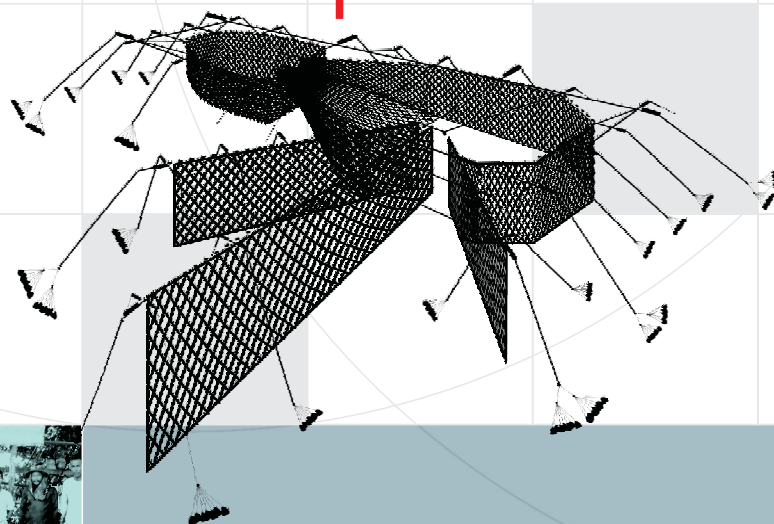


# INSTITUTION OF THE SET NET FISHER GROUP

Development to  
Sustainable Coastal  
Fisheries Management:  
The Case of  
Rayong Province,  
Thailand

Phattareeya Suanrattanachai  
Pattaratjit Kaewnuratchadasorn  
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Aussanee Munprasit



**Institution of the Set Net Fishers Group for the Development of Sustainable  
Coastal Fisheries Management: the Case of Rayong Province, Thailand**

By

**Phattareeya Suanrattanachai, Pattarajit Keawnurachadasorn  
and  
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**The Set-Net Project**

By

**The Collaborative Project between SEAFDEC/TD  
And  
The Eastern Marine Fisheries Research and Development (EMDEC),  
The Department of Fisheries, Thailand**



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**Institution of the Set Net Fishers Group for the Development of Sustainable Coastal Fisheries Management: the Case of Rayong Province, Thailand**

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## Foreword

Since the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region was adopted in ASEAN-SEAFDEC Millennium Conference in November 2001, the SEAFDEC Training Department was implementing a project Coastal Fisheries Management under the ASEAN-SEAFDEC Fisheries Consulting Group (FCG) scheme.

For the year 2003, a project on Introduction of set-net fishing was initiated to support the development of Sustainable Coastal Fisheries Management. Coastal area of Rayong Province was to be the project site, supported by Japanese Trust Fund-I Program (Coastal Fisheries Management).

This project aims to reduce fishing pressure on coastal fishery resources through the introduction of set-net as a passive fishing gear, to alleviate fishing competition in congested fishing ground by organizing collective fishing operation on set-net through the pilot project, and to develop common policy concept of fishery management for fishing gear occupying wide fishing ground such as set net through the pilot project. And also to enhancement the coastal fishery resources by the installation of large stationery fishing gear such as Set-net and assess the feasibility and Environmental impact.

The project was composed of three main activities 1) Survey and monitoring of the fishing situation and environmental condition of project's area; 2) Installation and operation management of set net and 3) information transfer program of set net. The project will be emphasized on four major fields, fishing gear technology and management, fisheries biology, fishing ground condition and fishermen cooperative management.

The project's implication and outcome is either fishing technology or fisheries biological and environmental impact in particular will be planned to transfer to other ASEAN member countries. This results to more development of the sustainable coastal fisheries management in the near future.



Siri Ekmaharaja, Ph.D.  
Secretary-General

## **Preface**

The set net project greatly achieved to transfer set net fishing technology to the Mae Rumpheung set net fisher group. The group has operated the set net fisheries since year 2003 up to present. According to the set net operation, the group has also received incentive gained from fishes selling to unity the group member worked together. This has led the group experienced in the group administration and financial management. This experience is very important to sustain the group working longer. In addition, the group member has also paid their participation in the set net fisheries such as cleaning, maintenance, repairing as well as solving conflict of member's ideas to improve the group administration and management.

The gained result of the study is anticipated to help policy-maker and project planner to further formulate appropriate activities and training course to institutionize and develop the fisher group. This institution and development of the fisher group is applicable to support initial self-management and governance on coastal resources to obtain a sustainability of the resources.

Phattareeya Suanrattanachai and co-authors  
23 May 2008

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I should like to present my deepest gratitude to the Mae Rumpheung Set Net fisher group for your helps and hospitably participated in the conduct of this study. All the group members have given their unstinting encouragement to finish the study. Finally, I should like to present my deepest gratitude to all colleagues who directly and indirectly have helped me to complete this study. All of you have my profound respect.

Phattareeya Suanrattanachai and co-authors  
2 January 2008

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# **Institution of the Set Net Fishers Group for the Development of Sustainable Coastal Fisheries Management: the Case of Rayong Province, Thailand**

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## **Abstract**

Main objective of the study is to describe the set net fishers group functioning in set net fisheries management. The group function is focused on practicing in the group administrative affair and management with cooperative principle. The finding results found that the set net fishers group had two major functions. One is in capturing and harvesting activities. Other is related to the group administrative affair. Considering capturing and harvesting activities, the group members had chiefly participated in hauling net for harvest, maintenance and repair net and selling fishes on beach. Considering on administrative affair function, large number of the group member joined the group meeting, looked for new member to join the group, and helped developing the group system. The future group development might threaten by uncertain yield served to market demand, conflict of the group member's opinion, etc. A solution solved threats of the future group development might need an official announcement on the set net fishing areas, and more number of set net group in order to establish network.

**Keywords:** the set net fishers group, set net fisheries management,



# **Institution of the set net fishers group for the development of sustainable coastal fisheries management: the case of Rayong Province, Thailand**

## **Introduction**

It has been documented that fisheries in the Southeast Asian region have been facing deterioration in terms of natural resources. SEAFDEC has therefore placed coastal resource management program as a top priority, under which several projects have been implemented in response to the relevant components of the Resolution on Sustainable Fisheries for Food Security for the ASEAN Region adopted during the ASEAN-SEAFDEC Millennium Conference in 2001.

The coastal fisheries management program of SEAFDEC was funded by the Japanese Trust Fund (Trust Fund I, 2001-2005), and SEAFDEC/TD formulated a project under the program on the “Introduction of Set-net fishing to develop the sustainable coastal fisheries management”. The aim of the project was to introduce a large-scale stationary fishing gear and technology for the promotion of sustainable fisheries management particularly in the coastal areas. For this project, a type of Japanese fishing gear called Otoshi-ami (set-net) was selected.

In Japan, the Otoshi-ami has been used as an effective fishing gear to catch fish in coastal areas. Adopting a similar concept in the ASEAN region, the set-net fishing gear operation was introduced as a pilot project to promote responsible fisheries particularly in terms of target species selection. This means that fishers can select the wanted species and release the unwanted ones [1]. This fishing gear operation has also served as a remarkable impetus to transfer communal property rights to private property rights through the rights-based fisheries scheme which has been introduced and successfully adopted by the Japanese coastal fisheries sectors [2]. Rights-based fisheries scheme clearly defines the right to use the fishery resource with specific fishing gear in exclusive geographic fishing ground. This scheme provides the exclusive right to use the fishery resource to individuals and/or private groups. Then, the defined individual, private or fishers groups have the right to claim an incentive for long-period sustainability. In some fisheries, the right owner may vest the right to a cooperative or a community organization [3].

SEAFDEC/TD collaborated with the Department of Fisheries (DOF of Thailand in implementing the set-net fisheries near the Mae Rampaeng Beach in Rayong Province, Thailand. The Eastern Marine Fisheries Research and Development Center (EMDEC) in Rayong Province, has been assigned by the DOF to coordinate with SEAFDEC/TD to work on the project on-site. Jointly, both agencies agreed to promote the alternative fishing technology in the coastal areas, which is expected to reduce the fishing effort from small-scale fisheries. At the same time, this fishing technology also anticipated to promote community-based organization following the fisheries cooperative concept and development.

The transfer of the set-net fishing technology has proved to be beneficial after the project carried out regular fishing operations on set-net fisheries for more than four years since the development of the project in 2003. Following the criteria for community-based organization development, the set-net fishers group has also been established in the project area. This group took care of many functions such as

managing the fishing operation, net maintenance, and marketing of fish yields. The group was developed following the concept of fisheries cooperative as a supreme goal of any group institution.

This paper specially placed an emphasis on the institution of the set net fishers group. In addition, the group members' participation and functions are also highlighted to recognize how the group and its members have pursued set-net fisheries development for sustainable coastal fisheries management. The research results are useful and informative specially in suggesting an appropriate method or means to develop the set-net fishers group as well as on how the group functions for the community's economic development and sustainable coastal fisheries management.

## **The scope of the study**

### ***Rationale of the study***

- Describes the importance of the set net fisheries as alternative way to support coastal fisheries management
- Describes the role and function of the set net fishers group as local management body contributing to coastal fisheries management
- Describes the needs and problems encountered along line with set net fisheries development and management

### ***Objectives:***

- To identify the characteristics of the members of the set net fishers group
- To identify the members' functions in the set net fishers group management
- To identify the needs and problems in developing and managing the set net fishers group
- To recognize the group members' opinion on future activities and plans for the development and management of the set net fishers group
- To solicit the group members' opinion on how the set net fisheries support coastal fisheries management

### ***Methodology***

1. Survey with the members of the set net fishers group as target respondents
2. Questionnaire was designed as a formative tool to collect information and data from the respondents
3. Inputting and analyzing the data using descriptive analysis
4. Results of the survey are displayed using charts and tables along with explanations

### ***Envisage outcome of the study***

1. Common understanding on set net fisheries as an alternative way to support coastal fisheries management
2. Proper strategy and approach in managing the set net fishers' group

## **Background of the set net fisheries project**

### ***The conceptual framework of the project***

The Otoshi-ami fishing gear is a large-scale stationary fishing gear developed in Himi City, Toyama Prefecture, Japan and first installed in Japan Sea. SEAFDEC/TD received technical assistance from the Himi Fisheries Cooperative Association to transfer the technology of operating this type of fishing gear particularly adopting the concept of a large-scale stationary fishing gear for sustainable coastal fisheries management. This large-scale fishing gear, which is advantageous to effectively catch quality fishes, is composed of connected arms fixed at the bottom of the sea. Its connected partitions serve as barriers guiding the schools fish to swim towards the end of the extended arm. When the schools of fish collect in the extended arm, fishers harvest the fish alive. In harvesting, the fishers select only the target species and release the non-target species back to the sea.

Thus, this large-scale stationary fishing gear strongly supports the responsible fisheries practice on selective fishing since only the target aquatic species are chosen. Thus, this method of harvesting the fish is not harmful to the fisheries resources and it also yields better quality harvest [4]. Certainly, the structure of the fishing gear also helps improve the substrate that serves as shelter for marine living organisms. This feature is therefore beneficial as it enhances the fisheries resources and is friendly to the marine environment. Set net is a new and short name for such type of large-scale stationary fishing gear.

