Integrated Coastal Resources Management in Pathew District (ICRM-PD), Chumphon Province, Thailand

Thitiporn Suppanirun
Fishery Biologist
Chumphon Marine Fisheries Research and Development Center (CMDEC)
Department of Fisheries, Chumphon Province, Thailand

Introduction

In 2001, The Southeast Asian Fisheries Development Center (SEAFDEC) through the SEAFDEC Training Department (SEAFDEC/TD) and the Department of Fisheries (DOF) of Thailand conducted the collaborative pilot project on coastal fishery resources management with the cooperation of local fishing communities and other stakeholders, community groups and local administrative authorities in Pathew District, Chumphon Province under the auspices of the Japanese Trust Fund 1 (JTF-1).

The Chumphon Marine Fisheries Research and Development Center (CMDEC) served as the core implementing counterpart group and the Chumphon Provincial and Pathew District Offices of Fisheries as the collaborating agencies. The purpose of the project was to establish a practical framework for locally-based coastal resource management by encouraging fishermen's participation. It was supported by the creation of alternative job opportunities in coastal fishing communities. The collaborative pilot project was initially named the "Locally Based Coastal Resources Management in Pathew District (LBCRM-PD)" which started in 2001 and ended in 2006. Along the way, this was changed to Integrated Coastal Resources Management in Pathew District (ICRM-PD) in 2004.

The project site covers an area of approximately 117 km^2 in Pakklong Sub-District, Pathew District, Chumphon Province. Pakklong Sub-District comprised seven villages with 879 households and a population of 4152 (**Fig. 1**). The rural community is engaged in capture fisheries, coastal aquaculture and agriculture. The various fishing gears used are the Indo-pacific mackerel gill net, squid cast nets with light luring, blue swimming crab gill nets, shrimp trammel net, mullet gill nets, anchovy falling net with light luring, collapsible crab trap and cuttlefish traps, and other kinds of small-scale fishing gear. For aquaculture, the fishers are engaged in fish cage culture and shrimp farming. Rubber, coconut and palm oil are the major income sources from agriculture.

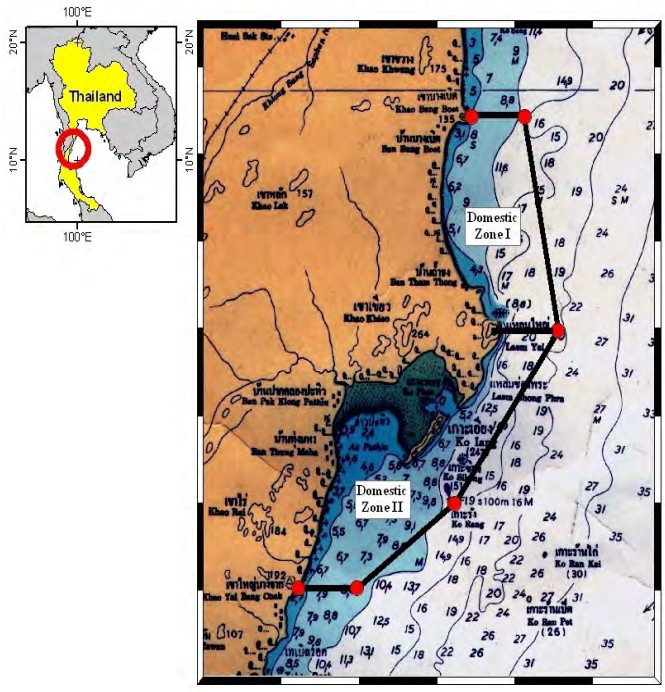

Fig. 1. Location of the project site

Overall Objectives of the LBCRM-PD/ICRM-PD project

The LBCRM-PD/ICRM-PD project in Chumphon Province, Thailand was mainly aimed at:

1. Establishing sustainable resource management at the local level;
2. Rehabilitating the coastal resources; and
3. Alleviating poverty in coastal fishing communities.

