

Responsible Fishing Technologies and Sustainable Coastal Fisheries Management in Southeast Asia

Siri Ekmaharaj



Established in December 1967 for the purpose of promoting sustainable fisheries development in Southeast Asia, the Southeast Asian Fisheries Development Center (SEAFDEC) has been working in partnership with countries in the region and other institutions worldwide to assist the region on sustainable fisheries development for food security and improvement of the livelihoods and well-being of the Southeast Asian people.

In Southeast Asia, fisheries provide significant means of livelihood and food security particularly to people living in the coastal areas. Relentless population growth and accelerated economic development in the region have brought about a rapid expansion in fisheries, causing an enormous pressure on the fish and other aquatic resources, leading to rapid depletion of fish stocks, and severe disruption and degradation of ecosystems and fish habitats.

In response, SEAFDEC and its member countries are working on establishing better management of the region's coastal fisheries. The strategic approaches focus on capacity building and participation of stakeholders in coastal resource management and community development; rights-based fisheries; and co-management system for coastal fishing communities. Responsible fishing technologies, particularly the use of Turtle Excluder Devices (TEDs) and Juvenile and Trash Excluder Devices (JTEDs), have been promoted to reduce and minimize undesired fishing impacts on the fish resources.

Overview of Fisheries in Southeast Asia

The Southeast Asian region covers a large expanse of maritime and inland waters in the tropics. The region is rich in productive aquatic resources from its surrounding seas and inland waters including the Mekong River and other big rivers, lakes and reservoirs. In Southeast Asia, fisheries production is important not only as a source of protein but also as means of employment, and income generation through domestic and international trade.

According to the FAO 2004 statistics on fisheries and aquaculture, the production of fish from both marine and inland waters in Southeast Asia contributed significantly to the world fisheries production. Furthermore, FAO reported that the increase in capture fisheries production in Southeast Asia has been very strong for the past four decades during which the production of marine capture fisheries increased to about 14 million mt in 2002. Together with rice, eating fish and fish products constitutes as almost a “way of life” for the majority of ethnic and religious groups in Southeast Asia.

Many countries in the region are ranked among the world's top 20 producers in capture fisheries, with some countries experiencing an annual increase of up to 5%. Pelagic fishes dominate the landings by volume and value, as demersal fisheries are largely over-exploited. Fisheries in Southeast Asia are small-scale and operated in coastal areas. Most fish catch is landed in small and decentralized landing places for distribution to domestic markets through a very complex marketing network. With abundant tropical fishery resources, the fish catch in Southeast Asia predominantly comprised many species. Most fishers rely on harvesting different species for their livelihood and rarely on one particular target species. Consequently, the fishers usually find it difficult to clearly define and understand the by-catch issue. The ecological features of tropical organisms, e.g., fecundity, migration or productivity, are very different from those in temperate waters. The monsoonal climate and ecosystems such as coral reefs, mangrove areas, sea grass base and other critical habitats are also unique to the tropics. This complexity requires new and innovative fisheries management approaches, which are based on specific local fisheries conditions. The most promising underlying principle for managing such complexity empowers the coastal fishing communities to deal with the present pressures and solve problems through co-management approaches, i.e. in partnership with local and national fisheries institutions.

SEAFDEC's Role in Sustainable Fisheries Management

With its 11 member countries: Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam, SEAFDEC aims to develop the fisheries potential in the region through research, training and information services to improve the food supply through rational utilization and management of the fishery resources. With adoption of the Strategic Plan in 1998, SEAFDEC placed its emphasis on activities related to the development of regional fisheries policy and on the establishment of ASEAN's common position on fisheries issues. In 2001, with the adoption of the Resolution and Plan of Action on Sustainable Fisheries for Food Security in the ASEAN Region, the efforts of SEAFDEC have been focused on the promotion of sustainable fisheries ensuring food security for the people.

