation of the LKIM. In addition to the aforementioned, lectures are available on general interest subjects such as Japanese language, telephone conversation techniques, photography, workshop on domestic tourism etc.

All of the above are short lectures usually lasting from one to two days; and in addition to technical personnel from LKIM, specialists from other government institutions such as the Ministry of Agriculture, the Ministry of Fisheries, etc. are invited as guest lecturers, as well as members of consultant companies from the private sector. Lecturers are normally selected from among LKIM officers of the appropriate department.

Six training lectures were given by the LKIM for AFA managers in 1991 on the subjects of investment analysis methods in activity planning and management methods of activities.

(3) Cooperative College of Malaysia (Maktab Kerjasama Malaysia)

- 1) This vocational school is a two year college which was established solely for the purpose of promoting the cooperatives. Its educational program centers on cooperatives, their management and operation, the publication of cooperative related materials and functions as a research center on cooperatives, fulfilling an advisory role for existing cooperatives, etc. The student body is composed of members of cooperatives, cooperative staff members, as well as officers from the Ministries of Agriculture, Fisheries, and other pertinent government agencies.
- 2) The aforementioned two year college was created in 1956 by Parliament and it was allocated the responsibility of overseeing the education and promotion of cooperatives. Initially, the college was made possible through the auspices of the Colonial Social Development Fund. It became a corporation in 1986 and it is presently under the jurisdiction of the Ministry of Land and Co-operative Development.
- 3) Its operating budget is currently based on two percent of the net profits of all cooperatives created as of 1969 to the present, as stipulated by the regulations under the Cooperative Law.
- 4) Its facilities include eight lecture halls, a library (containing 22,000 volumes), and a boarding facility capable of accommodating 240 people at any given time.
- 5) The faculty is composed of 28 members (the college is operated by a staff of 90, including full-time lecturers and lecturers from the University of Agriculture, Malaya).
- 6) The educational program is divided into the Diploma course of one to two years of study and short-term courses. The short-term courses are made up of regular programs lasting from three days to two weeks and special programs, implemented upon special request, lasting from two to 12 weeks. These special programs are set up upon request by an agency or institution, to the college; and the content of the course is decided in conjunction with its objective.

The educational program and content of the one year course of study is given below.

- a) First term: Cooperative principles, spirit, economic theory, human resources and communication, statistics, computer application
- b) Second term: Cooperative law, management and operations, investment management, financial management, debating techniques and idea formulation,

project paperwork

- 7) Those qualified to attend this course are cooperative leaders, staff members of cooperatives, and university graduates interested in working for a cooperative in future. The category of people who are not qualified to attend is as follows:
 - a) University graduates
 - b) College graduates who have two or more years of experience working for a cooperative
 - c) Personnel with more than five years of working experience at a cooperative
- (4) Adapting Existing Training Courses to the AFA

The content of the training courses sponsored by the LKIM and the possibility of implementing educational programs for AFA staff members are delineated below.

- 1) Evaluation of LKIM sponsored training program

The content of the training course currently implemented by the LKIM has been aimed at upgrading the education and general abilities of LKIM officers, and it has not been designed for practical application by AFA middle management personnel. In addition, since the training course is not directly aimed at educating AFA managers, there are very few courses and subjects offered which meet the needs of AFA managers. Under the present circumstances, there is no available course suited to the needs of AFA middle management personnel.

Hence, it is necessary that LKIM set up a special short-term curriculum aimed specifically at training AFA employees. The Training Center at Camal laut is equipped with sufficient boarding facilities and it is capable of meeting the needs of a long-term training program. If the facilities of the Training Center is made available in conjunction with a specially devised curriculum for AFA personnel, a training program to foster AFA middle management personnel is possible.

- 2) Implementing a training program for AFA personnel at the Cooperative College of Malaysia

The one to two year course at the Cooperative College of Malaysia is sufficiently capable as an educational institution, of producing upper management personnel for cooperatives. However, due to its restrictive entrant qualifications, sending AFA staff members there would be difficult, with the exception of the

manager and the accountant dispatched from LKIM.

