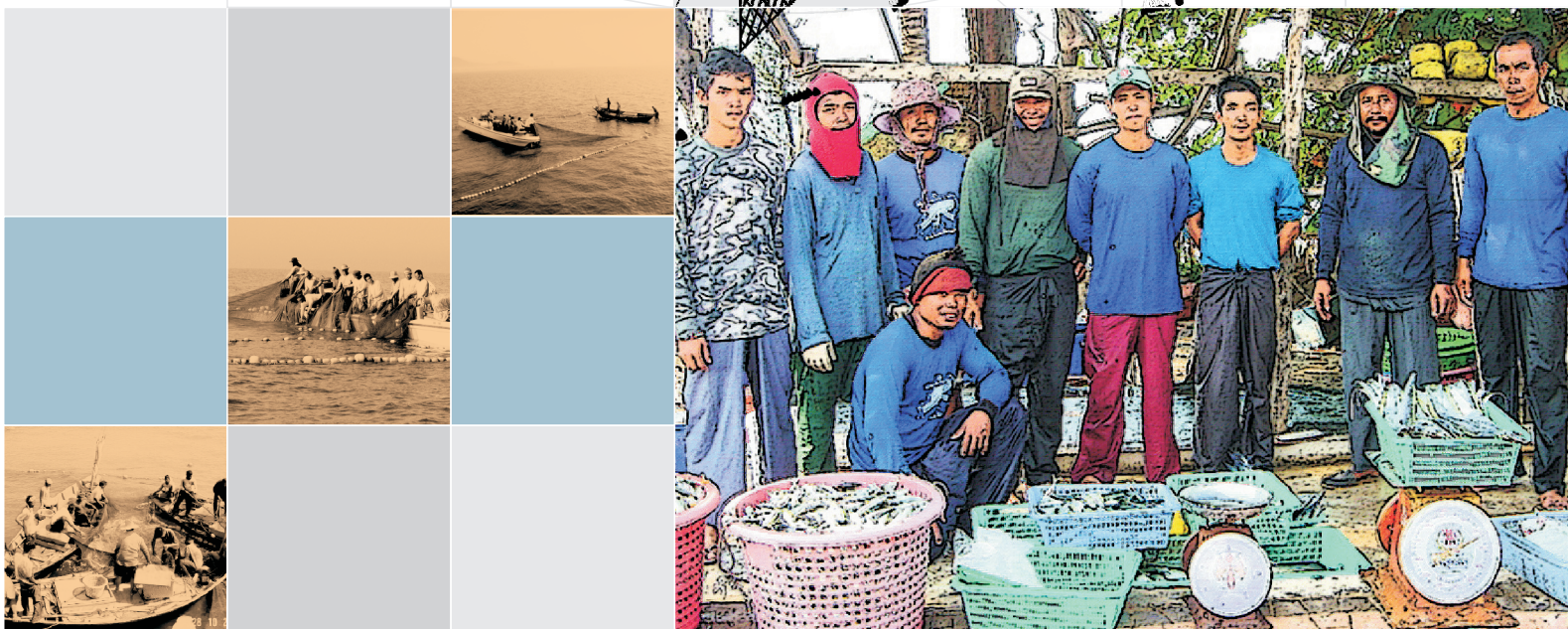
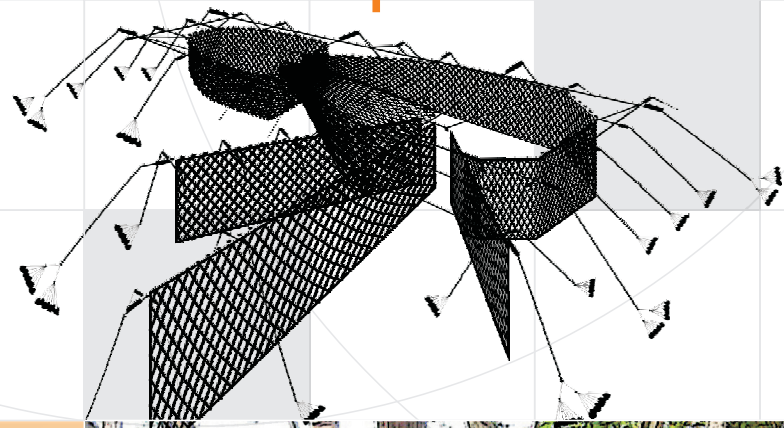


THE IMPLICATION OF SET NET FISHERIES TO COASTAL FISHERIES MANAGEMENT

Introduction of
Set-Net Fishing to Develop
Sustainable Coastal
Fisheries Management
in Southeast Asia :
**Case study
in Thailand,
2003-2005**

Pattaratjit Kaewnuratchadasorn
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Phattareeya Suanrattanachai



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by

**Pattaratjit Kaewnuratchadasorn
Narumol Thapthim
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**Introduction of Set-Net Fishing to Develop Sustainable Coastal Fisheries Management
in Southeast Asia: Case Study in Thailand 2003-2005**

**A Collaborative Project between SEAFDEC/TD
and
Department of Fisheries, Thailand**



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FOREWORD

Following the adoption of the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region during the ASEAN-SEAFDEC Millennium Conference in November 2001, the SEAFDEC Training Department took the responsibility of implementing a project on Coastal Fisheries Management under the ASEAN-SEAFDEC Fisheries Consultative Group (FCG) collaborative mechanism.

Consequently, a pilot project on the “Introduction of Set-Net Fishing to Develop Sustainable Coastal Fisheries Management” was initially implemented in Thailand in 2003 and the coastal area of Rayong Province was selected as the project site. The project, which was supported by the Trust Fund Program of the Fishery Agency of the Government of Japan, was conducted with the cooperation among the local fishermen, the Eastern Marine Fisheries Research and Development Center (EMDEC) and SEAFDEC/TD with technical assistance from the Tokyo University of Marine Science and Technology (TUMSAT) and Himi City, Japan. Through the pilot project, it was envisaged that fishing pressure on coastal fishery resources through the introduction of set net as a passive fishing gear would be reduced, fishing competition in congested fishing ground alleviated by organizing collective fishing operation on set-net, and common policy concept of fishery management could be developed for fishing gear occupying wide fishing ground such as the set-net.

After the project activities ended in 2005, SEAFDEC/TD continued to conduct follow-up activities through the project on Improvement of Set-Net Fishing Technology Transfer for Sustainable Coastal Fisheries Management in collaboration with the Rayong Set-Net project. This follow up project aimed to come up with recommendations and comments based on the lessons learnt, and plans for further promotion of an appropriate fishing gear to the fishers in the region.

Although this publication is based on results of the survey of fishermen around the set net project area in Rayong, Thailand, it is expected to shed light on the impact of the adoption of set net as a passive fishing gear, on the efforts of SEAFDEC to promote coastal fisheries management in the ASEAN region. It has always been the intention of SEAFDEC to disseminate the lessons learnt from this pilot project to the other countries in the region to assist them specifically in their respective efforts of promoting coastal fisheries management.



Mr. Siri Ekmaharaj, Ph.D
Secretary-General of SEAFDEC

PREFACE

The project on the “Introduction of Set Net Fishing to Develop Sustainable Coastal Fisheries Management in Southeast Asia: Case Study in Thailand”, which received funding support from the Japanese Trust Fund, was implemented since 2003. The set net activities were carried out mainly by the local small-scale fishermen who voluntarily participated in the group, with the cooperation of the Eastern Marine Fisheries Research and Development (EMDEC) of Rayong Province and with technical advice from Himi set-net fisheries cooperative, Tokyo University of Marine Science and Technology (TUMSAT) as well as the SEAFDEC Training Department. From the implementation of the set net activities, the members have indicated that their experience with this new fishing technology could help improve their knowledge and skills in fisheries. Moreover, the successful set net fishers’ group could be developed into fisheries cooperatives in the future.