In order to fulfill its mandate, SEAFDEC initiates fisheries programs to provide a regional platform for priority fisheries issues, exchange of expertise and experience, policy development and technical advice to support national fishery initiatives towards sustainable development of fisheries. Thus, for the effective implementation of regional fishery programs and enhancement of the impact on sustainable



fisheries development in the region, SEAFDEC collaborates closely with the Association of Southeast Asian Nations (ASEAN). With SEAFDEC's technical fisheries capability, the ASEAN member countries recognize that mutual benefits related to regional fisheries activities could be gained from the collaboration. In 1999, the ASEAN-SEAFDEC Fisheries Consultative Group (FCG) was established as a strategic alliance to pool resources and to avoid duplication of efforts. The FCG is mandated to identify important regional/international fisheries issues, provide technical assistance to ASEAN in the formulation and implementation of common policies, and to assist its member countries in formulating common positions on regional/international fisheries issues.

Responsible Fishing Technologies and Practices

One area of concern is the widespread use of damaging fishing techniques. The case in point is the shrimp trawl, which can cause serious damage on the marine environment especially on non-target organisms, such as the indiscriminate catch of sea turtles and juvenile fishes. The by-catch of juveniles and trash fish, once seen as unwanted and a waste of valuable resources, has caused negative effect on the fishery resources. Although such catch may present low economic value to fishers, it can comprise high value species in the future, if these are allowed to survive and grow to commercial size. To ensure the sustainability of the resource, avoiding such kind of catch should be a priority. Over the last years SEAFDEC has been actively engaged in the development and promotion of responsible fishing technologies and practices, that have the potential to significantly reduce such "by-catch".

The Turtle Excluder Devices (TEDs) and Juvenile and Trash Excluder Devices (JTEDs) were promoted in the region to avoid catching of sea turtles, other endangered species, and juvenile fishes by trawlers. These devices were

introduced to fishers and managers in the Southeast Asian region, through training and pilot demonstrations.

TEDs

Turtle Excluder Devices (TEDs) and various types of Juvenile and Trash Excluder Devices (JTEDs) were tried, modified and improved to reduce the by-catch at different sites in SEAFDEC member countries.

The SEAFDEC Training Department (TD) in cooperation with the Department of Fisheries of Thailand, designed a TED known as the Thai Turtle Free Device (TTFD). This device was developed in consultation with scientists and after discussions with the fishers and stakeholders, and was modified after a series of repeated field tests. Thus, various types of TEDs have been designed, constructed and tested in order to develop the most effective and practical TED suitable for the Southeast Asian waters. Recently, the TTFD has been certified by NOAA (USA) and is now widely promoted to prevent the catch of marine turtles especially in the waters of Thailand and those of the SEAFDEC member countries.

Moreover, SEAFDEC in collaboration with ASEAN started on a comprehensive program to investigate the impact of fisheries on the marine turtle populations. The collection of information from this program will provide a valid base for the appropriate management and conservation of marine turtles. In particular, the program covers incidental catch, distribution, and migration routes, together with some research work on turtle hatchery operations. It also emphasizes the importance of continuously promoting the adoption of TEDs to prevent the incidental catch of the marine turtles.

JTEDs

The other important device developed to prevent the catching of unwanted juveniles and trash fish is the JTED. The research on JTEDs was initiated by SEAFDEC/TD in

JTEDs (below) and TEDs (right) as selective fishing devices to promote responsible fishing technologies and practices in Southeast Asia



1998. Originally, two types of JTEDs were developed to be attached to the upper part of the cod end of a trawl fishing gear. The device comprises a rectangular-shaped window and semi-curved window, both made of a stainless steel frame 80 cm x 100 cm. The frame is covered with 'soft' separator gratings made of 8 mm polyethylene rope to separate the small catch from the larger catch. Different spacing between the soft separator gratings were set to investigate the level of escape from the net. After a series of field tests and demonstrations on the effectiveness of these devices, two types of JTEDs were finally developed and promoted: the Rigid Sorting Grid and the Semi-curved Rigid Sorting Grid.

