THE NEW ROLE OF EXTENSION WORKERS UNDER COMMUNITY-BASED MANAGEMENT REGIME: EXCHANGING SCIENTIFIC INFORMATION FOR BETTER COMMUNITY DECISION MAKING

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1. INTRODUCTION

During the past three decades, the demand for fish has increased rapidly both from developing and developed countries, owing to increase in population, change of consumer tastes and economic growth. Therefore, fish producing countries, including Thailand have expanded their exports and earned huge amounts of foreign exchange. In 1994, Thailand was the world's leading fish exporter earning nearly US\$ 4,000 million, of which around 40 percent was from frozen prawns.

In the developing world, 14-20 million people are directly involved in fisheries and aquaculture. The figure increases to 50 million if post-harvest handling and marketing are included. In addition, there are 1 billion people who rely on protein from aquatic products as their main source of animal protein (Pomeroy and Williams, 1995). The supply of fish comes mainly from the natural fish population and only a small portion come from aquaculture. Therefore, the fisheries resources have been heavily exploited in the last three decades resulting in resource depletion. At present, most coastal states face this problem and are trying to solve it by introducing various fisheries management measures, such as area and seasonal closures, gear restriction and limited entry. However, it has not been possible to solve this problem.

Thailand is one of the coastal states in which the fishery industry has been developed since 1960. In the 1960s, the trawl fishery was developed and demersal fish became acceptable to Thai consumers. Fishing technology developed rapidly and the number of fishing boats increased. This resulted in over-exploitation of the fisheries resources in Thai waters during the 1970s (Juntarashote, 1994).

The fisheries resources of Thailand are treated as common property. That is, anyone can benefit from these resources. They are, therefore, heavily exploited by fishermen who employ various types of fishing gear. Arising from the development of the Thai marine fishery during the last three decades, the two most severe problems are, fisheries resources depletion and conflicts among fishermen. If these two problems cannot be solved in the next decade, the fishery industry of Thailand may reach a stage where it is no longer viable. DOF has recognized these problems. Hence, many fishery management measures have been implemented for the recovery of the country's fisheries resources. Although these measures have been implemented for more than a decade, the fisheries resources have been unable to reach a satisfactory level for the following reasons:

- **1.** The number of staff and boats for law enforcement is inadequate for patrolling the coastline of 2,614 km, given the large number of fishing boats that use various types of fishing gear.
- 2. The fishermen do not co-operate fully.
- **3.** The law enforcement cost is very high.
- 4. The DOF is not the sole agency for fishery management.
- **5.** The fishery management policy is a "top-down" policy. Thus fishermen are not involved at any stage in establishing and implementing a fishery management programme.

Therefore, in order to solve the problems of the fishery industry, the DOF must seek other alternatives of fishery management. Community-based fishery management, which is a "bottom-up" policy, may be the answer.

In implementing a community-based fishery management programme, officials from various agencies must work closely with fishermen. The extension workers are seen to be the most important persons working with the fishermen. Their role in the past was principally technology transfer, but in a community-based fishery management programme, their role would be expanded to include other aspects such as exchanging scientific information with fishing communities for better community decision making.

2. COMMUNITY-BASED FISHERY MANAGEMENT IN THAILAND

Towards the end of 1992, the DOF, in collaboration with the Fishery Association of Thailand, organized a seminar in Surat Thani province. One of the recommendations made by the small-scale fishery group was that the DOF should establish a fishing rights system for Thai small-scale fishermen who are the poorest in the fishery sector. It is generally believed that if the fishermen were given management responsibilities, they would feel more committed and be more responsive to managing the resources. In addition, the fishing rights system would, firstly, solve the problem of conflicts among fishermen; secondly,

reduce law enforcement costs; and, thirdly, enable coastal fisheries resources to recover (Juntarashote, 1994).

In 1993, the DOF in collaboration with the Department of Fishery Management (DFM), Faculty of Fisheries, Kasetsart University, set up a development plan for a community-based fishery management programme for Thai fishermen. Fishing rights would be granted to all small-scale fishermen. They would be given exclusive rights to fish in their own fishing ground and, at the same time, they would have responsibilities in connection with the fishery management programme in that area.

However, in granting fishing rights to small-scale fishermen, the following have to be considered:

- Whether the DOF is ready to grant fishing rights to fishermen's institutions.
- Whether fishermen are willing to accept a fishing rights system.
- Whether the fishing rights system is in accord with the present fishery law.
- Whether the fishing rights system is in accord with the present fishermen's institutional law.
- . Whether the persons concerned with the fishing rights system have a common understanding of the concept of fishing rights (Juntarashote, 1994).