This SEAFDEC/TD project was intended to promote set net fisheries in Thailand. The main objective of the project is to understand the characteristics of the large-scale stationary fishing gear particularly its role in responsible fisheries and resource enhancement. Specially, the project was also aimed at organizing a collective fishing operation by local fishermen to alleviate fishing competition in congested fishing grounds; developing common policy concept in fishery management for fishing gear occupying a wide fishing ground; protecting the coastal fishing ground from other destructive fishing gear or heavy fishing activities; and enhancing the coastal resources by providing more substrate and shelter for marine organisms[1].

### ***The project implementation***

The project comprised three main activities, namely: (1) survey and monitoring, (2) installation and operation management of set net, and (3) information dissemination and technology transfer on set net operation and management. Three project working task forces were set up to implement the project, taking their respective responsibilities based on their expertise, authority and capacity. The task forces were: (1) the joint SEAFDEC/TD and DOF/EMDEC group, (2) the Rayong Provincial Office; and (3) the local fishers of Mae Rumpheung Beach comprising the fishers group.

The SEAFDEC/TD and DOF/EMDEC task force was in charge of implementing a series of sub-activities under the framework of Activity I (survey and monitoring) that included the pre-survey of the biological, geographical, and socio-economic conditions of the identified project area. In the meantime, an on-site training course was arranged for the local fishers of Mae Rumpheung Beach to understand the concept of the project and to prepare them for Activity II (installation and operation management of set net). During the training, the local fishers participated in mending and sewing the net as well as in installing and maintaining the net. Activity III, which

focused on information dissemination and technology transfer of the set-net operation, was implemented by all sectors and agencies concerned through monthly meetings, seminars, workshops and dissemination of publications emanating from the project. This was aimed to promote a common understanding on set net fisheries and stimulate the local fishers to participate in set net fisheries as means of practicing responsible fisheries.

The Rayong Provincial Fishery Office was responsible for the administrative and management aspects as a backstopping agency. The Office provided such information as fisheries regulations for the set net fisheries management and development, and initiated the, establishment of the set net fishers group based on the principle of fisheries cooperatives. The fishers group as the third task force serves as the key manpower to implement the actual work in set net fisheries that include harvesting the fish and marketing the yields.

### *Set net fisheries for sustainable coastal fisheries management*

Set net fisheries have been promoted as an alternative in achieving the sustainability of coastal fisheries management. Two points of view are presented to explain how set net fisheries could achieve such top goal. One point considers the biological goal, while the other is on advancing rights-based fisheries practice and management.

On the biological goal, the set net fisheries significantly affirmed that installation of this fishing gear improved the high biodiversity of the fisheries resources particularly in the surrounding area where the set net is installed [1]. The fishing gear operation also complies with responsible fisheries as it considers only the subsistence targeted aquatic species thus promoting selective sensitivity. This leads to harvesting only the good quality fish resulting in increased value of the catch.

On its implication in rights-based fisheries and management, the experience in Japan could be taken as an example. In Japan, the set net fisheries technology, transferred the use right to the fisheries cooperative association (FCA) or individuals to claim the incentives from this fisheries. The transfer of the right is based on the Japanese fisheries legal framework and recognition [2]. In the meantime, the FCA or individuals holding the right has the particular right to access the fisheries resources which excludes the non-right holding users. The right to access fisheries resource certainly ensures stability of income and job opportunity. The right to exclude non-right holders helps reduce the competition in using the fisheries resources among the users [5].

The set net fisheries pilot project implemented by SEAFDEC/TD in Rayong Province, Thailand, could be considered ideal as it has attained the, biological goal of enhancing the coastal fisheries resources. But from the point of view of rights-based fisheries and management, the top goal was still not yet attained because this is a very new and modern approach. In addition, this approach was considered contradictory to the customary ways of the fishers' who have been familiar and accustomed with the open access regime in fisheries. Thus, promoting the set net fisheries in line with rights-based fisheries, would require significant amount of awareness building exercises and extension programs specifically capacity building of the users' organizations and institutions.

### *Set net fisheries development and governance*

The implementation of the set net fisheries also placed great emphasis on fishing gear technology development and transfer. The experience from Japanese fisheries showed that the FCA is an important community-based organization taking charge of coastal fisheries management. Based on this concrete experience, the set net fisheries project also promotes community-based organization development and proper governance of the project.

David Symes, Fisheries Research [6] provided a definition of governance as the entire body of public as well as private interaction taken together to solve problems and create society opportunities. Based on this definition, the local fishers and local government agency concerned in the pilot project are highlighted to take part in the set net fisheries development and governance. Under the 1997 Constitution of the Kingdom of Thailand, setting the people's participatory approach in a democratic process is a top priority. People's participatory approach can be applied on individuals, groups, foundations, or associations. In 1994, the central government started to devolve authority to local government body even before the constitution was enacted [7].

On the conceptual framework of coastal fisheries management, the community-based fisheries management approach is an applicable mechanism to bring together people to participate in a group as a community-based organization. The community-based organization closely collaborates with the local government body especially the sub-district administrative organization mainly to locally manage the community resources. Co-management approach is taken into account from the resource management point of view. Practicing the co-management approach, a sub-district administrative organization and a community-based organization share the areas of responsibility, functions and authority over resource management [4].

In case of the project in Rayong Province, the set net fishers group works as a task force and takes the role of a community-based organization to carry on the set net fisheries. The set net fishers group was established taking into consideration the complicated social and geographic environments. On social environment, the members of the group came from several fishing villages under the governance of the Phe Municipal Administrative Office and the Tapong Sub-district Administrative Office. On the geographic environment, the set net was installed in the boundary area of the Phe Municipal Administrative Office.

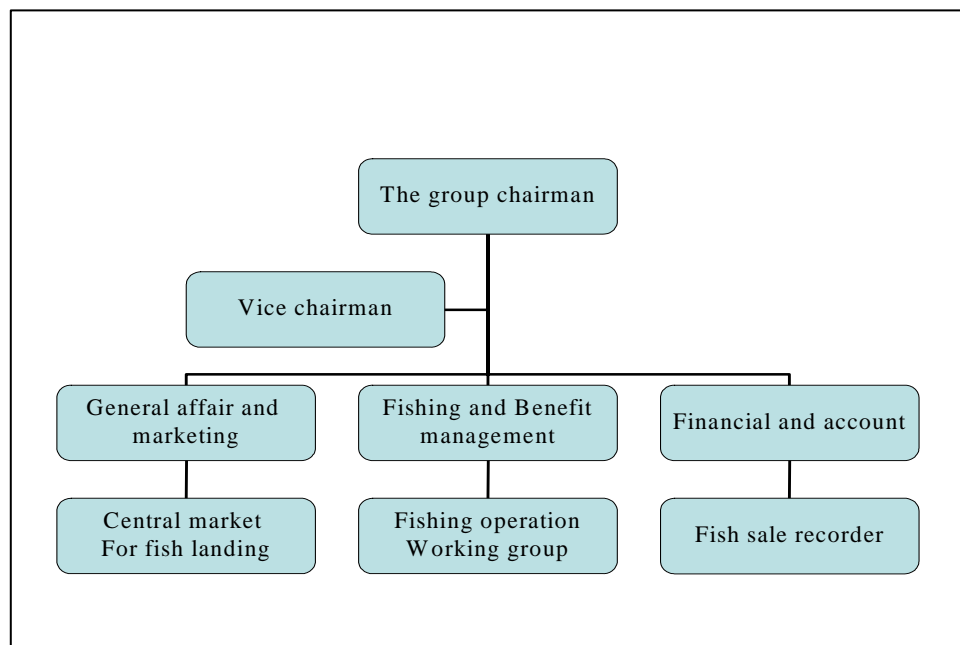
The community-based fisheries management approach worked very well to encourage the set net fishers group's members to participate in constructing and installing the set net and in developing the fish capture technique. The group also learns-by-doing the group administration and marketing management, and tries its best to find an appropriate way of handling both administrative and managerial works. However, it still seems that the fishers group is not yet ready to effectively adopt the co-management approach in the project area. Under the concept of co-management, the issue on preparing the readiness of the set net fishers group in management should be addressed first. Another issue is the insufficient support from local government bodies concerned. This means that the local government bodies share little and play low



functions in contributing enough support to the set net fishers group that would enable them to develop and manage the set net fisheries.

### **The presence of the set net fisheries and management**

The set net fishers group was the key working task force to collaborate particularly with SEAFDEC/TD and DOF/EMDEC to implement the set net fisheries. The group has learned the practice of group institution and development through training. After the establishment of the group, the organization structure of the group was developed in order to provide the enabling environment by setting-up also the proper functional positions. Chart 1 shows the structure of the set net fishers' group administration which was developed in 2005. Each position has no clearly defined job description, but a committee was also organized to take care of the logistic task. The committee supports the group administrative affairs and management.



**Chart 1. Structure of the set net fishers' group administration, Tapong Sub-district, Muang District, Rayong Province**

Source: [1]

In practice, the set net fisher group collectively operates the set net fisheries specifically carrying out such functions as capturing, marketing the fish products and administrating the group's activities. On its capturing function, the group hauls and harvests the fish three to four times a week. In 2006, the second new unit of the set net was installed. Thus, the group hauls and harvests fishes from the former set net and newly-installed set net at one time in order to reduce the operational costs. On its marketing function, the group usually sells their yields on the beach after sorting the fish to small fish retailers, fish traders and consumers. The remaining fish is brought to fish traders at Tapong Central Market. The financial and accounting committee of the group takes charge of managing the group's account which mainly included expenses in fishing operation and income gained from selling the fishes. A

DOF/EMDEC Official assists the group to manage their book account and related financial aspects.

### **Institutional development of the set net fishers group**

Fisheries Management Science Program [8] defines institution as the set of rules and arrangement (public, private, formal and informal) affecting a fishery as well as the organizations that develop and implement those rules. In case of the set net fishers group, this meaning of institution seems too formative to the group which has been newly established for the set net fisheries operation. Hence, the institution herewith could mean an elementary mechanism of administrative and managerial affairs carried out by the group itself. The fishers group's participation and function in the set net fisheries management can be explained as an elementary mechanism to encourage the institution of the group. The result of the survey is informative giving the orientation of the group's institution. In addition, the result of the survey also provides demographic information and characteristics of the set net fishers group that could be used as inputs for future capacity building development plan.

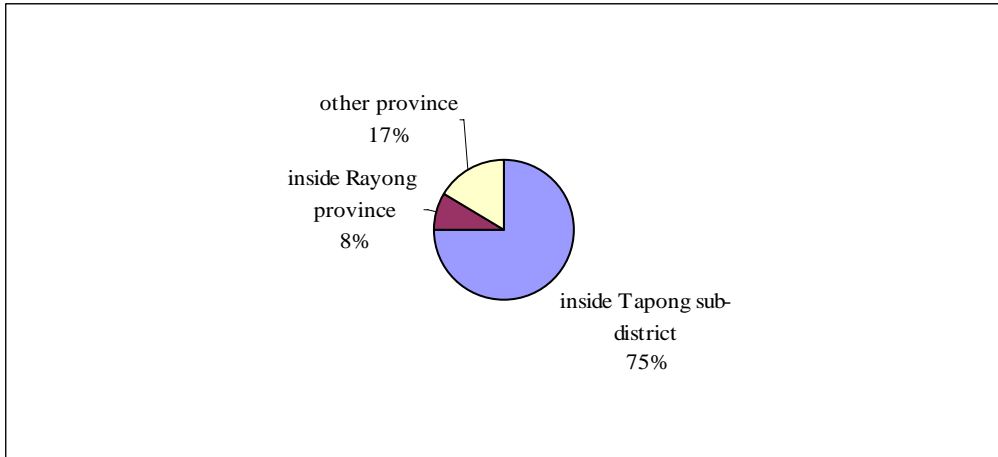
### ***Demographic information of the set net fishers group***

The members of the set net fishers group have ages that range from the youngest which is 22 years old to the oldest at 62 years old. The average age of the group members is 42 years old (Table 1).