Another study was conducted by SEAFDEC/TD to assess the performance of JTEDs in fishing operations, catch loading and water 'drag' as well as the effects of various towing speed on the net's deformation. All these factors can influence the escape potential of the JTEDs. Thus, many sea trials and experiments on the release of juveniles and immature commercial fish species using various kinds of JTEDs have been carried out in the region. The trials and experiments were conducted off the coasts of Prachuab Kiri Khan and Chumporn Provinces in the Gulf of Thailand, Muara Town of Brunei Darussalam, and Cat Ba Island in Hai Phong Province of Vietnam. More recently, tests were also conducted in the coasts of Alor Star, Kedah State of Malaysia, Manila Bay of the Philippines, Sorong, Bintuni, Arafura seas and Papua of Indonesia, Myeik and Tanwe of Myanmar and in Sihanoukville of Cambodia.

The JTEDs have since been improved and adopted by more resource users and stakeholders after understanding the device's performance, and have been refined to suit their fishing practices for the benefit of the fishery resources.

Sustainable Coastal Fisheries Management

The overexploitation and conflict on the uses of natural resources in coastal zones by fishing communities often lead to loss of access to and control over the fisheries resources, further reducing fishery production and resource values. Considering that this problem needs to be addressed as a priority, SEAFDEC initiated a number of pilot projects aimed at achieving the sustainable use of coastal resources to support the livelihood of the communities.

Locally-Based Coastal Resource Management

This project aims to alleviate poverty in coastal communities, as poverty and insecure livelihoods are one of the driving factors of unsustainable use of fishery and other coastal resources. The project has been implemented to stimulate and encourage people's participation in coastal resource

management and community development, which would contribute to the establishment of local community groups for the development and management of their own resources. The local management body could also promote the establishment of local businesses creating job opportunities inside and outside the fishery sectors of the community. In addition, the local management body could also encourage the people to participate and develop activities that would strengthen the people's awareness on managing their resources.

A Locally-Based Coastal Resource Management Project (LBCRM) was therefore established as a pilot project in Chumporn Province in Thailand. SEAFDEC/TD and the Department of Fisheries of Thailand collaborated in the conduct of the project under the ASEAN-SEAFDEC Fisheries Consulting Group (FCG) mechanism. The most pressing problems identified at the project site were coastal resource degradation, underemployment of local people and community poverty. Community based co-management was identified as the most appropriate approach to implement



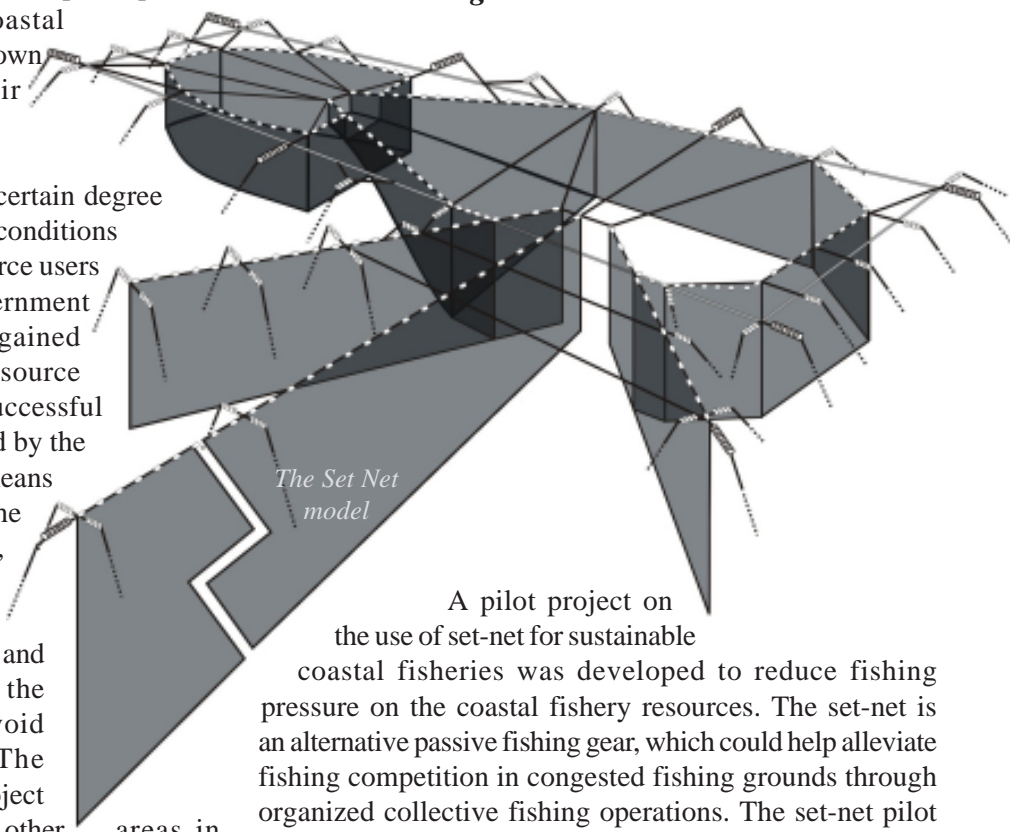
Consultation with local fishermen for fisheries co-management (top); and fishers planting mangroves to rehabilitate the natural resource (above)

