Profile of Fisheries in Southeast Asia

Southeast Asian Fisheries of Development Center
The Secretariat

Supported by Swedish International Development Cooperation Agency
(Sida)

SEC/SP/102 April 2009

PREPARATION AND DISTRIBUTION OF THIS DOCUMENT

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BIBLIGRAPHIC CITATION

SEAFDEC. 2009. Profile of Fisheries in Southeast, Southeast Asian Fisheries Development Center. 83 pp.

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SESSION I

Small Scale Fisheries

CAMBODIA

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July, 2007

1. INTRODUCTION

1.1 General background

The Kingdom of Cambodia is situated in Indochina peninsula of the Southeast Asian, which total area of 181, 035 Km^2, lie between 10^o-15 ^{o} N latitudes and 102 ^{o}-108 ^{o} E longitudes, and is bounded by Vietnam in the south and the east, Laos in the north and Thailand in the west and the northwest.

The topography of Cambodia is dominated by flat or occasionally lowland plain in the interior of the country, where it is surrounded by highland and mountains along the border and tropical climate consist of two seasons namely rainy season (monsoon season) and dry season which rainy season starting from May to November and dry season starting from December to April; and temperature yearly average around 27^oC. Among the total, land area account for 176,165.2 Km^2 (97.31%), and water area is 4,869.84 Km^2 (2.69%) (Nao & Ly, 1997, cited in Kim, 2005).

In the southwestern part of the country, Cambodia exists of 435 Km coastal line in the Gulf of Thailand, which stretches between the Vietnam borders in the south to the Thai border in the west. There are four provinces/municipalities located a long this coastline namely, Kep (26 Km), Kampot (67 Km), Sihanoukville (105 Km) and Koh Kong (237 Km). Cambodia also has an Exclusive Economic Zone (EEZ), extending from the shoreline to 200 nautical miles, which covered an area of 55,600 km^2 (World Resource Institute, 1994, cited in Kim, 2005).

In Cambodia, fisheries are one of the most important sectors, playing a very important role in the daily food production and contributing to the nation economic. Both fresh water and marine fisheries provided the employment to over 2 million people, many of whom are some of the poor people living in rural area. Fish make up approximately 75% of the protein and calcium in take, and it was estimated that up to 450.000 mt of fish are annually harvested at account of value US$ 500 million, making up over 10% of GDP.

1.2 Scope of the paper

This document had been arranged to SEAFDEC Secretariat reflected to the international issues which small scale fisheries as one of main issues. This document be compiled based on the limit existing information while community fisheries had been promoting in reflecting to small scale fisheries management in Cambodia.

2. SMALL SCALE FISHERIES OF CAMBODIA

2.1 Small scale fisheries production

Fish plays a very significant role not only in the diet, but in the economic of the Cambodian people. A household survey carried out in 1995-96 suggested that the average fish consumption rate of 4.2 million people in central Cambodia is 67 kg/capita/year. Small scale fisheries production was estimate to contribute more than 55 percent of the total catch. Therefore, it is very important for food security in the country, particularly for local people who lived in remote area.

Fisheries resources had been considered subject being under pressured by nature and human activities. Shallow water caused by erosion due to cutting flooded forest/mangroves lead to change ecosystem for aquatic species. Moreover, increasing fishing effort of the middle scale and small scale fisheries has lead to increase fishing pressure on the wild fish stock and also increase the practice of illegal fishing method as well modern destructive fishing gear, for instant electro-fishing and small size net etc.

Fisheries Administration, under the Ministry of Agriculture, forestry and Fisheries, play a role to manage these resources and is committing to continue and encourage management this important sector to achieve the government policy is to reduce poverty and strengthen living condition for people of Cambodia.

In Cambodia, majority fish production comes from inland fisheries while marine fish production started included when decreasing of freshwater fish production. In 1960s, at Tonle Sap great lack there are 10 tons/km^2, but fish production is decline very stable during the last decades. However, there are lacks of small scale data fisheries production because of it was overlooked for the past years; and fisheries management was focus mainly managing on taxation management rather than management of fisheries production gathering. The data were collected from medium and large scale fishing activities. The interesting on small scale fisheries production starting for last few years whiles the declining of natural fisheries production remarkable. The data of small scale capture fisheries production was only underestimated from central and local/provincial fisheries authorities, there is no single survey/research on this fish information so fare. The data of small scale fish production is under estimate from the central and provincial fisheries office.

Fig. 1 Small scale fisheries production of Cambodia
(Unit: ton)

Year	**2001**	**2002**	**2003**	**2004**
Total fisher production	693,001	672,752	598,003	510,539
Small scale fish production	250,000	250,000	214,000	181,900
% of small scale fisheries	36.07	37.16	35.79	35.63

Source: FiA (2004)

2.2 Define type of fishing area/activities

In Cambodia, fishing activities were characterized in three categories both inland and marine fisheries, namely large/commercial, medium and small scale fisheries. The type of

scale was classified follow the criteria based on law of fisheries (eg. size of fishing boat and fishing gear, seasonal fishing).

2.2.1 Fisheries Domain

The Kingdom of Cambodia, fisheries domain is divided into two types based on set of regulations; they are fisheries domain assigned by group and fisheries domain protected.

The fisheries domain assigned by group

The group of domain fisheries consists of three criteria:

- The fishing areas were defined such as fishing lots, fishing barrages, and bag net fishing or Dai) reserved as resources monopoly for a person or enterprise and used for large scale fishing activities.
- The flooded forest areas where area included all forest ranges flooded during monsoon, and are necessary shelters of fish fauna for feeding and spawning.
- The fish sanctuaries where areas reserved for fish fauna reproduction or fore conducting experimental works on technique and scientific research of fisheries within which all fishing prohibited.

Fisheries domain protected

The fisheries domain protected where area that fishing is not mentioned in any criteria of the fishing domain assigned by group, for which general rules apply. Fishing in the fisheries domain protected can be allowed both small scale and medium scale fishing.

2.2.2 Type of Small scale fishing

Inland fisheries

Small scale fishing

This type of fishing activities had been done year round, family fishing/household fishing, family consumption /livelihood, traditional fishing gear and it's strict to size as well. Small scale inland fisheries fishing gear such Three-picked pointed spear (sam); Sharp forked spear (chamrob); Handled scooping basket (chhneang day); Rice field small bag trap (leay); Funnel trap (chuch); Bamboo piece ell (luan); Bamboo piece botia trap (bampong trey kagn chruck); Handle pick out cone shaped hard trap (ang rut); Small vase trap (chit); Handle round scooping basket (kagn chreng chugn chuat); Small cylindrical drum trap (L<80 cm, D<30 cm) lop; Small vertical slit trap (H<80 cm, D<30 cm) sayoeun; Small oblong trap (L<80 cm, D<30 cm) tru; Long trough shaped bamboo trap (saap); Small cast net (L<5 cm) samnagn; Small scooping net (mouth D<2 m) thnang; Small raft mounted lift net (L each side<2 m) chhouoc; Single hooked line; Small handle drag net (L<3 m) angn chuorng; Small gill net (L<10 m) morng. (L: length; D: diameter; H: height).

Medium scale fishing

The operation is needed license through a fixed license per gear and can be operated only during the fishing season from 1st October to June 30th next year. The cost of license is

fixed on the basis of an estimate of expected for each gear type. In this criteria are gill net longer than 10 m, seine net, fishing trap associated (Lop Nor or Rav) not longer that 500 m of bamboo fence, hook lining, trap as large as D: 80 cm. For example, one main type of medium scale fishing called “dai fishing”, it is kind of bag net or stationary trawl position in the river to capture fish migrating downstream (Van Zalinge et al. 2000, cite in Ing Try at al.?).

Large scale fishing

The types consist of fishing lot operation, barrages fishing and bag net fishing (Dai) that larger than dai in medium scale, which are licensed through an auctioning system for a period of 2 years, leased term. The system provides monopoly of resource utilization within a given area or at a define site in the lake or river to a private individual fisherman/company with some restriction on the operation such as closed season before which all fixed installation must be dismantled. In the catch of these lots, if it is too large, there maybe a place reserved for subsistent fishing. Fishing gear called “fishing lot” (loh nessaat) is concession auctioned by the Cambodia government to the highest bidder for exclusive exploitation over a two year period. This was one of the main instruments of the government to generate revenue from the rent of the fisheries resource (Van Zaling et al. 2000, cited in Ing Try, at al.?).

Marine fisheries

Small scale fishing

Small scale or artisanal fisheries is characterized by open access fishing, operation in fishing zone which extends from the coast to a depth of 20 m, a year round fishing activities, family/household fishing. Fish production is directly consumed by the fishing family, with only the surplus, or high quality fish, sold for some cash. Boat used are without engines or with engine of less than 33hp. Licenses are not required for boats with no engine or with engine below 33hp and boats. Fishing activities not allowed including trawling, light fishing and illegal fishing gear, which did not listed in the law of fisheries.

Medium scale fishing

The middle scale fisheries used relatively efficient fishing gear that have the capacity to fish offshore, boat uses are with engine more that 33 hp but less than 50 hp. The fishermen/participants use this scale is required to pay a fishing fee to the government according the fishery law.

Large scale fishing

The commercial fishery is characterized by large scale fishing from 20 m depth to the limit of the EEZ. In general, this scale the boat used with engines more than 50 hp, and it is also pay a fee of follow the fisheries law. They used all different kind of fishing gears including only single trawling and it be prohibited for fishing gear and fishing method such as pair trawling, light fishing and other fishing gears did not list in the fishery law.

2.3 Small scale fisheries management

The population of Cambodia is estimated to be 20 million in 2010. Over 80% of Cambodian people lived in rural area, which 50% of this population is engage full or part

time in fisheries. However, management fisheries resources to be used by rural people is very lack paid attention or was overlooked for long time a go. Small scale fisheries issues starting considered while declining natural fisheries production both inland and marine is well known.

In October 2000 the government of Cambodia announced a major change in fisheries management policy which small scale fisheries was promoted through establishment community fisheries, 65% area was reduced from fishing lot concession to open access. The establishment of community fisheries based on legal basis and frame work of "Royal Decree on Community Fisheries" and approval of the "Sub-decree on the establishment of community fisheries" done in 2004. These legislations (decree and sub-decree) provided the basis for a co-management system through community fisheries. Fisheries Administration is key role in fostering and facilitating community efforts in resources management and livelihood development. The vision for sustainable fisheries resource, the Fisheries Administration plan to promote as follow:

- To ensure the sustainable management and utilization of the fisheries resources to secure food for the people and to alleviation poverty;
- To promote and encourage aquaculture development by all means especially small scale aquaculture in rural area as well mean of protein supply and supplement existing levels and forms of production
- To promote community fisheries for local participation in fisheries management and secure as sustainable livelihood for farmers in terms of social, economic and nutritional benefit;
- To protect and conserve critical habitat and manage sustainable and restore the endangered species;
- To encourage investment in fisheries sector and improve the basic infrastructure for fisheries development especially for post harvest handling and processing.

3. PROBLEMS, CONSTRAINS RELATED TO SMALL SCALE MANAGEMENT

In Cambodia, small scale fisheries management is under estimate both fisheries production, fishing gear as well number of fishing family. There are not so many information refers to small scale fisheries management, particularly there are no proper statistical system set-up for small scale capture fisheries, so far. Thus lead to the negligence of the important contribution from the capture fisheries to livelihood of the poor.

The declining of the natural fish stock including species is well recognized. There are 300 to 500 fish species had disappeared from Tone Sap Great Lake, Mak S.(2000). Excess fishing effort and associated declines in abundance of target species is thought to be a serious problem for most of Cambodia's fisheries. The key causes appear to be population increase coupled with:

a) An economy that is not expanding rapidly enough to cater to rising needs,
b) The Government policy of allowing everyone the opportunity to fish for subsistence or income. The important of small scale fisheries was overlooked and underestimated by the central government and local authorizes and even other

institution (Ing Try, at all. (Year?)). Even prohibited fishing gear, at current, the electro-cute and small mesh size net is illegally fishing gear, which have been practiced everywhere in Cambodia's water body. The large number of local fisher used this gear commonly because these materials are cheap and available in local market. On the other hand, unregulated foreign fishing activities are another reason. Improved management in the forestry sector, however desirable, had produced and increase in migration of the people to the coastal zone. Many become involved in fishing, where entry cost are low. Export demand also encourages additional fishing effort, especially the high value species in oversea market.

Small scale fisheries suffer many problems covering the degradation of fish habitat and increasing number of fishers leading to the increasing pressure on the aquatic resources, fish habitat, and decline in fish catch and causing competition among natural resources users, particularly person who lived in community fisheries. Since fisheries reform, domain fisheries have been cut from private sector (lots) to open access, meaning local community had received right to access and mange those resources. A number of community fisheries were established, only coastal zone alone, there are 40 community fisheries were established until middle of year 2007. However, the conflict of this reform put more seriously to natural resources while the limitation for boundaries, concrete structure and community planning are under processing as well premature concept for Fisheries Administration. On the other hand, the operational problems of small scale fisheries management had been well recognized on over fishing, human resources, illegal fishing, legislation, conflict among user in local and who from out site that fishing area; and administration performance "there are been a problem of too much bureaucracy with the department of fisheries and more general the Ministry of Agriculture, Forestry and Fisheries" Ing Try, at al. year?.

4. CONCLUSTION

In land and marine fisheries are recognized main contributions for livelihood needs of Cambodian. They are significant to food security, providing alternative job for rural pourers. Fish is an important source of nutrients and contribution for food and it also provide in come generation both government through taxation of fishing and household fishing. Over 85% of Cambodian people lived rural area, which among of them taken fishing as one of main job. However, the fisheries resources suffer from both unsustainable management and over exploitation. Event there are no data scientific evidence on declining natural fish production in Cambodia but these resources are suffering both human activities and natural disaster.

Co-decentralization through open access for fisheries management based on community fisheries is on the way, and the overlooked on small fisheries manage is still in place and also absent of a proper legal frame work refer to community fisheries. There are no single data or information of fisheries production to be relievable in community fisheries in Cambodia so far. Under estimate from central and local authority on small scale fisheries production had been done and it will continues more at the future.

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THE PHILIPPINES

Arsenio, RFPN for the Philippines 2007

1. INTRODUCTION

The Philippines is an archipelagic country consisting of more than 7,100 islands lying north of the equator and on the western rim of the Pacific Ocean. The total land area is about 298,170 km^2. The territorial seas are bounded by: in the north by Taiwan through the Bashi Channel; in the east by the Philippine Sea; in the south by the Celebes Sea; and in the west by the South China Sea (Figure 1). It extends about 2,000 km in a south-north direction, from the northeast coast of Borneo to 150 km off Taiwan.

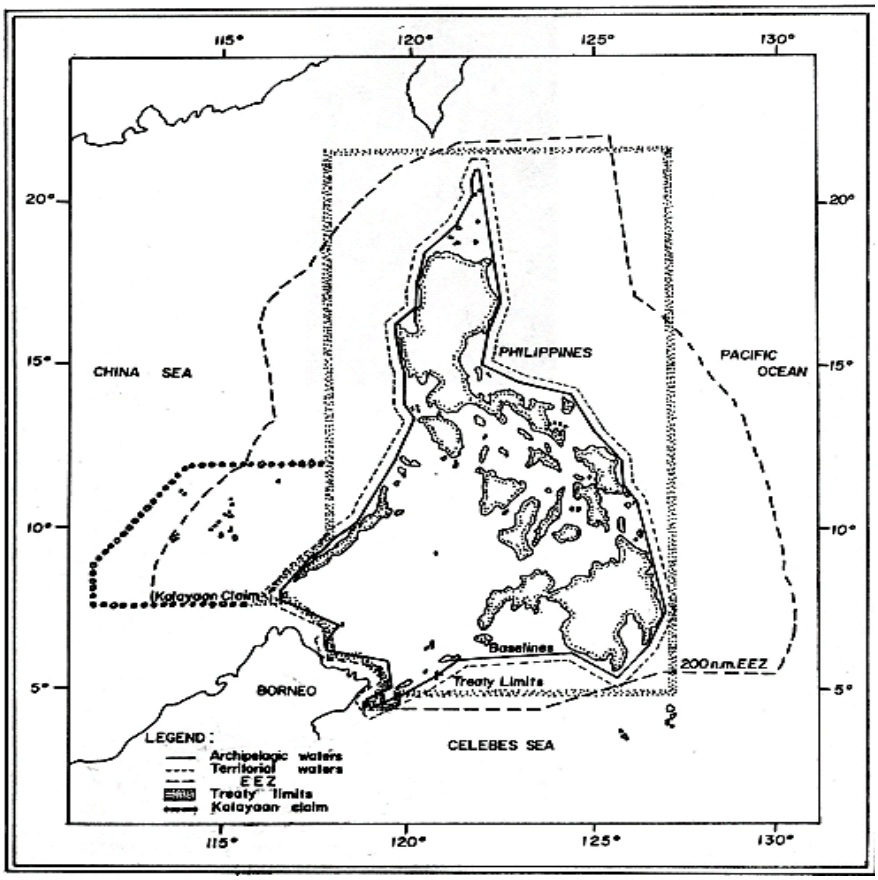

Figure 1 The extent of Philippine waters including its 200 EEZ

The total territorial water area, including the exclusive economic zone (EEZ), is about 2.2 million km^2 wherein coastal waters totals to 266,000 km^2 or about 12% available area for small-scale fisheries exploitation (Table 1). The shelf area, down to 200 m, covers 184,600 km^2. Coastline length is about 17,460 km. The country's coral reef area is estimated at 27,000 km^2, the second largest in Southeast Asia. Reef fisheries occur within the 10-20 fathoms. There are 915 reef fish species, and more than 400 scleractinian coral species. Inland resources include swamplands, lakes, rivers and reservoirs with a total area of 496,063 hectares.

Table 1. Fishery resources of the Philippines

A. Marine Resources	
1. Total Territorial Water Area (including the EEZ)	2,200,000 sq. km.
a. Coastal	266,000 sq. km.
b. Oceanic	1,934,000 sq. km.
2. Shelf Area (Depth 200 meters)	184,000 sq. km.
3. Coral Reef Area	27,000 sq. km.
4. Coastline (length)	17,460 km
B. Inland Resources	
1. Swamplands	246,063 ha
a. Freshwater	106,328 ha
b. Brackishwater	139,735 ha
2. Other Inland Resources	250,000 ha
a. Lakes	200,000 ha
b. Rivers	31,000 ha
c. Reservoirs	19,000 ha

The Philippines ranked 8th in 2005 among top fish producing countries in the world with its total production of 4.16 million metric tons of fish, crustaceans, mollusks and aquatic plants (including seaweeds). The production constitutes 2.8% of the total world production of 146.27 million metric tons (FAO Website).

2. POLICY AND LEGAL FRAMEWORK-FISHERIES MANAGEMENT

2.1 Republic Act No. 8550 "The Philippine Fisheries Code"

Republic Act No. 8550 "The Philippine Fisheries Code" is also known as the Fisheries Code of 1998, *" An act providing for the Development, Management and Conservation of the Fisheries and Aquatic Resources, integrating all Laws pertinent thereto, and for other purposes."* It has mandated the Department of Agriculture through the Bureau of Fisheries and Aquatic Resources and serves as guide in carrying-out its major tasks of fisheries resource management

Under this Act, the Bureau of Fisheries and Aquatic Resources was reconstituted from its staff status to line agency under the Department of Agriculture, and its prime mandate is to promote the management, development, conservation, protection and utilization of fisheries and aquatic resources of the country except municipal waters which shall be under the municipal or city government.

As one of the Republic Act (RA) 8550 policies, the government manages fisheries and aquatic resources in a manner consistent with the concept of an integrated coastal area management in specific natural fisheries management areas, appropriately supported by research, technical services and guidance. Thus, BFAR has issued various fisheries administrative orders (FAOs) to address fishery management.

Fisheries and Aquatic Resource Management Councils (FARMC)

Linked to the implementation of RA 8550, Sec. 68 provides for the development of fisheries and aquatic resources in municipal waters and bays by the fisherfolk and their organizations residing within the geographical jurisdiction of the *barangays*, municipalities or cities with the concerned local government units. Sec. 69 provides for the establishment of fisheries and aquatic resource management councils (FARMCs) at the national level and in all municipalities/cities abutting municipal waters. The councils will be formed by fisherfolk's organizations/cooperatives and NGOs in the locality and be assisted by the local government units and other government entities. Consultation and orientation on the formation of the councils is also required before they are organized.