Since the coastal area of Mae Rumphueng, Rayong Province was selected as the project site where the set net fishing gear was installed, the feedback from other local fishermen who also use this coastal area as their fishing ground could serve as a good indicator of the success of the project. Hence, the opinion of fishermen was sought and the result of the study is intended to serve as important information on the impact of set net activities to other areas. The result could also serve as important lesson to reflect on specifically in considering the further development and promotion of the set net as a passive fishing gear, in the ASEAN region.

The Authors
March 2008

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The Authors
March 2008

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The Implication of Set Net Fisheries to Coastal Fisheries Management

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Abstract

The objective of this study was to analyze the opinion of the fishermen on the impacts of set net to their fishing and on the set net fisheries to coastal fisheries management. The data were collected by interviewing 60 local fishermen who fish along the Mae Rumphueng Beach, Rayong Province, Thailand from 28 to 30 March 2007, using a pre-designed questionnaire. The fishers' opinion on the status of the marine resource revealed that compared to the past, the status of the resource was poor as observed by 65% of the respondents. Others have indicated that the resource had not changed while some said that the resource was better (as rated by 32% and 3%, respectively). The results also indicated that 98.3% of the respondents have realized the importance of coastal fisheries management for the sustainable use of the coastal resources. They fully agreed with the suggestion that they should be involved and should participate in the coastal fisheries management. From the time the set net project was implemented, most of the fishers have been familiar with the set net project with 56.6% of the total respondents participating in the set net activities at least ones while 41.7% did not participate in the activities because they did not have enough information on the project. However, the fishermen positively agreed that the set net fishery is useful for fishery resources management even though they also indicated that it has no impact on their fishing activities. For the survey, the respondents considered were the ex-members of the set net fishers' group (58.3%) while the remaining 41.7% were never members of the group. The main reasons they gave for their lack of interest in becoming members of the group included their available time which did not match with the operating time of the set net activities, the income gained is less, and the uncomfortable feeling of working with other people (80%, 21.7% and 20%, respectively).

Key words: opinion, set net fisheries, coastal fisheries management, Mae Rumphueng Beach

The Implication of Set Net Fisheries to Coastal Fisheries Management

1. Introduction

Marine fisheries have developed rapidly in the Southeast Asian region. Consequently, the depletion of marine resources, the competition and the conflict among fishing boats are among the major problems that the coastal fishermen in this region have been suffering.

In accordance with the outcome of the ASEAN-SEAFDEC Millennium Conference held in November 2001, coastal fisheries management was one of the strategies identified as top priority for the sustainable development of fisheries in the ASEAN region. As a result, the SEAFDEC Training Department (SEAFDEC/TD) was made responsible for implementing a project on coastal fisheries management under ASEAN-SEAFDEC Fisheries Consultative Group (FCG) collaborative mechanism.

Thus, the “Introduction of Set Net Fishing to Develop Sustainable Coastal Fisheries Management in Southeast Asia: Case Study in Thailand” was conducted as a pilot project since 2003 by SEAFDEC/TD and the Eastern Marine Fisheries Research and Development Center (EMDEC) of the Department of Fisheries (DOF), Thailand in collaboration with the local fishermen’ group and supported by Japanese Trust Fund Program. The objectives of the project are to reduce fishing pressure on coastal fishery resources through the introduction of set net fishing gear, to alleviate fishing competition in congested fishing ground by organizing collective fishing operation on the set net, and to develop common policy concept of fishery management for fishing gear occupying wide fishing ground such as the set net.

For the project, the coastal waters of the Mae Rumphueng, Rayong Province, situated at 2.6 miles or 4.8 kilometers away from the shore (SEAFDEC, 2005) on the upper coast of the Gulf of Thailand, was selected as the project site.

The set net fishing gear is an alternative fishing technique introduced to the local fishermen. The implementation of the set net project has shown successes not only in terms of the catch but also in creating collaboration among the fishers and in the development as well as conservation of the coastal resources. In the beginning, eighty-five registered fishermen from seven fishing villages on the Mae Rumphueng Beach participated in the activities with supportive technical assistance from TD and DOF (SEAFDEC, 2005). Later, a fishers’ group committee was set up with the agreement of group members. Currently 10 fishermen¹ remained in the set net fishers’ group. These people certainly have derived some benefits from joining in the set net activities. However, since there are other fishermen who also use this area and its surrounding as their fishing ground, the views of the fishers outside the group on the coastal fisheries management project could provide good information for further promotion of the set net fisheries program.

Therefore, this study which emphasized on the implication of set net fisheries to coastal resources management, considered the result of the survey of a group of

¹ Data were updated on March 2007

fishermen who fish around the project area, focusing on the opinion of the group on coastal fisheries management and the impact of set net to their lives as well as the opinion of the fishers on the present set net fishers' group.

2. Objectives of the study

- To analyze the understanding of non-member fishers on the status of the coastal resources;
- To collect and evaluate the non-members' opinions on set net fisheries;
- To assess the recognition of non-members on the importance of set net fisheries to coastal fisheries management;
- To find out the reasons why non-members do not want to participate in the set net group.

3. Methodology

The survey was conducted along the Mae Rumphueng Beach, Rayong Province from 28 to 30 March 2007. The data were gathered from nine fishing villages, namely: Ban Khon Ao, Ban Naen Chan, Ban Hin Chon, Ban Naen Sao Thong, Ban Tapong Nok (Klong Kra-Chor), Ban Pa Khan, Ban San Jao, and Ban Phae (Fig. 1). The respondents were fishermen who have been fishing around this area. The total number of respondents for the survey was 60. A questionnaire was used as an instrument to gather the information (Annex 1). The data were analyzed using the SPSS software and presented through frequency percentages.

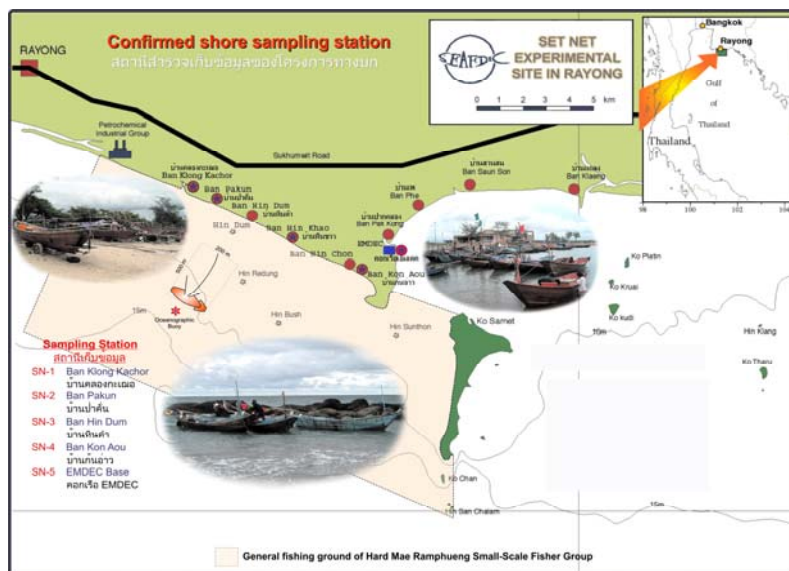


Fig. 1. The map of the survey area

4. Rationale of the study

In Thailand, majority of the coastal fishermen who fish on subsistence basis are employing the small traditional fishing gears such as trammel net, crab gill net, fish gill net, etc. As the small-scale fishers have been confronted with several problems and constraints that affected their incomes and living standards, many countries in the region have been seeking ways of helping their local people in attaining better livelihoods through sustainability in fisheries management.

In an effort to improve the living standard of the country's small-scale fishermen, the Department of Fisheries of Thailand has implemented a number of coastal fisheries management programs in many coastal areas of the country. Various strategies for coastal fisheries resources management have been adopted in such projects based on the nature of the local people in the communities, such as providing education, building awareness in marine resources conservation, establishing marine reserves, enforcing fisheries law and regulations, installing artificial reefs, etc.