the LBCRM project. Local government agencies, the fishers and other stakeholders were encouraged to participate in the decision-making process on coastal resource management, employing their own sustainable fishing methods in their immediate coastal areas.

The project succeeded in achieving a certain degree of improvement in the people's living conditions and reduction of conflicts among resource users by sharing the fishing ground. Government officers, stakeholders, fishers, etc. gained understanding on community and resource management. Furthermore, a very successful crab bank program (in Box) established by the fishers, was promoted. It serves as a means of responsible use of resources by the communities themselves. Additionally, fishers participating in the project and using collapsible crab traps agreed to modify their gear to be more responsible and environment-friendly by expanding the bottom mesh size of the trap to avoid catching the small-sized crabs. The successful outcomes from this pilot project proved that this model was applicable to other areas in the region.

The experience and knowledge gained from the pilot project has been disseminated to other member countries through the SEAFDEC information transfer mechanism. As a result, Brunei Darussalam, Indonesia, and Myanmar have expressed their intentions to initiate similar projects in their countries, while comparable projects are already implemented in Malaysia and Cambodia.

Use of Set-net to Develop Sustainable Coastal Fisheries Management



A pilot project on the use of set-net for sustainable coastal fisheries was developed to reduce fishing pressure on the coastal fishery resources. The set-net is an alternative passive fishing gear, which could help alleviate fishing competition in congested fishing grounds through organized collective fishing operations. The set-net pilot project aimed to develop a common policy concept of fishery management for fishing areas occupying wide fishing grounds. The project also aimed to assess the feasibility and environmental impact of installing large stationary fishing gear. During the implementation of the project, various types of set-nets appropriate for specific fishing grounds were designed and modified. Monitoring was conducted to determine the efficiency of the gear especially with regards to the design, installation position, harvest operation and maintenance.

Another activity conducted was the transfer of information, which would lead to understanding of the advantages of

Crab Bank Program

Crab Bank Program, which was first implemented in Banpred Village of Trad Province in Thailand, is a scheme used to conserve the crab resource. It is usually established by the community as part of their effort in coastal resource management. The fishers deposit their caught berried female crabs in cages maintained by the program until they spawn. After spawning, the crabs are sold by their weights in local markets with the proceeds proportionately shared: 50% of the sales is returned to the fishers who turned over the berried crab, 40% is retained by the Program for maintenance of the cage facilities and equipment, and 10% is allotted for the feeds. Under this Program, the fishers' motivation and morale have been very high.



the set-net. This involved organizing local fishermen and their leaders, and encourage them to participate in set-net preparation, installation and operation. A project evaluation was conducted through technical seminars attended by scientists, fishing gear specialists, fishers in the set-net group, and other resource users. The result of the project showed that the set-net is an appropriate fishing gear for coastal fishing grounds considering their environmental conditions and the community's participation.