In reality, there is only one LKIM officer who has attended the one year course to date; and under the present situation, it will be difficult to send large numbers of AFA staff members to attend the one year course at the college. Furthermore, the AFA will also be required to allocate two percent of their net profits to the college in conjunction with the other cooperatives, if they were to utilize the services of the college. Under the present circumstances, not all AFAs would be capable of doing so.

5.2.5 AFA Credit System

(1) Accomplishments

- 1) One of the objectives of the AFA set forth under ACT 44 (1971) is to support financing for fishermen. However, although credit is available for the purchase of diesel oil and ice as of 1992 for all three AFAs in the study area, there is as yet, no system of financial assistance for fishermen in the areas of operating and development capital.

In the past, the Endau AFA made RM10,000 of reserve funds available as operating capital for fishermen. A maximum loan of RM2,000 was given to five fishermen and the loans have remained uncollected due to personal circumstances such as death, sale of fishing boat, and shut down of fishing operations.

Consequently, the Endau AFA does not have any reserve funds available for its fishermen, making it impossible for the association to extend credit for uses other than the purchase of diesel oil and ice.

In conclusion, the underlying reason for the passive stance of the AFA in Malaysia in extending financing to fishermen, is due to the lack of funds and problems encountered in loan collections, as in the case of the Endau AFA.

- 2) In marked contrast to the AFAs, the Mersing Farmers' Association is annually allotted RM20,000 as loan capital to assist an average of about 200 farmers per year. The association will not disburse the loans in cash form, but will purchase the actual article desired by the farmer in lieu of the cash.

The maximum loan amount is RM5,000 and a loan may be approved without collateral, if there are two association members acting as guarantors and the approval of the board of directors. The yearly interest loan rate is six percent

and it is much lower than commercial interest rates. Loan funds are derived from surplus profits generated by the association's economic activities, membership stocks, and members' savings accounts.

A segment of the financing system implemented by the Farmers' Association can be adapted to the AFA.

(2) Reforms of the AFA credit system

The following conditional factors are required in order to implement reforms of the AFA credit system.

- 1) Introduction of a credit fund and low interest financing
- 2) Employment of a specialist thoroughly versed in credit activities
- 3) Development of a fail safe loan collection system
- 4) Overcome the lack of fishermen initiative to repay loans and improve the loan collection rate
- 5) Implement reforms in the organization of the AFA which will enhance AFA credit activities

In deliberations with the LKIM, BPM, AFA managers, and members on the aforementioned conditional factors, a summary of the discussions are presented below.

a) Introduction of a credit fund and low interest financing

Both the LKIM and the BPM pointed out the necessity of using government capital as part of the fund required for credit financing. The underlying reason is that the current basic lending rate of BPM commercially based loans is 8.9 percent, whereas low interest rates (maximum 6 percent) could be offered to fishermen with the use of government capital.

b) Employment of a credit specialist

The BPM will provide the appropriate personnel in conjunction with the institution of a credit system.

c) Development of a fail safe loan collection system

AFA loans will be available only for fishermen who have signed a fish consignment contract with the association; and thereby enable the AFA to offset the credit fund with fish sales. Although a standard consignment contract uniform in scope will be instituted, personal details will be worked

out between the AFA and the fisherman on an individual contract basis.

- d) Overcoming the lack of fishermen initiative to repay loans and improve the loan collection rate

Fishermen are thoroughly aware of the necessity of added interest rates that accompany loans and of the need to repay them. Therefore, if appropriate management and supervisory measures are taken on the part of the AFA, defaults on loans would not occur except in the event of force majeure, such as ocean disasters, forfeiture of fishing boat due to illegal conduct, an extremely long-term lean fishing season, etc.

- e) Implement reforms in AFA which will enhance its credit activities

In order to successfully carry out an AFA credit system, it is necessary either to drop the status of members who would become potential rivals of this system, to associate member status or to exclude them altogether and remove a potential impediment (if they are not excluded, AFA credit activities may not develop at all, due to the opposition of fish traders).

However, in order to implement such a measure, it is necessary to create a regulation that will stipulate the associate member status of fish traders or their exclusion from the association, through discussions with the AFA members.

5.2.6 Function and Organization of the AFA

The AFA was organized by personnel engaged in fishing related activities as stipulated under Section V of ACT 44 (AFA law).