**Table 1. Fishers group members' ages and number of children in a family**

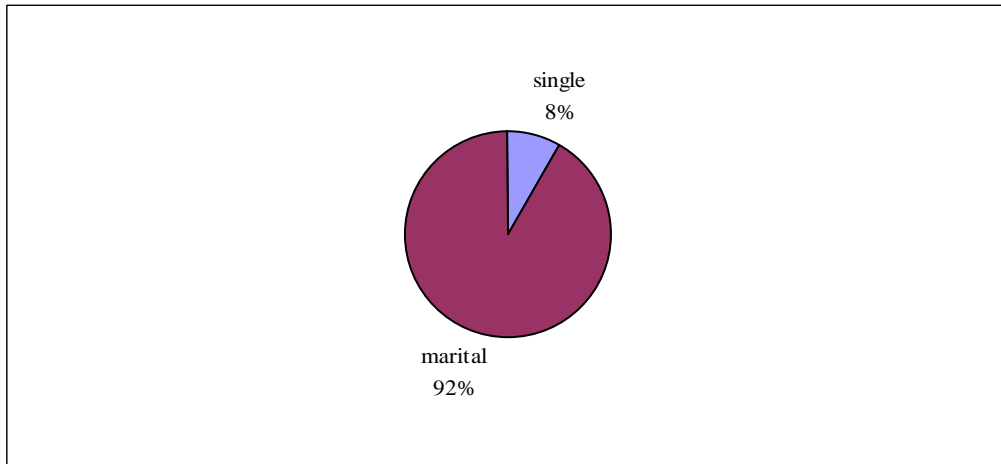
Items	Number of respondents	Minimum	Maximum	Mean
Age	12	22	62	42
No. of Children in a family	12	0	3	1

The results of the survey also showed that 83% of the group members had originally resided in Rayong Province, of which 75% were born in Tapong Sub-district territory while the other 15% were born in Rayong Province (Fig.1). of the total group members, 17% were born in other provinces.



**Fig. 1 Birthplace of the set net group members**

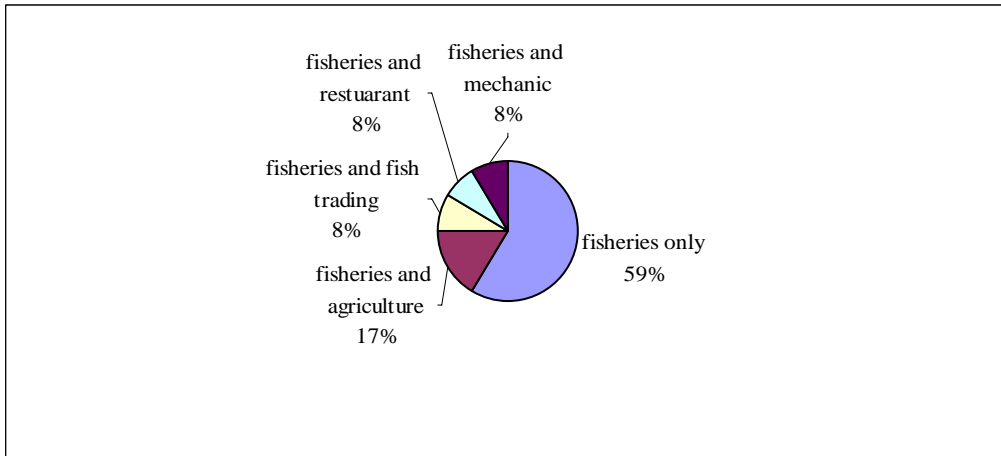
Most of the members of the set net fishers group are married (92%), only 8% were single as shown in Fig. 2



**Fig.2 Marital status of the set net group members**

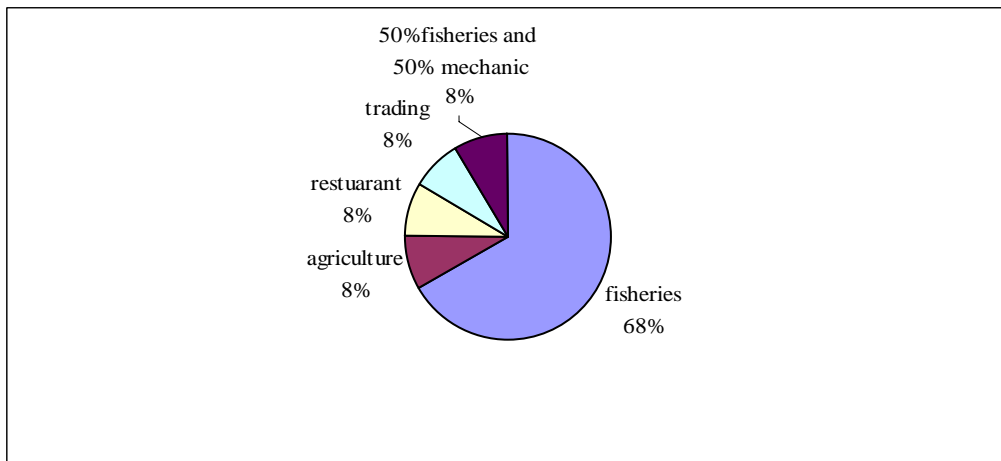
As for the number of children in a family, the result of the survey shown in Table 1 indicated an average of only one child. The maximum number of children in a family is three. On the educational level, 100% attended only the primary school level.

For the type of career of the group members, the respondents provided two types based on the source of income and on the skills of the group members. Fig. 3 shows the categories of career employed by the group members, which illustrates that the main career of group members is in fisheries only (59%) while the group members engage in both fisheries and agriculture comprised 17%. Other types of career pursued were on fisheries and fish trading, fisheries and restaurant, and fisheries and mechanic, which comprised the remaining 8% equally.

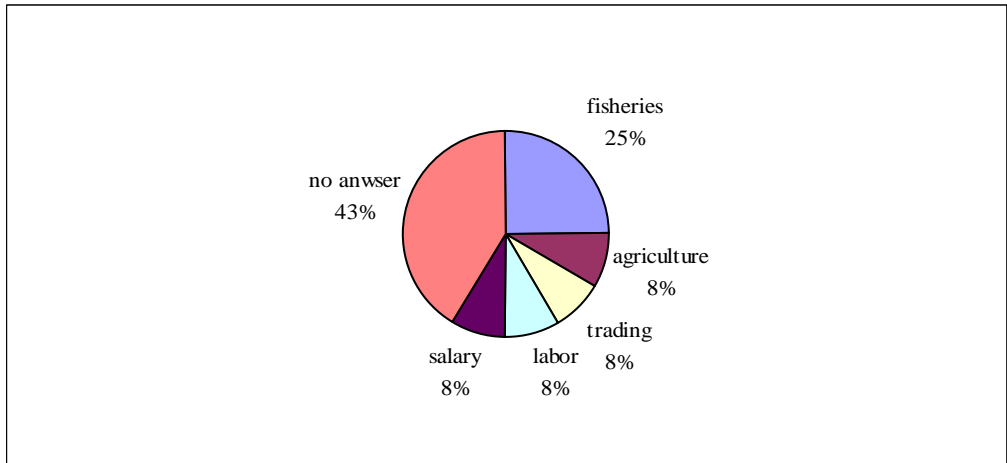


**Fig.3. Categories of career employed by the group members**

The type of occupation is helpful to assess the source of income of a fisheries household. Fig. 4 and Fig. 5 show the major and minor sources of income ranked by the group members themselves. Major source of income here implies that the group members are engaged fulltime in such type of career. Minor source of income means the group members are engaged part-time in such type of career or their wives must have also provided support to increase their income from part-time engagement. Fig. 4 shows that 68% are engaged in fisheries as their major source of income. Other major sources of income such as agriculture, restaurant, trading fisheries products and mechanic works correspond to 8% equally. Fig.5 shows the minor sources of income of the fisheries households. The data point out that fisheries are still the minor source of income (25%) compared with incomes gained from other sectors.

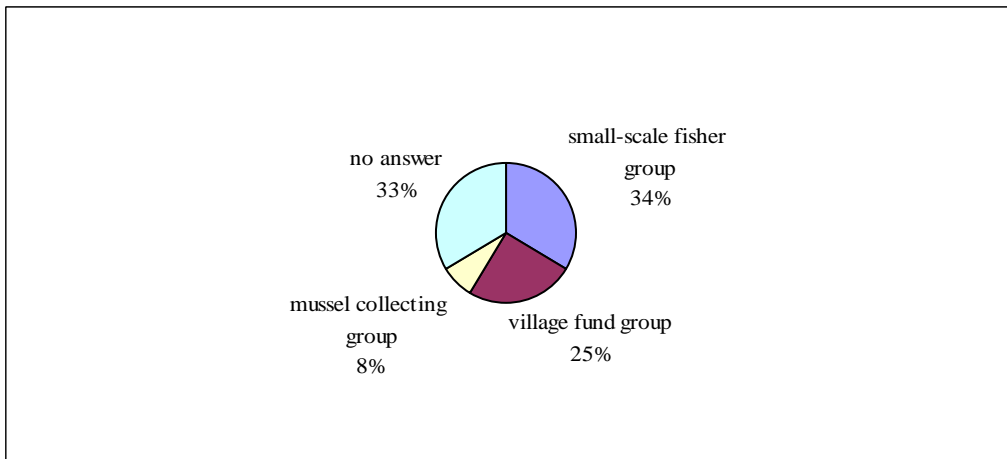


**Fig.4. Major sources of income**



**Fig.5. Minor sources of income**

The survey also investigated whether the group members have experience in joining and working in people’s groups and on the type of group they have joined. Fig.6 indicates the type of people’s group that the group members are currently participating in. The result also indicated that the group members join at least one type of people’s group. Fig. 6 also shows the people’s group that the group members first cited. A large number of the group members join the small-scale fishers group (34%). The second most popular people’s group is the village fund group participated in by 25% while 8% participated in the mussel collecting group. However, as shown in Fig.6 some group members did not provide any answer (33%), this could mean that probably they did not join any group.

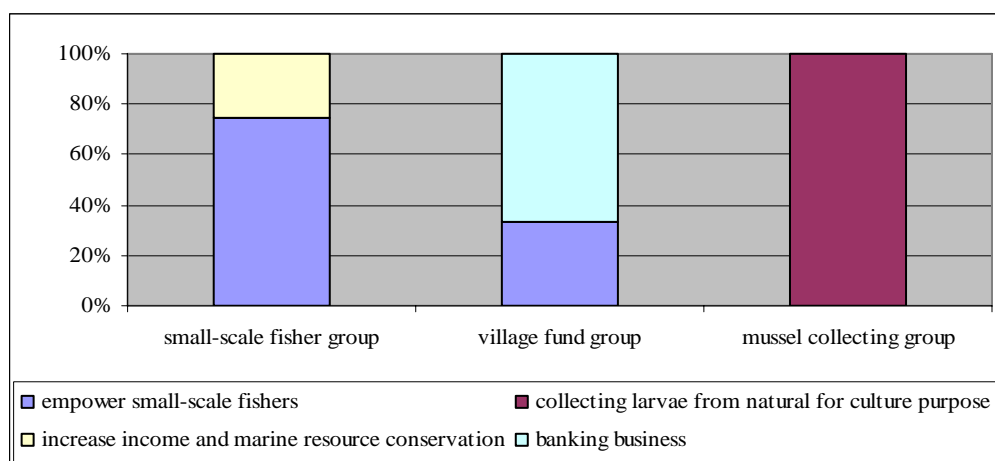


**Fig. 6. Names of people’s groups**

Table 2, which shows a cross tabulation between the type of people’s group participated in by the group members, also indicates that a group member may have also joined both the small-scale fishers group and the village fund group, small-scale fishes group with mussel collecting group, and the village fund group with mussel collecting group or the Tapong CO-OP. Fig. 7 indicates the objective of the group members in joining the people’s group.