As the fish caught in the set-nets are of good quality, the fishers using the set-net can increase their catch value. The fishermen who were involved in the project, had the chance to work under a group cooperation and management, facilitating future cooperative development. The fishermen also gained more knowledge on the fishery resources of coastal fishing grounds and the utilization of the resources as a group, in a responsible manner.

Capacity Building on Coastal Resource Management

One of the main reasons for the lack of success in modern fisheries management is the top-down approach which leaves the fishing communities completely out from the decision-making process. This leads to the building up of barriers between the fisheries administrations and the fishing communities. In view of this, SEAFDEC/TD offers training courses on Coastal Fisheries Management for Fishery Managers. The participants are the fishery managers who provide information to the decision makers in formulating and transforming policy into management plans.

The training course is aimed at extending the knowledge and experience of fishery managers on sustainable coastal resource utilization and management with practical methods and approaches in coastal resources management under different conditions. It also intends to strengthen the participants' practical competence in planning and implementing applicable coastal fishery management plans. Participants undertake simple research studies on several management issues and discuss these with project officers, local institutions and the fishermen. SEAFDEC hopes that through this training course, the gap between what is implemented in the field and what is happening in central government offices can be reduced.

Another important training course is on Coastal Fisheries Management and Extension Methodology, which targets the extension officers dealing with the communities, as participants. The course aims to familiarize the participants with the principles, concepts and needs for basic changes in coastal fisheries management and the roles of fishing communities in the sustainable development and management of the coastal resources. The course capitalizes on the fact that extension techniques and

methodologies are tools for communication between the fishers and fishery organizations. During the course, the participants make use of active extension tools and methods in gathering information on the ground situation and present the problems to the communities thus, leading directly to problem solving. Capacity building on extension services with knowledge and experience through the extension officers is instrumental for the success in fisheries resources management.

Sustainable Utilization of Potential Fishery Resources and Reduction of Post-harvest Losses

Short supply and ever-increasing demand for fishery products require greater efficiency in utilizing the fish catch. This means that there is the need to reduce wastage and losses during harvest operations and post-harvest processing. One way to achieve this is to improve fisheries technologies in harvesting (onboard and onshore), processing and distribution of the fishery products from the fishers to the consumers. SEAFDEC considers improved technologies for food safety in fish handling and preservation as among the most important issues that need to be developed and implemented in the region. As an example, many countries in the region are still using low-level technologies in fish handling due to lack of chilling and preservation facilities, causing high wastage due to poor hygiene and spoilage.

Thus, SEAFDEC initiated a study on appropriate on-board fish handling and preservation technology in the Southeast Asian countries with the objective of developing an appropriate technology on handling and preservation of fish at sea. The study had two components: (1) research on the improvement of fish handling technology for medium-scale fishing boats; and (2) training on fish handling and preservation techniques.

For the research on the improvement of fish handling technology for medium-scale fishing boats, refrigerated containers with chilled seawater system (Super Chill) was developed. This involves maintaining/keeping the temperature of chilled seawater as long as possible without adding large amounts of ice. This technology was transferred to fishermen and fishing boat owners, many of whom did not have even a basic knowledge on fish handling and preservation, and thinking that having only ice is enough to preserve the fish.

For the second component of the project, training on fish handling and preservation techniques has been conducted on-site in different countries in the region. Specifically, the training was conducted at the Permankat Fishing Port and

Semarang Fishing Technology Training Center in Indonesia; in some fishing villages and fisheries colleges in Thailand; at the Myanmar Fisheries Federation; with many groups of fishermen in Nha Trang, Vietnam; and with the trawl fisher groups in Singapore. At present, many fisheries groups are already familiar with the Super Chill technology and many fishing boats apply it in their fishing and carrier boats. Furthermore, the knowledge and techniques on the use of the Super Chill have also been transferred to government officers, stakeholders, college instructors, and students who are expected to promote the technology to other interested parties. SEAFDEC hopes that this technology will help the fishermen improve the quality of their catch.

