

EFFECTIVE INVESTMENT IN COMMUNITY-BASED INFRASTRUCTURES AS A PREREQUISITE FOR COASTAL FISHERIES MANAGEMENT

by

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1. Introduction

1.1 Importance of Fisheries in the Indonesia Economy

Fisheries plays an increasingly important role in the national economy of Indonesia. Although its share is relatively small to the gross domestic product (about 3%), the sector's socio-economic and nutritional contribution is very prominent. Fisheries provides employment for over 4.3 million fishermen/fish farmers especially in the coastal and rural areas with other substantial additional in handling, processing and marketing activities which is in total represented some 5% of Indonesia's total productive labour force. The sector also supplies about 60% of the total animal protein consumed by the population with a per capita consumption of about 18 kg in 1994. The fisheries sector is as well one of the major foreign exchange earners of the country generating about US\$ 1.8 billion in 1994.

The growth of the sector over the last decade has been steady. The total fish production increased from 2.4 million tons (1985) to 4.0 million tons (1994) with an average annual growth rate of 5.9%. Table 1 shows fisheries production in 1985 and 1994.

Marine capture fisheries contributed 77% to total fish production, followed by aquaculture (16%) and inland open waters (8%) in 1994.

Table 1. Indonesia: Fisheries Production 1985 and 1994

Unit: ,000 Tons

Sub-sector	1985	1994
Marine capture Fisheries	1,821	3,080
Inland Open Waters	269	336
Aquaculture	305	597
Total	2,395	4,013

The sector will continue to feature prominently in the economy of Indonesia as the country is one of the largest archipelagos in the world with vast fishery resource both for capture and culture activities. Its role will be growingly expanded if policies and programmes on sustainable development and management of fisheries are consistently implemented.

1.2 The Purpose of the Paper

The purpose of the Paper is to highlight the importance of and the need for effective investment in community-based infrastructure as a prerequisite for coastal fisheries management on the basis of the Indonesian experiences and situation.

2. The Smallscale Fisheries Development

2.1 The Role and Structure of Smallscale Fisheries

The Indonesian fisheries is dominated by smallscale operations. This operations contribute about 80% to the national fish production. Its importance is even more as it has strong socio-economic and political implications involving over 4.3 million fishermen/fish farmers and fish processors in addition to their families. Table 2 shows number of fishermen/fish farmers in 1994.

Table 2. Indonesia: Number of Fishermen/Fish Farmers in 1994

Sub-sector	Unit : Number	
	Total	(% of Total)
Marine Capture Fisheries	1,850,200	42%
Inland Open Waters	465,540	11%
Aquaculture	2,064,120	47%
Total	4,379,860	100%

Activities of the aquaculture sector in particular are also mainly smallscale operations where only to a lesser degree the unit sizes are more than 2 ha.

In the marine sector, there were over 390,000 fishing vessels and a large variety of fishing gears in 1994. The fishing vessels are mainly made of wood and small in size. Of these, about 62% are dugouts and non-powered boats, 22% powered with outboard engine and the remaining 16% equipped with inboard engines. The majority of fishing vessels with inboard engine are also small, of which 89% are below 10 GT, 7% of 10-30 GT and 4% above 30 GT. Table 3 shows fishing fleet structure in 1994.

Table 3. Indonesia: Fishing Fleet Structure in 1994

<u>Type/Size of Boat</u>	<u>No of Units</u>	<u>(% of Total)</u>
Total	<u>396,185</u>	<u>100%</u>
<u>Non-Motorized</u>	<u>245,486</u>	<u>62%</u>
Dug-out canoes	126,800	32%
Plank Boats:	118,686	30%
- Small	72,694	
- Medium	36,189	
- Large	9,803	
<u>Motorized</u>	<u>150,699</u>	<u>38%</u>
Outboard Motor	87,749	22%
Inboard Motor:	62,950	16%
less than 5 GT	45,331	
5-10 GT	9,604	
10-20 GT	3,376	
20-30 GT	1,688	
30-50 GT	1,869	
50-100 GT	567	
100-200 GT	340	
more than 200 GT	175	

2.2 The objective of and Policy on Smallscale Fisheries

The Objective of smallscale fisheries development is to improve incomes of fishermen and fish farmers including their families. To this end, during the on-going Sixth Five-Year Development Plan (1994-1998), policies related to smallscale fisheries will concentrate efforts primarily on:

- (i) increasing productivity of coastal fisheries;
- (ii) encouraging the utilization of under-exploited resources;
- (iii) rational management of resources, especially in highly pressure coastal areas;
- (iv) strengthening capacity building of fishermen/fish farmers;
- (v) development of effective fisheries infrastructure; and
- (vi) enhancing institutional capacities of fishermen/fish farmers

These efforts will be supported by improving access to fisheries technology, credit support, private sector participation (i.e. development of nucleus estate and smallholder/NES scheme), promotion of agribusiness development, continued administrative reforms and cross-sectoral joint programmes (such as transmigration programme).

2.3 Trends in Community-based Coastal Resource Management

A part from the increasing contribution that the fisheries sector has made to the economy of Indonesia, over-fishing situation has been reported in a number of marine waters such as the north coast of Java, the east coast of Sumatera and the Bali Strait. In addition, degradation of coastal habitats has contributed to the depletion of the fishery resources. Moreover, the increasing number of new entrants into the fisheries, the continuing influx of fishermen fishing in major fishing grounds and the open access nature of the fisheries have resulted in further deterioration of the coastal environment.