The organization is headed by a board of directors and the management, operation, etc. of the association is carried out under the chairman of the board of directors by members who have been employed as AFA staff.

The various groups pertinent to the association are given below.

- (1) General meetings

General meetings are attended by AFA members and they are held once a year between January and March. Progress reports on various AFA activities are presented as well as a financial report. Explanation and approval of the activities planned for the new year are given. In addition, members of the board of directors, the SFA representative, etc. are elected.

The board of directors, which is the foremost decision making body of the association, cannot be empowered without the attendance of one third of its members. Members who attend the general meeting are paid a daily stipend (the amount differs with each AFA).

(2) Board of Directors

Members of the board of directors are voted in during general meeting elections. Although the number of directors differ according to each AFA, generally there are 10 to 15 members. There are 10 members on the board of directors of the Endau AFA.

Among the board members, one member will be selected to serve as chairman of the board. The term for all board members is two years. In addition, according to the AFA Act, three to five board members must be elected from category 11(1)A.

The board of directors hold regular meetings once a month, in addition to extraordinary general meetings, at which deliberations, decisions, etc. are made on each AFA activity, management and operation of the organization, and on other plans.

Board members are not paid a regular salary, but are recompensed on a daily basis for attending board meetings, and for other services rendered in the line of duty for the AFA. The amount differs according to each AFA.

(3) Organization and management/operation of AFA activities

The actual management and operation of the AFA is carried out by the general manager and assistant manager who are appointed by the chairman of the board of directors with the approval of the remaining board members. They are supported by AFA staff members who are also hired, subject to approval of the board.

The actual formulation and operation of AFA activities is carried out by the general manager; and at AFAs which implement many activities, an assistant manager is employed, in addition to an accountant. These three personnel occupy a vital position within the AFA and in actuality, they are the crux of the actual operation of the association.

The general manager, the assistant manager, and the accountant are often LKIM officers who have been sent from the agency and draw their salaries from LKIM. The remaining AFA staff members are employees of the AFA and they are paid by the association.

An organizational chart of the Endau AFA and the management and operations of

their activities are given in Fig.II.5.2.1.

5.2.7 AFA Fishing Grounds and Fishery Resource Management

(1) Conditions in fishery resource management

The management and care of fishing grounds and fishery resources are under the jurisdiction of the DOF and presently the AFA does not play a role in this area.

In addition, the LKIM has been independently pursuing a policy to nurture fishery resources by dropping artificial reefs and it is currently engaged in preparations to drop them in the study area.

In recent years, there has been a conspicuous decline in fishery resources and the AFA's participation in measures such as dropping artificial reefs, release of fish fry, etc., implemented by DOF, LKIM, and other governmental agencies, is desired.

(2) Use of the ocean area under a system of exclusive fishing rights

The AFA in Malaysia do not possess exclusive fishing rights unlike the AFA in Japan. As a result, the ties binding the fishermen to the AFA are weak and it has been difficult to foster a spirit of cooperation among AFA members. Fishing rights referred to here are "the exclusive rights to conduct fishing in a designated ocean area" and "the right to harvest as well as culture fish and plant life".

Since the AFA does not possess the right to manage and administer fishing rights, it has been unable to manage and nurture the fishing grounds in their area. This is the underlying reason why it has been difficult to stop the growing decline in fishery resources.

In order to strengthen the AFA, measures which will allow the association to manage, protect, and nurture fishing grounds and fishery resources, i.e. giving the AFA exclusive fishing rights over an area where they have dropped artificial reefs; and placing the administration of these fishing rights under the supervision of DOF is recommended. Such measures which will help strengthen the AFA are necessary.

The following notable results are anticipated if the AFA is entrusted with fishery resource management and fishing rights.

- 1) A spirit of joint cooperation in the management of fishery resources and fishing grounds will evolve.

- 2) The merits of joining the AFA will be increased tenfold and a spirit of cooperation will pervade the organization.
- 3) Petty fishermen engaged in traditional fishing methods will be fostered and protected.

However, it is important to bear in mind that allocating fishing rights to the AFA must be implemented in gradual stages over a long period of time, taking into consideration such factors as the differing state of affairs of the country, the educational level and the degree of fishermen awareness, etc. In this Project, it is an issue to be resolved by the year 2010 or 2020.