Apparently, the Tenth National Economic and Social Development Plan (2007-2011) of Thailand had been promoting the capacity building of rural communities for economic and social development. In this regard, the DOF of Thailand acts as the responsible national agency in policy development for fisheries as outlined in the National Fisheries Development Policies which includes the development of fisheries and the organizations involved as well as in the Management of Fisheries Resources and Environment. The DOF has always promoted the participation of fishermen and the concerned organizations in fisheries administration, management and development; increasing the knowledge and skills of fishermen for their self-reliance; providing means for viable occupation as well as increasing their capability in managing their respective fisheries organizations.

Haad Mae Ramphueng, a huge expanse of beach area stretching 12 km along the eastern coast of the Gulf of Thailand with real fishing village marking where the beach ends, is one of Rayong's better known attractions located in Tapong Subdistrict. Since this beautiful sandy beach is admired by tourists who stop in this pleasant area for relaxation, this area could also serve as one of the potential economic areas in Rayong Province. Many seafood restaurants are located on the beach area serving menus using many kinds of live aquatic species such as live blue swimming crab, shells and fishes. The coastal area of Mae Rumphueng is a good fishing ground, where various kinds of fishing gear such as crab gill nets, fish gill nets, and squid/fish hand lines are being operated by local fishermen. The fishers' catches are supplied daily to restaurants along the beach and to local markets. There are no commercial fishing gears like trawlers and anchovy purse seines operating in this coastal area. Obviously, since the fisheries resources in this area have been densely exploited the abundance of such resources has been greatly affected. As a means of decreasing the pressure on the exploitation of the fishery resources, set net fishery was introduced to the community in 2003.

Set net fishery has been characterized as an alternative approach to alleviate the severe competition in a crowded fishing ground and the pressure on the fishery resources (SEAFDEC, 2005). The introduced fishing gear was adopted by the local fishermen

under a joint collaborative effort in terms of technical assistance between SEAFDEC and DOF of Thailand. Himi City-Government of Japan also offered its technical support and assistance at the beginning of the project. As the set net is a passive fishing gear that promotes aggregation of marine organisms, it was observed that the catch from the set net provided a significant variety of fishes with good quality. In other words, this could imply that high biodiversity was present in and around the area where the set net was installed.

The set net operations were carried out by the local small-scale fishermen who also volunteered to provide the manpower in constructing, deploying, operating, managing, and maintaining the gear. Through their participation in the activities, the fishermen could gain knowledge that has been transferred by the Japanese experts. This will be useful for the improvement of their skills and of their cooperative effort that could be developed into fisheries cooperatives in the future. Meanwhile, a fishers' group was established to organize the group's collective work and for the management of the fisheries with technical assistance from SEAFDEC and DOF.

As the Mae Rumphueng coastal area is also a fishing ground of small-scale fishermen who employ traditional fishing gear and fish near the set net area, it was also agreed to assess the impacts of set net fisheries to the small-scale fishermen as well as to analyze their opinion on the set net in relation to coastal fisheries management.

5. Results and Discussions

Based on the responses to the questions exploring the opinion of fishermen on the implication of set net fisheries, five main results of the survey are being presented in this report. These are: the general information on the respondents; information on the fishery sector; the opinion of fishermen on coastal fisheries management; the opinion of local fishermen on set net fisheries; and the opinion of fishermen on the set net fishers' group.

Part I: General information on the respondents

Sixty fishermen were considered as respondents of the interview survey. The ages of target respondents ranged from 25 to 66 years old with an average of 44 years old.

As indicated in Table 1, 88.3% of the respondents were born in Rayong Province, of whom 63.3% were born in Tapong Subdistrict and 25.0% in Phe Subdistrict. Another 11.6% of the respondents born in other provinces mostly came from the northeastern part of Thailand. Most of the respondents are married (90%), having attained their education mainly at the primary level (88.3%). Being conducted along the beach, the survey area covered Ban Khon Ao of Phe Subdistrict until Ban Rhuom Jai of Tapong Subdistrict.

Table 1. General information on the target respondents

General information	Number	Percent (%)
<u>Place of birth</u>		
Tapong subdistrict	38	63.3
Phe subdistrict	15	25.0
Other provinces	7	11.6
<u>Marital status</u>		
Single	6	10.0
Married	54	90.0
<u>Education</u>		
None	1	1.7
Primary school	53	88.3
Secondary school	4	6.7
Vocational school	1	1.7
No answer	1	1.7

Regarding the types of occupation, some fishers work not only in fishing but also engaging in other jobs to augment their incomes. Table 2 shows that 60% of the total respondents are fulltime fishermen followed by 23.3% employed in both fisheries and agriculture. Some of them work both in fisheries and restaurants (5.0%), and as employees in the fishery sector (5%).

Table 2. Types of occupation

Occupation	Number	Percent (%)
Fisheries	36	60.0
Fisheries and agriculture	14	23.3
Fisheries and restaurants	3	5.0
Employee in fishery sector	3	5.0
Fisheries and aquaculture	1	1.7
Fisheries and fish trading	1	1.7
Fisheries and mechanic repairs	1	1.7
Fisheries, Fish trading and agriculture	1	1.7
Total	60	100.0

The main sources income of the respondents were fisheries only (86.7%), while 5 % of the respondents indicated that they have major incomes from both fisheries and agriculture. The rest of the respondents have main incomes from other jobs such as mechanical repair, labor, fish trading, restaurant and tourism (1.7% each) as indicated in Table 3.

Table 3. Sources of income

Source of income	Number	Percent (%)
Fisheries	52	86.7
Fisheries and agriculture	3	5.0
Mechanical repairs	1	1.7
Labor	1	1.7
Fisheries and fish trading	1	1.7
Restaurant	1	1.7
Tourism sector (Banana boat rental)	1	1.7
Total	60	100.0

It was also found that most respondents have participated in the people’s groups at least ones. Fig. 2 exhibits the list of people’s group cited by the respondents. About 77% of the respondents are current members of the small-scale fishers’ group, followed by 13.3% and 1.7% with the Tapong Fisheries Co-Operative and the Village Fund Group, respectively. Still, few respondents (8.3%) indicated that they did not join any groups because they were not interested in working with any groups.

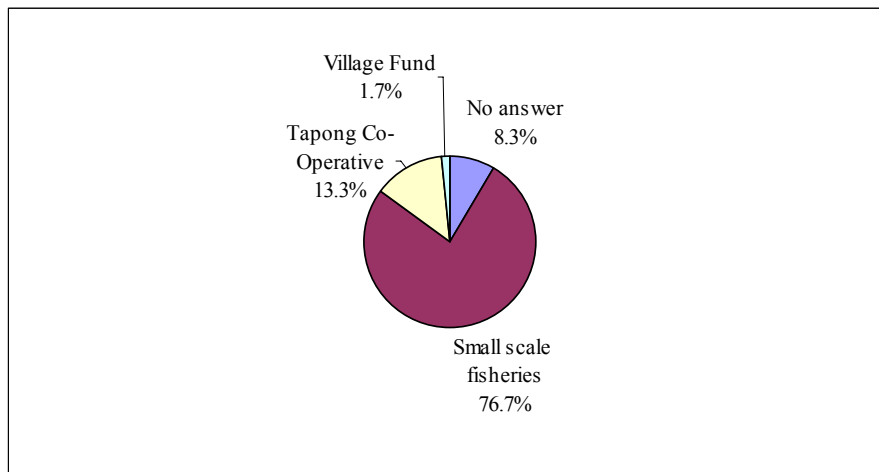


Fig. 2. List of people’s groups

Some of fishers were members of more than one people’s groups. Table 4 shows the cross tabulation between the types of people’s group comprising group 1 (first cited) and group 2 (second answer). Some fishermen have joined both the small-scale fisheries group and the Tapong CO-OP (3 fishers), small-scale fisheries group and village fund group (4 fishers), small-scale fisheries group and saving group (1 fisher), and small-scale fisheries group and mussel collecting group (3 fishers).

