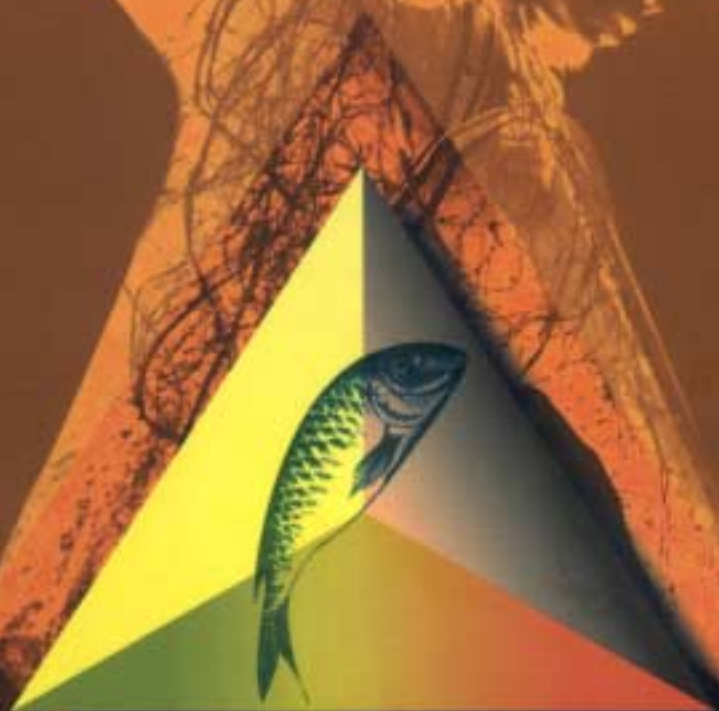


COMMUNITY-BASED FISHERIES MANAGEMENT IN PHANG-NGA BAY, THAILAND



REGIONAL OFFICE FOR ASIA AND THE PACIFIC
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
BANGKOK, THAILAND



RAP Publication 1998/3
BOBP Report No. 78

COMMUNITY-BASED FISHERIES MANAGEMENT IN PHANG-NGA BAY, THAILAND

Proceedings of the
National Workshop on Community-based Fisheries Management

Phuket, Thailand, 14-16 February 1996

Regional Office for Asia and the Pacific
Food and Agriculture Organization of the United Nations
Bangkok, Thailand

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ISBN 974-86284-8-5

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PREPARATION OF THIS DOCUMENT

This document is the report and proceedings of a National Workshop held jointly by the Thai Department of Fisheries, FAO and the Bay of Bengal Programme of FAO (BOBP) in Phuket, Thailand, 14-16 February 1936. Funds were made available through the GCP/RAS/1 38/JPN Project.

The document comprises the final report of the Workshop, the list of participants and agenda, early results of the Community-based Fisheries Management (CBFM) Project after the Workshop, and the papers presented at the Workshop.

Ms. **Donna** J. Nickerson, Coastal Management Officer, FAO Regional Office for Asia and the Pacific, prepared the reports on the Workshop and the early results of the CBFM project, and edited the papers contained in this document. Careful reviews of the Workshop Report were provided by Mr. Somsak Chullasorn and Mr. Jate Pimoljindn, Directors of the Phuket Marine Biological Center and Andaman Sea Fisheries Development Center respectively, Department of Fisheries, Thailand. Advice and guidance for the publication was provided by Dr. Veravat Hongskul, Senior Fishery Officer, and Ms. Pornsuda David, Technical Assistant, FAO Regional Office for Asia and the Pacific.

Distribution:

Participants of the Workshop
FAO/BOBP Member Countries
FAO Fisheries Department
Fisheries Officers in FAO Regional Offices

Nickerson, D.J. (Ed.). 1998.

Community-based Fisheries Management in Phang-nga Bay, Thailand. Proceedings of the National Workshop on Community-based Fisheries Management organized by the Department of Fisheries of Thailand, FAO and the Bay of Bengal Programme, Phuket, Thailand, 14-16 February 1996. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. RAP Publication 1998/3 (BOBP Report No. 78), 227p.

ABSTRACT

This document reports the outcome of the Workshop aimed to build a common understanding among the key participants from the Department of Fisheries (DOF) of Thailand, the fishers and village leaders, universities and NGOs, of the importance, benefits and constraints, roles and responsibilities, and needs for flexibility in undertaking the new approach of 'partnership in management' under the DOF/BOBP Community-based Fisheries Management (CBFM) Project in Phang-nga Bay, Thailand. Another objective was to build a consensus among the key participants on the objectives, issues for management and general approach for implementation of the project. Presentations on the status and trends of fishery resources, the ecology, socio-economics, opportunities for women's involvement, as well as fisher's own knowledge of the Bay were presented and are contained in this document. Recommendations of the Workshop include: organization of a CBFM management framework; establishment of a revolving fund managed under the CBFM framework with funding sources from NGOs, Government of Thailand, and fishers' profits; and provision of training and information services for awareness building. It was recommended that the priority issue to be addressed was to develop approaches and measures to effectively execute and enforce the fisher community ban on push nets and trawlers. The early results of the CBFM project after the workshop are also given.

PREFACE

The National Workshop on Community-based Fisheries Management was the first meeting held together with the Department of Fisheries (DOF), the FAO Regional Office for Asia and the Pacific, the Bay of Bengal Programme (BOBP), the fisherfolk and community leaders to plan the future use of a commonly held resource - the fisheries of Phang-nga Bay. Representatives from all perspectives of management, including the scientific community, universities, government, the private sector, non-governmental organizations, and most important, the coastal fisherfolk communities who have perhaps the closest knowledge of the Bay's coastal resources, participated in the Workshop. To ensure an effective dialogue among these different sectors, a joint DOF/FAO/BOBP Organizing Committee was established for the preparation of the Workshop to create a forum for dialogue on the issues of concern and action required in co-managing the Bay's important resources.

The papers presented in the Proceedings range from technical studies on ecological processes of Phang-nga Bay to the socio-economic and cultural aspects of the coastal fisherfolk communities. Local knowledge of the fisheries and ecosystem was presented by fisherfolk and is contained in the Workshop Report.

A concern for maintaining the high biological productivity of the Bay was shared by all the sectors. What was needed was the unified commitment to a common set of goals, objectives and priorities for management. The Workshop achieved this. It was a successful preliminary step towards a larger purpose - implementation of the Community-based Fisheries Management Project in Phang-nga Bay by the Thai Department of Fisheries with support from FAO and BOBP.

Many contributed to help achieve the objectives of the Workshop. The GCP/RAS/138/JPN (Development of Community-based Coastal Fisheries Management Systems for Asia and the Pacific) Project provided financial support for the Workshop, the Asian Productivity Organization sponsored the participation of a resource person, the FAO Regional Office for Asia and the Pacific and the BOBP provided technical support while the Thai Department of Fisheries provided excellent logistical support for the Workshop. The fisherfolk of Phang-nga Bay took time from their livelihood activities to prepare for and participate in the Workshop, and are continuing to dedicate their time towards an improved and more sustainable management of the fishery resources of the Bay.

It is hoped that this publication would be useful not only to Thailand, but also to other coastal States in their consideration of community-based coastal fisheries management for which all aspects of issues concerned (legal, institutional arrangement, ecology and biology, socio-economic, technology transfer, etc.) must be considered carefully to ensure successful implementation.

