MARINE FISHING INDUSTRY IN THE MEKONG DELTA, VIETNAM : PRESENT STATUS AND RECOMMENDATIONS FOR FUTURE DEVELOPMENT

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ABSTRACT

In 1994, the Mekong Delta had 14,337 fishing boats. They exploited 404,500 tons of products from 220,000 km^2 of the Economic Exclusive Zone, that covers respectively 44% and 60% of national and regional fisheries' production. Traditionally developed since the beginning of the twentieth century, the industry has undergone different stages by political changes. In recent years, dramatic changes arose from the motorisation and the introduction of high productive new fishing gears (trawl net, gill net and encircling net) for off-shore fishing to prevent the exploitation in the coastal areas.

Meanwhile, longlines, stow nets, scrape gears are also important. Private sector covers large proportion in the total production output. Cost structure and profitability depend on fishing types, scales and sectors.

The study also presents recommendations for further development of the industry. Particular emphasis is placed on gaining knowledge of resource management and fishing technology.

KEYWORDS : marine fishing, fishing gears, industry.

ABSTRAK

Pada tahun 1994, Delta Mekong memiliki 14437 perahu penagkap ikan yang mengeksploitasi 404.500 ton ikan dari 220.000 km^2 dari ZEE yang meliputi 44% produksi total nasional dan 60% produksi regional. Industri penangkapan ikan laut sudah berkembang secara tradisional sejak awal abad ke-20 dan melewati beberapa tahap perkembangan seiring dengan perubahan politik. Dewasa ini, industri tersebut mengalami perubahan yang dramatik, yang ditimbulkan oleh motorisasi dan introduksi jenis alat tangkap baru yang tinggi produktivitasnya (termasuk trawl, jaring insang dan jaring lingkar) untuk penangkapan ikan di wilayah lepas pantai, dalam rangka mencegah eksploitasi yang berlebihan di wilayah pantai. Sementara itu, alat tangkap lain yang juga penting dan dominan digunakan adalah pancing rawai, pukat kanton, alat pengumpul (longline, stow gear, scrape gear) dan sebagainya. Sektor swasta melingkupi proporsi besar dalam struktur sektoral dan dalam hasil produksi total. Ekonomi dari industri tersebut dalam arti struktur biaya dan keuntungan tergantung dari tipe, skala dan sektor penangkapan. Makalah ini terutama menekankan pada perolehan pengetahuan untuk pengelolaan sumber daya, perbaikan alat tangkap dan teknologi penangkapan. Selain itu juga membahas rekomandasi untuk pengembangan industri selanjutnya.

KATA KUNCI: perikanan laut, alat tangkap, industri.

The Mekong Delta, located between the latitude 7-10°30' N and the longitude 102°30'-109°E belongs to the southern part of Vietnam (Fig. 1). The Delta has 4 millions ha of land and about 220,000 square kilometres of the Economic Exclusive Zone (EEZ). It is divided into eleven provinces, of which six coastal provinces (Tiengiang, Bentre, Travinh, Soctrang, Angiang, Minhhai and Kiengiang). The coastline of 900 km stretches from Vungtau to Hatien (Tuan and Phuong. 1994).