In 1994, the DOF formally set up several committees for the establishment of community-based fishery management for small-scale fishery. The urgent tasks are (a) drafting a new fishery law to incorporate the fishing rights system, and (b) preparing a pilot project.

2.1 Pilot Project

Since the community-based fishery management concept is new to Thailand, it is essential to have a pilot project in order to study' the problems that may occur and seek solutions. The DOF and DFM agreed to start the pilot project by October 1995.

The principal criteria for selecting a pilot project area for improving the management of coastal fishery will include the following (Juntarashote, 1995):

Economic

Sustainable capture fisheries is capable of becoming the principal source of livelihood of the communities selected.

Competition from commercial trawlers is minimal or there is a strong possibility of minimization through project implementation.

DOF is able to provide legal and practical assistance to protect fisheries.

Social

Previous participation by the communities in DOF or NGO programmes should have been demonstrated.

Willingness on the part of fishermen to cooperate in managing and protecting fisheries resources should be shown to exist.

Ability and willingness of fishermen to work with the neighboring villages in a community approach to resource management.

Ecological

Potential exists for adequate and sustainable fish catch from coastal fishery. In addition, the following criteria should apply to areas for the implementation of a package to improve management of coastal zone resources in relation to small-scale fishery:

- Potential for sustainable small-scale coastal fishery based on more than one stock within a three-kilometer limit.
- A significant number of small-scale fishermen to form a viable self-supporting organization.
- Sufficient depth of water for installing artificial reefs.
- Demonstrable relationship between groups which might form a community.
- The existence of at least a rudimentary organization among fishermen or experience of participating in previous department programmes.
- Fishermen views are consistent with the active management of fishery.
- Some potential exists for mangrove or sea grass rehabilitation (MIDAS, 1995).

Based on the above criteria, there are many areas that show a potential for the implementation of CBFM. But, owing to budget constraints and the limited number of competent staff, only three provinces have been selected as pilot project areas. These are:

- 1. Trat Province, on the eastern coast of the Gulf of Thailand.
- 2. Nakhon Si Thammarat Province, on the western coast of the Gulf of Thailand.
- 3. Trang Province, on the Andaman Sea.

In addition, under the Bay of Bengal Programme (BOBP), Phang-nga Bay has been chosen as a pilot project area that is being implemented by the Andaman Marine Fishery Center of DOE

In order to avoid future difficulties and problems of project implementation, the following research aspects will be looked into as they relate to the pilot project areas:

- 1. The socio-economic conditions of fishery households and their attitudes towards CBFM.
- 2. The establishment of fishermen's institutions and their functions as well as performances in the past.
- 3. The abundance of coastal fisheries resources, in particular of sedentary species and their utilization.
- 4. The activities and performances of the NGOs that work in the pilot project areas.
- 5. Changes that would occur in fishery households and communities on account of the introduction of CBFM.

Components of the programme

- 1. Identification of a potential fishing community as a coherent mix of a number of settlements or groups. Individual fishing communities or settlements are not usually large enough to constitute a management unit for a sustainable fishery area over which they can be given rights. Identification will be carried out through close consultation and co-operation with the communities.
- 2. Identification of relevant fishing grounds in which the community will have fishing rights. Community surveys to determine usual or traditional fishing grounds and the interest of other communities in those grounds.
- 3. Ensuring that neighboring communities will respect fishing rights. This may prove difficult as the adjacent community will not necessarily be included in CBFM in the short term, and may therefore be excluded from some fishing grounds without

being given rights to others. There may be a need to reach an agreement on some fisheries resources or some fishing grounds being common property resources.

- 4. Granting of legal rights to the community to identify fishing grounds and protect their resources. At present, a new fishery law is being drafted to provide for community fishing rights.
- 5. Establishment of a community fisheries management committee. This will be decided by the community, with advice and training on what is involved in committee work.
- 6. Management training/awareness raising of the community and committee. This includes:
 - basic principles of fishery management and coastal environmental issues;
 - · business management principles;
 - · legal aspects of community-based fishery management; and
 - moreover, government personnel will be made aware of the principles and methodology and of their roles of in CBFM.

3. ROLES OF EXTENSION WORKERS

So far, the main objective of fishery industry development is to increase fishery production both in terms of quantity and value. In order to increase fisheries production continuously, a major change in the attitude, knowledge and skills of fishermen is required. The fishermen must break away from traditional attitudes and methods in favor of more objective attitudes and scientific methods. An extension education service must play a fundamental role in this respect.

Principles of extension work

The ultimate goal of extension work is to raise the standard of living of small-scale fishermen. Therefore, extension workers should encourage fishermen to make the necessary efforts to improve their technical knowledge, in order to raise their income and standard of living.