Each local people’s group has various purposes that persuaded the people in joining the group. The small-scale fisheries group is the most popularly joined group. Its objectives are to provide news and information to the members, empower the small-scale fishing group, mobilize funds for lending, and help enhance the marine resources. The objectives of the Tapong CO-OP and Saving Group, on the other hand are mainly for savings and lending. For the mussel collecting group, their purpose is to collect larvae from the natural source for culture activities.

Table 4. Types of local people's group: existence and membership

Group 1	Group 2						Total
	None	Small scale fisheries	Tapong Co-Operative	Village Fund	Saving Group	Mussel collecting group	
None	5	0	0	0	0	0	5
Small scale fisheries	35	0	3	4	1	3	46
Tapong Co-Operative	4	4	0	0	0	0	8
Village Fund	1	0	0	0	0	0	1
Total	45	4	3	4	1	3	60

Part II: Information on fishing sector

Twenty-eight respondents (46.7% of the total) revealed that they have worked in the fisheries sector for more than 21 years (Table 5). Most of them indicated that they have gained experience in fishing since they were young. However, some of the respondents migrated from other provinces and settled in Rayong Province permanently, and have also been engaged in fishing for a couple of years.

Table 5. Number of years working in fisheries

Number of years	Number	Percent (%)
0-5	6	10.0
6-10	1	1.7
11-15	9	15.0
16-20	16	26.7
≥21	28	46.7
Total	60	100.0

Most of target respondents have at least 1 fishing boat. The survey however, found out that one respondent (1.7%) had no fishing boat of his own, instead he hires fishing boat from other fishers, as indicated in Table 6.

Table 6. Number of fishing boats

Ownership	Number	Percent (%)
None	1	1.7
1 fishing boat	57	95.0
2 fishing boats	1	1.7
3 fishing boats	1	1.7
Total	60	100.0

Sixty-three fishing boats, which consisted of inboard powered engine fishing boats, long-tailed fishing boats, and unidentified (92.1%, 4.8% and 3.2%, respectively), were found along the beach in the study area (Fig. 3). From the survey, it was observed that the length of the inboard powered fishing boats ranged from 3 to 7.5 m but mostly 6 m

in length. For long-tailed boats, 3 fishing boats were found having different lengths, i.e. 3, 4 and 6 m (Table 7).

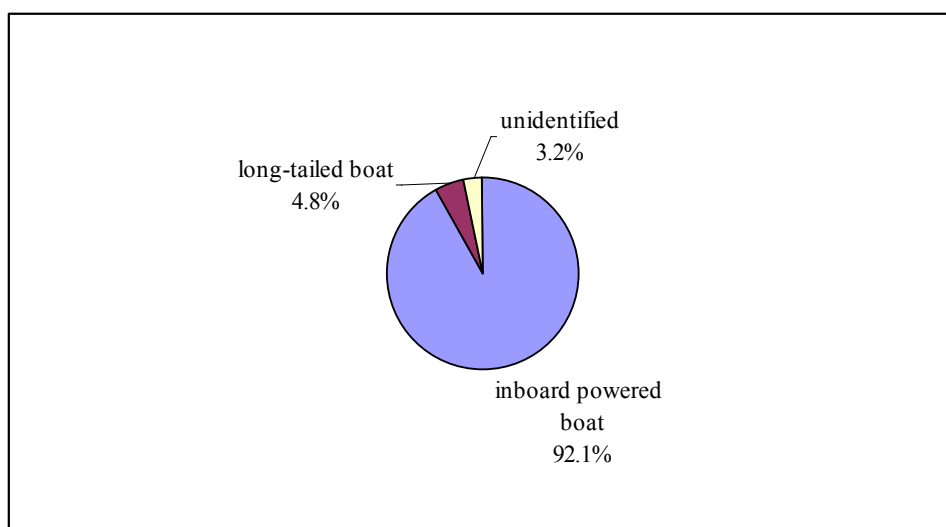


Fig. 3. Types of fishing boats

Table 7. Length of fishing boats by type of fishing boats

Length of fishing boat (m)	Inboard powered boat (%)	Long-tailed boat (%)
3	-	33.3
4.0	-	33.3
5.0	3.4	-
6.0	58.6	33.3
6.5	17.2	-
7.0	15.5	-
7.5	5.2	-
Total	100.0	100.0

In Rayong Province, the fishers use various types of fishing gear for catching the target fishes. In a year, the fishing gears are switched depending on the fishing season and sea conditions. This part of the survey gathered the necessary information from 59 of the total respondents because 1 respondent did not own any fishing gear. The results are shown in Fig. 4 and Table 8. However, as the data were collected only at a certain period of time (in March 2007), the results is not representative of a whole year trend.

Fig. 4 illustrates the fishing gears frequently used by each household. From the results, it is shown that 81.4% of the total respondents used crab gill nets as the main fishing gears, followed by squid trolling and squid hand line (8.5% and 5.1%, respectively) as these fishing gears can be operated the whole year round except during rough seas.

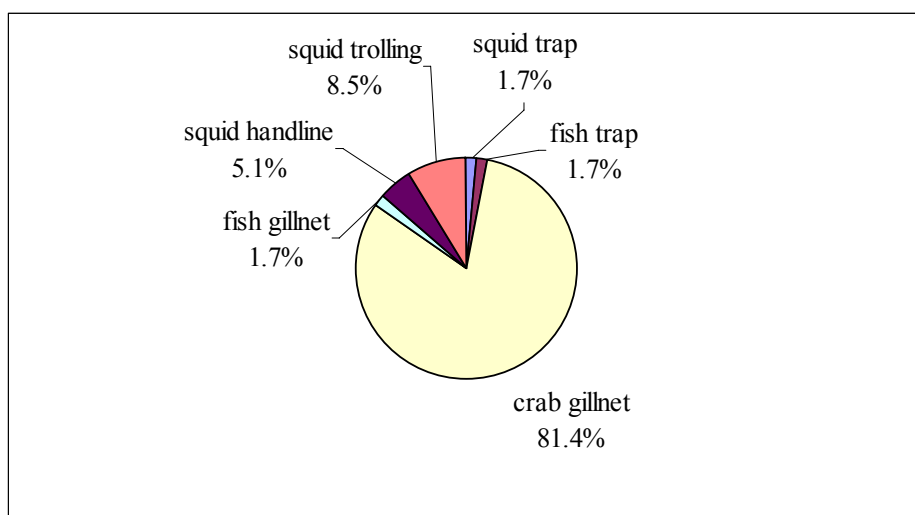


Fig. 4. Types of fishing gear

Table 8-A shows the combination of fishing gears which indicated that 34 respondents used at least 2 types of fishing gear. For example, 28 respondents owned both crab gill net and squid trap, crab gill net and fish trap, crab gill net and fish gill net, crab gill net and squid hand line, crab gill net and fish hand line as well as crab gill net and squid trolling.

In addition, 10 respondents owned 3 types of fishing gear. Aside from the combination mentioned above, they also used squid trap, fish gill net, fish hand line, squid trolling, jellyfish dip net (Table 8-B). Lastly, 3 respondents used 4 types of fishing gear (Table 8-C).

Table 8. The combination of types of fishing gear used

A. Gear1 x Gear2

Gear 1	Gear 2						Total
	Squid trap	Fish trap	Fish gill net	Squid handline	Fish handline	Squid trolling	
Squid trap	0	1	0	0	0	0	1
Fish trap	0	0	0	0	0	1	1
Crab gill net	8	2	2	5	4	7	28
Squid handline	0	0	0	0	3	0	3
Squid trolling	0	0	0	0	1	0	1
Total	8	3	2	5	8	8	34

B. Gear1 x Gear2 x Gear3

Gear1	Gear3	Gear2			Squid trolling	Total
		Squid trap	Fish gill net	Squid handline		
Crab gill net	Squid trap				1	1
Crab gill net	Fish gill net	1				1
Fish trap	Fish handline				1	1
Crab gill net	Fish handline	1		4		5
Crab gill net	Squid trolling				1	1
Crab gill net	Jellyfish dip net		1			1
Total						10

C. Gear1 x Gear2 x Gear3 x Gear4

Combination of fishing gear	Number
Crab gill net + squid handline + fish handline + fish trap	1
Crab gill net + squid trap + fish handline + squid trolling	1
Crab gill net + squid trap + fish gill net + shrimp gill net	1
Total	3

The fishermen have been fishing along the coast, which could be divided into 3 fishing zones, namely: from the sea shore to 3 km of the coast, surrounding the set net area, and area from 3 to 12 km.

