



*“Reversing Environmental Degradation Trends
in the South China Sea and Gulf of Thailand”*

MANGROVE DEMONSTRATION SITES IN THE SOUTH CHINA SEA



**UNEP/GEF
Regional Working Group on Mangroves**





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Cover Photo: Mangrove logs cut for charcoal production, Batu Ampar – Ms. Unchalee Pernetta.

Photo credits:

Page 1 Mangrove Seedling Nursery in Fanchenggang, China – Dr. Hangqing Fan
Page 2 Interior of the Mangrove Visitor Centre, China – Dr. Hangqing Fan
Meeting Organised by Xindi Company to Develop the Plan for the Urban Mangrove Park, China – Dr. Hangqing Fan
Page 3 Horseshoe Bat Roosting in *Rhizophora*, Indonesia – Mr. Nyoto Santoso
Secondary Mangrove in the Production Forest Area, Indonesia – Mr. Nyoto Santoso
Page 4 Charcoal Kilns in Batu Ampar Operated by the Kooperasi Panter, Indonesia – Dr. John Pernetta
Page 5 Small-scale Fisherman in the Peam Krasop Wildlife Sanctuary, Cambodia – Dr. John Pernetta
Page 6 Fish Fence Trap in the Estuarine Reaches of the Peam Krasop Wildlife Sanctuary, Indonesia – Dr. John Pernetta
Page 7 Fish Cage Culture in Mangroves in Trat Province, Thailand – Dr. Sonjai Havanond
Page 8 Visitors Taking a Boat Tour through Mangroves in Trat Province, Thailand – Dr. Sonjai Havanond

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Fangchenggang Mangrove Demonstration Site

The Fangchenggang mangrove demonstration site is located between 108°4'12" and 108°25'48" East, and 23°26'24" and 21°42'36" North, in Guangxi Province, People's Republic of China (Figure 1).



Figure 1 Mangrove Distribution in the Fangchenggang Demonstration Site, Guangxi Province, China.

The total area of mangrove in Fangchenggang is 1,414.5 hectares within which are found 10 true mangrove and 5 associate mangrove species. The dominant tree species are: *Bruguiera gymnorrhiza*, *Kandelia candel*, *Aegiceras corniculatum*, and *Avicennia marina*. Nine different formations and 17 communities of mangrove are found in the area, which also supports 37 species of polychaete; 104 species of mollusc; and 13 species of other marine creatures. The average density of the macrobenthos is 346 individuals m^{-2} , and the mean biomass is 225.68 gm^{-2} . One hundred and forty five species of benthic algae, 94 species of phytoplankton, 68 species of zooplankton, and 71 species of fish have also been recorded. In addition, 187 species of birds including numerous migrants are known to utilise the area, suggesting that this site is an important habitat for birds. Non-mangrove vascular plants found in the coastal area total 634 species whilst the seagrass *Zostera japonica*, occupies an area of 3 km^2 in the vicinity of the mangroves.

The Fangchenggang mangrove site encompasses 19 villages that are under the jurisdiction of the four towns of Dongxing, Jiangping, Jiangan, and Gangkou. All villages can be categorised as mangrove dominated coastal villages and the total population is around 41,290. The labour force numbers 22,713 and the area of tillable land in all 19 villages is 2,947.8ha, of which 66.69% is farmed for rice, 13.44% for sweet potato, 11.17% for peanut, 6.97% for corn, and 1.24% for cassava.

The specific objectives of the project are to:

- Develop, test and adopt an appropriate cross-sectorial management framework with participation of all stakeholders and decision-making systems based on appropriate databases;
- Develop and implement a business plan that includes a complete stakeholder analysis, identification of potential revenue streams, and full economic valuation of all mangrove goods and services;

- Develop as appropriate, and harmonise existing legislation regarding the protection and use of mangrove areas and ensure that adequate capacity exists at all levels to enforce existing regulations;
- Develop the Fangchenggang mangrove system as a centre for enhancing the capacity of all stakeholders to sustainably use mangrove habitats and resources through public awareness campaigns, training, programmes of visits and exchange of personnel with other centres of mangrove expertise in the countries bordering the South China Sea;
- Restore biodiversity in the area by reforesting 60ha with the mangrove species *Heritiera littoralis* in Fangchenggang, to demonstrate the technical and practical implementation of biodiversity conservation.