There are a number of principles which will contribute to the efficieiency of extension programmes and lead to greater success. These are as follows:

1. Helv veovle to helv themselves

In developing countries, extension work has appeared to be on the borderline of charity. In fact, this type of work differs from the charitable assistance given to fishermen. Extension workers should not turn people into beggars.

The extension workers should have a clear understanding of the basic principle for which an extension service is designed: to help people to help themselves. The most difficult task for extension workers is to correct the misunderstanding that extension is charity. The real purpose of extension work is to motivate and convince fishermen to improve their living conditions themselves.

2. Work at the village level

Previous experience has proved that the fishermen are not likely to change significantly if the basic extension programme is introduced from outside. Therefore, the fishery extension workers can achieve their objectives if they work closely with the target group and become acquainted with the fishermen's problems, make friends with them and gain their confidence.

3. Encourage learning by doing

To learn something by doing it is much more educative than to learn it merely through verbal communication of ideas.

4. Create an imbalance

It has been found that extension creates an imbalance in the level of knowledge in a specific area. Thus, differences emerge in the technological know-how of the target groups. In terms of the flow of technology, it is obvious that there is a shifting of technology from place to place and that people select an appropriate technology according to what is readily available to them, and by the amount of information channeled from higher technology sources to groups with lower technological know-how (Juntarashote and Daosukho, 1986).

Some specific roles that an extension education service performs include:

- Providing direct technical assistance to fishermen.
- Providing educational materials.
- Assisting in marketing and market development.
- Presenting training and educational programmes.

- Conducting field trial research.
- Assisting fishermen in formal and informal activities.
- Assisting in government decision-making, policy planning and programming in all aspects of fisheries development.

4. THE NEW ROLES OF FISHERY EXTENSION WORKERS UNDER A COMMUNITY-BASED MANAGEMENT REGIME

At present, fisheries management in Thailand is government-based management, or government-centralized management. It has been found that the success of fishery management is rather limited for the reasons mentioned above. The DOF, therefore, realized that it is essential to change the concept of fishery management from government centralized management to community self-governance and self-management. However, it is impossible to suddenly change from government-based management to community-based management owing to several problems. These primarily include the fact that fishermen's institutions are not well developed, and that the present legal framework is inappropriate. Therefore, at an early stage, co-management should be introduced to fishermen. Co-management is defined as the sharing of responsibility and/or authority between the government and local fisheries resources users/community to manage the fishery or resource (e.g., coral reef, mangrove shoreline habitat) (Pomeroy, 1994).

Co-management is the first step in developing community-based fishery management. This should be followed by (Berkes, 1994):

- 1. Information dissemination. The DOF must inform the fishermen of the new concept of fishery management. This will be done by the fishery extension workers. It is time- consuming since the extension workers must visit each fishing community and explain to the fishermen the concepts of co-management and community-based fishery management. In addition, extension workers have to explain these concepts to local fishery officials and other local offtcers who are concerned with this project.
- 2. Consultation. For the development of community-based fishery management, close consultation has to be maintained between fishermen and extension workers.
- 3. Co-operation among fishermen and between fishermen and extension workers.
- **4.** Communication between the DOF and the fishermen. Two-way communication between the DOF and the fishermen is essential.

- 5. Information exchange. Exchange of data and information between fishermen and extension workers should be done regularly.
- 6. Advisory role. The fishery extension workers play a very important role as advisors to fishermen. Advice may relate in particular to fishery biology, aquaculture, fish processing, fish marketing, group development and leadership improvement.
- **7.** Joint action. In co-management and community-based management, the government and the community will work together from the beginning. They will act together in implementing the programme and solve the problems that arise.
- 8. Partnership. The relationship between fishermen and DOF officials must change to one of a close partnership. The success or failure of the project will be shared by both parties and not be attributed to officials only as has been the case in the past.
- **9.** Community control. This will come into effect when the management regime evolves into CBFM. The community will have full authority to manage the fishery whereas the government will act as advisor to the community. Fishery management measures will be established by the community.
- 10. Inter-area coordination. Once community-based management has been well developed, each fishing community will have its own fishing grounds and apply its own fishery management measures. Thus, the close inter-area coordination of fishing communities will create better fishery management and increase their bargaining power.

The key conditions for successful fishery co-management

Ostrom (1990 and 1992) and Pinkerton (1989) described the key conditions for successful fishery co-management as follows;

- Clearly defined boundaries.
- Clearly defined membership.
- Group cohesion.
- Existing organization.
- Benefits exceeding costs.
- Participation by those affected.
- Enforcement of management rules.
- Legal rights to organize.
- Co-operation and leadership at community level.

- Decentralization and delegation of authority.
- Coordination between government and community.