RA 8550 also provides the legal framework for the role of National Fisheries and Aquatic Resource Management Councils (NFARMC), M/CFARMC and IFARMC. Fisheries Administrative Order (FAO) 196 provides the guidelines creating and implementing FARMCs. The creation of a FARMC will institutionalize the major participation of the fisherfolk and other resource users in the planning and formulation of policies and programmes for the management, conservation, protection and sustainable development of fisheries and aquatic resources.

In addition, Executive Order (EO) No. 240 was initially the offshoot of the creation of FARMCs in *barangays*, cities and municipalities. Its implementing guidelines elaborate the function of the FARMCs. Its framework seeks the enhancement of their empowerment through meaningful participation in the management, development and protection of fisheries and aquatic resources for sustainable production. This executive order enumerates the primary functions such as in the preparation and advisory role in fisheries and aquatic resource management policies and plans for integration into the local development plan. It also provides the local government units and special agencies with guidelines including the evaluation of all projects and applications. These guidelines concern the development and implementation of projects and issuance of permits and licenses for the appropriate use of the resources and to ensure that resource use limits and controls are imposed.

2.2 Republic Act No. 7160 "Local Government Code of 1991"

The enactment or promulgation of municipal or city ordinances and related resolutions affecting fishing and fisheries is already transferred/vested to the Local Government Units pursuant to Republic Act No. 7160 or the Local Government Code of 1991. This law had made some structural changes in terms of the devolution of functions related to the transfer of basic services and technology to the fishing communities. This code intends to give greater autonomy to local government units in the management of their aquatic resources. In relation to this, a memorandum of agreement between DA and DILG would authorize the devolution of fisheries regulatory functions within municipal waters. The jurisdiction over the municipal waters has been transferred to the local government units concerned.

3. PROFILE OF THE SMALL SCALE FISHERIES

3.1 Fishing Ground

3.1.1 Marine Municipal

In 1995, there were at least 13 fishing grounds considered as major production areas for the municipal sub-sector. The top four highest producing areas were the Visayan Sea with 11.28 percent, followed by the Moro Gulf with 9.41 percent, the East Sulu Sea with 9.01 percent and the Bohol Sea with 9.10 percent (Table 2).

Table 2. Marine municipal fisheries production by main fishing grounds, 1995

Fishing ground	Total [tonnes]	% of total
Visayan Sea	88 616	11.28
Moro Gulf	73 938	9.41
East Sulu Sea	71 486	9.10
Bohol Sea	70 756	9.01
Guimaras Strait	51 332	6.54
Leyte Gulf	49 901	6.35
West Palawan Waters	46 948	5.98
South Sulu Sea	42 019	5.35
Lamon Bay	41 862	5.33
Samar Sea	40 236	5.12
Davao Gulf	33 743	4.30
Cuyo Pass	25 587	3.26
Tayabas Bay	17 498	2.23
Other	131 447	16.74
Total	785 369	100.00

Source: BFAR Fisheries Profile 2000

3.1.2 Inland Water Fishing

There exist a total of 496,063 hectares inland water resources consisting of lakes, rivers, reservoirs and swamplands, though the most productive of them are the lakes. The most extensive lakes are found in mainland Luzon (Table 3). Foremost is Laguna de Bay (Laguna Lake), which is the largest lake in the Philippines and the second largest freshwater lake in Southeast Asia.

Table 3. Ten Major Lakes in the Philippines

Name of Lakes	Location	Area (ha)
1. Laguna de Bay	Laguna and Rizal	90,000
2. Lake Lanao	Lanao del Sur	34,700
3. Taal Lake	Batangas	23,400
4. Lake Mainit	Surigao del Norte; Agusan del Norte	14,000
5. Naujan Lake	Oriental Mindoro	10,900
6. Lake Buluan	Maguindanao; Sultan Kudarat	6,500
7. Lake Bato	Camarines Sur	3,800

8. Lake Buhi	Camarines Sur	1,800
9. Lake Dapao	Lanao del Sur	1,000
10. Lake Sebu	South Cotabato	964
TOTAL		**187,064**

Source: Philippine Fisheries Profile 2005

3.2 Number of Fisherman

The total number of fisherman totaled 1,614,368 in 2002 (Table 3). The number of municipal fisheries tops the number of fisherfolk as a whole with total number of 1,371,676 (84.97% followed by fishfarmers, and the commercial fisheries.

Table 4. Number of fisherfolk by type (2002).

Type	Number of Fisherfolk	%
Municipal Fisheries	1,371,676	84.97
Aquaculture (Fishfarmers)	226,195	14.01
Commercial Fisheries	16,497	1.02
Total	**1,614,368**	**100.00**

Source: NSO 2002 Census for Fisheries

3.3 Number of Fishing Boats

The municipal fishing boats for the year 2000, categorized as motorized and non-motorized, totaled 177,627 and 292,180 units, respectively. The estimated fish production of these boats was 289,131.84 tonnes for motorized boats or 37.81 percent, and for non-motorized boats 475,595.16 tonnes or 62.19 percent. (BFAR 2000).

The boats used by the municipal fishermen have a relatively narrow hull, the base of which is a dugout made of tropical hardwood, and the walls are of plywood. The size ranges from 7 to 9 m in length, and if motorized, they are powered with 6 to 16 HP petrol engines. Most of them are equipped with outriggers for stabilization; those without outriggers only use sails and paddles. Small-scale fishermen also use bamboo rafts to carry their small fishing gear in shallow waters of the coast where boats cannot operate.

Table 5. Number of Small Scale Fishing Boats (2000)

Region	Total	Motorized	Non-Motorized
CAR	660	49	611
I	17,678	11,641	6,037
II	3,304	1,502	1,802
III	27,038	18,375	8,663
IV	69,927	26,569	43,358
V	54,715	19,453	35,262
VI	41,808	16,234	25,574
VII	56,142	19,100	37,042
VIII,	58,068	16,255	41,813
IX	45,650	13,280	32,370
X	9,041	2,472	6,569
XI	24,099	11,382	12,717
XII	10,759	2,671	8,088
XIII	31,283	11,202	20,081
ARMM	19,635	7,442	12,193
TOTAL	469,807	177,627	292,180

Source: BFAR Website 2007

Fishing gear

The main municipal fishing gear types in the Philippines are gillnet, hook and line, fish corral, beach seine, baby trawl, ring net, Danish seine, spear, long line, purse seine, fish pot, bag net, crab lift net, troll line, jigger, push net, round haul seine, filter net, drive-in net, lift net, fyke net, pole and line, drift filter net, cast net and others.

3.4 Production of Small Scale Fisheries

In 2005, the fish production of the Philippines reached 4.16 million tons. Aquaculture posted 1,895,847 tons (45.55%), followed by commercial fisheries 1,133,976 tons (27.25%), while municipal fisheries 1,132,046 tons (27.20%) breakdown into marine capture 988,240 tons (87.30%) and inland with 143,806 tons (12.70%). Region IV-B registered the highest production for small scale fisheries (Table 6).

Table 6. Municipal Fisheries Production, by Region (in MT), 2005

Region	Marine	Inland	Total
NCR	5,271	-	5,271
CAR		899	899
I	29,080.89	2,277.72	31,358.61
II	15,227.57	6,801.35	22,028.92
III	26,457.06	9,842.66	36,299.72
IV-A	37,222.96	72,010.84	109,233.80
IV-B	177,562.92	760.99	178,323.91
V	102,904.67	2,825.31	105,729.98
VI	135,158.01	5,740.50	140,898.06
VII	51,933.11	169.92	52,103.03
VIII	68,833.25	2,761.00	71,594.25
IX	118,981.69	583.94	119,565.63
X	33,117.44	1,992.57	35,110.01
XI	32,399.43	174.51	32,573.94
XII	28,974.60	15,810.54	44,785.14
XIII	61,231.78	17,475.48	78,707.26
ARMM	63,882.99	3,684.56	67,563.55
TOTAL	**988,240**	**143,806**	**1,132,046**
Percentage	**87.30%**	**12.70%**	**100%**

Source: Philippine Fisheries Profile, 2005

3.5 Major Fish Species Caught

The majority of municipal marine fish catch are small pelagics; mackerel, small tuna, scad, anchovy, and sardine as seen in Table 7 . The top three species caught were Indian Mackerel (7.1%), Roundscad (6.7%), and Frigate Tuna (6.1%) respectively.

Table 7. **Marine Municipal Fish Catch, by Major Fish Species, 2005**

Major Species	Total	% to Total
1. Indian mackerel (Alumahan)	70,201.08	7.1
2. Roundscad (Galunggong)	65,812.53	6.7
3. Frigate Tuna (Tulingan)	60,119.56	6.1
4. Big-Eyed Scad (Matangbaka)	56,600.86	5.7
5. Indian Mackerel (Alumahan)	46,333.21	4.7
6. Squid (Pusit)	45,333.21	4.7
7. Yellowfin tuna (Tambakol)	44,194.09	4.5
8. Anchovies (Dilis)	43,220.48	4.4
9. Fimbriated Sardines (Tunsoy)	37,845.15	3.8
10. Blue crab (Alimasag)	32,894.67	3.3
11. Others	485,706.95	49.1
Total	**988,239.87**	**100.0**

Source: Philippine Fisheries Profile, 2005

In inland bodies of water snail and tilapia comprised the bulk of the catch (60%). The emergence of tilapia in the inland waters may be attributed to the stocking program of BFAR wherein fingerlings are dispersed and stocked to replenish the stocks on lakes, rivers and other bodies of water.

Table 8. Inland Municipal Fish Catch by Major Species, 2005

Region	Total	% to Total
1. Suso (Snail)	52,489	37
2. Tilapia	32,501	23
3. Carp	9,726	7
4. Dalag (Mudfish)	8,126	6
5. Biya (Lizard fish)	5,415	4
6. Ayungin (Theraponids)	4,764	3
7. Hipon (Shrimp)	4,700	3
8. Gourami	3,832	3
9. Hito (Catfish)	3,314	2
10. Kanduli (Sea Catfish)	3,056	2
11. Martiniko (Climbing Perch)	1,534	1
12. Bangos (Milkfish)	637	0
13. Others	13,714	10
Total	**143,806**	**100**

Source: Philippine Fisheries Profile, 2005

4. CHARACTERIZATION OF SMALL SCALE FISHERIES

4.1 Small scale fisheries definition

Small-scale fishing is synonymous to artisanal, municipal, coastal and subsistence fishing. In the Philippines, however, it is normally called municipal fisheries. More specifically, 'subsistence fisheries' refers to fisheries wherein fishing units catch marine products mainly for household consumption. 'Coastal fisheries' are defined as fisheries by fishing ground or area, thus, the range 0 to 15 km is described as coastal fisheries.

Small-Scale Fisheries (SSF) or Municipal Fisheries include capture operations using motorized and non-motorized boats that weigh 3 GT or less, as well as fishing and gathering less mobile aquatic animals without using boats. In this sub-sector, the persons involved are referred to as municipal fisherfolk who are directly or indirectly engaged in municipal fishing and other related fishing activities (BFAR 2001). These fisherfolk use bancas (a type of boat) with a capacity of 2-5 persons, usually without engine, and uses fishing gear like hook and line, gillnet and others (BFAR 1987). By area of operation, municipal fisheries can be classified into two types, namely: marine municipal fisheries in coastal waters and inland municipal fisheries for freshwater areas such as lakes, rivers and streams.

4.2 Importance of small-scale fisheries to the economy, livelihood and food security

The fisheries industry is important to the economy of the country contributing 2.1% (116 billion pesos) to the country's Gross Domestic Product (GDP) and accounted for 15% of the Gross Value Added (GVA) in Agriculture, Fishery and Forestry Group. And though in terms of production the municipal fisheries only registered 1,132,046 metric tons which is only 27% of the total production, it represents 35% of the total value of the fisheries products, the highest among the sectors which amounts to 50 billion pesos. The municipal fisheries sector also contributes for the largest jobs created in the fisheries with 1,371,676 it employs in the sector, about 85% of the involve manpower in fisheries.

4.3 Current issues of concern, problems and constraint

4.3.1 Problems of the small-scale fisheries industry (FIRM and DAP 1987)

The problems and needs of the municipal fisheries industry are classified into industrial, socioeconomic, political and institutional.

1. Industrial

- Low fish production
- Underutilization of fisheries resources
- Mal exploitation of some fishing grounds
- Proliferation of illegal fishing
- Lack of ice plants and cold storage facilities
- Lack of effective organizational and extension machinery
- Dearth of integrated research systems
- Poor delivery and dissemination of technological packages
- Ineffective promotion and implementation of fishing industry financing programmes

2. Socioeconomic

- Inequities in access to resources, opportunities and sources

3. Political

- Unequal, inadequate and poor delivery of government services
- Mal intervention of local officials especially during site selection, endorsement and implementation of a fisheries project
- Poor peace and order situation

4. Institutional

- Poor accessibility to institutional e.g. technical, extension, information and financial support

Furthermore, a study conducted by the BFAR RFTC project coordinating staff in 1981 had identified some major constraints in small-scale fisheries industry as follows: a) dearth of trained manpower; b) few fish markets; c) dynamite fishing; d) poaching by alien fishermen;

e) competition from commercial fishing boats; f) increasing fuel costs and g) lack of mechanization.

4.3.2 Solutions to these constraints (FIRM and DAP 1987)

To address these problems, the following measures may be considered:

1. Industrial

- Introduction of new and modern fishing gear and technology
- Promotion of fish conservation measures and proper resource utilization by adopting the concept of maximum sustainable yield
- Support for fisheries infrastructure projects such as ice plants, fish storage and transport facilities, ports, wharves and markets
- Development of an effective organizational extension machinery
- Sustaining and strengthening research and development and extension services
- Development of a more effective information and technological transfer system
- Development and installation of a more effective warden system
- Development of effective financing programmes
- Strengthening rural credit systems
- Identification, prioritization and solution of fisheries-related problems

2. Socio-economic

- Empowerment of the people through community organizations for more effective implementation of socioeconomic projects
- Participation of subsistence fishermen in designing policies, strategies and programmes involving them
- Promotion of fisheries-related alternative income-generating projects e.g. net making, boat building, engine repair and maintenance and salt making
- Development of an insurance programme to benefit the small-scale fishermen and their families

3. Political

- Development of a more effective delivery of government services to small-scale fishermen through proper decentralization of government efforts
- Increase government support for fisheries research and extension
- Limited and proper intervention of local officials in the project
- Promotion of peace and order

4. Institutional

- Carry out institutional reforms to democratize access by the sustenance fishermen to services, resources and opportunities

- Check the duplication of functions and fragmented efforts towards fisheries development by synchronization/integration of service delivery of all line agencies

4.3.3 Future development of a decentralized small-scale fisheries management scheme

A decentralized system of management of coastal resources has long been acclaimed. The local governments and resource users were appraised to become part and parcel of the development and sustenance of community-based management and co-management projects and programmes. It is recognized that the early and continuing involvement of project beneficiaries is one of the factors that contribute to the success of the project development, implementation and evaluation. (Pomeroy et al. 1996)

Pomeroy et al. (1996) noted in an impact evaluation study that future CBCRM projects should be build on the existing occupational multiplicity of most fishermen and fishing households. These interventions are more likely to be sustainable since they would fit into the successful adaptive strategy of occupational multiplicity. Community organizing and consensus building are also encouraged. But such a strategy may experience difficulties, especially where the people in the community have no history of collective action.

Support from government through legislation, funding and enforcement is necessary to sustain such interventions. In most instances, local initiatives require collaboration with government to enforce user rights. It is crucial to continue the capability-building efforts from various sectors to enhance empowerment and a sense of reliance among municipal fishermen. The schemes must not only cover a short range but consider the long-term impact of conservation measures for the overall benefit of the users of municipal waters.

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THAILAND

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1. INTRODUCTION

Thailand is a peninsular country located in South-East Asia, with an area of approximately 514,000 km^2 and a coastline of 2,614 km. Marine fisheries are operated in two major fishing areas, viz. the Gulf of Thailand and the Andaman Sea off the west coast of peninsular Thailand. The Gulf of Thailand, a semi-enclosed sea, covers an area of about 320,000 km^2 and the country had a long coast line of 1,875 km. There exists areas in the Gulf of overlapping claims arising from different boundary demarcation methods employed by Thailand and her neighbors, viz., Cambodia, Malaysia and Vietnam. Being part of the Sunda continental shelf in the South China Sea, the Gulf is rather shallow with an average depth about 45 m. The Andaman Sea is deeper than the Gulf of Thailand, with an area of about 126,000 km^2. It has the great features of oceanic waters. The length of the coastline on the Andaman Sea side of peninsular Thailand is 740 km.

Thailand's Exclusive Economic Zone (EEZ) covers 420,280 km^2, of which 304,000 km^2 in the Gulf of Thailand and 116,280 km^2 in the Andaman Sea (Fig. 1). Thai EEZ within the Gulf of Thailand includes overlapping areas between Thailand and Cambodia (34,000 km^2), Thailand, Cambodia and Vietnam (14,000 km^2) and Thailand and Malaysia (~4,000 km^2).

Figure 1 Thai Fisheries Zone: broken lines represent Thai EEZ

2. POLICY AND LEGAL FRAMEWORK-FISHERIES MANAGEMENT

2.1 The National Fisheries Policies

The Department of Fisheries (DOF) is a lead national agency in policy development for fisheries in Thailand. Followings are the National Fisheries Development Policies outlined by DOF:

1. Policy on Development of Fisheries and Involved Organization

1a. To have fishermen and involved organization participate in fisheries administration, management, and development.

1b. To increase knowledge and skill of the fishermen for their self-reliance and viable occupation as well as to increase their capability in managing of their organizations.

2. Policy on Management of Fisheries Resources and Environment

2a. To maintain fisheries resources in harmonization with sustainable utilization and without negative impact to environment, under joint administration and management by Thai people, community, local organization, and government.

2b. To maintain fisheries resources in harmonization with decentralization policy by assignment MCS to local authority (Ao Bo To) and other department concerned.

2c. The right-based fisheries management for coastal and marine fisheries is promoted to replace open access.

2d. To reduce fishing capacity for the Gulf of Thailand that harmonize to the global initiative.

3. Policy on Aquaculture Development

3a. Increasing fish production from aquaculture sufficiently for domestic consumption.

3b. Increasing fish production in terms of both quantity and quality for domestic trade and export.

3c. Accelerate research in supporting commercial aquaculture for increasing trade volume, quality standard and reducing cost of production.

3d. Development of sustainable marine shrimp culture system for domestic trade as well as for export.

3e. Develop production and marketing of ornamental fish and aquatic plants for export in order to raise the aqua-culturists' income.

4. Policy on Oversea Fisheries Development

4a. Develop and raise the capacity and technology of overseas fishing fleet to meet proper standards for fishing operation in international waters.

4b. Control and regulate fishing operation in compliance with agreements with other coastal States or joint-venture partners.

4c. Expand fishing operation towards high seas and deep seas.

4d. Develop personnel involving in overseas fisheries sub-sector.

5. Policy on Fisheries Industry Development

5a. Maintain the status of Thailand as one of the important fish producing and exporting country.

2.2 Legal Framework

2.2.1 The level(s) of government jurisdiction over fisheries

All the central, provincial and local government authorities including the public participation have jurisdiction over fisheries according to the decentralization policy.