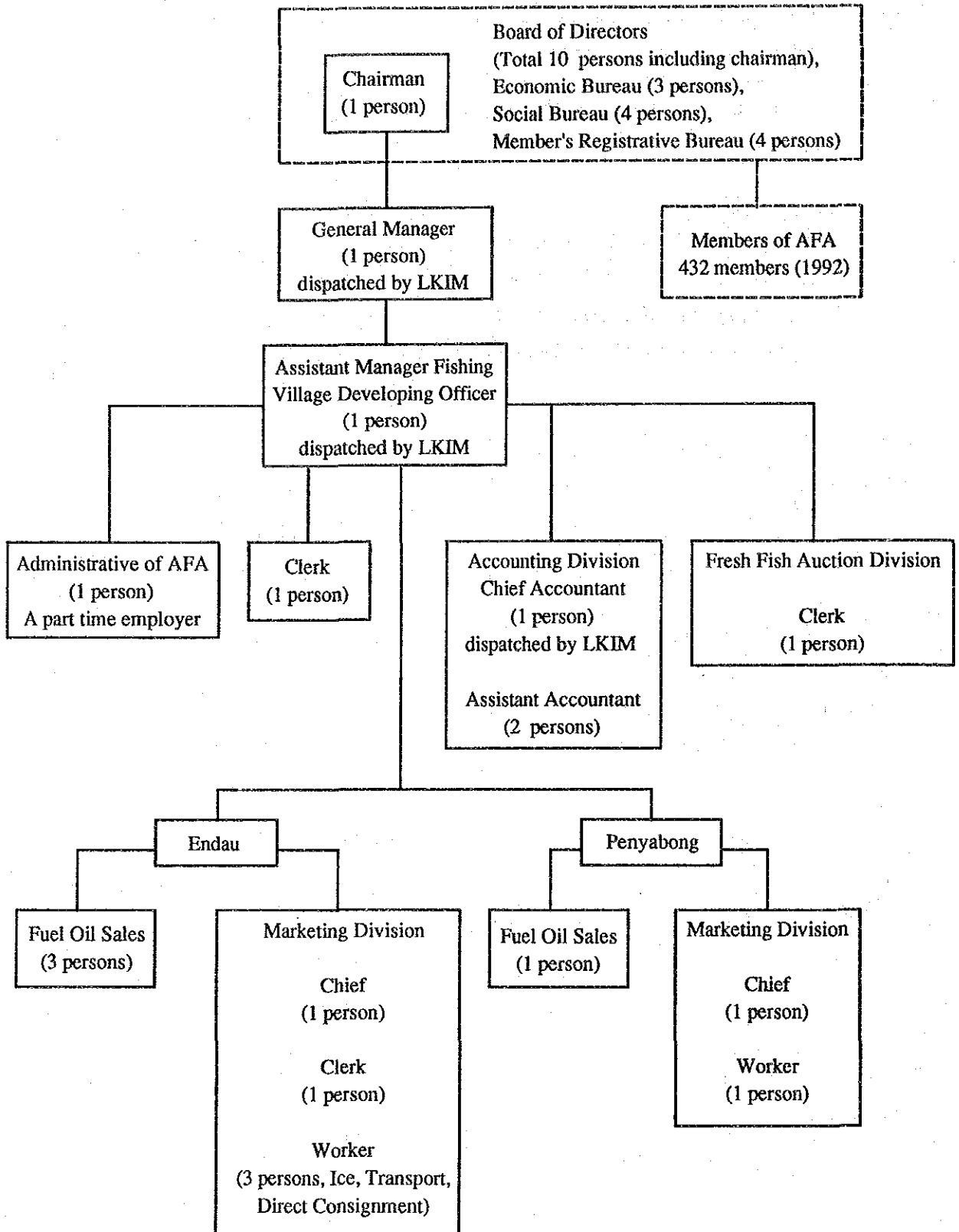


Fig. II.5.2.1 Organization of Endau AFA (1992)

Table II.5.2.1 Number of Fishermen and AFA Members (1990)

