



Implementation of the Ramsar Convention,
Management and Protection of Wetland Areas



The First Step and Steps to Follow

Conservation and Protection of Wetland Areas



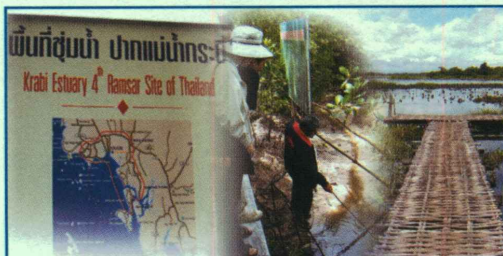
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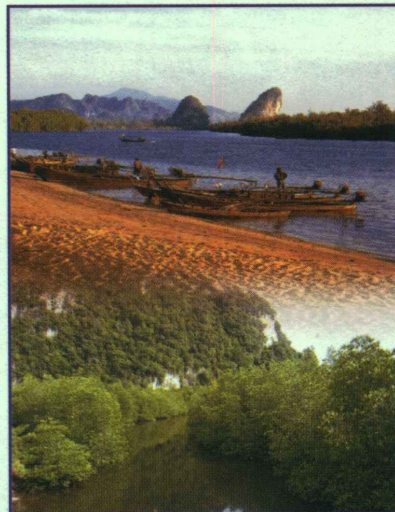


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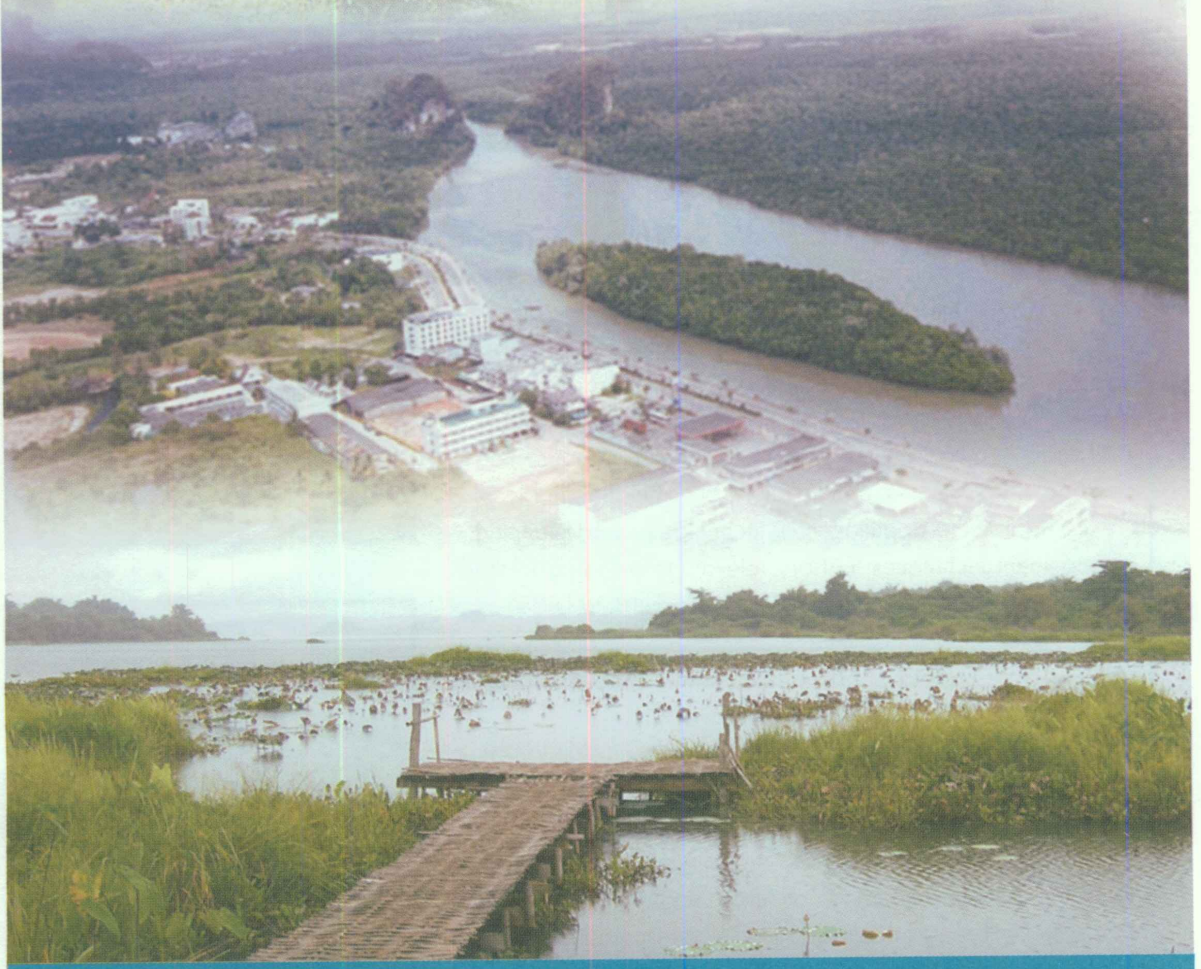
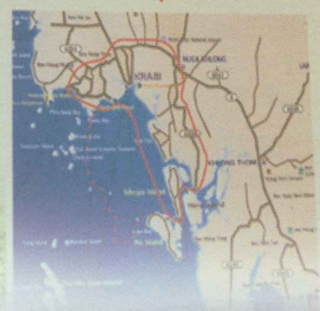
พื้นที่ชุ่มน้ำบริเวณลุ่มน้ำคลองบงคาย มีพื้นที่ 4,558 ไร่ 4 งาน 85.58 ตารางวา หรือประมาณ 7.31 ตารางกิโลเมตร ตั้งอยู่ในพื้นที่ตำบลบงคาย อำเภอเมือง จังหวัดกระบี่