Activities of the LBCRM-PD/ICRM-PD Project

The six main activities implemented under the LBCRM-PD/ICRM-PD project were:

1. Baseline Survey

During the conduct of this activity, the participation of the resource users and stakeholders was promoted in order to obtain the necessary information and data for the establishment of sustainable coastal resource management and community development. The activity covered the following four major sub-activities (**Fig. 2**):

1.1 Biological Survey

The survey was done to monitor the output of the fishermen in terms of catch per unit effort (CPUE), identify the composition of the species caught, etc. The local people collected the data daily, which were then handed over to CMDEC for monthly analysis.

1.2 Oceanographic and Coastal Survey

This activity was initiated by SEAFDEC/TD, CMDEC and the Chumphon Marine Coastal Resource Research Center (CMCRRC), which were also involved in the survey, analysis and presentation of results, specifically those on the status of the coral reefs, sea grasses, and water quality in the project site.

1.3 Fishing Ground and Gear Survey

The survey aimed to monitor the fishing ground for each type of fishing gear and the seasonal changes of gears used by the Pakklong fishermen. The survey was conducted between January 2002 and September 2006 by SEAFDEC/TD.

1.4 Socio-economic Survey

The survey was conducted as a household survey in seven (7) villages of the project site in order to record the information into the database that could be utilized to develop an extension program and community development plans suitable for the target groups. The database was also used by the community in assessing the changes in the community in terms of number of households, population and occupation, and was later on referred to during the final evaluation of the project. The survey was conducted between 2002 and 2005 by SEAFDEC/TD and CMDEC.

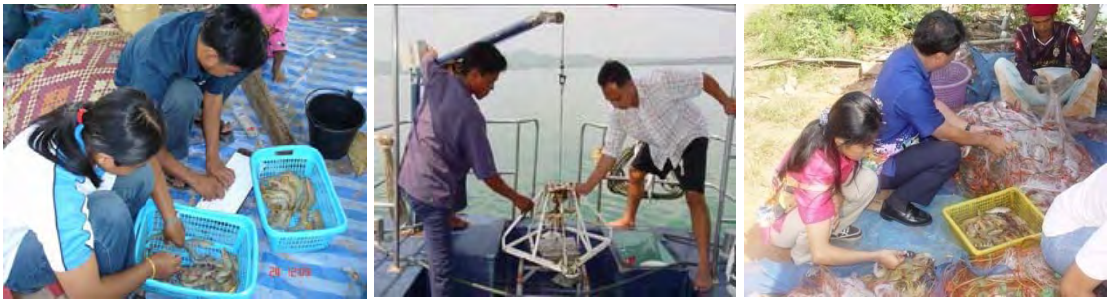

Fig. 2. Biological survey (left), oceanographic survey (center) and socio-economic survey (right)

2. Promoting and Extending Community-Based Resource Management

The project aimed to promote responsible fishing practices and aquaculture as well as encourage the fishers to participate in the monitoring, surveillance and control activities of the demarcated coastal zones. This was also intended to enhance the communities' capacity to advance fisheries management among themselves. Three sub-activities were conducted under this activity:

2.1 Zoning Arrangements

The project staff, fishermen, the Pakklong Sub-district Administrative Organization (Ao.Bo.To), and the stakeholders agreed to establish a maritime territorial zone in the project site. Thus, the project prohibited area was ratified on 4 October 2002 through the provincial mandate on the "Prohibition of some fishing gear to operate in the zoned area of Chumphon waters". This led to the banning of trawls, push nets and dredges from operating in the project area. Moreover, the aquaculture area in Tung Maha Bay was also divided into zoned areas (4 zones), namely: the cruising lane for fishing boats, fish cage culture area, shellfish culture area, and monsoon avoidance area (**Fig. 3**).