Unit: Person			
Name of AFA	Number of Fishermen (*1)	Number of AFA Membership (*2)	Membership Rate
K. Sedili AFA	1,095	253	23%
Mersing AFA	917	854	93%
Endau AFA	1,060	293	28%
Total	3,072	1,400	46%

Remarks: The number of fishermen for the licensed boats.
 Source 1: (*1) Fisheries Statistics 1990, DOF, Mersing
 Source 2: (*2) Provided by AFA Managers, April 1992

Table II.5.2.2 AFA Members by Category (1990/1991)

Unit: Person													
Category	11(1)A		11(1)B		11(1)C		11(2)		Others		Total		
	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	
(1) K. Sedili AFA													
Malay	235	275	27	34	17	18	9	11	0	0	289	338	
Chinese	18	19	17	18	3	3	0	0	0	0	37	40	
Sub. Total	253	294	44	52	20	21	9	11	0	0	326	378	
(2) Mersing AFA													
Malay	606	346	47	53	13	25	16	34	0	0	682	458	
Chinese	248	135	43	30	23	11	7	14	0	0	321	190	
Other	0	0	0	0	1	1	0	0	0	0	1	1	
Sub. Total	854	481	90	83	37	37	23	48	0	0	1,004	649	
(3) Endau AFA													
Malay	204	195	42	43	31	31	8	14	0	1	285	294	
Chinese	89	79	26	8	27	32	5	7	0	11	147	127	
Sub. Total	293	274	68	51	58	63	13	21	0	12	432	421	
Total	1,400	1,049	202	186	115	121	45	80	0	12	1,762	1,448	
	(79)	(72)	(11)	(13)	(7)	(8)	(3)	(6)	(0)	(1)	(100)	(100)	

Remarks: 11(1)A: Engaged in fishing more than 120 days/year
 11(1)B: Fish processors & distributors
 11(1)C: More than 60 percent of income earned from fishing
 11(2): Fishing related AFA staff, etc.

Source: Provided by AFA Managers, April, 1992

Table II.5.2.3 Net Profit by AFA Economic Activities (1990/1991)

Activities	Mersing District					
	K. Sedili AFA		Mersing AFA		Endau AFA	
	1990	1991	1990	1991	1990	1991
Diesel oil	24,441	33,547	73,406	67,350	186,210	145,373
Ice supply	-	-	-	9,592	34,224	38,633
Auction	9,728	4,549	-	-	4,380	1,227
Grilled fish	-	1,691	-	-	-	-
Fish seed	-	16,653	-	-	-	-
Transportation	-	-	2,251	11,778	-	-
Deepsea fishing	-	-	-	-	59,975	19,675
General work (*1)	9,741	-9,741	14,106	-7,281	1,582	3,981
Tender (*2)	-	6,681	-	-	-	-
Profit/Loss	43,910	53,380	89,763	81,439	286,371	208,889

Remark 1: "General work" (*1) Miscellaneous work such as office cleaning

Remark 2: "Tender (*2)" is Subcontract work from the Government, DOF, LKIM.

Source : Annual report of AFA's economic activity, 1990/1991, LKIM

Table II.5.2.4 Number of Fishing Boats Utilizing Diesel Oil Supply by AFA (1990/1991)

Area	No. of Fishing Boats(A)	Unit: Boat			
		1990		1991	
		Average Use per Month(B)	Average Monthly Utilization Ratio (B/A)	Average Use Per Month (B)	Average Monthly Utilization Ratio(B/A)
K. Sedili	255	107	42%	59	23%
Mersing	297	73	25%	71	24%
Endau	239	96	40%	85	36%
Average	264	92	35%	72	27%

Remark 1: (A) Number of boats excluding •• use of diesel oil.

Remark 2: (B) Number of boats •• diesel oil AFA more than one time per month.

Source 1 : (A) from Fisheries statistics 1990, DOF, Mersing.

