

4. ASSESSMENT OF FMDS IN MODEL AREA

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4.1 Selection of the Model Area

4.1.1 Selection Criteria

- (1) Socio-Economic Indicators
- (2) Fishing Activities/Fish Production
- (3) Fish Marketing and Distribution System
 - 1) Origin/Destination (O/D) pattern of fish
 - 2) Operational level of auctioning and consignment
 - 3) Relationship between fishermen and traders
- (4) Fish Marketing Facilities
 - 1) LKIM, KO-NELAYAN and subsidiary complexes
 - 2) Private jetties: number and location
 - 3) Gazetted wholesale market: location
 - 4) Export and import points: location
- (5) Law, Institution and Organization
 - 1) Fish Marketing Regulation and its application
 - 2) Activities of LKIM and KO-NELAYAN
- (6) Fishermen/traders and Fishermen Association (FA)
 - 1) LKIM fishery development strategy
 - 2) Number of fishermen
 - 3) FA membership
 - 4) Activities of FA
 - 5) Financial conditions of FA and related institutions
- (7) Technology Transfer

4.1.2 Model Areas

The location of model areas is shown in figures in the beginning of this report.

(1) West Coast of Peninsular Malaysia

1) Kedah State

Zoning: Kuala Kedah LKIM complex, 4 AFA, Private jetties,
Gazetted private wholesale market (Alor Setar)

2) Perak State

Zoning: Major fish landing sites (private jetties in Hutan Melintang,
Pulau Pangkor, and Lumut)

(2) East Coast of Peninsular Malaysia

1) Northern Terengganu State

Zoning: 3 LKIM complexes (Kuala Besut, Pulau Kambing, Chendering),
Private jetties, Wholesale market (Kuala Terengganu),
FA in northern Terengganu state

2) Eastern Johor State

Zoning: 3 LKIM complexes (Endau, Mersing, Kuala Sedili), Private
jetties, FA in the eastern Johor state

(3) Sarawak State

Zoning: LKIM complex and FA in Kuching will be selected as a model
area of the FMDS in Sarawak, where many fish landing sites
are located along the river mouth and isolated because of
the poor road conditions from east to west.

(4) Sabah State

Zoning: Labuan, Kota Kinabalu, Lahad Datu and Keninngau (sales
depot at inland area)

(5) Marketing and Distribution Points

- 1) Bukit Mertajam repacking center
- 2) Tampoi gazetted wholesale market
- 3) Kuala Lumpur gazetted wholesale market
- 4) Kuantan (Pahang State)
- 5) Import points from Thailand (Bukit Kayu Hitam & Penkalan Kubor)

4.2 Fish Production in Model Areas

Number of fishing boats and fish landing volume in each model area are shown in Tables 4.2.1 to 4.2.3, and detail data by fishing methods and boat size are shown in Appendices 4.1 to 4.12.

4.2.1 Kedah State

(1) Number of fishing boats by fishing method

1) The model area

The total number of fishing boats is 1,867 (approximately 84 percent of the entire state); of which 604 boats are trawlers (equivalent to the number in the entire state); 51 boats are anchovy purse seiners (equivalent to 56 percent of the entire state); and the remaining 1,212 boats are other types of fishing boats (equivalent to 79 percent of the entire state).

2) Kuala Kedah

The total number of fishing boats is 610 (equivalent to 33 percent of the model area); of which 454 boats are trawlers (equivalent to 75 percent of the model area); 13 boats are anchovy purse seiners (equivalent to 26 percent of the model area); and the remaining 143 boats are other types of fishing boats (equivalent to only 12 percent of the model area).

3) LKIM complex and private jetties

The number of fishing boats which utilize the LKIM complex is 149 (24 percent of the Kuala Kedah area); of which 140 are trawlers (equivalent to 31 percent of the entire Kuala Kedah area); seven general purse seiners (equivalent to 54 percent of the entire Kuala Kedah area); no anchovy purse seiners (concentrated in other areas); and the remaining two boats are other types of fishing boats (equivalent to only one percent of Kuala Kedah).

(2) Volume of fish landed

The total volume of fish landed throughout the entire state in 1988 was 72,776 tons; of this total volume, 61,269 tons were landed in the model area (equivalent to 84 percent of the entire state). About

35,280 tons were landed at Kuala Kedah (58 percent of the model area); and out this volume 3,584 tons were landed at LKIM complex (10 percent of the Kuala Kedah). However, trash fish are not landed at LKIM complex.

Landing volume estimated based on number of fishing boats using LKIM complex (excluding trash fish) is 2,878 tons more than the volume of fish actually landed at LKIM complex (excluding trash fish). Although there is some error due to different data sources, this volume is exceedingly large to dismiss. A segment of the fish catch is also landed at private jetties.

The major species composition of fish landed in Kedah state is shown below. The anchovy are landed mainly at Langkawi Island and Tanjung Dawai and are dried and processed in the same area. Indian mackerel are distributed as fresh fish for domestic consumption. A portion of shrimp and squid are frozen and exported.

Landing Volume by Species in Kedah (1988)

Species	Volume (MT)	Percentage (%)
Anchovy	17,962	24.7
Indian Mackerel	14,602	20.1
Shrimps	3,503	4.8
Squids	3,496	4.8
Jewfish	1,421	2.0
Sardines	1,267	1.7
Others	9,967	13.7
Trash Fish	20,557	28.2
TOTAL	72,775	100.0

Source: Annual Fisheries Statistics, 1988

4.2.2 Perak State

(1) Number of fishing boats by fishing method

1) Model area

The total number of fishing boats is 1,603 (equivalent to 31 percent of the entire state); of which 687 boats are trawlers (equivalent to 37 percent of the entire state); 49 boats are purse

seiners (about 38 percent of the entire state); and the remaining 867 boats are engaged in other types of fishing (equivalent to 27 percent of the entire state).

2) Lumut

Presently, there is no LKIM complex in the Lumut area now, but plans to construct a complex are underway. The total number of fishing boats is 50 (equivalent to 6 percent of the entire model area) and there are no trawlers or purse seiners. They are all small scale fishing boats.

3) Pangkor Island

The total number of fishing boats is 359 (about 22 percent of the entire model area); of which 142 are trawlers (equivalent to 21 percent of the entire model area); 42 purse seiners (equivalent to 86 percent of the entire model area); and the remaining 175 boats are engaged in other types of fishing (about 20 percent of the total model area).

(2) Volume of fish landed

The total volume of fish landed in the entire state in 1988 was 179,982 tons and the volume of fish landed in the model area was 65,051 tons (36 percent of the entire state). Of this volume, 276 tons were landed at Lumut (about 0.4 percent of the model area), which is presently planning the construction of LKIM complex, and 21,482 tons were landed at Pangkor Island on the opposite shore (equivalent to 33 percent of the model area).

The major species composition of fish landed in Perak state is shown in next table. Shrimps and squids are landed mainly outside the model area, and anchovy is landed at Pangkor Island and processed into dried fish delicacies. Indian mackerel, threadfin bream, and others are also often landed by trawlers and several kinds of fish are processed into dried fish delicacies.

Landing Volume by Species in Perak (1988)

Species	Volume (MT)	Percentage (%)
Shrimps	28,114	15.6
Indian Mackerel	8,846	4.9
Anchovy	7,249	4.0
Threadfin Bream	6,537	3.6
Squids	6,475	3.6
Others	54,013	30.0
Trash Fish	68,748	38.2
TOTAL	179,982	100.0

Source: Annual Fisheries Statistics, 1988

4.2.3 Northern Terengganu

(1) Number of fishing boats by fishing method

1) Model area

The total number of fishing boats is 1,279 (equivalent to 70 percent of the entire state); of which 273 boats are trawlers (equivalent to 65 percent of the entire state); 230 boats are purse seiners (equivalent to 98 percent of the entire state); and the remaining 776 boats are engaged in other types of fishing (equivalent to 67 percent of the entire state).

There are 20 large trawlers exceeding 70 tons (equivalent to the number in the entire state), 5 trawlers of 40-69 tons, 23 trawlers of 25-39 tons (equivalent to 72 percent of the entire state), and 225 trawlers of less than 25 tons (roughly 62 percent of the entire state). There are 10 purse seiners exceeding 70 tons, 38 purse seiners of 40-69 tons (both equivalent to the entire state), 47 purse seiners of 25-39 tons (equivalent to 98 percent of the entire state), and 135 purse seiners of less than 25 tons (about 98 percent of the entire state).

2) Kuala Besut

The total number of fishing boats is 327 (equivalent to 26 percent of the entire model area); of which 71 boats are trawlers (about 26 percent of the entire model area); 69 boats are purse seiners (equivalent to 30 percent of the entire model area); and 187 boats are engaged in other types of fishing (equivalent to 26 percent of the

entire model area).

There are three large trawlers exceeding 70 tons (equivalent to 15 percent of the entire model area), one trawler of 40-69 tons (about 20 percent of the entire model area), six trawlers of 25-39 tons (about 26 percent of the entire model area), 61 trawlers of less than 25 tons (equivalent to 27 percent of the entire model area). There are four purse seiners exceeding 70 tons (equivalent to 40 percent of the entire model area), 19 purse seiners of 40-69 tons (equivalent to 50 percent of the entire model area), 21 purse seiners of 25-39 tons (equivalent to 45 percent of the entire model area), and 25 purse seiners of less than 25 tons (roughly 18 percent of the entire model area).

Purse seiners are comparatively many in this area. The use of large fishing boats exceeding 70 tons is prevalent in both trawl and purse seine fishery.

3) Pulau Kambing

The total number of fishing boats is 281 (equivalent to 22 percent of the entire model area); of which 63 boats are trawlers (equivalent to 23 percent of the entire model area); 47 boats are purse seiners (equivalent to 20 percent of the entire model area); and the remaining 171 boats are engaged in other types of fishing (equivalent to 22 percent of the entire model area).

There are three trawlers exceeding 70 tons (equivalent to 15 percent of the entire model area), three trawlers of 40-69 tons (equivalent to 60 percent of the entire model area), four trawlers of 25-39 tons (equivalent to 17 percent of the entire model area), and 53 trawlers of less than 25 tons (equivalent to 23 percent of the entire model area). There are no purse seiners exceeding 70 tons (concentrated in model areas or other areas), 10 purse seiners of 40-69 tons (equivalent to 26 percent of the entire model area), 19 purse seiners of 25-39 tons (equivalent to 40 percent of the entire model area), and 18 purse seiners of less than 25 tons (equivalent to 13 percent of the entire model area).

In this area, some large boats exceeding 70 tons are used for trawl fishery, and but purse seiners are mainly small.

4) Chendering

The total number of fishing boats is 192 (equivalent to 15 percent of the entire model area); of which 58 boats are trawlers (roughly 21 percent of the entire model area); 24 boats are purse seiners (equivalent to 16 percent of the entire model area); and the remaining 110 boats are engaged in other types of fishing (equivalent to 14 percent of the entire model area).

There are 14 trawlers exceeding 70 tons (equivalent to 70 percent of the entire model area), one trawler of 40-69 tons (equivalent to 20 percent of the entire model area), eight trawlers of 25-39 tons (equivalent to 35 percent of the entire model area), and 35 trawlers of less than 25 tons (equivalent to 16 percent of the entire model area). There are six purse seiners exceeding 70 tons (equivalent to 60 percent of the entire model area), nine purse seiners of 40-69 tons (equivalent to 24 percent of the entire model area), four purse seiners of 25-39 tons (equivalent to nine percent of the entire model area), and five purse seiners of less than 25 tons (equivalent to 4 percent of the entire model area).

The only harbour type fishing port in Malaysia is in Chendering. Fishery by large trawlers and purse seiners is well developed and its further expansion and development is the most important future issue. On the other hand, traditional small-scale fishery still exists and it is another issue in terms of protection of artisanal fishermen.

(2) Volume of fish landed

The total volume of fish landed in the entire state in 1988 was 83,456 tons and 67,817 tons were landed in the model areas (equivalent to 81 percent of the entire state). 14,481 tons were landed in Kuala Besut (equivalent to 34 percent of the entire model area), 12,913 tons in Pulau Kambing (equivalent to 34 percent of the entire model area), 7,728 tons in Chendering (equivalent to 26 percent of the entire model area), and 10,922 tons in Chendering (equivalent to 16 percent of the entire model area). All of this volume was landed at LKIM.

The major species composition of fish landed in Terengganu state is shown below. These are domestically consumed as fresh fish and a portion of them is processed into fish balls or fish crackers near the

fish landing sites.

Landing Volume by Species in Terengganu (1988)

Species	Volume (MT)	Percentage (%)
Round Scad	19,879	23.8
Selar Scad	8,305	10.0
Threadfin Bream	7,218	8.6
Indian Mackerel	6,015	7.2
Sardines	5,839	7.0
Squids	4,281	5.1
Tuna	3,229	3.9
Others	20,573	24.7
Trash Fish	8,117	9.7
TOTAL	83,456	100.0

Source: Annual Fisheries Statistics, 1988

4.2.4 East Johor

(1) Number of fishing boats by fishing method

1) Model area

The total number of fishing boats is 1,529 (equivalent to 44 percent of the entire state); of which 588 boats are trawlers (equivalent to 62 percent of the entire state); 52 boats are purse seiners (equivalent to the entire state); and the remaining 889 boats are engaged in other types of fishing (equivalent to 36 percent of the entire state).

There are 43 trawlers exceeding 70 tons (equivalent to the entire state), 134 trawlers of 40-69 tons (equivalent to 99 percent of the entire state), 95 trawlers of 25-39 tons (equivalent to 95 percent of the entire state), and 316 trawlers of less than 25 tons (equivalent to 47 percent of the entire state). There is no purse seiner exceeding 70 tons. There are 36 purse seiners of 40-69 tons (equivalent to the entire state), 12 purse seiners of 25-39 tons (equivalent to the entire state), and 4 purse seiners of less than 25 tons (equivalent to the entire state).

All large trawls as well as small and large purse seines are concentrated in the model areas.

2) Endau

The total number of fishing boats is 188 (equivalent to 12 percent of the entire model area); of which 154 boats are trawlers (equivalent to 26 percent of the entire model area); 15 boats are purse seiners (equivalent to 29 percent of the entire model area); and the remaining 19 boats are engaged in other types of fishing (equivalent to 2 percent of the entire model area).

There are 25 trawlers exceeding 70 tons (equivalent to 58 percent of the entire model area), 74 trawlers of 40-69 tons (equivalent to 55 percent of the entire model area), 34 trawlers of 25-39 tons (equivalent to 36 percent of the entire model area), and 21 trawlers of less than 25 tons (equivalent to 7 percent of the entire model area). There is no purse seiner exceeding 70 tons. There are eight purse seiners of 40-69 tons (equivalent to 22 percent of the entire model area), five purse seiners of 25-39 tons (equivalent to 42 percent of the entire model area), and two purse seiners of less than 25 tons (equivalent to 50 percent of the entire model area).

This area is an important base for offshore fisheries and there are many large trawlers.

3) Mersing

The total number of fishing boats is 375 (equivalent to 25 percent of the entire model area); of which 87 boats are trawlers (equivalent to 15 percent of the entire model area); 22 boats are purse seiners (equivalent to 42 percent of the entire model area); and the remaining 266 boats are engaged in other types of fishing (equivalent to 30 percent of the entire model area).

There are 12 trawlers exceeding 70 tons (equivalent to 28 percent of the entire model area), 12 trawlers of 40-69 tons (equivalent to 9 percent of the entire model area), 29 trawlers of 29-39 tons (equivalent to 31 percent of the entire model area), and 34 trawlers of less than 25 tons (equivalent to 11 percent of the entire model area). There is no purse seiner exceeding 70 tons. There are 13 purse seiners between 40-69 tons (equivalent to 36 percent of the entire model area); seven purse seiners are 25-39 tons (equivalent to 58 percent of the entire model area); and two purse seiners are less than 25 tons

(equivalent to 50 percent of the entire model area).

Trawl fishery is predominant in this area, but it is on a smaller scale than in Endau.

4) Kuala Sedili

The total number of fishing boats is 284 (equivalent to 19 percent of the entire model area); of which 165 boats are trawlers (equivalent to 28 percent of the entire model area); 15 boats are purse seiners (equivalent to 29 percent of the total model area); and the remaining 104 boats are engaged in other types of fishing (equivalent to 12 percent of the entire model area).

There are six trawlers exceeding 70 tons (equivalent to 14 percent of the total model area), 30 trawlers of 40-69 tons (equivalent to 22 percent of the entire model area), 16 trawlers of 25-39 tons (equivalent to 17 percent of the entire model area), and 113 trawlers of less than 25 tons (equivalent to 36 percent of the entire model area). There is no purse seiner exceeding 70 tons. There are 15 purse seiners between 40-69 tons (equivalent to 42 percent of the entire model area), but there are purse seiners of either 25-39 tons or less than 25 tons.

Trawl fishery is predominant in this area, but it is on a smaller scale than in Endau.

5) LKIM complex and private jetties

a) Endau

The number of fishing boats utilizing the LKIM complex is 25 (13 percent of the Endau area); of which 15 are trawlers (equivalent to 15 percent of the entire Endau area); 10 boats are purse seiners (equivalent to 67 percent of the entire Endau area); and there are no other boats.

Trawlers and purse seiners are the only types of fishing boats utilizing this complex for landing. Although the majority of purse seiners in this area land their fish at the complex, most of the trawlers land their fish at private jetties and seldom utilize the complex.

b) Mersing

The number of fishing boats utilizing the LKIM complex is 126 (34 percent of the Mersing area); of which 63 are trawlers (equivalent to 72 percent of the entire Mersing area); eight boats are purse seiners (equivalent to 36 percent of the entire Mersing area); and the remaining 55 boats are engaged in other forms of fishing (equivalent to 21 percent of the Mersing area).

An increasing number of medium and small trawlers land their fish at the complex in this area. However, the majority of the large trawlers and other fishing boats still use the private jetties.

c) Kuala Sedili

The number of fishing boats utilizing the LKIM complex is 143 (50 percent of the Kuala Sedili area); of which 113 are trawlers (equivalent to 68 percent of the entire Kuala Sedili area); six boats are purse seiners (equivalent to 40 percent of the entire Kuala Sedili area); and the remaining 24 boats are engaged in other forms of fishing (equivalent to 2 percent of the Kuala Sedili area).

An increasing number of small trawlers utilize the complex in this area. However, all of the medium and large trawlers still use the private jetties. In addition, the majority of purse seiners and other types of fishing boats utilize the private jetties.

(2) Volume of fish landed

The total volume of fish landed for the entire state in 1988 was 88,543 tons and 67,755 tons were landed in the model areas (equivalent to 77 percent of the entire state). About 13,882 tons were landed in Endau (equivalent to 20 percent of the entire model area), 11,733 tons in Mersing (equivalent to 17 percent of the entire model area), 15,125 tons in Kuala Sedili (equivalent to 22 percent of the entire model area). Of this volume, 1,790 tons from Endau were landed at LKIM complex (equivalent to 13 percent of Endau's total volume); 1,736 tons from Mersing (roughly 15 percent of Mersing's total volume) and 1,489 tons from Kuala Sedili (about 10 percent of Kuala Sedili's total volume) were landed at LKIM complex. However, 208 tons of trash fish were landed at the Mersing complex. Trash fish are not landed at the

other complexes.

The difference in estimated volume of fish landed at LKIM complex (excluding trash fish) and the actual volume of fish landed at the complex (excluding trash fish) for Endau, Mersing, and Kuala Sedili is 408 tons, 3,214 tons, and 4,965 tons, respectively. According to the interview survey of fishermen, in many cases a segment of the fish catch is landed at the private jetties.

The major species composition of fish landed in the model area is shown below. These are distributed as fresh fish domestically and in Singapore. In addition, they are processed into fish balls or fish crackers and a limited amount of squid is frozen and exported.

Landing Volume by Species in East Johor (1988)

Species	Volume (MT)	Percentage (%)
Shrimps	11,628	17.2
Threadfin Bream	4,918	7.3
Selar Scad	3,988	5.9
Squids	3,597	5.3
Tuna	3,206	4.7
Others	22,822	33.7
Trash Fish	17,597	26.0
TOTAL	67,756	100.0

Source: Annual Fisheries Statistics, 1988

4.2.5 Kuantan

The total number of fishing boats is 109; of which 72 boats are trawlers; 13 boats are purse seiners; and the remaining 24 boats are engaged in other types of fishing.

There are 38 trawlers exceeding 70 tons, 17 trawlers of 40-69 tons, 16 trawlers of 25-39 tons, and one trawler of less than 25 tons. The number of large boats is high.

Total landing volume of these fishing boats is estimated around 13,500 tons. The majority of large trawl boats in Pahang state are concentrated in Kuantan. This is due to the following reasons: firstly, this area is the distribution point for both the southern and

eastern sides of the peninsula; secondly, private investment by Chinese is large.

As part of the strategy to develop the fishery resources of the east coast, large fishing boats have increased; and by encouraging this trend, promotion of offshore fishing will become an issue. However, it would be impractical to promote this area without considering the possibility of competition with the Chendering fishing port in Terengganu state and Endau landing site in East Johor, which are the focus of offshore fisheries. Furthermore, competition with the private jetties is another issue which needs to be resolved.

4.2.6 Sarawak State

(1) Number of fishing boat by fishing method

1) Model areas

The total number of fishing boats is 945 (equivalent to 11 percent of the entire state); of which 148 boats are trawlers (equivalent to 14 percent of the entire state); 19 boats are purse seiners (equivalent to 83 percent of the entire state); and the remaining 778 boats are engaged in other types of fishing (equivalent to 10 percent of the entire state).

There are 30 trawlers exceeding 70 tons (equivalent to 29 percent of the entire state), 35 trawlers of 40-69 tons (equivalent to 27 percent of the entire state), 15 trawlers of 25-39 tons (equivalent to 14 percent of the entire state), and 68 trawlers of less than 25 tons (equivalent to 10 percent of the entire state).

There is no purse seiners exceeding 70 tons; there are 13 purse seiners of 40-69 tons (equivalent to 81 percent of the entire state), three purse seiners of 25-39 tons (equivalent to 75 percent of the entire state), and three purse seiners of less than 25 tons (equivalent to the entire state).

In Sarawak, the fishing boats are scattered throughout the state. They do not necessarily concentrate near Kuching, the capital. However, this model area typifies the fishery structure found throughout

Sarawak.

2) Kuching

The total number of fishing boats is 527 (equivalent to 56 percent of the entire model area); of which 102 boats are trawlers (equivalent to 69 percent of the entire model area); 12 boats are purse seiners (equivalent to 63 percent of the entire model area); and the remaining 413 boats are engaged in other types of fishing (equivalent to 53 percent of the entire model area).

There are 30 trawlers exceeding 70 tons (equivalent to the entire model area), 34 trawlers of 40-69 tons (equivalent to 97 percent of the entire model area), 14 trawlers of 25-39 tons (equivalent to 93 percent of the entire model area), and 24 trawlers of less than 25 tons (equivalent to 35 percent of the entire model area).

There are no purse seiners exceeding 70 tons; there are 11 purse seiners of 40-69 tons (equivalent to 85 percent of the entire model area). There are no purse seiners of 25-39 tons, but there is one purse seiner of less than 25 tons (equivalent to 33 percent of the entire model area).

This area has typical characteristic as a base for trawl fishery, particularly trawling by large boats. It also fulfills an important role as the fish landing center for small fishing boats.

3) Mukah

The total number of fishing boats is 418 (equivalent to 44 percent of the entire model area); of which 46 boats are trawlers (equivalent to 31 percent of the entire model area); seven boats are purse seiners (equivalent to 37 percent of the entire model area); and the remaining 365 boats are engaged in other types of fishing (equivalent to 47 percent of the entire model area).

There are no trawlers exceeding 70 tons; there is one trawler of 40-69 tons and one trawler of 25-39 tons (equivalent to seven percent of the entire model area). There is no purse seiner exceeding 70 tons; there are two purse seiners of 40-69 tons, three purse seiners of 25-39 tons (equivalent to the entire model area), and two purse seiners of less than 25 tons (equivalent to 67 percent of the entire model area),

This area is a typical center for artisanal fishery.

4) LKIM complex and other fish landing sites

The number of fishing boats which utilize the LKIM complex is 37 (7 percent of the Kuching area); of which 22 are trawlers (equivalent to 22 percent of the Kuching area); two are purse seiners (equivalent to 9 percent of the entire Kuching area); and the remaining 13 boats are other types of fishing boats (equivalent to only 8 percent of the Kuching area).