To halt further degradation of the fishery resources and sustain livelihoods of fishermen/fish farmers, the Government attempts to promote coastal fisheries management with the active participation of the coastal community. An effective community-based coastal resource management programme would result in coastal resource regeneration and rehabilitation, reduction in stock depletion, reduced fish spoilage, improved product quality, establishment of alternative source of livelihoods and increased incomes.

3. The Importance of and the Needs for Effective Infrastructure

3.1 Importance of Effective Infrastructure

Effective infrastructure is one of the major requirements for proper fisheries development and management. Such infrastructure may include infrastructure support for: (i) capture fisheries (fishing port, fish landing place, jetty), (ii) aquaculture (aquaculture jetty, collection center), (iii) hand-ling and processing (drying space, storages), and (iv) marketing facilities (transport).

Fisheries infrastructure are expected to:

- (i) facilitate improvement of value-added process of fishery products;
- (ii) ease marketing of fish and fishery products;
- (iii) improve producing and living conditions of fishing communities;
- (iv) enhance the cohesion of fishermen/fish farmers and the local population;
- (v) grow the collective behaviour of fishermen/fish farmers and develop self-help initiatives.

Development of infrastructure should be in such a way that for:

- (i) Those coastal waters with development potential would support further utilization of the resources whereas the facilities would provide adequate services for loading/unloading, mooring, etc.;
- (ii) those coastal waters with high fishing pressure would provide less incentive for fishermen to increase catch, instead better support for handling, processing and marketing would be provided so that fish spoilage would be reduced and fish quality would be improved. Improving value added of fishery products would increase prices of fish sold.

To effectively implement (ii), other factors should compliment such as control over licensing and regulation of fishing gears, as further discussed in Chapter IV.

3.2 The Needs for Effective Infrastructure

Community-based infrastructure should fully recognize specific locality of the fishing community using the infrastructure. The conflict however is that government tends to provide infrastructure support to fishing community that can be expected to generate revenues for local government. In such a situation, although

small fishing community has considerable contribution to socio-economic and nutritional goals, they might not be provided with reasonable infrastructure.

In the case of Indonesia, two situations are presented:

- (i) isolated /remote and scattered small fishing communities of say, about less than 30 families.

A lot of this type of small fishing communities are found in Sumatera for instance (i.e. Bangka island). The community needs simple jetty, possibly made of wood, to cost about Indonesian Rupiah (Rp.) 15-30 million or even less, on-shore protection shed, drying space, storages within the fishing village.

Similarly in aquaculture activities (seaweed culture) in West Nusa Tenggara for instance, very simple wooden jetty and landing beach have been satisfactorily functioned supported by open space for drying.

As far as the financing, operation and maintenance (O/M) is concerned, there are two alternatives:

- (a) construction and O/M by the fishing community themselves;
- (b) construction by government and O/M by the fishing community.

Fishery officer might be only responsible for catch records. Catch mainly to supply local community and the nearby areas.

- (ii) coastal fishing village may have more than 100-200 families.

This is typical fishing community in Java. The community needs fish landing place: possibly of concrete wharf/jetty, access channel, idle berth, processing area, market/auction hall, small ice plant, fresh water supply, power supply, and fish boxes.

Construction and O/M of the facilities by government (local/district authority) in cooperation with fishermen cooperatives. In return, fishermen pay government a fixed percentage out of their total/gross sales.

3.3 Issues

There are a number of issues associated with the development of effective investment in community-based infrastructure in relation to coastal fisheries management:

- (i) the key to success is the collective behaviour or self-help initiatives amongst the fishing community. In this relation, the issue of fishermen's organization is very critical;

- (ii) the government's commitment to give greater role to fishermen to have wider control over the coastal resources also remains an important issue in which it requires socialization process right from the top management down to the field administrative level;
- (iii) identification and design of appropriate infrastructure taking fully into account the specific locality and needs of fishing community.

4. Other Factors Affecting Proper Coastal Fisheries Management

A part from the primary importance of effective infrastructure, there are a number of factors that need to be taken into consideration for proper coastal fisheries management. These include:

- (i) limit entry or control over licensing to avoid over-capitalization;
- (ii) reduce fishing efforts in highly pressure waters and promote alternative source of livelihoods;
- (iii) enforcement of regulatory measures;
- (iv) resource enhancement (i.e. promote artificial reef); and
- (v) improve social infrastructure (health care, education/public awareness of common property principle and sustainable utilization of fishery resources).

5. Conclusion and Suggestions

5.1 Conclusion

From the above discussion and experiences, it can be concluded that effective investment in community-based infrastructure is a prerequisite for coastal fisheries management whereas the collective initiatives of the fishing community in the operation and management of such facilities are very critical to the achievement of sustainable development and management goals. To effectively attain the goals, other factors such as control over licensing, reduce fishing efforts and promote alternative source of livelihoods in highly pressure coastal areas should be complimented each other.

5.2 Suggestions

It is suggested that socialization process of the community-based approach to coastal resource management needs to be initiated, from central government down to local administrative level, particularly the self-help and collective initiatives that fishing community should play in utilizing fisheries infrastructure.