2.2.2 The legal source of their authorities

The key legislations are as follow:

- The Fisheries Act B.E. 2490 (1947) – revised in 1953 and 1985 now in the process of revising to update for fisheries situation.
- Act Governing the Right to Fish in Thai Waters in B.E. 2482 (1939)
- Act Organizing the Activities of the Fish Market B.E. 2496 (1953)
- Wildlife Reservation and Protection Act B.E. 2535 (1992)

The other related legislations are as follow:

- The Constitution of the Kingdom of Thailand B.E.2550 (as the core legislation concerning the decentralization and public participation)
- The Thai vessel Act was established in B.E. 2481 (1938)
- The National Reserved Forest Act B.E.2507 (1964)
- Forestry Act, B.E.2484 (1941)
- National Parks Act B.E. 2504 (1961) (impacting on marine parks and their licensing of or management of these parks)
- Enhancement and Conservation of National Environmental Quality Act, 1992.
- Animal Feed Quality Control Act, B.E.2525 (1982)
- Food Act, B.E.2522 (1979)
- Drug Act, B.E. 2510 (1967)
- Endemic Animal Act B.E.2499 (1956)
- Foreign Business Act B.E.2542 (1999)
- Dangerous Substance B.E.2535 (1992)

2.2.3 The Principle Management Instruments

1. Fisheries Act B.E. 2490 (1947).
2. Wildlife Reservation and Protection Act B.E. 2535 (1992), and
3. Enhancement and Conservation of National Environment Quality Act, 1992

2.2.4 **At Ao Bo To level** (Sub-District authorities)

The Ao Bo To Act B. E 2535 (1994) concerning the natural resources and environment in harmonize to the National Constitution B.E 2550 (2007) and Fisheries Act B.E. 2490 (1947), e.g. Section 67 (subsection 7) and Section 71 have been applied.

2.3 Fisheries management

2.3.1 Fisheries management for small-scale and large-scale fisheries implemented by The Department of Fisheries of Thailand

1. Boat-tenure system (freezing the trawler number), no transferring license except for the son, license have to be renewed every year otherwise the license will be cancelled

2. Closed area and closed season including limit certain fishing methods

3. Reserved zone within 3 km from shoreline, preserve zone for nursing area of juvenile fish and invertebrate, no fishing for engine boats

4. Promote the community-based fisheries management by using demarcated area for small scale fisheries and prevent trawling activities in the demarcated area.

5. Resources and habitats rehabilitation for recovering the fishery resource and habitats, artificial reef installation for obstruct trawling activities, shelter for spawners and juvenile fish, spawning area for fish and invertebrate

6. Resource enhancement to fruitful the local species by fry seed releasing program

7. Limit cod-end mesh sizes of trawler and mesh sizes of purse seiners

8. Plan for fishing capacity reduction especially the trawlers and push netters

9. Promote right-based fisheries to replace open access

10. Promote small business to small scale fishermen to produce local fishery products

2.3.2 Fisheries Management Instruments

1. Monitoring, control and enforcement to the illegal fisheries

2. Sea water monitoring for approved zone of the fishing grounds that connect from farm to spoon program for good quality exporting products

3. The Department of Fisheries assigns the concerned authority and local authority to monitoring, control and enforcement the illegal fisheries under the Decentralization Policy of the National Constitution B.E 2540

4. Licensing for all commercial fishing gear

5. Using indicator as management tool (CPUE, decrease in mean length, changes in species composition, changes in number of species, percentage of spawners in the catches, mean size of spawner, MSY and MEY)

6. Community-based fisheries management for small-scale fisheries, fishermen community limits number of small scale fishing boat and promote right-based fisheries

7. Artificial reef installation to protect the habitats and increase shelter for fish

8. Fry seed releasing around artificial reef and mangrove areas

9. Resource conservation, responsible fisheries and awareness programs for fishermen, school students and school masters

3. PROFILE OF SMALL SCALE FISHERIES

3.1 Inland captured Small-Scale Fisheries

3.1.1 Fishing ground

Most of fishermen in this sub-sector are small-scale. The important fishing grounds are rivers, lakes, swamps and reservoirs. Fishing gears used including gillnets, longline, hook and line, scoop nets, cast nets, and lift nets which gillnet is the most popular and efficient, particularly in swamps and reservoirs. Number of fishing boats and fishermen for inland capture small-scale fisheries are not officially recorded; therefore no data are available.

3.1.2 Production and Species caught

Aquatic species usually caught are Thai silver barb, snakehead, walking catfish, local carps and snake skin gourami. The production during the past five years from 2000 to 2004 is 201,500, 202,500, 198,700, 198,400, 203,700 tons; respectively.

3.1.3 Sustainable Development Initiatives for Inland Captured Fisheries

* Promotion of the use of fish ladder in dam-reservoirs to maintain fish biodiversity in the rivers and reservoirs.

* Control program on the use of destructive fishing gears or others means in freshwater fisheries.

* Water discharge quality control program from inland aquaculture to freshwater environments.

* Promotion of co-management program for fishing communities in freshwater basins.

3.2 Marine capture Small-Scale Fisheries

3.2.1 Fishing Ground

Of the 76 provinces, 24 are coastal provinces (Fig. 1) including the fishing grounds in the Gulf of Thailand divided into 4 zones and one main fishing ground in the Andaman Sea. The detail is indicated in Table 1.

Table 1. Coastal Fishery Zones in Thai waters.

Thai waters	Fishing zone	Areas	Coastal provinces
Gulf of Thailand	1	Eastern Gulf	Trat, Chantaburi and Rayong province
	2	Inner Gulf	Chonburi, Chachoengsao, Samut Prakarn, Samut Songkram, Samut Sakorn, Bangkok and Petchaburi
	3	Middle Gulf	Prachuap Khiri Khan, Chumphon and Surat Thani
	4	Lower Gulf	Nakhon Sri Thammarat, Pattalung, Songkhla, Pattani and Naratiwas province.
The Andaman Sea	5	Andaman Sea	Ranong, Phang-nga, Phuket, Krabi, Trang and Satul

3.2.2 Number of Fishermen

Marine fishery censuses were carried out in 1985 and 1995 and marine fishery survey in 1990 and 2000. The countrywide fishery censuses established that there were 139,506 fishermen (including coastal aquaculture workers) in 1985, 148,306 in 1990, 157,377 in 1995 and 181,666 in 2000. Thus, the annual rate of increase was 1.23% during 1985-1990 period, 1.19% during the 1990-1995 period and 3.08% during 1995-2000 period. Latest data in 2000, there was an estimated 181,666 people involved in the sector of which 76,222 as small-scale fishermen, 4,316 as commercial fishermen, and 101,128 involved in fisheries related activities. Out of 76,222 small-scale fishermen, 64, 098 are male and 12,124 are female.

Table 2. Number of Fishermen during the peak season in 2000 (Source: National Statistical Office, 2001)

Fishing activities	2000 Census
	Number of Fishermen (M:F)
Small-scale fisheries	76,222 (Male : Female = 64,098:12,124)
Large-scale fisheries	4,316 (Male : Female = 4,198:118)
Aquaculture	62,598 (Male : Female = 45,466:17,132)
Fishery employees	38,030 (Male : Female = 35,186:2,844)
Total	181,666 (Male : Female = 148,948: 32,218)

3.2.3 Number of Fishing Boats

The number of fishing boats of small-scale fisheries (SSF) that are <10 GT and large-scale fisheries (LSF) which are >10 GT from the Marine Fishery Intercensal Survey of the period of 1985 and 2000 (National Statistical Office, 2001) are shown in Table 3. The number of small-scale fishing boats in 1985 and 2000 were 46,181 and 51,078 boats; respectively whereas the number of large-scale fishing boats were 8,357 and 7,041 boats indicating that number of small-scale fishing boats was about 80% and the rest is the number of large-scale fishing boats. For small-scale fishing boats, the number of outboard powered boat (Long tail boat) were highest followed by inboard powered boat and non-powered boat.

The small-scale fishing boats classified by fishing gear type based on Marine Fishery Intercensal Survey of the period of 2000 were dominated by gill netters followed by traps, trawlers, push netters and falling netters (see detail in Table 4). The gill netters for small-scale can be categorized in 13 types which the shrimp gill netters were the highest number (10,890 fishing boats) followed by the crab gill netters (7,525 fishing boats).

Table 3. Number of Fishing Boats categorized by gross tonnage during 1985 and 2000. (Source: National Statistical Office, 2001)

Type of Boats	Year 1985		Year 2000		% of change
	Number	%	Number	%	
Total	**54,538**	**100**	**58,119**	**100**	**6.6**
Non-powered boat	2,826	5.2	2,639	4.5	**-6.6**
Outboard-powered boat	36,430	66.8	42,217	72.7	**15.9**
Inboard-powered boat	15,282	28.0	13,263	22.8	**-13.2**
<10 GT	6,925	12.7	6,222	10.7	**-10.2**
10-49 GT	6,547	12.0	5,064	8.7	**-22.7**
>50 GT	1,810	3.3	1,977	3.4	**9.2**

Table 4. Number of fishing boats by type of main fishing gears and by type of boats and gross tonnage in 2000. (Source: National Statistical Office, 2001)

Type of boat and fishing gears	Gross Tonnage					Total
	Non-powered boat	Outboard powered boat	Inboard powered boat			
			<10 GT	10-49 GT	>50 GT	
Trawler	**-**	**403**	**1,256**	**2,375**	**1,532**	***5,566***
Otter board trawl	-	-	*1,241*	*1,873*	*1,048*	*4,162*
Pair trawl	-	-	*15*	*502*	*484*	***1,001***
Beam trawl	-	*403*	-	-	-	***403***
Beach seine	**107**	**92**	**-**	**-**	**-**	***199***
Surrounding net	**-**	**221**	**129**	**519**	**404**	***1,273***
Anchovy purse seine	-	*114*	*57*	*150*	*58*	***379***
Thai purse seine	-	-	*2*	*191*	*227*	***420***
Luring purse seine	-	-	-	*68*	*87*	***155***
Mackerel purse seine	-	-	*65*	*86*	*14*	***165***
Bonito purse seine	-	-	-	*20*	*18*	***38***
Other surrounding net	-	*107*	*5*	*4*	-	***116***
Dredge	**15**	**181**	**8**	**44**	**-**	***248***
Short-necked clam dredge	-	-	*4*	*44*	-	***48***
Other dredge	*15*	*181*	*4*	-	-	***200***
Lift net	**398**	**1,333**	**77**	**19**	**-**	***1,827***
Anchovy stick held lift net	-	-	*16*	*18*	-	***34***
Crab portable lift net	*252*	*619*	-	-	-	***871***
Jelly fish scoop net	-	*60*	*58*	-	-	***118***
Acetes dip net	*114*	*338*	-	-	-	***452***
Fish lift net	*12*	*153*	-	-	-	***165***
Other lift net	*20*	*163*	*3*	*1*	-	***187***
Falling net	**275**	**873**	**768**	**717**	**8**	***2,641***
Squid falling net	-	*81*	*688*	*492*	*8*	***1,269***
Anchovy stick held box net	-	-	*80*	*225*	-	***305***
Other cast net	*275*	*792*	-	-	-	***1,067***
Gill net	**845**	**26,554**	**2,234**	**708**	**22**	***30,363***
Spanish mackerel gill net	-	*33*	*14*	*99*	*22*	***168***
Giant sea pearch gill net	-	*573*	*2*	*1*	-	***576***
Threadfin gill net	-	*258*	*21*	-	-	***279***
Mackerel gill net	*45*	*2,048*	*317*	*307*	-	***2,717***
Indian mackerel gill net	-	*128*	*125*	*32*	-	***285***
Mullet gill netter	*228*	*3,183*	*66*	*44*	-	***3,521***
Rocky fish drift gill ner and set gill net	-	*258*	*18*	-	-	***276***
Whiting sillago gill net	*12*	*1,052*	*104*	-	-	***1,168***
Crab gill net	*138*	*6,649*	*632*	*106*	-	***7,525***
Shrimp gill net	*166*	*9,734*	*916*	*74*	-	***10,890***
Cuttle fish trammel net	-	*512*	*12*	*5*	-	***529***
Mackerel encircling gill net	*2*	*175*	*6*	*21*	-	***204***
Other gill net	*254*	*1,951*	*1*	*19*	-	***2,225***

Table 4. (cont.)

Type of boat and fishing gears	Gross Tonnage					Total
	Non-powered boat	Outboard powered boat	Inboard powered boat			
			<10 GT	10-49 GT	>50 GT	
Trap	**595**	**6,575**	**802**	**274**	**-**	**8,246**
Fish trap	*92*	*1,057*	*49*	*52*	*-*	***1,250***
Squid trap	*-*	*1,645*	*500*	*172*	*-*	***2,317***
Shrimp trap	*68*	*1,243*	*219*	*48*	*-*	***1,578***
Mud crab trap	*396*	*1,040*	*29*	*1*	*-*	***1,466***
Small grouper trap	*21*	*745*	*3*	*-*	*-*	***769***
Other trap	*-*	*62*	*2*	*-*	*-*	***64***
Bamboo stake trap	**11**	**318**	**5**	**5**	**-**	**339**
Set bag net	**116**	**1,400**	**51**	**-**	**-**	**1,567**
Boat push net	**-**	**2,879**	**510**	**393**	**9**	**3,791**
Hook and line	**242**	**1,172**	**373**	**10**	**2**	**1,799**
Handline and pole line	*208*	*588*	*196*	*-*	*-*	***992***
Trolling line	*14*	*150*	*159*	*3*	*-*	***326***
Long line	*20*	*434*	*18*	*7*	*2*	***481***
Miscellaneous	**35**	**216**	**9**	**-**	**-**	**260**

Figure 2. Photo of a gill netter (top left), a trawler (top right) and push netters (bottom)

3.2.4 Production of Small Scale Fisheries

Total marine capture fisheries production during 2001 to 2004 shown in Table 5 were steady state at about 2.6 million mt per year of which approximately from 0.18 to 0.26 million mt were shared by SSF while LSF production were between 2.3 to 2.4 million mt. It

indicates that the production from large-scale fisheries is twelve times higher than small-scale fisheries. There appeared to be a declining trend in total fish catch of SSF from 63,290 tons in 2001 to 43,394 tons in 2004 which particularly occurred for demersal fish (Fishery Information Technology Center, 2003; 2004; 2005; 2006).

3.2.5 Major fish species caught

During 2001 to 2004 periods, the dominant aquatic species for small-scale fisheries was fish dominated by short mackerel and followed by anchovy, mullet, Spanish mackerel and Indian mackerel (Table 5). The second dominant species was shellfish of which the short necked clam dominated the catch. Shrimp was the third dominant species for small-scale fisheries with banana shrimp was the highest abundance. The detail for list of species caught by SSF is shown in Table 5 where the fish species caught by LSF were also relatively compared.

4. CHARACTERIZATION OF SMALL SCALE FISHERIES

4.1 Small Scale Fisheries Definition

SSF in Thailand is characterized as those with small boats of less than 12 m LOA (overall length) or less than 10 gross tonnage (GT), with or without engine, inboard or outboard engine, and mostly operated in shallow water. The small-scale sector conducts fishing at approximately 5 km from the shoreline in one-night operation. The fish are landed at the village and sold directly to the consumers by the owner's wife. Fishing activities are for sufficiency.

4.2 Importance of Small Scale Fisheries to the economy, livelihood and food security

As a result from geographical advantage, Thailand is one of the top fish producing nations in the world. During the year 2000-2004, annual fish production was 3.7-4.1 million tons which derived from both capture and aquaculture fisheries including large scale or commercial fisheries and small-scale fisheries. The fish production are both consumed domestically and exported. Fish is the primary source of animal protein for most of Thai population particularly low-income residents in remote rural villages and this is reflected in the per capita fish consumption of 25-32 kg during the past decades. The export value of fish and fishery products has increased significantly. In 2006, a trade surplus of 154 billion Baht was observed.

To promote and assist small-scale fisheries, DOF- Thailand has supported the socio-economic assistance for fisheries sector by promoting Community-based Fisheries Management (or Co-management) program to the fishermen groups as follow:

a. Promote small business for local fishery products, ready to eat product and promote One Tombon One Product (OTOP)

b. Program for alternative job training in practice and on the success site visit

c. Promote fishermen group revolving fund to face out loan and secure for their livelihoods

d. Promote the fishermen group co-op shop for cheaper essential daily needs

e. Promote fishermen’s wives as house wife groups to do small business on fishery or agriculture products

Table 5. Marine capture fishery production in Thai waters from 2001 to 2004 (Source: Fishery Information Technology Center, 2003; 2004; 2005; 2006)

Unit: Ton

Species		**2001**			**2002**			**2003**			**2004**	
	SSF	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	***Total***
Total marine resources	**252,805**	**2,383,072**	**2,635,877**	**197,029**	**2,452,113**	**2,649,142**	**189,387**	**2,464,431**	**2,696,461**	**268,494**	**2,366,698**	***2,635,192***
Sub-total Fish	***63,290***	***2,159,026***	***2,222,316***	***55,721***	***2,211,925***	***2,267,646***	***50,670***	***2,239,503***	***2,290,173***	***43,394***	***2,270,486***	***2,313,880***
Sub-total Pelagic fish	***37,964***	***768,485***	***806,449***	***32,552***	***800,414***	***832,966***	***29,164***	***822,875***	***852,039***	***29,178***	***848,356***	***877,534***
Short mackerel	19,300	122,015	141,315	16,125	130,297	146,422	14,123	142,100	156,223	14,750	145,648	*160,398*
Indian mackerel	479	31,470	31,949	637	32,124	32,761	418	33,772	34,190	1,280	33,609	*34,889*
Spanish mackerel	799	12,746	13,545	1,206	15,487	16,693	1,394	17,667	19,061	1,671	24,567	*26,238*
Wolf herring	225	12,366	12,591	363	14,240	14,603	97	13,532	13,629	97	12,093	*12,190*
Longtail tuna	35	57,494	57,529		62,588	62,588	-	72,063	72,063	6	81,525	*81,531*
Eastern little tuna	187	45,463	45,650	349	51,140	51,489	368	44,497	44,865	185	54,702	*54,887*
Round scad		92,408	92,408		103,984	103,984	-	98,745	98,745	0	100,355	*100,355*
Hardtail scad	689	18,055	18,744	487	18,581	19,068	701	18,780	19,481	576	16,501	*17,077*
Trevallies	672	50,280	50,952	513	47,304	47,817	260	48,279	48,539	271	50,596	*50,867*
Big eye scad		32,595	32,595		34,699	34,699	-	44,588	44,588		40,741	*40,741*
Black banded trevallies	3	4,529	4,532	5	9,379	9,384	2	8,919	8,921	8	5,314	*5,322*
Threadfin	329	4	333	669	6	675	423	355	778	542	68	*610*
Sardinellas	2,217	142,815	145,032	2,231	126,646	128,877	1,900	123,019	124,919	2,102	117,799	*119,901*
Anchovy	3,701	141,800	145,501	2,870	148,861	151,731	2,916	150,744	153,660	3,261	159,976	*163,237*
Mullet	9,137	2	9,139	6,999	0	6,999	6,449	0	6,449	4,148	0	*4,148*
Black pomfret	127	4,073	4,200	87	4,371	4,458	88	4,499	4,587	84	4,054	*4,138*
Silver pomfret	64	370	434	11	707	718	25	1,316	1,341	197	808	*1,005*
Sub-total Demersal fish	***10,247***	***420,260***	***430,507***	***13,563***	***483,193***	***496,756***	***12,565***	***461,162***	***473,727***	***7,177***	***475,772***	***482,949***
Barracuda	480	15,347	15,827	208	18,010	18,218	168	16,430	16,598	298	14,013	*14,311*
Crocker	*438*	*44,494*	*44,932*	*289*	*51,375*	*51,664*	*777*	*47,485*	*48,262*	*587*	*50,264*	*50,851*

Table 5. (cont.)