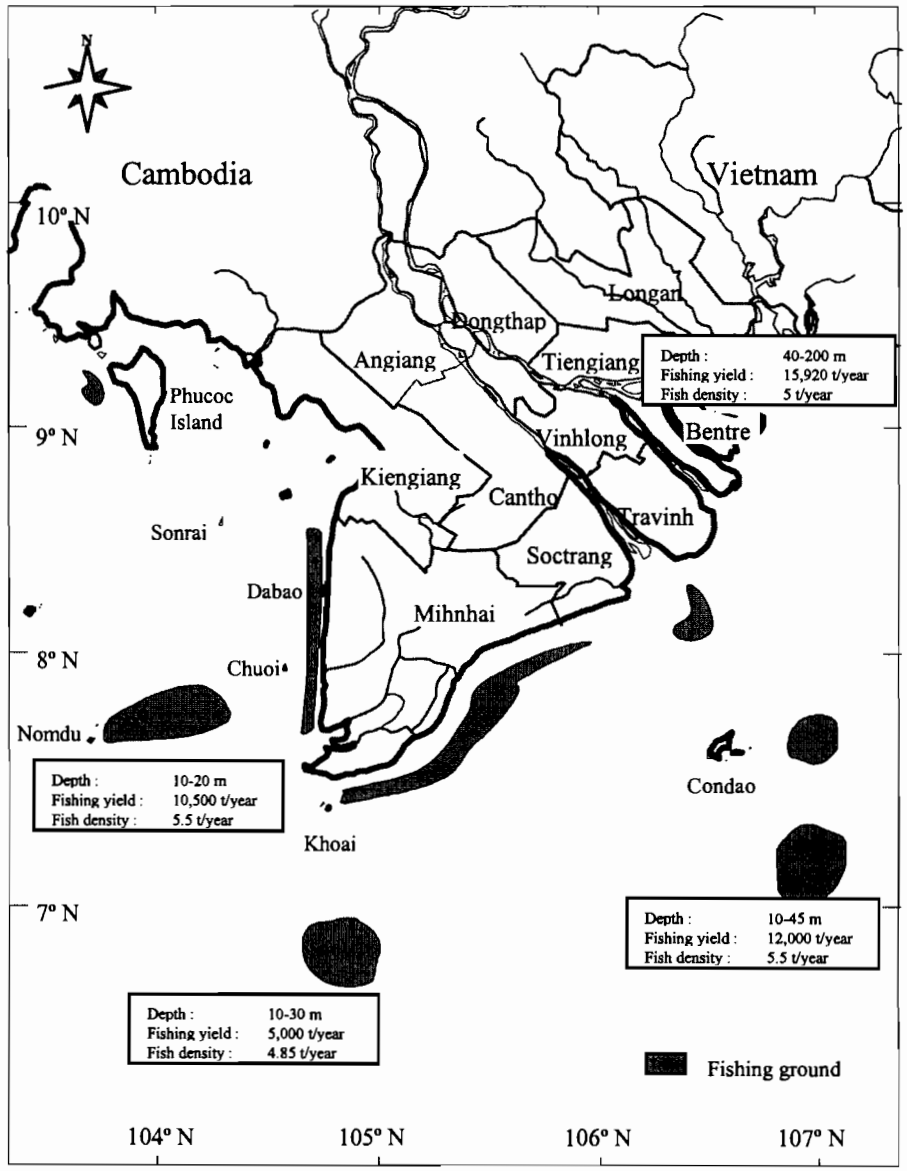

Figure 1 : Map of provinces of Mekong Delta
Peta sejumlah propinsi di Delta Mekong

The fishing grounds of the Mekong Delta are mainly located in the South China Sea (south-east area) and in the Gulf of Thailand. However, they are also very attractive for other fishing fleets from the central and the northern parts of Vietnam.

The traditional fishing industry of the Mekong Delta had taken advantage of favourable natural conditions to produce significantly for local consumption. In recent years, the fishing of the Delta has rapidly developed and become main instance. In 1994, its production arrived at respectively about 60% and 40% of the regional and national fisheries' production.

This study aims to understand the general picture of the fishing of the Mekong Delta from the past to the present, particularly :

- to understand the development and the fishing gear structure of the industry,
- to identify the sectorial structure,
- to analyse costs, gross revenues and profitability according to the distinct fishing types,
- to propose recommendations for further development of the fisheries.

MATERIAL AND METHOD

Statistical data were gathered from the Provincial Departments of Fisheries and other related authorities (Fisheries Resources Protection and Management Units, Fishing Companies, etc.)