Source 2: (B) from Interview survey to AFA Managers, 1992

Table II.5.2.5 Number of Fishing Boats and Their Utilization Rate of the Auctions (1990/1991)

Organization	Number of Fishing Boats (A)	1990				1991	
		Average Use per Month (B)	Average Monthly Utilization Ratio (B/A)	Sales Vol/kg Boat/Month (C)	Average Use per Month (B)	Average Monthly Utilization Ratio(B/A)	Sales Vol/kg Boat/Month (C)
		K. Sedili AFA	262	27	10%	443	20
Mersing LKIM	299	61	20%	324	26	9%	464
Endau AFA	244	89	36%	215	65	27%	193
Average	268	59	22%	327	37	14%	340

Remarks: Number of Fishing Boats includes Out boat engines.

Source 1 : (A) Fisheries Statistics 1990, DOF, Mersing.

Source 2: (B) & (C) from Interview survey to AFA Managers.

Table II.5.2.6 Total Fish Landing Volume and Fish Sales by Auctions (1991)

Unit: MT			
Organization	Volume through Auctions(A)	Total Fish Landing Volume of the Area (B)	Ratio (A/B)
K. Sedili AFA	104	9,754	1%
Mersing LKIM	145	4,745	3%
Endau AFA	157	12,838	1%
Total	406	27,337	1%

Source 1 : (A) LKIM Annual Report 1991.
 Source 2: (B) & (C) from Interview survey to AFA Managers.

Table II.5.2.7 Fish Landing at LKIM Jetty and Fish Sales Volume and Ratio by Auctions (1991)

Unit: MT			
Organization	Volume through Auctions (A)	Fish Landing Volume at LKIM Jetty (B)	Ratio (A/B)
K. Sedili AFA	104	3,064	3%
Mersing LKIM	145	2,557	6%
Endau AFA	157	1,043	15%
Total	406	6,664	6%

Source : Laporan Keseluruhan Aktiviti Kompleks LKIM Kuala Sedili, 1991
 Source : Laporan Keseluruhan Aktiviti Kompleks LKIM Mersing, 1991
 Source : Laporan Keseluruhan Aktiviti Kompleks LKIM Endau, 1991

Table II.5.2.8 Sales Volume through Auction at Endau AFA (Jan. to Aug. 1992)

Number of Boats	Weight (kg)	Percentage (%)	kg/Per. Boat	Value (RM)	RM/kg
3 (AFA Fishing Boats)	55,155.40	74	18,385.13	145,357.10	2.64
39 (Other Boats)	19,548.80	26	501.25	27,147.72	1.39
Total (Average)	74,704.20	100	(1,778.67)	172,504.82	(2.31)

Source : Log books of Auction at Endau AFA.

6. Fish Marketing Facilities

6.1 Fish Marketing Facilities in east Johor

There are three LKIM complexes currently in existence in the study area. A Mercator projection of the three fishing ports are given in Fig.II.6.1 to II.6.3.

6.1.1 Basic Facilities

A comparison of the basic facilities (i.e. landing, preparing, mooring, navigational routes and anchorage facilities) of the three LKIM complexes in Endau, Mersing and Kuala Sedili was done to determine the best location for the new fishing complex.

(1) Endau

The complex is located on the right bank, approximately 2.5 kilometers upstream from the river mouth of Endau River. Although the width of river in the vicinity is about 400 meters wide, the depth in front of the existing jetty, which is 58 meters long, is shallow. Subsequently, it is difficult for fishing boats to dock at the jetty during ebb tide.

The land area fronting the river at this complex is narrow and there is very little room for expansion. There is sufficient water depth in the river and at the river mouth for fishing boats to navigate in and out of the river throughout the whole tidal range.

(2) Mersing

The Mersing complex is located near the river mouth on the left bank of Mersing River. A jetty for passenger ferry boats is located downstream of the 64 meter long complex jetty. The width of the river in the vicinity is narrow and less than 100 meters wide.

The water depth near the LKIM jetty and at the river mouth is shallow (see Fig. II.6.4). Fishing boats are forced to wait for the tide, since they are unable to negotiate the river mouth during ebb tide. Adjacent to the complex, there is an ice plant and a residential area which leaves very little room for expansion.

(3) Kuala Sedili

The Kuala Sedili complex is located on the left bank of Sedili River, slightly upstream from the river mouth. In front of the 98 meter long complex jetty, is a wide expanse of water stretching out like a lake; and the water depth surrounding the jetty is sufficient for fishing boats to dock at the jetty irrespective of tidal conditions. However, one disadvantage is that fishing boats are required to wait for the tide in order to navigate the river mouth since the

water depth at the river mouth is shallow. In addition, expansion opportunities for facilities as well as the land area is very limited.

