MOLLUSC CULTURE AS A TOOL FOR SUSTAINABLE INTEGRATED COASTAL ZONE MANAGEMENT, SOUTHERN THAILAND

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ABSTRACT

Oyster culture was introduced in 1960 in the coastal zone of Ban Kadaji, Ban Don Bay, Surajthani, southern Thailand. More widespread mollusc culture was promoted in 1991 by the Department of Fisheries. It was part of an Integrated Coastal Zone Management plan which encouraged the villagers to work more with cockle culture and harvesting. A coastal aquaculture co-operative was formed. At present, mollusc culture and gill net are the main sources of income of the villagers. Cockle culture, oyster culture, shrimp culture, gill net, and trap fishing are done in Ban Kadaji by 60, 120, 10, 10, and 12 families respectively.

INTRODUCTION

The Gulf of Thailand is situated between 5°-13° N and 99°-106° E and constitutes a portion of the shallow Sunda Shelf, opening to the South China Sea (Kullavanij 1991). Ban Don Bay is part of the Gulf of Thailand which is in the Upper South of Thailand. The Upper South Region has a total area of about 52,600 km^2 and is located in the upper part of the Malay Peninsula. The region lies between the Gulf of Thailand to the East and Andaman Sea to the West (OEPP 1992).

The coastal zone of Thailand encompasses 2,600 km of coastline which is very rich in natural resources including fishes, coral reefs, mangrove forests, beaches and mineral deposits (Paw *et al.* 1988). Ban Don Bay is an excellent area for aquaculture. Culture of oyster, *Saccostrea lugubris*, is famous in Ban Don Bay because of the unique taste of the oysters. Ban Don Bay is also a culture area for blood cockle, *Anadara granosa*, and an important fishing ground for small-scale fisheries for mud crab, *Scylla serrata*, short-necked clam, *Paphia undulata*, and white shrimp, *Penaeus merguiensis*.

CONSTRAINTS IN COASTAL ZONE MANAGEMENT

The coastal zone of Thailand is very rich in natural resources. About 70 % of the population of the country lives within a few kilometres from the coast. And almost one-third of its 73 provinces border the sea (OEPP 1992). The growth of GDP in Thailand was 10 % or higher from 1988 through 1990, making it one of the fastest growing economies in the world. Several sectors of the Upper South economy contributed to the growth, but tourism and aquaculture have shown particularly rapid expansion (OEPP 1992).

During periods of rapid growth, there are often conflicts between parties competing for natural resources. In Ban Don Bay's coastal zone, conflicts may develop between marine shrimp farmers and mangrove conservation, because the farmers want to clear mangrove for shrimp pond construction. Other conflicts occur all over the coastal provinces between coastal fisheries and aquaculture. The parties need to operate in the same coastal area. The conflicts are less obvious when the government encourages the people to do aquaculture (Tookwinas *et al.* 1991), which is an important aspect of integrated coastal zone management (ICZM).

One of the constraints in ICZM is to make the farmers understand the long term sustainability of their occupation. This is the first challenge for the coastal zone developers. Investment and expertise assistance in developing new activities are also needed.

FISHERIES AND AQUACULTURE IN BAN DON BAY

Fishermen in the Ban Don Bay area use small-scale fishing gear: shrimp gill net, crab trap and gill net, threadfin net and motor push net. OEPP (1992) revealed that the total catch per unit effort (CPUE) did not decline significantly over the years because fishermen increased catch efficiency by modernising the equipment. But, the value of CPUE declined, because the catch composition changed. In addition to fishing, coastal aquaculture is traditional practice in Ban Don Bay.

Oyster culture was first introduced in 1960 (Ratanavinijkul 1979), and during the subsequent period it expanded rapidly to meet increased national and international demand. For the year 1994, the Fisheries Economic Division (1996) calculated that coastal aquaculture in Ban Don Bay encompassed the following areas and yields: marine shrimp farms 8,038 ha, production 25,858 tonnes; estuarine fish farms 5.4 ha, production 32 tonnes; blood cockle farms 1,158 ha, production 4,509 tonnes; oyster farms 640 ha, production 10,295 tonnes.

COASTAL ZONE MANAGEMENT AT BAN KADAJI

The coastal village Ban Kadaji has a coastal zone of 6.1 km^2 (Nanyanart 1997). The total population is 1,916 persons (914 males and 1,002 females) in 334 families. The main occupation is coastal aquaculture of marine shrimp, blood cockle, and oyster. Traditional fishing with gill net, line, and trap constitutes a minor activity. The present situation is very different compared to previous years. In the decade 1960-70, the main occupation of the villagers was coastal fisheries, mainly with motor push net, and to a small extent crab traps, gill nets, and lines. The situation was similar to other coastal villages of Thailand.

The motor push net is a very efficient gear but it catches a high number of small (juvenile) economically important fish which cause degradation of the fisheries resources. It is therefore illegal to operate the gear within a distance of 3,000 m from the shoreline. However, it is difficult to enforce the law because motor push nets are mostly operated by small scale fishermen, obtaining the main source of income of the family by using this type of gear. The Royal Thai Government, through the Department of Fisheries (DOF), has tried to use both law enforcement and incentive motivation to stop illegal fishing with motor push net.

DOF introduced the concept of sustainable fisheries occupation which turned out to be an efficient method to stop illegal use of motor push net. The key to success was stimulation of coastal aquaculture (fish cages and mollusc culture). At Ban Kadaji, cockle culture was introduced in 1986. The coastal area was zoned for oyster and cockle culture by leasing to the farmers at the rate of 80 baht/rai per year (1 ha = 6.25 rai, 1 US$ = 25 baht in 1986).

The Farmer Association for Coastal Aquaculture was established for the first time in this village. The association leased an area for cockle culture, and villagers were employed by the association to carry out cockle culture and harvesting. The income from aquaculture was higher, more constant, and sustainable compared to the motor push net. After the year 1987, there was no more fishing with motor push nets. At present, mollusc culture and gill net are the main sources of income of the villagers. Cockle culture, oyster culture, shrimp culture, gill net and trap are done by 60, 120, 10, 10, and 12 families in Ban Kadaji respectively.

KEYS TO SUCCESS OF ICZM

The basic steps in the process of introducing ICZM at Ban Kadaji can be listed as follows:

1: The villagers were educated about sustainable occupation. Conservation of the coastal natural resource was discussed with the villagers.

2: DOF implemented an extension project for coastal aquaculture in order to replace motor push nets. The government also contributed some free material to the farmers such as cage net, mollusc seed, fish fingerlings, some portion of feed and technical advise.

3: DOF made budget available for construction of the village infrastructure, such as freshwater tanks, small fishing harbours and a village meeting hall.

4: The forming of a village association for coastal aquaculture has been encouraged. The association was registered.

5: The management and activities of the association has been decided by an elected committee. DOF only contributed with advise, basically on technical aspects.

Mollusc culture is the most suitable activity for small-scale fishermen. It can be used as a tool for coastal zone management, because (a); mollusc culture can be practised by traditional and semi-traditional methods; (b) the culture does not demand feeding which means low investment cost; (c) the seed for oyster can be available naturally; (d) high demand in local markets for oyster and cockle; (e) application of motor push net by fishermen can easily be discouraged when fishermen obtain a higher income from mollusc culture.

It is concluded that sustainable coastal aquaculture is needed for the development of coastal areas in Thailand. The concept and experience from Ban Kadaji can be applied to other coastal villages. More participation from villagers, non-government organisations (NGO) or private volunteer organisations (PVO) would be welcome. More understanding about sustainable occupation, natural resource conservation and forming of villager associations are important steps in the development of ICZM.

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