Species		**2001**			**2002**			**2003**			**2004**	
	SSF	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	***Total***
Treadfin bream	327	106,331	106,658	221	121,155	121,376	990	111,511	112,501	242	105,653	*105,895*
Monocle bream	46	0	46	62	-	62	45	-	45	16	0	*16*
Lizard fish		71,918	71,918	-	79,055	79,055	-	72,810	72,810		57,017	*57,017*
Hair tail	87	16,197	16,284	-	19,873	19,873	-	17,597	17,597		17,396	*17,396*
Red Snapper	244	8,192	8,436	1,217	10,435	11,652	239	13,256	13,495	370	17,760	*18,130*
Giant seapearch	497	0	497	556	-	556	190	-	190	186	0	*186*
Big eyes	7	93,690	93,697	1	103,583	103,584	1	103,962	103,963	16	136,556	*136,572*
Sand whiting	5,466	4,037	9,503	6,523	6,166	12,689	6,770	7,891	14,661	2,450	12,256	*14,706*
Barbel eel	966	180	1,146	988	83	1,071	180	126	306	228	29	*257*
Marine catfish	561	11,116	11,677	475	14,192	14,667	571	14,400	14,971	788	15,241	*16,029*
Rays	197	12,935	13,132	175	16,115	16,290	1,165	16,966	18,131	251	17,240	*17,491*
Shark	35	11,111	11,146	21	13,897	13,918	26	14,383	14,409	8	10,147	*10,155*
Flatfish	109	14,633	14,742	122	18,514	18,636	242	12,530	12,772	269	10,296	*10,565*
Indian halibut		1,149	1,149	-	1,356	1,356	0	2,658	2,658		3,062	*3,062*
Conger eel		2,089	2,089	-	2,144	2,144	0	2,232	2,232		2,801	*2,801*
Grouper	787	6,841	7,628	2,705	7,240	9,945	1,201	6,925	8,126	1,468	6,041	*7,509*
Other food fish	***11,758***	***235,064***	***246,822***	***6,550***	***234,733***	***241,283***	***5,993***	***261,269***	***267,262***	***4,702***	***176,972***	***181,674***
Trashfish	***3,321***	***735,217***	***738,538***	***3,056***	***693,585***	***696,641***	***2,948***	***694,197***	***697,145***	***2,337***	***769,386***	***771,723***
Sub-total Shrimp/ prawn	***28,095***	***60,762***	***88,857***	***27,158***	***58,910***	***86,068***	***26,226***	***58,471***	***84,697***	***20,923***	***56,381***	***77,304***
Banana shrimp	13,348	3,584	16,932	14,848	3,393	18,241	15,077	4,173	19,250	9,654	5,766	*15,420*
Jumbo tiger prawn	731	993	1,724	1,269	596	1,865	1,360	1,517	2,877	251	1,985	*2,236*
Tiger prawn	4	2,011	2,015	4	1,609	1,613	350	2,039	2,389	12	2,544	*2,556*
King prawn	1,750	954	2,704	1,916	1,394	3,310	916	2,674	3,590	606	2,828	*3,434*
School prawn	2,719	7,796	10,515	2,979	7,111	10,090	1,704	8,251	9,955	2,256	9,295	*11,551*
Other shrimp	6,721	40,507	47,228	2,675	39,059	41,734	3,026	33,057	36,083	3,856	27,102	*30,958*
Sergestid shrimp	2,805	1,202	4,007	3,437	1,176	4,613	3,651	1,282	4,933	4,176	1,558	*5,734*
Flathead lobster	17	1,838	1,855	21	2,296	2,317	61	3,042	3,103	104	2,663	*2,767*
Mantis shrimp	0	1,877	1,877	9	2,276	2,285	81	2,436	2,517	8	2,640	*2,648*
Sub-total crab	***34,186***	***16,087***	***50,273***	***28,067***	***14,054***	***42,121***	***28,822***	***14,808***	***43,630***	***28,971***	***12,981***	***41,952***
Blue swimming crab	28,296	8,509	36,805	23,575	5,299	28,874	26,248	6,126	32,374	24,320	4,934	*29,254*
Mud crab	5,416	1	5,417	3,822	1	3,823	1,252	7	1,259	2,845	14	*2,859*
Other crab	474	7,577	8,051	670	8,754	9,424	1,322	8,675	9,997	1,806	8,033	*9,839*
Sub-total Squid/ Cuttlefish	***22,364***	***146,868***	***169,232***	***22,692***	***167,078***	***189,770***	***19,487***	***151,469***	***215,257***	***137,069***	***26,554***	***163,623***
Squid	*16,793*	*60,667*	*77,460*	*15,529*	*73,976*	*89,505*	*14,753*	*65,709*	*80,462*	*13,998*	*59,596*	*73,594*

Table 5. (cont.)

Species		**2001**			**2002**			**2003**			**2004**	
	SSF	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	**Total**
Cuttlefish	1,599	63,990	65,589	2,221	70,991	73,212	1,999	66,208	68,207	3,050	65,605	68,655
Octopus	21	22,211	22,232	2	22,111	22,113	146	19,552	19,698	373	20,883	21,256
Bigfin reef squid	3,951	0	3,951	4,940	-	4,940	2,589	0	2,589	2,853	0	2,853
Sub-total shellfish	***55,587***	***329***	***55,916***	***34,105***	***146***	***34,251***	***54,902***	***180***	***53,424***	***36,335***	***296***	***36,631***
Bloody cockle	1,282	0	1,282	1,206	-	1,206	2,462	0	2,462	2,567	0	2,567
Horse mussel	387	0	387	267	-	267	24	0	24	44	0	44
Short necked clam	52,524	0	52,524	31,737	-	31,737	50,552	0	50,552	28,876	0	28,876
Scallop		234	234	-	124	124	0	180	180		156	156
Worm shell	54	0	54	21	-	21	206	0	206	95	0	95
Other shellfish	1,340	95	1,435	874	22	896	1,658			4,753	140	4,893
Sub-total other species	***49,283***	***0***	***49,283***	***29,286***	***-***	***29,286***	***9,280***	***0***	***9,280***	***1,802***	***0***	***1,802***
Jellyfish	47,534	0	47,534	28,947	-	28,947	8,791	0	8,791	1,528	0	1,528
Other species	1,749	0	1,749	339	-	339	489	0	489	274	0	274

4.3 Current Issues of Concern, Problems and Constraint

Small-scale fisheries in Thailand have faced several problems and constraints concerning coastal resources as follow:

1. Introduction of otter board trawling resulting in overexploitation of coastal fisheries resources.

2. Trawlers have the encroach protected areas within 3 km shoreline and illegally enter bays for fishing resulting in the destruction of coastal resources and habitats

3. The conflict among the beneficial groups that exploit the resources.

4. The competition for fisheries resources among the different groups of fishermen further increases the degradation of coastal fisheries resources.

5. The high cost of factor for production particularly the fuel cost

6. The lower prices of some aquatic species.

7. Small-scale fishermen face increased competition from commercial fisheries, which moves closer to the shoreline and enters bays and estuaries.

8. Fishing grounds are under serious stress from pollution due to human and industrial settlements and degradation from the restructuring of waterways, estuaries and bays.

9. Limitation in MCS, manpower, equipment and budget for the 2,614 km coastline resulting in inefficient fisheries management both by the central and local government.

4.4 Implementation of Co-management and Right-based Fisheries

During the past two decades, DOF of Thailand realized that the living standards of the fishermen especially small-scale fishermen are quite low and the coastal resources are in declining trend due to overexploitation. Therefore, DOF of Thailand initiated and implemented the projects and the collaborative projects with other organizations in coastal fisheries or coastal resource management (CRM) to improve living standards of the fishermen and for sustainable use of coastal resources. The projects implemented or are under implemented as follow:

1. The Small-Scale Fisheries Development Project (SSFDP): implemented under the 6^{th} and 7^{th} National Social and Economic Development Plans (1978-1991 and 1992-1996). The project area was in communities along the coastlines of both the Gulf of Thailand and Andaman Sea. The aim of the project was to improve fishermen's living standard. The outcomes of the project was that not only fishermen had additional income but also the fish shelter and spawning and nursing grounds were provided for fish stock which benefit to the fishermen.

2. The Bay of Bengal Program in Phang-nga Bay (BOBP): a collaborative project between DOF and the BOBP under FAO initiated according to the experience gained from

SSFDP which its strategy was top-down approach and the fishermen rarely understood. The bottom-up approach was therefore applied for this project implemented during 1996-2000. The project aimed at building sufficient resource management skills within the bay communities to eventually transfer a majority of fisheries management responsibilities to the villages. The ban of trawlers and push nets, the destructive fishing gears and often caused conflict with other types of small-scale fishing gears operation, is one of the examples of the project's activities. The project successfully enhanced the fishermen awareness of the need for the sustainable use of coastal resources and lead to the right and appropriate direction for fisheries management (Pimoljinda, 2002).

3. The Fishing Right Pilot Project in Bang Sa Pan Bay, Prachuap Khiri Khan province (FRPP): developed from SSFDP which implemented in 1997. This project aimed to establish a fisherman group in each village. The demarcated coastal area of 150,000 *rai* or 240 km^2 was set up in Bang Sa Pan Bay in the Gulf of Thailand and given to the communities. Nine fishermen groups in the project site have functioned as a management body for the demarcated area. The achievement of the project was that people much more understood the reason why they must protect their coastal resources.

4. The Locally Based Coastal Resource Management Project (LBCRM-PD) in Pathew District, Chumphon province: a collaborative pilot project on CRM between the DOF and the Training Department of the Southeast Asian Fisheries Development Center (SEAFDEC/TD). It was started in 2001 aiming to establish a practical framework for sustainable coastal resource management at local level through the encouragement of fishermen's participation. It encouraged the people to join in a decision making process on coastal fisheries management at community level by providing the opportunity for training and education programs. The outcome of the project was that the people learnt how to get the consensus, local organization increase its role in supporting the people's consensus. However, the people still need in guidance from officers or researchers to solve their problems.

5. Coastal Habitat and Resources Management Project (CHARM): a 5-year project (2003-2007) of the Royal Thai Government co-funded with European Union under execution by the Department of Fisheries of Ministry of Agriculture and Co-operatives, Thailand. CHARM project aims at promoting a co-management approach at the national, provincial and local levels between government, private sectors and local communities. Institutional arrangements and technical operations for co-management are tested and progressively developed into two project areas, Phang-nga Bay in the Andaman Sea (Phuket, Phang-nga, Krabi, and Trang provinces) and Ban Don Bay (Surat Thani province) in the Gulf of Thailand.

Besides DOF, there are private sectors working for public in the area of natural resources and environment protection and conservation (Tokrisna, *et.al.,* 1997) which can be categorized as follows:

1. Non-government organizations (NGOs) registered with the Ministry of Science Technology and Environment (MOSTE) which comprised more than 60 NGOs according to record from the Office of Environmental Policy and Planning (1996)
2. Non-government organizations (NGOs) did not register with the Ministry of Science Technology and Environment (MOSTE)
3. Business Firms
4. People organization (PO)

Fisheries and coastal community-based management particularly in southern Thailand are mainly carried out with the supports of NGOs. The forms of coastal management program implemented by NGOs and POs are in various form, however, they have common goals i.e.

1. To create awareness of local community for the sustainable management of coastal resources;
2. To build up and strengthen the local capacity in the conservation and rehabilitation of coastal resources;
3. To encourage the coordination among local communities, local government agencies, and NGOs

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VIETNAM

1. INTRODUCTION

- The coastal plains and marine waters of Viet Nam are considered the highly productive areas Covering an area of over 1.5 million-hectare of land, and bordered by a 3,260-km coastline, with an Economic Exclusive Zone of about 1 million km2,

- The total standing stock of marine fish is estimated at 4.2 million Mt, the annually allowable catch is estimated around 1.7 million Mt (but the economical catch is estimated about 1.4 Mt). The exploitable fish stocks about 40% are demersal and the balance 60% is pelagic.

- Scatter in small schools.

- The coast is intersected by plenty of river mouths, brackish water lagoons and bays constituting multiform of variously ecological waters and tidal flats capture fisheries, around 95% of the catches originates from the marine areas increased by 8-9% annually.

- Government: Fisheries sector, sub-divided into aquaculture and capture fisheries, has traditionally played an important role in coastal communities. (Potentially providing source of food, employment and domestic as well as foreign income- contributes app. 6% to Vietnam's Gross Domestic Product and US 1.760 billion from export. Government policy statement predicted that aquaculture products will become the main contributor to both domestic consumption as well as export earning. It emphasized that any further expansion of the marine capture fisheries should be targeted at an ecologically recoverable level of aquatic resources.

- Socially: support given to small-scale fishermen for shifting into newly created employment would help to reduce the pressure on coastal fish stocks.

2. MARINE FISHING

Marine fishing is an economic activity that results in taking fish out of its marine or brackish environment.

The marine fishing in Vietnam is carried out mainly in the major fishing area No. 71 West Central Pacific Ocean according to FAO's World Fishing Areas map.

In general, the marine fisheries of Vietnam are small in scale, operating mainly in coastal areas. Due to the over-accumulation of fishing efforts, the coastal resources began to show signs of overexploitation, some marine species of high value have been overfished. For this reason, the Fisheries sector of Viet Nam laid down as a policy the coastal fisheries restructure, i.e. by developing offshore fishing and shifting some groups of fishers to other fields of business activities such as aquaculture, trading, logistics, tourism services, entertaining services, etc. in order to reduce the fishing pressure on these areas.

a. Fishing Fleets

- “People’s fisheries” in the sense that it is private, small-scale and owned by hundreds thousands of individual households owning small and often artisanal boats.

- After 10 years of renovation, the capacity of fishing vessels has developed rapidly. In 1986, there were 31,680 fishing vessels with a total capacity of 537,500 hp, 29,000 artisan fishing facilities including rafts and wooden boats of 1-3 Mt/each. The fishing fleet of Viet Nam is, so far, made up of an estimated 103,037 fishing crafts as follows: Artisan fishing crafts, not powered: 31,000 units; Motorized local vessels: 73,037 units, powered by a total of 3,202,453 Hp in these Deep sea fishing vessels, about 6000 units, powered by a total of about 1,000,000 hp.

- Too many fishing vessels

- The increased production is a reflection of an increase in the number of fishing boats and total engine capacity, rather than an increase in fish stock. → decrease in Catch Per Unit Effort and effectiveness, over-exploited.

- Small-scale fishermen would be forced out of their playing fields, simply because, they will not be able to cover all expenses related to the investment for sailing highly equipped fishing boats off-shore

- protecting the aquatic environment and preserving the fisheries resources are very important factors.

b. Fishing Gears

- The artisanal fishing fleets exploit the coastal, near-shore resources that are within easy reach of small vessels. Passive fishing gears, nets, lines, traps and hooks are used. The productivity of these vessels and the income of fishermen working these vessels are low.

- The mechanized inshore fishing fleets have developed to take advantage of more modern fishing gears, trawling, gill netting, and long lining. These vessels are made of wood and they are generally between 10-20 m in length, powered by 20-45 hp inboard engines.

+ Trawl: 26%
+ Seine net: 4.3%
+ Gill net: 34.4%
+ Lift net :5.6
+ Hangkle and long-line :13.4
+ Fixed net :7.1%
+ Others :9%

c. Fishing Communities

- Approximately 48 million people live in Vietnam's coastal cities and provinces, of which around 20 million live in the 116 districts along the coastline and on the islands of the coastal provinces. In 2000, around 5 million of these people, men, women and children, lived in households engaged in fisheries and aquaculture.

- Poverty is common in coastal areas. Coastal poverty is concentrated particularly in the North-Central Region and lagoon fisheries areas

- Inshore capture fisheries, the traditional source of food and income for fishing households, are declining because of over-fishing, habitat changes and poor management, and unemployment in coastal communities is on the rise.

- Before 1990, mostly fishers were engaged in cooperatives household - based.

- Process of rehabilitation collective sector is going: 514 cooperatives and 4,300 collectives has been established

- Access to market:

+Directly to country side market

+Through local small scale traders

+Middle men

3. INLAND FISHING

Inland fishing is an economic activity that results in taking fish from fresh water environment. The total inland capture production ranges from 200,000 - 250,000 tons annually. This is an important source of subsistent food for people and also a supply of many valuable products.

a. Lake fishing

Viet Nam has over 200,000 ha of lakes, of which natural lakes account for about 10% and the remainder is occupied by reservoirs. The total catch from lakes is estimated to be roughly 9,000 tons a year, including 4,000 tons from natural lakes and 5,000MT from reservoirs.

b. Fishing in flooded areas

The large flooded areas do not appear in the North and the Centre but abound in the Mekong Delta for the period of 2-4 months annually, some as vast as 140,000 ha (in Dong Thap Muoi) and 218,000 ha (in Long Xuyen Quadrangle Areas). These are ideal places for fishing in the rainy season since there are various fish species migrating into from the Mekong River system. The two flooded areas alone produce over 20,000 tons per annum.

c. River fishing

The fish resources in the rivers of the North and the Centre have been overfished due to lack of protection measures. The interlacing channel system in the South produces a significant quantity of freshwater fish. The capture fisheries in Mekong River are still running on and bring about approximately 30,000 tons of commercial catch a year.

3. NUMBER OF CAPTURE FISHERIES LABORERS

Unit: person

Area/ province	Total	Of which: off-shore fishing laborers
WHOLE COUNTRY	1 022 253	159 366
Red River Delta	*69 895*	*5 673*
Ha Noi	8 596	-
Hai Phong	13 954	4 478
Vinh Phuc	1 568	-
Ha Tay	1 690	-
Bac Ninh	8 408	-
Hai Duong	2 134	-
Hung Yen	1 549	-
Ha Nam	3 230	-
Nam Dinh	15 649	650
Thai Binh	11 475	503
Ninh Binh	1 642	42
North East	*90 299*	*1 285*
Ha Giang	189	-
Cao Bang	860	-
Lao Cai	5 275	-
Bac Can	980	-
Lang Son	2 520	-
Tuyen Quang	173	-
Yen Bai	1 080	-
Thai Nguyen	680	-
Phu Tho	1 222	-
Bac Giang	56 118	-
Quang Ninh	21 202	1 285
North West	*30 107*	-
Lai Chau	2 500	-
Son la	25 413	-
Hoa Binh	2 194	-
North Central Coast	*128 641*	*11 945*
Thanh Hoa	25 822	2 850
Nghe An	32 457	1 820
Ha Tinh	12 552	585
Quang Binh	19 178	5 144
Quang Tri	9 783	456
Thua Thien Hue	28 849	1 090
South Central Coast	*171 050*	*59 982*
Da Nang	13 033	1 170
Quang Nam	25 215	5 696
Quang Ngai	23 860	18 543
Binh Dinh	46 946	26 407
Phu Yen	25 114	3 750
Khanh Hoa	36 882	4 416
Central highlands	*9 103*	-
Kom Tum	1 639	-
Gia Lai	4 250	-
Dac Lac	1 134	-

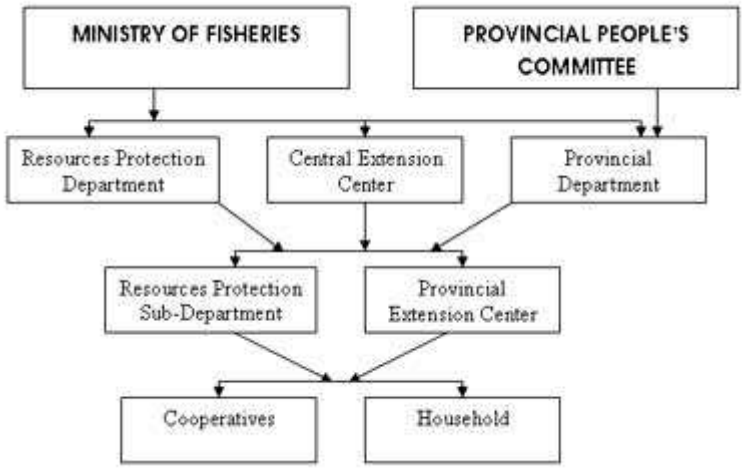
Lam Dong	2 080	-
South East	*115 898*	*30 514*
Ho Chi Minh city	4 326	1 060
Ninh Thuan	12 385	3 538
Binh Phuoc	648	-
Tay Ninh	5 391	-
Binh Duong	389	-
Dong Nai	4 737	-
Binh Thuan	57 072	8 707
Ba Ria Vung Tau	30 950	17 209
Mekong River Delta	*407 260*	*49 967*
Long An	58 264	-
Dong Thap	29 091	-
An Giang	63 416	-
Tien Giang	30 256	7 493
Vinh Long	7 821	-
Ben Tre	23 923	6 645
Kien Giang	51 730	17 647
Can Tho	44 156	-
Tra Vinh	23 000	2 512
Soc Trang	33 348	1 730
Bac Lieu	13 264	3 264
Ca Mau	28 991	10 676

4. SUMMARY OF FISHING BOATS IN VIETNAM FISHERIES SECTOR (UNTIL 31/12/2006)

N0	Province	CV						
		Small scale				Large scale		
		No machine	<20	20-<50	50-<90	90-<150	150-<400	>400
0	Quang Ninh	1660	4130	886	199	138	28	8
1	Hai Phong	845	285	640	246	206	52	4
2	Thai Binh	0	826	27	159	24	51	1
3	Nam Dinh	25	1325	480	87	13	29	6
4	Ninh Binh	0	59	12	0	0	2	0
5	Thanh Hoa	0	3107	706	530	252	227	2
6	Nghe An	48	1099	1649	535	270	123	6
7	Ha Tinh	160	2093	141	17	0	39	0
8	Quang Binh	0	1614	781	679	117	29	0
9	Quang Tri	0	1380	405	22	27	5	0
10	Thua Thien Hue	0	3918	236	140	80	2	0
11	Da Nang	0	327	917	151	63	87	6
12	Quang Nam	0	1893	1124	137	38	52	1
13	Quang Ngai	0	355	2020	754	308	329	12
14	Binh Dinh	0	1680	3548	1743	146	81	1
15	Phu Yen	0	1857	1182	477	323	281	0

16	Khanh Hoa							
17	Ninh Thuan	132	818	479	215	260	110	5
18	Binh Thuan	0	3103	2675	1201	426	652	25
19	Ba Ria Vung Tau	0	1142	1024	522	598	1353	363
20	Ho Chi Minh city	209	628	585	35	11	73	22
21	Tien Giang	1	126	419	197	134	499	27
23	Ben Tre	11	326	1405	431	223	564	146
24	Tra Vinh	6	287	657	142	39	54	1
25	Soc Trang							
26	Kien Giang	0	2856	1674	605	142	1722	1133
27	Bac Lieu	0	170	233	44	21	294	0
28	Ca Mau	0	954	1148	303	178	1045	27
	Total	3097	36358	25053	9571	4037	7783	1796

5. CURRENT MANAGEMENT SYSTEM



6. FISHING PROBLEMS

- *Environmentally Related Problems*

  - Over-exploitation of the near-shore resources.