The Editor
FAO Regional Office for Asia and the Pacific
Bangkok, February 1998

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PART ONE
REPORT OF THE WORKSHOP

REPORT OF THE WORKSHOP

OPENING OF THE WORKSHOP

- 1.** The National Workshop on Community-based Fisheries Management (CBFM) was organized by the Department of Fisheries of Thailand (DOF), in collaboration with FAO and the FAO Bay of Bengal Programme (BOBP) at the Phuket Paradise Resort Hotel, 14-16 February 1996. The Workshop was chaired by Mr. Somsak Chullasorn, Director of the Phuket Marine Biological Center (PMBC) of DOF and concurrent BOBP National Coordinator for Thailand. Ms. Donna J. Nickerson served as the Technical Secretary and Dr. Suwanna Panutrakul as Chief Rapporteur. The list of the participants is given in Appendix A and agenda and timetable in Appendix B.
- 2.** The Workshop opened with welcoming addresses by the Chairman; Mr. Sudchit Nimitkul, the Governor of Phuket; Dr. Kee-Chai Chong, Programme Coordinator of BOBP; and the opening address by Dr. Plodprasop Suraswadi, Director-General of the Department of Fisheries, Government of Thailand.
- 3.** The Workshop was organized as a first year activity of the DOF/BOBP Phase III Project in Thailand on “Community-based Fisheries Management in Phang-nga Bay”. The Workshop had two major objectives. First, the Workshop aimed to build awareness and a common understanding among the key stakeholders (fisherfolk leaders, village leaders, NGOs, DOF, and BOBP) who will be involved in the DOF/BOBP Community-based Fisheries Management (CBFM) project in Phang-nga Bay about the importance, benefits and constraints, roles and responsibilities, and needs for flexibility in undertaking the new approach of “partnership in management”. Secondly, the Workshop provided a forum for discussion with key stakeholders on the objectives and general approach for implementation of the DOF/BOBP coastal fisheries management project in Phang-nga Bay.
- 4.** The Workshop was seen as a timely response to both the Government of Thailand’s and fisherfolk’s own local initiatives in promoting CBFM as an effective means to manage resources. The Government of Thailand could use the lessons learned from the DOF/BOBP CBFM Project in its planned development and implementation of CBFM nationwide.
- 5.** The expected outputs of the Workshop were:

 - a. acceptance and commitment of key stakeholders of the roles and responsibilities they will need to play for effective partnership in management under the community-based fisheries management project;

- b. consensus of participants on the DOF/BOBP Work Plan. The Workplan components include problems, issues and objectives for management, roles and responsibilities for effective partnership in management and a general guideline for activities. This will serve as the platform for future development of management strategies to address problems and issues; and
- c. consensus of fisherfolk on the recommended “early actions” for consideration by DOF for implementation.

SESSION 1: PRESENT CONDITIONS IN WANG-NGA BAY FOR
COMMUNITY-BASED MANAGEMENT; GOVERNMENT
POLICY, GEOGRAPHIC, SOCIO-ECONOMIC,
INSTITUTIONAL AND LEGAL CONSIDERATIONS

ITEM 1: POLICY AND PROGRESS TOWARDS CBFM

6. Dr. Plodprasop Suraswadi, Director-General of DOF, outlined the government policy for CBFM in Thailand. The need for CBFM was described as largely originating from a situation of open access to Thailand’s marine and coastal waters and resources that has led to a depletion of coastal fisheries resources. Small-scale fisherfolk are the most affected; they not only have competition for resources within their own sector, but also from commercialized fisheries. DOF views CBFM as one means to address the important interrelated issues for the recovery of depleted resources and reducing the conflicts among fisherfolk. DOF would also like to see the fisherfolk develop a sense of ownership of coastal resources, and stressed the importance of building awareness to conserve the resources and environment.

7. Thailand is adopting the CBFM approach to help resolve several national issues of concern. Specifically, CBFM will be used to help Thailand rehabilitate small-scale fisheries; ease conflicts between small and large-scale fishers; create a sense of unity in society, and particularly creating a sense of belonging in the small-scale fisherfolk to the wider community; help transfer the costs of enforcement from government to the beneficiaries; better utilize Thailand’s coastal and marine waters; and help ensure sustainable incomes for the coastal communities.

8. The DOF/BOBP Workshop and Project on CBFM was agreed to be a timely response to the needs of Thailand. The continued heavy exploitation of the coastal resources combined with declines in productivity demands a management approach that aims for long-term sustainability. The meeting was informed that the government has recently initiated a plan for introducing a fishery right system to strengthen and continue promoting CBFM as an effective means to manage resources. The Director-General guided the Workshop to: think about how this can be achieved, *i.e.*, by province and also by communities; reach a common

decision; then try it out during the CBFM project as well as improve on it throughout the Project's implementation.

9. The Government of Thailand has recently included CBFM in its Eighth National Economic and Social Development Plan (1997-2001) under the Coastal Area Management Sub-project of the Rehabilitation of the Thai Seas Project. This National Plan would guide the future fishery policy for Thailand.

10. The Government of Thailand gave its support for CBFM and encouraged the fisherfolk to come to a common agreement on fishing rights to be adapted in Phang-nga Bay. The lessons learned from this pilot project in Phang-nga Bay would be used by DOF in drafting the revisions to the legislation needed for obtaining coastal fishing rights and enforcement under CBF imperative.

ITEM 2: GEOGRAPHIC CONSIDERATIONS

11. Papers were presented concerning the general **status** of coastal fisheries in Andaman Sea and Phang-nga Bay by Mr. Somsak Chullasorn and Mr. Jate Pimoljinda, and on the general environmental status of Phang-nga Bay by Mr. Prawin Limpasaichol and Dr. Hansa Chansang. The papers noted that, while Phang-nga Bay is an exceptionally diverse and productive ecological system, the increased exploitation of its resources has demonstrated effects including dramatic declines in fishery resources in the last decade that indicate sustainable management of the resources is imperative.

12. Key findings and issues from past studies by the DOF of the coastal fishery resources were raised for discussion. Phang-nga Bay has experienced a steady decline in the abundance of fishery resources over the last 30 years:

- a. declines in key target species of the small-scale fisheries, including fish, shrimps, crabs, and other invertebrates; and
- b. declines in commercial catch and catch composition. Catch by trawlers in 1969 was 250 kg/hr. Forty-nine percent was the target species, while fifty percent was bycatch, composed of non-target species. Eighteen years later, trawlers were able to catch only 38 kg/hr on the average. Thirty-three percent was the target species, and sixty seven percent was bycatch. In addition, the bycatch was largely composed of juveniles of the target species.

13. Probable causes for the decline in fishery resources were discussed. These included a degradation of environmental conditions in the Bay; continued use, in spite of the community ban, of destructive fishing practices of trawlers and push nets; overfishing; and lack of awareness in conservation measures in fisheries.

14. The environmental condition of the Bay was summarized. The increasing turbidity of the Bay's water quality was seen as a major concern. Discussion of the water quality issues centered around the local issue of construction of a deep-water harbour planned for the Bay. The potential effect of the harbour on Phang-nga Bay was of concern to the Workshop and the DOF's scientists recommended that the hydrology of the Bay, including residence time, should be taken into consideration in selecting the harbour's location.