Of the aforementioned three fishing ports, only the Endau complex possesses a river mouth that is navigable in all tidal conditions and a river that is wide and sufficiently deep.

Since Endau has room to accommodate large modern fishing port facilities, a detailed survey was conducted in order to select the optimum site for the port complex.

(4) Current conditions in utilization of basic facilities

- 1) Fish landing operations were increased from once a day in the morning to twice a day, morning and evening, in order to ease congestion at the jetties and to increase fish landing volume.
- 2) Sorting of fish is conducted on board at sea or on the river before entry into the port, in order to reduce fish landing time and to utilize the jetty more effectively. Although this practice has reduced the congestion at the jetty, it is not being practiced by all boats at present.
- 3) The current manager of the LKIM complex in Mersing is in close communication with the fishing boat owners and the fish traders in Singapore and Johor Bahru. As a result, he has raised the volume of fish landings.

6.1.2 Functional Facilities

(1) Ice plant

There are three existing ice plants in east Johor. Class B, C, and C2 fishing boats in this area have installed RSW equipment and no longer require ice for fish storage. Ice is now mainly used in fish marketing on land.

Presently, the design and scope of the existing ice plant in Endau is sufficient in view of the current balance in supply and demand. However, due to a shortage of fuel and inadequate management and operation of the plant, production levels have reached only 70 percent of its capacity; and this has resulted in a shortage of ice during the peak fishing season. This stems from the fact that the plant is operated by a parent company in Kuala Lumpur, which has left the local management and operations ineffectual (see Table II.6.1). Therefore, it is surmised that it will be unable to cope with large scale repairs when the need arises.

(2) Cold storage

Although there are small cold storage facilities at the existing LKIM complexes, they are also used for ice storage purposes; and the present facilities are insufficient. In order to meet the needs of fishing boat owners and fish traders in coordinating their fish price and sales schedules, it is necessary to improve these cold storage facilities.

(3) Freezing plant

- 1) There are two freezing plants for cuttlefish in Mersing. One is a joint operation by Malaysian and Japanese firms and the other is a modern facility jointly owned by Japanese and Taiwanese firms. However, the latter has been unable to begin operations for nearly two years, due to non-availability of a land-use permit from the Johor state government.
- 2) There will be a shortage of raw materials, in view of the combined potential production volume of both processing plants (see Table II.6.2).
- 3) The cuttlefish from Kuantan is being exported to processing plants in Thailand as there is no privately operated freezing plant for cuttlefish in Kuantan; and there is no available land area behind the LKIM complex to construct one. However, if cuttle fish can be processed in Endau, it would increase foreign currency earnings and raise its worth as a high value added industry.
- 4) The price of round scad drops one fourth to one fifth its regular price during the peak fishing season. Subsequently, in order to prevent the drop in fish price, the surplus fish will be frozen and stored for sale as fresh fish or feed for cultured fish during the lean season when the landing volume declines.

(4) Head cut

Head cut is a very simple processing procedure for thread fin bream, ox-eyed scad, etc. as raw materials for surimi or fish balls. In this process the fish head is cut off and the innards are removed. There are three such processing plants in Mersing and Endau which mainly ship their products to Singapore or Johor Bahru (see Table II.6.3).

(5) Surimi and surimi processing plants

There is presently one surimi processing plant in Kedah state and one plant for surimi based products in Penang state. The latter imports all of its raw materials from Thailand and exports its finished product to Europe (see Table II.6.4).

The destination of head cut processed fish is Singapore which is encouraging the importation of surimi, in order to avoid polluting the environment by engaging in surimi processing. Therefore, a surimi processing plant at Endau would not be a contender in the Singaporean market, but rather a cooperative source of surimi supply. In addition, the modern surimi-based product processing plant in Penang, producing 5000 tons/year, is another potential customer for the Endau plant.