Key achievements to date:

One of the key achievements has been the establishment of a cross-sectorial management framework for executing and supervising the implementation of activities for the Fangchenggang demonstration site. Firstly, the Management Board (MB), whose members are from a wide cross section of government institutions, was established in June 2004, and this committee monitors and guides the implementation of the activities through its' regular meetings.

Data on the biological resources and economic values of mangroves have been collected as background to the development of the management plan for the mangroves. The economic values and potential revenue streams from mangrove related resources have been analysed and reviewed in several published reports. In July 2006, these data were integrated into a GIS database in support of the development of the management plan for the mangroves of Fangchenggang.



Figure 2 Mangrove Seedling Nursery in Fangchenggang.

Development of the Mangrove Management Plan for conservation and sustainable use of mangrove resources and ecosystems in Fangchenggang commenced in December 2006. Maps produced

from the GIS database have been used for identifying different use zones. The management plan contains sections on planning for: general management; stakeholder participation; the mangrove park; the bird habitats; the protection of wild populations of *Heritiera littoralis*; and planning for environmental restoration and management of urban mangroves in Fangchenggang City. The active involvement of Xindi Company in the planning and development of the Urban Mangrove Park serves as a model of successful private sector involvement in habitat conservation.

In terms of capacity building and public awareness the Fangchenggang demonstration site has undertaken a number of activities. The most important output is the development of the visitor centre, which was constructed through co-financing support from the government and is used for research, education and awareness raising. Education and training programmes for students, residents, and government officers have been conducted at this centre. In addition a number of post-graduate students have undertaken research work at the demonstration site and one student has completed a Master's thesis on the ecology and propagation of *Heritiera littoralis*.



Figure 3 Interior of the Mangrove Visitor Centre.

The Fangchenggang demonstration site has produced various public awareness materials including: 2,000 copies of a document on environmental restoration and management in Fangchenggang City; 3 posters; 12 notice boards; 1 DVD; and 1 CD-ROM; which have been distributed to pertinent local authorities and communities. Seven (7) issues of a newsletter on the activities of the Fangchenggang demonstration site have been published and distributed. More than one thousand people have been involved in mangrove planting at the site or in training courses operated as part of the programme of activities.

Using modern content management software the Fangchenggang demonstration site officially launched its local mangrove website (www.mangrove.org.cn) for the first time in September 2004. This aims to raise awareness amongst local people and the global community of coastal and marine scientists and managers with regard to mangrove management activities at

Fangchenggang. In 2006 a photograph from the Fangchenggang mangrove demonstration site was used on a national postage stamp in a series of threatened and endangered species and habitats.

In order to restore degraded mangrove areas and to enhance biodiversity, replanting has been undertaken at the Fangchenggang demonstration site. About 20 hectares of degraded mangrove have been replanted with seedlings of *Rhizophora* sp. and *Bruguiera* sp. Two mangrove nurseries have been built and 10,000 seedlings of *Heritiera littoralis*, which is an endangered mangrove species in this area, have been raised. In addition a third nursery has been constructed in the Beilun Estuary portion of the site in order to propagate other native coastal plants.

With respect to the development and introduction of alternative livelihoods an eco-farming activity is being trialled in the urban mangrove area. A plan for a national urban mangrove park has been developed, which if established would be the first Urban Mangrove Park globally.



Figure 4 Meeting Organised by Xindi Company to Develop the Plan for the Urban Mangrove Park.