The number of fishing boats utilizing this complex is limited. However, the large trawlers utilize the complex for 73 percent of their landings and these boats have clearly concentrated at the complex. Fish landings by other fishing boats are scattered throughout the area.

(2) Volume of fish landed

The total volume of fish landed throughout the entire state in 1988 was 79,642 tons. Of this total volume, 16,182 tons were landed in the model areas (equivalent to 18 percent of the entire state); 14,259 tons were landed at Kuching (88 percent of the model area); and of this volume, 2,619 tons were landed at LKIM (equivalent to 18 percent of the entire area of Kuching). Trash fish are not landed at LKIM complex.

There is no difference between the estimated volume of fish landed by fishing boats using LKIM complex (excluding trash fish) and the actual volume of fish landed at the complex (excluding trash fish). This is probably due to the fact that fishing boats utilizing LKIM complex do not land their catch at private jetties.

The major species composition of fish landed in Sarawak state is shown below. Jellyfish are salted and exported to Japan and the rest are consumed within the state.

Landing Volume by Species in Sarawak (1988)

Species	Volume (MT)	Percentage (%)
Jelly Fish	19,686	24.7
Shrimps	13,292	16.7
Jewfish	3,343	4.2
Pomfrets	2,901	3.6
Marine Catfish	2,822	3.5
Others	33,421	42.0
Trash Fish	4,177	5.2
TOTAL	79,642	100.0

Source: Annual Fisheries Statistics, 1988

4.2.7 Sabah State

(1) Number of fishing boat by fishing method

1) Model area

The total number of fishing boats is 828 (approximately 32 percent of the entire state); of which 369 boats are trawlers (equivalent to 32 percent of the entire state); 24 boats are purse seiners (equivalent to 30 percent of the entire state); and the remaining 435 boats are other types of fishing boats (equivalent to 32 percent of the entire state).

There are seven trawlers exceeding 70 tons (equivalent to 44 percent of the entire state), 32 trawlers of 40-69 tons (equivalent to 97 percent of the entire state), 20 trawlers of 25-39 tons (equivalent to 36 percent of the entire state), and 311 trawlers of less than 25 tons (equivalent to 30 percent of the entire state).

There is no purse seiner exceeding 70 tons and no purse seiner of 40-69 tons; there is 1 purse seiner of 25-39 tons (equivalent to 33 percent of the entire state), and 23 purse seiners of less than 25 tons (equivalent to 31 percent of the entire state).

In Sabah, the fishing boats are scattered throughout the state. They do not necessarily concentrate near Kota Kinabalu, the capital. However, this model area typifies the fishery structure found throughout Sabah state.

2) Kota Kinabalu

The total number of fishing boats is 243 (equivalent to 29 percent of the entire model area); of which 116 boats are trawlers (equivalent to 31 percent of the entire model area); five boats are purse seiners (equivalent to 21 percent of the entire model area); and the remaining 122 boats are engaged in other types of fishing (equivalent to 29 percent of the entire model area).

There are seven trawlers exceeding 70 tons (equivalent to 64 percent of the entire model area), 26 trawlers of 40-69 tons (equivalent to 84 percent of the entire model area), and eight trawlers of 25-39 tons (equivalent to 40 percent of the entire model area). There are only 5 purse seiners of less than 25 tons (equivalent to 22 percent of the entire model area).

3) Kudat

The total number of fishing boats is 438 (equivalent to 25 percent of the entire model area); of which 192 boats are trawlers (equivalent to 51 percent of the entire model area); 14 boats are purse seiners (equivalent to 18 percent of the entire model area); and the remaining 230 boats are engaged in other types of fishing (equivalent to 54 percent of the entire model area).

There are three trawlers exceeding 70 tons (equivalent to 27 percent of the entire model area), three trawlers of 40-69 tons (equivalent to 10 percent of the entire model area), nine trawlers of 25-39 tons (equivalent to 45 percent of the entire model area), and 177 trawlers of less than 25 tons (equivalent to 57 percent of the entire model area). There is one purse seiner of 25-39 tons and (equivalent to the entire model area) and 13 purse seiners of less than 25 tons (equivalent to 57 percent of the entire model area).

4) Lahad Datu

The total number of fishing boats is 147 (equivalent to 18 percent of the entire model area); of which 65 boats are trawlers (equivalent to 17 percent of the entire model area); five boats are purse seiners (equivalent to 21 percent of the entire model area); and the remaining 76 boats are engaged in other types of fishing (equivalent to 18 percent of the entire model area).

There is one trawler exceeding 70 tons, two trawlers of 40-69 tons, three trawlers of 25-39 tons (equivalent to 15 percent of the entire model area), and nine trawlers of less than 25 tons (equivalent to 19 percent of the entire model area). There are only five purse seiners of less than 25 tons (equivalent to 22 percent of the entire model area).

5) KO-NELAYAN and SAFMA complexes and other fish landing sites

a) Kota Kinabalu

The number of fishing boats which utilize the SAFMA complex is 36 (15 percent of the Kota Kinabalu area); of which 21 are trawlers (equivalent to 18 percent of the Kota Kinabalu area) with no purse seiners. The remaining 15 boats are other types of fishing boats (equivalent to only 12 percent of the Kota Kinabalu area).

The fishing boats utilizing the complex in this area are limited to only a segment of the boats. The majority of the boats land their catch in areas around SAFMA.

b) Kudat

The number of fishing boats which utilize the KO-NELAYAN complex is 27 (6 percent of the Kudat area); of which 12 are trawlers (equivalent to 6 percent of the Kudat area); there is no purse seiner; and the remaining 15 boats are other types of fishing boats (equivalent to only 7 percent of the Kudat area).

Only some of the fishing boats land their fish at the complex in this area. The majority of the boats land their catch in areas around SAFMA.

c) Lahad Datu

There is no fish landing at KO-NELAYAN complex, and it functions only as a base for ice plant. Most of the fish are landed at the retail market's jetty or other private jetties.

(2) Volume of fish landed

The total volume of fish landed throughout the entire state in 1988 was 48,000 tons. Of this total volume, 15,057 tons were landed in

the model areas (equivalent to 31 percent of the entire state); 4,197 tons were landed at Kota Kinabalu (28 percent of the entire model area); 8,125 tons were landed at Kudat (equivalent to 54 percent of the entire model area); and 2,753 tons were landed at Lahad Datu (equivalent to 18 percent of the entire model area).

Of this volume, 865 tons were landed at SAFMA in Kota Kinabalu (equivalent to 20 percent of the entire Kota Kinabalu area); 390 tons were landed at KO-NELAYAN in Kudat (equivalent to 5 percent of the entire Kudat area).

The major species composition of fish landed in Sabah state is shown below. Shrimps are frozen and exported to Japan; some of the tuna catch is exported to the Philippines and Thailand, and the rest is for consumption within the state, Sarawak and Peninsular Malaysia.

Landing Volume by Species in Sabah (1988)

Species	Volume (MT)	Percentage (%)
Shrimps	11,400	23.8
Tuna	5,000	10.4
Selar Scad	2,500	5.2
Marine Catfish	2,200	4.6
Pomfrets	2,000	4.2
Jewfish	1,780	3.7
Others	23,120	48.2
TOTAL	48,000	100.0

Source: Annual Fisheries Statistics, 1988

**Table 4.2.1 Number of Fishing Boat and Landing Volume at
Model Areas of the West Coast of P.Malaysia (1988)**

Model Area	KEDAH	PERAK		
Major Landing Site	K.Kedah	P.Pangkor	P.Remis	Lumut
Number of Fishing Boat				
Public Complex	149	-	-	-
	24.4%			
Private Jetties	461	359	832	50
	75.6%	100.0%	100.0%	100.0%
Total	610	359	832	50
	100.0%	100.0%	100.0%	100.0%
Landing Volume (MT)				
Public Complex	3,584	-	-	-
	10.2%			
Private Jetties	31,695	21,482	40,752	276
	89.8%	100.0%	100.0%	100.0%
Total	35,279	21,482	40,752	276
	100.0%	100.0%	100.0%	100.0%

Remarks: Public complex is LKIM complex.

Source: Annual Fisheries Statistics 1988, DOF.

Annual Report from LKIM complex, 1988.

**Table 4.2.2 Number of Fishing Boat and Landing Volume at
Model Areas of the East Coast of P.Malaysia (1988)**

Model Area	North Trengganu			Kuantan	East Johor		
Major Landing Site	K.Busut	P.Kambing	Chendaring	Kuantan	Endau	Mersing	K.Sedili
Number of Fishing Boat							
Public Complex	327	281	192	-	25	116	143
	100.0%	100.0%	100.0%		13.3%	30.9%	50.4%
Private Jetties	-	-	-	459	163	259	141
				100.0%	86.7%	69.1%	49.6%
Total	327	281	192	459	188	375	284
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Landing Volume (MT)							
Public Complex	14,481	12,913	7,728	-	1,790	1,736	1,489
	100.0%	100.0%	100.0%		12.9%	14.8%	9.8%
Private Jetties	-	-	-	39,675	12,092	9,997	13,637
				100.0%	87.1%	85.2%	90.2%
Total	14,481	12,913	7,728	39,675	13,882	11,733	15,126
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Public complex is LKIM complex.

Source: Annual Fisheries Statistics 1988, DOF.

Annual Report from LKIM complex, 1988.

Table 4.2.3 Number of Fishing Boat and Landing Volume at Model Areas of Sarawak and Sabah (1988)

Model Area	SARAWAK		SABAH		
	Kuchin	Mukah	K.K.	Kudat	L.Datu
Number of Fishing Boat					
Public Complex	37	-	84	27	-
	7.4%		34.6%	6.2%	
Private Jetties	464	418	159	411	147
	92.6%	100.0%	65.4%	93.8%	100.0%
Total	501	418	243	438	147
	100.0%	100.0%	100.0%	100.0%	100.0%
Landing Volume (MT)					
Public Complex	2,619	-	855	390	-
	18.4%		20.4%	4.8%	
Private Jetties	11,640	1,923	3,342	7,735	2,735
	81.6%	100.0%	79.6%	95.2%	100.0%
Total	14,259	1,923	4,197	8,125	2,735
	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Public complex means LKIM complex in Sarawak, SAFMA or KO-NELAYAN complex in Sabah.

Source: Annual Fisheries Statistics 1988, DOF.

Annual Report from LKIM complex, 1988.

4.3 The Origin/Destination (O/D) Volume in Model Area

4.3.1 Distribution of Imported Fish Products

The inflow of fish for consumption as food (converted whole fish) to Peninsular Malaysia in 1987, excluding fish meal, was 214,000 tons. Of this amount, the imported fish volume from Thailand was the largest, equivalent to 72.3 percent or 155,000 tons, followed by 29,000 tons or 13.7 percent of imported fish from Indonesia, and 9,500 tons or 4.4 percent from Japan. Inflow volume from both Sarawak and Sabah states was minimal at 800 tons and 1,500 tons, respectively (Table 3.3.8).

In 1987, the total imported fish volume of Sarawak state was 14,200 tons (converted whole fish). Of this amount about 7,800 tons or 54.5 percent were imported from Peninsular Malaysia and 2,000 tons or 14 percent were imported from Sabah state. The largest volume of foreign imported fish was from Thailand at approximately 900 tons; and the remainder was from Japan and Singapore at about 600 tons, respectively (Table 3.3.8).

The total imported fish volume of Sabah state was 6,500 tons (converted whole fish) in 1987. Of this volume 2,400 tons or 36.3 percent are fish imported from Peninsular Malaysia. There was no imported fish from Sarawak state. The largest volume of fish imported from overseas was from Japan at 2,000 tons or 30.2 percent, succeeded by Thailand and Singapore at 700 tons and 440 tons, respectively (Table 3.3.8).

In observing marketing patterns of fish imported from Thailand to Peninsular Malaysia, fish which pass through Bukit Kayu Hitam, the point of origin for imported fish, are distributed on the west coast. All fish passing through Penkalan Kubor are distributed on the east coast of the Peninsular Malaysia. Therefore, the following has been observed:

- a) Via Bukit Kayu Hitam: Fish are mainly distributed from the west coast to Johor state; the main inflow points are Kedah state (Alor Setar wholesale market), Penang, Kuala Lumpur (central wholesale market), and Johor (Johor Bahru wholesale market)
- b) Via Penkalan Kubor: Fish are distributed to fill the shortage in Kelantan state, and also are distributed to Terengganu and Pahang (Kuantan), and even as far as Johor (Johor Bahru wholesale market)

4.3.2 Distribution of Exported Fish

The volume of fish exported from Peninsular Malaysia for consumption as food, excluding fish meal, was 165,000 tons in 1987 (converted whole fish). Of this volume, the export volume to Singapore was 92,000 tons or 55.6 percent; 33,000 tons or 20.1 percent to Thailand, and 4,000 to 7,000 tons to the USA, Japan, Canada, and Australia. Both Sarawak and Sabah states exported 7,700 tons and 2,800 tons, respectively (Table 3.3.5).

The total volume of exported fish from Sarawak state was about 6,700 tons (converted whole fish) in 1987. Of this amount, 2,200 tons or 32.2 percent were exported to Japan; and 300 to 1,200 tons were exported to Singapore, Australia, and the USA. In addition, there was an outflow of 850 tons or 12.7 percent of fish to Peninsular Malaysia and there was no flow of fish to Sabah state (Table 3.3.5).

The total volume of exported fish from Sabah state was 15,500 tons (converted whole fish) in 1987. Of this volume, 3,100 tons or 19.8 percent were exported to Singapore; 2,700 tons or 17.4 percent were exported to Japan, and 1,100 tons were exported to the Philippines. About 2,100 tons and 2,500 tons were exported to Peninsular Malaysia and Sarawak state, respectively (Table 3.3.5).

The flow of fish export volume from Peninsular Malaysia is described as follows. Fish exported to Singapore is mainly through from Johor Bahru. Fish exported to Thailand is via an overland route passing through Bukit Kayu Hitam or Pengkalan Kubor. Fish export to other countries is collected at Kuala Lumpur from the landing sites and exported by air or ship through Port Kelang.

4.3.3 Distribution of Fish for Domestic Consumption

- (1) Fish Distribution Pattern of Fish Products According to Traders and Origin of Fish in Kuala Lumpur

Findings from the results of the interview survey at the wholesale market in Kuala Lumpur are shown in Table 4.3.1 and Appendix 4.13 according to origin of inflow and fish marketing patterns by traders. The analysis of the data is given below.

- a) Total fish transaction volume of wholesalers who were interviewed is 12,300 tons annually. Of this amount, inflow of imported fish is 66.1 percent out of a total inflow and nearly all of this volume is imported from Thailand via Bukit Kayu Hitam. Currently, since imported fish from Thailand are cheaper in price and they are on a par with domestic fish product in quality, a large volume is being handled. In future an important issue will be to rationally adjust the inflow volume of both imported and domestic fish by analyzing their competitiveness in terms of quality, price, and convenience of collection.
- b) Most of the imported fish are brought to the wholesalers in Kuala Lumpur directly from the wholesalers in Thailand. Inflow volume brought via importers is only 0.5 percent.
- c) About 23 percent of the volume transacted at the Kuala Lumpur market is fish landed on the west coast of Peninsular Malaysia. Most of this volume is directly traded between wholesalers in the production area and wholesalers in Kuala Lumpur. An inflow of fish from Perlis, Perak, and Selangor is the largest, while the volume from Kedah is comparatively small. In terms of the balance of fish demand and supply in each state, Perlis and Perak are fish surplus areas while Kedah has a slight fish shortage. Moreover, since Selangor is located right on the outskirts of Kuala Lumpur, there is a large inflow of not only fish but other commodities as well.
- d) The inflow of fish landed on the east coast of the Peninsular Malaysia is 11.5 percent of the total volume transacted at the wholesale market. Most of this volume is directly shipped from wholesalers in production areas to wholesalers in Kuala Lumpur, as in fish from the west coast. The inflow rate from Terengganu and Pahang is large due to their substantial fish surplus volume and it is approximately equivalent to the inflow volume of the three states (Perlis, Perak, Selangor) on the west coast. This can be fully explained in terms of demand and supply of fish in each state.
- e) Any inflow of fish from Sarawak and Sabah to the Kuala Lumpur wholesale market could not be found from the results of this interview survey.

- f) Most of the inflow into the Kuala Lumpur wholesale market consists of a mass transportation from wholesalers.
- g) According to this survey, all the buyers at this wholesale market are retailers.

The following findings were noted from the results of the interview survey of exporters in Kuala Lumpur (Appendix 4.46).

- h) Approximately 50 percent of the volume transacted by exporters originates from the west coast of Peninsular Malaysia and half of this volume is from Selangor. According to the interview survey, the fish transacted by exporters is collected in Kuala Lumpur and exported. The fish from Selangor is believed to include fish from other areas as well. Fish from east coast corresponds to five percent. The rest 45 percent is imported fish.
- i) The destination of 48 percent of the transacted volume is earmarked for Sarawak. Imported fish from Thailand is also included in this volume.
- j) The destination of 53 percent of the transacted volume for export is earmarked for Singapore and the remainder is sent to Brunei, The Netherlands, Great Britain, etc.

The following findings were noted from results of the interview survey of importers in Kuala Lumpur (Appendix 4.53).

- k) Approximately 4,500 tons of fish are imported from Thailand to Kuala Lumpur. This volume is equivalent to about 56 percent of the total import volume handled by wholesalers in Kuala Lumpur. Since data on the number of traders classified according to scale of operations for both wholesalers and importers is not known, the average value for fish volume handled by both parties according to the sampling ratio in order of their importance, could not be sought. Therefore, if there is a volume of imported fish via importers on the market in addition to imported fish handled by wholesalers, the percentage of imported fish to the inflow of fish to Kuala Lumpur would be larger than the imported fish ratio of 66 percent handled by the wholesalers. The percentage is estimated to be less than 70 percent.

(2) Distribution Patterns According to Traders and O/D of Fish Products in Kedah

1) Survey of Alor Setar

Findings from the results of the interview survey of wholesalers in Alor Setar (including two or three LKIM complexes) wholesale market are shown in Tables 4.3.1 and 4.3.2, and the analysis of the data is given below.

- a) All of the inflow of fish to Alor Setar wholesale market are landed on the west coast of the Peninsular Malaysia. Of this volume, 69 percent is brought in directly by fishermen and 16 percent via wholesalers. An unique characteristic of this market is the high percentage of inflow from fish culturists (15%). About 84.5 percent of the market volume is supplied from within the state and the inflow from Perlis, a region with a large fish surplus volume, is comparatively small (much of the surplus fish in Perlis is believed to flow directly to Kuala Lumpur).
- b) There is no inflow of fish landed on the east coast of the Peninsular Malaysia to the Alor Setar wholesale market. This is because the demand/supply of fish within the state is well balanced and road conditions from the east coast to Kedah are not good.
- c) Most of the volume transacted at the Kuala Kedah wholesale market is for domestic consumption. Only about 7.1 percent of the volume handled by wholesale dealers is exported to Singapore. The outflow of fish to Kuala Lumpur is 15.9 percent and 10.0 percent to Pulau Penang, and is comparatively large. Although 84.5 percent of the inflow volume to the market is from within Kedah state, the volume earmarked for consumption within the state is comparatively small at 54.0 percent. The volume of fish transacted outside the wholesale market system appears to be quite large in view of the fact that demand/supply within the state is well balanced.
- d) Approximately 68.8 percent of the fish buyers are wholesalers. One third of these wholesalers sell fish within Kedah state, while the rest sell overwhelmingly outside the state. About 24.2 percent of the buyers are fish processors; the majority are local processors, and only 6.5 percent of the fish buyers are retailers.

The following findings were obtained from the results of the interview survey of exporters in Alor Setar (Appendix 4.47)

- e) Approximately 90 percent of the 1,270 tons handled by exporters is supplied from Kedah state. Only a minimal amount is purchased from Perak state and Thailand. At the time of this survey, the only destination of fish for export was Singapore.

The findings of the interview survey of importers in Alor Setar are given below (Appendix 4.54).

- f) About 1,050 tons of fish were brought from Thailand to Alor Setar via Bukit Kayu Hitam by importers. This volume did not go through the wholesale market, but was sent directly to wholesalers and retailers.

2) Survey of the LKIM Complex in Kuala Kedah

The data obtained from this interview survey of wholesalers is given in Appendices 4.16 and 4.17, and the analysis of the data is given below.

- a) All fish handled by the complex have been landed there. Of this volume, approximately half are disposed through direct consignment with fishermen and 30 percent are sold through the auction. In addition, about 20 percent are from wholesalers.
- b) The destination of 86 percent of the fish is within Kedah state, and 78 percent are earmarked for Kota Setar near Alor Setar. The ratio of fish going to areas outside the state is seven percent to Bukit Mertajam in Penang state, three percent to Perak Tonga in Perak state, and three percent to Kuala Lumpur. There is no outflow to the east coast. There were no indications of direct fish export, but fish earmarked for exporters in Kota Setar and Kuala Lumpur were six percent and three percent, respectively. It is believed that these fish are exported.
- c) Retailers purchase 40 percent of the entire fish volume handled at the complex. Most of this volume is supplied to areas within the state and does not go through the wholesale market in Alor Setar.

3) Survey of private jetties in Kuala Kedah

The data obtained from the interview survey of wholesalers are shown in Appendices 4.18 and 4.19, and the analysis of the data is presented below.

- a) The majority of the traders purchasing fish here are wholesale dealers (97%) and a small minority (3%) are retailers.
- b) More than 40 percent of the volume purchased is destined for Kuala Lumpur and slightly less than 40 percent is marketed within the state, mainly to Kota Setar. The remaining 17 percent is earmarked for Penang.

(3) Fish Flow Patterns According To Traders and O/D of Fish Products in East Johor

1) The survey of Johor Bahru

The data obtained from the interview survey of wholesalers are shown in Tables 4.3.1, Table 4.3.2 and Appendix 4.20, and the analysis of these data is presented below. A few of the wholesalers were interviewed in area outside the wholesale market. However, most of the interviews were carried out at the wholesale market in Johor Bahru.

- a) The shortage of fish within the state is covered by fish from the east coast of the Peninsular Malaysia.
- b) The entire fish inflow into the Johor Bahru wholesale market originates from the east coast of the peninsula. Of this volume, 34 percent is purchased by the wholesalers directly from the fishermen; and 42 percent is provided through other wholesalers. The percentage purchased through auction and fish culturists is 24 percent and it is rather high. About 71 percent of the volume is landed within the state and approximately 10 percent arrives from the states on the east coast (Kelantan, Terengganu, Pahang).
- c) Fish inflow could not be seen from the west coast of the Peninsular Malaysia according to the survey.

- d) About 9.8 percent of the fish volume transacted at the Johor Bahru wholesale market is earmarked for export, and 6.6 percent is exported to Singapore and 3.2 percent to Hong Kong (in the total transacted volume).
- e) Most of the fish volume transacted at this wholesale market (90.2%) is earmarked for consumption within the state due to a conspicuous shortage of domestic fish.
- f) About 59.7 percent of the fish buyers are wholesalers and 30.4 percent are small retailers which includes hotels, etc. These two groups are responsible for about 90 percent of the volume transacted at the market. Fish processors and exporters comprise only a nominal percentage.

The findings from the interview survey of exporters in Johor Bahru are explained below (Appendix 4.48).

- g) A total of approximately 1,270 tons of fish was exported mainly to Singapore by the interviewee of the survey. Of this volume, about 85 percent was purchased from Johor state, 10 percent from Pahang state and 5 percent from Kelantan state.

The following findings from the interview survey of importers in Johor Bahru are given below (Appendix 4.55).

- h) According to the survey, about 1,440 tons of fish are imported into Johor Bahru by the importers surveyed from Thailand and 280 tons from Indonesia.

2) The survey of the LKIM complexes

The data from the interview survey of wholesalers at the LKIM complexes in Endau, Mersing, and Kuala Sedili are shown in Table 4.3.3 and Appendices 4.22 to 4.27. The following results were obtained.

- a) Fish inflow to these complexes is from local production sites and there is no fish inflow from other areas.

