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# Local management of forested wetlands in tropical Asia

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Sustainable management of forested wetlands was the main concern of session 3. Taking the cases in Samut Songkram Province, Yasothon Province and Chanthaburi Province of Thailand, how it was possible to reverse forested wetland degradation and how sustainable management emerged at those study sites will be discussed. In tropical Asia, forested wetlands can be divided into (1) floodplain forests, (2) swamp forests and (3) mangrove forests.

Floodplain forests (freshwater periodic swamp forests) are found in areas with periodically wet conditions. Extensive floodplain forests are thought to have once existed in the alluvial plains of Asia, but little remains of them today as most have been cleared away to make room for paddy fields. The tropical Asian landscapes of paddy fields have been transformed from what were originally floodplain forests. Only in select places such as the Kaing land of Myanmar is it still possible today to observe the prototypical use of floodplain forests in agriculture. Comparison with the Kaing land case helps in understanding local resource use in the Lam Se Bai, a tributary of the Chi River in Yasothon Province.

Peat swamp forests and freshwater swamp forests are found on permanently wet inland elevations. The presence of highly productive forests in the humid environment led to the deposition of peat on the ground surface. On the coasts of east Sumatra, Malaya and Borneo, peat swamp forest is most fully developed over marine alluvium. Large areas of freshwater swamp forests are to be found in Laos and Cambodia, and also offer interesting points of comparison with the case of Yasothon Province.

Mangrove forests are found in coastal areas and have acted as an important source of firewood, charcoal and tanning materials. In 1962, Pendleton reported as follows;

‘Trees of the mangrove swamps have a variety of important uses. Tanning materials and red dyes are extracted from the bark of some mangroves. The wood is used as timber for marine purposes and for the manufacture of fishing structures in the Gulf, and a high-grade charcoal is made from it. Mangrove charcoal is especially prized for use in internally heated laundry irons, since the charcoal burns steadily and is not inclined to send off sparks as does other wood charcoal. It commands about twice the price of ordinary wood charcoal in the Bangkok market. Considerable quantities are exported.

Along the west side of the Peninsula, where mangrove fringes almost the entire coastline, the trees are cut and the bark is stripped during the off-agricultural season. Large brick charcoal kilns are worked here. These kilns are certainly of Chinese origin, and Chinese merchants control most of the trade. Mangrove firewood is used in tin mines and in the boilers of tin dredgers. The mangrove bark is taken in bundles by coastwise boats to Penang, Malaya; other craft ship charcoal in large open woven baskets to Penang and other coastal points.’ (Pendleton 1962:222-223)

Thus mangroves were an important source of firewood and charcoal for local people’s kitchens in the fuel-poor delta. The case of four villages in Yeesarn Sub-district, Samut Songkram Province provides a good example of the endogenous development of local mangrove forest management for charcoal-making. Aksornkoae et al. (1992) reported that the villages were established before 1932 and were declared legal in 1973 after the issuing of land ownership certificates. During 1943-1944, the Royal Forest Department surveyed this area to find that the plantations of *Rhizophera apiculata* had been established by local villagers. The government recognized this type of land use as agricultural land use and offered certificates of land ownership in 1955 and again in 1961 and 1973. At the present time, most of the land is privately owned.

An inventory estimated that the private mangrove (*Rhizophera apiculata*) plantation in Yeesarn Sub-district was about 2560 ha in 1987. It decreased to 1694 ha in 1990 due to conversion of mangrove plantation area into shrimp ponds. In 2006, there were 1315 ha of mangrove (*Rhizophera apiculata*) plantation and another 37 ha of natural mangrove forest. This total of 1352 ha of mangrove area constituted 22.2 % of the total area of Yeesarn Sub-district (Hassan 2006).

The case of Yeesarn Sub-district teaches us the dual function of privatization. Private ownership of mangrove forest ensured the sustainable production of charcoal from the *Rhizophera apiculata* plantation. At the same time, private ownership itself has no means of controlling strong economic incentives to convert mangrove areas to shrimp farming. Further studies will be done by Vipak Jintana and his research team.

Areas with mangrove forests have also acted as centers for salt production. In the old days, shrimp was a byproduct of salt pens. Since the late 1940s, when salt prices declined, local people began to engage in shrimp farming. In this early era, shrimp farms relied solely on natural larvae of *Peneaus merguiensis* and feed abundance. Stocking density of *Peneaus merguiensis* was less than 1/m2 at that time.

*Penaeus monodon* was originally harvested together with other shrimp species from traditional trapping-growing ponds. In Thailand, extensive and semi-intensive farms were commercially established in 1972 and 1974 respectively, after the first success in breeding *Penaeus monodon* at Phuket Fisheries Station in 1972. The stocking density of *Penaeus monodon* was 2-5/m2 in extensive and semi-intensive farms.