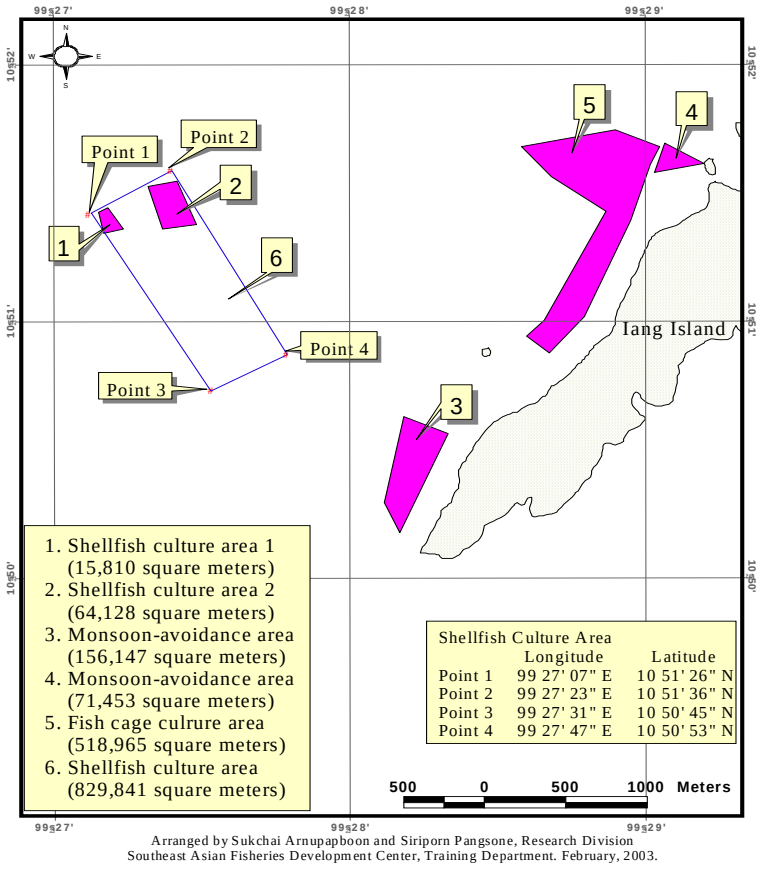

Fig. 3. Map of the zoned area

2.2 Crab Bank and Mesh-size Control for Crab Traps

Crab bank was used as a scheme to conserve the crab resources in the project area. The fishers addressed the decreasing catch of crab by depositing the gravid blue swimming crabs in the cages of the crab bank. The crabs are allowed to spawn in the cages after which they are sold to the local market. The profit from the sales of the crabs is divided to four parts: 50% as funds intended for loan of the group, 30% for the cage maintenance, 10% for the feeds of the crabs, and 10% for operating expenses.

In addition, the fishermen also changed the large mesh size of the bottom of the crab traps (from 1.25 inches to 2.5 inches), which was more effective as scientifically monitored by the CMDEC for one year (**Fig. 4**). The result showed an increasing trend in terms of

carapace size as well as total catch volume even if the data was yet marginal (**Table 1**). The enlarged mesh size resulted in higher benefits in terms of exploitation (**Fig. 5**). The rule of mesh size control was adopted by the fishers in the project area, where the fishers' motivation and morale have been very high. Now there are two crab bank systems adopted at the project site, the crab bank in cages and the Japanese system. The crab bank in cages is operated from March to September while the Japanese system is operated from October to February (monsoon season).

Fig. 4. Crab bank (left) and mesh size control (right)

Table 1. Catch of swimming crab from 2002 to 2006

Year	Average carapace length (cm)		Total catch (Ton/year)
	Male	Female	
2002	8.6	8.97	
2003	9.17	9.56	72.1
2004	9.55	10.01	87.6
2005	10.15	10.34	112.6
2006	10.39	10.62	142.6