15. The diversity of Phang-nga Bay's ecosystem has led to multi-use conflicts. Phang-nga Bay is characterized by valuable living and non-living resources, including seagrass beds, mangroves, corals, tin deposits, and beaches. Each resource brings its own set of uses as issues for management. Uses include small-scale fisheries, tin mining, ecotourism, tourism and resort development, recreational resorts, and coastal aquaculture of shrimp, fish, oyster, cockle and mussel. While some of these uses are compatible, others have impacted each other adversely. Efforts must be initiated to match compatible uses through more coordinated planning. For example, if permit processing for tin mining is not coordinated and approved through the relevant sector agencies, resource use conflicts will arise.

16. To be sustainable, resource management plans and measures developed under the CBFM Project must take into account local considerations including geography, environment, and socio-economic and cultural aspects. Community involvement from the beginning is essential. The issues and key findings of the DOF's scientists raised during this discussion were seen as an opportunity to exchange ideas and obtain feedback on the scientific assessments of Phang-nga Bay's resources with the fisherfolk. This would serve as a platform for future elaboration in subsequent discussion. For example, one potential option for a management measure that has shown success is a seasonal closure of specific fishing grounds, which could be considered by fishing communities under the DOF/BOBP Project.

ITEM 3: SOCIO-ECONOMIC AND GENDER CONSIDERATIONS

17. Papers were presented by Mr. Pongpat Boonchuwong and Dr. Ruangrai Tokrisna. The papers indicated several socio-economic trends, many of which have led to gender issues along the Andaman Sea coast of Thailand and, in particular, in Phang-nga Bay that have implications for the CBFM Project. By 1990, numbers of fishing households and fishing boats were steadily increasing in both the commercial and small-scale fishing sectors. In addition many of the fishing fleets from the Gulf of Thailand moved to the Andaman Sea.

18. Between 1985 and 1990, the number of both commercial and small-scale fishing households decreased by 5.5% and 6.8% respectively. This decrease was due in part to the decline of fishery resources and conflicts between the commercial and small-scale sectors. The largest decrease has been in the small-scale fishing sector, and the general trend in the

fisheries has been a movement from traditional fisheries towards increasing use of commercialized fishing gears. This has reduced women's participation in fisheries. Women are generally active in the small-scale sector, and have equal roles in small-scale fishing; often the entire family will go fishing together, and children begin participating as early as 8 years old. However, women have taken on tasks that take them away from the family, including work in town, in canneries and large-scale processing plants.

19. From 1990 to 1995, the numbers of commercial and small-scale fishing boats increased. Three main factors were seen to have caused this rising trend: an increase in population of coastal communities; the success of artificial reefs in aggregating fish led to increased catch; and fisherfolk enthusiasm of the idea that communities can look after fishing areas themselves. As community-based management becomes more successful, small-scale fisheries may increase in popularity as a profession, and communities should be prepared for the additional management considerations this may imply.

20. The CBFM Project along the western coast of Phang-nga Bay is one of three CBFM pilot projects to be implemented in Thailand with support from BOBP. The Andaman Sea Fisheries Development Center (AFDEC) has good reason for choosing this site. Besides being of ecological importance, socio-economic conditions of the area indicate a strong need for the Project. Living conditions of coastal small-scale fisherfolk in Phang-nga Bay are the poorest in the country. These fisherfolk have few sources of cash income which can help to supplement their main income from fishing. Therefore, the conditions and health of the fisheries and its habitats were viewed as critical for the long-term welfare of small-scale fishing communities.

21. The Workshop participants agreed that education to generate greater awareness on the long-term benefits of fisheries management is crucial, particularly to the younger generation who will be soon managing the fishery resources themselves.

22. Greater opportunities should also be provided to rural women in Phang-nga Bay to enable them to participate effectively as co-decision-makers in CBFM. Activities recommended to ensure greater equality of community perspectives included allowing women to express themselves, and providing women in the community with information, knowledge and support.

ITEM 4: THE NEW ROLE OF EXTENSION ORGANIZATIONS, EDUCATION INSTITUTIONS AND FISHERFOLK

23. Papers were presented by Dr. Kungwan Juntarashote and Mr. Sakul Supongpan. Approaches for and the importance of coordination both between sectors and within the public and private sectors to provide sufficient information for enabling fisherfolk to participate in CBFM were emphasized.

24. Government officials, extension workers and fisherfolk were encouraged to undertake consensus-based discussions together to reach solutions. A measure of success will be the establishment of an equal partnership between the community and government.

25. The role of extension workers should be expanded to include a broader set of responsibilities, from the stand point of management approaches, environmental issues, awareness-building, and sharing scientific information available in PMBC and AFDEC. A major role of extension workers would be to exchange ideas and listen to fisherfolk who have gained knowledge from their experiences in working with the local people to organize the push net ban in the Bay. The entire social and fisheries infrastructure needs of the fishing community must be considered in CBFM.

26. The introduction of artificial reefs in Thailand could hold lessons for CBFM. When first introduced, artificial reefs were not accepted by fisherfolk. With improvements in design and once benefits were demonstrated over time, artificial reefs have become largely successful and in many areas are managed by fisherfolk themselves. While CBFM has been accepted in concept, it will also need time to develop and evolve into a design that will meet the needs of Thailand's fishing communities.

ITEM 5: LEGISLATIVE REVIEW AND IMPLICATIONS

27. A paper was presented by Mr. Choomjet Karnjanakesorn on the outcome and progress of the legislative review and requirements for CBFM conducted by DOE. Review of the existing fishery legislation has found that additional conditions are required for CBFM implementation. Under the current Fisheries Law, communities do not have the enforcement authority to arrest or detain illegal fishers. This authority lies with the Department of Fisheries. Conditions to enable community enforcement authority can be introduced into legislation through one of three options. First, an additional condition can be added to the existing regulations. Secondly, an amendment can be made to the existing law. Finally, a last option would be to introduce a completely new Fisheries Law. The first two options were preferred in view of the more lengthy procedures involved in the drafting of new legislation which would require an approval by the Parliament.

28. The current Fisheries Act of 1947 empowers the Minister of Agriculture and Cooperatives or the Provincial Governor to regulate and enforce the activities of individuals or associations involved in fisheries by means of administrative power. Thus, the specific legislative power for the purpose of fishing right systems and CBFM could be enacted by adding a new Chapter concerning coastal fishing rights and CBFM into the existing Fisheries Act.

29. Provisions for resolving environmental issues affecting coastal fisheries should be incorporated into the Fisheries Law when it is revised.

30. DOF has drafted a potential framework for community-based fisheries management in Thailand which consists of a two committee level process. A committee at the national level, the “Central Committee on Coastal Fishing Right System”, could be comprised of government representatives, and would coordinate, supervise and approve the operation of the fishing right system. The community level “Local Committee for Coastal Fishing Right System” would be comprised of fisherfolk, and its roles and responsibilities include managing the resources, permitting the fishing and culturing activities, and reporting annually to the Central Committee. However, DOF would assess the outcome of the CBFM pilot project before finalizing this draft framework.

31. It was noted that the organizational structure of DOF is very progressive and optimal for the coordination needed to implement coastal resources management. The jurisdiction and responsibilities for rehabilitation of coastal aquatic resources is under the same umbrella as small-scale fisheries within PMBC and ASFDC.

SESSION 2: STRATEGIES FOR IMPLEMENTATION OF COMMUNITY-BASED MANAGEMENT IN WANG-NGA BAY

Discussion Leader: Mr. Somsak Chullasorn

Rapporteurs: Dr. Suwanna Panutrakul, Mr. Vudhichai Janekarn, and Ms Boonsri Jaruthamsophon

32. A panel discussion comprising Dr. Masamichi Hotta, Dr. Kungwan Juntarashote, Mr. Sakul Supongpan, Dr. Uwe Tietze and Prof. Tadashi Yamamoto brought together experiences from within and outside of Thailand in implementing CBFM. Discussions centered on the key factors that would need to be components of a CBFM strategy.