**Table 2. Types of local people’s group existence and membership**

Group 1	Group 2					
	small-scale fishers group	village fund group	mussel collecting group	Tapong CO-OP	No answer	Total
small-scale fishers group	0	1	0	0	3	4
village fund group	0	0	1	1	1	3
mussel collecting group	1	0	0	0	0	1
No answer	0	0	0	0	4	4
Total	1	1	1	1	8	12



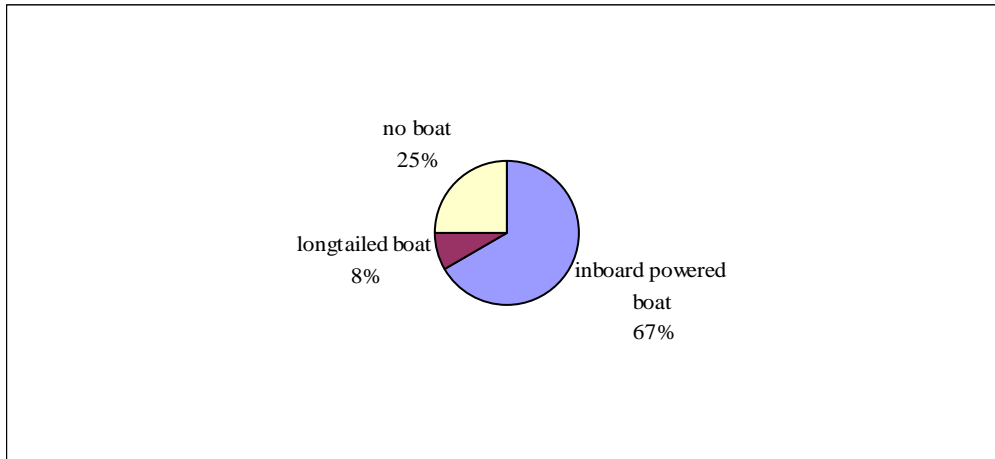
**Fig.7. Purpose of joining the local people’s groups**

The stack bar chart (Fig.7) shows three main bars corresponding to small-scale fishers group, village fund group and mussel collecting group, respectively. Each bar indicates the ratio of the number of group members indicating their purpose of joining each group. On the small-scale fishers group bar, the group members mentioned two purposes for joining this group, one of which is to empower the small-scale fishers group (78%) and the other is to increase income and improve marine resource conservation (22%). On the bar for the village fund group, a large number of group members indicates interest in banking business to access capital for further investments (62%) and to empower small-scale fishers (38%). For the bar of the mussel collecting group, the members had only one purpose which was to collect larvae or spats from natural sources for culture.

***Characteristics of the set net fishers group***

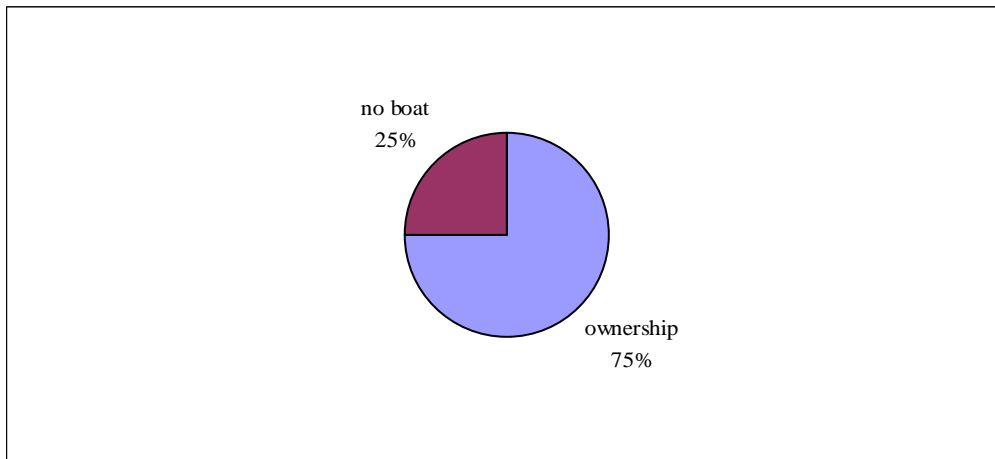
The group members have their main career and source of income coming from the fisheries sector. This part characterizes the capacity of the group members in fisheries on an individual basis. The capacity of each group member was evaluated based on the type of fishing boat and fishing gear used as well as on the status of their boat ownership. Moreover, the fishing ground and product distribution is also presented.

The two main types of fishing boats found along the Phe Beach and the Mae Rumpheung Beach are the long-tailed fishing boat and inboard-powered fishing boat. Results of the survey however, indicated that many of the group members had no fishing boat. Fig. 8 indicates that 67% of the members are using inboard-powered fishing boats, 25% use long-tailed fishing boat, and 8% do not own nor use fishing boat.



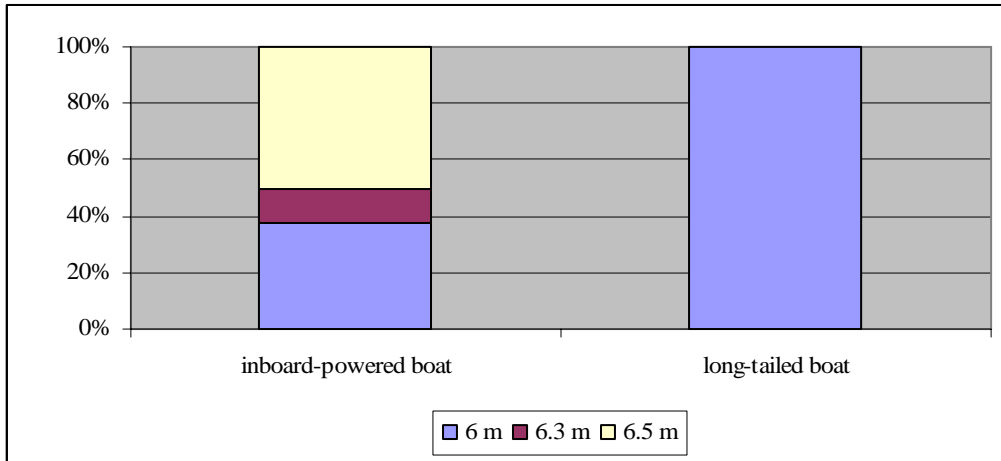
**Fig. 8. Types of fishing boats used**

Considering their status on boat ownership, the survey found that 75% are boat owners, while the other 25% has no fishing boat (Fig.9).



**Fig. 9. Fishing boat ownership**

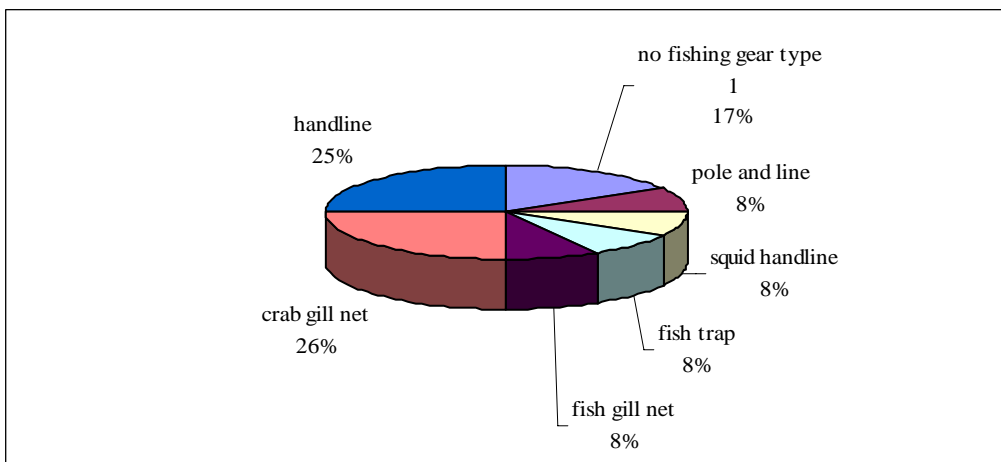
Each group member uses different types of fishing boats with different lengths. Fig.10 shows the length of the fishing boat by type of boats. On the bar for inboard-powered fishing boats, 50% use this type of boat which has length of 6.5 m, and 20% and 30% use the boat with lengths of 6.3 m and 6.0 m, respectively. On the bar for long-tailed fishing boat, the result of the survey shows that 100% use this type of boat which is 6 m in length.



**Fig. 10. Length of fishing boats and type of fishing boats**

Many technical documents have well defined the fisheries sector in Southeast Asian region to be located in the tropical zone. This information affirms a multi-species and diversity of the region’s marine aquatic resources. Fishers employed in the region used multi-type of fishing gear to catch fishes, owning at least one type of fishing gear. In the case of Rayong Province, the group members also use at least one type of fishing gear. The result of the survey also illustrates the type of fishing gear used with the number of ownership and the combination of various fishing gear.

Figs. 11, 12 and 13 indicate the type of fishing gear. These three charts include the number of group members who do not own any type of fishing gear. Basically, each figure illustrates the same name of the fishing gear used with each fishing gear used depending on the fishing season. Fig.11 displays the type of fishing gear (Type 1) and number of group members who do not own any Type 1 fishing gear. This chart totally shows that 17% do not own any Type 1 fishing gear and 83% having owned Type 1 fishing gear. Among the 83%, the numbers identified the type fishing gear used such as crab gill net (26%), handline (25%), fish gill net (8%), fish trap (8%), squid handline (8%) and pole and line (8%).