- b) The destination of fish earmarked for export at these complexes is Singapore. At the Kuala Sedili complex which is the closest in vicinity to Singapore, one-third of the total volume handled by this complex is earmarked for export. The percentage of exported fish at the Endau and Mersing complexes is 24 percent and 22 percent, respectively.
- c) Fifty-three percent of the total volume of fish handled at the Endau complex is supplied to local processors in Mersing area including Endau and 21 percent is shipped to the wholesalers in the Johor Bahru. There is no fish flow to other areas of Johor state.
- d) Nearly 70 percent of the fish handled by the Mersing complex is marketed within Johor state. Thirty-six percent is earmarked for the wholesalers in Johor Bahru wholesale market and 13 percent is sent to the retailers in Kelang. Fish flow to other areas in the state is minimal in volume and fish earmarked for local consumption is nominal, as in the case of the Endau complex.

Eleven percent of the total volume handled at the Mersing complex is transported to the wholesalers in Kuala Lumpur.

- e) Nearly all of the total volume of fish handled at the Kuala Sedili complex is marketed within Johor state, with the exception of fish earmarked for export. Of the total volume of fish handled at this complex, 42 percent is shipped to the wholesalers in Johor Bahru and 11 percent is sent to the processors in Mersing. Fish flow to other areas is minimal. In addition, nine percent of the total volume is sold to retailers in Kota Tinggi including Kuala Sedili.

(4) Fish Flow Pattern According to Traders and O/D of Fish in Kuantan

The data obtained from the interview survey of wholesalers at the Kuantan market, Tanjung Api, etc. is shown in Tables 4.3.1 and 4.3.2, and Appendices 4.28 and 4.29. An analysis of the data is given below.

- a) An inflow of imported fish was not found at the time of this survey. However, according to the importers interviewed, the import volume is only an nominal amount of 220 tons.

- b) About 90.6 percent of the fish volume transacted by the wholesalers in Kuantan originates from Pahang state. The inflow of fish from out of state such as Kelantan and Pulau Pinang was 8.9 percent and 0.5 percent, respectively. Nearly all of the fish sold at the Kuantan wholesale market originates from the east coast. In addition, 70 percent of the fish are bought directly from the fishermen and only 17 percent is purchased through the wholesalers. The remaining 14 percent is purchased at the auction or from the fish culturists.
- c) About 60 percent of the volume transacted at the wholesale market is sold within the state, 16.4 percent is sent to Kuala Lumpur, 12.8 percent to Johor and 4.6 percent to Melaka.
- d) Most of the volume sold within the state is bought by retailers for consumption within the state. The fish earmarked for Kuala Lumpur are purchased mainly by wholesalers, which is estimated to be about two thirds of the total volume for Kuala Lumpur.
- e) Export volume at the wholesale market is estimated to be 6.0 percent of the total fish volume transacted at the market, and it is sent to Singapore by wholesalers. In addition to this volume, 6.3 percent is bought by exporters for domestic market, but probably this volume is finally exported. In total, about 10 percent of the volume transacted at the market is exported, due to its proximity to Singapore. Besides, according to the interview survey of exporters, there are fish that are directly bought by exporters and do not pass through the wholesalers. It is known that this volume is more than the volume mentioned above; therefore, a considerable volume of fish is believed to be exported.

(5) Fish Flow Pattern According to Traders and O/D of Fish in Terengganu

The data obtained from the interview survey of wholesalers at the LKIM complexes of Chendering and Kuala Besut are given in Appendices 4.30 to 4.33, and an analysis is presented below.

- a) Both of the complexes at Chendering and Kuala Besut handled only fish catch landed by local fishermen and there was no inflow of fish from outside areas.

- b) Approximately 22.8 percent of the total volume of fish handled at Chendering are exported to Singapore. At Kuala Besut 26.6 percent of the total volume is exported to Singapore and 12.4 percent is exported to Thailand, i.e. 40 percent of the total volume of fish handled is exported.
- c) Approximately 40 percent of the fish landed at the Chendering complex is shipped to areas within Terengganu state, mainly to its capital, Kuala Terengganu. This is due to the fact that the complex is located near the capital with a large population and is the source of fish supply for that area.

Furthermore, fish destined to areas outside the state are 18.1 percent to Kuala Lumpur, 12.4 percent to Johor Bahru, and 9.1 percent to Bukit Mertajam (Penang state), of the total volume landed.

- d) Since the population in the vicinity of Kuala Besut is not very large, fish earmarked for local consumption is only 5 percent. Shipment of fish to areas outside the state is 30 percent to Kuala Lumpur, followed by 10 percent to Johor Bahru, and 9 percent to Penang. It is perhaps only natural that most of the fish are shipped to Kuala Lumpur which is nearer compared with other large towns and has the largest market.
- e) Wholesalers buy 77.4 percent of the fish landed at Chendering and purchase by retailers is only 3 percent. The processors from Kuala Terengganu and Bukit Mertajam each purchase 9 percent of the fish.

The majority of the buyers at Kuala Besut complexes are also wholesalers who comprise 76.8 percent of the buyers. Purchase by processors comprise 21.8 percent and a special characteristic is that fish earmarked for export is sold to processors in Thailand.

(6) Fish Flow Pattern According to Traders and O/D of Fish in Sarawak

Data obtained from the interview survey of wholesalers at the LKIM complex in Bintawa and at the private jetties in the vicinity of Kuching are shown in Table 4.3.4 and Appendices 4.34 to 4.37. An analysis of the data is given below.

- a) Most of the fish landed at the Bintawa complex are local fish and only a nominal volume is imported from Indonesia. Moreover, most of the fish handled at the private jetties are also fish caught locally and only a small volume is brought in from Lundu, Sarikei, and Sibiu.
- b) Approximately half of the fish volume handled at Bintawa is shipped to areas within Sarawak state. Of the total volume 16.3 percent is shipped to Kuching, 11.6 percent to Bintulu, 7.0 percent to Sri Aman, 6.4 percent to Bau, 4.8 percent to Lundu, and 2.8 percent to Limbang.

The fish export volume is 46 percent of the total volume of fish handled at this complex. Of this volume, 21 percent is earmarked to Brunei, followed by export to Taiwan, Singapore, and New Zealand at 7 to 10 percent. A very small volume of fish destined for Peninsular Malaysia is shipped to Kelang (Selangor state) and Johor Bahru.

- c) More than half (58%) of the fish handled by the private jetties are purchased by wholesalers in Kuching; and it is believed that most of it is exported. Moreover, 6 percent is exported directly to both Singapore and Taiwan. In total, approximately 70 percent is exported. As for the rest, slightly less than 20 percent is sold to wholesalers and 10 percent to retailers.
- d) Of the fish volume purchased by the wholesalers in Bintawa, 45.9 percent is exported and 26.5 percent is sold to other wholesalers. The remaining 27.6 percent are sold to retailers in Kuching and to other areas in Sarawak.

(7) Fish Flow Pattern According to Traders and O/D of Fish in Sabah

Data obtained from the interview survey of wholesalers in Kota Kinabalu, Kudat, Lahad Datu, and Labuan are shown in Table 4.3.4 and Appendices 4.38 to 4.45. An analysis of the data is given below.

- a) Fish inflow to Kota Kinabalu originates from Kudat, Tuaran, and the vicinity of Kota Kinabalu at 34.5 percent, 27.7 percent, and 15.6 percent, respectively. In addition to this, there is a small volume of fish inflow from Sipitang, Semporna, and Kota Belud. An inflow of fish from outside the state and from abroad was not seen.

- b) Approximately 80 percent of the fish product inflow to Kota Kinabalu is bought by local retailers, restaurants, etc. and the remaining 20 percent is resold to local wholesalers. An outflow of fish to outside areas was not seen.
- c) The entire fish volume handled at Kudat is locally landed. About 20 percent of the total volume of fish handled is exported to retailers in Brunei; the remaining 80 percent is destined to areas within Sabah state; 48.5 percent of the total volume handled is transported to Kota Kinabalu; and other areas include 14.1 percent to Kota Belud and 8.3 percent to Keninngau. Only 6.7 percent of the fish is marketed to the local areas of Kudat.

Furthermore, the total volume resold to wholesalers is 25.7 percent and 72.8 percent are sold to retailers mainly in Kota Kinabalu.

The aforementioned result is consistent with the fact that the fish inflow to the retailers in Kota Kinabalu is mainly from Kudat

- d) About 72 percent of the fish inflow at Lahad Datu is fish landed by fishermen and the remaining 28 percent are fish which have been resold wholesalers. Approximately 58 percent of the total volume of fish handled here is resold to local wholesalers and 25 percent to local retailers. There is a small volume of fish outflow to Sandakan and Tawau which is 14.2 percent and 3.0 percent, respectively.
- e) The entire volume of fish handled at Labuan is comprised of fish caught by local fishermen which is purchased by wholesalers and resold to processors in Kota Kinabalu.

Table 4.3.1 Inflow to Wholesale Market in Peninsular Malaysia (1990)

Origin	Unit: MT			
	WEST COAST		EAST COAST	
	Kuala Lumpur	Alor Star	Johor Bahru	Kuantan
Import	8,105 (66.1%)	- (-)	- (-)	- (-)
Domestic Production	4,165 (33.9%)	8,347 (100.0%)	4,419 (100.0%)	5,751 (100.0%)
East Coast	2,759 (22.5%)	8,347 (100.0%)	- (-)	28 (0.5%)
West Coast	1,406 (11.5%)	- (-)	4,419 (100.0%)	5,723 (99.5%)
Total	12,270 (100.0%)	8,347 (100.0%)	4,419 (100.0%)	5,751 (100.0%)

Remarks : 1. Based on FMDS Phase II Field Survey (Feb. - March, 1990)
 2. Figure shows the sum of the volume from interview survey to wholesalers.
 3. Figure in parentheses is percentage to the total sum in each market.

Table 4.3.2 Outflow from Wholesale Market in Peninsular Malaysia (1990)

Destination	Unit: MT			
	WEST COAST		EAST COAST	
	Kuala Lumpur	Alor Star	Johor Bahru	Kuantan
Export	- (-)	590 (7.1%)	432 (9.8%)	345 6.0%
Domestic Consumption	8,304 (100.0%)	7,757 (92.9%)	3,987 (90.2%)	5,406 (94.0%)
Local Consumption	8,172 (98.4%)	4,507 (54.0%)	3,987 (90.2%)	3,426 (59.6%)
Outflow to the other state	132 (1.6%)	3,250 (38.9%)	- (-)	1,980 (34.4%)
East Coast	- (-)	2,980 (35.7%)	- (-)	1,244 (21.6%)
West Coast	132 (1.6%)	270 (3.2%)	- (-)	736 (12.8%)
Total	8,304 (100.0%)	8,347 (100.0%)	4,419 (100.0%)	5,751 (100.0%)

Remarks : 1. Based on FMDS Phase II Field Survey (Feb. - March, 1990)
 2. Figure shows the sum of the volume from interview survey to wholesalers.
 3. Figure in parentheses is percentage to the total sum in each market.

Table 4.3.3 Outflow from LKIM Complexes (1990)

Destination	Unit: MT		
	WEST COAST Kuala Kedah	EAST COAST East Johor Trengganu	
Export	- (-)	4,853 (26.1%)	1,446 (32.7%)
Domestic Consumption	3,199 (100.0%)	13,707 (73.9%)	2,978 (67.3%)
Local Consumption	2,752 (86.0%)	13,326 (71.8%)	780 (17.6%)
Outflow to the other states	447 (14.0%)	381 (2.1%)	2,198 (49.7%)
East Coast	447 (14.0%)	381 (2.1%)	1,517 (34.3%)
West Coast	- (-)	- (-)	681 (15.4%)
Total	3,199 (100.0%)	18,560 (100.0%)	4,424 (100.0%)

Remarks : 1. Based on FMDS Phase III field survey (September 1990)
 2. LKIM complex in East Johor; Endau, Mersing and K. Sedili complexes in Terengganu ; Kuala Busut and Chendering complexes
 3. Figure shows the sum of the volume from interview survey to fish traders
 4. Figure in parentheses is percentage to the total sum in each state.

Table 4.3.4 Outflow from Sarawak and Sabah States (1990)

Destination	Unit: MT			
	Sarawak Kuching	Kota kinabalu	Sabah Kudat	Lahad Datu
Export	1,078 (45.9%)	- (-)	222 (21.1%)	- (-)
Domestic Consumption	1,271 (54.1%)	3,029 (100.0%)	832 (78.9%)	885 (100.0%)
P. Malaysia	124 (5.3%)	- (-)	- (-)	- (-)
Sarawak	1,147 (48.8%)	- (-)	- (-)	- (-)
Kuching	383 (16.3%)	- (-)	- (-)	- (-)
Others	764 (32.5%)	- (-)	- (-)	- (-)
Sabah	- (-)	3,029 (100.0%)	832 (78.9%)	885 (100.0%)
Kota Kinablu	- (-)	3,017 (99.6%)	511 (48.5%)	- (-)
Kudat	- (-)	12 (0.4%)	70 (6.6%)	- (-)
Lahad Datu	- (-)	- (-)	- (-)	732 (82.7%)
Others	- (-)	- (-)	251 (23.8%)	153 (17.3%)
Total	2,349 (100.0%)	3,029 (100.0%)	1,054 (100.0%)	885 (100.0%)

Remarks : 1. Based on FMDS Phase III field survey (September 1990)
 2. LKIM complex in East Johor; Endau, Mersing and K. Sedili complexes in Terengganu ; Kuala Busut and Chendering complexes
 3. Figure shows the sum of the volume from interview survey to fish traders

4.4 Fish Marketing Institution and Organization

4.4.1 LKIM

The Fisheries Development Authority of Malaysia (LKIM), by Act of Parliament in November 1971, was constituted as a statutory body, under the jurisdiction of the Minister of Agriculture. The Act indicated that the LKIM will be a regulatory body with specific reference to the fish marketing and also it empowered the Authority to engage in a wide variety of developmental activities (ranging from boat building to fish trading).

4.4.2 KO-NELAYAN

KO-NELAYAN or Sabah Multipurpose Fishermen's Cooperative was registered on September 16, 1978 with full financial support from the state government under the Cooperative Society Ordinance of 1958. In 1981, KO-NELAYAN became a statutory authority under the "Korporasi Kemajuan Perikanan dan Nelayan Sabah (KO-NELAYAN) Enactment" (No. 4/81) which became effective on May 1, 1981; and the cooperative became a corporation under the direct control and supervision of the State Ministry of Agriculture and Fisheries Development.

4.5 Fish Marketing and Distribution System

4.5.1 Basic Structure of Fish Marketing and Distribution

(1) Characteristics of FMDS at Fish Landing Site

1) General Outlook

The general movements of fishing boats in Malaysia are shown in Fig. 4.5.1. With the exception of islands such as Langkawi Island and Pangkor Island, fish is landed at the jetties which are situated along the embankments near the mouth of the rivers. Fish landing bases do not develop along coastlines because the sea is shallow to some distance from the shore. The only fishing port which has breakwaters is the Chendering fishing port in Terengganu state.

Fishing villages usually have been developed around fish landing sites located near the mouth of the river. It is generally rare for fishing boats to land their fish catch at a fish landing site which is not near their village. The jetties situated at the mouth of the rivers are simple structures usually constructed of wood and/or concrete and are divided into fish landing jetties, mooring jetties, and supply jetties for refueling, etc. Fish landing is usually concentrated at a few jetties and in some areas, to as many as 30 jetties. Most of the remaining jetties are used only for mooring. Supply jetties which are used only for refueling, etc. can be seen in some areas.

The fish landing jetties are differentiated into two groups. One group contains the jetties which are operated by public agencies such as LKIM, KO-NELAYAN, SAFMA, and the other group contains the jetties which are operated by the private sector. In 1989 the total volume of fish landed at the private jetties was 93 percent and the volume of fish landed at the LKIM complexes was only seven percent.

The private fish landing jetties are mainly operated by the local wholesalers, transporters, processors, etc. In addition to fish landing services, other services such as credit for fuel, loans for boat construction costs, etc. are available to boat owners. These services are a means of securing larger volumes of fish catch by private jetty owners.

When fish is landed at the private jetties, boat owners usually sell their fish catch by direct consignment, with the exception of progressive areas such as Kuantan (where fish disposed by auction) and small-scale fish landing sites where whisper auctions can be seen (mainly for local consumption).

The destination of these fish is mainly to wholesalers in metropolitan consumption areas, to local wholesalers, or processors. In particular, high grade fish are generally directly handled by wholesalers in the metropolitan consumption areas. In this case, the boat owner usually entrust to the transporter to carry the fish to the metropolitan consumption areas.

At the LKIM complexes, fish catch is sold by auction and by direct consignment. In 1989 the volume of fish handled at the complexes via auction was only six percent of the total volume of fish handled. Fish which is sold through the auction is small-lot consignments earmarked for local consumption. In many cases, the local retailers will purchase less than 100 kg of fish at any one time and there is very little participation of traders who have a network with metropolitan consumption areas.

2) The Study on Credit Ties in Mersing and Endau

In many instances, the boat owners have borrowed funds from traders to cover fishing operation or boat construction costs. Assuming that fishermen are tied to the traders by credits and their fish prices are unfairly suppressed by them, a detailed study was carried out on this credit structure in two areas; Endau and Mersing which are expected to greatly increase their fish catch volume in future and are located near major cities such as Johor Bahru, Singapore, etc.

In this study a questionnaire interview survey was conducted and simultaneously a follow up survey was carried out by specialists of this study team. Boat owners (those having fishing boat licenses) were interviewed and efforts were made to cover about 30 percent of the total according to class and tonnage of each fishing boat. The number of licensed boat owners in the two areas of Endau and Mersing and the number of boat owners interviewed in the survey are shown in Tables 4.5.1 a,b,c. Although sampling ratio by ethnic group deviated slightly

to Malays, the number of samples by boat size is nearly proportionate to the population.

The result of the interview survey are shown in Tables 4.5.2-14. An analysis of the data is given below.

a) Supplementary occupation to fishing (Table 4.5.2)

Approximately 70 percent of the total number of respondents were engaged only in fishing. However, 20 percent of the boat owners with fishing vessels of less than 10 tons were engaged in farming and 25 percent of boat owners with 40 to 60 tons fishing vessels were fish traders.

b) Classification of boat owners (license holders) (Table 4.5.3)

Although it is necessary to acquire a license issued by the DOF in order to operate a fishing boat, a license holder may not be the actual boat owner. License holders are divided into the following three classifications.

1. A nominal license holder deriving no income from boat operations.
2. A nominal license holder deriving no income from boat operations, but receiving income as a crew member.
3. An actual boat owner who derives income from boat operations.

Approximately 90 percent of the respondents in the survey were actual boat owners. The remaining 10 percent were nominal license holders. Although in principle only one license is issued per person, it has been suspected that some of the boat owners or traders buy licenses or receive income as a owner of other boats (generally 50 percent of the net income) from several fishing boats by financing other license holders to build boats. However, nominal license holders were only 10 percent of the boat owners (there is a case where the license holder has turned over the actual operation to his son due to old age); and it is believed that monopolization of fishing boats is in actuality, low.

c) The role of the fishing boat owner (Table 4.5.4)

Boat owners are either captains, generally called owner operators who operate usually with a crew, or owners who are not engaged in operation. Owner operators usually receive a share of the profits both

as captain and as boat owner. According to the results of the survey, roughly 75 percent of the total number of boat owners are owner operators and about 22 percent are owners who are not engaged in operation on board their boats. In studying the samples according to boat size, about 80 to 90 percent of the owners of boats less than 40 tons are owner operators and for vessels exceeding 40 tons, the ratio was approximately even between the two groups. The underlying reason for this is that the boats owners of boats exceeding 40 tons are able to earn sufficient income only from their share of the profits as boat owners. Therefore, they are able to place their priorities on fish sales rather than on their role as operation.

d) Funds for boat building (Tables 4.5.5-7)

Financing the total cost of building a fishing boat with personal funds is about 24 percent of all the boat owners. Since the cost of building a boat of less than 10 tons is about M\$10,000 and is comparatively inexpensive, 40 percent of the boat owners of this class finance the total cost of a fishing boat with personal funds. However, for boats exceeding 70 tons, the building cost is more than M\$300,000 and cannot be financed with personal funds. Of the owners who rely on financial aid, 53 percent have taken loans from the BPM, followed by 29 percent who borrow funds from the traders. In particular, 71 to 87 percent of the owners of boats less than 25 tons utilized BPM loan. In contrast, when the fishing boat exceeds 25 tons, the number of owners who borrow funds from traders is more than the owners utilizing BPM loan. According to the follow up survey conducted by the specialists, this is due to the well established credit transactions in fish trading between the owners of boat more than 25 tons and the traders, which make it easier for those owners to borrow funds from the traders than BPM.

In the case of a fishing boat of less than 25 tons, borrowed funds range between M\$300 to M\$50,000 and for fishing boats exceeding 25 tons, it varies from M\$7,000 to M\$300,000.

e) Financing for operating costs (Table 4.5.8-10)

Thirty-nine percent of the boat owners pay their operating costs by personal funds. This percentage increases as boat size becomes smaller. For boats less than 10 tons, the figure is 48 percent. In

contrast, the percentage becomes smaller when boat tonnage increases. The figure is seven percent for the boat exceeding 70 tons. According to 27 percent of the borrowers in the survey, the funds are used mainly for maintenance costs for the engine, the hull, etc. and 17 percent utilized the funds mainly for daily expenses such as fuel, ice, etc.. The percentage of fund utilization for maintenance costs was high for boats of less than 40 tons. During the follow up survey, it was found that funds were borrowed mainly to cover the cost of sudden breakdowns in the engine in case of small fishing boats.

Eighty-six percent of the borrowers replied that they were financed by traders. Funds from the traders are deducted from the sale of the catch whenever it is convenient for the borrower. Traders usually do not force them to repay. Of the respondents who had borrowed from the traders, 18 to 35 percent responded that they had no debts at the time of the survey. On the average, the remaining balance of debt ranged from M\$2,000 to M\$10,000. According to the follow up survey, it was found that boat owners did not aggressively try to finish repaying their debt to the traders since the traders did not force them to make repayments even when they were able to (the traders can not receive a stable supply of fish unless they keep the boat owners in debt).

f) Marketing of fish catch (See Tables 4.5.11-13)

Seventy percent of the owners mainly sell their catch to local wholesalers, followed by 16 percent to wholesalers in other areas, and nine percent to local retailers. However, there was only one major destination from which to select on the questionnaire and this may have been the reason for this response. In actuality, the fish catch is sorted by species group or by volume and sold to several traders simultaneously. In many cases, high grade fish is handled directly by the wholesalers in Johor Bahru, Singapore, etc. and fish for fish meal is directly handled by processors.

When the respondents were asked if they had to sell their catch to the traders because they had borrowed funds from them, 67 percent replied "Had to". According to follow up survey on this issue, fish sold obligatorily to the traders applied to only a portion of the high grade fish or fish for processing. A major portion of the catch could be sold freely.

Thirty-three percent of the respondents stated that a major factor in the selection of a buyer was "obligation", due to borrowing of funds. This is greatly different from the 67 percent who replied "Had to" in the aforementioned question. It is probably due to the fact that the sale obligation is only limited for high grade fish. As a major factor in the selection of buyers, 41 percent responded fish price, and 17 percent answered old established trading relationships. According to the follow up survey, the majority of the respondents answered that they were free to sell most of their fish catch and would sell it to the trader with the best prices, although they were not able to select the buyer for a portion of their high grade fish when funds were borrowed from the trader. However in reality, since a relationship built on mutual trust is important, it is unlikely that buyers are frequently changed.

g) Income (Table 4.5.14)

In the area of boat owner income, many of the respondents probably gave lower figures in income than the actual. The results of the survey indicated that income rose with an increase in fishing boat size. Moreover, owners of boats less than 10 tons who fell below the income poverty line, were 81 percent and owners of boats between 10 and 25 tons were 33 percent. It is probable that the actual percentage is lower. The low incomes of boat owners of small fishing boats is due to size of boat and traditional fishing methods.

Information on fish price is mutually exchanged; and the sales unit price of fish is not different among boat owners (including those with no obligation to sell). Therefore, the difference in owner income is not due to the difference in fish price.

The following conclusions have been arrived through the above analysis and the results of interview survey to transporters, traders, etc.

1. There are no credit ties in the form of loans between the traders and the fishermen and fish prices do not appear to be suppressed unfairly or rather traders are put into a situation where they offer loans as a service in order to secure fish.

2. When funds are borrowed from the traders, fishermen are obligated to sell only high grade fish and fish for processing to the traders; and they are free to sell the remainder of their fish freely.
3. Fish is directly handled between the boat owners and the traders and processors; and it is an important factor for their business that a relationship of mutual trust is built.