When the fishers return back to the shore, their catch is immediately sold to buyers. On the Mae Rumphueng beach, there are 4 market channels for the distribution of the fish catch. These are the fish traders, restaurants, direct sale to tourists, and the fish retailers.

Fig. 5 presents the main channels of the catch distribution which composed of 91% to fish traders, 7% to restaurants, and 2% not for sale. Moreover, Table 9 reveals that the fishermen also have alternative routes for the distribution of their catches. From the results, 6 respondents indicated using 2 routes of distribution which are both fish traders and restaurants (2 people) and both fish traders and tourists (4 people).

The survey also found 2 households using 3 distribution routes, namely: the fish traders, restaurants and tourists. Two households revealed that they sold their catches to all the 4 routes which are the fish traders, restaurants, tourists as well as the fish retailers.

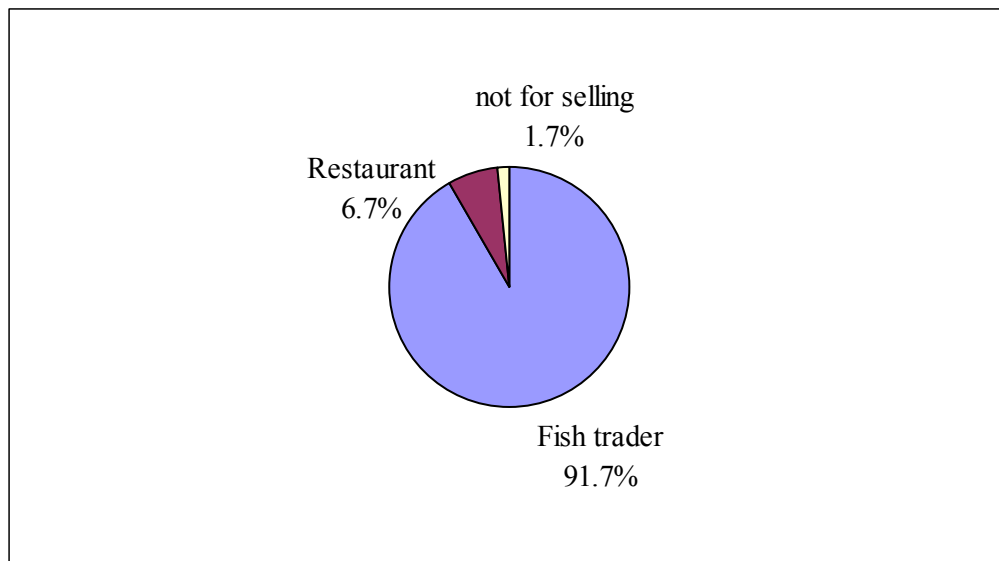


Fig. 5. Channels for distribution of catch

Table 9. The combination of channels for distribution of catch

Distribution 1	Distribution 2	Distribution 3	Distribution 4	Number
Fish trader	Restaurant			2
Fish trader	Tourist			4
Fish trader	Restaurant	Tourist		2
Fish trader	Restaurant	Tourist	Retailer	2
Total				10

Part III: Opinions of fishermen on fisheries management

As the local fishermen have been engaged in fishing operation along the coast in front of Mae Rumphueng beach, they have observed the changes of the marine resources in the area. This part of the study therefore, examined the opinion of the local fishermen about the status of the marine fisheries resources in the area.

As shown in Fig. 6, the fishermen's views on the current status of marine resources indicated that 65% mentioned poor condition of the marine resource compared to the past while 32% expressed that the status of the marine resources has not changed. Conversely, 3% observed that the resource is better than in the past.

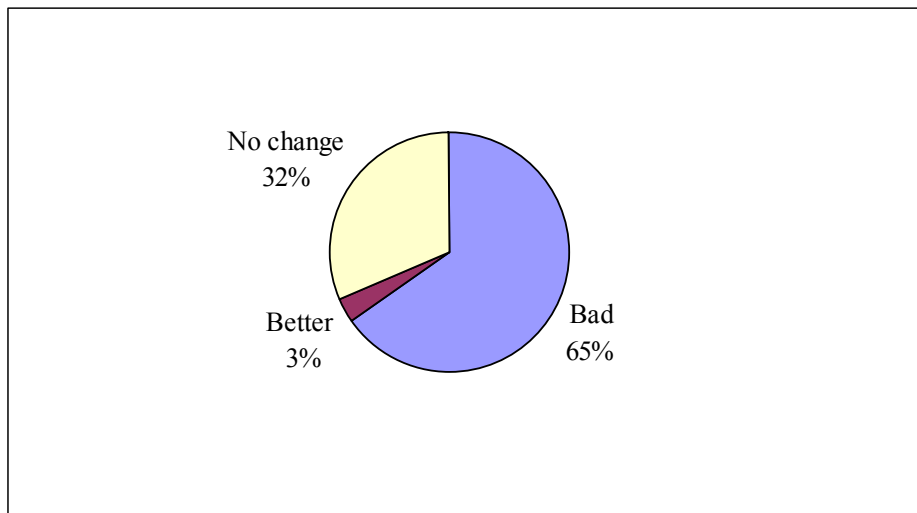


Fig. 6. Present status of the marine resources

There were numerous problems that the local fishermen faced in their fishing operations as indicated in Table 10. They indicated that commercial fishing boats entering the 3 km area and the depletion of the marine resources, are the major problems that they have been confronted with.

Table 10. The problems that fishermen faced

Problem	No	Yes
1. The depletion of marine resources	36.7	63.3
2. The competition with other fishing boats (trawl, anchovy purse seine) for fishing ground	61.7	38.3
3. Commercial fishing boats get into 3 km area	33.3	66.7
4. Highly operational expenses (fuel, food, etc.)	70.0	30.0
5. Bad sea condition/ rough sea/ strong winds	88.3	11.7
6. Using the net with small mesh size	96.7	3.3
8. Damages of fishing gears	98.3	1.7

Note: from 60 respondents

Based on the resources situation, most of respondents (98.3%) realized that coastal fisheries management is needed (Fig. 7) for the sustainable use of the coastal resources. Fig. 8 indicates that all respondents fully agreed with the suggestion that they should be involved and should participate in the coastal fisheries management as they are the users of the resources and could take full advantage from the bounty of the sea.

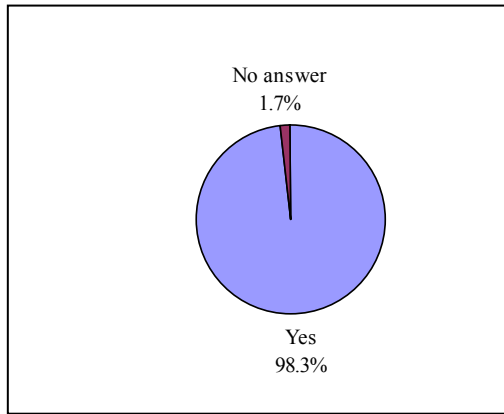


Fig. 7. Opinion of fishermen on the coastal fisheries management

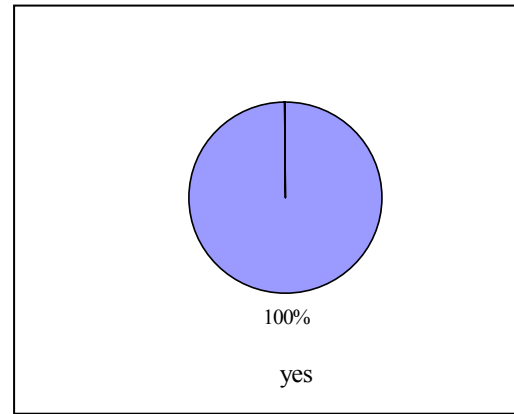


Fig. 8. People's participation in the coastal fisheries management activities

The survey also asked the respondents' opinion on how the marine resources could be enhanced if they are involved in the fishery management. As seen in Table 11, the three priority answers were: setting up a crab bank, artificial reefs installation and controlling the trawl fishing boats, respectively.

