

Community-based Crab Conservation in Chonburi, Thailand: Engaging Local Fishers and Communities in Marine Conservation

Nisakorn Wiwekwin¹ * and Praparsiri Barnette²

¹ Saensuk Municipal Office, Saensuk Municipality, Chonburi, Thailand

² Department of Aquatic Science, Faculty of Science
ICM Learning Center, Burapha University, Chonburi, Thailand



Key Message

The success of blue swimming crab conservation as experienced in Chonburi Province of Thailand is largely due to:

- linking conservation with food security and livelihood of the local community;
- increased understanding and realization of the rights, role, and responsibility of the local fishers and coastal communities to ensure sustainable supply of marine resources; and
- committed local political leadership to effectively promote partnerships among government, stakeholders, and other interest groups in leveraging human and financial resources to replicate and scale up conservation efforts throughout the province.

Abstract

The blue swimming crab (*Portunus pelagicus*) is among the important local and export commodities of Chonburi, and is a key source of livelihood for local fishers. However, the harvest was continuously declining in the late 1990s as a result of overharvesting, environmental degradation, and use of advanced fishing equipment.

As part of the integrated coastal management (ICM) program of Chonburi Province, a crab conservation project was implemented focusing on the following:

- increasing the roles and responsibilities of local fishers and communities in marine conservation;
- protecting the gravid females (i.e., crabs with eggs) to enhance production (i.e., protecting the “mother” [broodstock], as opposed to the conventional approach of protecting the young); and

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* Email: nisakorn.w@hotmail.com

- educating fishers and the public by engaging them in the protection and conservation of marine and coastal resources.

The key processes included: (1) gathering female crabs with eggs and holding them in submerged cages; (2) securing the cooperation of fishers to temporarily “surrender” gravid female crabs to the project until the eggs were released to the surrounding water; and (3) returning the crabs to fishers and monitoring crab harvests over time. This project was first implemented by Sriracha Municipality to demonstrate its feasibility.

Over the years, increase in harvesting of crabs was observed since the crab conservation program started in 2006. This translated to better income and improved livelihood for the local fishers.

Since then, the crab conservation project was replicated and incorporated into the local development plans and budgets of seven other local governments in Chonburi Province, including the municipalities of Saensuk, Sathahip, Laemchabang, Bang Phra, Banglamung, and Bang Sarae as well as Pattaya City.

The outcome of the crab conservation projects in Chonburi were: (a) increasing understanding, appreciation, and ownership of the local stakeholders; (b) improving local capacity in marine resource management; (c) creating local platforms for public education and engagement on marine conservation; (d) leveraging and facilitating technical and financial assistance for replications in other coastal areas; and (e) integrating or mainstreaming crab conservation into local development plans.

Background

Chonburi Province is a popular destination for local and foreign tourists for its scenic