Politically and financially, the Fangchenggang demonstration site has received very strong support from various institutions and departments of the national, provincial and local governments. Considerable cash co-financing (US\$381,966) has been contributed from various sectors including the Fangchenggang Land and Resource Department, Guangxi Land and Resource Department (Guangxi Oceanic Bureau), State Environmental Protection Administration (SEPA), National Financial Ministry, Donation from STORA ENSO Co., and the National and Guangxi 908 Ocean Special Project.

The active participation and strong support from all relevant national and local government institutions in implementing activities at the Fangchenggang demonstration site is considered to be a desirable model for replication elsewhere in the region. Management of this site is characterised by a high-degree of co-operation among internal institutions and with regional partners and the wider international community.

Batu Ampar Mangrove Demonstration Site

The Batu Ampar mangrove demonstration site is located just South of the equator at 0°50'24" and 0°52'12" and from 109°65" to 109°68" East in the Batu Ampar, Kubu and Teluk Pakedai districts of West Kalimantan Province in Indonesia. The total area of mangrove forest is 65,585 hectares of which around half (33,401ha) is classed as protected forest and the remainder (32,183ha) is classed as production forest from which timber is harvested sustainably (Figure 5).

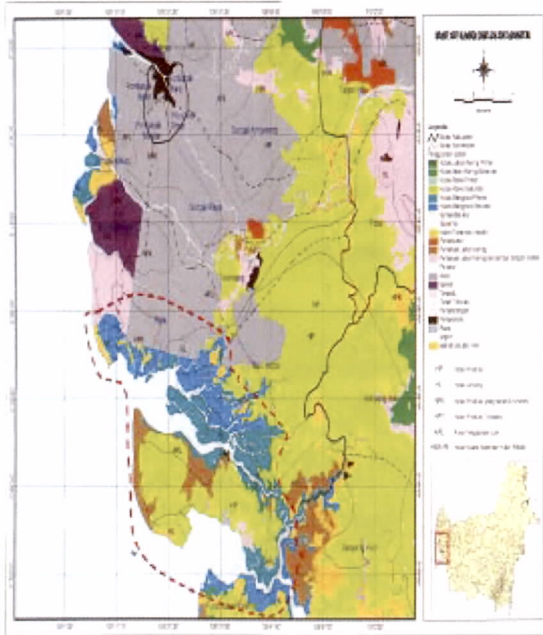


Figure 5 Map of Batu Ampar Mangrove Demonstration Site. Blue is Conservation and Green Production Forest Areas of Mangrove.

There are 20 true mangrove species and 30 associate species within the Batu Ampar site, of which *Rhizophora* spp., *Bruguiera* spp. and *Nypa fruticans* are the most dominant. *Rhizophora apiculata* maintains the highest density compared with other species at both the seedling, pole and tree level. Timber volumes range from around 170 to 180 cubic metres, per hectare in the production forest and between 340 and 350 cubic metres per hectare in the protection forest.



Figure 6 Horseshoe Bat Roosting in *Rhizophora*.

Fauna identified in the Batu Ampar mangroves includes 11 species of mammals two of which are considered vulnerable (*Nasalis larvatus* and *Helarctos malayanus*). There are six species of reptiles and 46 bird species known from the area. The birds include 35 resident, 11 migrant species and one, *Ptilocichla leucogrammica*, which is endemic to Kalimantan. One hundred and eight fish are recorded from the coastal waters of which 51 are resident and 57 seasonal migrants. Other fauna include 11 crustacean species, 15 bivalves, 17 species of gastropods, 18 phytoplankton species with average density of 316,547 individuals m^{-3} and 3 zooplankton species with a density of 68,000 individuals m^{-3} .

The total population of Batu Ampar, Kubu and Teluk Pakedai Districts was 35,068, 32,955, and 20,474 giving population densities of 18 people km^{-2} , 27 people km^{-2} , and 70 people km^{-2} , respectively in 2001. The community is composed of farmers and fishermen and they are dependent on mangrove forest. Communities in Kubu and Teluk Pakedai districts are also charcoal producers, operating 135 kilns and producing 422.7 metric tonnes of charcoal annually.