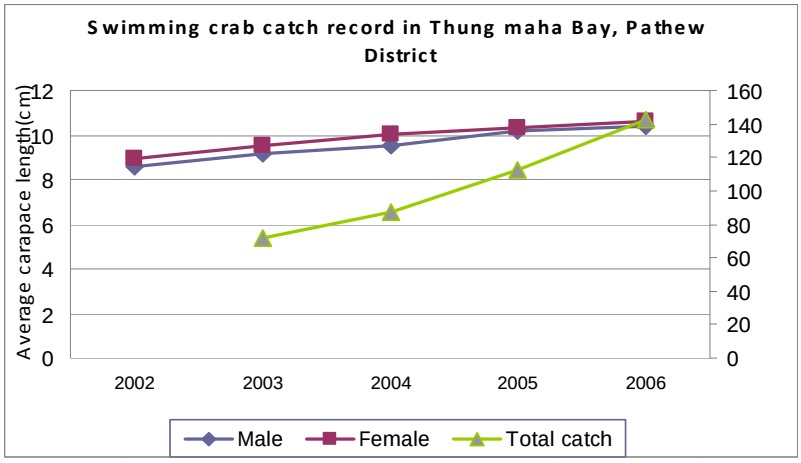

Fig. 5. Total catch of swimming crabs in Tung Maha Bay, Pathew District

2.3 Pakklong Fishermen Group (PFG)

The fishermen established the PFG, which has been registered with the Chumphon Provincial Cooperative Promotion Office with 108 fisher members. The main responsibilities of the PFG are to represent the fishermen in raising problems and discussions on how to solve fisheries problems with the government, find ways in promoting fisheries resource management and conservation, and patrol in the project site from illegal fisheries (**Fig. 6**). The PFG were also involved in three major activities of the project:

- Volunteer manpower for monitoring and surveillance of illegal fishing in the project area with the local enforcement officers participating in the efforts;
- Participate in fingerling releasing and mangrove reforestation activities; and
- Establish a saving – loan funds

Fig. 6. PFG meeting (left), fish releasing (center) and mangrove reforestation (right)

3. Promoting local business

In order to reduce over-dependence on the coastal resources, the project encourages and enhances local businesses aside from capture fisheries at the project site. The project also assists the fishers to increase their household incomes in two ways: by improving the technologies of handling, marketing and processing fisheries products; and creating alternative job opportunities inside and outside the fishing communities.

3.1 Improving the technologies of handling, marketing and processing fisheries products

The Project helped the fishers increase their income by improving technologies of handling, marketing and processing fisheries product, and by creating job opportunities aside from capture fisheries. The activities also support the “One Tambon One Product” (OTOP product) scheme that the Thai government has been promoting nationwide. In collaboration with the Pakklong Sub-district Administrative Organization (Ao.Bo.To) and other local agencies, the project provided the necessary technology and marketing information to the targeted people.

3.1.1 Fish Processing

Fish processing is being operated by the women’s group in village No. 1. The members comprised both the fishers and their housewives. Fish processing activity was a good alternative livelihood because adding value to the fish products could lead to better profit (**Fig. 7**). Production has been good in terms of fish processing, packing, marketing and accounting system that resulted in a smooth flow of their business.

3.1.2 Local Snack and Dried Flower Making

A group of women from village No.4 conducted some activities as alternative livelihoods such as processing of Pan Sep and Thong moun (local snacks), dried flower making, and selling groceries (**Fig. 7**).

However, the income of the members from this activity has been very low may be because they are generally fully engaged in the activities in rubber plantations and thus, could hardly afford to spare some of their time for the group work.

Fig. 7. Processed fish products (left) and production of local snack (right)

3.1.3 Batik painting

A group of women from village No. 6 produced various batik painted materials like cloths, shirts, T-shirts, bags, and handkerchiefs (**Fig. 8**). The members work for 3-4 hours a day after finishing their own work in the rubber plantations.

Fig. 8. Batik products by the Batik Painting Group

3.2 Creation of alternative job opportunities inside and outside the fishing communities

3.2.1 Babylonia Shell Culture

Babylonia shell culture was demonstrated in the project site (**Fig. 9**). The first experiment was conducted for 7 months from August 2005 to February 2006. The result was rather pessimistic with small growth of the shells after three (3) months of culture. The suspected cause was attributed to the unfavourable sea conditions when the monsoon season set in.

Fig. 9. Babylonia shell demonstration culture in the project site

The second experiment was conducted for 6 months from March to September 2006 during the calmer season, which was considered an improved way and incorporating the lessons learned from the first experiment. The result was still negative as seen in the economic calculation. This did not convince the PFG to pursue this venture in the future under the present production result as well as the marketing trend of the shells.

3.2.2 Fish Cage Culture with Artificial Feeds

This activity aimed to solve the problem on the use of trash fish caught from push net operations for fish feeds considering that push net operations have been prohibited in the project site. The CMDEC cooperated with fish farmers by demonstrating the use of artificial feeds for sea bass fish cage culture (**Fig. 10**). Although the growth rate of the fishes fed artificial feeds was rather low, the experiment could not be concluded as a failure due to the feeds but perhaps due to the water quality or culture technique adopted.