Table 1: Number of Marine Fishery Boats by Size, 1994

Units

Boats Size	Number
< 10 GT	49,463.00
10-30 GT	3,399.00
> 30 GT	1,345.00
Total	54,207.00

Table 2: Development of Fisheries Production, 1990-1994

Units(tons)

Item	Volume Production				
	1990	1991	1992	1993	1994
Marine Capture Fisheries	2,370,107.00	2,537,612.00	2,692,068.00	2,886,289.00	3,080,168.00
Brackish Water Culture	287,073.00	323,156.00	337,431.00	355,284.00	346,214.00
Others	505,289.00	488,833.00	513,833.00	553,749.00	587,499.00
Total Production	3,162,469.00	3,349,601.00	3,543,332.00	3,795,322.00	4,013,881.00

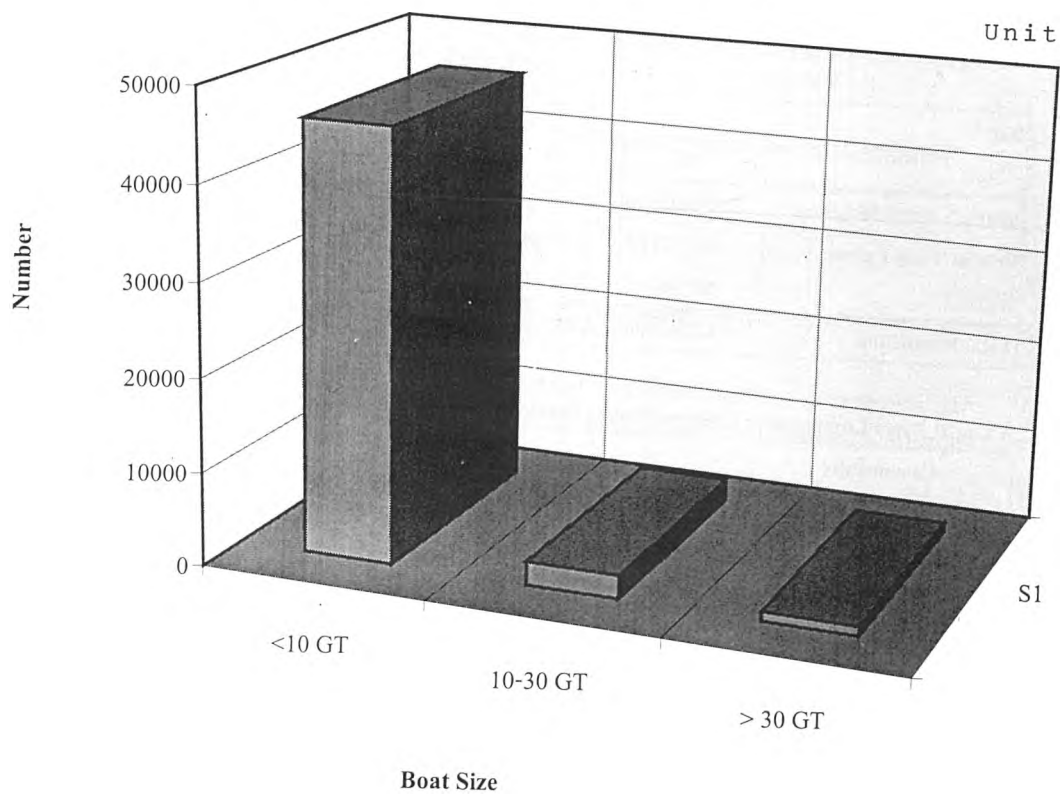
Table 3: Main Commodities Fisheries Export Development, 1990-1994

Commodities	Value				
	1990	1991	1992	1993	1994
Value (1,000 US\$)	941,421.00	1,139,312.00	1,126,229.00	1,374,452.00	1,479,116.00
Shrimp	690,230.00	769,982.00	764,850.00	876,703.00	1,009,738.00
Tuna, Skipjack, Small Tunas	124,748.00	184,426.00	145,968.00	213,819.00	182,200.00
Others Fish	115,771.00	174,371.00	205,239.00	269,029.00	266,151.00
Crabs	10,672.00	10,533.00	10,172.00	14,901.00	21,027.00