(2) Characteristics of FMDS from Landing Site to Consumption Area

The existing FMDS is formulated for effective collection and flow of domestic fish (mainly fresh fish transported with ice for local consumption, for large consumption area wholesale markets, and for exports) and imported fish from Thailand (mainly fresh fish transported with ice and some frozen fish; very little for re-export). Raw materials for processing and exported fish other than chilled fish are of secondary importance to the objectives of FMDS of domestic fish. A distinctive feature of FMDS in Malaysia is the dominance of chilled fish which is preferred by the consumers.

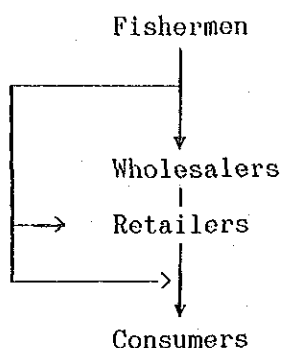
There are no problems in transporting fish from the production to consumer areas. Despite close-knit, exclusive transactions between intermediaries, fish is packed in ice and transported quickly and effectively in wooden boxes. Collection and flow of fish are efficiently accomplished by agents at production areas; this practice adequately meets the needs of small scale, scattered fish landings.

(3) FMDS for Domestic Consumption and Exports to Singapore

Transactions of domestic fish for local consumption and transactions for fish to large consumption area wholesale markets and for export differ greatly. In the latter case, there are fish dealers in the landing site who collect, pack and transport fish to the large consumption area wholesale markets or to Singapore. They act as agents for wholesalers of consumption areas and as agents for Singaporean wholesalers. There is no such agent for local consumption.

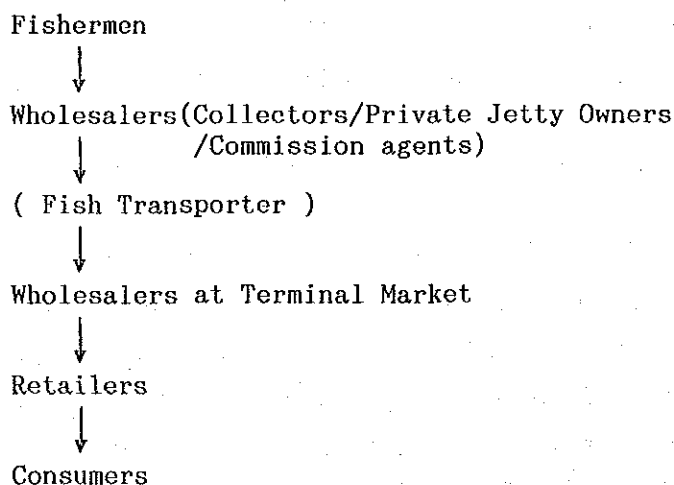
Fish is purchased from fishermen and sold to local retailers by wholesalers in the production areas. Fish is also sold directly from

fishermen to retailers and consumers.



The wholesale activities for local consumption are conducted near the retail markets located in the centre of the local consumption area. Market facilities are not provided in many cases and transactions take place at the "open-air market". Fish is delivered by the wholesalers or by transporters.

Fish products for large consumption area wholesale markets are collected and packed by the production area wholesalers and are sent to the wholesale market in time for transactions. The wholesalers at the production area are also engaged as wholesalers, private jetty owners or collectors, or simply commission agents. Transport is arranged by either the wholesalers in consumption areas or their agents in the production areas.

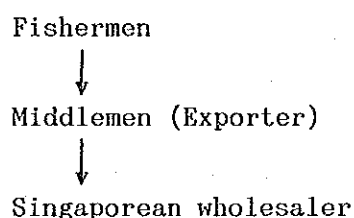


A strong trading relationship has been established between the wholesalers at the large consumption area wholesale markets and their agents at the production areas. They maintain daily contact to adjust

fish price and transport volume. If the agents at the production areas are in need of funds, they are provided by the wholesalers.

Transactions are in the form of direct consignments and the fish price is rarely negotiable. The agents are paid by the wholesalers only after the fish has been sold at the consumption area markets. Payment may be made one day later, one week later, or ten days later depending on the reciprocal relationship between the wholesaler and their agents. The auction system conducted at the limited LKIM complexes eliminate these disadvantages for the fishermen, since the transaction is indirectly made with the middlemen through the auctioneer, and the payment is in cash. Usually the fish price at the auction is higher than in direct consignments because of the competition. However, the fish sold at the auction generally flow to production area markets and are rarely seen in large consumption area markets, with the exception of fish handled at auctions held by traders at the private jetties in Kuantan.

Fish products exported to Singapore generally do not pass through the hands of the consumption area wholesalers. Wholesalers at the production areas collect, pack, and arrange the transport of fish to Singapore. In such cases, the middlemen act as agents of Singaporean wholesalers.

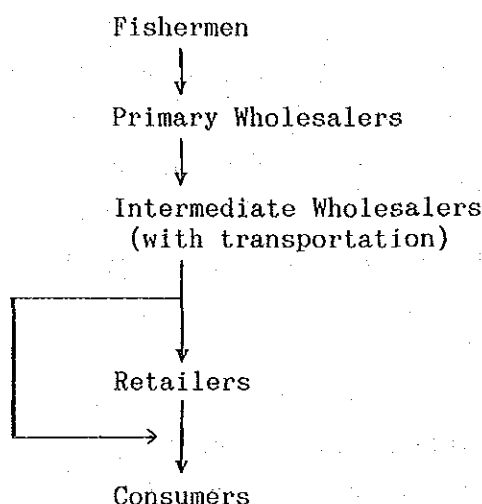


The trading relationship in export transactions is built on traditional and close-knit ties. Credit which is financed by the Singaporean wholesalers is available to fishermen through the middlemen.

Production area wholesalers transport fish to wide consumption areas in case where there are no wholesale markets in these areas. Working in close relationship with the consumption area traders, the production area wholesalers collect, transport, and release fish to either the consumption area wholesalers or the small retailers.

Therefore, their roles are larger than the agents of consumption area wholesalers. This practice is carried out in markets outside the seven designated wholesale markets (Kuala Lumpur, Ipoh, Alor Setar, Johor Bahru and Melaka, George Town, Bukit Mertajam).

Consumption area wholesale markets do not exist in Sabah and Sarawak states. The influence of the production area wholesalers is particularly strong in Sabah. The following marketing/distribution channels are found in Sabah:



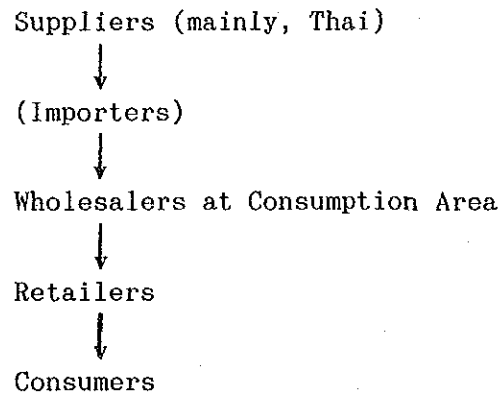
There is often no designated wholesale market other than LKIM complexes in the production areas.

In the Kuala Lumpur wholesale market, transactions take place only between the wholesalers and the retailers. Auctions are not conducted. A close-knit relationship exists between the two parties and there are many regular customers. In turn, this relationship allows moderate payment conditions for the retailers and there is the advantage of discount prices which are offered by the wholesalers. In other wholesale markets, some transactions are carried out directly between the wholesalers and the consumers. However, consumers are exceptional visitors to the wholesale markets, and a continuous trading relationship does not evolve. The auction is not held in the other markets.

(4) FMDS of Imported Fish

The wholesalers in consumption areas directly contact with

suppliers in Thailand to import fish. A segment of the imports is handled by importers, and wholesalers play a large role and their trading relationship with the Thai suppliers is traditionally close. Transporters are arranged by either the Malaysian wholesalers or Thai suppliers.



(5) FMDS of Raw Materials for Processing

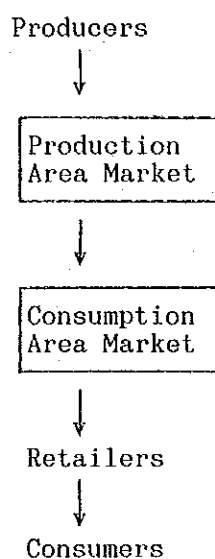
Raw materials for processing are usually purchased directly from fishermen or through wholesalers at the production areas. Occasionally collectors participate in transactions. However, processors usually develop their own purchasing and sales channels.

(6) A Comparison with FMDS in Japan

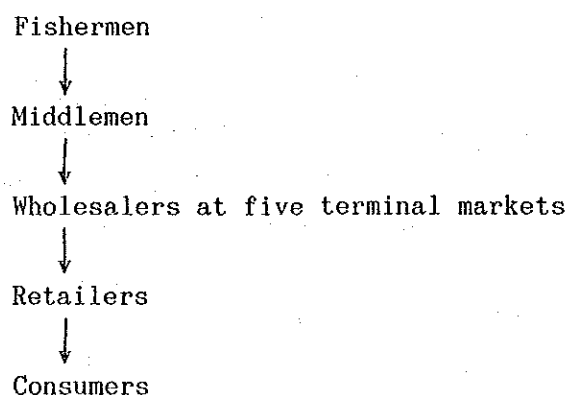
Characteristics which are unique to the FMDS in Malaysia in comparison to the distribution system in Japan are:

- 1) The structure of production and consumption area markets are vague.
- 2) The role of traders in the consumption market is not diversified.

The basic FMDS structure in Japan is as follows:

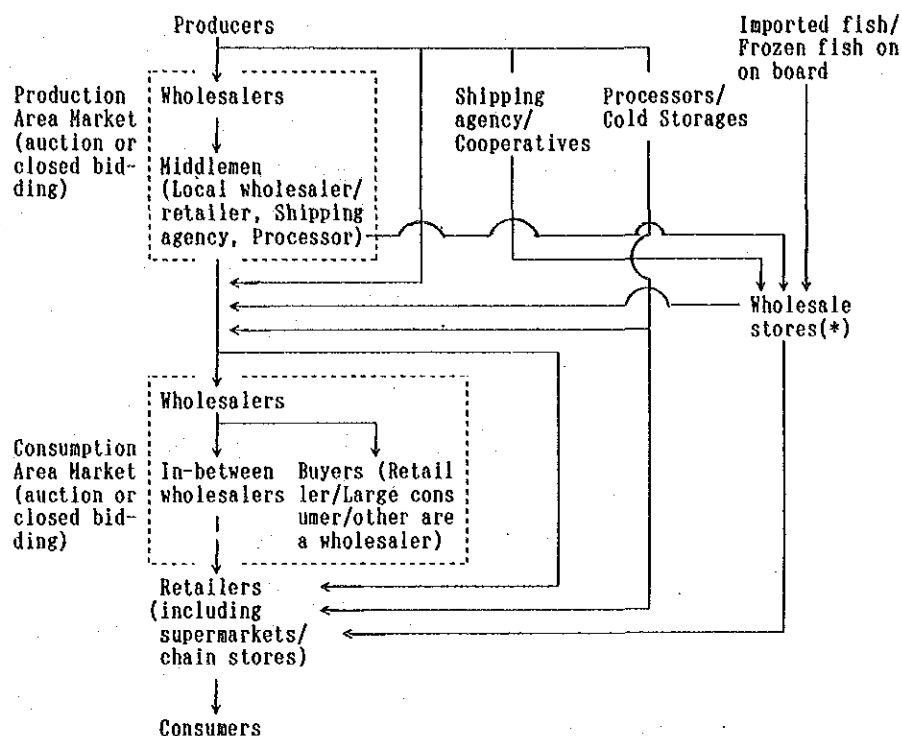


The basic FMDS structure in Malaysia (excluding importer, exporter and processor) is as follows:



The trading relationship is close-knit and exclusive. The distribution structure in Malaysia centers around the wholesalers in consumption areas. Legally designated wholesale markets are found only in seven areas.

A detailed marketing/distribution structure of fish products in Japan is shown in the following model diagram:



Note :(*) Through or not through, either is possible
Source: Annual Statistics Fish Marketing and Distribution 1989,

Ministry of Agriculture, Forestry and Fisheries in Japan

The production and the consumption area markets in Japan have a variety of market participants. The marketing channels are more complicated with different stages, in contrast to Malaysia. Particularly, the in-between wholesalers at the consumption area markets do not exist in Malaysia.

In Malaysia, the fish market is not very competitive and the producers have very few channels to select. There is no auction system practiced at the designated wholesale markets in consumption areas. Fish prices are determined according to the wholesalers at the seven wholesale markets since sales and purchasing channels are organized exclusively around them.

(7) Approach to Improvement in the FMDS in Malaysia

The first step in improving the FMDS in Malaysia is to clarify the functions of the wholesale markets. Since the functions of the production and consumption area markets are vaguely defined in the Fish Marketing Regulations (FMR), definition or clarification of their

functions should be made officially (irrespective of whether a new provision is added to the Regulations). If there is a lack of market facilities, new facilities should be constructed. If wholesale market functions have concentrated at a particular facility, additional designation under the FMR directives will have to be made. Under this framework, a fair division of roles between public and private facilities should be considered in order to promote free competition.

LKIM complexes alone have been designated as production area markets. The number of designated markets should be increased by selecting private jetties as new production area markets under the FMR. New facilities should be constructed where facilities do not exist. If conditions for creating new production area markets are instituted through public intervention, measures ensuring fair transactions can be introduced. Such measures should focus on fishermen participation in the marketing/distribution of fish. In order to accomplish this, the followings are required.

- 1) To renovate the credit system to give fishermen the opportunity to freely sell their fish
- 2) To promote FA participation in marketing/distribution of fish and to avoid participation of fishermen on an individual basis
- 3) To increase the number of fish dealers at production area markets by issuing additional licenses
- 4) To promote the auction for local consumption and to accept direct consignment system
- 5) To allow fishermen access to market information (fish price information) at consumption area markets

The designation of consumption area wholesale markets, in addition to the existing seven wholesale markets should be considered. The functions of the existing seven wholesale markets and the activities of their wholesalers should be reviewed to assess the possibility of increasing the participants in the marketing structure. In order to achieve competitive market conditions, the introduction of auction should be considered. However, the traditional forms of transaction

which center around the wholesalers at consumption centers will not be forcefully changed.

4.5.2 Fish Marketing Regulations and Enforcement

- 1) The Fish Marketing Regulations (FMR) were established in 1973 and has been enforced by the LKIM.
- 2) The FMR are comprised of 20 clauses, mainly concerned with the designation of a Fish Marketing Control Area (FMCA) and the regulation of fish dealing within this control area. The LKIM has the power to issue licenses to fish dealers within this regulated area.
- 3) The entire Peninsular Malaysia and Sarawak were designated as the FMCA in 1986. Simultaneously, in addition to Kuala Lumpur, Ipoh, Johor Bahru, and Alor Setar, all the LKIM complexes, and the nine private jetties in Kuala Kedah were designated as wholesale markets. In addition, the Melaka wholesale market was designated in 1989.
- 4) Although the LKIM has been empowered to issue licenses to the fish dealers under the Fish Marketing Regulations, the licenses issued by the LKIM have been limited to dealers operating in the aforementioned five wholesale markets, to the fish dealers of the LKIM complexes, and to importers and exporters.
- 5) The LKIM may stipulate typical conditions to the licensees. At present the conditions actually attached to the license are "wholesale" in the case of the seven prescribed wholesale markets and "by auction" at all the LKIM complexes.
- 6) According to clauses 10-12 of the Fish Marketing Regulations, an auction system is stipulated. The auction fee is not permitted to be more than five percent of the price fixed at the auction. The auction is conducted according to these stipulations, i.e. buying and selling is conducted by tender at prices higher than the minimum reserved price.
- 7) The weighing scales which are utilized at the wholesale markets and the LKIM complexes are only those scales approved by LKIM. All the weighing scales are inspected by the Ministry of Trade and Industry and

a seal is affixed to those which have passed inspection.

- 8) According to clause 14 of the Fish Marketing Regulations, all fish marketed in the FMCA area is required to pass through the designated wholesale markets or LKIM complexes. However in actuality, there are difficulties in enforcing this provision and actual fish marketing patterns differ greatly. This is due to the fact that the designated wholesale markets do not include all the wholesale markets; the number of licenses are limited; and there is no method of directing and regulating the transporters, processors, and retailers involved in buying and selling who are not covered by these Regulations.
- 9) According to clause 15 of the Fish Marketing Regulations, the operating hours of wholesale markets and LKIM complexes are designated by LKIM and usually begin and close operations at a time determined based on customary in that area.
- 10) Clause 16 of the Fish Marketing Regulations requires the use of fish transport containers which have been stipulated by LKIM. This stipulation has been effectively and completely carried out for imported fish. However, for domestically landed fish, the traditional wooden boxes are still being utilized and the containers specified by LKIM are not in use. But MOA has instituted a plan to implement the use of these specified containers in stages. The introduction of these plastic containers highlights the problem of who will bear the cost, as well as overcoming strong opposition from importers about when the containers are to be utilized for imported fish. Therefore, the introduction of the prescribed containers needs careful consideration.
- 11) Clause 17 of the Fish Marketing Regulations stipulates the grading of fish. However, LKIM has not established an uniform grading standard yet and grading is conducted independently by those who are involved in fish transactions.
- 12) Regulation for fish processors are stipulated in clause 18 of the Fish Marketing Regulations; however, this provision has not been enforced yet.
- 13) Clauses 19 and 20 of the Fish Marketing Regulations stipulate the provision of information required by LKIM and the issue of purchase and

sales invoices of transactions. These clauses are being satisfactorily implemented.

- 14) In order to successfully and completely enforce the Fish Marketing Regulations, it is essential to improve the enforcement bodies. The Enforcement Unit, Marketing Division of LKIM is currently staffed with only 60 members and is hardly responsible for overseeing the entire country. It may be impossible to increase the number of staff. The possibility of educating and training NFA, SFA, AFA staff as well as staff from private sector should be considered.

4.5.3 Credit Facilities

- (1) Credit facilities in the fisheries sector are administrated totally by BPM. Management of funds, screening of those qualified to receive loans, and repayment are all handled by BPM. Although LKIM/DOF have directly given out loans (in some areas, this practice is still continued), in principle, the funds under the jurisdiction of MOA must go through BPM according to Malaysian government policy. The recovery ratio from fishermen by BPM is very low in comparison to the Federal Agricultural Marketing Authority (FAMA) credit system available to farmers.
- (2) Credit facilities in the fisheries sector can be generally classified into the Special Integrated Agricultural Loan Programme (SPKP) and others. The SPKP is a special government fund account. Certain target groups are given loans through BPM. The Malaysian government provides BPM with the fund at a four percent interest rate while BPM in turn, provides loans to these target groups at the same interest rate.
- (3) The Details of SPKP Loans for Fishery Sector
 - 1) Loans based on recommendations by LKIM

In order to receive a loan from the SPKP, the borrower must receive a recommendation from the Fishermen Development Area (FDA) committee which is composed of LKIM, DOF, and BPM.

 - a) The construction of large fishing boat (more than 70 GRT)

The maximum loan is M\$300,000; the repayment period is seven years.

- b) Fishing gears, engine, and other related equipment (more than 40 GRT in Peninsular Malaysia and more than 25 GRT in Sarawak)
The maximum loan per person is M\$60,000; the repayment period is seven years.

c) Fish culture

Tiger Prawn:	M\$120,000 (Individual)	M\$1,800,000 (Group)
Cage Culture:	M\$ 35,000 (Individual)	M\$ 175,000 (Group)
Fry Production:	M\$ 30,000 (Individual)	M\$ 150,000 (Group)
Cockle Culture:	M\$ 30,000 (Individual)	M\$ 150,000 (Group)
Mussel Culture:	M\$ 35,000 (Individual)	M\$ 150,000 (Group)

Repayment period is generally five years.

d) Marketing

If there is a shortage of initial investment or operating capital in the areas of wholesale, retail, or transport, applicants who qualify for loans are individual members, the Fishermen Association or joint-venture with FA (Bumiputras are at advantageous in receiving this SPKP credit). The maximum loan is M\$200,000 and the repayment period is usually five years.

2) Loans based on DOF recommendations

The necessary conditions for applicants are same as those of LKIM recommendation. However, the applicable field is only aquaculture outside the FDA.

3) BPM Fisheries Credit Scheme

In addition to the aforementioned, the BPM has its own independent SPKP Programme. Those who may apply for this credit scheme are fishermen whose incomes are less than M\$1,000. The maximum sum of a loan is M\$50,000 and the repayment period is five years. Recommendation by LKIM/DOF is not necessary. They only provide assistance in filling out the application.

(4) Financing for the Poor and Needy

This plan was implemented from 1989. It was established for fishermen with incomes of less than M\$175 per month. Equity is not necessary. The maximum loan is M\$5,000 and is interest free.

(5) AJDF Loans

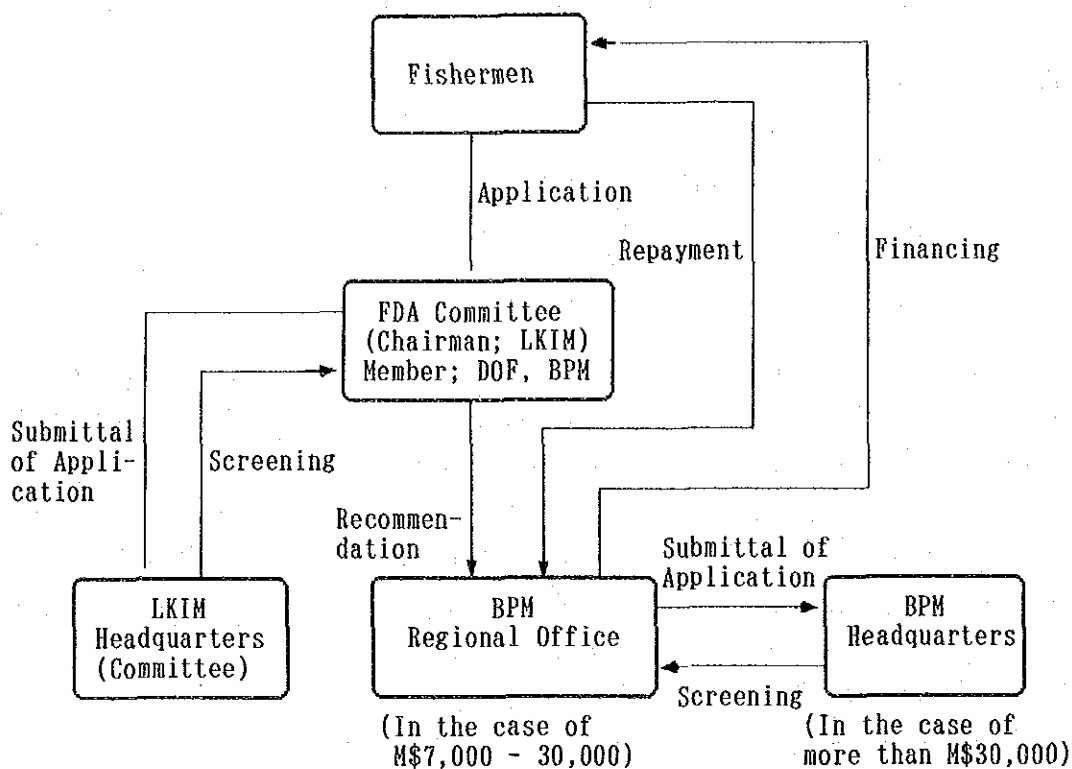
The funds for large investments are provided by the OECF to AJDF. The maximum loan is M\$2,000,000 with a 6.5 percent interest rate.

(6) BPM General Financing

There are no restrictions in purchasing clause or qualifications. The maximum loan is M\$6,000,000 and the interest rate is one to two percent higher than the interest rate of the current market.

With the exception of financing for the poor outlined in (4), all the aforementioned financing schemes require the applicant to have an equity of a minimum of 20 percent of the funds required. Subsequently, the coverage by loans is 80 percent. However, SPKP financing is more or less flexible based on LKIM/DOF arrangements. The BPM places importance on the rate of available equity and security (fixed assets or guaranty) at the time of screening of applicants.

The screening procedures of applications which require LKIM recommendation require usually two to three months to a maximum of six months. Membership in AFA is preferable, but not necessary.



The Screening Procedure of Applications by LKIM Recommendation

(7) The following qualifications are required for BPM screening of the applicant.

- 1) To possess a fishing license.
- 2) To be a boat owner-operator.
- 3) To have insurance when his fishing boat exceeds 40 GRT
- 4) To be a Malaysian citizen.
- 5) To be under the age of 55 years.
- 6) To specify one's fish landing site.