  - Decline in catches per unit effort, and the catch composition tended to shift to smaller fish.

  - Illegal fishing devices are widely applied

  - Fishing in spawning grounds and nursery areas, often for aquaculture purposes, also reduces the replacements for the capture fisheries.

  - Use of small mesh size nets to catch small size fish before they get sexually mature. This practices lead to a decrease in stock population.

- *Socially Related Problems*
  - Lack of investment funds

- Lack of know-how.
- Development of fisheries to a smaller contingent of rich fishermen and change most fishermen into a labour resources.
- Lead to large unemployment in fishing communities and increase the income gap.
- Low level of education resulting many negative phenomenon such as high bird rate drinking-up, using drug as well as very difficult to be transferred to new job in the coastal rural areas
- Until now, the coastal fisheries are still considered as an exit to create more employment and income for coastal people where there is a rapid population growth rate.

7. NEEDS FOR ALTERNATIVE EMPLOYMENT

- To improve incomes and living conditions for low income groups in particular - and at the same time to ensure its environmental sustainability.

- Present employment in fisheries and aquaculture is mainly made up by inshore fisheries and to a lesser extent brackish water aquaculture, mainly shrimp farming and recently also inter-tidal mollusk farming.

- To decline the fishing pressure on living aquatic resources in the costal areas, poverty alleviation.

- To generate additional employment and high income for the rural coastal areas absorb potential labour redundancies in fisheries and also increasing populations of working age. This is a national issue across all the economic sectors.

- To relocate coastal fishermen.

- Increasing and improving the opportunities for gainful and productive employment of rural populations.

- To improve the nutritional status, improve earnings from fishery products for domestic consumption and exports and to contribute to poverty alleviation and employment in coastal areas.

SESSION II

Large Scale Fisheries

MALAYSIA

Arthur Besther Sujang, RFPN for Malaysia 2007

1. INTRODUCTION

The fisheries sector is an important sub-sector in Malaysia and plays a significant role in the national economy. Apart from contributing to the national Gross Domestic Product (GDP), it is also a source of employment, foreign exchange and a source of protein supply for the rural population in the country. Basically, the fisheries sector has three main subsectors, namely marine capture fisheries, aquaculture, and inland fisheries.

The territorial water of Malaysia is about 47,000 square nautical miles and the Exclusive Economic Zone covers an area of over 160,000 square nautical miles.

Figure 1: EEZ boundaries in Peninsular Malaysia

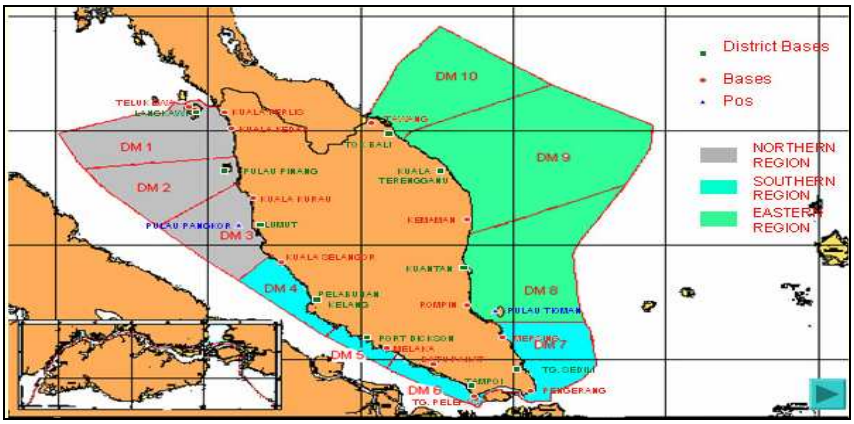
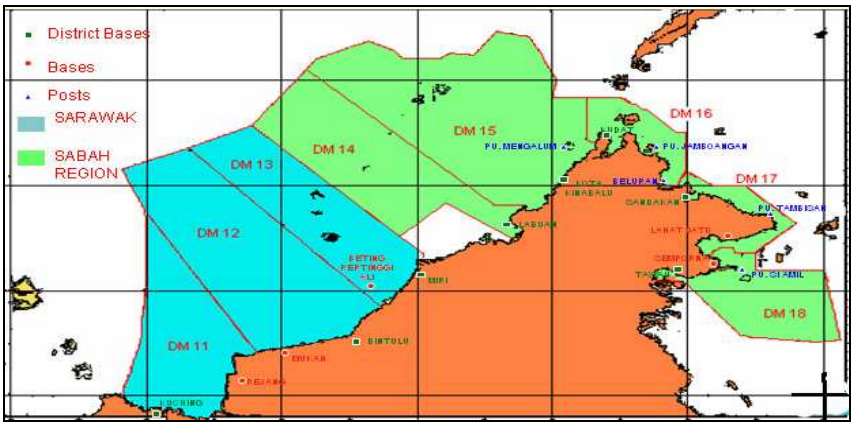


Figure 2: EEZ boundaries in Sabah and Sarawak

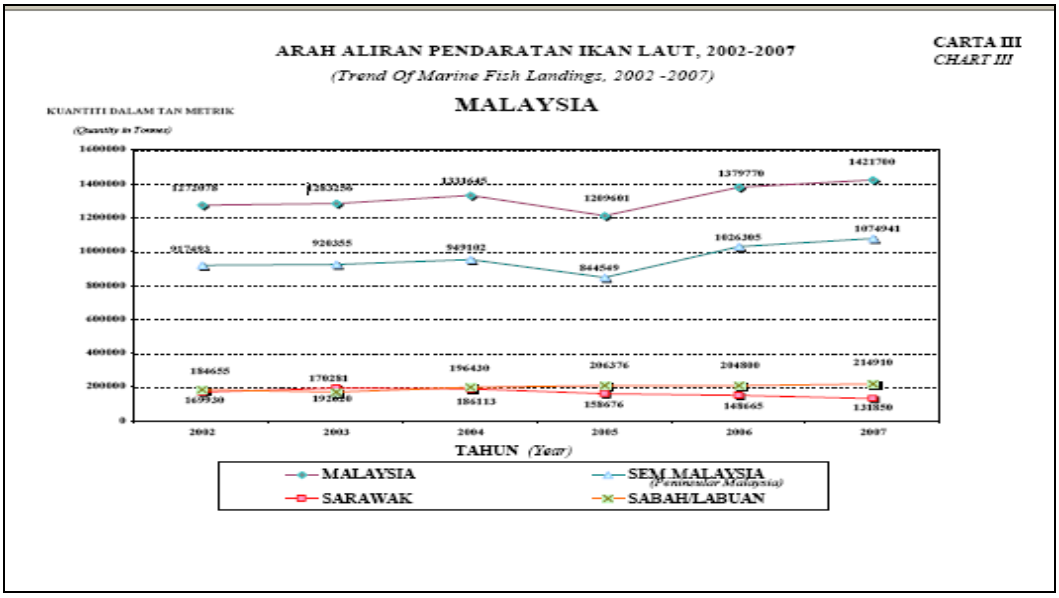


The fisheries sector in 2005, produced 1.421,403.83 tonnes of fish valued at RM 5,245.68 million. Statistically, the fisheries sector recorded an overall decrease in production by 7.58% and value by 4.23%, contributing about 1.08% to the GDP. By sector, production from marine capture fisheries contributed 1.209,601 tonnes or 87.1% of the nation's fish

production with a value of RM 4,017.52 million. In 2007, marine capture fisheries contributed about 1,421,760 tonnes.

Within the sector, the coastal fisheries remained the major contribution of 988,313 tonnes or 71.17% of the nation's fish production. The deep-sea fisheries sector managed 221,288 tonnes or 15.94% of the nation's fish production. *(Department of Fisheries, Annual Fisheries Statistic, 2005 Volume 1)*

Chart 1: Trend of Marine fish Landing, 2002 -2007



2. POLICY AND LEGAL FRAMEWORK

The Fisheries Ordinance 1909 was the only legislation regulating the fishing industry in the early 1900s. This Ordinance was subsequently amended in 1912, 1924 and 1926, and was finally repealed in 1951. The Fisheries Rules of 1951 came into force on 10 August 1951. During this time there were also seven Fisheries Ordinances or Enactments introduced by the various States. The fishing industry at that time was mostly traditional fisheries and regulation was minimal.

However, in the 1960s and 1970s, the introduction of trawling in coastal waters created much conflict between traditional fishermen and trawlers. This led to the formulation of the Fisheries Act 1963, which provided a more comprehensive legal framework to manage the fisheries in Malaysian waters. This Act was formulated to integrate and strengthen the legal framework relating to marine and inland fisheries; to protect the natural living resources; to protect the interest of the fishermen; to ensure equitable allocation of fisheries resources; and to strengthen administrative activities to reduce conflict among the fishing communities. This Act was subsequently replaced by the Fisheries Act 1985.

Fisheries Act 1985

The Fisheries Act 1985 is the current legislation, and implemented to manage, develop, conserve and control marine fishing and marine fisheries resources in Malaysian fisheries

waters. This Act is an expansion of and improvement on the previous act, incorporating the Exclusive Economic Zone (EEZ), consistent with relevant provisions in the 1982 United Nations Convention on the Law of the Sea (UNCLOS), to which Malaysia acceded on 14 October 1996. Several new provisions have been incorporated into the Fisheries Act 1985, and the law now requires the Director-General to formulate and continuously upgrade fishery programmes based on the latest scientific knowledge to ensure optimum utilization of fishery resources in line with good management practices. The Fisheries Act 1985 has provisions for the monitoring, control and surveillance (MCS) of fishing vessels in the EEZ. Foreign fishing vessel caught fishing illegally in the Malaysian EEZ are apprehended and severely dealt with under this Act. The objective of the Act is to provide better conservation, management and development of fisheries in Malaysia in the light of Malaysia's commitment towards the implementation of the provisions of UNCLOS. The provisions of the Fisheries Act 1985 follow the provisions provided for in UNCLOS. Briefly, the Act covers:

- Administration of fisheries in Malaysia;
- Licensing and management of local and estuarine fishing operations;
- Control of fishing by foreign fishing vessels in Malaysian fishing waters;
- Offences, prohibitions and control of certain methods of fishing;
- Establishment of marine parks and marine reserves;
- Offences and legal procedures relating to the implementation of the Act.

The Fisheries Act 1985 was revised in 1993 to make provisions for an equitable and efficient utilization of the resources, conservation and protection of the marine resources and environment according to present needs. This includes:

- To prevent over-exploitation of the fisheries resources in the inshore waters.
- To eliminate competition among artisanal and commercial fishers.
- To promote the development of offshore industrial fisheries.
- Restructuring of the ownership pattern of fishing units in accordance with the new economic policy.
- More equitable distribution of resources.

3. PROFILE OF LARGE SCALE FISHERIES

3.1 Fishing Ground

Four fishing zones have been established through a licensing scheme whereby zones are designated for specific fishing gear, classes of vessels and ownership. The four management zones attempted to provide equitable allocation of resources and reduce conflict between traditional and commercial fishermen.

Basically the four zones are (Refer Picture 3):

- **Zone A** less than 5 nautical miles from shore, reserved solely for small-scale fishers using traditional fishing gear and owner-operated vessels.
- **Zone B** beyond 5 nautical miles, where owner-operated commercial fishing vessels of less than 40 GRT using trawl nets and purse seine nets are allowed to operate.
- **Zone C** beyond 12 nautical miles, where commercial fishing vessels of more than 40 GRT using trawl nets and purse seine nets are allowed to operate.
- **Zone C2** beyond 30 nautical miles, where deep-sea fishing vessels of 70 GRT and above are allowed to operate.

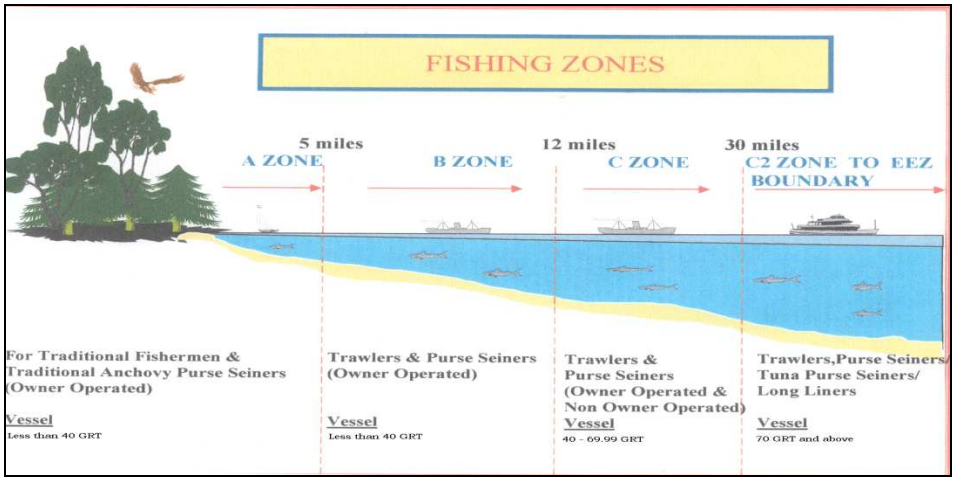


Figure 3: Fishing Zones

3.2 Number of Fishermen (Fisheries Statistics 2005)

A total of 90,702 fishermen (excluding aquaculturist) were recorded working on licensed fishing vessels in 2005 compared with 89,453 in 2004. Out of that 39,221 fishermen worked on trawlers and purse seines while the remainder 51,481 fishermen worked on traditional fishing vessels.

Table 1: Total number of fishermen

Group	Number Of Fishermen	Percentage
LSF	41,964	32.95%
SSF	48,738	38.28%
Aquaculturist	36,634	28.77%
Total	**127,336**	

3.3 Total Number of Fishing Vessels (Fisheries Statistics 2005)

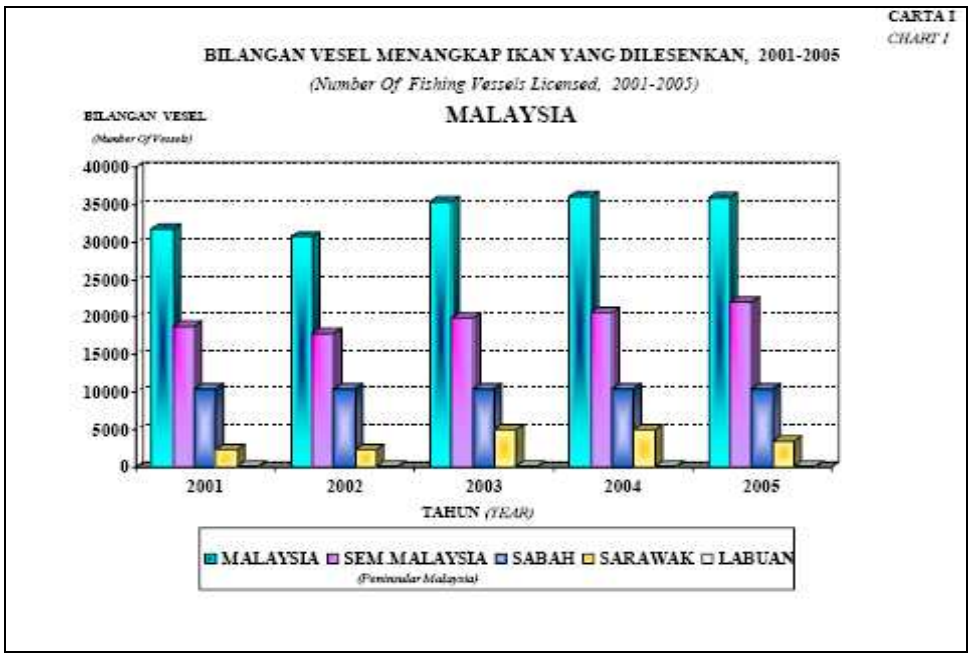
Fishing vessels registered in Malaysia decreased by 0.33% from 36,136 units in 2004 to 36,016 units in 2005. The number of licensed fishing vessel in Peninsular Malaysia stood at 22,041 units in 2005 which was 61.20% of the total nation's fishing fleet. The number of

deep-sea fishing fleet still remained comparatively small compared with the fishing fleet operating in the inshore waters. In the year 2005, there were 35,180 licensed fishing vessels to exploit the coastal areas compared with only 836 units deep-sea fishing units which increased by 3 units from 833 units in 2004.

Table 2: Number of fishing vessels

Group	No. of Fishing Vessels	Fishing Gears	Percentage
LSF	7,394	Trawl Nets Fish Purse Seine Anchovy Purse Seines	20.53%
SSF	28,622	Other Seines Gill/Drift Nets Lift Nets Stationary Traps Portable Traps Hooks & Lines Bag Nets Push/Scoop Nets Barrier Nets Shellfish Collection Others	79.47%
Total	**36,016**		

Chart 2: Number of Fishing Vessels Licensed, 2001- 2005



SSF Fishing Vessel

Figure 4: Small-Scale Fisheries Fishing Boats

Drift Net

LSF Fishing Vessels

Figure 5: Large-Scale Fisheries Fishing Boats

Fish Purse seine

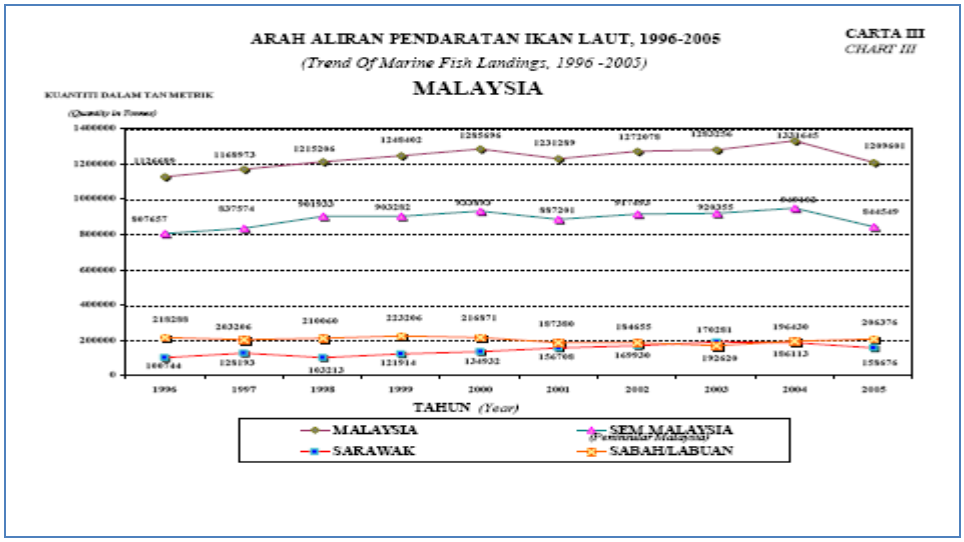
Trawl Nets

Anchovy Purse Seines

3.4 Production Large Scale Fisheries

In the year 2005, total marine landings dropped quite substantially in comparison with previous years which generally registered an increase by 1% to 4%. The marine landings recorded a production of 1,209,601 tonnes as compared to 1,331,645 tonnes in 2004 decreasing by 9.16%. Landing from deep-sea fisheries sector increased by 13.08% from 195,686 tonnes in 2004 to 221,228 tonnes in 2005.