33. Two factors that would need to be established in Thailand for successful CBFM are strong fisheries management organizations, and a sense of the long-term benefit by fisherfolk of CBFM. CBFM requires commitment and extra effort by fisherfolk and the long-term benefits of the effort must be well understood by all stakeholders. Awareness of such benefits was seen as an important early activity.

34. A number of support services will be necessary to build up the level of organization of the fishing community for successful CBFM. These services include ensuring access to credit for attaining independence from the middlemen, introducing potential changes in occupations as alternatives to capture fisheries, and introducing special income generating projects for women in the community.

SESSION 3: EXPERIENCE OF NGOs AND EXTENSION WORKERS IN PHANG-NGA BAY IN BUILDING COMMUNITY-BASED FISHERIES MANAGEMENT

Discussion Leader: Dr. Hansa Chansang

Rapporteurs: Dr. Suwanna Panutrakul, Mr. Vudhichai Janekarn, and Ms Boonsri Jaruthamsophon

35. A panel discussion comprised of local NGOs, including Mr. Tanu Nahnien (Wildlife Fund, Thailand) and Mr. Sukit Siripatr (Raindrop Association), as well as Mr. Opas Nuanvilailuk (Fishery Conservation Unit, DOF) and Mr. Kornvit Chantkusol (Extension Officer, DOF) related lessons learned from a grassroots organizational perspective in CBFM efforts in Phang-nga Bay.

36. Although much progress has been made by DOF, NGOs and the communities to provide a foundation for community-based management, CBFM has yet to be established in Phang-nga Bay and should be approached and implemented on a step-by-step basis. This incremental evolving process is necessary because the country does not have the necessary institutional framework to apply a full-scale CBFM at present. Three activities were identified as early necessary steps for the CBFM Project in Phang-nga Bay:

- I. clarify and define what is meant by the term “coastal fishing rights”. The following was suggested as an initial set of criteria: a) geographical areas where fisherfolk have usually or historically fished; and b) stock abundance and the potential for stock recovery in the case of overfished stocks;
2. establish a supporting information mechanism and statistical database to transfer management responsibility to the fishing communities; and
3. establish the fishermen’s group as a local level management structure.

37. One option discussed for forming the local level management framework was that fishing communities be mobilized and organized into “cohesive groups” based upon common interests, issues and problems, family relationships, and other criteria that could ensure homogeneity within the group. Further, the elected Village Council was seen as a potential nucleus for a community-based fisheries management committee. In Phang-nga Bay’s fishing villages, most, if not all, of the Council members are fisherfolk. In cases where the elected Village Council’s members are not fisherfolk, other alternatives can be used such as the above criteria.

SESSION 4: FISHERFOLK PRESENTATIONS ON INITIATIVES UNDER WAY AND NEEDS FOR THE FUTURE IN PHANG-NGA BAY

Discussion Leader: Mr. Pisit Charnsanoh

Rapporteurs: Dr. Suwanna Panutrakul, Mr. Vudhichai Janekarn, and Ms Boonsri Jaruthamsophon

38. A panel comprising representatives of fishing communities focused discussion on issues and future directions for the CBFM Project as seen by fisherfolk. The panel included Mr. Usen Muenthongwari (Trang Province), Mr. Saman Naiyanart (Surattani Province), Mr. Samroeng Rakate (Phang-nga Province), Mr. Din Singtho (Krabi Province), Mr. Samak Ruenchit (Trat Province), and Mr. Mahamasugree Masaning (Pattani Province). The panel identified three of the major initiatives which helped to provide a firm foundation for CBFM in Phang-nga Bay. These include the community ban on push nets, the subsequent expansion of the ban to include trawlers, and ratification of the community ban as a Bay-wide policy and the mangrove reforestation initiative in Phang-nga Province. Environmental issues, artificial reefs, fish marketing, education and awareness, fishery enforcement, and establishment of the local-level management structure based upon existing fishermen's groups were topics of discussion and identified issues for the CBFM Project.

ITEM 1: MAJOR INITIATIVES THAT HELPED TO PROVIDE A FIRM FOUNDATION FOR CBFM IN PHANG-NGA BAY

Environmental concerns as an early motivation for stewardship and action

39. Fisherfolk presentations revealed that, about ten years ago, their catch of the target species, including silver silago, crabs, and shrimp dropped severely. This corresponded with the findings of scientists described in Session 1. Both groups independently came to the conclusion that this was caused by a variety of factors all of which combined to alter the fishery resources to a point from which they have yet to recover. Factors included the use of small-scale fishing gear with small mesh size; increased effort by both small-scale fishers and commercial fishing boats; the intrusion of the push netters and trawlers into inshore areas; and environmental degradation, largely caused by tin mining, shrimp aquaculture and other land-based sources.

40. Environmental concerns are regarded as a priority area among consideration for Phang-nga Bay's communities. Fisherfolk recommended issues to be resolved under CBFM. It became apparent that those closest to the resource were the first to see the link between ecosystem health, resource sustainability, and their livelihood. Fisherfolk stated that the costs of environmental problems, particularly development of mangrove areas for shrimp

ponds, are often borne the local fisherfolk communities but they do not have any share in the benefits. A more equitable distribution of the costs and benefits of environmental services from the resources arose from the discussion as one of the general objectives for the community-based management project.

41. An issue of concern was the steady expansion in shrimp farming operations in Phang-nga Bay, Lanta Islands, and Sikao Bay in particular. Water discharged from the farms is usually not treated prior to disposal into the sea. The discharged water is believed to contain environmentally harmful chemicals that can cause the death of natural organisms. Therefore, to solve the problems, the Department of Fisheries should address the uncontrolled discharge of effluent from shrimp ponds. Any efforts to promote fishery enhancement including the deployment of artificial reefs or release of seeds will not be achieved without a simultaneous resolution of these environmental issues.

42. The community leaders expressed concern about the pollution problems in Phang-nga Bay, and stated that they are aware of the problems and general environmental effects. They experienced the direct effects particularly in Trang Province from shrimp pond effluent, and believe that the water discharged may destroy their environment. Sediments and other pollutants are found in the effluent, and it is felt that it will be more of a serious problem in the future.

The community ban on push nets

43. The ban on push nets in coastal areas was the first fisherfolk initiative in Phang-nga Bay and originated as a response from the fishing communities to environmental changes in the Bay and the subsequent social conflicts arguably arising from the changes:

Environmental changes

1. Fisherfolk stated that the deterioration of marine resources in Phang-nga Bay caused by push nets, discharge from shrimp ponds, industries, oil and grease pollution led to a gradual decline in yields and fisherfolk income.
2. This decline in income has in turn led fishermen to emigrate to other areas and many of the younger members of the community have experienced social problems, including drug abuse.

Social conflicts

1. Before the ban, conflicts existed between fisherfolk using push nets and gill nets. Push nets are a destructive fishing gear and its use leaves visible impact to the

resources. Fisherfolk using gill nets therefore blamed the use of push nets in coastal areas for their low yields in fisheries.