4.5.4 Fish Price Analysis

(1) Objectives

Fish price has been analyzed according to available data, with the objective of clarifying the fish pricing mechanism in Malaysia. Price differences vary according to fish species, fish size, area or region, and at different stages of marketing. The factors underlying price differences have been studied against other relevant data.

(2) Selection of Representative Fish Species

The following six species were selected as representative fish species for price analysis:

- (a) Spanish mackerel
- (b) Big white prawn
- (c) Indian mackerel
- (d) Squids
- (e) Round scad
- (f) Threadfin bream

In selecting these representative species, emphasis was placed on such factors as landing volume, regional similarities, classification of fish species used in Malaysia, and their importance in fishery. Two species were selected from Grade A, Grade B and Grade C categories, respectively.

(3) Results of Fish Price Analysis

1) Fish price by species

The average annual wholesale price of the representative fish species in 1988 are indicated below.

	Peninsular Malaysia	Sarawak
(a) Spanish mackerel	M\$5.14/kg	M\$3.15/kg
(b) Big white prawn	M\$18.82/kg	M\$10.39/kg
(c) Indian mackerel	M\$2.56/kg	M\$2.32/kg
(d) Squids	M\$3.37/kg	M\$2.14/kg
(e) Round scad	M\$1.04/kg	N.A.
(f) Threadfin bream	M\$2.22/kg	M\$2.26/kg

Source: LKIM Monitoring Report on Fish Wholesale/Retail Price in Peninsular Malaysia

Spanish mackerel and big white prawn are Grade A, Indian mackerel and squids Grade B, and round scad and threadfin bream Grade C. The wholesale prices were the highest for Grade A fish, succeeded by Grade B, and followed by Grade C which was the lowest. Normally the landing volume (production volume) is the dominant factor in fish price: the relative cheapness of (c) Indian mackerel is due to the fact that it had the highest production volume (58,000 tons, 1988); the relative cheapness of (a) Spanish mackerel in Sarawak may be due to the fact that Sarawak produces 1,650 tons; nearly 15 percent of the total volume of Spanish mackerel landed in Malaysia. The retail price of spanish mackerel is also cheap in Sabah which produces 1,000 tons; 10 percent of the total volume in Malaysia.

2) Fish Price by Size

Relevant data explaining fish size to prices were obtained only for (c) Indian mackerel.

Weight of Fish	Price
Below 100 g	Below M\$2.00/kg
100 g	M\$2.50/kg
150 g	M\$3.50/kg
Over 180 g	M\$4.00/kg

Source: Sampling data from quality control study by JICA Study Team, 1990

Price differences were observed in the wholesale/retail prices of (b) big white prawn and (d) squids according to size. However, due to distorted data on pricing for these two species, the relation between size and price was not very clear.

3) Seasonal Fluctuation

(a) Spanish mackerel: The price varies according to the volume of fish landed in the west coast of Peninsular Malaysia. The price is low in the beginning of year, rising from May and June. The price stabilizes in September and rises again until the end of the year.

(b) Big white prawn: Landing volume on the west coast of Peninsular Malaysia is almost constant throughout the year. The east coast and Sarawak have fishing seasons from (December to

February. However, the price is not influenced by fluctuations in landing volume.

- (c) Indian mackerel: The price does not fluctuate very much throughout the year, due to an almost constant landing volume in the west coast of Peninsular Malaysia.
- (d) Squids: The wholesale price usually does not change very much monthly. The price varies according to supply volume not only in Kuala Terengganu but also in some of the other areas.
- (e) Round scad: The wholesale price is almost constant. In local areas such as Kuala Terengganu a tendency of increase in price is observed according to a decrease in fish landing volume.
- (f) Threadfin bream: The wholesale price fluctuates not only in Kuala Terengganu but also in some of the areas according to landing volume.

4) Price by Region/Area

- (a) Spanish mackerel: Although the landing volume is large in Terengganu and Pahang States, the annual mean whole sale price is high in local production areas of these states. (Compared to the national average, it is 10 to 20 percent higher in price.) In Sarawak as stated earlier, the price of Spanish mackerel is comparatively low, due to a large landing volume.
- (b) Big white prawn: In Sabah the price is very low (more than 40 percent lower than the national average) with the exception of Tawau and Tuaran. The wholesale price is high in Kota Bahru, Kuala Terengganu and Kuantan in Peninsular Malaysia, partly due to landing volume. Of these three areas, Kota Bahru has the highest price level in Malaysia.
- (c) Indian mackerel: Indian mackerel is landed in large quantities in Kedah State, which contributes to low wholesale prices in Alor Setar. Sabah and Sarawak states maintain relatively low prices, while the east coast of Peninsular Malaysia show a

high price level despite a large landing volume.

(d) Squids: Size appears to be the main factor in pricing. The wholesale price is high even if the landing volume is large (Kedah, Terengganu and Pahang states). This may be due to the fact that some squids are being exported.

(e) Round scad: The wholesale price is comparatively high in Terengganu State in spite of a large landing volume. Kota Bahru has the highest wholesale price, which is not influenced by landing volume.

(f) Threadfin bream: Terengganu state has the largest landing volume and the wholesale price is low. It is followed by Pahang state where the wholesale price is high. Wholesale price of other fish is also high in Kuantan, Kelantan state.

5) Fish Price at the Kuala Lumpur Wholesale Market

The wholesale price of (a) Spanish mackerel, (c) Indian mackerel, (e) Round scad and (f) Threadfin bream at the Kuala Lumpur wholesale market is about average among the wholesale price levels in the eight areas in peninsular Malaysia. In contrast, the wholesale price of (b) big white prawn and (d) squid for export differ from the average. It is probable that the wholesale price at the Kuala Lumpur market is indicative of standard pricing levels of fish products for domestic consumption.

6) Wholesale Prices and Retail Prices

The retail price is usually higher than the wholesale price by around 20 to 30 percent. The mean rate of the difference to wholesale price in Peninsular Malaysia is shown by species as follows:

(a) Spanish mackerel:	19%
(b) Big white prawn:	2%
(c) Indian mackerel:	26%
(d) Squids:	23%
(e) Round scad:	48%
(f) Threadfin bream:	34%

In Sarawak, the difference between retail and wholesale price is

also around 20 to 30 percent for most species.

7) Wholesale Price at Consumption Areas and Fish Price at Landing Sites

A comparison between the wholesale price at terminal consumption centers and the consignment price, auction price, floor price and wholesale price (taken from LKIM Complex Managers' Monthly Reports) at fish landing sites indicate the following:

- Grade A Fish

Price levels at landing sites are high, compared to wholesale prices at consumption areas. It is unable to explain the fish (grade A) flow from landing area to consumption area.

- Grade B Fish

It is difficult to compare the price of (d) squids which varies according to size due to distorted data on size. The price wholesale prices of Indian mackerel at consumption areas are higher and it does not contradict to the fish flow.

- Grade C Fish

Wholesale prices of both species at consumption areas are higher than the prices at fishing landing sites.

Most of Grade A fish are directly transported to consumption area. Consequently, a frequent shortage in supply in production area raises the prices of Grade A fish.

There is always an ample supply volume of Grade B and C fish, and the prices around fish landing areas are kept at moderate. In case of fish export, such as squids (d), there may be other mechanism for price determination.

(4) Pricing Mechanism in the Fish Marketing System

- 1) In many cases, transaction payments from the wholesalers in the consumption area markets to the wholesalers in production areas are made after a certain period of time from the sale at the wholesale market. When the wholesalers at production areas ship the fish product to the wholesalers in consumption areas, the exact price is not known. The actual amount of the transaction payment is informed only after

the sale at wholesale market.

- 2) The purchase price of the wholesalers at production areas is dependent on the price offered by the wholesalers at the consumption area. Unless the wholesalers at production area are willing to take risks, the sales fish of fishermen is determined by the sales price of the wholesalers at consumption areas.
 - 3) Retailers in consumption areas add their margin usually more than 20 percent to the wholesale price.
- (5) Price Determination at the Kuala Lumpur Wholesale Market

The price levels of four fish species at the Kuala Lumpur wholesale market equal to the average price level for the eight wholesale markets in Peninsular Malaysia. Wholesale prices at this market seem to be indicative of standard pricing of fish for domestic consumption. However, the following factors should be considered.

- 1) Transport volume to Kuala Lumpur wholesale market from each production area is less than 15 percent of the landed volume.
- 2) The volume of imported fish handled at the Kuala Lumpur wholesale market exceeds 65 percent to the total handled volume (Table 4.3.1).
- 3) At the fish landing sites, particularly at the LKIM complexes on the east coast of Peninsular Malaysia, fish prices are higher than the prices at the wholesale market. Therefore, fish flow cannot be explained in terms of price.
- 4) There are six designated wholesale markets in addition to the market in Kuala Lumpur.

Considering the influence of imported fish on the price of domestic fish, it can be concluded at present time that fish price levels are determined based on the prices at the Kuala Lumpur wholesale market.

4.5.5 Profit Distribution in Fish Marketing

Producer price and traders' margin for several fishes in Malaysia and Japan are shown in the following table.

Producer price and fish traders' margin in Malaysia and Japan

Unit : % (Retail price=100)

Species	Producer Price	Wholesaler Margin	Retailer Margin
<u>Malaysia</u>			
Spanish mackerel	67.5	10.1	18.6
White shrimp	81.1	5.1	12.7
Indian mackerel	53.9	9.7	26.9
Squids	58.7	5.6	25.8
Round scad	50.7	8.9	23.3
Threadfin bream	48.7	5.0	37.9
<u>Japan</u>			
Horse mackerel	39.6	16.3	43.1
Japanese squid	60.8	10.2	28.3
Saury	32.7	35.2	31.5

Remarks: Wholesaler's margin includes all the margins between producer's price and wholesale price at consumption area. Costs for transportation and handling are not included in wholesaler's and retailer's margins.

Source: Malaysia; Annual Fisheries Statistics, 1988, DOF.
Japan; Ministry of Agriculture, Forestry and Fisheries, "Survey on Pricing Mechanism by Step in Marketing of Fisheries Products" (Oct. 27, 1987)

In a comparison of the data in Malaysia and Japan, the percentage of producer price in the retail price is higher in Malaysia. The profit margin of the wholesalers and retailers are lower than Japan.

In Japan, markets in the consumption and production areas are fully established and the wholesaler's profit margin are divided according to marketing stages in both markets. Moreover in-between wholesalers play an important role in consumption area markets and it is necessary to include their profit margin as well. The following data has been given to explain the different stages in profit margin.

Producer Price and Traders' Margins by Stage in Japan

Unit : % (Retail price = 100)

Species	Producer Share	Wholesaler Commission		In-between Wholesaler Margin	Retailer Margin
		Product.*1	Consump.*2		
Horse mackerel	39.6	1.9	2.4	8.8	43.1
Japanese squid	60.8	2.7	4.2	4.7	28.3
Saury	32.7	1.2	3.1	9.2	31.5
Sardine	7.8	3.5	2.7	14.5	31.7
Japanese mackerel	25.5	1.0	2.6	10.5	32.3

Remarks *1: Production Market, *2:Consumption Market

Source : "Survey on Pricing Mechanism by Step in Marketing of Fisheries Products" in Tokyo dated Oct. 27, 1987, Ministry of Agriculture, Forestry and Fisheries, Japan

In Japan, marketing channels are complicated and profit margins are taken at each distribution stage (based on commissions). The overall profit margin of the wholesaler is high, particularly the share of the in-between wholesalers who do not exist in Malaysia. The marketing structure in Malaysia is more simple: the functions of in-between wholesalers are fulfilled by the wholesalers at the wholesale markets in the consumption areas. The profit margin of wholesalers in Malaysia is almost equivalent to the commissions of the Japanese wholesalers (in the production or consumption areas). In Japan, the profit margin of the in-between wholesalers is an additional element.

4.5.6 Income Level of Fishermen

(1) Household Income

The following are summarized figures of household income by social stratum /target group in Peninsular Malaysia, Sabah and Sarawak, based on a household survey conducted by the Statistical Department. Monthly household income shows the income level of each target group.

Monthly Household Income by Target Group in Malaysia

UNIT: M\$

REGION/TARGET GROUP	1984	1987
PENINSULAR MALAYSIA	1,095	1,074
Urban	1,541	1,467
Rural	824	853
Rubber Smallholders	520	535
Padi Farmers	406	462
Coconut Smallholders	514	492
Fishermen	672	632
Estate Workers	632	670
SABAH	1,212	1,116
Urban	1,909	1,614
Rural	1,005	994
Rubber Smallholders	544	506
Padi Farmers	395	416
Coconut Smallholders	596	677
Fishermen	818	714
Estate Workers	619	531
SARAWAK	1,033	1,141
Urban	1,871	1,749
Rural	844	988
Rubber Smallholders	449	408
Padi Farmers	394	481
Coconut Smallholders	601	554
Fishermen	742	755
Estate Worker	574	1,142

Source : Incidence of Poverty and Mean Household Income by Stratum and Target Group, 1984 and 1987 ". pp 52-53 of the Mid-term Review of the Fifth Malaysia Plan (1986-1990), GOM

From these figures, the following can be deduced.

- 1) The income level of fishermen is always high in the rural areas of Peninsular Malaysia, Sabah and Sarawak.
- 2) Only estate workers have the same income level as fishermen. In Peninsular Malaysia and Sarawak in 1987, estate workers had higher income than fishermen. This is due to a recovery in the international market of plantation commodities.
- 3) The income level of fishermen is much higher than that of farmers (rubber smallholders, coconut smallholders and paddy farmers) in Sabah and Sarawak.
- 4) Fishermen's income levels have stagnated from 1984 to 1987 (slightly declining).

(2) Poverty Line Income (PLI)

The poverty level in Malaysia is determined by minimum expenditure levels or poverty line income (PLI) to separate the poor and the non-poor. The PLI is updated annually using the Consumer Price Index to reflect changes in price levels. For 1987, the PLI was about M\$350 per month for a household in Peninsular Malaysia, M\$429 per month for a household in Sarawak, and M\$533 per month for a household in Sabah.

The data on income distribution of fishermen households and paddy farmer households (Household Income Survey, 1987) is shown in Table 4.5.15. On the west coast of Peninsular Malaysia, more than 50 percent of the fishermen households exceed the income level of M\$400. Some 70 to 85 percent of fishermen households in Selangor, Penang and Melaka states have high income. In contrast, paddy farmer households with incomes above M\$400 per month are less than 50 percent, with the exception of paddy farmer households in Melaka and Negri Sembilan.

On the east coast, 65 percent of the fishermen households in Kelantan, 73 percent in Pahang, 78 percent in Johor, and 40 percent in Terengganu state are above the monthly income level of M\$400. Sixty-seven percent of the farmers' income in Johor and 100 percent of the farmers' income in Pahang are high.

In relation to per capita GDP by state (1986), the states with more than M\$3,000 per capita GDP have a relatively higher percentage of fishermen households in the income level exceeding M\$500, with the exception of Terengganu with a per capita GDP of M\$3,802 where approximately 30 percent of the fishermen households fall within income levels exceeding M\$500. This may reflect the fact that fishermen households have other sources of income, particularly in states such as Penang, Perak, Selangor, and Johor where there are many industrial activities.

The PLI in Sarawak is M\$429 per month. Accordingly, about 53 percent of fishermen households and 34 percent of the paddy farmer households fall within an income level exceeding M\$500. In Sabah, the PLI is M\$533 per month, and about 60 percent of the fishermen households fall within an income level exceeding M\$500; whereas about 77 percent of the farmer households fall within an income below M\$500.

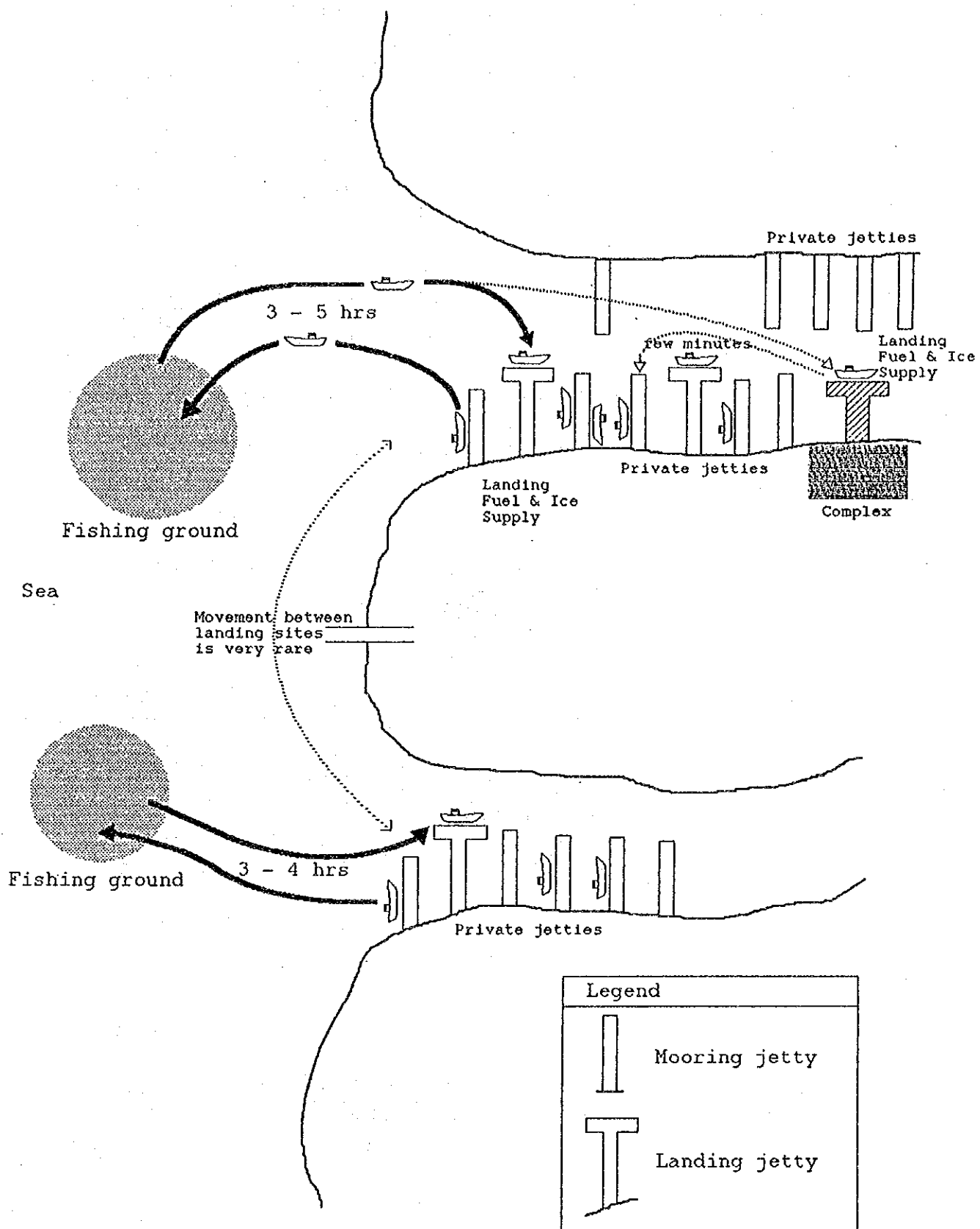


Fig. 4.5.1 Movement of Fishing Boats at Landing Site

Table 4.5.1a Number of Boat License Holders in Mersing and Endau

Ethnic group	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Malays	181	119	13	18	12	343
	52.8%	34.7%	3.8%	5.2%	3.5%	100.0%
Chinese	32	28	67	108	38	273
	11.7%	10.3%	24.5%	39.6%	13.9%	100.0%
Indians	0	0	0	0	0	0
Others	0	1	0	0	0	1
	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%
Total	213	148	80	126	50	617

Source: License list from DOF office, 1989

Table 4.5.1b Number of Respondents (License Holders) of Survey

Ethnic group	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Malays	63	49	7	14	7	140
	45.0%	35.0%	5.0%	10.0%	5.0%	100.0%
Chinese	0	1	16	31	7	55
	0.0%	1.8%	29.1%	56.4%	12.7%	100.0%
Indians	0	0	0	0	0	0
Others	0	0	0	0	0	0
Total	63	50	23	45	14	195

Remarks: Based on interview survey in Sept., 1990

Table 4.5.1c Percentage of Respondents in the Total License Holders

Ethnic group	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Malays	34.8%	41.2%	53.8%	77.8%	58.3%	40.8%
Chinese	0.0%	3.6%	23.9%	28.7%	18.4%	20.1%
Indians						
Others		0.0%				0.0%
Total	29.6%	33.8%	28.8%	35.7%	28.0%	31.6%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.2 Percentage of the Boat Owner Who Has Another Job

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
None	63.6%	74.5%	95.7%	58.3%	73.3%	69.5%
Wholesaler	1.5%	9.8%	0.0%	25.0%	6.7%	9.4%
Processor	3.0%	0.0%	0.0%	6.3%	0.0%	2.5%
Transporter	0.0%	0.0%	0.0%	2.1%	0.0%	0.5%
Ice trader	0.0%	0.0%	0.0%	0.0%	6.7%	0.5%
Farmer	21.2%	5.9%	0.0%	0.0%	6.7%	8.9%
Other industries	10.6%	9.8%	4.3%	8.3%	6.7%	8.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.3 Classification of License Holders (Actual Ownership)

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Nominal A	1.6%	6.0%	8.7%	6.7%	7.1%	5.1%
Nominal B	4.7%	8.0%	8.7%	4.4%	0.0%	5.6%
Actual owner	93.8%	86.0%	82.6%	88.9%	92.9%	89.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: 1) Nominal A does not have any income from the catch

2) Nominal B is just a crew

3) Based on interview survey in Sept., 1990

Table 4.5.4 Role of Boat Owner in Fishing

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Office work	4.7%	18.0%	13.0%	46.7%	50.0%	21.9%
Crew	1.6%	4.0%	8.7%	0.0%	0.0%	2.6%
Captain	93.8%	78.0%	78.3%	53.3%	50.0%	75.5%
Others	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.5 Percentage of Boat Construction by Own Capital

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
All from own	43.8%	18.0%	14.3%	15.9%	0.0%	24.4%
Partially others	40.6%	52.0%	85.7%	77.3%	92.9%	60.6%
All from others	15.6%	30.0%	0.0%	6.8%	7.1%	15.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.6 Source of Capital for Boat Construction

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
BPM	71.1%	88.9%	23.8%	22.7%	35.0%	53.0%
Commercial bank	5.3%	2.2%	4.8%	0.0%	0.0%	2.4%
Wholesaler	10.5%	4.4%	33.3%	61.4%	45.0%	29.2%
Co-owner	5.3%	2.2%	19.0%	9.1%	5.0%	7.1%
Others	7.9%	2.2%	19.0%	6.8%	15.0%	8.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.7 Amount of Loan for Boat Construction

Unit:M\$

	Gross tonnage of boat (GT)				
	0-9.9	10-24.9	25-39.9	40-69.9	70<
Minimum	300	4,000	7,000	10,000	70,000
Maximum	15,000	50,000	81,000	150,000	300,000
Mean	7,720	14,007	30,611	47,946	218,107
S. D.	3,646	7,256	23,168	29,100	80,387

Remarks: Based on interview survey in Sept., 1990

Table 4.5.8 Credit or Loan for Daily Operation and Its Usage

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
None	48.4%	44.0%	39.1%	29.5%	7.1%	39.0%
Maintenance	23.4%	32.0%	34.8%	20.5%	35.7%	27.2%
Fuel/Ice	7.8%	12.0%	8.7%	38.6%	28.6%	17.4%
Both of above	20.3%	12.0%	17.4%	11.4%	28.6%	16.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.9 Major Source of Loan or Credit for Daily Operation

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
AFA	0.0%	3.6%	0.0%	3.2%	16.7%	3.4%
Wholesaler	93.9%	92.9%	73.3%	83.9%	66.7%	85.7%
Co-owner	0.0%	3.6%	20.0%	0.0%	0.0%	3.4%
Others	6.1%	0.0%	6.7%	12.9%	16.7%	7.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.10 Current Amount of Loan or Credit for Daily Operation (M\$)

	Gross tonnage of boat (GT)				
	0-9.9	10-24.9	25-39.9	40-69.9	70<
Minimam	0	0	0	0	0
Maximam	24,000	10,000	16,000	25,000	30,000
Mean	2,216	1,576	4,727	5,537	9,909
S. D.	4,751	2,152	5,581	5,694	8,999
Repaid	34.5%	33.3%	27.3%	20.0%	18.2%