Chart 3: Trend of Marine Fish Landing, 1996 - 2005



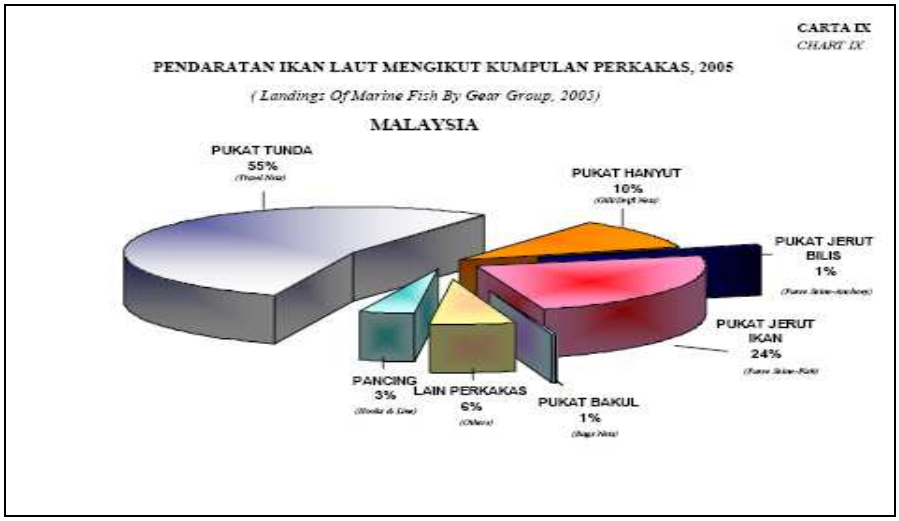
3.5 Major Fish Species Caught

Chart 4: Landing of Marine Fish by Main Species, 2005

Table 3: Production of Fish Species and type of fishing gears

Year	Fishing Gears	Production (Tonnes) LSF	Major Fish Species Caught	Total Productions	Percent
2005	Trawl Nets Fish Purse Seine Anchovy Purse Seine **Total**	656,774 288,957 13,258 **958,989**	Trash Fish Round scad Anchovy	1,209,601	79.28%
2004	Trawl Nets Fish Purse Seine Anchovy Purse Seine **Total**	745,552 264,262 19,070 **1,028,884**	Trash Fish Round Scad Anchovy	1,331,645	77.26%
2003	Trawl Nets Fish Purse Seine Anchovy Purse Seine **Total**	727,513 264,170 13,639 **1,005,322**	Trash Fish Round scad Anchovy	1,283,256	78.34%
2002	Trawl Nets Fish Purse Seine Anchovy Purse Seine **Total**	703,676 290,555 19,944 **1,014,175**	Trash Fish Round Scad Anchovy	1,272,078	79.72%
2001	Trawl Nets Fish Purse Seine Anchovy Purse Seine **Total**	675,957 255,149 13,209 **944,315**	Trash Fish Round Scad Anchovy	1,231,275	76.69%

Chart 5: Landing of Marine Fish by Gear Group, 2005



3.6 Major Fishing Harbour/ports

The main landing places in Malaysia are located along the coast of Peninsular Malaysia, Sabah, Sarawak and the Federal Territory of Labuan. These landing ports are managed by the The Fisheries Development Authority of Malaysia (FDAM).

Figure 6: Major Fishing Harbours/ Ports

1. FDAM Port, Batu Maung, Penang
2. FDAM Fishery Port, Chendering, Terengganu
3. FDAM Complex Kuala Pahang, Pahang
4. FDAM Complex, Kuala Perlis, Perlis
5. FDAM Complex, Endau, Johor

4. CHARACTERISTERIZATION OF LARGE SCALE FISHERIES

4.1 Large scale fisheries definition

The marine capture fisheries can be categorized into two main types, namely coastal or inshore fisheries, and deep-sea fisheries.

The coastal or inshore fishery, where the fishing vessels operate within 30 nautical miles from the coastline, is an important subsector in socio-economic terms. The fishing vessels range from the traditional type to commercial vessels of less than 70 GRT. In 2005, the inshore and coastal fisheries contributed more than 988,313 tonnes of total marine fish landings at 1,209,601 tonnes of the country.

The deep-sea fishing vessels operate beyond 30 nautical miles from the shoreline. In 2005, the deep-sea fisheries contributed 221,288 tonnes of total marine fish landings. The fishing vessels are fairly large, 70 GRT and above. Basically, commercial gear such as trawls, purse seines and hook-and-line are used.

The marine capture fisheries are characterized by various types of fishing gear used by the fishermen to harvest the large diversity of marine species found in Malaysian waters. The fishing gear is classified into commercial fishing gear -trawl, fish purse seine, driftnet, gill net - and traditional fishing gear, including hook-and-line, bag net, trammel net, lift net and traps. However, the fishing gears that contribute the bulk of the landings are trawls, purse seines, driftnets and gill nets.

Fishing effort

Fishing effort in the Malaysian industry is controlled by the licensing of both fishing vessels and fishing gear. This programme controls entry of new individuals into the fishing industry. Every fisherman is required to have a fisherman registration card.

Commercial fishing vessels, like trawlers and fish purse seiners, are prohibited from fishing in waters less than 5 nautical miles from the shore. The waters within 5 nautical miles of the shore are the nursery grounds of juveniles of prawns and fish. This will reduce fishing pressure from trawlers and fish purse seiners.

Under the Fisheries Act 1985 and the related regulations, fishing gear that is destructive to the environment and the fisheries resources are banned. Banned gear includes fishing pair trawling, electric fishing, fishing using poisons and explosives, push nets and gill nets of more than 10 inches mesh size. Other conditions set by the Department of Fisheries to control efforts by the fishermen are with regards to ownership and employments of foreigners are:

- Fishing vessel which is less than 40 GRT must be owner operator and all crew must be local;
- Zone C fishing vessel is allowed to employ 80% foreign crew;
- Zone C2 and C3 fishing vessel is allowed to employ 100% foreign crew.

Currently, most of the foreign crew is from Thailand, Indonesia and Myanmar, and the number of foreign crew registered in 2005 is 25,888.

Table 4: Fishing Effort

Fishing Vessels	No.of days going to sea per month	No.of days at sea	No.of haul per days	Duration per haul (hour)	No. of trip to sea per month
Trawler less than 70 GRT	25	2 – 3	3	3	8 – 12
Trawler more than 70 GRT	20	3 – 7	3	3	4 – 6
Fish Purse Seine less than 70 GRT	25	2 – 3	Depend on sighting of fishes	2 - 3	8 – 12
Fish Purse Seine more than 70 GRT	20	3 – 7	Depend on sighting of fishes	2 - 3	4 – 6
Anchovy Purse Seine	25	1	Depend on sighting of fishes	1 - 2	25

4.2 Importance to the Economy, Livelihood and Food Security

The fisheries sector is a source of employment, foreign exchange and a source of protein supply for the rural population in the country. Fish constitutes 60-70% of the national animal protein intake, with per caput consumption of 47.8 kg per year. The rate of demand for fish as the main source of protein is expected to increase from the current annual consumption of 630,000 tonnes to over 1,579,800 tonnes by 2010 (using an estimated population of 26,330,000 with a per caput consumption of 60 kg/year).

The demand for fish and fish products is expected to increase due to population growth, rise in per capita income and growing awareness of the health benefits of fish products. It is estimated that the total demand for fish and fish products in Malaysia by 2010 will be 1.59 million tonnes/year. At international level, demand for high value fresh fish and reformulated fish products and fish protein concentrates is also expected to increase.

One of the goals of fisheries management is to achieve sustainable coastal fisheries. In order to achieve this goal, various management strategies have been formulated and implemented to control fishing effort and promote rehabilitation and conservation of marine resources and marine ecosystems. These measures include:

- Direct limitation of fishing effort through the licensing of fishing gear and fishing vessels. A review of the effectiveness of the fisheries licensing procedures is an ongoing process;

- Identification of nursery areas that should be protected and managed as a nursing area to ensure survival of juveniles of commercially important fish species. These areas could be gazetted as closed fishing areas or areas that are zoned for specific fishing gear, based on the tonnage of the fishing vessels;

- Facilitation of cooperative research effort between government and academicians to provide data essential for the formulation of area management plans;

- Establishment of strict enforcement on regulations that address the problem of illegal fishing;

- To maximize income through efficient and optimum utilization of the natural resources and revitalization of the fisheries sector in contributing to the economic development of the country

- To use modern sustainable methods of fishing for optimal production

- To increase aquaculture production

- To increase production through offshore fishing (in areas above 30 nm from shore)

4.3 Current Issues of Concern, Problem and Constraint

Main constraints faced by Malaysian fishers in deep-waters are IUU fishing and encroachment by illegal foreign fishing vessels. To better coordinate among various maritime agencies in Monitoring, Control and Surveillance, in 2004 Malaysian Maritime enforcement Agency (MMEA) were formally established. MMEA were established with a number of enforcement agencies, namely the Marine Police, Royal Malaysian Navy, Royal Malaysian Air Force and the Department of Fisheries.

Other constraint faced are over fishing in coastal areas, competition between traditional and commercial fisheries for fishing grounds, competition for the use of coastal zone for compatible purposes, greater fishing effort because of more efficient technology, use of destructive fishing practices, impact of pollution; and habitat destruction.

5. REFERENCES

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http://www.fao.org/fi/fcp/en/MYS/body.htm

http://www.mmea.gov.my

THE PHILIPPINES

Arsenio Banñares, RFPN for the Philippines
Regional Fisheries Policy Network (RFPN) Member for the Philippines (until December 2007)

1. INTRODUCTION

The Philippines is an archipelagic country consisting of more than 7,100 islands lying north of the equator and on the western rim of the Pacific Ocean. The total land area is about 298,170 km^2. The territorial seas are bounded by: in the north by Taiwan through the Bashi Channel; in the east by the Philippine Sea; in the south by the Celebes Sea; and in the west by the South China Sea (Figure 1). It extends about 2,000 km in a south-north direction, from the northeast coast of Borneo to 150 km off Taiwan.

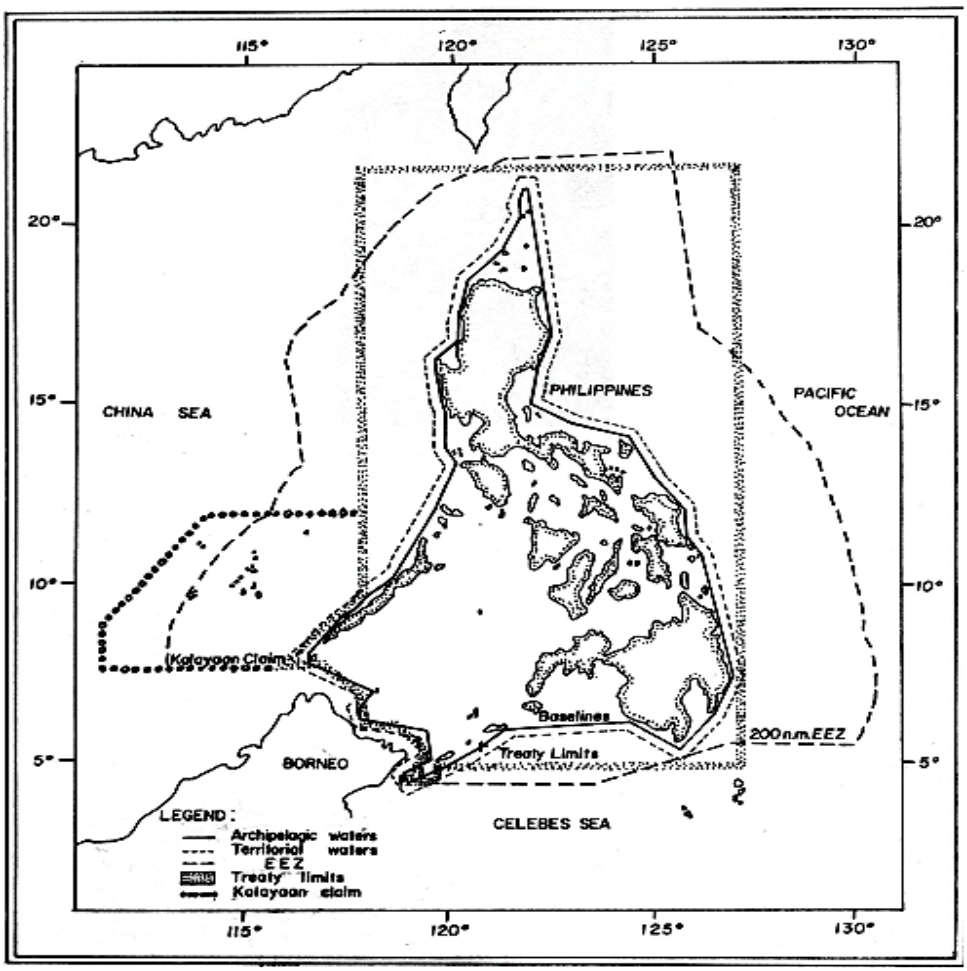

Figure 1. The extent of Philippine waters including its 200 EEZ

The total territorial water area, including the exclusive economic zone (EEZ), is about 2.2 million km^2 wherein the marine waters totals to 1,934,000 km^2 or about 88% available area for exploitation of the commercial fisheries (Table 1). The shelf area, down to 200 m, covers 184,600 km^2 with a coastline length of about 17,460 km. The country's coral reef area is estimated at 27,000 km^2, the second largest in Southeast Asia.

Table 1. Fishery resources of the Philippines

A. Marine Resources	
1. Total Territorial Water Area (including the EEZ)	2,200,000 sq. km.
a. Coastal	266,000 sq. km.
b. Oceanic	1,934,000 sq. km.
2. Shelf Area (Depth 200 meters)	184,000 sq. km.
3. Coral Reef Area	27,000 sq. km.
4. Coastline (length)	17,460 km

The Philippines ranked 8th in 2005 among top fish producing countries in the world with its total production of 4.16 million metric tons, which comprised of fish, crustaceans, mollusks, and aquatic plants (including seaweeds). The production constitutes 2.8% of the total world production of 146.27 million metric tons (FAO Website).

2. POLICY AND LEGAL FRAMEWORK

Republic Act No. 8550 "The Philippine Fisheries Code" is also known as the Fisheries Code of 1998, " *An act providing for the Development, Management and Conservation of the Fisheries and Aquatic Resources, integrating all Laws pertinent thereto, and for other purposes."* It has mandated the Department of Agriculture through the Bureau of Fisheries and Aquatic Resources and serves as guide in carrying-out its major tasks of fisheries resource management

Under this Act, the Bureau of Fisheries and Aquatic Resources (BFAR) was reconstituted from its staff status to line agency under the Department of Agriculture, and its prime mandate is to promote the management, development, conservation, protection and utilization of fisheries and aquatic resources of the country except municipal waters which shall be under the municipal or city government.

As one of the Republic Act (RA) 8550 policies, the government manages fisheries and aquatic resources in a manner consistent with the concept of an integrated coastal area management in specific natural fisheries management areas, appropriately supported by research, technical services and guidance. Thus, BFAR has issued various fisheries administrative orders (FAOs) to address fishery management. With the new Fisheries Code, the 15-kilometer boundary was transferred to the management of the local government units and the large scale fisheries are prohibited to enter the said fishing zones.

3. PROFILE OF LARGE SCALE FISHERIES

3.1 Fishing Ground

In the Philippines, tunas are caught mainly from the Sulu Sea, Moro Gulf and north Celebes Sea, although considerable tuna fisheries also exist in waters off Western Negros, Northwestern Luzon and Southern Luzon (Zaragoza *et al*. 2004). Yellowfin tuna, skipjack and eastern little tuna are highly migratory species that cross territorial boundaries of several nations. The Fishing grounds in the Philippines are listed in Table 2.

Table 2. Area and location of major fishing grounds in the Philippines.

Fishing ground	Area (km^2)	Location
Seas		
1. West Sulu Sea	29,992.50	Palawan
2. South Sulu Sea	12,642.00	Zamboanga del Sur/Sulu/Tawi-Tawi
3. East Sulu Sea	9,288.00	Zamboanga del Norte/Negros
4. Sibuyan Sea	8,127.00	Aklan/Masbate/Romblon
5. Bohol Sea	7,946.00	Bohol
6. Samar Sea	3,870.00	Samar/Masbate/Leyte
7. Visayan Sea	3,096.00	Panay/Negros/Cebu/Masbate
8. Camotes Sea	2,476.80	Cebu/Leyte/Bohol
Bays		
1. Lamon Bay	2,838.00	Quezon/Camarines Norte
2. Tayabas Bay	2,213.00	Quezon
3. Illana Bay	2,128.50	Lanao del Sur/Maguindanao
4. Manila Bay	1,935.00	Manila/Bataan/Cavite
5. Sibugay Bay	1,935.00	Zamboanga del Sur
6. Iligan Bay	1,811.16	Misamis Occidental/Lanao del Norte
7. Imuruan Bay	1,087.80	Palawan
8. San Miguel Bay	774	Camarines Sur
9. Tawi-Tawi Bay	592.4	Tawi-Tawi
10. Butuan Bay	516	Agusan del Norte
Gulfs		
1. Moro Gulf	12,900.00	Zamboanga del Sur/Maguindanao/Sultan Kudarat
2. Davao Gulf	4,024.00	Davao del Sur/Davao del Norte/Davao Oriental
3. Ragay Gulf	3,225.00	Camarines Sur/Quezon
4. Leyte Gulf	2,724.00	Leyte Island/Samar Island
5. Panay Gulf	2,311.00	Iloilo/Negros Occidental
6. Lingayen Gulf	2,064.00	Pangasinan
7. Lagonoy Gulf	1,935.00	Albay/Camarines Sur/Catanduanes
8. Asid Gulf	619	Masbate
9. Albay Gulf	412.8	Albay
Channels		
1. Babuyan Channel	3,612.00	Cagayan/Babuyan Island
2. Jintotolo Channel	280	Capiz/Masbate
3. Maqueda Channel	129	Camarines Sur/Catanduanes
Straits		
1. Tablas Strait	3,870.00	Tablas Island/Mindoro Oriental
2. Mindoro Strait	3,426.24	Palawan/Mindoro Occidental
3. Tañon Strait	2,786.40	Cebu/Negros
4. Cebu Strait	1,818.90	Cebu/Bohol
5. Iloilo Strait	1,006.00	Iloilo/Guimaras
Passages		
1. Burias Pass	1,393.20	Burias Island/Camarines Sur
2. Ticao Pass	804.75	Ticao Island/Sorsogon

3.2 Number of Fisherman

The total number of fisherman totaled 1,614,368 in 2002 (Table 3). The fisherfolk involved in the commercial fisheries shows that there are 16,497 fishermen, a mere 1% of the industry. The fisherfolk mainly came from municipal fisheries which tops the employment in fishing with 1,371,676 (84.97%) fishermen employed and followed by fishfarmers (14%).

Table 3. Number of fisherfolk by type (2002).

Type	Number of Fisherfolk	%
Municipal Fisheries (SSF)	1,371,676	84.97
Aquaculture (Fishfarmers)	226,195	14.01
Commercial Fisheries	16,497	1.02
Total	**1,614,368**	**100.00**

Source: NSO 2002 Census for Fisheries

3.3 Number of Fishing Vessels

The main vessel types involved in the tuna fishery are handline bancas (up to 60 GT in size), ring netters (usually < 100 GT), small purse seiners (< 250 GT) and large purse seiners, or "superseiners" (> 250 GT), with significant catches also taken by trolling, gillnet and artisanal gears, and a small number of domestic longline vessels. According to the latest inventory of BFAR, there are 3,874 Philippine fishing vessels that are licensed by the Bureau (Table 4).