Creation of the ban

The fishing community responded to the combination of the above conditions by organizing themselves to prevent push nets from being used in the Bay. An assembly was set up by fisherfolk in a number of villages. At present, 35 villages in four districts have been organized into assemblies. Under the assembly system, members from each village gather together once a month for general discussion on fisheries problems. The fisherfolk have found that the monthly meetings enable them to be kept informed of the problems of each village as they arise.

Results of the ban

1. The ban was successful in significantly decreasing the number of push nets. At present, very few push nets are used in the Bay.
 2. Resource health and productivity showed improvement after implementation of the ban. This was seen in the noticeable increase in production of shrimp, blue swimming crabs, and the occurrence of mantis shrimp and marine catfish.
 3. Success in this initiative has led to other activities of community effort in conservation of living marine resources, for example restoration of mangroves, and establishing the 3 km demarcated boundary to prevent trawling.
44. It was recommended that the ban on destructive fishing practices be continued and further reinforced through a combination of enforcement and awareness. In particular, it was felt that quantifying the benefits of the ban would help to convince the individual “non-compliers” and villagers in the surrounding areas that are not presently a part of the ban, of the importance of the ban and to comply.

Mangrove reforestation in Phang-nga Bay

45. The fisherfolk have long recognized the relationship of the Bay’s healthy habitat to their fishery resources, and facing an increasing loss of mangrove areas from aquaculture and other land-use changes, combined with a declining catch and smaller fish caught over the last 10 years, initiated a mangrove reforestation programme in 35 villages of Phang-nga Province. This programme has been at the initiative of many of the communities in the Bay, particularly in Ko Yao-Yai and Ko Yao-Noi Islands of Phang-nga Province.

Ratification of the ban as a bay-wide policy

46. Early success in the pushnet ban and mangrove reforestation initiative helped support the idea of CBFM in the area, and paved the way for a later undertaking that brought the concept even greater influence. In April 1995, the Governors and village leaders from the three provinces of Phuket, Krabi, and Phang-nga signed an agreement to ban push nets and trawlers within the three kilometer zone reserved for small scale fisheries. The fisherfolk voiced their commitment for sustainable resource use and responsible fishing with this fisherfolk-led initiative, and the larger community of Phang-nga Bay responded by supporting the ban and ratifying it as a Bay-wide policy.

ITEM 2: OPPORTUNITIES AND POTENTIAL ROLES AND RESPONSIBILITIES
FOR COOPERATIVE MANAGEMENT

Potential future government role in the initiatives

47. The fisherfolk asked for greater support from the government agencies, and particularly the Department of Fisheries to help continue implementation of these initiatives in moving towards a more comprehensive community-based management structure. DOF support was needed to enforce the ban on pushnets and trawlers.

48. Discussions revealed that existing penalties were not a strong enough deterrent to the commercial trawl fishers. The Workshop recommended that government impose stricter penalties for violations. The commercial trawl fishery was seen as a primary target for government attention, through a combination of increased enforcement and awareness-building. Management measures to address these enforcement issues were recommended as an area of focus for the CBFM Project.

49. Government sectors have supported the push net ban by helping fisherfolk change their fishing away from the push net to other activities through the provision of funds to support entrance into other activities or businesses. It was recommended that this government support for alternative incomes and other initiatives and activities to cooperate in working together on coastal resources management should be continued and expanded.

Development of management measures

50. CBFM was seen to be an ideal opportunity to use the skills and knowledge of the fisherfolk combined with the ecological science of PMBC and ASFDC and the social science knowledge within local universities in the development of management measures that would make "sound common and scientific sense" and therefore be sustainable. In fact, fisherfolk voiced the importance of incorporating cultural values in the CBFM measures they would develop.

51. Discussions also noted that closed fishing seasons have been in effect for more than 10 years with some degree of success. Under careful management practices, it was felt that this could be a potential option for the communities to consider.

Targets for education and awareness

52. The Workshop agreed that enforcement alone is not completely effective in solving their fisheries management problems. Awareness and education targeted to the users of the resource and “non-compliers” of the ban and particularly the trawler operators and owners, is needed as a supplementary approach to enforcement. Participants agreed that the users of the resources must recognize benefits to the resources and to themselves before they are motivated to comply with any fishery legislation or initiative.

53. Fisherfolk stated that an approach to acceptance of a management measure is to demonstrate the impact or benefit to the long-term sustainability of the resources upon which they depend. For example, if resources show an increase over time, encouragement would be provided to continue the measure or impose more stringent measures, if required. Close cooperation between fisherfolk and government in preparation of these outreach materials and information required to better understand problems, and causes and effects will be essential to assist fisherfolk in managing resources under CBFM.

54. A recent co-operative effort between fisherfolk and DOF is the placement of demarcations at strategic points along the 3 km seaward boundary to separate small-scale fishing craft zones from zones allocated for commercial fishing crafts. The demarkation has helped the trawlers more clearly identify the fishing zones and serves as a deterrent to the trawlers for entering the prohibited zone. After implementation of this measure, the fisherfolk have found some indication of improvements and increase of the fishery resources in the Bay. Therefore, education and awareness-building targeted at the trawler fisherfolk and owners was strongly recommended.

55. A continuous exchange of information between the fisherfolk and PMBC/AFDEC was an area of work identified for the CBFM Project. This information would help form the content of awareness building materials, including the quantitative benefits of the ban, artificial reefs, and other potential measures. It was noted that the problem in the past was that DOF did not always know what the fisherfolk needed, but that this would change under CBFM.

56. Awareness of conservation of resources for sustainable use should be targeted at fisherfolk who enter into aquaculture operations, particularly shrimp culture, and also raft mussel culture.

ITEM 3: EXPERIENCES IN ORGANIZING FISHERFOLK GROUPS

57. Where several villages are located within one enclosed geographic area, a system of co-management by representatives from the villages involved has been proposed.

58. One effective measure that has been discussed and initiated to reduce improper fishing gear, is for the assembly to provide fishing nets of legal mesh size to the fishermen. In addition, marketable sized fish could be sold in a better price through a marketing process held by the assembly.

59. Experience in Surattani Province showed that the driving force in establishing cooperatives is an identified common need and mutual benefit to be shared by the group. The experience of the community leader has found that decisions cannot be left to the community leader, but must involve the entire committee that has been set up under the cooperatives on all the decisions, even though the process will take longer for a decision.

ITEM 4: ARTIFICIAL REEFS

60. Fisherfolk did not initially accept artificial reefs. However, once the fisherfolk found that artificial reefs aggregated more fish in an area, and their incomes rose with less fishing effort, the artificial reefs were accepted and became popular. Therefore, the benefits of any potential action must be demonstrated and should be a large part of the education and awareness-building campaigns if artificial reefs and other potential management measures will continue to be promoted in the future.

61. A growing problem for CBFM management is the placement of surrounding nets around both the artificial reefs and coral reefs by fisherfolk outside the communities. Poisonous powders are used to chase the fish out of corals or artificial reefs. Under this practice, only larger fishes were collected from the nets, while the small and non-valuable fish were discarded.

62. The pros and cons of artificial reef installation were discussed. While the benefit in certain villages in increasing income was fully recognized, a major problem of artificial reefs was the damage caused to purse seines and gill nets. Careful consideration of artificial reef placement and methods of construction should be a part of the CBFM Project. In addition, it was also believed that perhaps the budget expenditure on artificial reefs would be more worthwhile if spent on community effort in restoring marine production by preventing intrusion of trawlers and push nets.

63. The Department of Fisheries was requested to review the benefits and shortcomings of artificial reef construction to improve its future activity.