Remarks: 1) Figures for "Repaid" show percentage to the total of borrower

2) Based on interview survey in Sept., 1990

Table 4.5.11 Major Buyer of Fish Caught

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Local retailer	10.9%	2.0%	4.5%	15.9%	7.1%	8.8%
Local wholesaler	82.8%	90.0%	40.9%	54.5%	35.7%	70.1%
Other wholesaler	1.6%	2.0%	50.0%	29.5%	35.7%	16.0%
AFA	3.1%	2.0%	4.5%	0.0%	14.3%	3.1%
Processor	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Others	1.6%	4.0%	0.0%	0.0%	7.1%	2.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.12 Obligation to Sell the Fish to the Lender

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Obligation	56.5%	59.2%	76.2%	81.0%	85.7%	67.0%
Non-obligation	43.5%	40.8%	23.8%	19.0%	14.3%	33.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.13 Major Reason to Select the Buyer

	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Obligation	29.7%	36.0%	36.4%	34.1%	28.6%	33.0%
Fish price	25.0%	38.0%	36.4%	61.4%	64.3%	40.7%
Trading custom	25.0%	20.0%	22.7%	0.0%	7.1%	16.5%
Other factors	20.3%	6.0%	4.5%	4.5%	0.0%	9.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.14 Income Level of License Holders

Monthly Income (M\$)	Gross tonnage of boat (GT)					Total
	0-9.9	10-24.9	25-39.9	40-69.9	70<	
Less than 350	81.3%	32.7%	0.0%	2.2%	0.0%	35.4%
350 - 499	18.8%	44.9%	0.0%	0.0%	0.0%	17.4%
500 - 699	0.0%	6.1%	26.1%	8.9%	14.3%	7.7%
700 - 899	0.0%	2.0%	13.0%	4.4%	0.0%	3.1%
900 - 1,099	0.0%	10.2%	17.4%	4.4%	0.0%	5.6%
1,100 - 1,499	0.0%	2.0%	13.0%	11.1%	0.0%	4.6%
1,500 - 1,999	0.0%	0.0%	0.0%	8.9%	0.0%	2.1%
2,000 - 2,999	0.0%	2.0%	17.4%	33.3%	14.3%	11.3%
3,000 - 4,999	0.0%	0.0%	0.0%	13.3%	28.6%	5.1%
5,000 - 7,999	0.0%	0.0%	13.0%	13.3%	14.3%	5.6%
8,000 - 9,999	0.0%	0.0%	0.0%	0.0%	21.4%	1.5%
10,000 - 14,999	0.0%	0.0%	0.0%	0.0%	7.1%	0.5%
15,000 - 19,999	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
20,000 - 29,999	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
30,000 - 49,999	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50,000 - 99,999	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
More than 100,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Remarks: Based on interview survey in Sept., 1990

Table 4.5.15 Income Distribution of Fishermen and Paddy Farmers Household and Per Capita GDP (1986)

Income Level (M\$/month)→	Fishermen(%)			Paddy Farmer(%)			Per Capita GDP(M\$)	Population (x1,000)	PLI(1987) (M\$/month)
	<399	400-499	>500	<399	400-499	>500			
P. Malaysia									
Perlis	44.4	11.2	44.4	51.0	14.0	35.0	398	177	350
Kedah	45.9	12.6	41.5	50.3	13.2	36.5	2,760	1,271	350
Penang	15.6	6.2	78.2	47.3	11.1	41.6	3,986	1,105	350
Perak	25.3	15.3	59.4	67.2	10.2	22.6	5,438	2,008	350
Selangor	14.8	13.6	71.6	54.3	6.6	39.1	9,581	2,034	350
Negri Sembilan	33.3	-	66.7	37.5	25.0	37.5	2,020	657	350
Melaka	30.4	13.6	56.0	33.4	-	66.6	1,390	512	350
Johor	22.3	12.4	65.3	33.3	16.7	50.0	5,918	1,990	350
Pahang	26.7	19.8	53.5	-	33.3	66.7	2,986	1,152	350
Terengganu	59.9	10.6	29.5	76.8	5.3	17.9	3,802	708	350
Kelantan	35.5	21.0	43.5	59.6	11.8	28.6	1,564	1,120	350
Sarawak	19.1	28.0	52.9	51.1	14.7	34.2	5,455	1,682	429
Sabah	22.5	17.1	60.4	69.0	8.3	22.7	5,090	1,442	533

Remarks: 1) PLI is Poverty Line Income estimated in 1987
2) Per capita GDP (1986) at constant price of 1978

Source : Household Survey conducted in 1987, DOS

Mid-Term Review of Fifth Malaysia Plan (1986-1990), GOM

4.6 Fish Marketing Facilities and Their Operation/Management

4.6.1 LKIM Complex

(1) Present Status and Problems

There are 21 LKIM complexes nationwide; of which 14 are operational. The capacity of the facilities, year of construction, cost of construction and operational conditions of each complex are as shown in Table 4.6.1, and the planned capacity and recent actual fish landed volume of the complexes are shown in Table 4.6.2.

Chendering is the only fishing port with breakwaters and a wharf of more than 400 m in the shape of a harbour. The complex is located within the mouth of the river and is comprised of a wharf of about 50 to 100 m long, an unloading area, and a 10 to 20 tons freezing plant.

The fish landing ratio of each complex has increased only 10 to 40 percent of the fish landing volume estimated during initial planning, with the exception of the Kuala Besut and Pulau Kambing complexes where the utilization rate has been increasing.

The present status and the problems of each complex within the model area are as follows.

- a) The fish landing and supply jetty of each complex with the exception of Kuala Besut is not separated and a part of the landing jetty is being utilized for supply services of fishing boats. Since the complex is congested and waiting time is long, only about 18 to 50 percent of the fishing boats use the LKIM complex for refueling. Another underlying cause of the low utilization rate is that credit is not accepted and payment must be in cash for the fuel. Refueling is time-consuming due to the small capacity of the oil pump. If the pump capacity is enlarged, refueling time can be reduced.
- b) With the exception of the complex at Kuala Sedili, fish landing is time-consuming and the jetties are not efficiently utilized at the other complexes because the fish catch is sorted on board or at the jetty after the boat has arrived at the jetty. This brings about

great congestion particularly in Kuala Kedah and Pulau Kambing complexes.

- c) Fish landing time at most of the LKIM complexes is about twice a day (in the morning and evening). However at the complexes of Chendering, Endau, Mersing and Kuala Sedili, fishing boats can land their fish only once a day. If operational hours are extended, the fish landing time can be increased to twice a day, and their landed volume of fish can be increased.

(2) Present Status of Each Model Area

1) Kuala Kedah

- a) The correlation between fish landing and the operational hours of the markets in each area

Small fishing boats unload fish in the morning and large boats unload at night. The complex is operational during this time. According to data obtained in this study, fish landed in the morning is destined for the local and Singaporean markets; and fish landed at night is sent to Ipoh, Sungai Besar, Kuala Lumpur, and Alor Setar markets. Fish is transported to these markets in time for their opening hours (Appendix 4.65).

- b) Fish handling

Fish is kept in ice and placed in insulated boxes or in fish holds or in RSW system where fish is kept in chilled sea water, and transported. However, insulation of fish hold is not very effective and fish handling is poor (the fish is kept on deck for long periods and thermal conductivity is low between ice and fish because the fish and ice are not properly mixed). In addition, the RSW cooling system is not sufficiently maintained or breaks down often and the chilling efficiency is low.

Fish landing is time-consuming and the jetty is congested, since the fish catch is sorted on board/jetty after arrival at the jetty.

- c) Capacity of the facility

The jetty is usually congested due to fish sorting on board at jetty particularly around peak landing periods. If the fish is

sorted before entry into the complex, the capacity of the complex is sufficient for the fishing boats presently using the complex, and further it is possible to increase the number of landings to more than twice a day. However, in order to make the complex attractive to the users, effective complex operation should be instituted and a credit system should be introduced.

d) Vacant land for development

There is no vacant land around the complex as the surrounding area is a residential/institutional area. The city plans to develop an industrial area on the opposite bank of Kedah River (Fig. 4.6.1).

e) Other related facilities

The capacity of existing ice plants in Kedah is 121 tons a day, and ice is also supplied from Perak state. Presently it is sufficient to meet the demand. In Kuala Kedah area, there are three large fish meal plants and one freezing and processing plant of medium capacity. These plants are facing shortages in raw materials.

2) Lumut

a) This complex is currently under construction and is planned as a fish landing site for fishing boats in the Lumut area, and Pangkor Island and a loading/unloading site for cargo boats plying between Lumut and Pangkor Island.

b) The Lumut complex is situated along the Sitiawan River. A large vacant area of public land along the river is available.

3) Kuala Besut

a) The correlation between fish landing and the operational hours of the markets in each area

Generally small fishing boats unload fish in the morning and large boats unload at midnight. The complex is operational during this time. According to this study, fish landed in the morning are destined for the local, Kuala Lumpur, and Johor Bahru markets and fish landed at midnight are destined for the local and Kota Bahru markets (Appendix 4.66).

b) Fish handling

The maintenance of RSW cooling system is being carried out here, but the popularity of RSW is low. The capacity of the facilities is adequate for the number of fishing boats presently using the complex. However, fish landing is time-consuming because the catch is sorted on board/jetty. Therefore, it is congested around peak landing hours.

c) Capacity of the facility

The fish landing and supply jetties are separate which gives Kuala Besut complex an advantage over the other complexes. The length of the fish landing jetty is sufficient and is able to accept all fishing boats within the area provided that the catch is sorted before arrival at jetty as shown in Table 4.6.3.

d) Vacant land for development

There is vacant land at the complex site for the following purpose.

- Area for ice plant and cold storage
(max. 150 ton/day): 1,800 m²
- Area for processing plant: 2,025 m²
- Vacant land: 3,016 m²

The vacant land behind the complex is agricultural land and there is extensive public land along the river where large scale development is possible (Fig. 4.6.2).

e) Other related facilities

The existing ice plants in Terengganu state have a capacity of 432 tons a day. There is a shortage of ice in Kuala Besut area. The demand for ice in 1989 at the Kuala Besut complex was 9,219 tons, and the shortage was supplied from Chendering, Kota Bahru and Thailand. A freezing and processing plant of capacity of two tons per six hour cycle for high grade fish is under construction.

4) Pulau Kambing

a) The correlation between fish landing and the operational hours of the markets in each area.

Small fishing boats unload fish in the morning and large boats

unload in the afternoon. Fish landed in the morning are sent to the local and Johor markets and fish landed in the afternoon are destined for the Kota Bahru and Kuala Lumpur markets (Appendix 4.67).

b) Fish handling

The maintenance of refrigerated sea water (RSW) cooling system is commonly done, and this system is popular among trawlers. Fish landing is time-consuming and the jetty is very congested because the fish catch is sorted on board at the jetty after the fishing boats have arrived at the jetty.

c) Capacity of the facility

Since the jetty is very congested, it is being expanded and its functional facilities are being renovated. As indicated in Table 4.6.3, the length of the existing jetty is insufficient, even if the fish is sorted before arrival at the jetty.

d) Vacant land for development

Although the site of the complex is narrow and there is no vacant land available behind the complex, there is a vacant lot in the commercial area on the same side as the jetty where development on a limited scale is possible (Fig. 4.6.3).

e) Other related facilities

There is an ice plant in Chendering with a capacity of 200 tons a day. Ice is supplied from Chendering and other private ice plants in Kuala Terengganu.

5) Chendering

a) The correlation between fish landing and the operational hours of the markets in each area

Fish catch is landed mainly in the morning and is sent to the Johor and Kuala Lumpur markets (Appendix 4.68).

b) Fish handling

The maintenance of RSW cooling system is commonly done, and this system is popular among trawlers.

Although fish landing is time-consuming because the fish catch is

sorted on board at the quay after the arrival of fishing boats at the quay, it is not congested because the length of quay is sufficient.

c) Capacity of the facility

The length of the existing quay is sufficiently long as shown in Table 4.6.3. As the Chendering port will be the offshore fishing base in the east coast of Peninsular Malaysia, it is necessary to promote efficient operation of complex including sorting of fish catch. In the past, many confiscated boats were moored at the wharves within the harbour and the wharves could not be utilized effectively. However, this is no longer a problem after the confiscated boats were moved to the offshore island, Kapas.

d) Vacant land for development

There is vacant land within the complex site for the following purpose.

- Area for cold storage: 2,160 m² (a small-scale rapid freezing and five 10-ton refrigeration rooms are under construction)
- Area for expansion of market hall: 4,140 m²
- Vacant land for DOF: 4,000 m²

The land behind the complex is hilly and is located between the ocean and the campus of a fishery training school. Development on a small-scale is possible (Fig. 4.6.4).

e) Other related facilities

There is an ice plant in Chendering with a capacity of 200 tons a day, and currently its production is sufficient to supply ice to Kuala Besut and Pulau Kambing complexes. A freezing and a processing plant for fish cake and fish balls are under construction within the complex.

6) Kuantan

Currently, a complex is under construction to accommodate all the fishing boats in the area after the private jetties located along the rivers are demolished. However, as shown in Table 4.6.3, the fish landing volume within the area (along the rivers) has already exceeded the estimated volume; and the capacity of the complex is insufficient. In addition, if the private jetties are physically

demolished, it is necessary to secure mooring space other than the wharf. The office facilities for local wholesalers who have been using the private jetties have to be constructed.

There are private ice plants in Kuantan with a capacity of 170 tons a day in total. This capacity is adequate to meet current fish landing volume. There are fish processing factories making fish crackers and fish balls. However, this is still a cottage industry.

7) Endau

- a) The correlation between fish landing and the operational hours of the markets of each area

Fish catch is landed mainly in the morning and is sent to the Kuala Lumpur, Johor Bahru, and the local markets. Fish landed in the afternoon is transported in time for the opening of the Kuala Lumpur and Johor markets (Appendix 4.69).

- b) Fish handling

The RSW cooling system is quite popular in trawlers; however its maintenance is insufficient, and insulation of fish hold is not effective.

Fish landing is time-consuming and the jetty is congested because the fish catch is sorted on board at the jetty after the arrival.

- c) Capacity of the facility

Although the capacity of the complex is sufficient for the limited number of fishing boats presently using the complex, it is slightly congested particularly around peak landing periods because fish is sorted on board at the jetty.

The wooden jetty is old and other land facilities have not been renovated. The present complex cannot handle large volume of fish catch (Table 4.6.3). If fish is sorted on board before arrival at the jetty, fish landing capacity can be increased to higher levels. A large number of large fishing boats at Endau is operating in the offshore fishing grounds on the east coast, and it will increase with the future development of offshore fishery in the east coast. In order to cope with this situation, the capacity of the complex should

be expanded, and the land facilities should be improved along with effective complex operations, introduction of a credit system and improvement of other services to the users.

d) Vacant land for development

The land adjacent to the site is a mangrove area. The proposed site for a new complex is on agricultural and forest land and is located at the lower part of the river near the bridge. It is sufficiently spacious for large scale development (Fig. 4.6.5).

e) Other related facilities

The capacity of the existing ice plants in east Johor is 186 tons a day, and it is sufficient to fulfill the ice requirement in the model area.

8) Mersing

a) The correlation between fish landing and the operational hours of the markets of each area

Fish catch is landed in the early morning and is sent to the Kuala Lumpur, Johor Bahru, and local markets. If fish is landed in the afternoon, it can be transported in time for the opening hours of the Kuala Lumpur and Johor markets. However, the fish is landed only once in the morning, and the operational hours of the complex is short (Appendix 4.70).

b) Fish handling

The RSW cooling system is popular in trawlers; however its maintenance is insufficient, and insulation of fish hold is not effective .

Fish landing is time-consuming and the jetty is congested because the fish catch is sorted on board/jetty after the arrival at the jetty.

c) Capacity of the facility

If the fish is sorted before arrival at the jetty and the operational hours of the complex are increased, the capacity of the jetty is adequate to handle about three times the present fish landing volume (Table 4.6.3). However, in order to make the complex

attractive to the users, services should be improved, i.e., effective complex operation should be instituted and a credit system should be introduced.

d) Vacant land for development

The land behind the complex site is vacant and is located in residential and agriculture areas on the opposite side of the road. There is no vacant land adjacent to both sides of the site due to an ice plant, a FA office, and a jetty for small ferry boat. Limited development is possible (Fig. 4.6.6).

9) Kuala Sedili

a) The correlation between fish landing and the operational hours of the markets of each area

Fish catch is landed once in the afternoon and is sent to the Johor Bahru, Kuala Lumpur, and local markets. However, it is too late for the local market; therefore, it is necessary to land fish in the morning to be in time for the opening hours of the local market (Appendix 4.71).

b) Fish handling

The RSW cooling system is quite popular in trawlers; however its maintenance is insufficient, and insulation of fish hold is not effective.

Sorting of fish is conducted on board at sea or river mouth before arrival at the jetty.

c) Capacity of the facility

The length of the existing jetty is sufficient and is able to accept all fishing boats in the vicinity, if the operational hours of the complex is increased (Table 4.6.3). However, in order to make the complex attractive to the users, the services should be improved, such as, effective complex operation should be instituted and a credit system should be introduced.

d) Vacant land for development

There is a vacant area of 550 m² within the complex site for possible small scale development. The area behind the complex is

a vacant agricultural land which may be used for large scale development (Fig. 4.6.7).

10) Bintawa

- a) The correlation between fish landing and the operational hours of the markets of each area

Fish catch is landed from midnight to morning and is sent to the local market in time for its opening hours (Appendix 4.72).

- b) Fish handling

There are few fishing boats with refrigeration facility in fish holds; and most of the boats are using ice. Fish catch is sorted on board or on the jetty after arrival at the complex and fish landing is time-consuming. However, the jetty is not congested because the capacity of the jetty is large and each fishing trip is long.

- c) Capacity of the facility

Presently, fish catch is unloaded at the complex by only large fishing boats and small fishing boats unload at the jetties in front of the public markets. The length of the existing jetty is adequate (Table 4.6.3). In case that the development of the offshore fishing grounds is necessary to meet the future increase in fish demand, there is a need for improvement in the sorting of fish catch as well as institution of effective complex operation. Further it is also necessary to install a lower step at the jetty in order to facilitate small boats.

- d) Vacant land for development

There is no vacant land within the complex site but there is extensive vacant land in the industrial area on the opposite side of the road for large scale development of the fishery industry (Fig. 4.6.8).

(3) The possibility of expanding the use of the LKIM complex

The possibility of expanding the use of each complex in the model area was investigated, taking into present situation of the aforementioned facilities and its operation.

1) Kedah state

Fishing boats which operate outside the Kuala Kedah area, fish in fishing grounds near their landing site. It is unlikely that these boats will land their fish catch at the LKIM complex in the future. The potentiality of developing new fishing grounds is low in the west coast due to limited fish resources. Consequently, these fishing boats are not expected to transfer in great numbers to the Kuala Kedah area.

Therefore, the LKIM complex will only service the fishing boats in the Kuala Kedah area. The possibility of transferring the fishing boats currently using the private jetties in Kuala Kedah, to the LKIM complex has been considered. As shown in Table 4.6.3, the jetty currently in use will be able to accommodate up to 8,880 tons of fish landing volume. In addition to sorting fish on board the boats before arriving at the complex, it is necessary to institute services such as a credit system for fishermen, quick paperwork procedures and other efficient operating measures which will make the complex attractive to its users. Unfortunately, expanding the jetty and concentrating fish landing at the complex is not feasible since construction costs cannot be met with the benefit brought by the expansion of jetty, because increase in production can not be expected in view of the fish resource conditions. Therefore, it is inappropriate in terms of national economy (Appendix 7.1).

2) Perak state

A plan to construct a LKIM complex in the Lumut area is underway. The possibility of transferring the fish catch of fishing boats utilizing Pangkor Island, to this complex has been considered.

Pangkor Island is located close to the fishing grounds and has many fish processing facilities. Therefore, fishing boats will not land their fish catch directly at Lumut. Furthermore, there is no advantage to have the small cargo boats transfer their loading and unloading site to the complex which is located far away.

In order for fishing boats to transfer from Pangkor Island to Lumut, it is necessary to build mooring facilities for fishing boats,

fish processing facilities, housing, and to secure labor. It will be difficult to bear economic benefits which offset all the costs necessary for these facilities. Moreover, the fishermen and processors have developed and carried on a livelihood in this island for several generations in their respective trade and are deeply rooted to this area. Therefore they are opposed to transfer.

3) Terengganu state

a) Kuala Besut

As shown in Table 4.6.3, the capacity of jetty is sufficient under the present conditions. In conjunction with an increase in large fishing boats with future development of offshore fishing grounds on the east coast, fish landings will be concentrated at Chendering which is located comparatively close to the large city consumption areas on the west coast and has adequate capacity and water depth for the boats, because in Kuala Besut the river mouth is shallow and water depth is insufficient at the jetty for large fishing boats. Therefore, as indicated in Table 4.6.4, a large increase in fishing boats is not anticipated and it is not necessary to expand the jetty.

b) Pulau Kambing

This complex will be the base for small and medium fishing boats. Large fishing boats which will increase in future, should be concentrated in Chendering. However, it is necessary to expand the jetty currently in use, as its capacity is inadequate to accommodate the present number of fishing boats. It is presently being expanded and renovated.

c) Chendering

The Chendering complex is most suited to accommodate large fishing boats in terms of its facilities and its geographical position. By strategically establishing the Chendering complex as a base for large fishing boats in Terengganu state in order to promote offshore fisheries, large fishing boats which are expected to increase with the development of offshore fishing grounds will be concentrated here. However, as shown in Table 4.6.4, it is not necessary to expand its facilities but to promote sorting of fish on board before arrival at the complex, to institute services such as

credit system for fishermen, quick paper work procedures and other efficient operating measures which will make the complex attractive to its users.

4) Johor state

a) Endau

This area has developed as a base for offshore fisheries due to its close proximity to large city consumption areas such as Johor Bahru and Singapore. The private jetties is currently over-crowded with fishing boats and it is difficult for them to accommodate the large fishing boats which will increase with future development of offshore fisheries. The present complex is old, its capacity is small, and it is impossible to expand the facility due to unavailable land space within the site. Therefore, it is necessary to transfer to the vicinity and expand the complex in order to accommodate the increased number of fishing boats. It is estimated that the anticipated benefit by increased production will cover fairly the construction costs (Appendix 7.2). However, it is vital that measures are taken to make the complex more attractive to fishermen by introducing a credit system, and accelerating paperwork procedures, sorting fish on board the boat before arrival at the complex, etc.

b) Mersing

Mersing will remain mainly as a base for small and medium fishing boats; and the number of fishing boats is not expected to increase overall due to the narrow width of the river and the shallow river mouth. It will be difficult to transfer all the fishing boats utilizing the private jetties to the complex, since there is a very small space to expand and no suitable location to transfer to. Therefore, in order to increase use of current complex facilities, it is necessary to make the complex more attractive to fishermen by introducing a credit system, and by accelerating paperwork procedures, sorting fish on board the boat before arrival at the complex, etc.

c) Kuala Sedili

This complex is mainly utilized by small and medium fishing boats. Although its facilities are adequate to accommodate all the

fishing boats in that area (river), it is necessary to make the complex more attractive to fishermen by introducing a credit system, and by accelerating paperwork procedures, sorting fish on board the boat before arrival at the complex, etc. in order to transfer and concentrate the fishing boats utilizing the private jetties to the complex.

5) Bintawa, Sarawak State

In future a shortage in fish supply is anticipated on the west coast of Peninsular Malaysia and the development of highly potential offshore fishing grounds in Sarawak is expected to fulfill this shortage. It is desirable that large fishing boats expand their use of Bintawa as one of the fish supply base for Peninsular Malaysia. However, its fish landing facilities are adequate and no expansion is necessary (Table 4.6.4). It will become necessary to install refrigeration and cold storage facilities as supply base for fish exported to outside the state. However, these refrigeration facilities will be limited to high grade and not medium or low grade fish from financial viewpoint, if fish price in Peninsular Malaysia does not rise (Appendix 7.5). It is also necessary to consider the installation of a processing plant to produce high quality fish balls, dried fish, fish delicacies, etc.

4.6.2 KO-NELAYAN, SAFMA and ANGKASA Complex

(1) Present Status and Problems

The present capacity and the operational conditions of each complex/center is shown in Table 4.6.5.