3.2.3 Swimming Crab Culture

The size of the blue swimming crabs caught from crab traps was smaller than marketable size. The crab trap fishermen and CMDEC agreed to conduct an experiment on crab culture in cages until the crabs reach marketable size (**Fig. 10**). Swimming crab culture was however did not attract the fishermen because more time must be spent to take care and observe the behavior of the crabs, and more particularly when the feeds given was not enough, the strong crabs eat the weak crabs during molting. The benefit was therefore not considered worthwhile.

Fig. 10. Fish cage culture with artificial feeds (left) and blue swimming crab culture (right)

4. Enhancing human resources capability and participation

Participatory training and educational courses were arranged to suit the needs of the target groups of trainees comprising the project staff, community leaders, fishers' group leaders, women's group leaders, and Ao.Bo.To council members. Preparation of the courses was part of the objectives of establishing and extending LBCFM as well as promoting local business ventures**.** Since 2002, training courses on the sustainable use of the coastal resources have been arranged for 150 students from five (5) schools near the project site every year.

5. Development of extension methodologies and strengthening the extension system

Extension services are necessary to develop the technologies and their methodologies. The text, manuals as well as any visual methods and materials produced from experiments through the extension and training activities have been prepared and promoted.

Leaflets, posters, newsletters and calendars were distributed to schools and communities (**Fig. 11**). Overall, 49 copies of published documents containing the results of the project's various activities were produced.

Fig. 11. Information materials on the project's activities and achievements

6. Rehabilitation and enhancement of the coastal resources

This activity was implemented by the DOF of Thailand, which had allocated a certain amount of budget for the installation of artificial reefs (ARs) around the demarcated coastal zones. Setting up of sustainable management and utilization of resources around the areas of the deployed ARs was also conducted as part of the target activity on releasing of fingerings.

6.1 Installation of Artificial Reefs (ARs) and Fish Enhancement Devices (FEDs)

The installation of ARs in the project area aimed to: 1) increase aquaculture production; 2) increase fishing ground; and 3) prevent illegal fishing activities such as the use of push nets. The DOF installed ARs at the project site from March to April 2004. Two batches of 1750 pieces of concrete cube frames, 1.5x1.5x1.5 m were installed at 12 m depth covering an area 2 km^2. In March 2007, ARs (675 pieces) were also installed in 1 km^2 area fronting the Ban Thung Maha Bay. In August 2005, SEAFDEC supported the purchase of materials and trained the fishermen on the construction of 10 units of fish enhancing devices (FEDs). The FEDs were installed around the ARs, however the FEDs were lost 6 months after installation. In July 2006, an experiment on the new design of FEDs was conducted (**Fig. 12**).

Since the FEDs design was observed to have some weak points, this was improved for more durability and effectiveness. The FEDs were installed between the groups of ARs, and four (4) months after installation, 4 units were lost and disappeared as observed in November 2006. The fishermen expected the FEDs were destroyed by trawl nets or damaged by strong winds and high waves during the monsoon season.