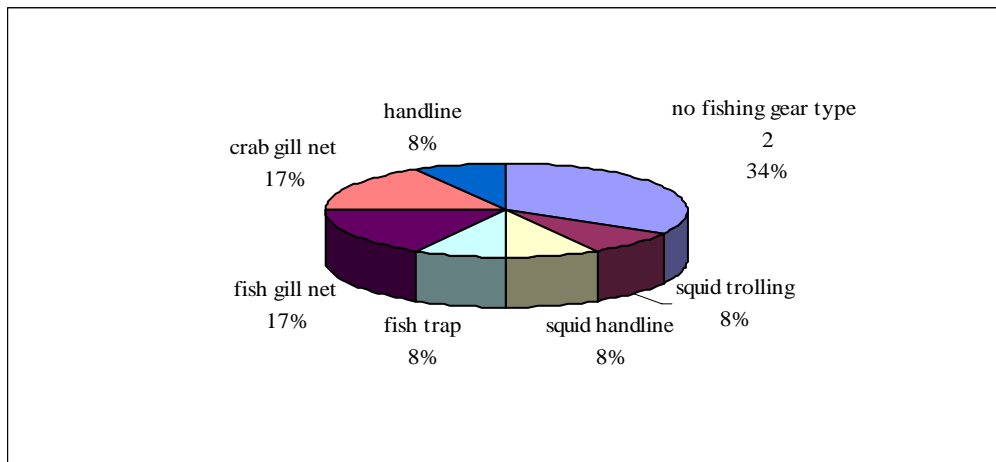


**Fig.11. Number of fishing household using Type 1 fishing gear**

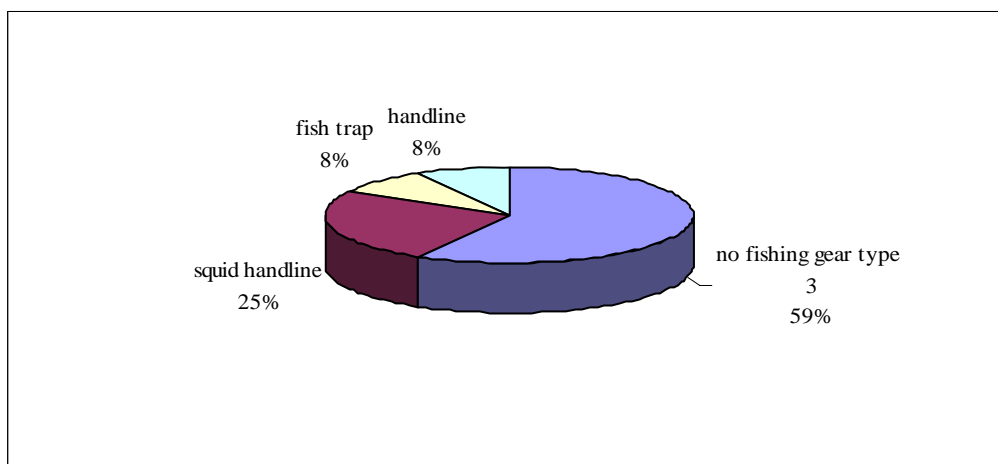
Fig. 12 reveals the number of fishing gear (Type 2) belonging to a member of the group. Nevertheless, this chart shows that some of the group members do not use



Type 2 fishing gear (34%). Fig. 13 indicates the same trend as Fig. 12, with very few members using Type 3 fishing gear. This figure also shows that 59% do not have Type 3 fishing gear.

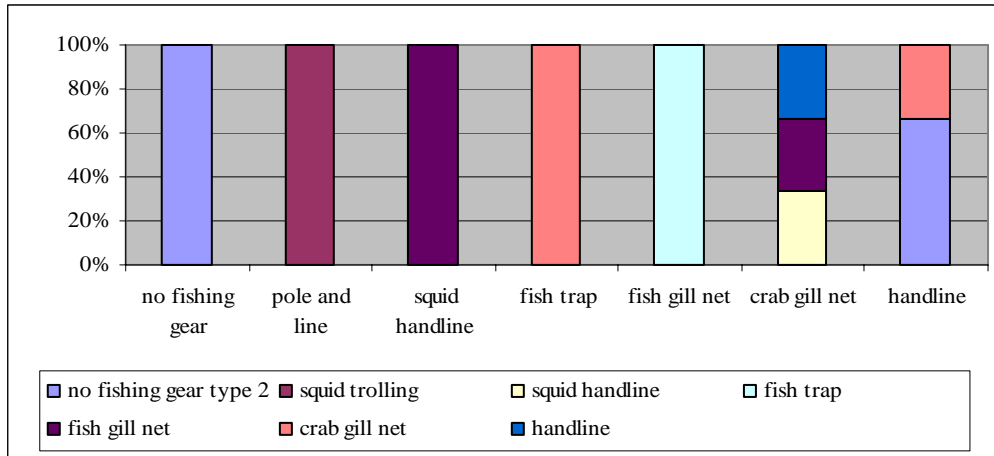


**Fig. 12. Number of fishing household with Type 2 fishing gear**

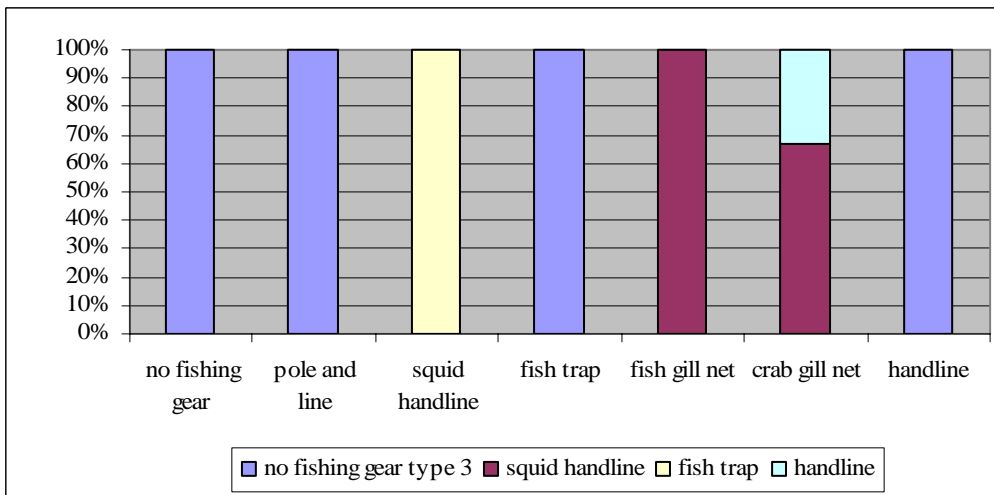


**Fig.13. Number of fishing household with Type 3 fishing gear**

The combination of fishing gear type is displayed in Fig. 14 and Fig.15, where Fig.14 illustrates the number of group members using combined Type 1 and Type 2 fishing gear. Fig.15 indicates the number of group members employing Type 1 and Type 3 fishing gear. Fig.14 indicates the group members' usage of combined Type 1 and Type 2 fishing gear. Each stack bar is composed of three categories, e.g. crab gill net with squid handline, fish gill net and handline. Fig. 15 shows the group members' usage of combined Type 1 and Type 3 fishing gear. On the crab gill net bar, a member also uses squid handline and handline. The group members indicated that when using specific fishing gear belonging to either Type 1 or Type 2 or Type 3, they mainly consider the fishing season and also after observing the abundance of the target marine aquatic species.

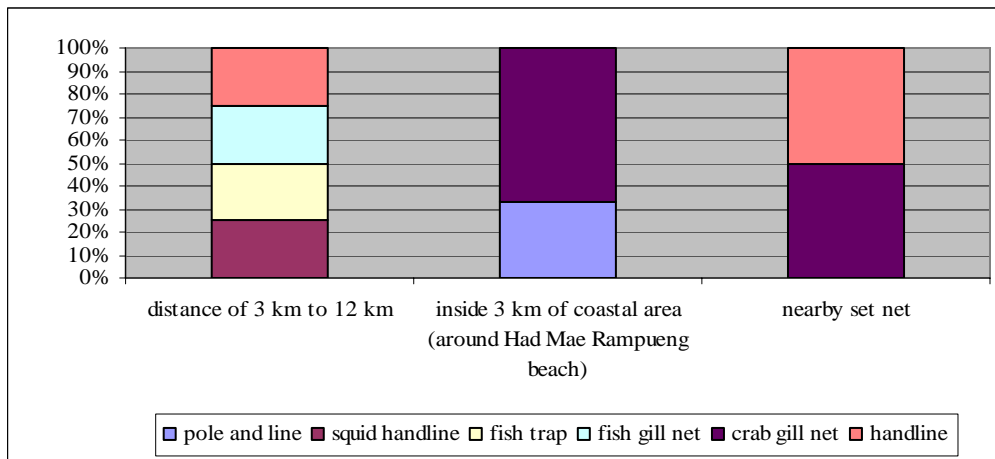


**Fig. 14. Number of fishing household possessing Type 1 and Type fishing gear**



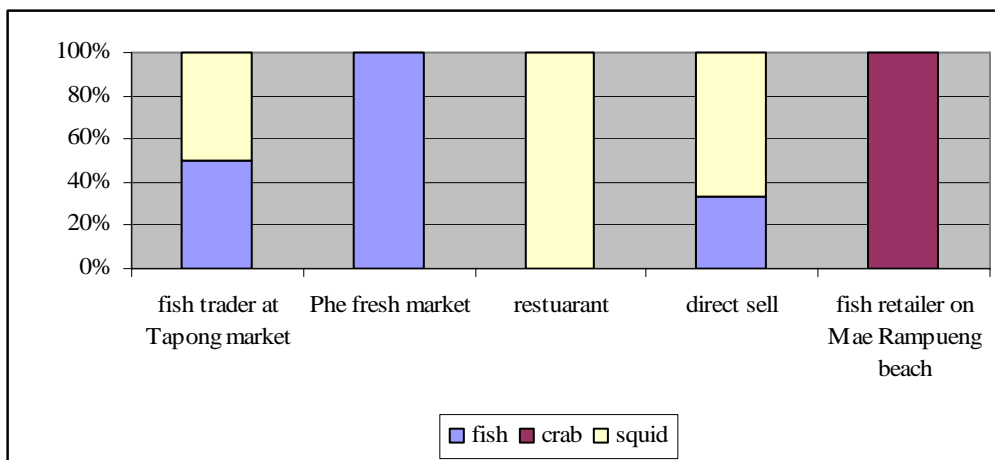
**Fig. 15. Number of fishing household having Type 1 combined with Type 3 fishing gear**

The group members also provided the information that their fishing ground is usually grouped into three zones based on the members utilizing the zone. Basically, the three fishing ground zones are: inside 3 km of the coastal area (along Had Mae Rumpheung Beach), a distance of 3 km to 12 km, and area near the set net installation site (Fig.16). Crab gill net (67%) and pole and line (33%) fishing gears mainly occupied the area inside the 3 km of coastal area. In the distance of 3 km to 12 km, squid handline, fish trap, fish gill net, and handline (25% each), are employed in this area. Crab gill net (50%) and handline (50%) are used to fish near the set net installation site, but the group members emphasized that this was at the only beginning of the fishing gear installation.



**Fig. 16. Fishing ground occupied by types of fishing gear**

Fish product distribution fundamentally takes four routes, namely: the fish traders at Tapong Market, Phe fresh market, restaurants, fish retailer on Mae Rumpueng Beach (Fig. 17). This chart indicates that fish and squid products have the same channel of distribution, which are sold to fish traders at Tapong Market, Phe fresh market and restaurants, and also directly sold to consumers. The group members mainly sell fish products in Phe fresh market, meanwhile, squid product is chiefly sold to restaurants Crab product is in demand by fish retailers on Mae Rumpueng Beach.