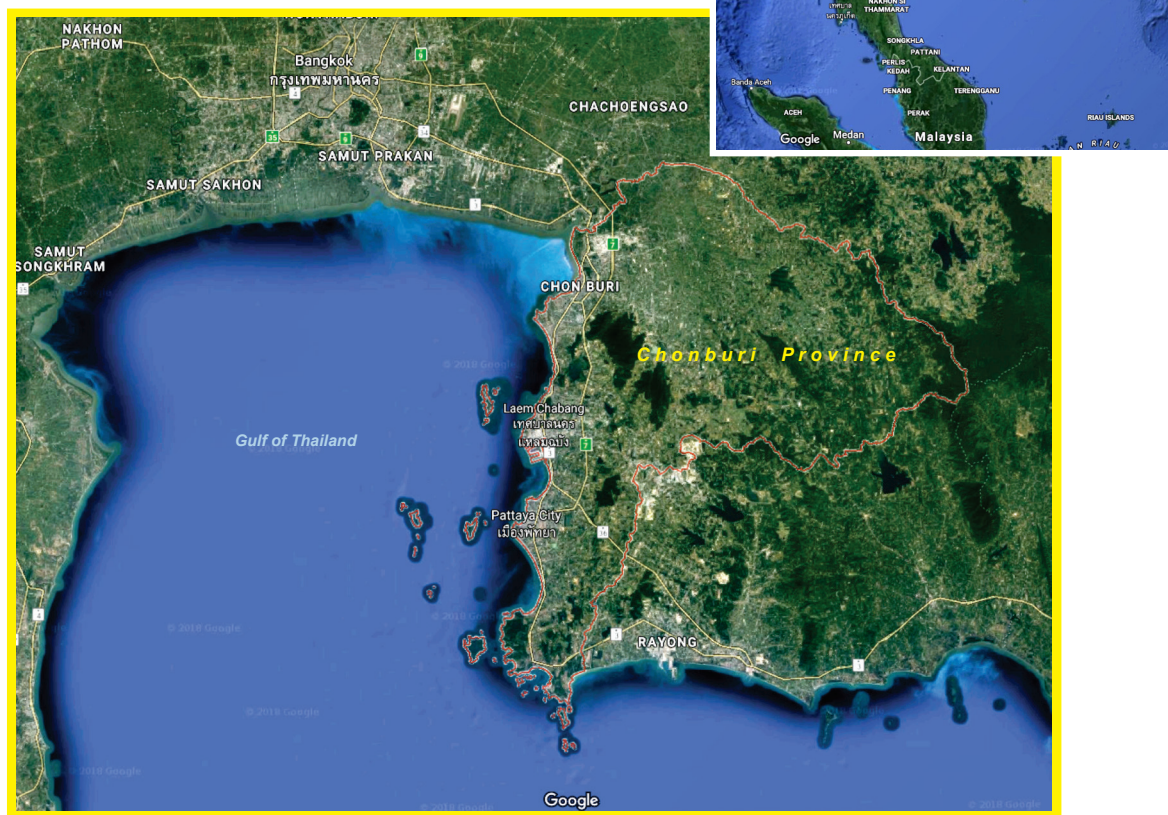
beaches, fresh seafood and proximity to cosmopolitan Bangkok (Figure 1). Over the past 30 years, Chonburi has undergone economic transformation, from agricultural to industrial, as a result of a national policy to develop the eastern region of the Gulf of Thailand through the implementation of the Eastern Seaboard Development Project.

In the late 1990s, the adverse environmental impacts of rapid development of the Eastern Seaboard, including Chonburi Province, were recognized by both the government and the people of Thailand. About the same time, the national government’s decentralization policy was officially adopted providing local governments with the opportunity and responsibility to manage their environment and natural resources therein.

An ICM demonstration project was initiated in Chonburi Province in 2001 involving five municipalities, including Sriracha, which hosted the ICM project office. A provincial-wide Coastal Strategy was adopted in 2004, with Sriracha, subsequently, adopting a medium-term implementation plan (ICM Action Plan) with the blue swimming crab conservation as one of the priority projects.

The blue swimming crab is an important local commodity in Chonburi in high demand among locals as well as tourists. In 1998, the harvest from the Gulf of Thailand reached a peak of 37,281 tons, from 18,708 tons in 1985. Harvest then continuously declined from the late 1990s to 15,132 tons in 2009 (Vanguard, 2012, cited in Thai Health Promotion Foundation, 2012). The decline was associated with overharvesting and environmental degradation arising from unregulated coastal development. Local fishers and commercial operators, including those from Chonburi Province, were using collapsible bottom traps and floating seines, which captured the mature and gravid crabs, and even the young

Figure 1. Chonburi Province is located in the eastern seaboard of the Gulf of Thailand, south of Bangkok.



ones. Some of the fishers were relying primarily on the crab harvest and this significant decrease in the population of the blue swimming crabs was affecting their income and threatening their livelihood.