Figure 2. Some large-scale fishing vessels in the Philippines

Table 4. Number of Commercial Fishing Vessels, by Type of Fishing Gear Used, 2007

Region	Ring Net	Hand line	Modified Danish Seine	Purse Seine	Bag Net	Trawl	Drift Long line	Gill net	Drive-In Net	Round Haul Seine	Beach Seine	Push Net	Total
1	0	0	38	0	0	36	0	0	0	0	0	0	**74**
2	33	0	18	0	0	0	1	0	0	18	1	0	**71**
3	8	2	8	26	3	6	11	0	0	0	0	9	**73**
4	115	153	41	83	160	19	0	42	15	1	0	0	**629**
5	86	2	71	23	94	52	0	0	0	0	1	0	**329**
6	99	42	74	60	5	153	0	0	0	0	0	0	**433**
7	224	91	157	4	3	0	0	1	1	4	0	0	**485**
8	141	3	109	1	14	57	3	1	0	0	5	0	**334**
9	12	16	39	63	40	3	4	0	0	0	0	0	**177**
10	88	1	0	0	31	0	0	1	0	0	0	0	**121**
11	73	18	0	0	39	0	0	0	0	0	0	0	**130**
12	64	441	0	89	5	0	14	5	0	0	0	0	**618**
13	5	1	28	0	5	0	0	1	0	0	0	0	**40**
ARMM	1	0	0	5	3	0	0	0	0	0	0	7	**16**
CAR	0	0	1	0	0	5	0	0	0	0	0	0	**6**
NCR	4	5	88	114	1	67	28	4	16	0	0	11	**338**
Total	**953**	**775**	**672**	**468**	**403**	**398**	**61**	**55**	**32**	**23**	**7**	**27**	**3874**

Source: BFAR-FRQD 2007

3.4 Production of Large Scale Fisheries

n 2005, the fish production of the Philippines reached 4.16 million tons. Aquaculture posted 1,895,847 tons (45.55%), followed by commercial fisheries 1,133,976 tons (27.25%), and municipal fisheries with 1,132,046 tons (27.20%). It can be noted in Table 6 that all sectors in fisheries are increasing.

Table 5. Comparative fisheries production by sector, 2001-2005

Year	Aquaculture	Municipal	Commercial	Total
2005	1,895,847	1,132,046	1,133,976	4,161,870
2004	1,717,027	1,080,764	1,128,382	3,926,173
2003	1,454,503	1,055,143	1,109,636	3,619,282
2002	1,338,393	988,938	1,042,193	3,369,524
2001	1,220,456	969,535	976,539	3,166,530

Source: Philippine Fisheries Profile, 2005

3.5 Major Fish Species Caught

The bulk of the commercial fisheries production came from small pelagics such as roundscad, Indian sardines and frigate tuna while large pelagic fishes are dominated by skipjack and yellowfin tuna (Table 6).

Table 6. Major fish species caught by commercial fisheries sector, 2005.

Major Species	Total (MT)	% to Total
1. Roundscad (Galunggong)	214,963.24	19.0
2. Indian sardines (Tamban)	176,929.22	15.6
3. Frigate tuna (Tulingan)	113,839.98	10.0
4. Skipjack (Gulyasan)	112,696.42	9.9
5. Yellowfin tuna (Tambakol)	69,833.06	6.2
6. Eastern little tuna (Bonito)	51,167.30	4.5
7. Fimbriated sardine (Tunsoy)	46,323.10	4.1
8. Indian mackerel (Alumahan)	37,932.49	3.3
9. Slipmouth (Sapsap)	35,588.09	3.1
10.Big-eyed scad (Matangbaka)	34,932.33	3.1
11. Other Species	239,770.98	21.1
Total	**1,133,976.21**	**100.0**

Source: Philippine Fisheries Profile, 2005

3.6 Major Fishing Harbors/Ports

The Department of Public Works and Highways executes the development of fishports and related infrastructure while the Philippine Ports Authority and the Philippine Fisheries Development Authority (PFDA) operate and manage the larger ports and related infrastructure. The two (2) biggest fishport in the Philippines are the Navotas Fishport Complex in Navotas City, Metro Manila which ranks 1st in terms of volume of fish landings and General Santos Fishport in General Santos City which ranks 1st in tuna landings (2004). In 2003, nearly 70% of the commercial catch of oceanic species is landed in Mindanao regions: Region 12 – General Santos and Region 9 – Zamboanga (Barut and Gervilles, 2005). The other six (6) major ports are the fishport complexes in Lucena, Camaligan, Iloilo, Davao, Zamboanga, and Sual. The government-owned major fishport complexes provide landing quays and market halls for fish traders and handlers.

4. CHARACTERIZATION OF LARGE SCALE FISHERIES

4.1 Large Scale Fisheries Definition

Large scale fisheries or commercial fisheries in the Philippine context refers to the taking of fishery species by passive of active gear for trade, business or profit beyond subsistence fishing or sports fishing as defined in the New Fisheries Code of 1998 using vessels that weighs 3.1 GT and above which are required to fish beyond 15-kilometer of the shoreline. Commercial vessels are further classified into Small scale (3.1 to 20 GT), Medium scale (20.1 to 150 GT), and Large scale (more than 150 GT) as defined by BFAR Fisheries Administrative Order 204 series of 2004. Small scale commercial vessels may fish within

the 10-15 kilometer area of the municipal waters as long as the municipality has a specific Ordinance about it and that the fishing area has a minimum depth of 6 fathoms and that the vessels should use are passive fishing gears.

Commercial fishing vessels are required to initially register with the Maritime Industry Authority (MARINA), then to certificate of inspection and registration of homeport by the Philippine Coast Guard (PCG), before finally going to the Bureau of Fisheries and Aquatic Resources (BFAR) for issuance of Certificate of Fishing Vessel and Gear License (CFVGL) and International Fishing Permit (IFP), if fishing outside the country.

Description of Fishing Effort/ Fleets – Handliners and Purse seiners

The most distinct and unifying feature of handline fishers everywhere is the simple hook-and-line gear they used to catch tuna. The hooks are baited on a 1.5 kg nylon handline, strong enough to catch fish weighing 30-100 kg (Tambuyog, 2000). Milkfish fingerlings are usually used as bait for tuna. Handliners that are usually associated with commercial fishing are the "*Pamariles*"- the distant-water handliners or referred to as "Pumpboats" (or mother-boats). Big pumpboats displacing 15 GT can carry 10 *kawa-kawa* (smaller boats) and 50-150 blocks of ice.

Due to the declining catch in the Philippine EEZ, the bigger handline vessels scour the international waters for tuna, amidst the looming threats of apprehension and detention due to poaching. Handliners are not covered by bilateral fishing agreements. Fishers travel as far as Indonesia (specifically within Irian Jaya), Australia, Papua New Guinea and Fiji to catch tuna. Fishing trips to Indonesia may last 20 days back and forth, while trips to farther places like Australia and PNG may last up to a month.

A purse-seine fishing is a fleet-based operation composed of a mother-boat supported by service and light boats. The mother-boat and the light boats stay in the open sea for six months to one year. The mother-boat is usually stationary, while the light boats roam the fishing grounds to check the payaos (FADs) and direct the mother-boat to the areas where there are better chances of abundant fish catch. The purse-seine vessels frequent the fishing grounds of Indonesia, where a fishing agreement exists between the fleet owner and the local Indonesian authorities.

A service vessel comes regularly to transport the tuna catch from the fishing ground to the fish landing area at the General Santos Fishport. The purse-seine crew can likewise go home every time a service vessel visits the fishing operation. A minimum expense of US$1,800 is incurred every time a service boat goes to the open sea to transport tuna and crew and to bring in supplies of food and ice to the fleet.

4.2 Importance to the Economy, Livelihood and Food Security

The fisheries industry is important to the economy of the country contributing 2.1% (116 billion pesos) to the country's Gross Domestic Product (GDP) and accounted for 15% of the Gross Value Added (GVA) in Agriculture, Fishery and Forestry Group. Since 1977, foreign trade of fishery products has generated a surplus balance of trade, which means earnings from exports have exceeded payments for imports (Figure 2.3.4.a). Currently, the top fishery

exports of the Philippines are tuna, shrimps and prawns, seaweeds, octopus, and crab and crab fat. Altogether, these commodities account for about 82% of total fishery exports (Table 2.3.4.a). The major destinations of Philippine fish and fishery products are Japan, USA, Hong Kong, Taiwan and Korea (BAS 2005).

4.3 Current Issues of Concern, Problems and Constraint

IUU fishing is rampant in the waters of the country. No other fishing by foreign flagged vessels is permitted in the Philippine EEZ, but a considerable amount of IUU fishing based on the regularity of apprehensions of vessels illegally fishing in Philippine waters would occur, most of it is longliners. Chinese, Malaysian, Taiwanese, Japanese and other fishers from neighboring countries are making free use of the Philippine waters. Some violators are vessels that were given transshipment permits which turned to fishing.

Approximately 25-40% of the country's total fish production is lost due to discards and improper post-harvest handling. Such losses can be attributed to one or a combination of physical, nutritional or value losses. About one-third of the harvested products are spoiled before they reach their market destinations. Lack of infrastructure facilities (e.g., fishing ports, market roads and dry/cold-storage facilities) and limited technological know-how contribute to post-harvest losses.

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THAILAND

Chongkolnee Chamchang (Ph.D), RFPN for Thailand

1. INTRODUCTION

Thailand is a peninsular country located in South-East Asia, with an area of approximately 514,000 km^2 and a coastline of 2,614 km. Marine fisheries are operated in two major fishing areas, viz. the Gulf of Thailand and the Andaman Sea off the west coast of peninsular Thailand. The Gulf of Thailand, a semi-enclosed sea, covers an area of about 320,000 km^2 and the country had a long coast line of 1,875 km. There exist areas in the Gulf of overlapping claims arising from different boundary demarcation methods employed by Thailand and her neighbors, viz., Cambodia, Malaysia and Vietnam. Being part of the Sunda continental shelf in the South China Sea, the Gulf is rather shallow with an average depth about 45 m. The Andaman Sea is deeper than the Gulf of Thailand, with an area of about 126,000 km^2. It has the great features of oceanic waters. The length of the coastline on the Andaman Sea side of peninsular Thailand is 740 km.

Thailand's Exclusive Economic Zone (EEZ) covers 420,280 km^2, of which 304,000 km^2 in the Gulf of Thailand and 116,280 km^2 in the Andaman Sea (Fig. 1). Thai EEZ within the Gulf of Thailand includes overlapping areas between Thailand and Cambodia (34,000 km^2), Thailand, Cambodia and Vietnam (14,000 km^2) and Thailand and Malaysia (~4,000 km^2).

2. POLICY AND LEGAL FRAMEWORK– FISHERIES MANAGEMENT

2.1 The National Fisheries Policies

The Department of Fisheries (DOF) is a lead national agency in policy development for fisheries in Thailand. The National Fisheries Development Policies outlined by DOF are as follow:

1. Policy on Development of Fisheries and Involved Organization

1a. To have fishermen and involved organization participate in fisheries administration, management, and development.

1b. To increase knowledge and skill of the fishermen for their self-reliance and viable occupation as well as to increase their capability in managing of their organizations.

2. Policy on Management of Fisheries Resources and Environment

2a. To maintain fisheries resources in harmonization with sustainable utilization and without negative impact to environment, under joint administration and management by Thai people, community, local organization, and government.

2b. To maintain fisheries resources in harmonization with decentralization policy by assignment MCS to local authority (Ao Bo To) and other department concerned.

2c. The right-based fisheries management for coastal and marine fisheries is promoted to replace open access.

2d. To reduce fishing capacity for the Gulf of Thailand that harmonize to the global initiative.

3. Policy on Aquaculture Development

3a. To increase fish production from aquaculture sufficiently for domestic consumption.

3b. To increase fish production in terms of both quantity and quality for domestic trade and export.

3c. To accelerate research in supporting commercial aquaculture for increasing trade volume, quality standard, and reducing cost of production

3d. To develop sustainable marine shrimp culture system for domestic trade as well as for export.

3e. To develop production and marketing of ornamental fish and aquatic plants for export in order to raise the aqua-culturists' income.

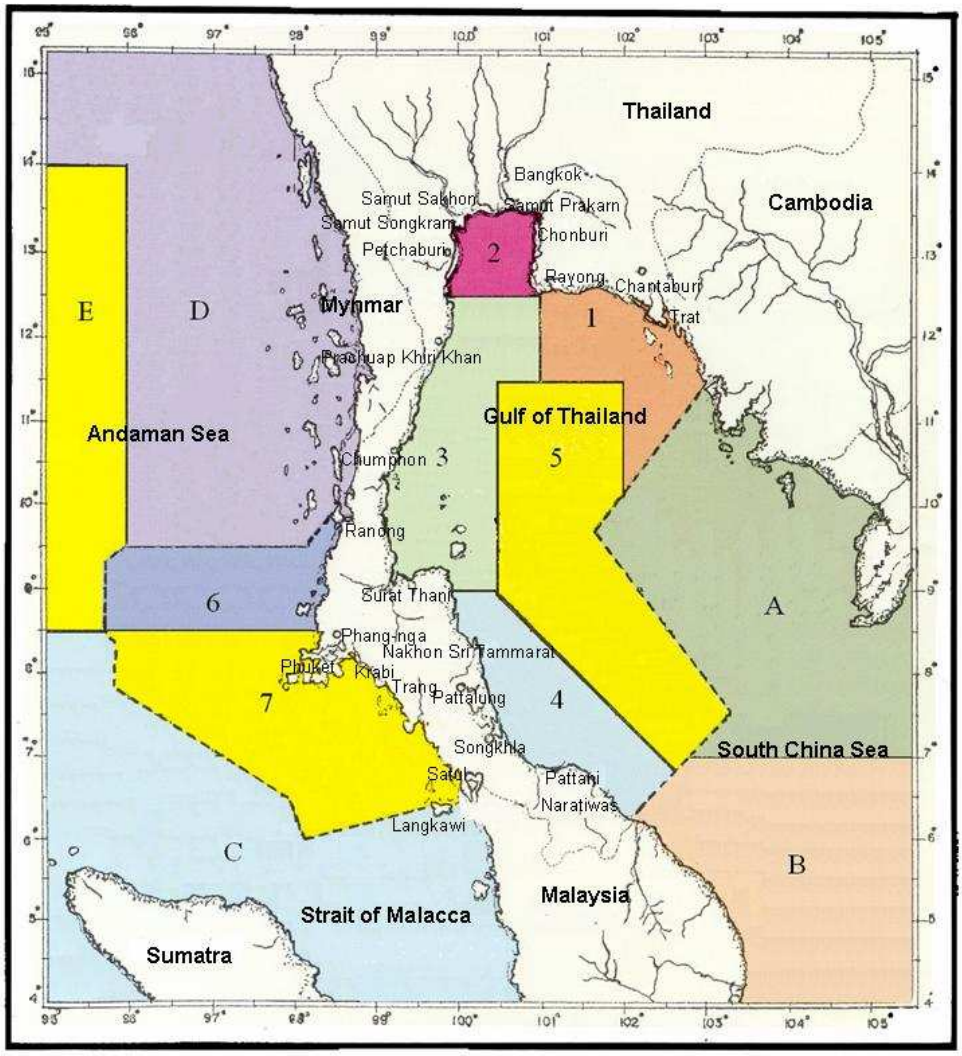

Fig. 1. Thai Fisheries Zone: broken lines represent Thai EEZ

4. Policy on Oversea Fisheries Development

4a. To develop and raise the capacity and technology of overseas fishing fleet to meet proper standards for fishing operation in international waters.

4b. To control and regulate fishing operation in compliance with agreements with other coastal States or joint-venture partners.

4c. To expand fishing operation towards high seas and deep seas.

4d. To develop personnel involving in overseas fisheries sub-sector.

5. Policy on Fisheries Industry Development

5a. To maintain the status of Thailand as one of the important fish producing and exporting country.

2.2 Legal Framework

2.2.1 The level(s) of government jurisdiction over fisheries

All the central, provincial and local government authorities including the public participation have jurisdiction over fisheries according to the decentralization policy.

2.2.2 The legal source of their authorities

The key legislations are as follow:

- The Fisheries Act B.E. 2490 (1947) – revised in 1953 and 1985 (At present DOF and concerned parties have made a draft of new Fisheries Act to update for fisheries situation which is currently in the process of consideration of the Office of Council of State).
- Act Governing the Right to Fish in Thai Waters in B.E. 2482 (1939)
- Act Organizing the Activities of the Fish Market B.E. 2496 (1953)
- Wildlife Reservation and Protection Act B.E. 2535 (1992)

The other related legislations are as follow:

- The Constitution of the Kingdom of Thailand B.E. 2550 (as the core legislation concerning the decentralization and public participation)
- The Thai vessel Act was established in B.E. 2481 (1938)
- The National Reserved Forest Act B.E. 2507 (1964)
- Forestry Act B.E. 2484 (1941)
- National Parks Act B.E. 2504 (1961) (impacting on marine parks and their licensing of or management of these parks)
- Enhancement and Conservation of National Environmental Quality Act 1992.
- Animal Feed Quality Control Act B.E. 2525 (1982)
- Food Act B.E. 2522 (1979)
- Drug Act B.E. 2510 (1967)
- Endemic Animal Act B.E. 2499 (1956)
- Foreign Business Act B.E. 2542 (1999)
- Dangerous Substance Act B.E. 2535 (1992)

2.2.3 The Principle Management Instruments

1. Fisheries Act B.E. 2490 (1947).
2. Wildlife Reservation and Protection Act B.E. 2535 (1992), and
3. Enhancement and Conservation of National Environment Quality Act 1992

2.2.4 General Condition Regarding Foreign Access, and Restriction

The activities which are eligible for investment promotion by the Board of Investment as follows:

- Activities which are important and beneficial to the economic and social development and security of the country activities which involve production for export
- Activities which have high content of capital, labor or service
- Activities which utilize agricultural product or natural resources as raw materials provided that in the opinion of the Board that they are non- existent in the Kingdom, or existent but inadequate, or use out-of-date production processes.
- In general, foreigners may operate businesses upon obtaining a license from the Director-General and may operate only certain businesses.

2.2.5 Restrictions on Fisheries Investment

- Prohibit foreigners from operating the business not permitted to them with special reasons as described in List One (to operate the fishery for marine animals in Thai waters and within Thailand specific economic zones)
- Prohibit foreigners from operating any business concerning national safety and security, business affecting art and culture, tradition and folk handicraft or the business affecting natural resources or environment as prescribed in List Two unless permitted by the Minister with the approval of the Cabinet.
- Prohibit foreigners from operating the business prescribed in List Three in which Thai nationals are not ready to compete unless permitted by the Director-General with the approval of the Committee especially for marine culture.

2.2.6 Investment Legal Management

Investment Promotion Act B.E. 2520 (1977): The activities which are eligible for investment promotion by the Board are those which are important and beneficial to the economic and social development, and security of the country, activities which involve production for export, activities which have high content of capital, labor or service or activities which utilize agricultural produce or natural resources as raw materials, provided that in the opinion of the Board, they are non-existent in the Kingdom, or existent but inadequate, or use out-of-date production processes.

2.3 Fisheries management

2.3.1 Fisheries management for the whole fisheries implemented by DOF of Thailand

1. Boat-tenure system (freezing the trawler number), no transferring license except for the son, license have to be renewed every year otherwise the license will be cancelled.
2. Closed area and closed season including limit certain fishing methods.

3. Reserved zone within 3 km from shoreline, preserve zone for nursing area of juvenile fish and invertebrate, no fishing for engine boats.
4. Promote the community-based fisheries management by sing demarcated area for small scale fisheries and prevent trawling activities in the demarcated area.
5. Resources and habitats rehabilitation for recovering the fishery resources and habitats, artificial reef installation for obstruct trawling activities, shelter for spawners and juvenile fishes, spawning area for fish and invertebrates.
6. Resource enhancement to fruitful the local species by fry seed releasing program.
7. Limit cod-end mesh sizes of trawler and mesh sizes of purse seiners.
8. Plan for fishing capacity reduction especially the trawlers and push netters.
9. Promote right-based fisheries to replace open access.
10. Promote small business to small scale fishermen to produce local fishery products.