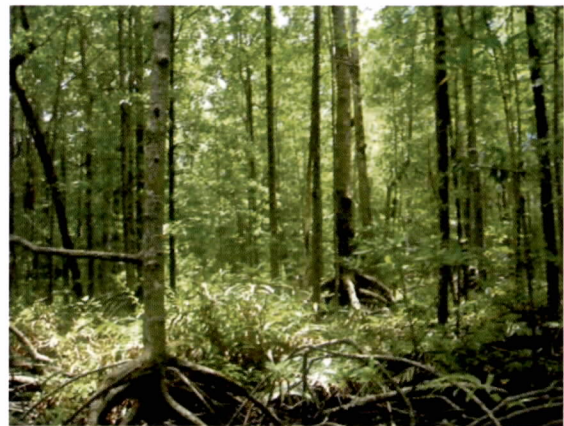


Figure 7 Secondary Mangrove in the Production Forest Area.

Objectives of the Batu Ampar Demonstration Site are to:

- Establish an institutional framework for sustainable mangrove management in Batu Ampar;
- Develop baseline environmental and socio-economic databases and a decision support system;
- Develop a business plan in support of the implementation of the overall management plan;
- Conduct training, education and public awareness activities; and
- To facilitate the development and approval of local regulations regarding mangrove management.

Key achievements to date:

Activities of the Batu Ampar mangrove demonstration site, commenced in September 2006 with the appointment of operational project personnel including a site manager, assistant and administrative support staff. At the same time a multi-sectorial Management Board was established to guide and supervise the implantation of activities. The Management Board has 20 members and has met four times to discuss the main activities including training needs, compilation and analysis of relevant biological and economic data and information, policy and legislation, to resolve conflicts, and to work on the development of the management plan for the area.

Inventories of baseline data and information on biodiversity, including biomass estimations, and socio-economic parameter, including economic value, have been conducted, and the results input to a GIS database system using a satellite derived base map. These data and information together with information on policy and legislation have been analysed in order to identify potential conflicts and solutions, which will be incorporated into the management plan at site level. Reports on mangrove flora and fauna, habitat distribution, land-use patterns, and economic values at Batu Ampar have been produced for use in consultations with relevant stakeholders.

The key achievement to date has been the development of the management plan for Batu Ampar. The draft management plan and assessment reports have been put together and presented to a series of consultative discussion meetings with key stakeholders in the various sub-districts and villages. Participants have included both civil society and private sector stakeholders whose comments and suggestions have been taken into consideration in revising and finalising the draft.

Another major activity has been the development and implementation of the business plan for sustainable livelihood and business opportunities. Alternative livelihoods and business opportunities based on the use of non-timber mangrove products have been identified and analysed. Business opportunities that have been introduced and encouraged include the introduction of coconut shell charcoal production and the production of soft-shelled crab. Training and study visits have been provided to individuals from local communities who were interested in these activities. A training course on the improvement of charcoal quality has been conducted for small-scale charcoal producers.

Numerous training, education and public awareness activities have been implemented including: improvement of charcoal quality; management of mangrove ecosystems; and silvofishery techniques. These have been delivered to students, government institutions and for local communities as appropriate.



Figure 8 Charcoal Kilns in Batu Ampar Operated by the Kooperasi Panter.

Public awareness materials including posters and brochures have been designed and published under the framework of the demonstration site. These have been distributed to local fisher folk, communities and local government authorities. The Batu Ampar demonstration site has established a "sustainable mangrove utilisation information centre", which is located in the Faculty of Forestry of Tanjungpura University in Pontianak.

In order to facilitate the development and approval of local regulations regarding mangrove management, a review and evaluation of the existing rules and regulations pertaining to community-based resource management has taken place. This review has examined and analysed constraints to successful management at the community level. Identified constraints include a need for training, the need for quantitative assessment of current uses and ownership, and the low capacity of the local community to enforce regulations. The outcome of this review and analysis will be used in the development of local regulations for mangrove management.