This case study highlights the efforts of the local governments in Chonburi in addressing their marine conservation challenges by using the

conservation program of blue swimming crabs to demonstrate the solutions to overharvesting and environment degradation through increasing public awareness, stakeholders' participation, and sharing of responsibilities. The success of the program was also attributed to a leader who understands and champions the cause of the fishers and the importance of marine conservation (Box 1).

Box 1. An ICM champion.

Mr. Chatchai Thimkrajang, former mayor of Sriracha Municipality, played a critical role in the establishment and implementation of the ICM program in Chonburi. As head of the Chonburi Fisheries Association, he was responsible in understanding the problems of local fishers, the consequences of unsustainable fisheries practices and other natural and human-induced factors on local food security and livelihood. He considered the local people's lack of awareness and understanding of the marine resources and environment and how these were adversely affected by their activities, as well as weak law enforcement at the local level, as among the root causes of problems that affect the sustainability of local fisheries.

Based on his extensive management experience and being a fisher himself, Mr. Chatchai believed that providing a demonstration was the best strategy to capture the interest of local fishers and to educate them on environment friendly fishing practices and marine conservation. He knew how local fishers learn from each other by sharing experiences and efficient techniques.

Figure 2. Mr. Chatchai Thimkrajang demonstrating a gravid female crab being placed in an enclosed tray for nurturing until the eggs are released.



Approach and Methodology

The “crab condo” project

Scientific studies have shown that one female crab can produce up to a million eggs (depending on the size of the crab) (Nitiratsuwan, et al., 2007; Oniam, et al., 2012; Kunsook, et al., 2014). Recognizing the unrealized potential if these gravid crabs are captured and sold before they are able to release their eggs, a novel idea of “protecting the mother,” instead of the conventional approach in marine and coastal resource management of protecting the young, was adopted and tested in Chonburi as one of the conservation activities of the ICM program.

Inspired by the condominium developments in Sriracha Municipality, the design consisted of a stack of baskets so that each gravid crab was kept separately to facilitate feeding, maintenance, and removal after release of eggs (Figures 2 and 3). The local fishers called it “crab condominium” or more popularly, “crab condo”. The structure was submerged near the coast, using floating rafts, to facilitate regular feeding and maintenance. Collaborative arrangements among local fishers were made: for them to “surrender” gravid female crabs for stocking the crab-condo; for maintenance of the structure; and for sale arrangement after the release of eggs. Funding was secured from the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) to support the pilot demonstration of the project in Sriracha.

Pilot testing of the crab condo

In partnership with the Chonburi Fisheries Association, the Sriracha Municipality introduced the crab conservation project to local fishers in Sriracha Nakhon Village and enlisted their support in building the first “crab condo”

Figure 3. The “crab condo” consists of stacked trays (left) that are submerged using floating rafts (right). Local fishers are responsible for maintaining the setup.



using reusable materials to house a maximum of 120 female crabs. This pilot initiative served to test the initial “crab condo” of its durability, operational and maintenance requirements, and management by the local fishers. Technical support was provided by Kasetsart University to monitor and evaluate outcomes associated with the crab conservation project, including regular monitoring of water quality as well as plankton composition and biomass.

A year later, Sriracha Nakhon Village received a grant from the national government’s SML (Small, Medium, and Large Villages) Program. The program aimed to encourage villagers to take part in solving community problems in response to local needs.

Under the guidance of the fisheries association, local government, ICM program coordinator and technical advisers, and local universities, the villagers used the additional budget to triple the crab condo’s holding capacity from 120 to 360 female crabs and to strengthen the holding structure further by using better materials.

Extension of the crab condo demonstration to other villages

With increasing knowledge and confidence and ownership of the demonstration project, the Sriracha Nakhon villagers became speakers and educators to other interested villagers, including the neighboring village of Choom Chon Rim Talay. Among those interested in the project were seafood restaurant owners whose business depended on sustainable crab supplies. At that time, the crab condo operation in Sriracha Municipality was able to house 1,600 gravid female crabs with a potential of releasing an estimated 1.6 billion eggs. Consequently, fishers also noted higher crab harvests compared to the same periods in previous years.