Cost and return used for comparing six main fishing gears (trawl net, gill net, encircling net, longline, stow net, and scrape net) were obtained from the survey of income and expenditure (27 September to 30 December 1994) through questionnaires. Considering the geographical characteristics and distribution of fishing activities, samplings were taken from 20 villages of three provinces including Kiengiang, Mihnhai and Tiengiang. The sample size was determined according to the existing numbers of the fishing boats and horsepower groups of each production type. It equalled to about 10% of total number of fishing boats (Tab. 1).

Historical developments were obtained from interviews of old fishermen's generation and from records in library.

Table 1 : Number of samples by coastal provinces
Jumlah contoh menurut propinsi pantai

Fishing gear	Kiengiang	Mihnhai	Tiengiang	Total
Trawl net	108	60	30	198
Gillnet	71	39	22	132
Encircling net	10	5	2	17
Longline	66	42	17	125
Stow net	10	6	3	19
Scrape net	11	7	3	21
Total	276	159	77	512

RESULTS

Development of marine fishing industry in the Mekong Delta

- Before 1930

This period started by the Nguyen Dynasty's claiming on this area in 17th-18th centuries. Before 1930s, fishing activities dominated only in the inland and inshore areas. Small boats and rafts were used. The fishing tools were very simple such as small gill nets, cast nets, fences or trap nets.

- From 1954 to 1975

The Delta was under the regime of the Republic of Vietnam. With the financial aid from the American Government and the business cooperation between big organisations and individuals, the marine fishing industry had considerably developed. Fishing companies had been created and a number of rich owners had obtained boats of average and large size. Then, the number of labourers in this industry had significantly increased. However, the war was a limitation factor to the fisheries' growth

The fishing boats, then, exploited the off-seashore. Pelagic fishing boats equipped with gill nets, mackerel longlines, sailed as far as hundreds of nautical miles away from the shore. Meanwhile, other supporting activities were developed, for instance fish-cargoes and fuel supplying boats. Ice mills and fish processing factories were also built near the main fishing ports of Kiengiang province.

Traditional fishing gears (stow nets, beam trawl nets, mullet nets, fences and traps) continued to expand beside the setting up of new fishing gears such as mackerel gillnets or shark gillnets. In 1973 and 1974, the fishing output reached about 500,000 tons per year. According to Thong (1994), the number of fishing boats in the South Vietnam increased from 7,000 units in 1954 to 92,265 in 1973. Motor boats increased from only 5 units to 63,709 in the same period.

- From 1975 to now

Since the revolution of 1975, marine fishing industry has undergone different stages due to the national policy oriented towards socialism.

From 1976-1985, Vietnam reorganised the fisheries in the frame of cooperatives. The government controlled the industry through allocating fishing targets and supplied fishing gears, engines and other materials as well. The Government also organised procurement, processing and export of products. There were remarkable changes during this period.

During the short period after 1975, many fishing boats had disappeared through the illegal overseas immigration, and the fishing yield decreased consequently. Again, during the period 1979-1982, the number of boats continuously decreased because of the legal and illegal overseas immigration as well as because of the shortcoming of the cooperatives and nationalised system.

Since 1983, the Government has turned towards the market economy. The marine fishing resumed the progress with increasing number of boats and yields. Unsuccessful state-owned enterprises and cooperatives were liquidated, and both state and private units were encouraged to take initiatives. Fishermen, therefore, have been prosperous and many of them were able to set up their own enterprises. The flotillas have enlarged fishing grounds up to the off-shore areas. Besides, because of the exhaustion of inshore fishing areas and the need of resources conservation, fishermen have been improving their fishing means for offshore fishing.

Present characteristics of marine fishing in the Mekong Delta

The fishing industry of the Mekong Delta has been growing during the last few years (Tab. 2). Trawlnets, encircling nets, gillnets, longlines, stow nets, scrape nets and trap nets are currently major fishing gears. Nevertheless, because of the over-exploitation in the coastal areas, of pollution and ineffective fishing management, the inshore fish resources are seriously decreasing.