From the 1980s, an intensive shrimp farming system was introduced. It is believed that a viral disease outbreak caused the collapse of the shrimp exports from Taiwan to Japan in 1987-1988. This led Thailand, encouraged by extremely high prices in the Japanese market due to supply

shortages, to replace Taiwan as the world's leading producer of farm-raised *P. monodon* in 1988. High profitability of this activity fuelled a rapid spread of shrimp farming into mangrove forests along the Gulf of Thailand. In the 1990s, shrimp farming areas began to decline in number due to outbreaks of shrimp disease (FAO. 2006-2010).

*Penaeus vannamei* was introduced into Asia in the 1990s (Briggs et al. 2004). In the 2000s, commercial production of *Penaeus vannamei* overtook the production of P. *monodon* in China, Taiwan and Thailand due to a number of favorable factors. Thailand freely permits the commercial culture of *Penaeus vannamei*, but has official restrictions due to fears over importation of exotic diseases, and thus only SPF (Specific Pathogen Free) broodstock may be imported.

In the reviews of global production of farmed fish, Naylor et al. (2004) defined the stages of aquaculture as follows.

'Two key criteria, ownership of stock and deliberate intervention in the production cycle (husbandry), distinguish aquaculture from capture fisheries. Fish farming typically involves the enclosure of fish in a secure system under conditions in which they can thrive. Interventions in fish life cycles range from exclusion of predators and control of competitors (extensive aquaculture) to enhancement of food supply (semi-intensive) to the provision of all nutritional requirements (intensive). Intensification implies increasing the density of individuals, which requires greater use and management of inputs, greater generation of waste products and increased potential for the spread of pathogens.'

In Thailand nowadays, shrimp farming systems have diverged into two groups: 'natural systems' (i.e. extensive aquaculture) and 'developed systems' (i.e. intensive).

Aside from these types of shrimp farming, the Welu Wetland of Chantaburi has also attracted visitors through ecotourism based around its mangrove fireflies, a successful case of local mangrove management. Taking the case of Wele Wetland, Sommai Suppakun shows the importance of community participation for mangrove forest management in Mangrove Forest Resource Development Station No.2 (The Sorn, Chantaburi Province) of DMCR (Department of Marine and Coastal Resources). In contrast to the case of Yeesarn Sub-district (Samut Songkram Province), the whole area of Wele Wetland is national reserved forest, and the people living there have no land title at all.

The situation in Wele Wetland is common among the mangrove forests in Thailand. Sudtongkon and Webb (2008) noted the state management of mangrove forest and its failure as follows.

'In Thailand, mangrove forests are claimed and managed by the state (Aksornkoae 2004). The central government centralized and monopolized the control and management of natural resources together with the process of territorialization. Subsequently, mangroves were put under strict control by the state agencies, and settlement or forest utilization by local people in mangrove conservation zones is prohibited (Aksornkoae 2004). Early assessments of coastal management policy for Thailand failed to recognize the potential of communities in the process. State mangrove forest management can occur without the participation of local people, which not surprisingly has declined since the government claimed control and management of natural resources.'

If mangrove forests are owned and managed by the state, communities have limited or no rights of access. However, even under the 'exclusive' state management, coastal communities do access and manage mangrove forests. In their case study of mangrove forests under two management systems, i.e. state management and community management, Sudtongkon and Webb (2008) illustrate successful mangrove conservation and management in coastal villages in Trang Province, southern Thailand. They pointed out that 'the basis for the success in forest management was that the resource was necessary to local livelihoods and was becoming scarce; the communities enjoyed autonomous decision making and had a high degree of social capital; the forest and user groups were well defined and monitored; effective leadership was present in the villages to apply sanctions and resolve conflicts; and there was substantial assistance from an external non-governmental organization, which served as a bridge between the villages and the government' (Sudtongkon and Webb 2008).

Although the cases of Trang Province and Wele Wetland share many common features, we can find some differences. For example, 'resource scarcity' was not the driving force for the recent recovery of the mangrove forest and its conservation in Wele Wetland. After the collapse of the shrimp farming, caused by a viral disease outbreak in the 1990s, many villagers gave up shrimp farming, reduced their farm size and returned to extensive aquaculture. Those changes made room for reforestation in areas that had been disturbed by shrimp farming.

In the past several decades, mangrove forest areas have been rapidly destroyed and/or degraded in Thailand. Among the many reasons for this, land use conversion for aquaculture, agriculture and mining have been the main factors in recent years. In our research project, anthropogenic disturbances and local management of mangrove forests will be studied holistically and compared with other cases (e.g. Walters 2000, 2003, 2004, and 2005). Local uses of plant resources, including medicinal plants in mangrove and beach forests, will also be studied.

At study sites, field interviews and remote sensing methods will be used to analyze the past and present status of land cover and land use, analyze the natural environment, and investigate changes in these elements. We will begin our field research work on mapping land cover and land use changes using available aerial photographs, satellite images and geographical information system (GIS) data, combined with field observation and interviews documenting experiences from the local management of forested wetlands.

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