CONCLUSION

There are many internal and external factors affecting the state of the coastal resources that include environmental deterioration as well as socio-economic pressure, which eventually impact the livelihood of coastal people. Given the fact that majority of the fishers in the region still predominantly practice semi-subsistence fishing, better management of the coastal resources and community fisheries is fundamental to ensure long-term food and financial security for coastal communities now and in the future. The coastal communities can actually play a greater role in coastal resources management than previously practiced. Lessons learnt from many projects implemented by SEAFDEC show that the success of the projects is based on factors like (1) adequate financial support, clear work plan and effective organization; (2) appropriate policy and regulation with back up from the central and local governments; (3) support of local institutions and cooperation among the project stakeholders; and (4) responsible project staff. The future of resources management lies in the ability of the fishers and the coastal communities to implement management regulations and technologies through co-management systems that ensure cooperation and partnership among all stakeholders.

SEAFDEC has greatly contributed to the fishers' growing awareness on the need to secure the marine fishery resources for their livelihood by adopting sustainable utilization of the coastal resources, and the need to protect the coastal habitats and biodiversity.

Further Readings

Chokesanguan, B., Ananpongsuk, S., Siriraksophon, S. and L. Podapol, 2004. Study on Juvenile and Trash Excluder Devices in Thailand, SEAFDEC/Training Department, pp. 1-18.

Chokesanguan, B., Ananpongsuk, S., Siriraksophon, S. and Abdul I. Hamid, 2004. Study on Juvenile and Trash Excluder Devices in Brunei Darussalam, SEAFDEC/Training Department, pp. 1-15.

Chokesanguan, B., Ananpongsuk, S., Siriraksophon, S., Wanchana, W. and N. Long, 2004. Study on Juvenile and Trash Excluder Devices in Vietnam, SEAFDEC/Training Department, pp. 1-20.

Chokesanguan, B., Ananpongsuk, S., Siriraksophon, S. and R. Rosidi, 2004. Study on Juvenile and Trash Excluder Devices in Malaysia, SEAFDEC/Training Department, pp. 1-31.

Chokesanguan, B., Ananpongsuk, S., Chanrachakij, I., Manajit, N. and G. Tumpubolon, 2004. Study on Juvenile and Trash Excluder Devices in Indonesia. SEAFDEC/ Training Department, pp. 1-18.

Chokesanguan, B., Ananpongsuk, S., Siriraksophon, S. and J. Dickson, 2004. Study on Juvenile and Trash Excluder Devices in the Philippines. SEAFDEC/ Training Department, pp. 1-12.

SEAFDEC/TD. 2002. Special Report on Locally Based Coastal Resource Management in Pathew District, Chumphon Province, Thailand. SEAFDEC Newsletter Volume 25, No. 4, October-December 2002, 8-9 p

SEAFDEC/TD, 2003. Proceedings of the Toward Further Development of Coastal Resource Management. Lessons Gained Through Locally Based Coastal Resource Management in Pathew District, Chumphon Province, Thailand. TD/RP/58. 233 pp.

Munprasit A. 2006. Background and updating of Rayong Set-net Project. Local and International Technical Seminar on Rayong Ser-net Fisheries and its Technology Transfer 3-5 October 2006 At Star Hotel ,Rayong, Thailand. 52 pp.

SEAFDEC/TD. 2006. Special Report on International Training Course on Coastal Fisheries Management Course I: The international training courses on coastal fisheries management. SEAFDEC Newsletter Volume 29, No. 2, April-June 2006, p. 8-9.

About The Author

Dr. Siri Ekmaharaj, Ph.D., is the Secretary-General of SEAFDEC and concurrently, the Chief of SEAFDEC/TD.

He can be reached at:

Tel: +66 2 4256199

Fax: +66 2 4256110-11

E-mail: sg@seafdec.org