In terms of co-financing the Department of Forestry has provided US\$100,000 between 2003 and 2006 in support of a trial programme of mangrove forest management by local people. The Department of Marine and Fisheries has provided US\$90,000 for the biennium 2005-2006 and the Provincial Government has provided US\$10,000 in 2007 to support of project activities.

It is concluded that the lessons learned, which can be drawn from the execution of Batu Ampar Demonstration Site activities include the assessment techniques used to evaluate the current uses and economic values of mangrove resources in the area and their application to the development of a business plan for alternative livelihood initiatives.

Peam Krasop Wildlife Sanctuary Mangrove Demonstration Site

Peam Krasop Wildlife Sanctuary (Figure 9) is located in Koh Kong Province, Cambodia (11°25'-35' North and from 102°57' to 103°09' East). Koh Kong Province shares a marine and terrestrial border with Thailand's, Trat Province, and activities are co-ordinated between the two demonstration sites. The total area is around 25,897 hectares of which: 10,511ha (41%) consists of mangrove forest; 5,385ha (21%) is evergreen disturbed forest; 800 ha (3%) is grassland; and the open water surfaces total 6,913ha (27%). The remaining area includes abandoned shrimp farms and agricultural land, bamboo thickets and secondary regrowth, 2,288ha (8%).

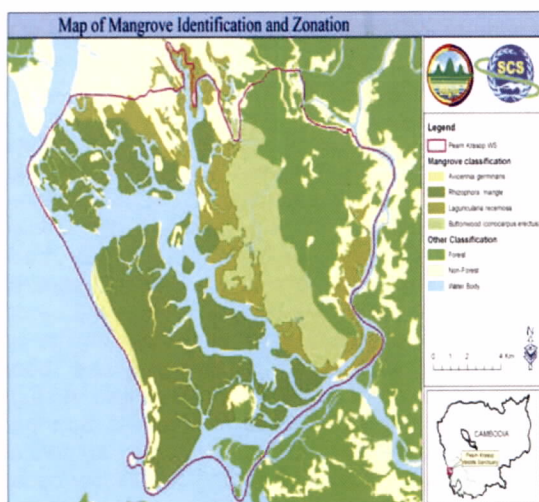


Figure 9 Map of the Peam Krasop Wildlife Sanctuary Demonstration Site.

There are 43 mangrove species (both true and associate species) in this sanctuary. Thirty four species of water birds, including 21 species of waders (Charadriidae and Scolopacidae) and six species of Terns and Gulls (Laridae), have been recorded at the site. Of the 3,787 water birds counted on the western shore of Peam Krasop, two species occur in internationally significant numbers.

The population of Peam Krasop is around 9,000 people of whom 90 percent are migrants from other provinces. In total, there are 10 villages in 6 communes located within or adjacent to the demonstration site. The occupations of the population include fishing, charcoal production and mangrove logging. Farming and livestock production are widespread but generally conducted on a small-scale.

The whole area of the sanctuary is currently under the jurisdiction of the Department of Nature Conservation and Protection, of the Ministry of Environment. The Cambodia Coastal Zone Committee, an inter-ministerial body, acts as the decision-making body for all coastal zone management in the country including policy and economic development.



Figure 10 Small-scale Fisherman in the Peam Krasop Wildlife Sanctuary.

Peam Krasop Wildlife Sanctuary is the only nationally protected area in Cambodia that contains primary mangrove forest. Importantly, this Wildlife Sanctuary includes the Koh Kapik Ramsar Site, which has been designated as an internationally important wetland for migratory waterfowl.

At the present time, there is little information and few facilities to support tourism, but the area is easily accessible by boat and given the rich avifauna it could possibly be developed as a potential eco-tourism destination. Overnight stays are possible, as are day trips as the sanctuary is very near Koh Kong Town.