As mentioned above (Fig. 4) for instance, majority of respondents are engaged in crab gill net. Each day their catch would average around 5-10 kg depending on the fishing season. Besides the blue swimming crabs and other fishes that are mainly caught using the crab gill net, gravid crabs are also caught although in lesser quantities. They realized that the abundance of blue swimming crabs from nature might decrease if they continue to catch the gravid crabs. It seems that the fishermen understand the importance and usefulness of crab bank as they had heard about crab bank activities in other places. Therefore, they think that crab bank could be a good means of enhancing the crab resource and thus, would increase their catch in the future.

Table 11. Opinion of fishermen on strengthening marine resource enhancement

Opinions	Percent (%)
Crab bank activity	20
Artificial reefs installation	17
Control trawl fishing boats	12
Do not catch juveniles and small fish	7
Control purse seine fishing boats from operating at AR area	5
Closed season (not allowing trawl fishing within 3 km)	3
Group leader should act as good supporter for any conservation activities	2
People should participate in releasing fish fingerlings/post larvae activities	2
Watchdog	2
Controlling the number of fishing boats/gears	2
No answer	30
Total	100

Part IV: Opinions of local fishermen on set net fisheries

In this part, we examined the impacts of set net fisheries to people who were not involved in the activities, as they have also been fishing along the coast and near the location of set net fishing gear.

A large amount of respondents (92% of the total) were well aware of the set net project which have been implemented along the Mae Rumphueng coast, and currently operated by a fishers' group with technical assistance from SEAFDEC/TD and EMDEC (Fig. 9). Most of the fishermen got the information regarding the set net project from the leader of the fishers' group. There were several project activities that were opened for the participation of the fishermen, such as the group meetings, preparation of the set net structure, set net installation, maintenance and cleaning of the net, etc. Fig. 10 shows 56.6% of the total respondents participated in the set net activities at least ones while 41.7 % did not participate in the activities because they did not have enough information on the project.

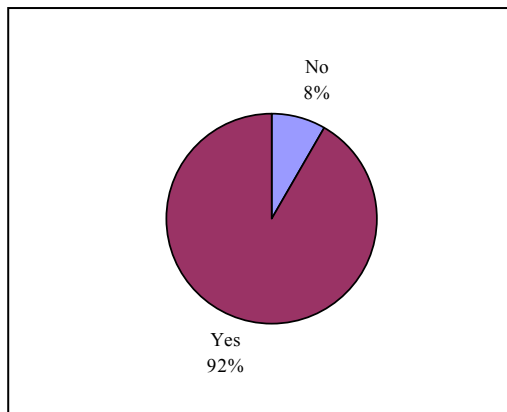


Fig. 9. People's recognition of the set net project

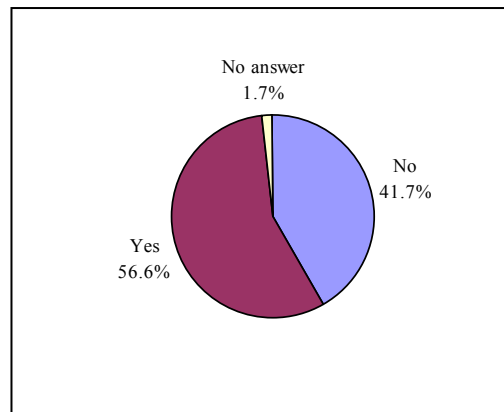


Fig. 10. People's participation in the set net activities

Several activities had been conducted since the project started. The local fishermen had the opportunity to participate in such activities, as it is one of the project objectives for the fishermen to be able to handle the set net fishing management by themselves.

The results showed that less than 50% participated in each activity (Fig. 11). During the initial meeting which was conducted at the beginning of the project, about 200 fishermen were gathered in order to introduce and provide information on the concept of the project. After the meeting, net construction and installation were done including training on net maintenance. Since then, the number of fishermen participating in the various activities had reduced because they could not find time to join the group. Later, some of them decided to quit from the project. Presently, there are 11 fishers remaining in the group (Suanrattanachai *et al*, unpublished).

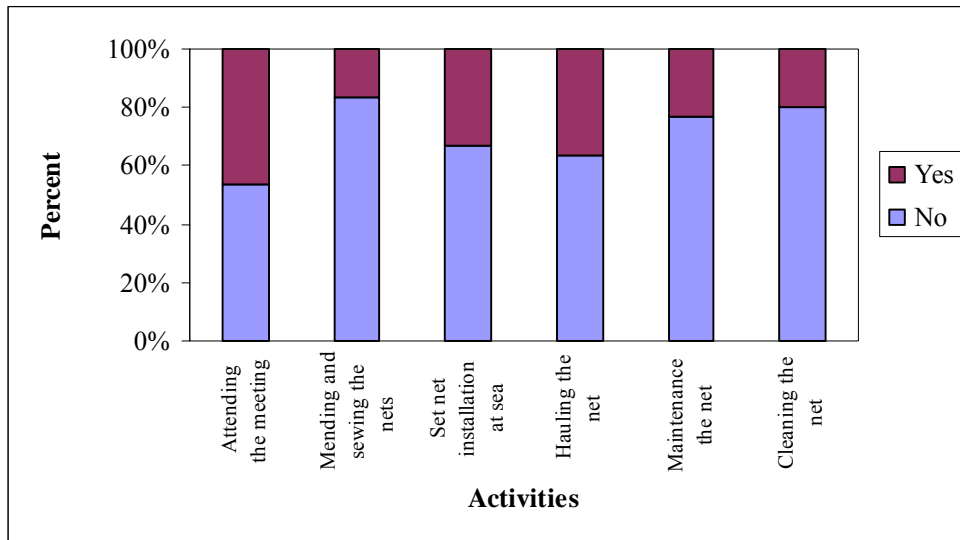


Fig. 11. People's participation in the various set net activities

As indicated above, the target samples of this survey were the fishermen who are currently non-members of the set net fishers' group. The results indicated that the respondents comprised 58.3% who were ex-members of the set net fishers' group while the other 41.7% have never been members of the group (Fig. 12). So the next question asked was for them to give their reasons for not participating in the group any longer. Consequently, the reasons were examined. As shown in Table 12, the main reason was the time available did not match with the set net activities operating time (80%). Other reasons included less income gained and the uncomfortable feeling in working with other people (21.7 and 20%, respectively).