1) Lahad Datu

Among all the facilities, only the ice plant is utilized. The non-operational facilities are freezers and cold storages. These facilities must be effectively used. In addition, there is a shortage of ice in Lahad Datu.

2) Keninngau

The fish sales center and its facilities are not utilized at all. It is necessary to consider an effective use for these facilities or transfer to other area.

3) SAFMA in Kota Kinabalu

About 80 percent of the total volume of fish landed in Kota Kinabalu is landed at the embankment next to the complex and the remaining 20 percent is landed at the SAFMA complex. The financial condition of the SAFMA complex appears to be not good. The fish landing volume is not expected to increase greatly in future at SAFMA which mainly handles fish for export. However, it is anticipated that there would be shortage in fish supply in Sabah in future, and it is necessary to develop the offshore fishing grounds on the west coast of Sabah. Therefore, the complex should not only handle fish for export, but also function as a public landing site and as a base for fish supply within Sabah.

4) SAFMA in Labuan

Fish landed at SAFMA in Labuan is mainly exported to Singapore, Brunei, etc. It is geographically at a disadvantage as a fish supply base for Sabah state in comparison to Kota Kinabalu. The capacity of the facility is sufficient at present, but it is necessary to replace the old machinery of the processing plant for export products.

5) ANGKASA in Kudat

The capacity of the existing basic and functional facilities are adequate at present. But, occasionally there is a breakdown in the electricity supply and a shortage of water supply during the dry season since infrastructure is not well developed. Only the ice plant and a part of the cold storage are utilized among the facilities at the complex transferred from KO-NELAYAN. The jetty is only utilized for loading ice on to the fishing boats.

4.6.3 Wholesale Market/Retail Market

(1) Wholesale Market

Alor Setar wholesale market, which is a designated wholesale market of the model area on the west coast of Peninsular Malaysia, is managed by the private sector.

Kuala Lumpur wholesale market, which is a public market, will be transferred to new market facilities currently under construction.

The present market of Johor Bahru market are to be transferred to new facilities.

The designated wholesale market in Ipoh is publicly managed. Although the buildings and facilities are in good condition, there are plans to expand their facilities to accommodate some of the wholesalers who are doing business in temporary stalls.

The Taiping wholesale market which was newly designated in June, 1990 is operating in simple stalls at the present time. However, since there is a plan to construct a new wholesale market operated by private sector, for which it is currently awaiting permission from the city authorities.

The Penang wholesale market which was also newly designated at the same time as the Taiping wholesale market, is currently conducting its operations within the Charausta retailers' market and on the roadside which is next to the market. Congestion is great and the hygienic conditions are poor. However, there are plans to move to a new public market presently under construction, which is expected to be completed within the year 1990.

In addition, there are open-air wholesale markets in the morning on vacant land adjacent to the retail markets in the major cities of model areas on the east coast of Peninsular Malaysia, Sarawak, and Sabah states such as Kuala Terengganu, Kuantan, Kuching, and Kota Kinabalu.

(2) Retail markets

Retail markets within the model area are under the management of the city/municipality and are well developed. However many of them do not have an adequate water supply system.

4.6.4 Fish Export/Import Points

(1) Bukit Kayu Hitam

The facility is well developed and there are no problems.

(2) Penkalan Kubor

The complex is located along the river boundary. The wharf, parking lot, and cargo handling areas are not paved and are not well developed. The office is old and in need of renovation. However, plans for the construction of a new complex is underway at present.

(3) Tampoi Export Point (Johor Bahru)

The office is located in the existing wholesale market and there are plans to move it to the new wholesale market. There are no problems.

(4) Tampoi Import Point (Johor Bahru)

The office is located within customs and there are no problems.

(5) Bukit Mertajam Repacking Point

This is a transit point for long distance transport. It is used not only for domestic fishery products which are re-packed and transshipped, but also for imported fish from Thailand. This is a publicly run market. Although its buildings are in good condition, the road which runs through the market is narrow and it is difficult for lorry more than 10 tons to enter the market.

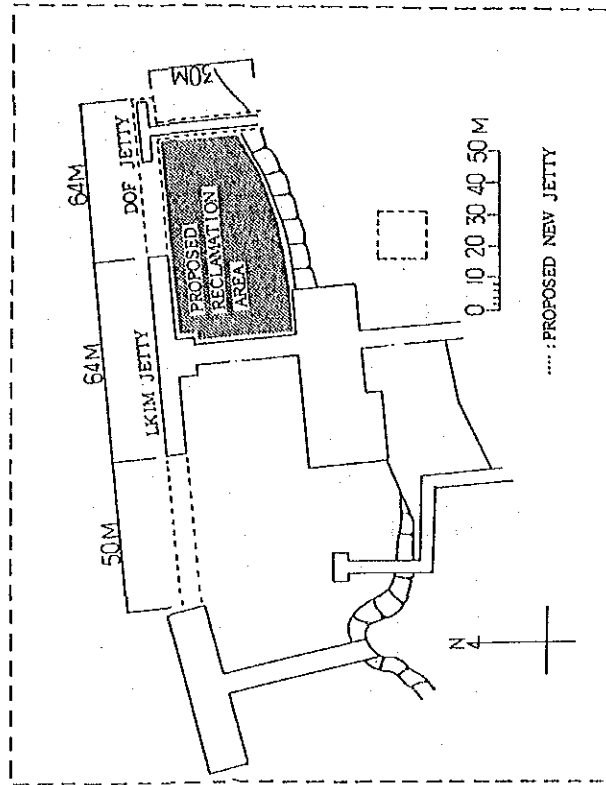
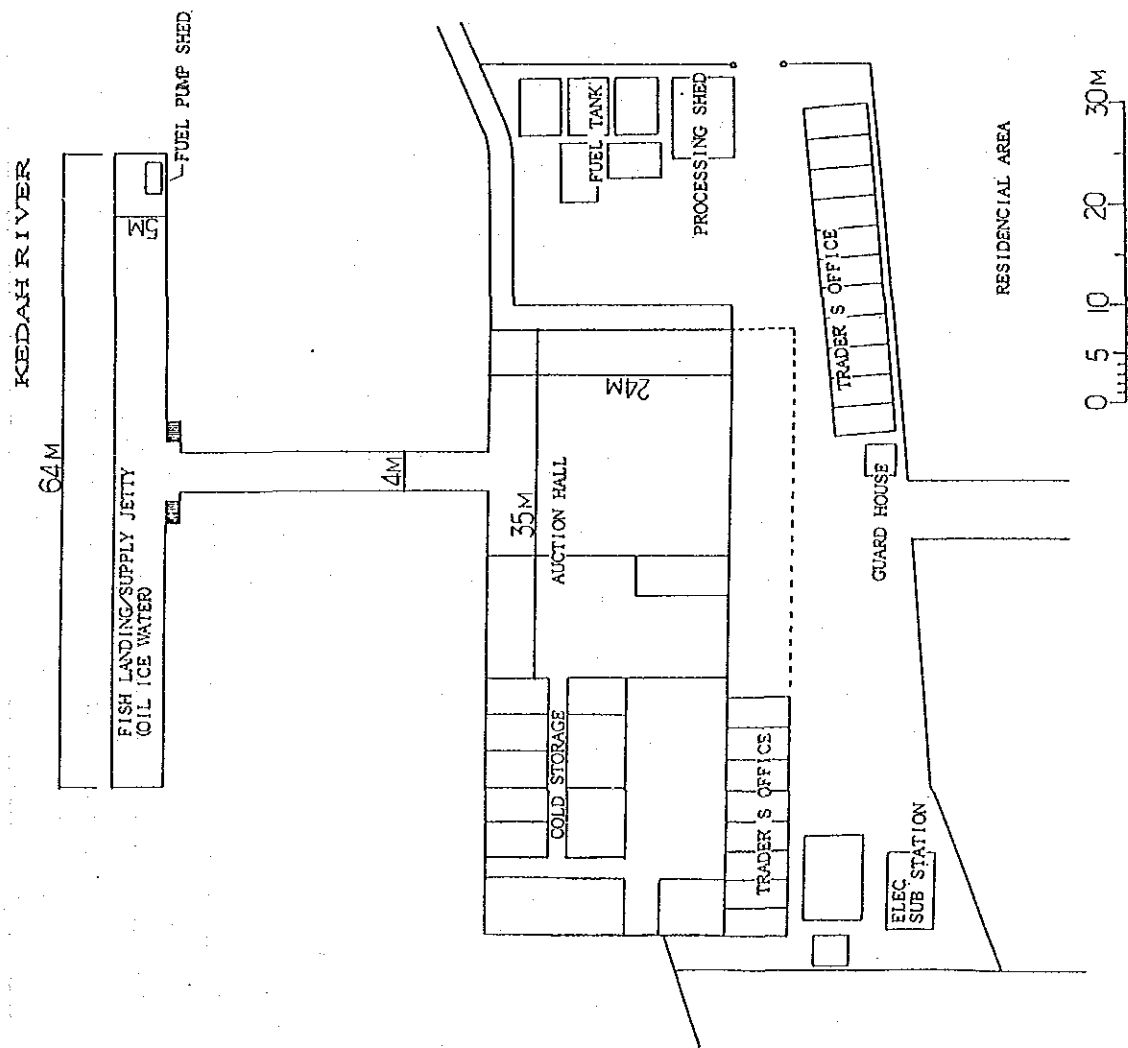


Fig. 4.6.1 General Layout Plan of LKIM Complex of Kuala Kedah

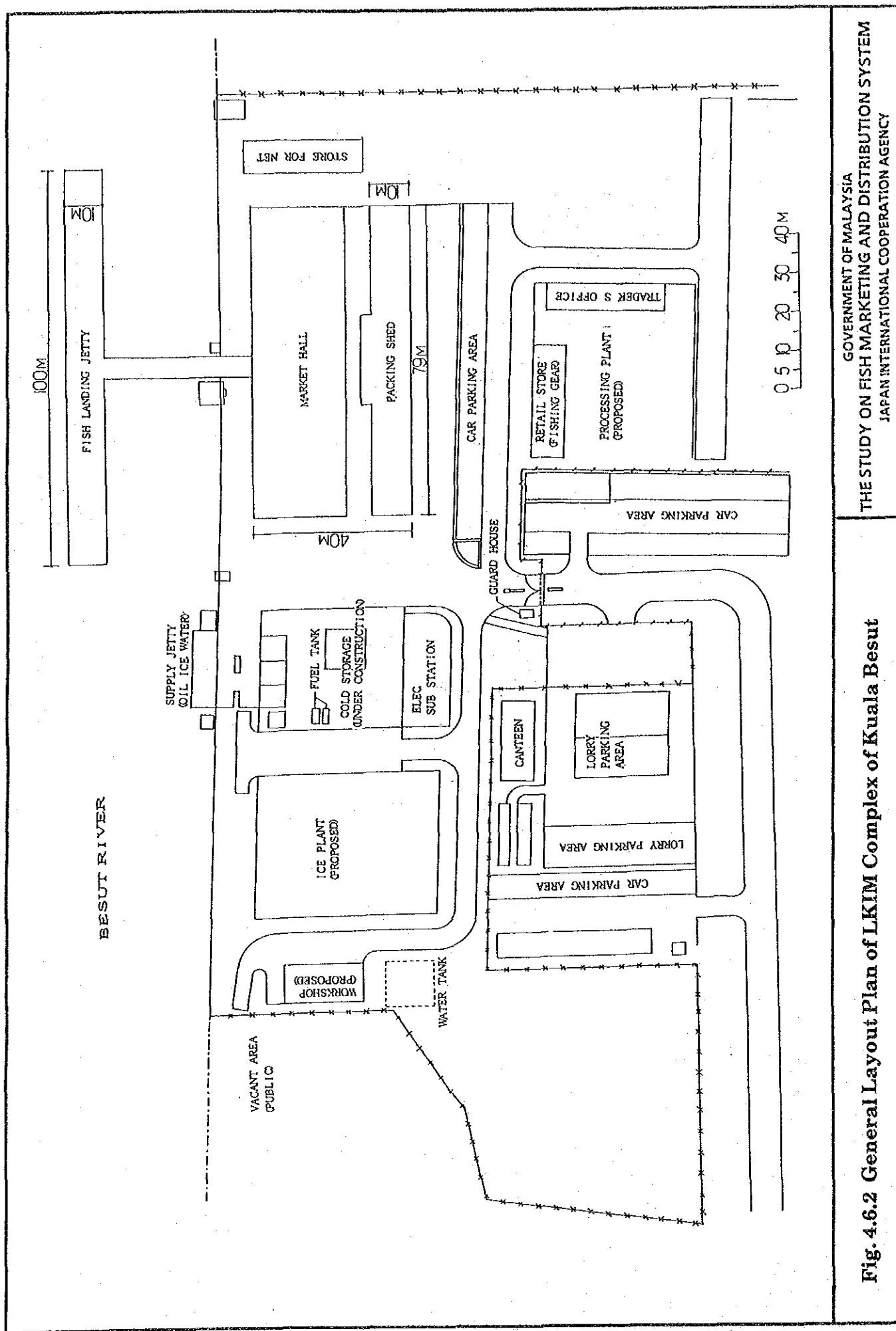


Fig. 4.6.2 General Layout Plan of LKIM Complex of Kuala Besut

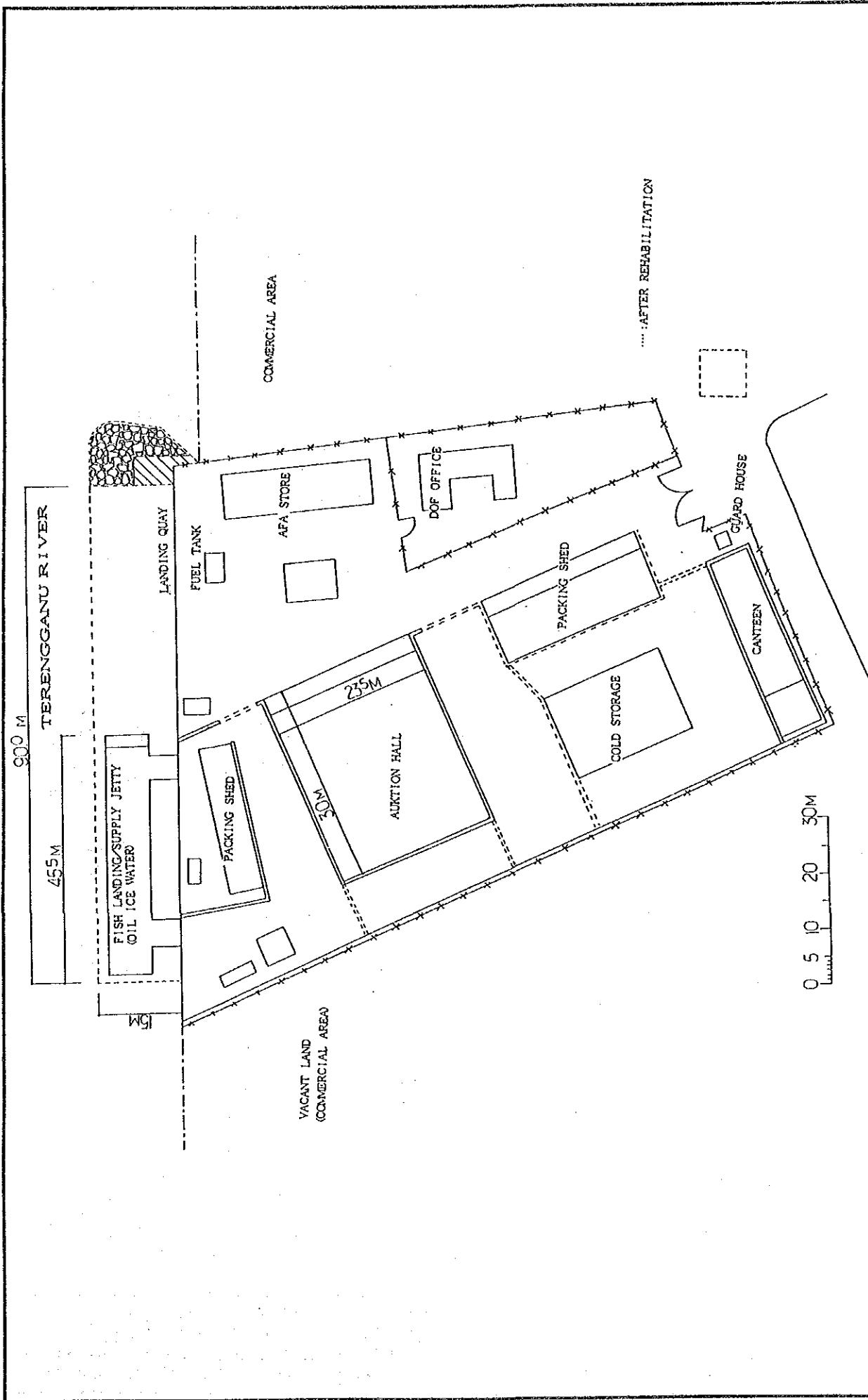


Fig. 4.6.3 General Layout Plan of LKIM Complex of Pulau Kambing

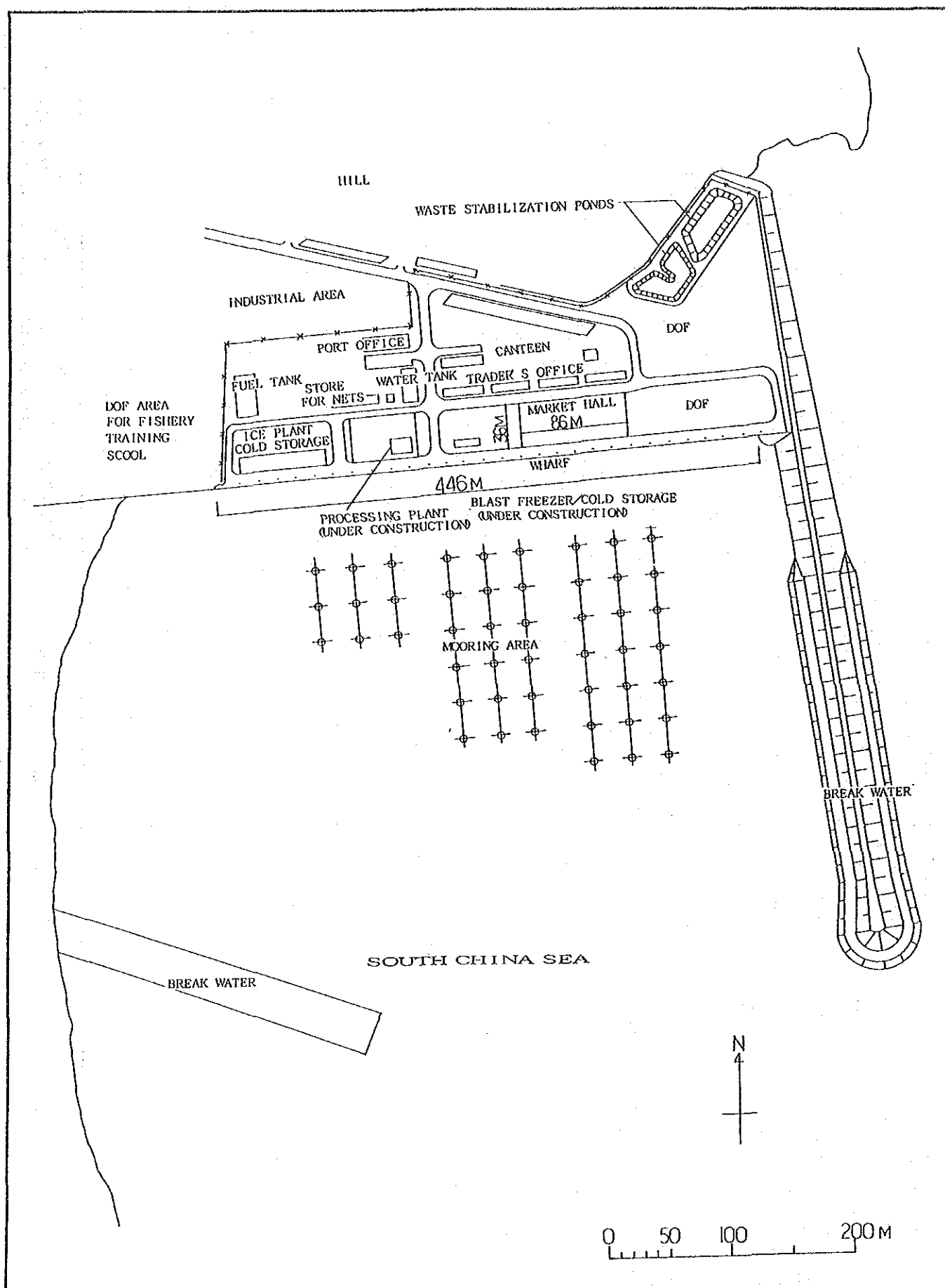


Fig. 4.6.4 General Layout Plan of LKIM Complex of Chendering

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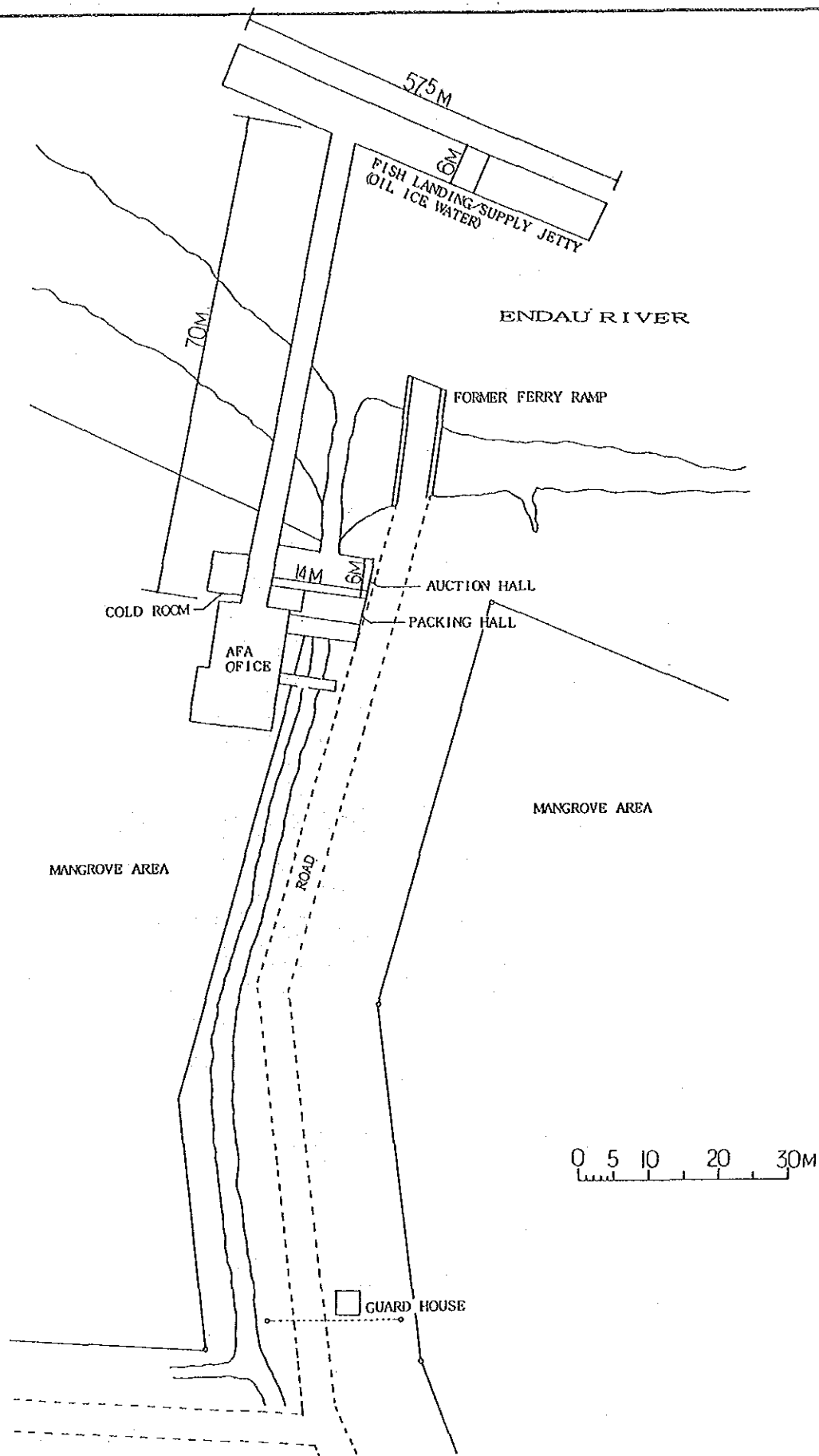