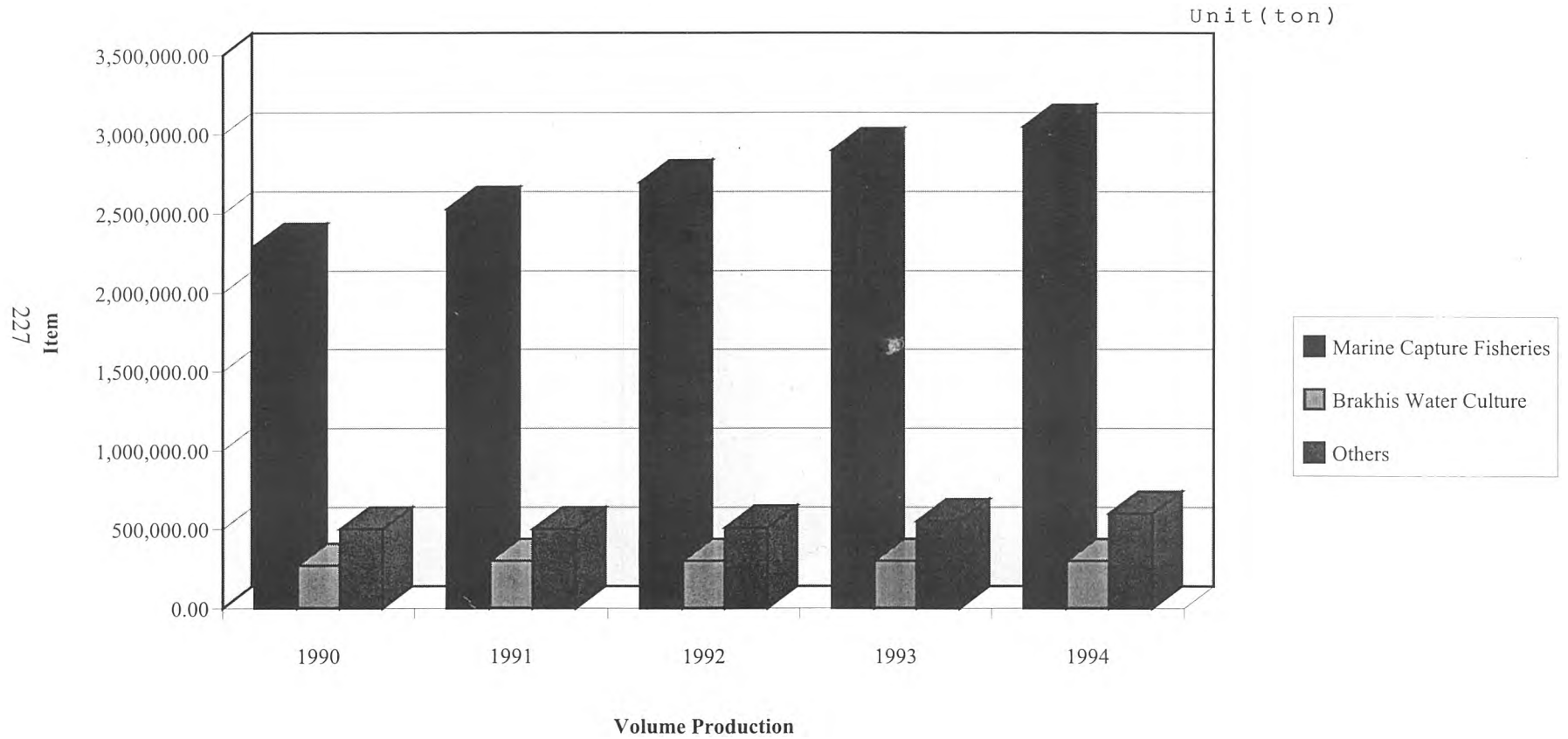
Table 4: Main Commodities Fisheries Export Development, 1990-1994

Commodities	Volume				
	1990	1991	1992	1993	1994
Value (1,000 US\$)	279,767.00	357,962.00	362,100.00	459,507.00	454,350.00
Shrimp	94,037.00	95,626.00	100,455.00	98,569.00	99,523.00