Utilizing the conservation program as platform for public education and engagement

The crab condo project, with its catchy name, attracted media attention and visitors to its facility including schoolchildren, fishers, and officials from other local areas. Concurrently,

the local government and fishers in Sriracha Municipality were taking the opportunity to promote marine conservation in general including providing visitors with hands-on experience in releasing crabs and other marine species.

A partnership arrangement was also made with Duang Manee School, a private elementary and junior high school in Sriracha, to develop an outdoor learning curriculum that emphasized the relationship among the marine environment, marine resources, marine conservation, and local livelihood. The curriculum included project activities in relation to marine and coastal resources management as well as discussions and interactions with municipal officers and experts.

Facilitating technical and financial assistance to other areas interested to replicate the program

In 2007-2008, the crab condominium concept was replicated in coastal fishing villages in other local municipalities and cities in Chonburi Province. Fishers from the Rim Talay Village in Sriracha Municipality worked with fishers of Wat Luang Village of Bang Phra Municipality and Ban Laem Chabang Village of Laem Chabang Municipality to develop crab condos through project grants from the Global Environment Facility/United Nations Development Programme/Small Grants Programme (SGP) and the national government's SML program. The ICM Project Office in Sriracha assisted community-based organizations in developing the project proposals submitted to SGP. In accordance with the SGP process, the grant amount was given directly to the community-based organizations, as part of capacity building and empowerment of local communities in environment and natural resources management.

Integrating crab conservation into local development plans and leveraging support from various partners

In order to sustain crab conservation activities, local governments eventually mainstreamed it as part of their environmental plans and budgets. In addition, some municipalities were able to leverage more funding support from external sources. For example, coastal fishing villagers from the municipalities of Bang Sarae, Sattahip, Saensuk, and Banglamung applied the crab condo model in 2009 and 2011, respectively, by using funds from their local governments and private sector partners.

Variations in holding technique for gravid crabs

In areas with strong wave action, the crab condo model demonstrated by Sriracha Municipality was difficult to maintain. In Sattahip and Saensuk, the technique was modified with the construction of onshore holding structures to keep the gravid crabs until their eggs were released. In Sattahip, cement ponds were constructed and filled with seawater, which was periodically oxygenated. In Saensuk, plastic buckets containing seawater were used with continuous oxygenation using air pumps (Figure 4).

Other conservation approaches

To complement the conservation approach of protecting gravid female crabs in holding structures, the Chonburi Fisheries Association provided the fishers with crab traps of appropriate/legal mesh size, in exchange for traps with illegal mesh sizes. The new traps were designed to protect young crabs from capture until they reached the standard size for consumption. Local governments also released juvenile crabs and fish to celebrate holidays and special occasions.

Figure 4. On-shore holding structures for gravid crabs in Saensuk Municipality (left). Mr. Narongchai Khunpluem, Mayor of Saensuk Municipality, placing a crab in one of the tanks (right).



Other conservation/rehabilitation measures focusing on sea turtles, mangroves, seagrasses, coral reefs, beach areas, and environment-friendly aquaculture techniques were also implemented by local governments and used as opportunities for stakeholder education and participation.

Results

Increased crab catch

Interviews with local fishers in Bang Phra Municipality in 2010 showed that crab catch using collapsible bottom trap and gill net in Sriracha Bay increased from 1–5 crabs per night before the crab conservation program started to 5–10 crabs per night in 2010. A study conducted by the Sriracha Fishery Research Station of Kasetsart University for Saensuk Municipality using 60 collapsible bottom traps and 1.5 km-long crab gill net showed increase in crab catch per deployment from 54 crabs in 2011 to 105 crabs in 2012 (a 94% increase), accompanied by an increase in average crab carapace size from 3.88 cm to 4.51 cm (Sriracha Fishery Research Station, 2011, 2012). The

increase in crab catch also increased the income of the local fishers.