2.3.2 Fisheries Management Instruments

1. Monitoring, control and enforcement to the illegal fisheries.
2. Sea water monitoring for approved zone of the fishing grounds that connect from farm to spoon program for good quality exporting products.
3. The Department of Fisheries assigns the concerned authority and local authority to monitoring, control and enforcement the illegal fisheries under the Decentralization Policy of the National Constitution B.E 2540.
4. Licensing for all commercial fishing gear.
5. Using indicator as management tool (CPUE, decrease in mean length, changes in species composition, changes in number of species, percentage of spawners in the catches, mean size of spawner, MSY and MEY).
6. Community-based fisheries management for small-scale fisheries, fishermen community limits number of small scale fishing boat and promotes right-based fisheries.
7. Artificial reef installation to protect the habitats and increase shelter for fish.
8. Fry seed releasing around artificial reef and mangrove areas.
9. Resource conservation, responsible fisheries and awareness programs for fishermen, school students and school masters.

3. PROFILE OF THE LARGE SCALE FISHERIES (LSF)

3.1 Fishing ground

Of the 76 provinces, 24 are coastal provinces (see Fig. 1) including the fishing grounds in the Gulf of Thailand and in the Andaman Sea (see map in Fig. 1):

The fishing grounds of marine capture fisheries in the Gulf of Thailand are divided into 5 zones as follow

1. Fishing Zone (FZ) 1 denoted Eastern Gulf covering coastal zone of Trat, Chantaburi and Rayong province
2. FZ 2 denoted Inner Gulf covering coastal zone of Chonburi, Chachoengsao, Samut Prakarn, Samut Songkram, Samut Sakorn, Bangkok and Petchaburi province
3. FZ 3 denoted Middle Gulf covering Prachuap Khiri Khan, Chumphon and Surat Thani province.
4. FZ 4 denoted Lower Gulf covering Nakhon Sri Thammarat, Pattalung, Songkhla, Pattani and Naratiwas province.

5. FZ 5 denoted Central Gulf covering the center area of The Gulf of Thailand

For fisheries operated in the waters outside the Gulf of Thailand are the areas in South China Sea which were categorized into 2 zones i.e.

6. FZ A
7. FZ B

Main fishing grounds in the Andaman Sea are divided into 2 zones:

8. FZ 6 denoted Upper Thai waters covering coastal zone of Ranong and upper part of Phang-nga province.
9. FZ 7 denoted Lower Thai waters covering lower part of Phang-nga, Phuket, Krabi, Trang and Satul province.

For fisheries operated in non- Thai waters in the Andaman Sea are divided into 3 zones:

10. FZ C
11. FZ D
12. FZ E

3.2 Number of Fishermen

The latest available data on countrywide marine fishery censuses, carried out in 1985 and 1995 and marine fishery survey in 1990 and 2000, established that there were 139,506 fishermen (including coastal aquaculture workers) in 1985, 148,306 in 1990, 157,377 in 1995 and 181,666 in 2000. Thus, the annual rate of increase was 1.23% during 1985-1990 period, 1.19% during the 1990-1995 period and 3.08% during 1995-2000 period. Latest data in 2000, there was an estimated 181,666 people involved in the sector of which 76,222 as small-scale fishermen, 4,316 as large-scale fishermen, and 101,128 involved in fisheries related activities. Out of 4,316 of large-scale fishermen, 4,198 are male and 118 are female.

Table 1. Number of Fishermen during the peak season in 2000 (Source: National Statistical Office, 2001)

Fishing activities	**2000 Census**
	Number of Fishermen (M:F)
Small-scale fisheries	76,222 (Male : Female = 64,098:12,124)
Large-scale fisheries	4,316 (Male : Female = 4,198:118)
Aquaculture	62,598 (Male : Female = 45,466:17,132)
Fishery employees	38,030 (Male : Female = 35,186:2,844)
Total	181,666 (Male : Female = 148,948: 32,218)

3.3 Number of Fishing Vessels

The number of registered fishing boats of small-scale fisheries (SSF) sized <10 GT and large-scale fisheries (LSF) sized >10 GT from Thai fishing vessels statistic survey of the period of 2003 to 2005 (Fishery Information Technology Center, 2005; 2006; 2007) are shown in Table 2. The number of registered large-scale fishing boats was higher than those of small-scale fishing boats. The large-scale fishing boats classified by fishing gear type were dominated by otter board trawlers followed by squid falling netters, pair-trawlers and surrounding netters; respectively (see Fig. 2).

Table 2. Number of registered fishing boats categorized by type of main fishing gears and by type of boats and gross tonnage from 2003 to 2005. (Source: Fishery Information Technology Center, 2005; 2006; 2007).

	Year 2003	**Year 2004**	**Year 2005**			
Type of boat /fishing gears	**<10 GT**	**>10 GT**	**<10 GT**	**>10 GT**	**<10 GT**	**>10 GT**
Otter board trawler	911	4,261	897	3,999	746	3,483
Pair trawler	4	1,630	1	1,409	-	1,398
Beam trawler	51	92	44	89	40	90
Surrounding netter	37	1,276	75	1,280	65	1,121
Anchovy purse seiner	70	254	80	264	64	295
Spanish mackerel gill netter	24	343	20	257	1	194
Indo-Pacific mackerel gill netter	108	2	168	60	160	54
Crab gill netter	397	230	603	219	281	229
Shrimp trammel netter	772	54	343	34	216	42
Squid trammel netter	159	167	43	73	1	1
Indo-Pacific Mackerel encircling gill netter	16	65	2	67	-	42
Other gill netter	456	494	522	706	352	512
Squid falling netter	690	1,403	1,433	1,727	1,010	1,489
Anchovy falling netter	264	607	321	713	234	560
Other falling netter	11	48	-	3	1	-
Anchovy lift netter	4	36	20	41	18	39
Other lift netter	98	217	106	202	85	227
Push netter	447	154	393	152	369	151
Other netter	2	-	5	-	3	-
Long liner	8	75	8	48	6	36
Other gear	34	12	5	-	12	-
Total	**4,563**	**11,420**	**5,089**	**11,253**	**3,664**	**9,963**

Fig. 2. Photo of an otter board trawler

Fig. 3 Photo of pair-trawlers

3.4 Production of LSF

Total marine capture fisheries production during 2001 to 2004 shown in Table 3 were steady state at about 2.6 million mt per year of which approximately from 0.18 to 0.26 million mt were shared by SSF while LSF production were between 2.3 to 2.4 million mt. It indicates that the production from LSF is twelve times higher than SSF (Fishery Information Technology Center, 2003; 2004; 2005; 2006).

3.5 Major fish species caught

During 2001 to 2004 periods, fish particularly pelagic fish was the dominant aquatic species for LSF dominated by short mackerel and followed by sardine and anchovy. The second abundant species was squid while shrimp was the third abundant species. The detail for list of species caught by LSF compared with SSF is shown in Table 3.

3.6 Major fishing harbours/ports

Based on the study of Pollution Control Department **(published year not addressed)** on fishing ports reported that there are a total of 735 fishing ports along the coastal provinces of Thailand which can be divided into 3 types based on sectors established i.e. (1) Ports established by Fish Market Organization (18 fishing ports) (2) Ports established by Private sectors (524 fishing ports) and (3) Ports established by other governmental agencies (DOF of Thailand) and local governmental agencies (Provincial Office or Municipality) in order to meet local communities demand especially small-scale fishermen (193 fishing ports).

Table 3. Marine capture fishery production in Thai waters from 2001 to 2004 (Source: Fishery Information Technology Center, 2003; 2004; 2005; 2006); Unit: Ton

Species		**2001**			**2002**			**2003**			**2004**	
	SSF	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	**Total**
Total marine resources	**252,805**	**2,383,072**	**2,635,877**	**197,029**	**2,452,113**	**2,649,142**	**189,387**	**2,464,431**	**2,696,461**	**268,494**	**2,366,698**	**2,635,192**
Sub-total Fish	***63,290***	***2,159,026***	***2,222,316***	***55,721***	***2,211,925***	***2,267,646***	***50,670***	***2,239,503***	***2,290,173***	***43,394***	***2,270,486***	***2,313,880***
Sub-total Pelagic fish	***37,964***	***768,485***	***806,449***	***32,552***	***800,414***	***832,966***	***29,164***	***822,875***	***852,039***	***29,178***	***848,356***	***877,534***
Short mackerel	19,300	122,015	141,315	16,125	130,297	146,422	14,123	142,100	156,223	14,750	145,648	160,398
Indian mackerel	479	31,470	31,949	637	32,124	32,761	418	33,772	34,190	1,280	33,609	34,889
Spanish mackerel	799	12,746	13,545	1,206	15,487	16,693	1,394	17,667	19,061	1,671	24,567	26,238
Wolf herring	225	12,366	12,591	363	14,240	14,603	97	13,532	13,629	97	12,093	12,190
Longtail tuna	35	57,494	57,529		62,588	62,588	-	72,063	72,063	6	81,525	81,531
Eastern little tuna	187	45,463	45,650	349	51,140	51,489	368	44,497	44,865	185	54,702	54,887
Round scad		92,408	92,408		103,984	103,984	-	98,745	98,745	0	100,355	100,355
Hardtail scad	689	18,055	18,744	487	18,581	19,068	701	18,780	19,481	576	16,501	17,077
Trevallies	672	50,280	50,952	513	47,304	47,817	260	48,279	48,539	271	50,596	50,867
Big eye scad		32,595	32,595		34,699	34,699	-	44,588	44,588		40,741	40,741
Black banded trevallies	3	4,529	4,532	5	9,379	9,384	2	8,919	8,921	8	5,314	5,322
Threadfin	329	4	333	669	6	675	423	355	778	542	68	610
Sardinellas	2,217	142,815	145,032	2,231	126,646	128,877	1,900	123,019	124,919	2,102	117,799	119,901
Anchovy	3,701	141,800	145,501	2,870	148,861	151,731	2,916	150,744	153,660	3,261	159,976	163,237
Mullet	9,137	2	9,139	6,999	0	6,999	6,449	0	6,449	4,148	0	4,148
Black pomfret	127	4,073	4,200	87	4,371	4,458	88	4,499	4,587	84	4,054	4,138
Silver pomfret	64	370	434	11	707	718	25	1,316	1,341	197	808	1,005
Sub-total Demersal fish	***10,247***	***420,260***	***430,507***	***13,563***	***483,193***	***496,756***	***12,565***	***461,162***	***473,727***	***7,177***	***475,772***	***482,949***
Barracuda	480	15,347	15,827	208	18,010	18,218	168	16,430	16,598	298	14,013	14,311
Crocker	438	44,494	44,932	289	51,375	51,664	777	47,485	48,262	587	50,264	50,851

Table 3. (cont.)

Species		2001			2002			2003			2004	
	SSF	LSF	Total	SSF	LSF	Total	SSF	LSF	Total	SSF	LSF	Total
Treadfin bream	327	106,331	106,658	221	121,155	121,376	990	111,511	112,501	242	105,653	105,895
Monocle bream	46	0	46	62	-	62	45	-	45	16	0	16
Lizard fish		71,918	71,918	-	79,055	79,055	-	72,810	72,810		57,017	57,017
Hair tail	87	16,197	16,284	-	19,873	19,873	-	17,597	17,597		17,396	17,396
Red Snapper	244	8,192	8,436	1,217	10,435	11,652	239	13,256	13,495	370	17,760	18,130
Giant seapearch	497	0	497	556	-	556	190	-	190	186	0	186
Big eyes	7	93,690	93,697	1	103,583	103,584	1	103,962	103,963	16	136,556	136,572
Sand whiting	5,466	4,037	9,503	6,523	6,166	12,689	6,770	7,891	14,661	2,450	12,256	14,706
Barbel eel	966	180	1,146	988	83	1,071	180	126	306	228	29	257
Marine catfish	561	11,116	11,677	475	14,192	14,667	571	14,400	14,971	788	15,241	16,029
Rays	197	12,935	13,132	175	16,115	16,290	1,165	16,966	18,131	251	17,240	17,491
Shark	35	11,111	11,146	21	13,897	13,918	26	14,383	14,409	8	10,147	10,155
Flatfish	109	14,633	14,742	122	18,514	18,636	242	12,530	12,772	269	10,296	10,565
Indian halibut		1,149	1,149	-	1,356	1,356	0	2,658	2,658		3,062	3,062
Conger eel		2,089	2,089	-	2,144	2,144	0	2,232	2,232		2,801	2,801
Grouper	787	6,841	7,628	2,705	7,240	9,945	1,201	6,925	8,126	1,468	6,041	7,509
Other food fish	***11,758***	***235,064***	***246,822***	***6,550***	***234,733***	***241,283***	***5,993***	***261,269***	***267,262***	***4,702***	***176,972***	***181,674***
Trashfish	***3,321***	***735,217***	***738,538***	***3,056***	***693,585***	***696,641***	***2,948***	***694,197***	***697,145***	***2,337***	***769,386***	***771,723***
Sub-total Shrimp/ prawn	***28,095***	***60,762***	***88,857***	***27,158***	***58,910***	***86,068***	***26,226***	***58,471***	***84,697***	***20,923***	***56,381***	***77,304***
Banana shrimp	13,348	3,584	16,932	14,848	3,393	18,241	15,077	4,173	19,250	9,654	5,766	15,420
Jumbo tiger prawn	731	993	1,724	1,269	596	1,865	1,360	1,517	2,877	251	1,985	2,236
Tiger prawn	4	2,011	2,015	4	1,609	1,613	350	2,039	2,389	12	2,544	2,556
King prawn	1,750	954	2,704	1,916	1,394	3,310	916	2,674	3,590	606	2,828	3,434
School prawn	2,719	7,796	10,515	2,979	7,111	10,090	1,704	8,251	9,955	2,256	9,295	11,551
Other shrimp	6,721	40,507	47,228	2,675	39,059	41,734	3,026	33,057	36,083	3,856	27,102	30,958
Sergestid shrimp	2,805	1,202	4,007	3,437	1,176	4,613	3,651	1,282	4,933	4,176	1,558	5,734
Flathead lobster	17	1,838	1,855	21	2,296	2,317	61	3,042	3,103	104	2,663	2,767
Mantis shrimp	0	1,877	1,877	9	2,276	2,285	81	2,436	2,517	8	2,640	2,648
Sub-total crab	***34,186***	***16,087***	***50,273***	***28,067***	***14,054***	***42,121***	***28,822***	***14,808***	***43,630***	***28,971***	***12,981***	***41,952***
Blue swimming crab	28,296	8,509	36,805	23,575	5,299	28,874	26,248	6,126	32,374	24,320	4,934	29,254
Mud crab	5,416	1	5,417	3,822	1	3,823	1,252	7	1,259	2,845	14	2,859
Other crab	474	7,577	8,051	670	8,754	9,424	1,322	8,675	9,997	1,806	8,033	9,839
Sub-total Squid/ Cuttlefish	***22,364***	***146,868***	***169,232***	***22,692***	***167,078***	***189,770***	***19,487***	***151,469***	***215,257***	***137,069***	***26,554***	***163,623***
Squid	16,793	60,667	77,460	15,529	73,976	89,505	14,753	65,709	80,462	13,998	59,596	73,594

Table 3. (cont.)

Species		**2001**			**2002**			**2003**			**2004**	
	SSF	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	**Total**	**SSF**	**LSF**	**Total**
Cuttlefish	1,599	63,990	65,589	2,221	70,991	73,212	1,999	66,208	68,207	3,050	65,605	68,655
Octopus	21	22,211	22,232	2	22,111	22,113	146	19,552	19,698	373	20,883	21,256
Bigfin reef squid	3,951	-	3,951	4,940	-	4,940	2,589	0	2,589	2,853	0	2,853
Sub-total shellfish	***55,587***	***329***	***55,916***	***34,105***	***146***	***34,251***	***54,902***	***180***	***53,424***	***36,335***	***296***	***36,631***
Bloody cockle	1,282	-	1,282	1,206	-	1,206	2,462	0	2,462	2,567	0	2,567
Horse mussel	387	-	387	267	-	267	24	0	24	44	0	44
Short necked clam	52,524	-	52,524	31,737	-	31,737	50,552	0	50,552	28,876	0	28,876
Scallop	-	234	234	-	124	124	-	180	180	-	156	156
Worm shell	54	0	54	21	-	21	206	0	206	95	0	95
Other shellfish	1,340	95	1,435	874	22	896	1,658			4,753	140	4,893
Sub-total other species	***49,283***	***0***	***49,283***	***29,286***	***-***	***29,286***	***9,280***	***0***	***9,280***	***1,802***	***0***	***1,802***
Jellyfish	47,534	0	47,534	28,947	-	28,947	8,791	0	8,791	1,528	0	1,528
Other species	1,749	0	1,749	339	-	339	489	0	489	274	0	274

4. CHARACTERIZATION OF LARGE SCALE FISHERIES

4.1 LSF definition

No specific definition for SSF and LSF has been given. Nevertheless, it can be presumed that the SSF and LSF in Thailand is classified by type of fishing gear, length of boat and effort (Aosomboon, 2006) which DOF Thailand has defined SSF in participation with small-scale fishermen as "*the fisheries within family, no fishing boat or with small size fishing boat less than 10 ton gross, fishing activities are for sufficiency*". Consequently; LSF should refer to "*the fisheries with medium or large size of motored fishing vessels more than 10 ton gross using more advanced technology and operate fishing offshore*". Large-scale fishing operations are based largely in urban areas responsible for major annual catch of Thailand. The fishing effort of LSF defined by duration of fishing varied between 3 days to more than a month depending on their size of vessels. Most of crews of LSF are migrants from Myanmar, Laos, Cambodia and Vietnam.

4.2 Importance of LSF to the economy, livelihood and food security

The fishing industry was the economic backbone of many Thai coastal cities. LSF sector was of major importance to the economy, livelihood and food security as an earner of foreign exchange, employment creation, contribution to the gross domestic product, increasing supply to meet consumer demand and generate income to purchase other food products. In 2004 marine fisheries production was 2.64 million mt which ranked the ninth of the world which LSF contributed approximately 90% of total production but the production was come from both within and outside Thai waters. Estimated annual per capita fish consumption in Thailand is about 35 kg illustrated that fish is important for Thai consumers. The fish consumed mostly from capture fisheries which is around 73 %, only 27 % comes from aquaculture in year 2003. In terms of export, Thailand ranked the third of the world. The export of fish and fish products in 2004 was 4,413 million USD and reached 4,865 million USD in 2005. This represents 10.24% increase in terms of value. The Gross Domestic Product (GDP) for fisheries in 2004 was 16% accounted for 1.6% of GDP of the whole country.

Table 4. Fish Products Exported during 2004-2005

Items	2004		2005	
	Volumes (MT)	Values (million USD)	Volumes (MT)	Values (million USD)
Shrimp	240,957	1,683	282,974	1,790
Cephalopod	106,411	425	99,612	401
Fish	421,482	471	497,121	537
Other Fisheries Product	888,298	1,835	961,890	2,137
TOTAL	**1,657,148**	**4,413**	**1,841,597**	**4,865**

4.3 Current issues of concern, problems and constraint

1. Government control is limited. Although the use of certain kinds of fishing gear within three kilometers of the coast was banned, there appeared to be no restriction on trawl net-mesh size and undersized commercial food fish were being caught and dumped in with trash fish in the production of fishmeal.
2. Increase in pressure as neighboring countries claimed territorial waters extending to 200 nautical miles from its coast. This reduced the fishing grounds in the Gulf of Thailand and in the Andaman Sea available to Thai fishermen and hence increased the intensity of fishing off the coast of Thailand.
3. The fish resources in coastal waters have been severely depleted, as shown by estimates of potential yields of various fish stocks, the change in catch composition towards smaller-sized fish and low value species.
4. The conflict between SSF and LSF, although large-scale fishing units are often prohibited by law from operating in the coastal area reserved for the SSF, the presence of high-value species, such as shrimp, and the higher fish densities in shallow waters which characterizes tropical ecosystems as well as increasing fuel costs coupled with enforcement difficulties result in encroachment and open competition between the two fisheries over the same resource. This leads to overcrowding effects and physical conflict between gears such as trawl net and stationary gear.
5. Excessive fishing vessels and probably number of non-registered fishing vessels are equal to number of registered fishing vessels.
6. Destructive fishing gears are still used.
7. Increase in fuel costs.
8. The outcomes from the research are rarely applied to management actively.
9. Lack of local laborer but increase in illegal foreign workers from Myanmar, Cambodia, Laos and Vietnam.
10. Fisheries law is out of date.

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