Tuna, Skipjack, Small Tunas	72,756.00	103,368.00	73,439.00	92,764.00	79,729.00
Others Fish	107,851.00	153,061.00	183,513.00	262,093.00	268,214.00
Crabs	5,123.00	5,907.00	4,693.00	6,081.00	6,884.00

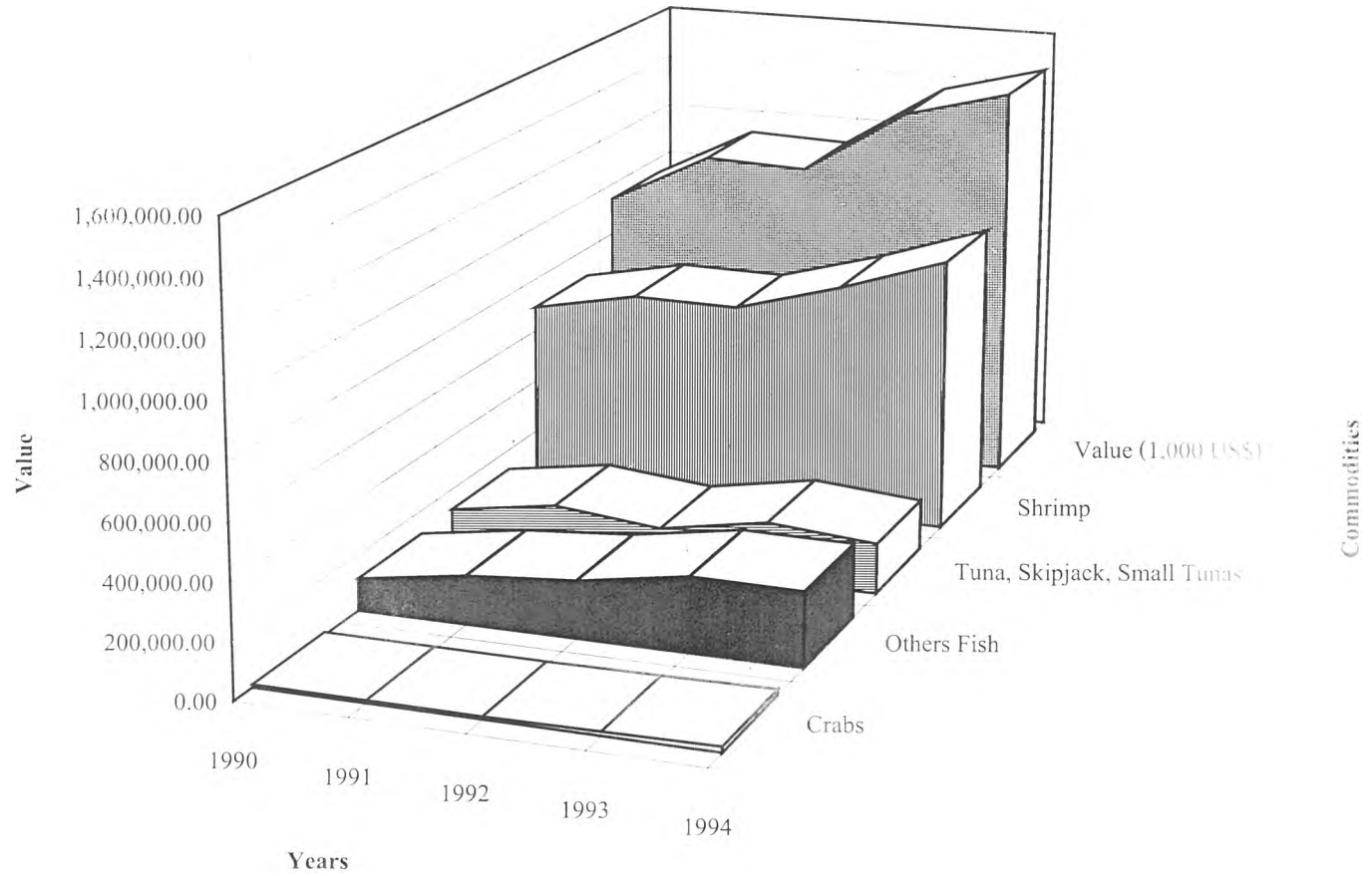
Number of Marine Fishery Boats by Size, 1994