Raised public awareness, participation, commitments, and financial resources in marine conservation

Through the successful crab conservation initiatives, the local fishers and general public's understanding on the need for and benefits from marine conservation has broadened. The fishers played a significant role in securing gravid female crabs and also in the operation and maintenance of the holding structures. This has greatly enhanced their understanding, commitments, and skills with greater appreciation of teamwork and networking among fishers' groups. With technical and financial support from the local government and other partners, the fishers also learned about the importance of collaborating with the local government and of following regulations.

Crab conservation was incorporated into the local development and budget plans of eight municipalities in Chonburi as a component of marine conservation in Sriracha, Saensuk, Satthahip, Laemchabang, Bang Phra, Banglamung, Bang Sarae, and Pattaya City.

Inspired other local governments in Chonburi to adopt ICM approach

With the benefits of crab conservation initiatives and strong stakeholders' support, many local governments in Chonburi were impressed with the benefits and efficiency of the ICM concept and approach in addressing local concerns. This inspired many of them to adopt the ICM system. From 2006 to 2010, the number of local governments implementing ICM in Chonburi increased gradually from the initial 5 demonstration sites to all 26 coastal governments, and later to noncoastal ones as well, covering the entire province (Kanchanopas-Barnette, et al., 2012).

Lessons Learned

Capable and well-exposed local leadership can mobilize resources and strengthen collective efforts in addressing local economic, social, and environmental concerns.

Many of the achievements in implementing ICM demonstration, in particular, the crab conservation project in Sriracha Municipality were largely attributed to the efforts and leadership of the mayor who was convinced of the concept and sustainable development objectives of the ICM system. Study tours and participation in workshops and forums overseas enhanced his knowledge, vision, and commitment to address the social, economic, and environmental challenges of his municipality. His efforts to involve the local fishers and coastal communities strengthened the voice and participation of the stakeholder while mobilizing national and external technical and financial support.

The benefit of starting small is a guiding principle in environmental management at local level to test and demonstrate applicable measures, which are practical and relatively easy to understand, implement, and replicate.

The idea of protecting the gravid female crabs to allow them to release their eggs and improve future harvests was a practical concept that local fishers easily understood. The potential benefits that fishers gained from the crab conservation project encouraged their voluntary participation and cooperation. Thus, the project was able to use one village as a pilot site with a relatively small setup to demonstrate the methodology and test its implementability. With the initial success, replication in other villages was possible.

Engaging local stakeholders as partners and enhancing their capacity strengthens effectiveness in sustainable management of marine conservation initiatives.

Local stakeholders, including fishers' groups and communities, can play leading roles if they are given opportunities to enhance their knowledge, capacity, and skills in practical measures that address their common concerns. This was demonstrated in the case of fishers in the Sriracha crab conservation project. Willingness to share lessons and experiences with fellow fishers in other municipalities also contributed to replication and adoption of approach and techniques to meet local conditions.

Mainstreaming crab conservation was made possible when local government recognizes the dynamic role of local fishers in marine conservation.

The initial allocation of local budget by Sriracha Municipality and other local governments in subsequent initiatives made it possible to implement crab conservation activities. The success of the demonstration and replication projects

convinced local governments of the value of local fishers' participation in marine conservation activities. This led to mainstreaming crab conservation projects into local government plans, ensuring financial sustainability.

The concept and practice of ICM supports national decentralization policy to engage local governments and stakeholders.

In Thailand, the decentralization policy and governance framework promote a people-centered development aimed to increase the participation of all stakeholders. Hence, the introduction of ICM governance framework and process in Chonburi was well-received by both national and local governments as ICM provides a broad sustainable development framework and a systematic planning and implementing process in addressing environmental, social, and economic challenges.

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