Fig. 4.6.5 General Layout Plan of LKIM Complex of Endau

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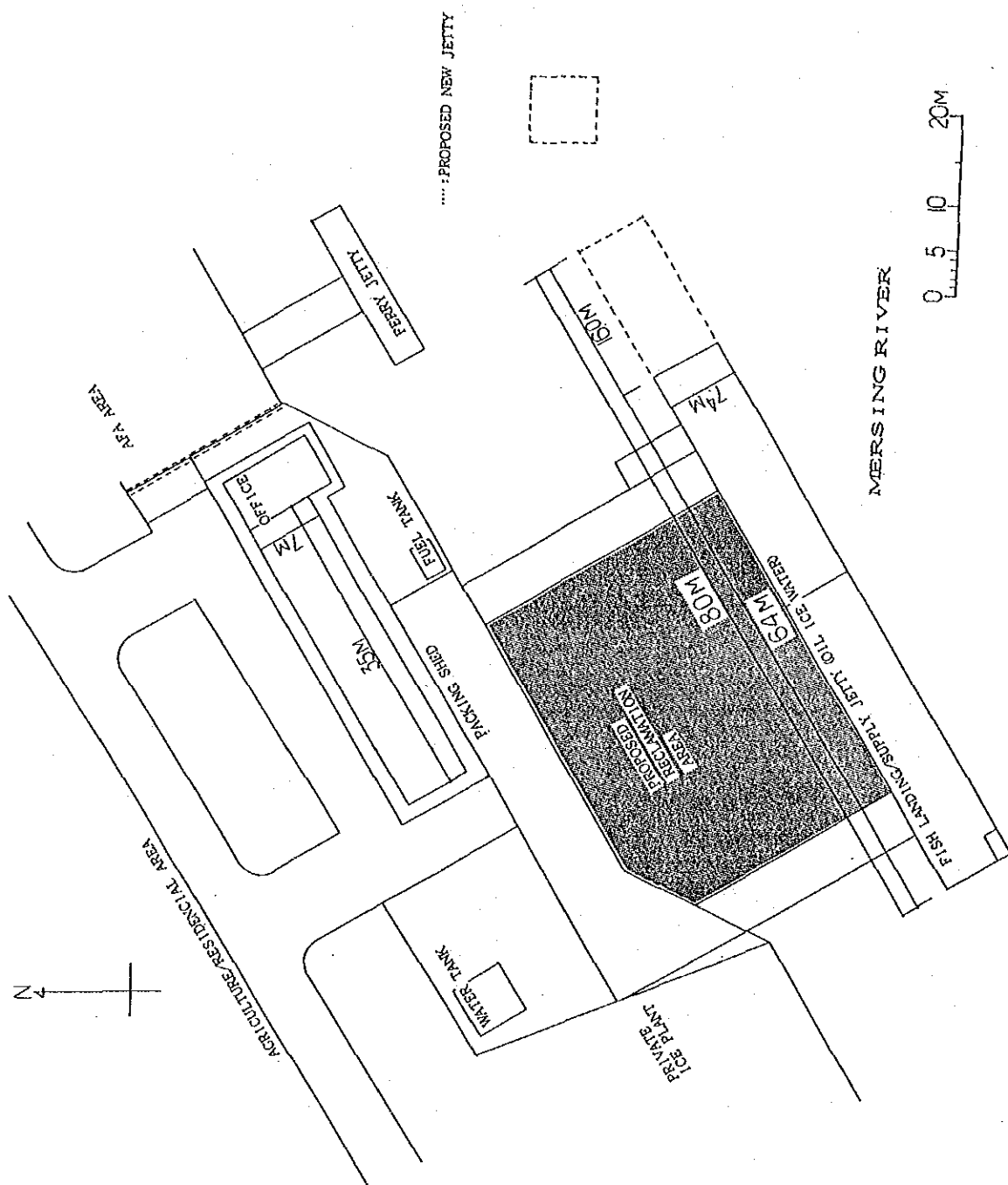


Fig. 4.6.6 General Layout Plan of LKIM Complex of Mersing

SEDILI RIVER

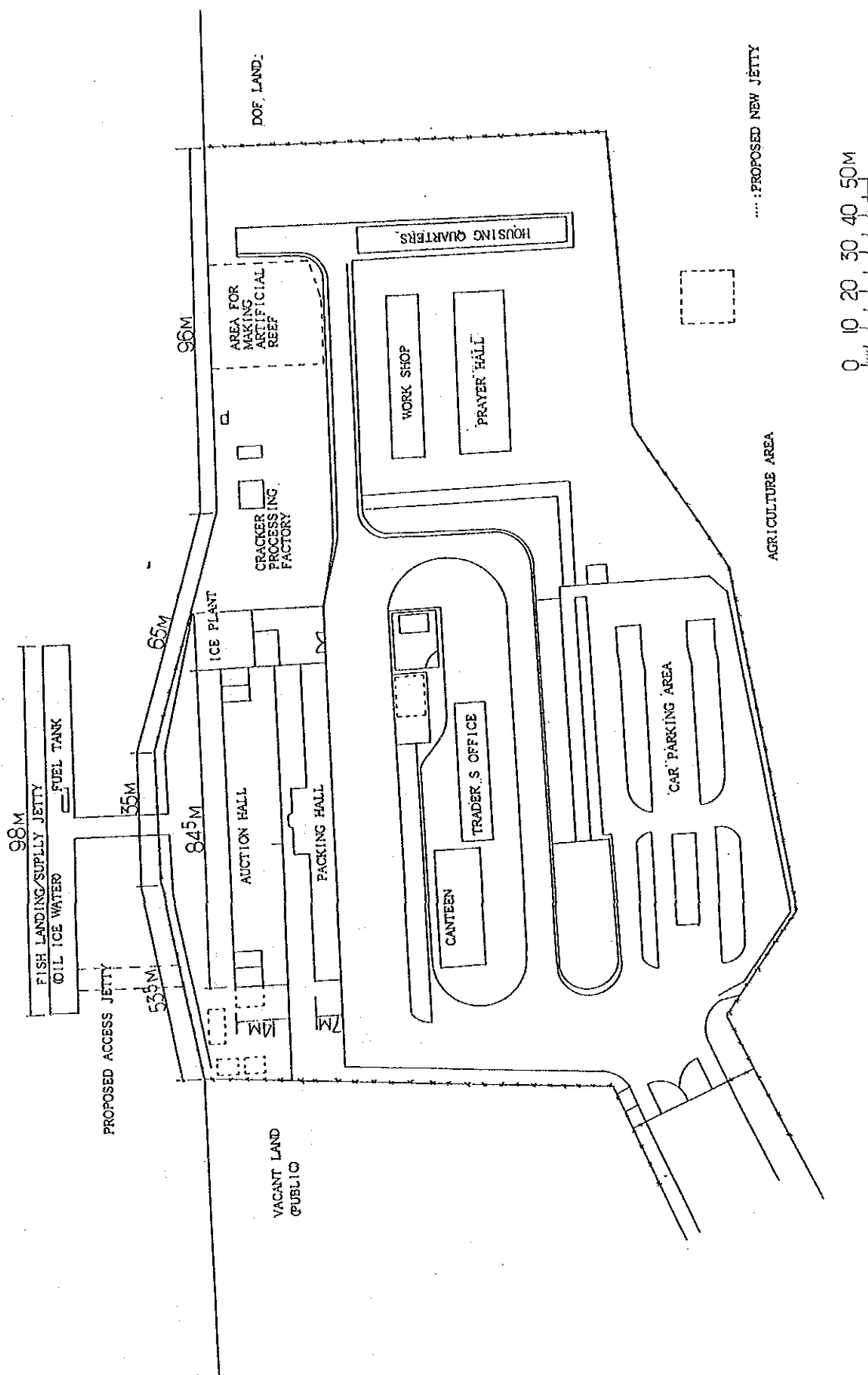


Fig. 4.6.7 General Layout Plan of LKIM Complex of Kuala Sedili

SARAWAKU RIVER

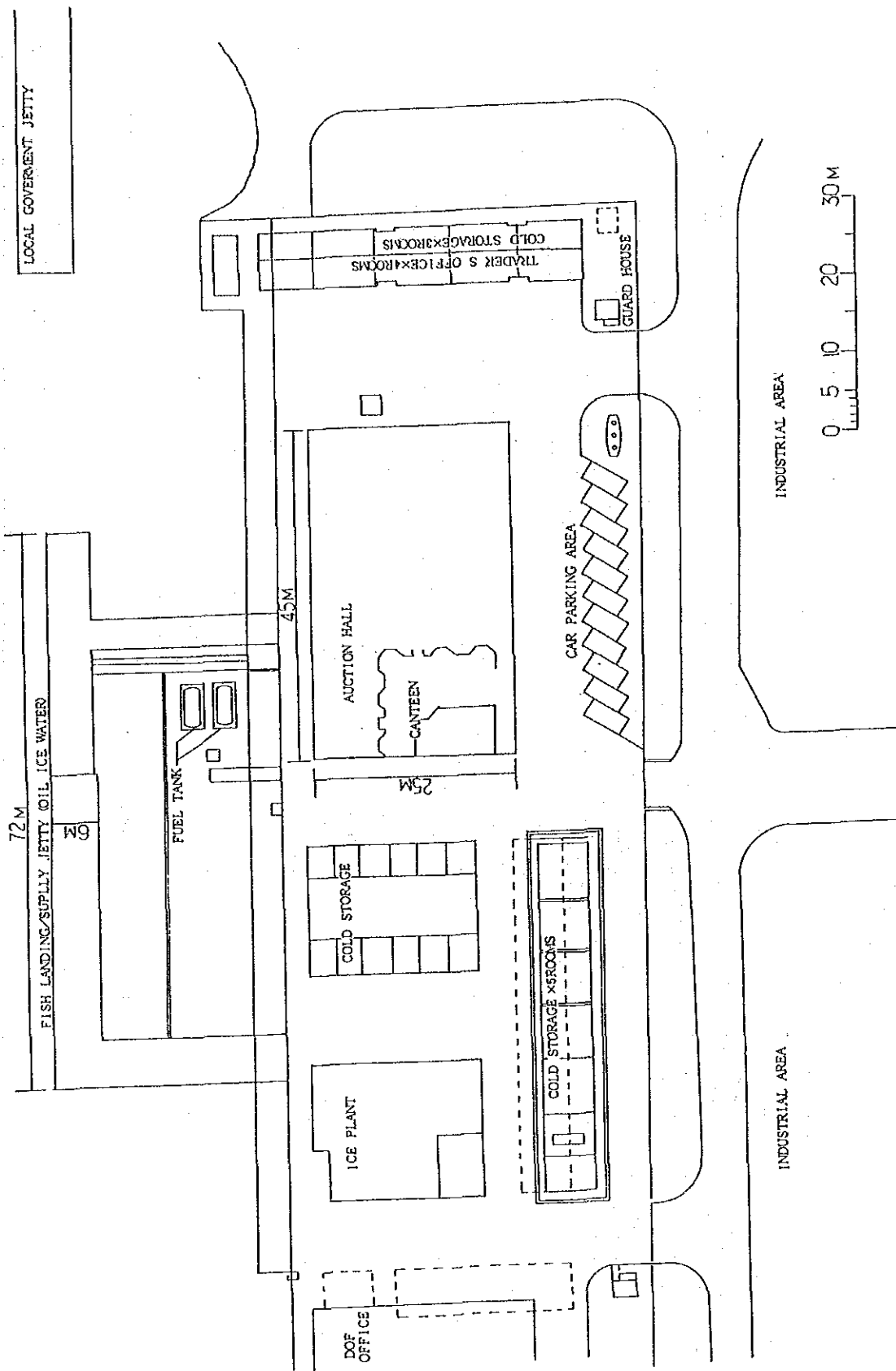


Fig. 4.6.8 General Layout Plan of LKIM Complex of Bintawa

Table 4.6.1 Capacity of Facilities, Construction Year and Cost of LKIM Complex (1/2)

State	Location of Complex	Present Condition of Complex	Jetty Length (m)	Auction Hall (m ²)	Packing Hall (m ²)	Cold Storage (MT/unit)	Ice Plant (MT/day)	Crusher (MT/hr x unit)	Fork Lift (set)	Store for Nets (m ²)	Processing Plant (m ²)	Traders Shed (m ² /unit)	Canteen Shop, Stall (m ²)
Kedah	Kuala Kedah	Operation	64 (C)	840 (C)	—	20x2	—	40x2	—	—	—	18x18	—
Perang	Batu Maung	Operation	93 (C)	—	—	10x2	—	—	—	—	—	~x30	—
Perak	Lumut	Under Const.	50 (C)	—	400 (-)	120m ²	—	NA	NA	—	—	9x16	120
Kelantan	Getting Che.Latiff	Operation Under Const.	100 (C) 50 (C)	456 (-) 420 (-)	506 (-)	10x1 120m ²	7 —	— —	— —	— —	— —	— 25x8	320 270
Terengganu	Kuala Besut Pulau Kambang Chendering Kenaman	Operation Under Rehab. Operation Operation	100 (C) 90 (C) 446 (C) 50 (C)	3,160 (C) 744 (C) 3,096 (C) —	850 (C) 250 (S) — 117 (S)	10x7 10x6 10x2 10x2	— — 200 —	30x2 10x2 20x5 10x6	— — — —	240 — 432 —	— — — —	9x8 26x26 14x36 —	192 138 396 —
Pahang	Kuantan Kuala Pahang Nerasi Kuala Romping	Under Const. Partly Oper. Partly Oper. Under Const.	100 (C) 50 (C) 32 (C) 100 (W)	1,575 (-) — — —	— — — 335 (W)	640m ² NA 10x1 10x1	— — — —	NA NA 10x1 10x1	NA — — NA	— — — —	— — — —	27x14 — — —	380 — — —
Johor	Endau Mersing Kuala Sedili	Operation Operation Operation	57 (W) 71 (W) 98 (C)	84 (W) 245 (W) 600 (W)	47 (W) — 588 (S)	10x1 10x1 10x4	— — 80	10x1 40x1 25x1	— 2 2	— 33 —	— — 186	— 33 36x10	— — 408
Sarawak	Bintawa Belawai Mukah Bintulu Miri	Operation Partly Oper. Partly Oper. Under Const. Under Const.	72 (C) 56 (-) — NA NA	530 (S) 608 (-) — NA NA	— — — NA NA	10x9, 30x1 20x1 — NA NA	20 10 — NA NA	30x1 — — NA NA	— 1 — NA NA	— — — NA NA	— 584 — NA NA	32x7 ~x7 — NA NA	196 117 — NA NA

Remarks: O; Facilities available, data not available, NA; Under planning, data not available, —; No facilities (C); Concrete, (S); Steel-frame, (W); Wooden

Source: LKIM and the results of field survey of THE STUDY on FMS by JICA, Sept. 1990.

Table 4.6.1 Capacity of Facilities, Construction Year and Cost of LKIM Complex (2/2)

State	Location of Complex	Fuel Tank (galxset)	Water Tank (galxset)	Electric Supply	Communication System	Fishing Boat Repair Facilities	Sewage Disposal	Construction		Expansion/Rehabilitation	
								Year	Cost (1000\$)	Year	Cost (1000\$)
Kedah	Kuala Kedah	4,000x1 3,000x4	4,000x1	○	Telephone	—	—	1976	1,300	—	—
Perang	Batu Maung	NA	10,000x1	○	Telephone	—	—	1984	5,900	—	—
Perak	Lumut	NA	NA	○	NA	—	—	NA	NA	—	—
Kelantan	Getting Che-Latiff	NA NA	10,000x1 NA	○	Telephone NA	— —	— —	1982 NA	2,400 1,300	— —	— —
Terengganu	Kuala Besut	NA	50,000x1	○	Telephone	—	—	1982	NA	—	—
	Pulau Kambing	2,000x1 2,500x1	10,000x1	○	Telephone	—	—	1972	1,300	1990	4,100
	Chendering Kemaman	2,500x8 2,500x3	50,000x1 2,100x1	○ ○	Telephone Telephone	— —	○ —	1981 1987	26,000 2,300	1998 —	30 —
Pahang	Kuantan	NA	66,000	○	NA	—	—	NA	5,800	—	—
	Kuala Pahang	NA	NA	○	Telephone	—	—	NA	NA	—	—
	Nerassi	NA	NA	○	Telephone	—	—	NA	NA	—	—
	Kuala Romping	2,700x4	NA	○	NA	—	—	1967	40	1978	—
Johor	Endau	1,000x1	NA	○	Telephone	—	—	1974	100	1988	300
	Mersing	2,600x1	20,000	○	Telephone	Slipway	—	1978	400	—	—
	Kuala Sedili	1,000x1	50,000	○	Telephone	—	—	1983	5,800	1984~87	250
Sarawak	Bintawa	8,000x3	4,000	○	Telephone	—	—	1976	1,400	1988	800
	Belawai	1,000x1	NA	○	Telephone	—	—	NA	NA	—	—
	Mukah	NA	NA	○	Telephone	—	—	NA	NA	—	—
	Bintulu	NA	NA	NA	NA	—	—	NA	NA	—	—
	Miri	NA	NA	NA	NA	—	—	NA	NA	—	—

Remarks : ○ : Existing, data not available, NA : Under Planning, data not available, — : Not existing
Source : LKIM and the results of field survey of THE STUDY on FMS by JICA, Sept. 1990.

Table 4.6.2 Target and Actual Landing Volume at LKIM Complexes

State	Location of Complex	Present Condition of Complex	LKIM's Target Landing Volume (MT/year)(A)	Actual Land- ing in 1988 (MT/year)	Actual Land- ing in 1989 (MT/year)(B)	Utilization Rate (%) (B) ÷ (A)
Kedah	Kuala Kedah	Operation	10,000	3,584	3,620	36.2
Penang	Batu Maung	Operation	15,000	1,552	2,165*	14.4
Perak	Lumut	Under Const.	8,000	—	—	—
Kelantan	Getting Che.Latiff	Operation	10,000	538	1,002	10.0
		Under Const.	10,000	—	—	—
Terengganu	Kuala Besut	Operation	15,000	14,481	15,099	100.0
	Pulau Kambing	Under Rehab.	10,000	12,913	9,665*	96.7
	Chendering	Operation	52,000	7,728	9,969	19.2
	Kemaman	Operation	10,000	233	350	0.4
Pahang	Kuantan	Under Const.	20,000	—	—	—
	Kuala Pahang	Partly Oper.	10,000	NA	NA	NA
	Nenasi	Partly Oper.	2,000	NA	NA	NA
	Kuala Romping	Under Const.	8,000	—	—	—
Johor	Endau	Operation	5,000	1,790	1,343**	26.9
	Mersing	Operation	8,000	1,736	3,149	39.4
	Kuala Sedili	Operation	15,000	1,489	2,261	15.1
Sarawak	Bintawa	Operation	10,000	2,619	2,557	25.6
	Belawai	Partly Oper.	8,000	NA	NA	NA
	Mukah	Partly Oper.	8,000	NA	NA	NA
	Bintulu	Under Const.	8,000	—	—	—
	Miri	Under Const.	8,000	—	—	—

Remarks : *; Landings from Jan. to Nov. in 1989, **; Landings from April to Dec. in 1989.

Source : LKIM and the results of field survey of THE STUDY on FMDS by JICA, Sept. 1990.

Table 4.6.3 Present Utilization and Maximum Possible Landing Volume at the Existing Jetties of Complex in Model Areas

Location of Complex	Number of Boat Using Complex (1988)	Landing Volume at Complex (1988)(MT)	Time to Sort Their Catch	Congestion at Jetty	Maximum Possible Landing Volume(MT)	Insufficiency of Jetty Capa. for Present Landing Volume	Landing Volume in the Area(MT)	Acceptable Landing Ratio to the Landing in the Area
Kuala Kedah	149	3,584	After	C	8,880	S	35,280	25 %
Kuala Besut	327	14,481	After	C	33,500	S	14,482	231 %
Pulau Kambing	281	12,913	After	C	8,750	I	12,913	68 %
Chendering	192	7,728	After	N	54,477	S	7,728	705 %
Kuantan	—	—	—	—	21,240(*)	—	29,620	72 %
Endau	25	1,790	After	N	6,650	S	13,882	48 %
Mersing	116	1,736	After	C	6,429	S	11,733	55 %
Kuala Sedili	143	1,489	Before	N	17,330	S	15,125	115 %
Bintawa	37	2,619	After	N	40,291	S	11,777	342 %

Remarks; "After"; After arrival at jetty, "Before"; Before arrival at jetty, C ; Congested, N ; Not congested

S ; Sufficient, I ; Insufficient, —; Under construction, (*); based on the quay length in the Plan "Maximum Possible Landing Volume" is based on the assumption of that the landing time will be saved through the sorting of catch before arrival of boat at jetty, and that complex will supply fuel, etc. to the boats which use the complex for fish landing (Appendices 4.75 - 83).

"Landing Volume in the Area" is the landing in the same river or sites in the vicinity including private jetties in 1988 and does not include future increase production.

Source; Present landings are based on the data from LXIM and DOF.

Table 4.6.4 The Possibility of Expanding the Use and Capacity of LKIM Complex

Location of Complex	Jetty Length (1988) (m)	Maximum Possible Landing Volume(MT)	Landing Volume in the Area(MT)	Feasibility for Expanding Jetty	Required Additional Length for Jetty (m)	Target Landing Volume (MT)
Kuala Kedah	64	8,880	35,280	×	0	8,880
Kuala Besut	132	33,500	14,720	—	—	14,720
Pulau Kambing	52	8,750	13,120	○	25	13,120
Chendering	400	54,477	23,730	—	—	23,730
Kuantan	100 *	21,240	29,620	○	39	29,620
Endau	58	6,650	23,040	○	63 **	13,882
Mersing	64	6,429	12,120	×	0	6,429
Kuala Sedili	98	17,330	15,280	—	—	15,280
Bintawa	72	40,291	35,280	—	—	35,280

Remarks; "Maximum Possible Landing Volume" is based on the assumption of that the landing time will be saved through the sorting of catch before arrival of boats at jetty, and that complex will supply fuel, etc. to the boats which use the complex for fish landing (Appendices 4.75 - 83).

2) "Landing Volume in the Area" is the landing in the same river or in the vicinity including private jetties in 2000, which was calculated by apportioning the future estimated increase production in the State to the Model Areas according to number of existing large fishing boats, then concentrating all the increase production by large boats in the Model Areas to Chendering and Endau.

3) "Feasibility for Expanding Jetty"; ○; Feasible from the national economic view-point, ×; Not feasible from the national economic view-point (Appendix 7.1 - 2)

4) *; LKIM' plan

5)**; Geographical marginal capacity for expansion

Source; Jetty length in 1988 is based on the data from LKIM.

Table 4.6.5 Facilities and Operational Conditions of Public Complexes in Sabah State (1989)

Location of Complex/Centre	KUDAT	LAHAD DATU	SEMPORNA	PAPAR	SIPITANG	KUALA PENYU	KOTA MARUDU	KENINGAU
Construction Year	1983	1984	1983	1983	1982	1981	1983	1983
Cost (1000M\$)	4,165	4,775	2,122	962	1,348	872	366	359
Management Body	ANGKASA	KO-NELAYAN	SAFMA	KO-NELAYAN	KO-NELAYAN	KO-NELAYAN	ANGKASA	KO-NELAYAN
Function	Complex	Complex	Complex	Centre	Centre	Centre	Market. Centre	Market. Centre
	Capa.	Status	Capa.	Status	Capa.	Status	Capa.	Status
Block Ice Plant (BLK/day)	104	O	104	O	96	X	—	—
Flake Ice Plant (ton/day)	5	X	5	O	—	—	—	—
Ice Storage(ton)	50	O	50	O	25	O	10	X
Cold Storage(ton)	100	X	100	O	25	X	10	X
Blast freezer (ton/12hr)	5	X	5	O	—	—	—	—
Plate freezer (ton/24hr)	2	X	2	O	—	—	—	—
Power supply(KVA)	350	O	350	O	40	O	17	O
Vacant Area	O	O	—	—	—	—	—	—

Remarks : (1) Status O ; Operating, X ; Not operated, — ; No facilities
 (2) Papar buys ice from SAFMA at Kota Kinabalu and sells it to Sipitang and K. Penyu.
 Source : Data from KO-NELAYAN, Dec. 1989.