SESSION 5: WORKSHOP SUMMATION OF WHAT IS NEEDED TO ENSURE STEWARDSHIP AND AN EFFECTIVE PARTNERSHIP FOR THE FUTURE IN PHANG-NGA BAY

Discussion Leader: Dr. Veravat Hongskul
Rapporteurs: Dr. Suwanna Panutrakul, Mr. Vudhichai Janekarn, and Ms. Boonsri Jaruthamsophon

64. A panel discussion comprising the Discussion Leaders of Sessions 2-4 summarized priorities, roles and responsibilities and needs to be addressed under the CBFM Project in Phang-nga Bay. Panelists included Mr. Somsak Chullasorn, Mr. Pisit Charnsanoh, Mr. Jate Pimoljinda, Dr. Hansa Chansang and Mr. Samroeng Rakate.

65. A priority concern reinforced and summarized from the previous Sessions was the request for DOF to increase enforcement efforts in the nearshore area on the push net and trawler ban. DOF strongly supported this request, and stated that an enforcement officer has been placed at the Project site in Phang-nga Bay to work with fisherfolk in the first year activity of the CBFM Project. DOF gave its commitment to expand enforcement support to the communities in future.

66. It was agreed that under the new approach of partnership in management, government and the communities would each strive to learn from each other to reach consensus on how best to manage the resources for the future. Future consensus decisions under CBFM would include but not be limited to: expenditures of government funds in the communities; research on environment and management; how to completely eliminate the two destructive fishing gear, namely of push nets and trawlers in nearshore fishing; how to establish the fishermen's group as a local-level management structure; and artificial reef management.

67. In addition, the fisherfolk requested the DOF to consider whether or not the entire area of Phang-nga Bay could be included in the DOF/BOBP Community-based Fisheries Management Project. In that way, the communities of the Bay could perhaps better decide on planning the fishing right within the Bay and the allocation of areas to certain uses, fishing gears, and zoning schemes within the Bay.

68. It was recommended that DOF should spearhead closer cooperation among the government organizations as an important part of ensuring smooth implementation of CBFM. It was felt that the enforcement process, in particular, could be more efficient if the various steps with the various agencies in the process could be better understood and coordinated. Agencies mentioned with jurisdictional responsibility in the activities and issue areas identified for the CBFM Project include DOF, the Department of Forestry, Harbour Department, Health Department, and the various authorities and agencies involved

in enforcement, the Provincial, District, and Village Government Agencies, Police Department, Provincial Court, lawyers, and NGOs for better understanding of the laws.

69. Management of coastal fishery resources and fishing gear should be specific to conditions within each Bay represented at the Workshop. These include Phang-nga Bay, Sikao Bay and Lanta Islands. While exchange of experiences in CBFM was seen as important, each area would need to have a separate CBFM structure and system.

70. The Asian Productivity Organization (APO) was requested to consider possible support to study tours for fisher leaders from villages in the CBFM Project. As the CBFM system of Japan was used as an example in many of the discussions, it was felt that a study tour to Japan to observe this system would be very beneficial to the communities involved in implementing the CBFM Project in Thailand.

71. Fisherfolk requested a regular patrol by DOF to enforce the push net and trawl ban and other management measures developed under CBFM in Phang-nga Bay. Fisherfolk offered to join with DOF's enforcement officers on the surveillance patrols in the Bay.

72. It was agreed that DOF would support the development of the CBFM fisherfolk groups at various levels (i.e., district, provincial, and regional). This support includes information required for CBFM, assistance in research directed towards the identified issues, and funding assistance.

73. Other areas for consensus included setting objectives for multiple use of the Bay's resources and help in identifying sustainable activities and income that would have no harmful or the least harmful effect to the Phang-nga Bay ecosystem.

74. DOF and the NGOs should organize various coastal resources management training courses, covering issues from sea grass conservation to water quality monitoring and fisheries management. These courses could be conducted by mobile teams to reach out to the villages, targeting leaders of the communities, women, children and young people, and local fishery officers. Each course should be conducted for 8-10 fishing villages.

Revolving fund

75. To continue useful programmes of DOF and expand into new related areas, a revolving fund for fisherfolk to both further their fishing occupations and develop alternative sustainable income activities was prioritized as an early activity of CBFM. In addition to alternative incomes, it was determined that both government and non-government sectors should consider a new balanced concept of natural resource use that could balance incomes with ecosystem sustainability. Part of this effort was seen as identifying sustainable occupations for the fisherfolk communities of Phang-nga Bay.

76. Additional proposed uses of a revolving fund include organizing an in-country study tour for the fisherfolk's group to observe the activities of fishing villages that have established effective revolving funds and are good examples of CBFM; organize training on accounting administration for members of cooperatives; and expanding local participation in the CBFM. The revolving fund would be managed by the fisherfolk's group.

Awareness

77. DOF could help the communities in education on marketing mechanisms targeted towards the fisherfolk and community leaders and to help generate additional family income, by assisting women in finding adaptable occupations. Children were viewed as important targets of awareness building, and fisherfolk felt that training to children in conservation for environmental sustainability should be a part of CBFM.

SESSION 6: DOE/BOBP PROJECT OBJECTIVES AND DRAFT WORK PLAN

Discussion Leaders: Mr. Somsak Chullasorn, Mr. Jate Pimoljinda, Dr. Kee-Chai Chong and Ms. Donna J. Nickerson

Rapporteurs: Dr. Suwanna Panutrakul, Mr. Vudhichai Janekarn and Ms. Boonsri Jaruthamsophon

78. This session helped to narrow the focus of earlier discussions to help summarize priority areas for the DOE/BOBP CBFM Project Work Plan as a starting point for future elaboration and discussion on specific activities:

Establish CBFM management framework

1. Clarify and define what is meant by the term 'coastal fishing rights'.
2. Define geographic area to be included in the Project.
3. Establish a supporting information mechanism and database to transfer management responsibility and authority to the fishing communities.
4. Establish a fisherfolk community management framework and system for coordination between individual groups within the Bay. Assist in establishing an integrated provincial and regional level framework to facilitate CBFM local level efforts and ensure close cooperation among relevant government organizations.

Priority issue area to be addressed

Development of approaches and measures to effectively execute and enforce the ban on push nets and trawlers. Suggestions included awareness building and increasing regular patrol boat coverage in Phang-nga Bay that would utilize fisherfolk and government manpower.

Revolving fund

Establishment of a revolving fund managed by the fisherfolk's group to: further their fishing occupations; develop alternative sustainable income activities; organize a study tour for the fisherfolk's group to observe the activities of fishing villages that have established effective revolving funds and are good examples of CBFM; organize training on accounting administration for the members of cooperatives; and expand local participation in the CBFM.

Training and information services for awareness building

1. DOF and the NGOs will organize various coastal resources management training courses.
2. PMBC and AFDEC will help exchange information with the communities to develop awareness building materials (e.g., benefits of artificial reefs, the pushnet and trawl ban, and other potential measures taken by communities).
3. DOF will provide the information to the communities required for CBFM decision-making, including assistance in research directed towards the identified issues, and funding assistance.

79. With strong direction and consensus on the above recommendations for priority action, the Phang-nga Bay fisherfolk and DOF agreed to meet again in mid-March 1996 to prepare the details and schedules of activities for the Project, and prioritize activities for early action.