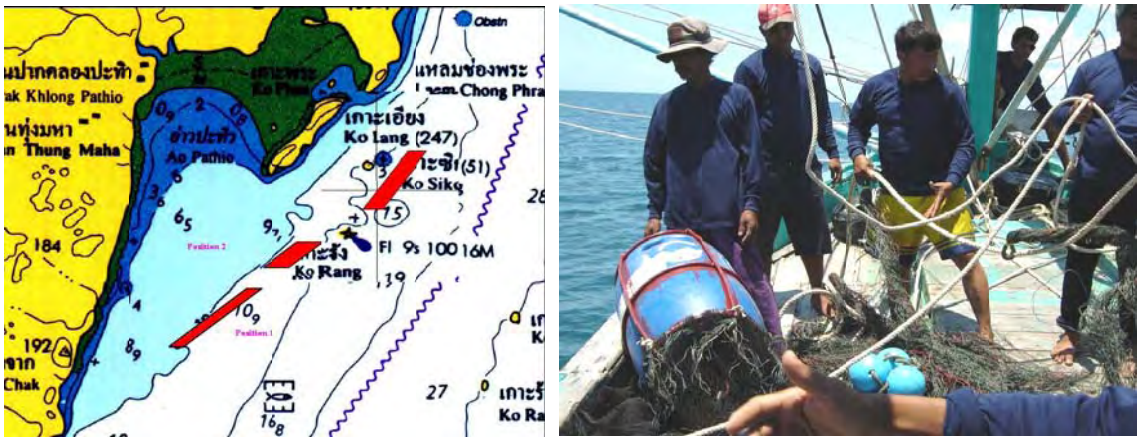

Fig. 12. Map of artificial reefs area (left) and FEDs constructed and installed by fishermen (right)

6.2 Release of Fingerings and Evaluation of Tagging Technique

The fry and fingerlings released through this activity were provided by the Chumphon Coastal Aquaculture Station. These include: 5,800,000 banana shrimp (size 1-2 cm), 3,000,000 tiger shrimp (size 1-2 cm), 161,000 sea bass (size 1-4 in), and 44,000 blue swimming crabs (size 4-6 cm). Releasing of fry and fingerlings was done by students, teachers, AoBoTo, fishermen, villagers, staff of CMDEC and SEAFDEC/TD since 2002.

In 2007-2008 tagging technique was used to estimate the number and growth rate of marine animals recaptured after releasing. In 2007 and 2008 releases, respectively, 1000 and 1968 of tagged sea bass size (8.5-12.3 cm) while 1128 and 1000 of tagged banana shrimps (size 4.5-9.5 cm) were recovered(**Fig. 13**). The biggest tagged sea bass (51 cm) was caught in Thung Maha Bay after releasing for 413 days. The CMDEC provided complimentary T-shirts for fishers who return the shrimps/fishes that have been tagged.

Fig. 13. Tagged sea bass recaptured from Thung Maha Bay

6.3 Mangrove Rehabilitation

The Pakklong Fishermen Group, students, teachers, Ao.Bo.To., fishermen, villagers as well as staff of CMDEC and SEAFDEC/TD cooperated in planting 1000, 2200 and 500 mangrove seedlings in 2005, 2006 and 2007, respectively (**Fig. 14**).

Fig. 14. Mangrove reforestation in the project site

Final Project Evaluation

The final project evaluation was outsourced through the Coastal Resources Institute (CORIN) of the Prince of Songkhla University, Hat Yai, Songkhla, Thailand. The results of the evaluation indicated that the activities of this project were well planned in such as way that every aspect of the issues has been resolved. Baseline survey was assessed as very good because it provides all the important details needed to identify and prioritize the issues in the project area. The CBRM activities were very significant in the understanding and learning process of the local people regarding the protection and conservation of the environment and the coastal resources.

The local businesses of the villages were also very significant as well, because these provided them with alternative and/or additional sources of income to sustain their daily needs. More importantly,

the dissemination of information materials to the local people was a great way to keep them updated with and informed about recent developments and enabled them to identify ways where they can participate and extend help. Lastly, the resource enhancement activities were also very important in engaging the interest and participation of the local people rather than just giving them theoretical knowledge which is difficult for them to visualize and understand. However, the weak point observed was the insufficient collaboration between the Ao.Bo.To. and other agencies involved in the project.

Follow-up Actions for the Project

After end of the LBCRM-PD/ICRM-PD, the DOF of Thailand through the CMDEC has been supporting the activities under the project until now, specifically:

- the activities of the PFG;
- in giving support materials for the maintenance of the crab bank;
- in releasing of more fingerings;
- in conducting training courses on sustainable use of the coastal resources for 150 students from 5 schools in the project site every year; and
- initiating green mussel culture.

Specifically in 2007 and 2008, some members from the PFG cultured green mussels using rope materials tied on rafts in Thung Maha Bay (**Fig. 15**). The spats of green mussels were sold to other farmers for culture in the Andaman Sea and adults of green mussel were distributed to the local markets. The DOF supported the materials for making and setting the rafts.

Fig. 15. Green mussel culture in the project site using rafts