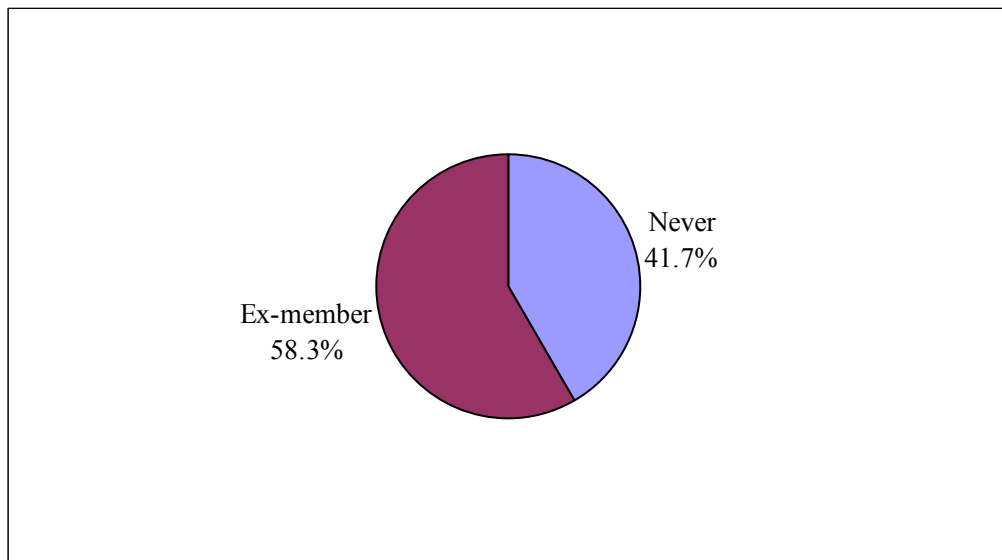


Fig. 12. Membership status of the respondents

Table 12. Reasons why local people did not want to join the set net project

Reason	No		Yes	
	Number	Percent (%)	Number	Percent (%)
Time availability	12	20.0	48	80.0
Providing less income	47	78.3	13	21.7
Uncomfortable feeling to work with others	48	80.0	12	20.0
Too many members	55	91.7	5	8.3
Not well-managed group	57	95.0	3	5.0
Health problems	58	96.7	2	3.3
Lack skills	59	98.3	1	1.7
No information from the group	59	98.3	1	1.7
No freedom	59	98.3	1	1.7

This survey also investigated the fishers' opinion on the set net fisheries as they have been fishing around the set net area. The series of questions asked regarding the utilization of set net fishing ground and the corresponding responses are presented in Table 13. The summary of the responses is shown below:

Question no.1: The results show that 71% of the target group does fishing operations around the set net area.

Question no.2: 45% of the total respondents stated that the set net area can be a new fishing ground contradicting with another 36.7% who said that this area can not serve as new fishing ground because they are familiar with the conditions of the area as they have moved around searching for other good fishing grounds.

Question no.3: Most of the respondents said that the present location of the set net is suitable.

Question no.4: 88.3% of the total respondents mentioned that the set net fisheries has no impact to their fishing activities because their fishing ground is in another area.

Question no.5: 41.7% of the total respondents expressed their opinion that after the set net installation, their catch had been increased while another 40% did not agree.

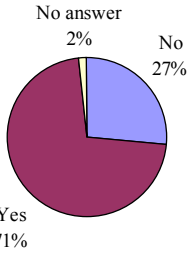
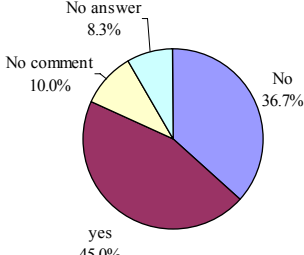
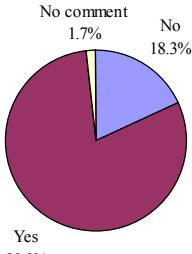
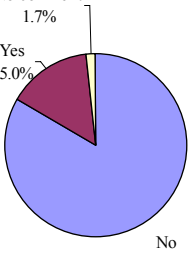
Question no.6: 75% of the respondents observed that the set net fishing gear is important as shelter for small marine organisms and that it enhances the growth of marine organisms living in the area. However, still there were some who did not agree with this.

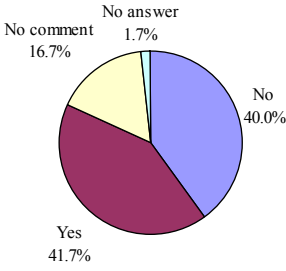
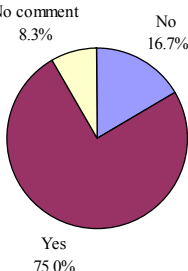
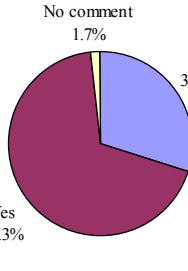
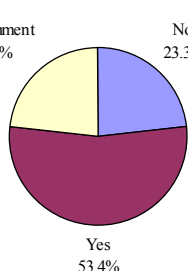
Question no.7: Most of the respondents agreed that the set net fishing area could be used as barrier to prevent commercial fishing boats particularly the trawlers and purse seine from getting into the prohibited area. Conversely, 30% disagreed that the set net fishing gear could protect the area from commercial fishing boats.

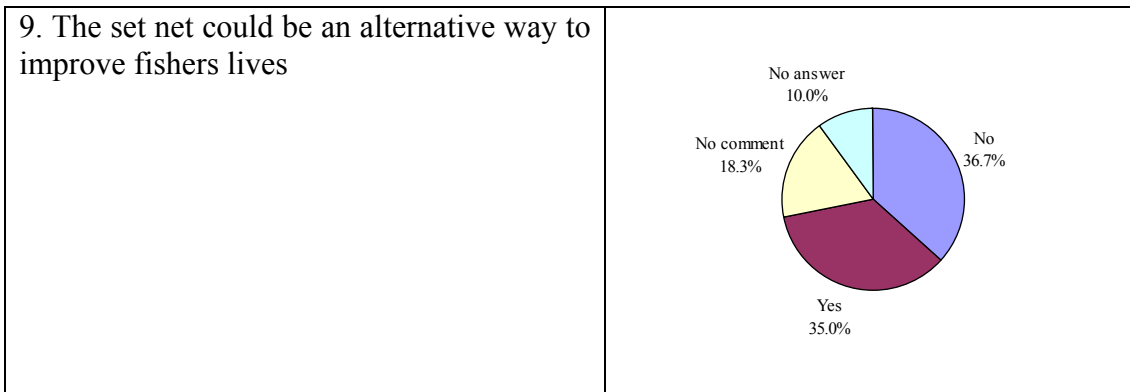
Question no.8: 53.4% of the target group indicated set net fisheries as the methodology for promoting coastal fisheries management. However, another 23.3% indicated non-agreement and no comment on this point that set net fisheries could be an approach for coastal fisheries management.

Question no.9: According to their points of view, some thought that set net fisheries can be an alternative way to improve their livelihood, but some of them did not think it is a way to improve their lives (35% and 36.7%, respectively). However, 18.3% did not say anything and another 10% had no answer on this issue.

Table 13. The Fishers' opinion on the set net fisheries

Questions	Results										
1. Have you ever fished near the set net?	 <table border="1" data-bbox="1066 533 1257 786"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>71%</td> </tr> <tr> <td>No</td> <td>27%</td> </tr> <tr> <td>No answer</td> <td>2%</td> </tr> </tbody> </table>	Response	Percentage	Yes	71%	No	27%	No answer	2%		
Response	Percentage										
Yes	71%										
No	27%										
No answer	2%										
2. The area that the set net is situated could be a new fishing ground	 <table border="1" data-bbox="979 913 1283 1167"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>45.0%</td> </tr> <tr> <td>No</td> <td>36.7%</td> </tr> <tr> <td>No comment</td> <td>10.0%</td> </tr> <tr> <td>No answer</td> <td>8.3%</td> </tr> </tbody> </table>	Response	Percentage	Yes	45.0%	No	36.7%	No comment	10.0%	No answer	8.3%
Response	Percentage										
Yes	45.0%										
No	36.7%										
No comment	10.0%										
No answer	8.3%										
3. The set net is located at a suitable area	 <table border="1" data-bbox="1059 1294 1251 1547"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>80.0%</td> </tr> <tr> <td>No</td> <td>18.3%</td> </tr> <tr> <td>No comment</td> <td>1.7%</td> </tr> </tbody> </table>	Response	Percentage	Yes	80.0%	No	18.3%	No comment	1.7%		
Response	Percentage										
Yes	80.0%										
No	18.3%										
No comment	1.7%										
4. The set net have an impact on fishing activities	 <table border="1" data-bbox="1059 1675 1251 1928"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>83.3%</td> </tr> <tr> <td>Yes</td> <td>15.0%</td> </tr> <tr> <td>No comment</td> <td>1.7%</td> </tr> </tbody> </table>	Response	Percentage	No	83.3%	Yes	15.0%	No comment	1.7%		
Response	Percentage										
No	83.3%										
Yes	15.0%										
No comment	1.7%										