Development of Fisheries Production, 1990-1994



Main Commodities Fisheries Export Development, 1990-1994



Main Commodities Fisheries Export Development, 1990-1994

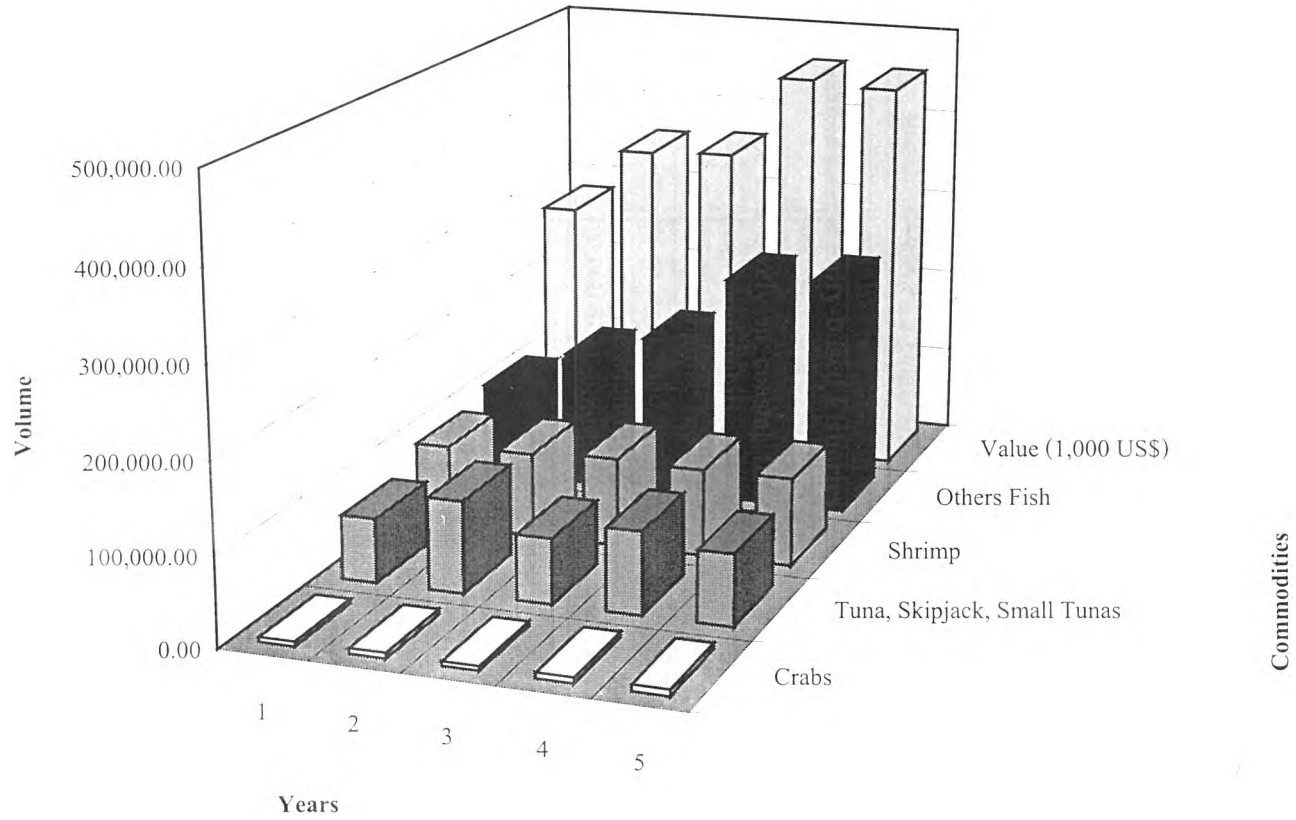


Table 5**Area Potential Development For Shell Fish and Sea Weeds in Indonesia**

No.	Provincien	Area Potential (Ha)	
		Shell Fish	Sea Weeds
1	Aceh	0.00	250.00
2	North Coast of Sumatera	400.00	150.00
3	west Coast of Sumatera	0.00	500.00
4	Riau	1,300.00	1,500.00
5	Jambi	250.00	0.00
6	South Coast of Sumatera	0.00	1,000.00
7	Bengkulu	0.00	100.00
8	Lampung	5,500.00	300.00
9	Jakarta	2,000.00	100.00
10	West Coast of Java	6,000.00	500.00
11	Central of Java	3,500.00	500.00
12	Yogyakarta	0.00	0.00
13	East Coast of Java	10,000.00	300.00
14	Bali	125.00	1,500.00
15	NTB	8,230.00	6,000.00
16	NTT	20.00	6,000.00
17	East Timor	0.00	0.00
18	East Coast of Kalimantan	0.00	1,000.00
19	Central Coast of Sulawesi	0.00	500.00
20	South Coast of Sulawesi	1,000.00	500.00
21	South East of Sulawesi	0.00	1,000.00
22	Maluku	0.00	3,000.00
23	Irian Java	0.00	500.00

**AREA POTENTIAL AND PRODUCTION FOR SEA WEEDS
IN INDONESIA, 1994**

No.	Location	Area Potential Ha.	Potential Sea Weeds (Ton/Year)	Production 1994 (Ton)	Level Exploitation %
1	Aceh	250	4,700	0	0.00%
2	North Coast of Sumatera	150	2,800	0	0.00%
3	West Coast of Sumatera	500	2,800	34	1.21%
4	Riau	1,500	28,100	0	0.00%
5	Jambi	0	0	0	0.00%
6	South coast of Sumatera	1,000	18,800	0	0.00%
7	Bengkulu	100	1,900	41	2.16%
8	Lampung	300	5,600	11	0.20%
9	Jakarta	100	1,900	0	0.00%
10	West Java	500	9,400	249	2.65%
11	Central Java	500	9,400	0	0.00%
12	Yogyakarta	0	0	166	0.00%
13	East Java	300	5,600	59	1.05%
14	Bali	1,500	253,100	92,827	36.68%
15	NTB	6,000	28,100	1,147	4.08%
16	NTT	6,000	112,500	2,009	1.79%
17	East Timor	0	112,500	0	0.00%
18	West Coast of Kalimantan	0	0	0	0.00%
19	Central of Kalimantan	0	0	0	0.00%
20	South Coast of Kalimantan	500	9,400	0	0.00%
21	East of Kalimantan	1,000	18,800	0	0.00%
22	North of Sulawesi	0	0	11	0.00%
23	Central of Sulawesi	500	9,400	135	1.44%
24	South of Sulawesi	500	9,400	6,752	71.83%
25	South East of Sulawesi	1,000	19,000	4,909	25.84%
26	Maluku	3,000	56,300	1,963	3.49%
27	Irian Jauya	500	9,400	125	1.33%

AREA POTENTIAL AND PRODUCTION FOR CAGE CULTURE IN INDONESIA, 1994

No.	Location	Area Potential Ha.	Production 1994 (Ton)
1	Aceh	1,344	10
2	North Coast of Sumatera	12,420	582
3	West Coast of Sumatera	1,657	308
4	Riau	6,592	99
5	Jambi	17,267	451
6	South coast of Sumatera	7	234
7	Bengkulu	51	45
8	Lampung	0	0
9	Jakarta	0	0
10	West Java	19,461	25348
11	Central Java	19,010	1508
12	Yogyakarta	2,276	71
13	East Java	1,739	111
14	Bali	360	6
15	NTB	0	10
16	NTT	0	0
17	East Timor	0	48
18	West Coast of Kalimantan	4,412	152
19	Central of Kalimantan	0	0
20	South Coast of Kalimantan	7,703	348
21	East of Kalimantan	6,324	2254
22	North of Sulawesi	84	1237
23	Central of Sulawesi	800	17
24	South of Sulawesi	0	0
25	South East of Sulawesi	0	0
26	Maluku	0	0
27	Irian Jauya	39,100	208

PRODUCTION FOR PEARL CULTURE IN INDONESIA, 1994

No.	Location	Production 1994 (Ton)
1	NTB	18.60
	West Lombok	2.70
	Central Lombok	0.00
	East Lombok	3.20
	Sumbawa	6.80
	Bima	5.90
2	Maluku	774.64
	Nort Maluku	0.77
	Central Maluku	0.39
	South East Maluku	773.48