**Fig. 17. Type of fish products and distributing channels**

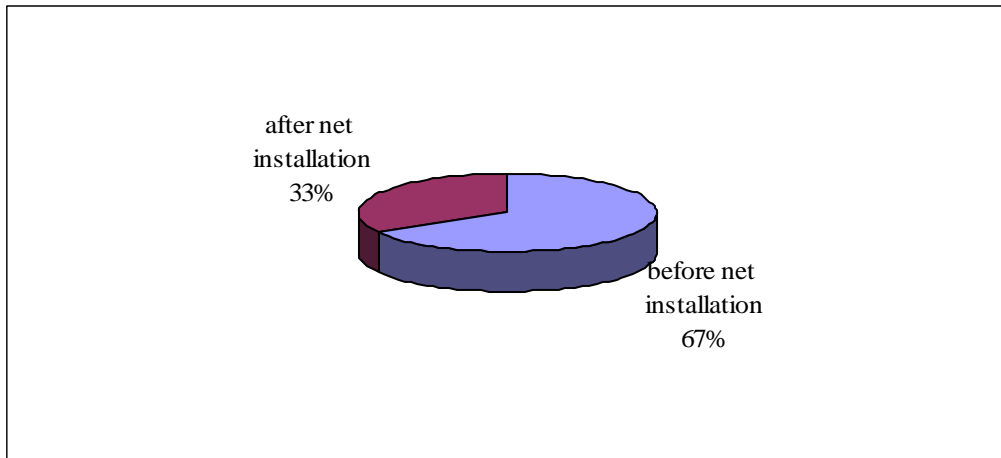
The characteristics of the set net fishers group have individually clarified the group members' ways of life which depend mainly on the fisheries sector. This information is useful to understand the group member's fishing skills and interests.

### **Fisher group's participation and functions in the set net fisheries management**

The group members comprise the working task force participating in the set net fisheries management for four years. The pattern of the group member's participation is significant in the management and in sustaining the group's involvement in the set net fisheries. The group member's participation was therefore observed from the beginning stage until the present time. The function of the group members is defined as a task which the members often practice. Here, the members' function in the

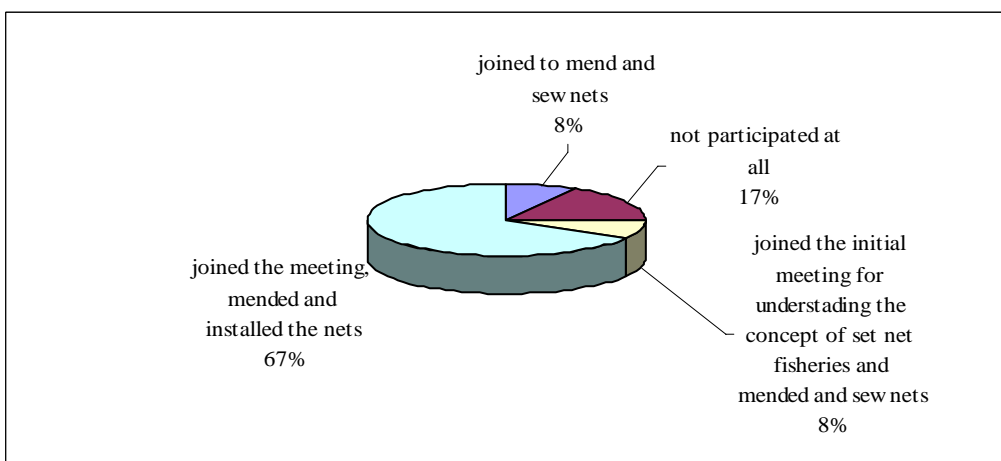
fishing operational activities is recognized. The members' involvement in the managerial and administrative functions is also highlighted.

The result of the survey found that the present group members (67%) joined the group before the installation of the set net fishing gear unit. The other 33% have just joined the group after the set net fishing gear was already installed (Fig. 18).



**Fig. 18. Number of group members participating in the group before and after the installation of the set net**

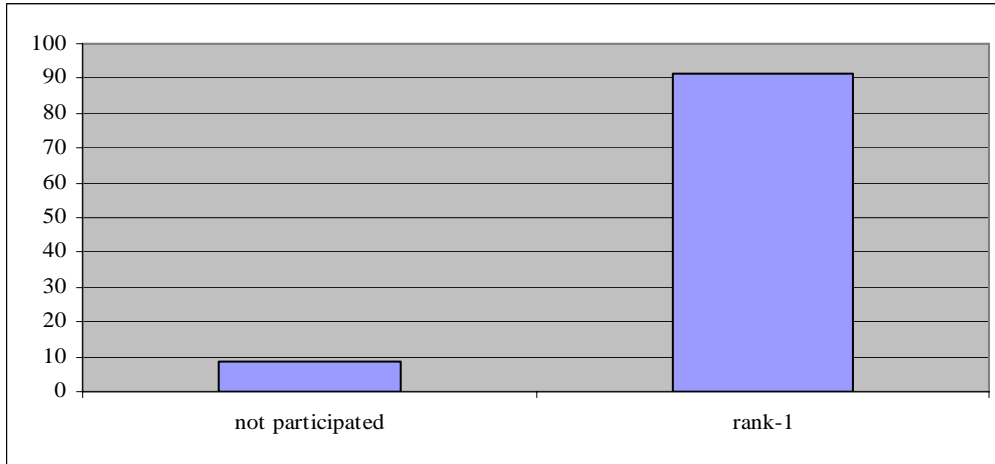
At the preparation stage of the set net fishing gear deployment, the group members' participation could be grouped into four types of participation. The number of the group members participating in each type shows that 8% joined the initial meeting to understand the concept of set net fisheries, 8% joined in the mending and sewing the net. A large part of the group members (67%) joined the meeting, as well as in mend and installing the net. However, the result also found that 17% of the group members did not participate in any type of activity (Fig.19).



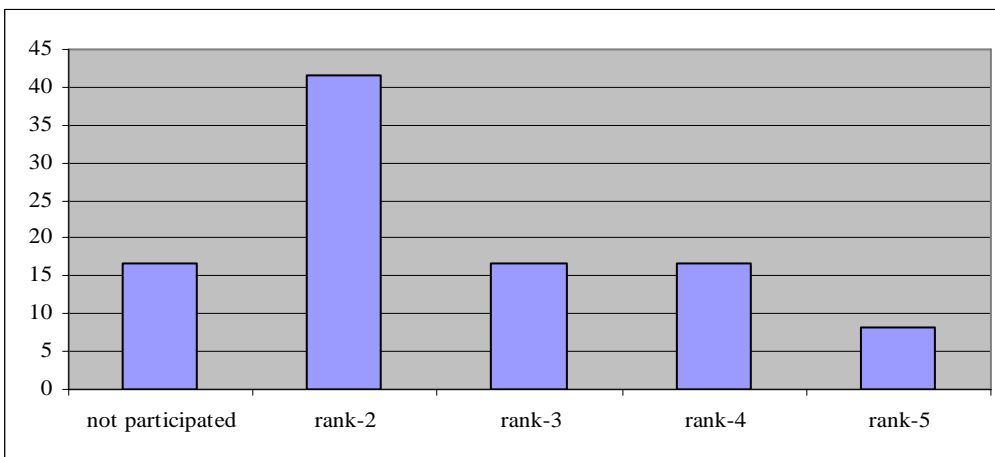
**Fig. 19. Group members' participation in the pre-installation of the set net fishing gear**

After the installation of the set net fishing gear, fishing operational activity was carried out to implement the set net fisheries. The group members were asked to rank

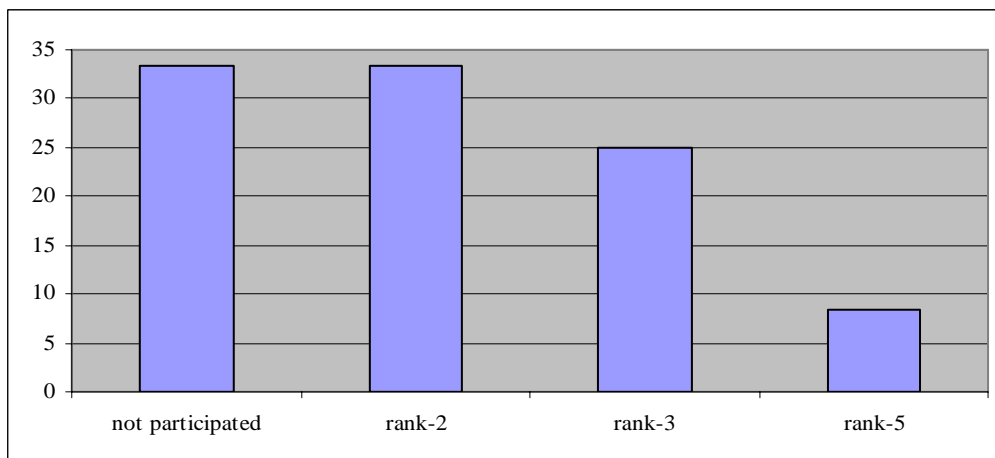
their task in the fishing operational activity. The result of the survey shows that 80% ranked hauling the net for harvesting as first (Fig.20). The group members (42% and 34%) ranked maintenance and repairing the net, and selling fish products on beach, respectively as second (Fig. 21 and Fig. 22).



**Fig. 20. Group members' participation in the hauling of the net for harvesting**

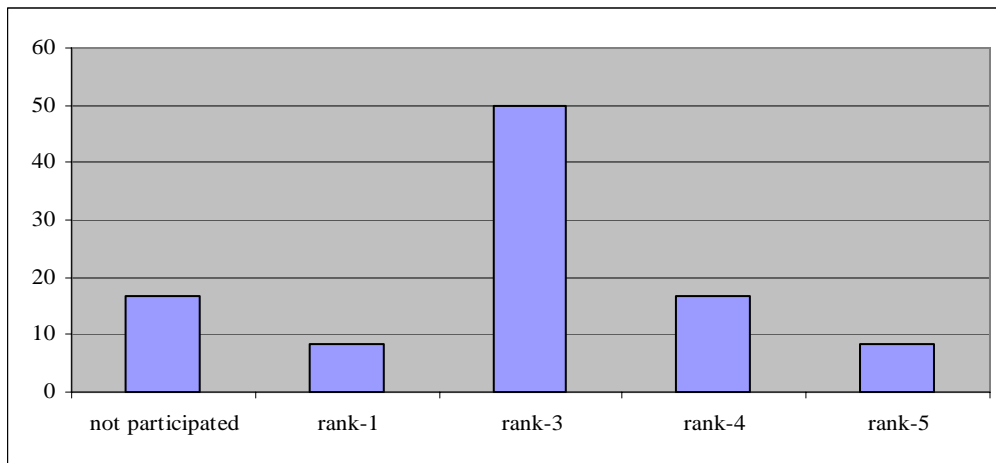


**Fig. 21. Group members' participation in the maintenance and repair of the net**

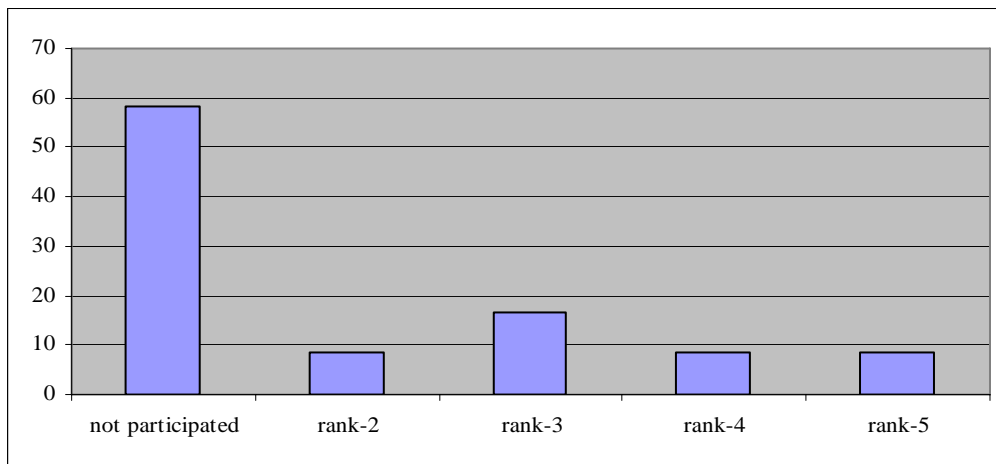


**Fig. 22. Group members' participation in selling the fish on the beach**

The group members ranked cleaning and re-installing the net and developing fishing technique third as shown in Fig. 23 and Fig. 24. For the cleaning and re-installing task, the group members usually do the cleaning bimonthly and in the end of the fishing season, and re-installing it when the next fishing season starts. On developing fishing technique, this task means a fishing technique for day by day operations and also refers to the technique in settling and adjusting the set net fishing gear to better trap fishes.