Table 2 : Number of fishing boats and horse power in the Mekong Delta
Jumlah kapal penangkapan dan kekuatan mesin di Delta Mekong

Year	Number of boats	Total horsepower (HP)
1980	4,794	60,904
1985	8,835	133,907
1987	9,634	163,563
1990	11,132	211,325
1991	11,546	262,109
1992	11,907	326,598
1993	13,075	396,174
1994	14,317	500,570

The fishing industry in the Delta is seeking to the off-shore fishing grounds through the improvement of fishing technology and boat capacity. There is also a trend in restructuring of fishing gears, especially from 1991 to 1994. Fishermen using respectively longline (32% of them), gill net (23%), trawl net (19%), encircling net (17%) and scrape net (12%) came from using other fishing gears. Moreover, many fishermen went from simple gears (stow net or scrape) to more efficient gears (gill net, trawl net or encircling net).

Long coastal areas and Economic Exclusive Zone of the Delta have a high potential with eight fishing grounds (Tab. 3), among which the distribution of species is very different. The fishing activities, therefore, depend on seasons (Tab. 4), target species and types of fishing gears (Tab. 5) as well.

Table 3 : Fishing grounds and fisheries resources in the Mekong Delta
Daerah penangkapan dan sumber daya ikan di Delta Mekong

Fishing grounds	Deepth (meter)	Bottom structure	Species
• South-East of Phanthiet and North of "Thu" islet	20 - 45	muddy	scad, lizard fish
• South-East of 'Thu" islet	40 - 200	sand and mud	snapper, scad, lizard fish
• 'Conson" island	25 - 40	sand and mud	scad, lizard fish, yellow strip trevally
• "Hau" river estuary	10 - 20	sand and mud	common ponyfish, lined silver grunt, spotted sardine
• "Chuoi" to "Namdu" islet	10 - 20	sandy mud and mud	giant catfish, lined silver grunt, goatfish, ornate threadfin bream
• South-East of "Camau" cape	10 - 20	sandy mud and mud	scad, mackerel, sardine, giant catfish
• South of "Khoai" islet	10 - 30	sandy mud and mud	seabream, mullet, trevally, scad, pomfret, mackerel
• South-East of "Trung" islet	10 - 45	sandy mud	bream, lezard fish, Malabar Jack, trevally, ponyfish, mackerel, tuna
• "Mythanh" estuary	5 - 32	mud	pink shrimp, banana shrimp
• "Bode" estuary to "Khoai" islet	5 - 15	sandy mud and mud	pink shrimp, banana shrimp
• "Dabac" islet to "Sonrai" islet	8 - 15	sandy mud and bivalve	tiger prawn, king prawn, pink shrimp, slipper lobster
• "Dabac" islet to "Honchong"	5 - 10	sandy mud and mud	king prawn, white shrimp, pink shrimp

Table 4 : Seasons and fishing grounds of coastal provinces in the Mekong Delta
Musim dan daerah penangkapan di beberapa propinsi pantai di Delta Mekong

Fishing gears	Fishing seasons	Fishing grounds
Trawl net	November - April	gulf of Thailand
	May - October	South-East sea of the Mekong Delta
Gillnet	November - February	Condao area
Encircling net	April - November	South-East sea of the Mekong Delta
	November - April	gulf of Thailand
Longline	November - April	Condao area
Stow net	all the year round	seashore along the Mekong Delta
Scrape net	all the year round	seashore along the Mekong Delta

Table 5 : Distribution of boats by type of gear and coastal province in the Mekong Delta, in 1994
Penyebaran kapal berdasarkan jenis alat penangkapan di beberapa propinsi pantai di Delta Mekong pada tahun 1994

Province	Trawl net	Gillnet	Encircling net	Longline	Stow net	Scrape net
Tiengiang	231	209	68	362	-	-
Bentre	585	342	19	189	72	-
Travinh	317	190	1	16	107	-
Soctrang	206	157	21	4	45	-
Mihnhai	1,034	917	100	835	335	409
Kiengiang	2,498	1,570	290	1,339	-	305
Total	4,871	3,385	499	2,745	559	714