Figure 1. DISTRIBUTION OF MANGROVE IN INDONESIA

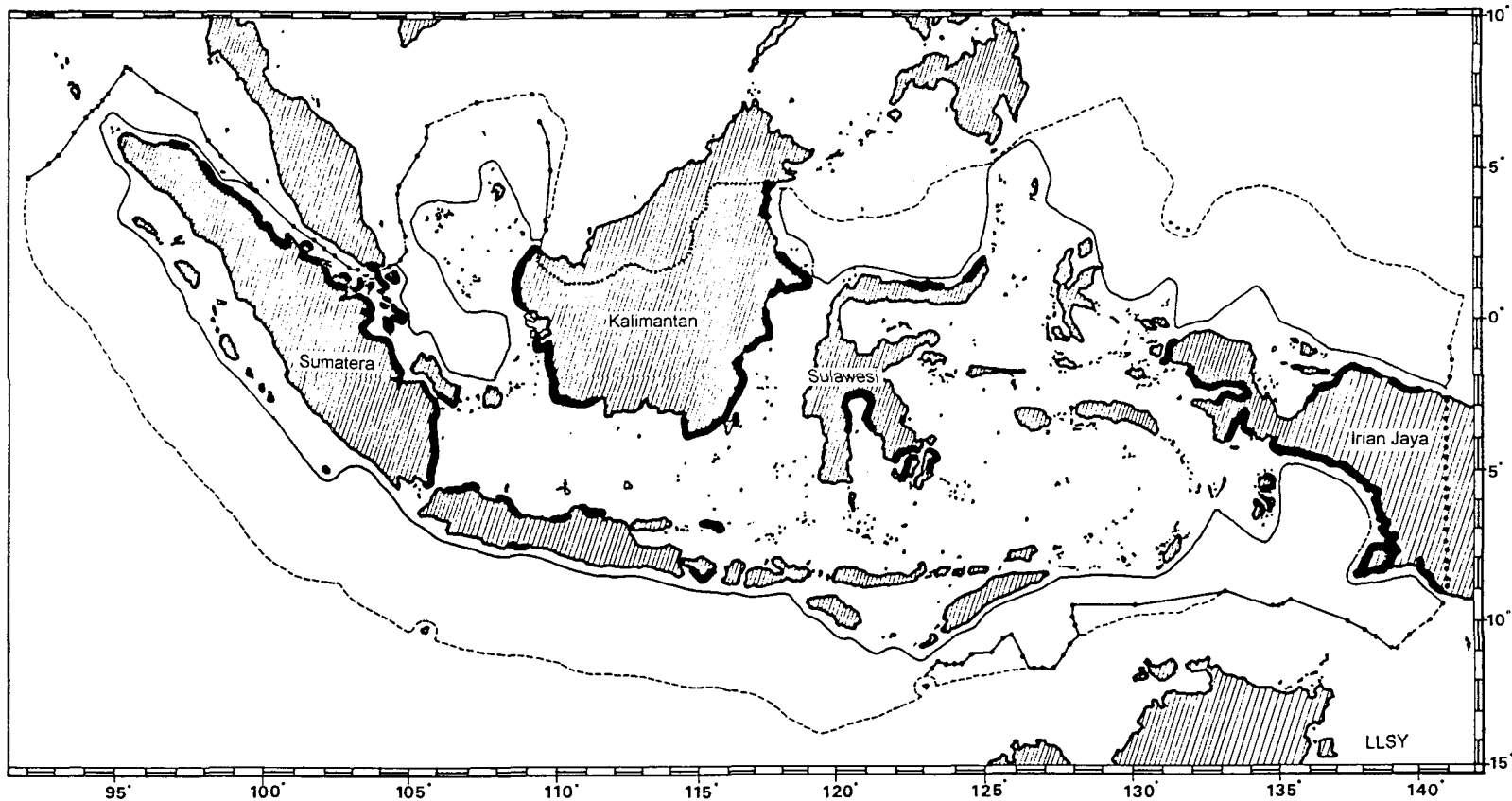


Figure 2. DISTRIBUTION OF CORAL REEF IN INDONESIA

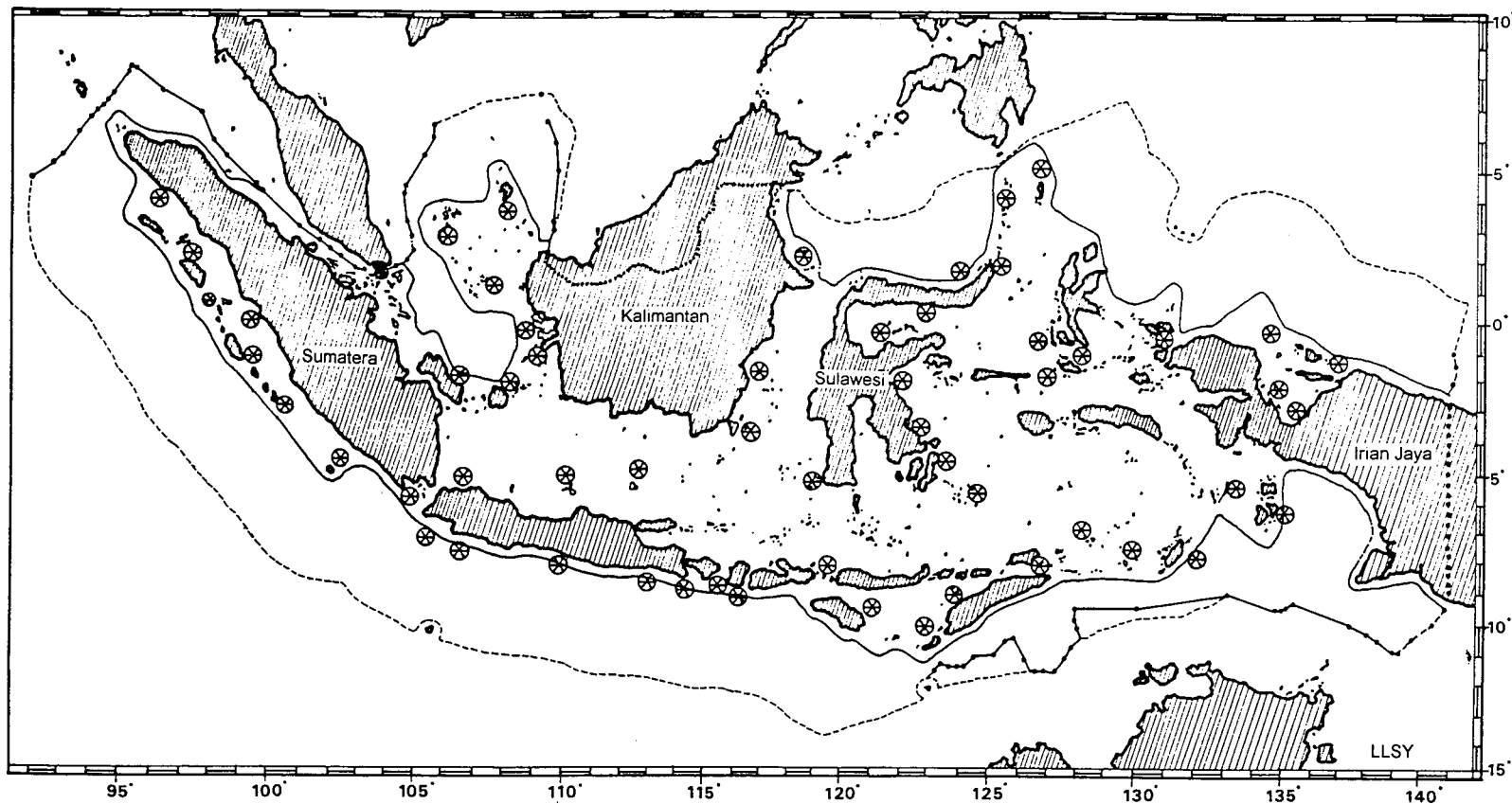