The most critical threats to the site are: habitat loss and reduction of aquatic resources, resulting from direct use of mangrove for charcoal; over exploitation of marine resources; land clearance and land encroachment; and in some areas soil erosion and sedimentation.

The impacts from these threats are likely to increase as a consequence of population growth resulting from both in-migration from other parts of the country, and locally high population growth rates. The majority of people living in the area are dependent on marine resources for direct use. Poverty is seen by the Provincial Government as a key issue that is an underlying cause of environmental degradation in the area.

Objectives of the Peam Krasop Wildlife Sanctuary Demonstration Site:

The overall goal is to promote wise and sustainable use of natural resources in the Peam Krasop Wildlife Sanctuary. Specific objectives are to:

- Develop in full consultation with all stakeholders, government, private sector and civil society, a management plan (including strategy, regulation and monitoring guideline) for the sustainable use of the natural resources in PKWS;

- Restore degraded mangrove and wetland areas;
- Support local communities in improving their livelihoods through mechanisms including partnership with private sector and NGOs;
- Promote understanding of wetlands and mangroves among local communities and authorities; and
- To improve the knowledge and skills of government officials, local authorities and communities with respect to wetland and mangrove management.

Key achievements to date:

Two cross-sectorial committees, with a combined membership of 25 people, have been established to supervise and guide the implementation of activities at the site, both within the framework and time frame of the South China Sea Project and beyond. The Management Board, whose members are from national and provincial related institutions, are responsible for supervising the project implementation at the political level. This Management Board is chaired by the Governor of Koh Kong Province. The Management Advisory Group members are mostly from provincial technical institutions, and are responsible for dealing with scientific and technical issues relating to the management of the Peam Krasop Demonstration Site. These two bodies convene regular meetings in order to monitor and guide activities including the development of the management plan for the sustainable use of mangrove and wetland resources in the Province.

Two joint meetings between the management teams for Peam Krasop and for the neighbouring Trat demonstration site in Thailand have been convened to discuss joint policy and activities relating to the management and conservation of mangrove resources. Major achievements include the development of a co-operative framework for joint management; joint guidelines for resource assessment and monitoring; and the required base line for establishing a joint GIS database.



Figure 11 Fish Fence Trap in the Estuarine Reaches of the Peam Krasop Wildlife Sanctuary.

Since Cambodia has limited data and information regarding mangrove related resources, field surveys of these resources have been conducted to collect biological data and information regarding species

distribution, density, composition, areas, and key associated benthic species. Socio-economic data and information regarding the use of mangrove resources, including income and harvesting costs for the local population and the economic values of the mangrove resources. At the same time, secondary data and information concerning mangrove related policy and legislation has been reviewed and analysed. All field and secondary data and information have been synergised as a basis for the development of a management plan for the area.

Capacity building for stakeholders commenced with training activities on project management and administration for project staff including the site manger and some technical members the Management Board and Management Advisory Group. In order to improve communication with the regional network, English and report writing were also elements included in this training.

Three training courses on community-based natural resource management have been conducted for target groups of 25 participants in each of three different communities surrounding the wildlife sanctuary. Similarly, 5 workshops have been conducted for mangrove and wetland resource management and conservation for the local authorities and community leaders. A seminar on mangrove and wetland biodiversity has been convened for provincial and district officials. A study tour to the Trat demonstration site was arranged for members of the local community and authorities in Peam Krasop to see first hand community-based mangrove management.

Public awareness initiatives are considered an indispensable element in strengthening the local communities understanding of mangrove and wetland resource management and conservation. Five hundred copies of posters and 5,000 copies of leaflets illustrating: mangrove and wetland biodiversity; ecosystem functioning; and the concept of management and sustainable use of these resources have been designed, published and distributed to local authorities and communities.

In order to restore degraded areas of mangroves, an experimental multi-species mangrove plot on an area of two hectares was replanted in order to test the efficiency of multi-species mangrove replanting. The results from this experiment will be used to modify methods of mangrove replanting, for use in other degraded mangrove areas along the coastline of Cambodia.