**Fig. 23. Group members' participation in cleaning and re-installing the net**



**Fig. 24. Group members' participation in developing the fishing technique**

However, as shown in Fig. 22 and Fig. 24, a number of the group members did not participate in selling the fish and in developing the fishing technique (34% and 59%, respectively). Some member cited that they did not have the skills in selling fish while some members said they are not skillful in fishing operation particularly in set net fisheries although they often listened to the group chairman when fishing operational management is discussed.

The group members' participation in the group administration and management is supportive information in order to understand how the group practices management. Table 3 shows the practical function of the set net fishers group's participation in the management and administration. The top four activities, which was identified by 50%

or more group members are: 1) join meetings between DOF and SEAFDEC staff (92%); 2) recruit new members to join the group (67%); 3) adjust the position of the set net settlement for better trapping of fishes (50%); and 4) help develop a group system by shifting from the traditional system to a modernized system, like a CO-OP or an association (50%).

**Table 3. Group members' participation in the group activities**

Type of participation	Participation (%)	
	Yes	No
1.schedule a queue for members to join in harvesting fishes	33	67
2.arrange short meetings to discuss problems and benefit management among members	42	58
3.assist the treasurer in managing the accounts (income and expenditures)	33	67
4.recruit new members to join the group	67	33
5.search new fishing technique for set net fisheries	25	75
6.serve as watchdog for the set net	42	58
7.join meetings between DOF and SEAFDEC staff	92	8
8.adjust the position of the set net settlement for better trapping of fishes	50	50
9.help develop a group system by shifting from a traditional system to modernized system like a CO-OP or an association	50	50
10.search for new marketing channels	42	58

The survey also made an investigation on the group members' opinion or recommendations in strengthening the group development and management for coastal fisheries management. Table 4 lists the group members' opinion and recommendations to strengthen the group development and management for coastal fisheries management.

**Table 4.Group members' recommendations and opinion to strengthen group development**

Criteria	List of recommendations & opinion	%
<b><u>Economic</u></b>	develop and manage the group marketing system	8
	group should responsibly fish only the marketable sized fishes	8
	increase marketing channels	8
	try to increase yield to increase income	8
<b><u>Fishing technique</u></b>	develop fishing technology	8
	need high technology fishing equipment	8
<b><u>Administrative</u></b>	develop group accounting system	8
	increase number of members	8
	legally approve the set net fishing gear	8
	meeting arrangement for common understanding among members	8
	no comment/ recommendation	17
Total		100

The group members were asked about their opinion and recommendations on how to strengthen the group to sustain coastal fisheries management. Table 4 shows the group members' opinion and recommendations which are grouped into three criteria. On the economic criteria, the group members suggested that the group should develop and manage the group marketing system, increase marketing channels and responsibly catch only the marketable sized fishes. On fishing technique, the group should provide facility both in terms of technique and equipment to support the group fishing operation. On the administrative criteria, the group should increase the number of its members to increase the manpower, in particular for the fishing and harvesting activities. The group also anticipates that the set net fishing gear should be legally approved to ensure the group's stability. The group should also develop the group accounting system to be credible, which should be based on accounting, standards. The group members also recommended that meetings should be arranged on regular basis in order to have common understanding among the members.

The survey did not only investigate the group members' opinion and recommendations in strengthening the group for coastal fisheries management, but they were also asked why they participate in the group. Table 5 indicates the reasons of the group members for participating in the set net fishers group. The top two reasons that were highly rated are: they wanted to participate in the new fishing technology (25%) and expected to gain higher income (17%).

**Table 5. Reasons of group members for participating in the set net fishers group**

<b>Reason for participating in the set net fisher group</b>	<b>%</b>
want to participate in new fishing technology	25
expect to gain more income	17
convince other friends to join the group	8
not owned fishing boat	8
spend less in the low cost of fishing operation	8
support the group to sustain work	8
as group leader, must participate in the group activities	8
work as a group in fisheries	8
promote fishing expertise	8
Total	100

The set net fishing gear unit and its advantages are vital to enable the group to make a remarkable observation of the fishing operation. The survey investigated the gear and its benefits based on the group members' appreciation of the gear and the fishing operation. Nine questions were designed following the objectives of the set net fishing gear installation and on how the gear installation and implementation benefits coastal fisheries management. The group members' appreciation was ranked into four levels, such as: 'highly agree', 'agree', 'fair', 'do not agree'. Each rank concretely indicates how the group members think about the set net fishing gear. This information can serve as a social point of view to further promote coastal fisheries management and enhancement.

The result of the survey on the group members' appreciation of the set net fishing gear is illustrated in Table 6, where the left column contains the set of questions concerning the set net fishing gear's functioning enhancing the coastal fisheries



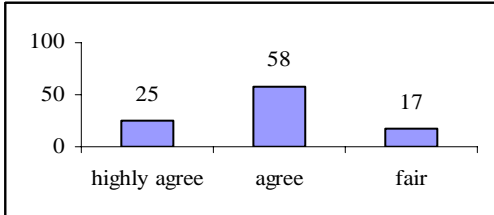
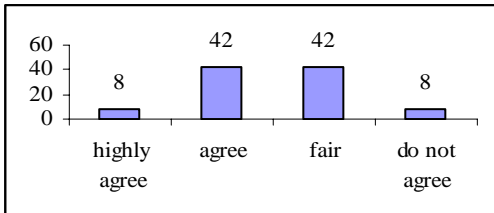
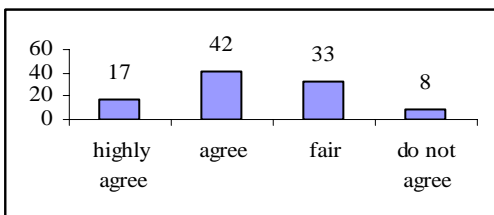
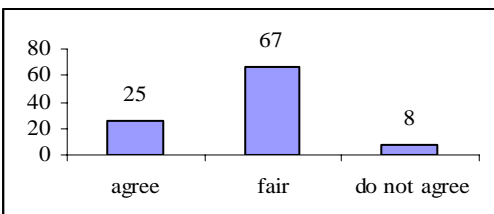
resources. The right column indicates how much the group members appreciated the advantages of the set net fishing gear.

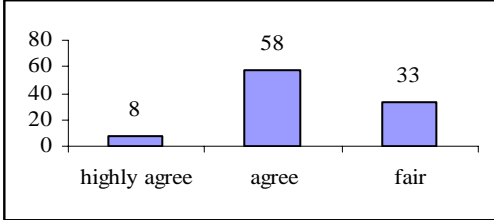
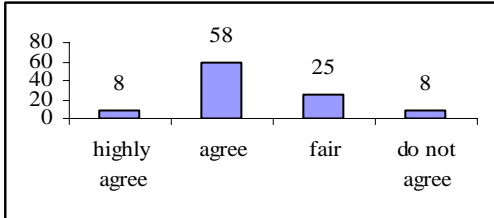
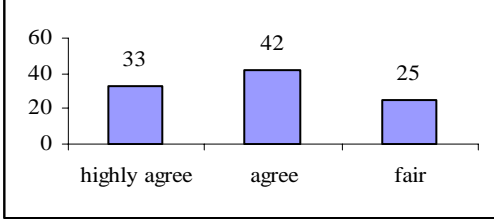
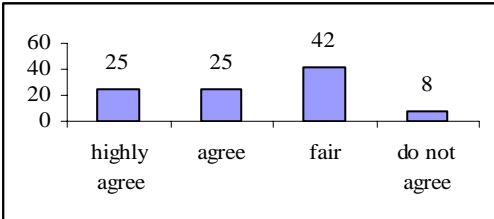
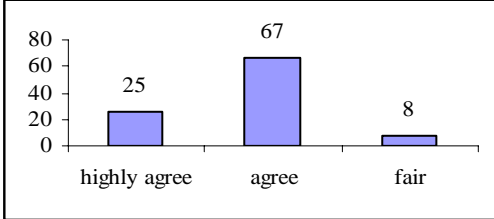
On whether the set net fishing gear helps enhance the aquatic resources, 58% agreed that the set net fishing gear enhances the aquatic resources as observed from the increasing fish catch compared with their catch during the pre-installation of the fishing gear.

On the fact that the set net fishing gear installation helps reduce encroachment of commercial fishing boats into 3 km coastal areas, 42% agreed while another 42% rated the question as 'fair'. This result should be verified with the informal and formal records of the police and local stakeholders.

In terms of responsible fisheries, 42%, agreed that the set net fisheries is an appropriate example to promote responsible fisheries because of its selectivity in harvesting as only marketable sized fishes are collected.

**Table 6. Group member's appreciation on the set net fishing gear and installation**

The set of question	Finding result										
1. the set net fishing gear helps to enhance the aquatic resources with increasing fish catch compared with the catch during the pre-installation of set net fishing gear	 <table border="1" data-bbox="762 913 1257 1126"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>highly agree</td> <td>25</td> </tr> <tr> <td>agree</td> <td>58</td> </tr> <tr> <td>fair</td> <td>17</td> </tr> </tbody> </table>	Response	Percentage	highly agree	25	agree	58	fair	17		
Response	Percentage										
highly agree	25										
agree	58										
fair	17										
2. the set net fishing gear installation helps reduce encroachment of commercial fishing boat into 3 km. of coastal areas	 <table border="1" data-bbox="762 1149 1257 1361"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>highly agree</td> <td>8</td> </tr> <tr> <td>agree</td> <td>42</td> </tr> <tr> <td>fair</td> <td>42</td> </tr> <tr> <td>do not agree</td> <td>8</td> </tr> </tbody> </table>	Response	Percentage	highly agree	8	agree	42	fair	42	do not agree	8
Response	Percentage										
highly agree	8										
agree	42										
fair	42										
do not agree	8										
3. the set net fisheries is an appropriate sample to promote responsible fisheries such as selecting and harvesting only marketable sized fishes	 <table border="1" data-bbox="762 1384 1257 1597"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>highly agree</td> <td>17</td> </tr> <tr> <td>agree</td> <td>42</td> </tr> <tr> <td>fair</td> <td>33</td> </tr> <tr> <td>do not agree</td> <td>8</td> </tr> </tbody> </table>	Response	Percentage	highly agree	17	agree	42	fair	33	do not agree	8
Response	Percentage										
highly agree	17										
agree	42										
fair	33										
do not agree	8										
4. the set net fisheries helps reduce conflict between small-scale fishers and commercial fishing boats	 <table border="1" data-bbox="762 1619 1257 1832"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>agree</td> <td>25</td> </tr> <tr> <td>fair</td> <td>67</td> </tr> <tr> <td>do not agree</td> <td>8</td> </tr> </tbody> </table>	Response	Percentage	agree	25	fair	67	do not agree	8		
Response	Percentage										
agree	25										
fair	67										
do not agree	8										