CLOSING OF THE WORKSHOP

80. Prior to the closure of the Workshop, Dr. Kee-Chai Chong and Mr. Jate Pimoljinda thanked Dr. Masamichi Hotta, FAO, for helping to organize, sponsor, and participate in the Workshop; Dr. Plodprasop Suraswadi, Director-General, DOF, for his participation, continued interest and support in CBFM; the Government of Thailand representatives; NGOs and the fisherfolk for their active participation. Lastly, the Chairman, Mr. Somsak

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Chullasorn, also thanked the experts for their participation, FAO, the Technical Secretary, Rapporteurs, Organizations involved in the early CBFM efforts, and the Interpreters. He then declared the Workshop closed.

APPENDIX A

LIST OF PARTICIPANTS

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1. Dr. Plodprasop Suraswadi, Director-General
2. Mr. Niwes Ruangpanit, Fishery Expert
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- 64. Mr. Tanu Nabrien, Phuket

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- 106. Mr. Samarn Naiyanart, Surattani
- 107. Mr. Samak Ruenchit, Klong Yai, Trad
- 108. Mr. Sommai Makting, Sikao, Trang
- 109. Mr. Usen Muentongwaree, Sikao, Trang

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- 110. Ms. Rachada Tharapak, Bangkok Business

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- Mr. Jate Pimoljinda
- Dr. Veravat Hongskul
- Dr. Masamichi Hotta
- Ms. Donna J. Nickerson

APPENDIX B

DOF/FAO/BOBP National Workshop on Community-based
Fisheries Management, Phuket, 14 - 16 February 1996

AGENDA AND TIMETABLE

- 14 Feb.1996 08.15 - 8.45 Registration
- 08.45 - 9.30 Opening ceremony
- 09.30 - 10.00 Coffee break
- 10.00 - 11.00 The DOF policy regarding CBFM
- 11.00 - 11.30 Status of coastal fisheries in the Andaman Sea, with
particular reference to Phang-nga Bay
- 11.30 - 11.45 open forum for discussion
- 11.45 - 12.15 Status of the environment and coastal ecology of the
Andaman Sea.
- 12.00 - 12.30 Open forum for discussion
- 12.30 - 13.30 Lunch break
- 13.30 - 14.00 Status of socio-economics and fisheries economics of
Thailand
- 14.00 - 14.15 Open forum for discussion
- 14.15 - 14.45 Opportunities for women's participation in the proposed
CBFM Project in Phang-nga Bay
- 14.45 - 15.00 open forum for discussion
- 15.00 - 15.15 Coffee break
- 15.15 - 15.45 Legislative review, requirement and enforcement for
CBFM
- 15.45 - 16.00 Open forum for discussion

- 16.00 - 16.30 Implementation of seafarming projects in Surattani based on lessons of DOF/BOBP Phase I Projects
- 16.30 - 16.45 Open forum for discussion
- 16.45 - 17.15 New role of extension organizations, education institutions, and fisherfolk for cooperation in CBFM
- 17.00 - 17.30 open forum for discussion,
- 15 Feb. 1996 08.15 - 08.30 Considerations for implementation of CBFM
- 08.30 - 08.45 Open Forum for Discussion
- 08.45 - 10.00 Strategies for implementation of CBFM in Phang-nga Bay
- 10.00 - 10.15 CoffeeBreak
- 10.15 - 10.45 Experience of NGOs and Extension Workers in Phang-nga Bay in building CBFM
- 10.45 - 12.00 Open forum for discussion
- 12.00 - 13.00 Lunch break
- 13.00 - 17.00 The fisherfolk's initiatives in controlling harmful fishing practices in the fishing grounds: The community ban on trawling and push net in the bays and prohibited area
Panel discussion: Fisherfolk community leaders: Trang (1), Phang-Nga (2), Pattani (1), Surattani (1), Trat (1)
- 16 Feb.1996 08.30 - 09.00 Some key principles and practices of CBFM gleaned from experiences in Japan, Indonesia, and the South Pacific
- 09.00 - 09.15 Open forum for discussion.
- 09.15 -09.45 Population issues and access to credit in relation to fisherfolk community development and management

09.45 - **10.15** BOBP initiatives

10.15 - 10.30 Coffee break

10.30 - 12.00 Workshop summation of what is needed to ensure stewardship of Phang-nga Bay's resources and an effective partnership for CBFM. Agreement on problems, issues and objectives

12.00 - 13.30 Lunch break

13.30 - 14.30 DOF/BOBP project draft work plan and objectives

14.30 - 15.00 Concluding remarks and closing the workshop

15.00 - 15.15 Vote of thanks

APPENDIX C

ABBREVIATIONS AND ACRONYMS

ADL	Actual Discharged Load
ASEAN	Association of Southeast Asian Nations
ASFDC	Andaman Sea Fisheries Development Centre
BOBP	Bay of Bengal Programme
CBFM	Community-based Fisheries Management
CFMP	Coastal Fisheries Management Plan
CIDA	Canadian International Development Agency
CPU	Catch Per Unit
CPUE	Catch Per Unit Effort
DOF	Department of Fisheries
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FCA	Fisheries Cooperative Association
FMO	Fish Marketing Organization of Thailand
FRMC	Fishing Rights Management Committee
FS	Fisheries Society
GRT	Gross Registered Tonnage
ICLARM	International Centre for Living Aquatic Resources Management
JIFRS	Japan International Fisheries Research Society
NESDB	National Economic and Social Development Board of Thailand
NGO	Non-government Organization
NSO	National Statistical Office, Office of the Prime Minister of Thailand
OEPP	Office of Environmental Policy and Planning
PMBC	Phuket Marine Biological Center
RFCC	Regional Fisheries Coordination Committee
RFD	Royal Forest Department
SEAFDEC	Southeast Asian Fisheries Development Center
TDRI	Thailand Development Research Institute
TGL	Total Generated Load
TURF	Territorial Use Rights in Fisheries

PART TWO

AFTER THE WORKSHOP: EARLY RESULTS OF THE CBFM PROJECT

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1. CBFM WORKSHOP DIRECTION

The CBFM Workshop in Phuket was in many ways a starting point for action on CBFM in Phang-nga Bay. It marked the transition between the design and planning stage of the project to its implementation. The issues were identified at the Workshop by consensus of social and natural scientists, fisherfolk and government - the three major players in CBFM. Equally essential was the clear understanding of a course of action and roles and responsibilities that was had by all players for CBFM implementation.

The focus of the CBFM in Phang-nga Bay is on the fisheries resource and on the fishers who make up the majority of coastal residents in the Bay. However, the CBFM seeks to manage both the problems within the fishery (e.g., overharvesting of living marine resources, use of destructive fishing gear, multiple use conflicts between small- and large-scale fishers), and the environmental factors that affect the health of the fishery resource (e.g., degradation of mangrove areas and seagrass beds which are nursery grounds for the fishery, poor water quality, etc.).

The issues identified for management under CBFM at the Workshop include: overharvesting of living marine resources, use of destructive fishing gear, degradation of coral, sea grass and mangrove resources, increasingly poor water quality, multiple use conflicts between small- and large-scale fisherfolk, all of which have contributed to a decline in fisherfolk income and increase in social problems.

The Workshop established a strong start. Since the Workshop, much has been achieved in addressing the identified issues. Progress has been made on enhancing the management structure for CBFM, implementing solutions to the identified issues, and in building capacity for new management approaches that integrate disciplines and bridge the gap between government and the public.