Table 6 : Distribution of boats by type of gear and coastal province in the Mekong Delta, in 1994 (%)
Penyebaran kapal berdasarkan jenis alat penangkapan di beberapa propinsi pantai di Delta Mekong, pada tahun 1994 (%)

Province	Trawl net	Gillnet	Encircling net	Longline	Stow net	Scrape net
Tiengiang	5	6	14	13	-	-
Bentre	12	10	4	7	13	-
Travinh	7	6	∈	1	19	-
Soctrang	4	5	4	∈	8	-
Minhhai	21	27	20	30	60	57
Kiengiang	51	46	58	49	-	43
Total	100	100	100	100	100	100

The fishing industry in the Delta is characterised as small-scale industry. 98.5% of fishing boats belonged to private owners. In 1994, 38% of the fishing households used trawl nets, 26% gill nets, 4% encircling nets, 21% longlines, 6% stow nets and 4% scrape nets (Tab. 6).

• Trawl net

There are two groups of trawl nets. Bottom trawl is used in the coastal and off-shore areas, while beam trawl net mainly operates on the bed rivers. The productivity of trawl net is the highest among fishing gears. Their number has been dramatically increasing, since they currently reach 4,871 boats.

• Gill net

Used to catch pelagic and demersal species, their output is ranked as the second place after trawls. These gears have becoming more abundant in the last period, with 3,385 boats.

• Encircling net

It focuses on pelagic fishes such as spotted sardine, Commerson's anchovy, giant catfish, round scad, white croaker and Indian mackerel. Its output is growing, with 499 boats recorded in 1994, due to the enlargement of the boat size and the installation of stronger motors.

• Longline

This gear has been moving from the inland area towards the coastal area and the off sea for better productivity. There has been also an improvement of this fishing type, such as the structure of longline and the installation of motors for off-shore fishing. In 1994, 2,745 boats were recorded.

• Stow net and Scrape net

These gears were the most affected by the decrease of resources along the coastal areas. They also caused the lowering of resources. During the last years, there has been a redeployment from these gears to other types. In 1994, 559 boats were equipped with stow nets and 714 boats with scrape nets.

Economy of fishing in the Mekong Delta

- Cost structure of marine fishing industry

Cost structure can be grouped into fixed and variable costs.

The fixed costs change according to the fishing gears, the size of boat, engine, fishing device. They also vary according to the status of boat, engine and gear. For encircling net and trawl net, fixed costs were higher than for other gears. The fixed costs of stow nets and scrape nets were the lowest. The most expansive item is the cost of boat (Tab. 7).

The variable costs can be divided into three groups according the different fishing types :

- the first group includes the most expansive items, that vary from 25.5% to 34.4% (labour) and 11.7% to 37.4% (gasoline) of the total variable costs;
- the second group (oil, ice, food, taxes and maintenance) covers 3.5 to 10% of the total expenditure;
- the third group of other costs is around 2% of total variable costs (Tab. 8).

Table 7 : Fixed costs of different fishing gears in the Mekong Delta in 1994 (US$ 1,000)
Biaya-tetap dari berbagai jenis alat penangkapan di Delta Mekong, 1994