5. the set net fisheries helps secure certain daily income to members	 <table border="1" data-bbox="762 203 1257 421"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>highly agree</td> <td>8</td> </tr> <tr> <td>agree</td> <td>58</td> </tr> <tr> <td>fair</td> <td>33</td> </tr> </tbody> </table>	Response	Percentage	highly agree	8	agree	58	fair	33		
Response	Percentage										
highly agree	8										
agree	58										
fair	33										
6. the set net fishing gear should be used a mark of 3 km. coastal areas serving as notice to commercial fishing boat.	 <table border="1" data-bbox="762 441 1257 658"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>highly agree</td> <td>8</td> </tr> <tr> <td>agree</td> <td>58</td> </tr> <tr> <td>fair</td> <td>25</td> </tr> <tr> <td>do not agree</td> <td>8</td> </tr> </tbody> </table>	Response	Percentage	highly agree	8	agree	58	fair	25	do not agree	8
Response	Percentage										
highly agree	8										
agree	58										
fair	25										
do not agree	8										
7. the set net fishing gear helps increase the biodiversity of aquatic resources	 <table border="1" data-bbox="762 687 1257 904"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>highly agree</td> <td>33</td> </tr> <tr> <td>agree</td> <td>42</td> </tr> <tr> <td>fair</td> <td>25</td> </tr> </tbody> </table>	Response	Percentage	highly agree	33	agree	42	fair	25		
Response	Percentage										
highly agree	33										
agree	42										
fair	25										
8. the set net fisheries and installation help reduce number of fishing effort occupied in area of the sea.	 <table border="1" data-bbox="762 922 1257 1140"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>highly agree</td> <td>25</td> </tr> <tr> <td>agree</td> <td>25</td> </tr> <tr> <td>fair</td> <td>42</td> </tr> <tr> <td>do not agree</td> <td>8</td> </tr> </tbody> </table>	Response	Percentage	highly agree	25	agree	25	fair	42	do not agree	8
Response	Percentage										
highly agree	25										
agree	25										
fair	42										
do not agree	8										
9. the set net fishing gear helps increase the substrate and improve shelter for marine living organisms.	 <table border="1" data-bbox="762 1169 1257 1386"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>highly agree</td> <td>25</td> </tr> <tr> <td>agree</td> <td>67</td> </tr> <tr> <td>fair</td> <td>8</td> </tr> </tbody> </table>	Response	Percentage	highly agree	25	agree	67	fair	8		
Response	Percentage										
highly agree	25										
agree	67										
fair	8										

Many members (67%) rated ‘fair’ the fact that the set net fisheries help reduce the conflict between small-scale fishers and commercial fishing boats.

Many group members (58%) agreed that the set net fisheries help in securing their certain daily income.

Many (58%) also agreed that the set net fishing gear should be remarkably used as a marker of the 3 km coastal areas to caution the commercial fishing boats.

On the question whether the set net fishing gear helps increase the biodiversity of aquatic resources, most of the group members gave different ratings: 33% highly agreed 42%, agreed while 25% rated the question fairly. All members agreed on this fact from the biological point of view.

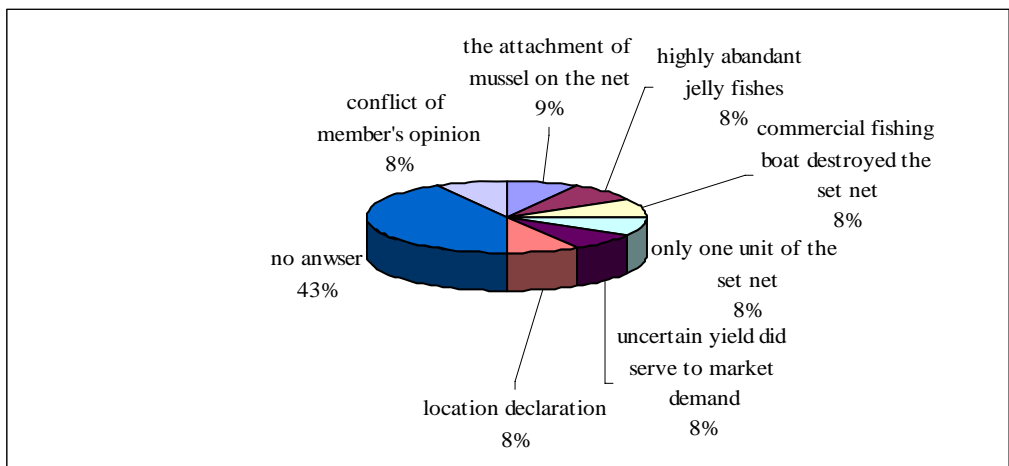
The set net fisheries and installation seem a little successful, so the group members rated their appreciation of the set net fisheries in reducing fishing effort in the occupied area of the sea as 'fair' (42%).

Excellently, the group members agreed (67%) that the set net fishing gear helps increasing the substrate and improve the shelter for marine living organisms.

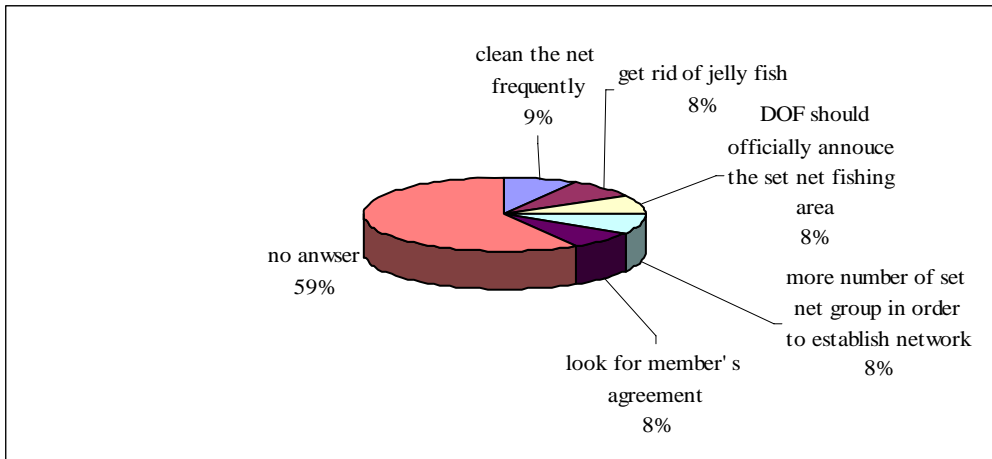
**Future development and management of the set net fisheries and the group**

The development and management of the set net fisheries and the fishers' group in the future have been verified through the group members' opinion in clarifying problems, finding solutions and identifying their needs. Problems have been recently experienced by the group members, making it difficult to further develop the set net fisheries and the group considering various criteria such as economic, social and administration. Fig. 25 shows the problems identified by the members based on their experience in practicing the set net fisheries. On the economic criteria, the group members criticized the uncertain yield which may not serve the market demand (8%). In addition, one fishing gear unit (8%) and location (8%) could be other threats that limit the promotion of the fishing gear.

The group members also faced the problem related to administrative work such as conflict of member's opinion (8%), the attachment of mussels on the net structure (9%), and high abundance of jellyfishes (8%). On social issue, the presence of commercial fishing boats could destroy the set net (8%). Fig. 26 shows the suggested the solutions for the problems identified in Fig. 25. Totally, the solutions mainly rely on developing the administrative work to certain functions in the set net fisheries and the group development. Specifically, the group members suggested that the DOF should officially announce the set net installation in the fishing area (8%) and increase the number of set net groups in order to establish a network (8%). Other solutions proposed included seeking the members' agreement to reduce conflict of opinions (8%), frequent cleaning of the net to effectively attract aquatic resources (9%), and getting rid of jellyfishes from the net (8%).

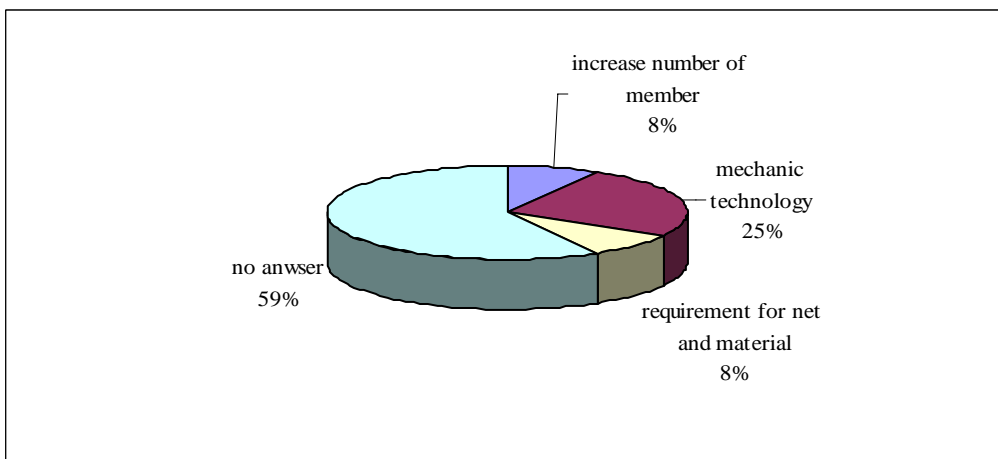


**Fig. 25. Identified problems threatening the future development of the set net fisheries and the fishers group**



**Fig. 26. Suggested solutions for future development of the set net fisheries and the fishers group**

The need to further develop the set net fisheries and the fishers group was also proposed. The mechanic of the fishing technology is highly required as suggested by 25% of the member who supported this necessity. The others suggested that an increase of the number of group members (8%) as well as more requirement on net and materials (8%) would be necessary (Fig.27).



**Fig. 27. Identified needs for future development of the set net fisheries and the fishers group**

Identification of the problems, solutions and needs confirmed that the group members practiced and experienced the implementation of the set net fisheries. However, the group members performed only an elementary role in an institution of the group to function in coastal fisheries management. The group placed greater emphasis on securing their benefits and incentives, as their top priority. The group members still need more practice and skills in adopting the principles of fisheries cooperative and financial management.

## Conclusion and recommendation

The set net fishers group is a primary collective management body in coastal fisheries. The group is in the process of learning-by-doing particularly in group development and management. The members' participation in the activities is a crucial tool to make the group exist further. The major type of the group members' participation was demonstrated by their interest in joining the capture and harvest of the fish. Such effort is important to encourage the group to fundamentally create an accumulative incentive for its members. However, the group was facing uncertainty in terms of fish products as well as on fish prices which tend to change according to market demand.

The group's function in the administrative affair and management is a practical experience leading towards the concept of cooperative management, a shift of the group management system from traditional to modern form of management. This initially made a credible environment among the group members. Currently, the group is keeping busy with managing and institutionalizing itself. In addition, the group also started to handle the systematic financial and accounting management however, the group is not yet ready to take functions related to co-management nor rights-based coastal fisheries management. An enabling environment such as legal framework preparation and strengthening the capacity of the group would be needed to make the group manage the set net fisheries for sustainable coastal fisheries.

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