<p>5. The catch have increased since the set net installation</p>	 <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>41.7%</td> </tr> <tr> <td>No</td> <td>40.0%</td> </tr> <tr> <td>No comment</td> <td>16.7%</td> </tr> <tr> <td>No answer</td> <td>1.7%</td> </tr> </tbody> </table>	Response	Percentage	Yes	41.7%	No	40.0%	No comment	16.7%	No answer	1.7%
Response	Percentage										
Yes	41.7%										
No	40.0%										
No comment	16.7%										
No answer	1.7%										
<p>6. The set net could enhance the marine organisms in numbers and high biodiversity</p>	 <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>75.0%</td> </tr> <tr> <td>No</td> <td>16.7%</td> </tr> <tr> <td>No comment</td> <td>8.3%</td> </tr> </tbody> </table>	Response	Percentage	Yes	75.0%	No	16.7%	No comment	8.3%		
Response	Percentage										
Yes	75.0%										
No	16.7%										
No comment	8.3%										
<p>7. The set net fishing gear is useful as a remarkable point of 3 km coastal area that is noticeable for commercial boat, particularly trawling</p>	 <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>68.3%</td> </tr> <tr> <td>No</td> <td>30.0%</td> </tr> <tr> <td>No comment</td> <td>1.7%</td> </tr> </tbody> </table>	Response	Percentage	Yes	68.3%	No	30.0%	No comment	1.7%		
Response	Percentage										
Yes	68.3%										
No	30.0%										
No comment	1.7%										
<p>8. The set net fisheries is the methodology for promoting coastal fisheries management</p>	 <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>53.4%</td> </tr> <tr> <td>No</td> <td>23.3%</td> </tr> <tr> <td>No comment</td> <td>23.3%</td> </tr> </tbody> </table>	Response	Percentage	Yes	53.4%	No	23.3%	No comment	23.3%		
Response	Percentage										
Yes	53.4%										
No	23.3%										
No comment	23.3%										



Part V: Opinions of fishermen on the set net fishers' group

In this part of the study, the problems occurring in the set net fishers' group were examined from the viewpoints of people outside the group.

From the result, some fishermen mentioned that the most common problem that could be found in the fishers' group is its management system. The not well-managed fishers' group could have created the problem.

On the possibility of the set net group developing into a fisheries cooperative in the future, 61.7% of the respondents expressed that it is possible for the set net group to develop into a fisheries co-operative, however 36.7% had no comment on this point (Fig. 13).

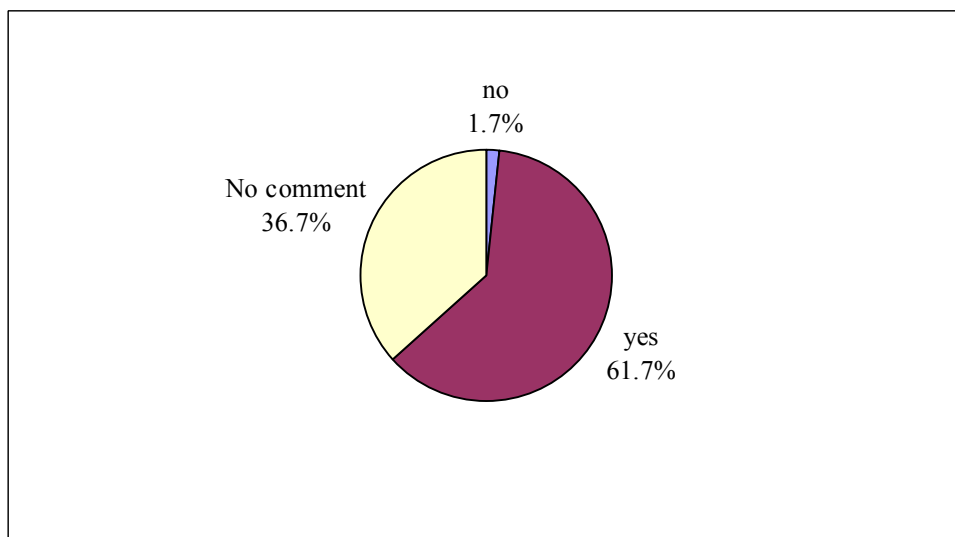


Fig. 13. The possibility of set net fishers' group developing into a fish cooperative

The survey also examined whether the respondents were interested to return to the group or to become new members of the set net fishers' group. Fig. 14 indicates that half of respondents seemed not interested to get involved in the set net fishers' group while 33% indicated interest in joining the set net activities of the group. However, the survey observed few more reasons that made the fishers leave the set net fishers' group such as the large number of members operating the set net activities. When sharing a

ration, they receive only a little amount of income which was not enough for their daily expenses. They indicated that they are still interested to join the group provided the number of members is limited to the most appropriate. Another suggestion made was the possibility of the set net to be operated within a village by a small group. Since they observed that the increased catch production of the set net fishing group would be an additional means of increasing their incomes, therefore they are thinking of becoming members of the group again.

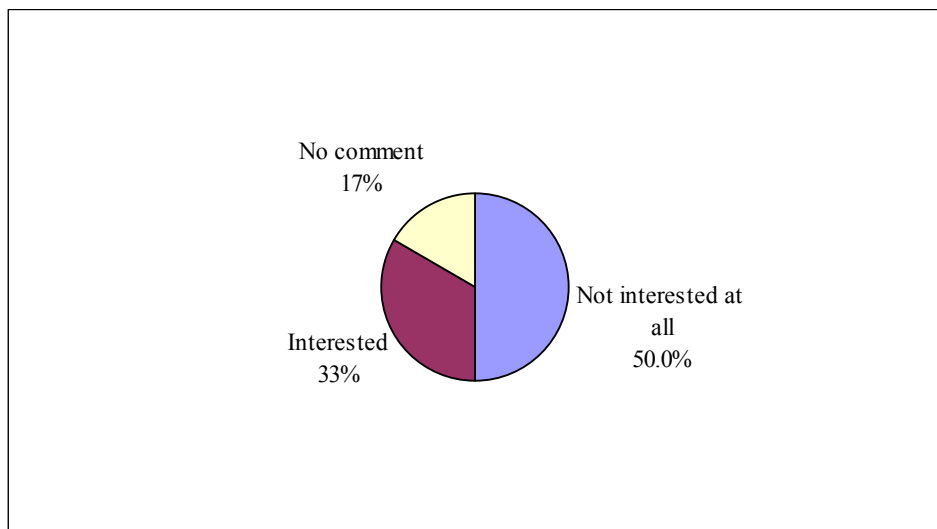


Fig. 14. The possibility of non-members becoming new members

6. Conclusion

A pilot project in Thailand, the set net fisheries has been conducted by a fishers' group with 11 members (updated on March 2007). Using this fishing gear as means of promoting sustainable coastal fishery management, created an opportunity for the community to implement the activities through self management although the project received support from government agencies on appropriate technology for sustainable resource uses.

Most of local fishermen positively recognized the installation of the set net because they understood the benefits that they indirectly obtained from the set net fishing gear. They believed that the set net fishers' group could develop into fisheries cooperative in the future only if they could consider building up a well-managed group.

As long as the local communities understand the value of the marine resources and the importance of marine resources conservation, this would encourage the cooperation of the community to conserve and utilize the coastal resource sustainably. This could create a change in developing sustainable CFM projects based on the successful CFM projects adopted elsewhere.

7. Reference

SEAFDEC/TD and DOF/Thailand. 2005. Final report of Set net Project/Japanese Trust Fund I: Introduction of SET-Net Fishing to Develop the Sustainable Coastal Fisheries Management in Southeast Asia: Case Study in Thailand 2003-2005. 402 pp.

Suanrattanachai P. P. Kaewnuratchadasorn and N. Thapthim. 2008. The Institution of the Set Net Fishers' Group Development to Sustainable Coastal Fisheries Management: the Case of Rayong province, Thailand.