2. CBFM GOVERNANCE APPROACH

Under the CBFM project, partially funded by FAO/BOBP the Government of Thailand has increasingly delegated certain responsibilities for coastal resource management to the coastal communities of the Bay. The local CBFM management structure was established, composed of village committees whose members include fisherfolk and village leaders. The fishery officers of AFDEC and PMBC serve as advisors to the committees and support implementation of their management initiatives and decisions.

Monthly meetings are held by the village committees and every two months, several village committees meet together with AFDEC, PMBC, universities, NGOs, FAO and others involved in support of Project implementation. Such close involvement and support establishes and maintains the trust and communication between government and the community that is essential in community-based management. The village committees have grown throughout the life of the Project, not only in number of villages with committees, but in their unity within the committees and their initiative and responsibility towards management decisions.

Continued learning by the communities and government staff involved in CBFM has increased the sense of stewardship for the Bay's resources. Experiences from participating in the new approach of CBFM, and through organized training has helped the participants to direct their sense of stewardship towards meaningful action.

3. TRAINING EXPERIENCES

DOF staff have been trained in consensus-building, interdisciplinary team work, public participation, completion of case studies that identified issues for management, development of objectives, strategies for actions and solutions, and evaluating progress in integrated coastal management (ICM).

Fisherfolk have also been trained in boat engine maintenance and repair. Previously, fisherfolk had to travel far outside their community to find an engine repair shop. The improved skills within the local communities resulting from the training has furthered the livelihoods of the fisherfolk and increased the self-sufficiency of the communities.

Resource conservation and management training was introduced in area schools and was conducted as part of the activities for children's outdoor learning camps in 1996 and 1997. As future fisherfolk, school children will also be trained in monitoring fish catch and habitat conditions in the Bay. They are being prepared for the future, as communities increasingly take on management responsibility in CBFM.

Future training plans include furthering the management skills of the village committee leaders through study tours to neighboring Provinces which have somewhat similar programmes in CBFM. The study tours will enable the participants to exchange experiences and lessons learned among fisherfolk.

4. IMPLEMENTATION OF CBFM SOLUTIONS

Progress has been made on implementing the solutions or actions to the issues identified at the Workshop.

One of the first successful management initiatives was the ban on push net and trawl fishing in the Bay. The ban was agreed to and supported by the fisherfolk and Governments of the three coastal Provinces of the Bay: Phuket, Phang-nga and Krabi. It marked the first collaborative implementation of a management initiative by government and the communities in the Bay. The fishing communities initiated the ban, the Governors of each Province signed it into force, and DOF, Universities and FAO are providing much of the technical means for its support under the CBFM project.

CBFM is helping to ensure continued compliance of the ban through a combination of enforcement, economic incentives, and education activities. Progress on implementing the push net ban was strong in 1995 and 1996. Before the ban, the destructive push nets were a common gear among some of the 13,000 coastal fisherfolk of Phang-nga Bay. By mid 1996, violators of the push net ban numbered approximately 40, largely because of the combination of an intensive awareness and education campaign conducted under the Project by AFDEC and PMBC, the increased enforcement presence in the Bay of an outposted enforcement officer, and the beginning of an economic incentive programme to replace the push net gear with the less destructive gill nets.

Implementation of actions during the project has also effectively tested and even strengthened the CBFM governance approach. For example, the education and enforcement activities of the project were reduced in 1997. This was followed by a subsequent increase in violations of the push net ban, rising from 40 in 1996, to over 160 in 1997. Tensions between violators and those who comply with the ban consequently increased. At the bi-monthly CBFM meeting in October 1997, village committee leaders requested increased support from DOF to help them address the rising violations of the ban on push-nets. DOF has responded and enforcement and education activities are being increased. Several lessons were derived from the experience. Participants learned that the activities had been effective, and that everyone's role was important in implementation. But most importantly, participants learned that the CBFM process could work. One of the most difficult tests of any management approach is its ability to deal effectively with problems. Concerns were communicated and resolved through the CBFM process.

More difficult has been the implementation of the ban on trawling in the Bay. The problem requires a different approach; its difficult to solve through awareness alone and economic incentives are costly, requiring more involvement from the national level. The communities have asked the DOF to further increase the fishery monitoring, control and

surveillance (MCS) operations by providing additional enforcement officers and fishery patrol boats to cover the vast expanse of the Bay.

Mangrove and seagrass areas have been rehabilitated in sites throughout the Bay. Conservation areas have been set up and notification boards placed at the sites.

An aggressive education campaign has been conducted throughout the Bay to discourage harvest of gravid female blue crabs. In addition, cages have been established near villages to place gravid female crabs inadvertently caught by fisherfolk. The cages are being used by the fisherfolk and once the crabs release their eggs, the crabs are sold and profits are used for village CBFM activities.

5. MONITORING

Implementation of the solutions or actions are being monitored by the project to be able to provide information on their effectiveness. Knowledge of the effectiveness of current actions will help the village committees and DOF determine how to adjust the actions and develop new ones where needed. DOF and the committees will also use the information to modify the issues initially identified, if needed. CBFM is adaptive and participants are continuously learning as new information arises in the process. The monitoring results are an important source of this new information upon which to base decisions.

Scientific studies previously conducted by PMBC and AFDEC in Phang-nga Bay have provided a baseline for future monitoring efforts. PMBC has observed numbers of juvenile fish, crab and shrimp species in undeveloped mangrove areas and undisturbed seagrasses. Studies indicated that mangrove areas have more variety of species present than do seagrasses in the Bay, and that both are important and productive nursery grounds for the Bay's fisheries. AFDEC has compiled a time series of data on fishery statistics in the Bay.

Standard monitoring forms are being developed by the AFDEC, PMBC and the Mangrove Research Unit, Department of Forestry, in Phuket. This way, data collected throughout the Bay can be designed to measure effectiveness of the actions currently being implemented. Data can also be compared over time. For example, measuring potential change in the fish populations and recruitments resulting from implementation of the ban on push nets requires the long term observance throughout the Bay of species abundance and diversity of juveniles found in the sea grass beds before and after the ban on push nets. Initial results have shown that both biomass and species richness within the seagrass beds have significantly increased following implementation of the ban.

These and other additional results of the scientific assessments of PMBC and AFDEC have been included in the education activities of the project throughout the Bay. Many of the scientists involved in the studies have taken part in these education activities which has enabled the fishers to continue the discussions and interactions with the scientists that had begun during the CBFM Workshop sessions in February, 1996. The scientists have stated that they have also been able to learn from the fishers, and have been able to use this improved understanding of the Bay in their continued studies on the Bay's problems which in turn, will be used by the CBFM project.

AFDEC is currently assessing the status and trends of the fisheries and habitat conditions in Phang-nga Bay using the data collected under the current monitoring. Findings will be presented to village committees and areas for improvements in data collection, vis-a-vis the objectives of the CBFM actions will be identified as well as additional sampling areas within the Bay which should be included in the monitoring programme. Considerations of potential changes in management measures, action and other CBFM activities can then be discussed at the meetings.

6. CONCLUSIONS

The Project has made significant progress in addressing many of the issues within a relatively short period of time, and has achieved a strong momentum within the communities for implementation of the community-based decisions. Continued success in CBFM will require the vigilance of government and communities to ensure a future for the Bay's small-scale fishers of sustained harvest. The Bay is a valuable resource for Thailand, and its communities are an example for not only Thailand, but for coastal communities around the world that are looking for solutions to the pressing resource management issues of today.