Even though the activities at the Peam Krasop demonstration site have resulted in numerous outputs, some planned activities have been delayed including the development of the GIS database and maps; replanting of a wider area of mangrove; and the finalisation of the management plan for the demonstration site, all of which will be completed by the middle of 2008.

Trat Mangrove Demonstration Site

Trat mangrove demonstration site is located in Trat Province, Thailand between 12°11' and 12°55' North and 102°31' and 102°39' East. There are 9,245 hectares of mangrove area in the entire Trat Province (Figure 12). Much of the mangrove is young regeneration and plantation forest, in contrast with Peam Krasop in neighbouring Koh Kong Province of Cambodia, where considerably more mature mangrove forest is found.



Figure 12 Map of Trat Mangrove Demonstration Site, Showing Different Classes of Land-use.

There are 5 major zones in the mangrove forest: a seaward *Avicennia-Sonneratia* zone, followed by *Rhizophora*, *Bruguiera*, and *Ceriops* zones, and a landward association comprised of *Lumnitzera*, *Excoecaria*, and *Xylocarpus*. The forest supports 20 genera and 33 true mangrove species and 36 associate mangrove species. Dominant mangrove trees include the large-leaved mangrove (*Rhizophora mucronata*), small-leaved mangroves (*R. apiculata*), *Ceriops decandra*, *C. tagal*, *Bruguiera sexangula*, *B. parviflora*, *Xylocarpus spp.* and *Lumnitzera spp.* Thirty two species of crustacean together with 55 species of fish are also recorded in close association with the mangroves.

One hundred and twenty two species of birds have been recorded in the general area, of which 95 are resident species; 25 are non-breeding migratory species; and two are breeding migratory species. The only critically endangered species, which are observed here are the brown moody (*Anomus stolidus*) and the great crested tern (*Sterna bergii*). At least 12 amphibian species and 30 species of reptiles, of which 19 are snakes have been found in this area.

Seven villages are located in the Tatapao/Namcheio conservation forest area while a total of 21 coastal villages in the Province depend upon mangrove resources for at least part of their livelihood and income. The mangrove forest in Trat has been used for many years as a source of charcoal and tannin, extracted under government concessions, which were terminated in 2001. At present local villagers earn their living through coastal fishing, while the collection and sale of mud crabs and grapsid crabs also makes an important contribution to the income of local people. At the

nearby Koh Chang National Park, collection of edible swallow nests is an extremely lucrative activity. Fire-flies are found in the mangrove forest and could serve as an ecotourism attraction in the future.



Figure 13 Fish Cage Culture in Mangroves in Trat Province.

The Government maintains a number of mangrove stations in the Province. Mangrove Development Station No. 4 has 9 government staff to operate activities for protection, and maintenance of 10,000ha of mangroves, including 2,000ha under the demonstration site. The station co-operates with scientific institutions in collecting data on biodiversity and environmental monitoring. The budget of the station is around 10 million baht per year. Mangrove Research Station No. 1 provides seedlings for replanting. This 14 year old station originated from the Seed Production Centre. Ten staff working at this station provide some 600,000-800,000 seedlings per year. Seedlings of ten mangrove species can be produced and supplied by the station. A 500 metre long walkway around the office provides visitors with access to the mangrove.