Fishing gears	Horsepower				
	<10 HP	11-45HP	46-90HP	91-250 HP	>250 HP
Trawl net					
boat	1.74±1.890	4.62±3.530	10.6±8.090	15.31±12.67	2.312±10.82
engine	0.74±0.880	2.33±1.620	5.12±3.620	4.69±3.440	6.36±2.470
fishing gear	0.168±1.152	0.174±0.128	0.384±0.303	0.494±0.320	0.886±0.443
Gill net					
boat	0.235±0.169	2.89±4.330	10.64±5.390	12.89±5.860	
engine	0.170±0.077	1.2±1.290	3.23±1.610	6.47±3.540	
fishing gear					
Encircling net					
boat		22.13±16.52	18.83±14.26	22.88±13.63	
engine		7.0±1.870	7.25±3.760	4.08±1.650	
fishing gear		10.8±2.410	12.5±2.430	7.58±5.740	
Longline					
boat	0.833±0.920	4.35±4.380	15±4.720		
engine	0.29±0.222	1.67±1.510	3.48±2.420		
fishing gear	0.159±0.235	0.623±0.495	1.02±0.408		
Stow net					
boat	0.391±0.984	3.17±1.570			
engine	0.301±0.436	2.03±0.596			
fishing gear	0.325±0.109	0.37±0.349			
Scrape net					
boat	1.05±1.310				
engine	0.536±0.384				
fishing gear	0.069±0.050				

Table 8 : Structure of variable costs of different gears in the Mekong Delta in 1994 (%)
Struktur biaya-biaya tidak tetap dari berbagai alat penangkapan di Delta Mekong pada tahun 1994 (%)

Cost structure (%)	Trawl net	Gill net	Encircling net	Longline	Stow net	Scrape net
Labor	27.8±11.9	31.4±20.6	31.6±12.7	34.3±17.2	28.8±29.9	25.6±22.9
Gasoline	37.4±14.4	25.0±14.1	19.8±9.20	24.7±14.5	11.7±10.7	37.4±27.1
Oil	3.13±4.54	30.1±3.00	8.80±2.59	2.28±1.45	1.99±1.84	4.41±3.49
Ice	6.20±5.39	8.30±3.60	9.85±5.78	2.80±5.07	-	3.85±5.34
Food	5.77±4.60	8.74±8.36	2.80±5.07	10.0±11.2	6.80±9.4	6.55±5.28
Other costs	1.36±2.10	1.23±2.32	3.73±7.13	4.82±10.5	6.36±7.97	1.27±1.65
Boat maintenance	4.00±4.32	4.58±3.05	4.66±1.81	4.24±3.91	7.36±4.68	3.12±3.16
Engine maintenance	4.45±3.63	4.61±3.38	4.84±3.02	4.00±4.33	4.57±3.98	3.41±0.40
Devices maintenance	2.82±2.40	6.74±7.06	5.99±5.67	3.40±3.79	15.2±14.7	3.35±3.07
Tax	5.89±3.92	7.16±8.41	9.20±11.6	4.85±4.88	11.3±14.3	5.93±4.80
Other	1.13±1.85	1.56±5.21	2.41±2.12	3.07±4.46	5.90±7.75	1.67±1.76

• Target species and catch value

Most of the fishing grounds in the tropical region enable fishermen to catch a wide variety of aquatic commodities. However, the fishermen always give priority to catch high priced commodities. The main species for trawl nets are shrimp, grouper, goldfish, croaker, ponyfish and threadfish. Gill nets are seeking mackerel, giant catfish, tuna, shark and cabio. The targets of encircling net are sardine, anchovy, scad, Indian mackerel and croaker. Longlines catch shark, sting ray, conger-pike and squid. Stow net and scrape are specialised in shrimps.

• Catching productivity

Thong (1994) reports that the productivity per unit of horsepower of trawl net, encircling net, gill net, longline and other fishing gears was gradually reducing between 1991-1993 (Tab.9).

In the Mekong Delta, the average catching productivity per unit of horsepower was obviously reduced from 1980 to 1994 (from 3.31 tons/HP to 0.89 ton/HP). However, the productivity was different according the coastal provinces of the Delta (Tab. 10). During the period 1980-1994, the Travinh province had the highest productivity (more than 3.0 tons/HP), while the lowest belonged to Kiengiang, Tiengiang and Bentre. Generally, the productivity of most fishing grounds in the Mekong Delta has been reducing obviously.