Roles of fishery extension workers in scientific information exchanges

The abundance of the coastal fisheries resource is the key factor for developing a CBFM programme. As mentioned in various papers, the coastal fisheries resources of Thailand are heavily exploited by fishermen. Trawls and push nets are the major gear exploiting the resources. At the same time they destroy coral reefs and the sea bed which are the habitat of aquatic animals. In addition, pollutants from agriculture, industry and households are discharged into the sea. Therefore, the coastal fisheries resource of Thailand faces the problem of depletion, **which** applies also to Phang-nga Bay.

Geographically, Phang-nga Bay is one of the most biologically productive bays because many rivers and canals flow into it. Nutrients from the land accumulate in the Bay and enrich the fisheries resources. However, owing to overfishing and the failure of fishery management measures, the fisheries resource in Phang-nga Bay has been depleted.

In order to enrich the fisheries resource in Phang-nga Bay, important data and information on fishery biology needs to be collected and analyzed. These are as follows:

- 1. Water quality. The quality of water in Phang-nga Bay has to be monitored regularly. Water quality is one of the key factors that indicate the health and abundance of fisheries resources.
- **2.** Species **composition.** It is essential to know the species composition of the fisheries resource in the Bay. These data may be obtained from the fishermen's catch and from researchers' own data. From these, extension workers may be able to give advice to the fishing community on establishing fishery management measures.
- **3.** Catch data. Data and information on fish catch by type of fishing gear and fishing grounds are essential for estimating total allowable catch. Collecting such data require the co-operation of fishermen, otherwise the reliability of the data will be limited. Fishery extension workers must therefore make the fishermen understand the importance of these data and instruct them on keeping proper records.
- **4.** Data **on** number of fishing boats by size and type, and number of fishing gears. These data are collected in the course of a fishery household enumeration. They should be collected yearly if possible. These data will be used for establishing the fishery management programme.

5. Data and information for artificial reef establishment. Artificial reefs are one of the means of enriching the coastal fishery resources. They create a habitat for aquatic resources and at the same time act as an obstacle to trawls and push nets that operate in coastal areas.

The collected data and information will be analyzed by researchers. The results of the analysis should be made available to the fishery management committee for decision-making purposes.

As mentioned above, in CBFM, the fishermen are responsible for managing their fishery themselves. However, the fishermen have experience only in fishing and some basic knowledge of their fisheries resource. They therefore require additional information on fishery biology as well as on fishery management concepts. It will be the duty of extension workers to simplify the scientific data supplied by DOF for transfer to fishermen and summarize fishery management concepts for them. However, at the initial stage, the fishermen will have to provide the essential data and information on their fishing activities to researchers or extension workers for analysis.

In sum, the further duties and roles of fishery extension workers in scientific information exchange for Phang-nga Bay, under the community-based management regime, should include the following:

Educate and point out the importance of fishery data and information to fishermen through group activities and the mass media.

- 1. Collect from fishermen in Phang-nga Bay, data and information on their fishing activities.
- **2.** Assist fishermen in establishing a fishery data collection system for fishery management purposes.
- **3.** Transmit to researchers for analysis the data and information that is collected from the fishermen.
- 5. Simplify and transfer research results to fishermen, These should include total allowable catch at Phang-nga Bay, catch per unit of effort, spawning ground, nursery ground, first capture size of fish to be caught, the optimum mesh size of each type of fishing gear and the optimum size and type of fishing boat to be used.
- 6. Advise the fishery management committee **about** fishery management measures such as limited entry, catch quota, area and seasonal closures. However, any measures have to be designed by the fishermen, not by fishery extension workers.

- 7. Establish a monitoring system based on catch records drawn up by fishermen. This will minimize the enforcement costs that will have to be borne by the fishermen.
- 8. Choose locations for installing artificial reefs for use by local fishermen. The locations should be selected on the basis of scientific criteria to avoid conflicts of interest among fisherman,

5. CONCLUSION

CBFM is a new concept of fishery management not only for fishermen in Phangnga Bay but also for many fishery officials and local officials involved in this programme. In addition, under this programme some commercial fishing vessels may lose some benefits and may be against the programme. Therefore, fishery extension workers have to work harder than in the past: They also need more knowledge of fishery biology and management. In future, any debate among fishermen will need strong scientific evidence and the extension workers will be responsible for providing such information. Fishery extension workers should therefore have higher qualifications to meet the requirements of the programme. In the success or failure of the programme, fishery extension workers constitute a key factor. Finally, it should be kept in mind that science and technology may answer every question but cannot solve every problem. To solve problems, other than scientific and technical, tolerant and responsive personnel with a good intellect are needed.

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