The main aims of the Trat Demonstration Site are to:

- Develop and implement a mangrove replanting programme in Trat Province centred on the demonstration site and Tatapao/Namcheio conservation forest, including re-planting around 300 hectares of mangrove annually, using a mix of species to increase the biodiversity of the forest estate.
- Strengthen and expand as appropriate, the community-based management system for the Trat Province Mangroves through:
 - Establishment of a management framework and networks of community-based stakeholder groups;
 - Preparation of a comprehensive management plan for the habitats and resources of the site including maps of forest areas and designated land uses including conservation areas;
 - Appropriate forest management actions including provision of data and information regarding zonation and socio-economic importance for decision-making; and

- Establishing and implementing an active programme of mangrove reforestation.
- Develop a business plan for sustainable financing of the management of the Trat Province mangroves including:
 - Diversification of income sources and improving financial security of local people with low incomes, including identification of new revenue streams and new opportunities;
 - Specific actions to investigate the feasibility of ecotourism locally, to generate income and promote the role of the demonstration centre; and
 - Increased capacity of local conservation groups and NGOs to devise and manage projects, network internationally, and pass on the experience they have accumulated to other conservation groups regionally.
- Enhance awareness and understanding of mangroves at all levels of government and civil society.

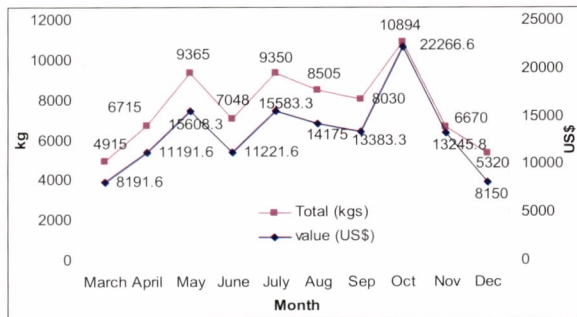


Figure 14 Production (kg) and Value (US\$) of Sesarmid Crab at Trat Mangrove Demonstration Site Recorded from Local Middle-men in 2006.

Key Achievements to date:

Trat Demonstration Site activities began in June 2005, and have resulted in the achievement of a number of outputs and outcomes. As in the case of the other demonstration sites, two oversight committees were established at the beginning of the project namely: a "Senior Advisory Board" and a "Management Board". Members of these bodies are drawn from various government bodies and NGOs and they have responsibility for monitoring and directing the implementation of the demonstration site activities.

A rapid assessment has been conducted in order to collect data on mangrove biological resources and socio-economic parameters. A biological survey was conducted in Pred Nai mangrove forest along 16 permanent transects, and the data collected include numbers of species, mean density, percentage of dominant species, and basal areas. A survey of the economic value has also been conducted using interviews with key informants to ascertain levels of income, uses of mangroves, volumes of production, and value. These data collected from rapid baseline surveys have been entered into a GIS database for the purpose of development of a comprehensive management plan for the site.

Regarding mangrove re-planting and restoration, a consultation meeting with local communities was convened in July 2007 at Hung Num Chow Community with 20 participants, in order to discuss and share opinions about the scheme and plan for mangrove restoration. Community leaders and others from the Peam Krasop Wildlife Sanctuary participated in a large scale mangrove re-planting in Trat in the first half of 2007.

Within the context of the training, education and public awareness programmes, the Trat demonstration site has introduced the so-called "Youth Camp Activity". This youth camp activity involved 140 school children from 15 schools in Trat Province actively participating in conservation and management actions including mangrove planting, field studies of ecology and preparation of art and essay work on mangroves. To date, three issues of a newsletter have been published and distributed in order to raise the awareness and to inform the public about the activities of the demonstration site.

The project has supported the Pred Nai Village Learning Centre and recently, 60 householders have started to provide home-stay for around 2,000 – 3,000 visitors per year. Visitors are mainly Thai students and provision of mangrove tour services adds to villagers' incomes. It is planned to evaluate these eco-tourism practices with a view to their promotion elsewhere.



Figure 15 Visitors Taking a Boat Tour through Mangroves in Trat Province.

The organisation of the educational tours with initial involvement of school children as a means of raising awareness could be considered as a successful lesson learned from this demonstration site. Strong financial and political support from national and local government institutions (10 million Baht per year provided to Mangrove Development Station No. 4), and the strong support from the Royal Family in protecting and re-planting mangrove in Trat province, is considered an important influence in successful community-based mangrove management at this site.

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