Table 9 : Fishing productivity in Vietnam
Produktivitas penangkapan di Vietnam

Fishing gears	Productivity (Ton/HP)		
	1991	1992	1993
Trawl net	0.7	0.58	0.55
Encircling net	0.75	0.75	0.72
Gill net	0.79	0.62	0.57
Longline	0.49	0.48	0.46
Others	0.83	0.61	0.65

Source : Thong, 1994

Table 10 : Fishing productivity (Ton/HP) in the Mekong Delta
Produktivitas penangkapan di Delta Mekong

Location	1980	1985	1990	1992	1993	1994
Mekong Delta	3.31	1.98	1.25	0.97	0.96	0.81
Kiengiang	1.40	1.56	0.99	0.67	0.74	0.60
Minhhai	2.29	2.40	1.19	1.10	1.16	1.06
Soctrang	-	1.13	0.99	0.79	0.83	0.82
Travinh	-	-	3.19	4.14	3.83	3.42
Bentre	-	2.63	1.62	1.20	0.87	0.63
Tiengiang	-	1.10	1.26	0.79	0.48	0.56

Source : Ha Xuan Thong, 1994

- Profitability of marine fishing industry in the Mekong Delta

  - Gross revenue

Gross revenue is calculated from total caught products sold and the unit prices of products. It varies significantly according to the fishing gears, fishing scale and target catching species. The highest revenue in 1994 belongs to the encircling net (US$ 23,180 ± 20,810), while the lowest is the scrape net (US$.4,308 ± 2,469).

- Gross economic profit (gross income)

Gross economic profit, also called operating profit, is the difference between the gross revenue and the operating costs. In 1994, the best profits came to the trawl net (US$ 5,910 ± 9,510) and longline (US$ 4,650 ± 6,341), meanwhile the lowest was obtained by scrape net (US$ 912 ± 1,589). Between these two extremes, there were results of encircling net (US$ 3,834 ± 9,866), gill net (US$ 3,340 ± 4,880) and stow net (US$ 2,690 ± 3,510). High standard deviation value of the mean indicates a wide range of gross economic profit among boats. The gross economic profit not only depends on the fishing scales and the use of modern technologies. It is also function of the skills of the fishermen and the abundance of fish.

This study also showed that a number of fishing units had a gross economic profit less than zero. The ratios of gross economic profit failures were 29.4% of encircling nets, 28.6% of scrape net, 15.8% of stow nets, 13.8% of trawls, 10.6% of gill nets and 7% of longlines. The failure groups belonged to the smallest fishermen, unable to modernise their equipment for fishing off-sea, while the resources along the coastline had been over-exploited. So that, these groups probably have fewer chances to continue the fishing activities.

RECOMMENDATION FOR FURTHER DEVELOPMENT OF FISHING IN THE MEKONG DELTA

The marine fishing in the Mekong Delta is gradually developing. However, several factors that are affecting the development of this industry should be carefully considered.

The fishery resources in the coastal areas are dramatically decreased due to over-exploitation and the use of small size meshes of fishing gears. Meanwhile, the rules in fishing and resources management are not effective. So that, the following tasks have to be put in priority :

- stock assessment and management plan for the in-shore fishing grounds;
- evaluation of off-shore fishery resources and fishing grounds;
- implementation of resource management and regulation in fishing industry.

Small-scale fishermen are unable to improve boats and motors for moving to off-sea fishing grounds. They still remain relied to the inshore fishing grounds. Such a situation is leading to poor profit and resource problems. Development of credit systems for small-scale fishermen would be very important and urgently needed.

Infrastructure development like fishing ports, transportation, pre-processing and process factories and supporting services such as motors, equipment for nautical communication, ice factories, cargo boats, post harvest technology to minimise lost are very important.

Promotion of fisheries' extension is also very important. The following tasks should be done :

- disseminating successful fishing experiences;
- gaining knowledge of resource exploitation, management and conservation;
- gaining knowledge of post harvest technology to fishermen.

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