There is also a processing plant with a production capacity of two tons per day in Kuala Kedah which recently commenced operations; and there is a plant in Kangar with a ten ton per day production capacity presently under construction. It is surmised that obtaining raw material will become difficult for both facilities. In contrast, a processing plant on the east coast where there is abundant surimi raw materials, would be at an advantage, due to its location in east Johor.

(6) Dried/salted fish

In Mersing there is one traditional dried fish factory and two local stores selling dried/salted fish that are very popular with tourists from Singapore. However, the quality of the product leaves much to be desired, and often the fish are burnt by oil and are yellowish brown in hue (see Table II.6.5). Therefore, a new dried fish production factory is desired for producing high quality dried fish, low in salt and water content, for tourists and the Singaporean market.

(7) Fish meal plant

There are four fish meal plants in Endau, with a total production volume of 18,000 tons per year. Two of the plants are located at the proposed fishing port site at Endau; and they are both large scale modern facilities (see Table II.6.5).

(8) Shipyard and repair dock

There are two boat construction facilities and one boat repair dock along the Endau River, in addition to one boat repair dock at the Mersing LKIM complex which has been leased to the private sector (see Table II.6.6).

The scope of the boat repair dock at Endau is quite large and it is sufficiently capable of handling the current number of fishing boats.

Presently, there are no engine and electrical repair facilities at the repair dock. As a result, boat owners are forced to take their repairs to mechanics in Mersing. Hence engine and electrical repair facilities are necessary.

(9) **Related infrastructure**

There are no constraints in electricity, water supply, and main roads to the consumption area markets from the proposed Endau fishing port site (see Table II.6.7).

The roads to the major consumption areas of Johor Bahru and Singapore are paved national roads; and currently, they are being expanded. In addition, the fish transport trucks will arrive at the markets at midnight or during early morning hours. Therefore, problems in traffic congestion are not anticipated.

6.2 New LKIM Complex in Kuantan, Pahang State

Many of the private jetties were closed shortly after the completion of the LKIM complex at Kuantan in 1991, through negotiations between related government agencies and private jetty owners. Subsequently, fishing boats which had been using these jetties, are now landing their fish at the complex.

This precedent has an important bearing on the way construction of the new fishing port in Johor state is pursued and its use of the facilities after operations have begun. The findings of a comparative analysis of current LKIM complex operations with those of the private jetties, just prior to the start of the complex are shown

View Points	Before Construction (Private Jetty)	After Construction (LKIM Complex)
1) Facilities	<ul style="list-style-type: none"> 1) Poor and temporary basic functional facilities 2) Diverse use of fish landing facilities such as ice & oil supply and fish marketing function 3) Not as a fishing base, but simply a fish landing supply area with only auction facilities 	<ul style="list-style-type: none"> 1) Permanent and integrated fishery industry complex. 2) Basic and functional facilities are not sufficient 3) Short length of fish landing and supply jetties 4) Shortage of mooring facilities for small boats 5) Shortage of hoist for landing 6) Narrow office space for traders 7) Insufficient cold storage capacity and no facilities for fish processing, boat repair dock and fishing gear repair
2) Utilization	<ul style="list-style-type: none"> 1) Large volume trading and competitive pricing are limited due to numerous trading sites. 2) Narrow space and poor sanitary conditions in the auction area. 3) Much time loss because of multiple use of the same jetty for fish landings, supply of materials and mooring of boat. 	<ul style="list-style-type: none"> 1) Convenient because trading is concentrated in one place and traders participating in auction at the complex have increased. 2) Wider space for fish auctions with fair sanitary conditions 3) Decrease in time loss because of separate and single purpose use for landing, supply and mooring at different parts of jetty.
3) Operation and Management	<ul style="list-style-type: none"> 1) Fish landing and trading once a day (8:30 to 11:30) 	<ul style="list-style-type: none"> 1) Fish landing and trading once a day (8:30 to 11:30).

6.3 Basic Facilities Along Endau River

(1) Berthing scope of existing jetties

Presently, there is one LKIM jetty and 16 private jetties along the Endau River (nine on the Johor side and seven on the Pahang side). Although the number of berths differ at each jetty, generally there is only one berth. The water depth in front of the jetties is relatively shallow and large fishing boats are affected by tide levels (Table II.6.8).