Figure 3. DISTRIBUTION FISHING PORT IN INDONESIA

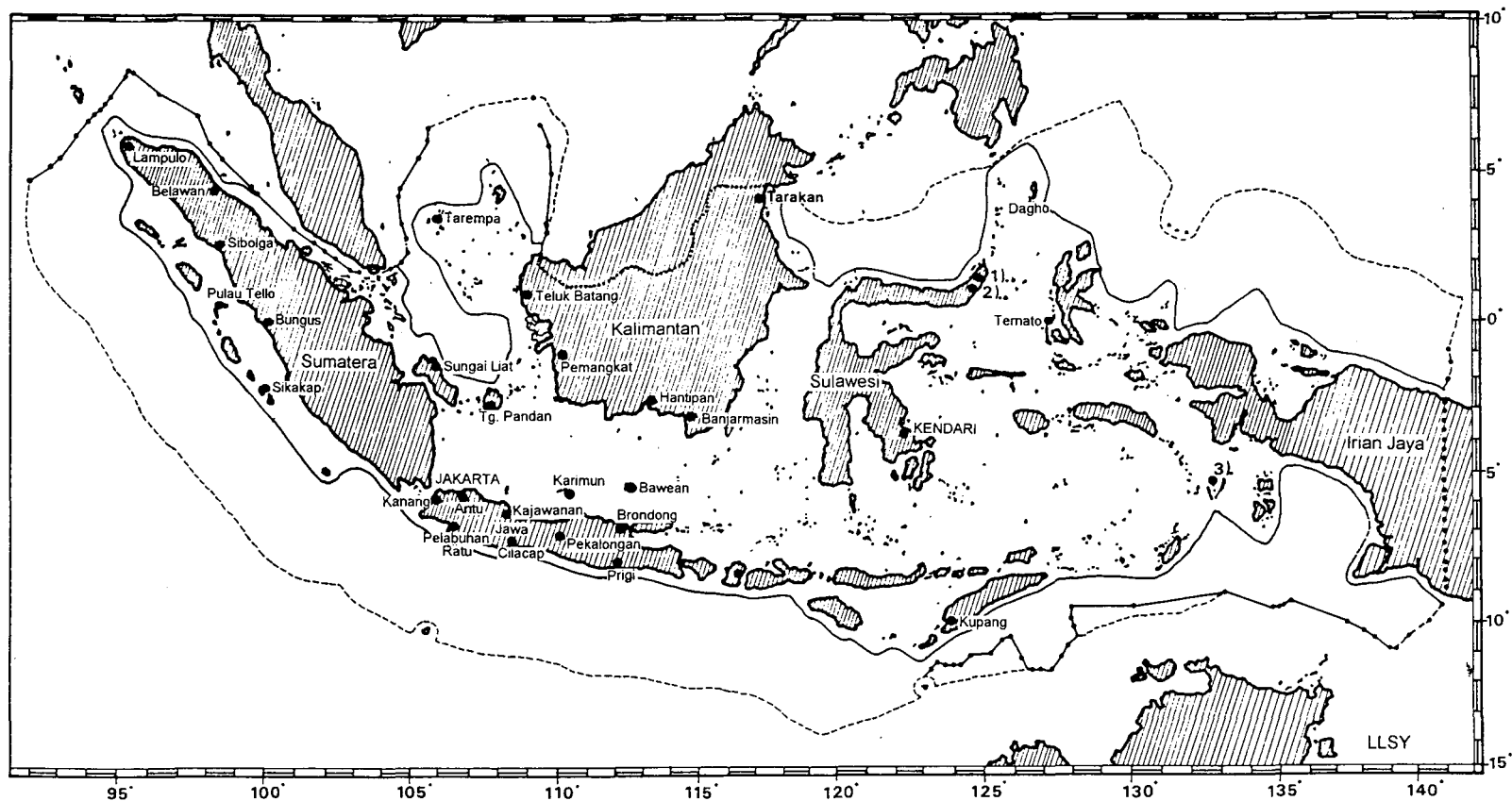


Fig. 4. AREA POTENTIAL DEVELOPMENT FOR MARI CULTURE IN INDONESIA