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Krabi Estuary 4th Ramsar Site of Thailand



Background and Overview of Implementation Outputs

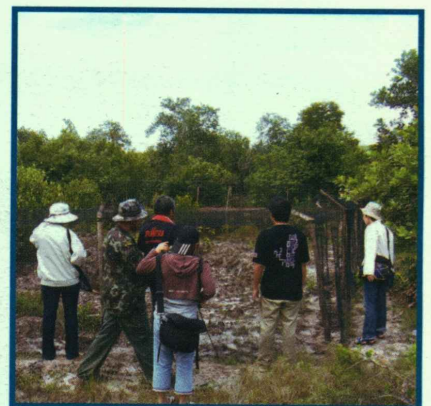
Background

In Thailand, implementation of the Ramsar Convention on the Management and Protection of Wetland Areas Project is being carried out as a five-year cooperation project between the Governments of Thailand and Denmark. Serving as project coordinators are Thailand's Office of Natural Resources and Environment Policy and Planning, which is the national focal point for the Convention, and the Danish Agency for Development Assistance (DANIDA).

As its main goal, the project is aimed at promoting and reinforcing the observance of wise and sustainable wetland management and utilization. Two pilot project areas have been selected, namely, Nong Bong Kai wetland in Chiang Rai Province and Krabi estuary in Krabi Province.

The project's core activities are as follows:

- * to campaign in order to promote awareness, knowledge, understanding and wise use of wetland areas to the public at all levels, covering both the government and private sectors,
- * to unite efforts among various agencies and within individual agencies to support management guidelines in the sustainable use of wetlands,
- * to strengthen the competence of officials from concerned agencies at all levels, that is, headquarters, and regional and local levels, with regards the application of technologies and planning and management techniques that are relevant to wetlands in the pilot areas,
- * to survey ecological features of wetlands and to analyze the economic value of wetlands so as to demonstrate their importance and show the impact of their loss in economic terms,
- * to draw up a management plan to boost participation by the local people and to take action in accordance with the plan,
- * to support the implementation of all activities initiated in pilot areas, covering demonstration of land use, sustainable agriculture, wise utilization of wetlands, as well as fundraising activities to uplift livelihood opportunities and the people's quality of life and to reduce threats to wetland resources.



Overview of Implementation Outputs



Implementation of the Management and Protection of Wetland Areas Project in the two pilot areas, Nong Bong Kai wetland in Chiang Rai Province and Krabi Estuary in Krabi Province, has received excellent support from concerned agencies at different levels, that is, headquarters and regional and local administration. As a result, the project has been carried out and coordinated effectively, contributing to the achievement of the project's goal, that is, to promote and support wise and sustainable management and use of wetlands.

Implementation of the Management and Protection of Wetland Areas Project was completed in 2005, with the cooperation and support of all concerned agencies at different levels, as mentioned above, as well as local communities on which the project has had direct positive and negative impacts. At the outset, implementation of the project started with building up knowledge, understanding, and awareness and conducting ecological assessment and economic study of wetlands. Necessary steps were taken as part of a participatory learning process in order to reach the project's goal and formulate a strategic plan for wetlands management in the two pilot areas.

In addition, the project provided an opportunity for the practical application of the strategic plan by sponsoring operational agencies and communities. The project divided its budget into two categories. The first was an operational budget, while the second was a local initiative fund earmarked for local communities.

In both pilot areas, implementation of the strategic plan led to its modification as reflected in the subsequent drafting of the 2005 Annual Action Plan and 2006 Annual Action Plan. The overall results of the implementation, based on the aforementioned plans, are as follows:

Nong Bong Kai Wetland, Chiang Rai Province

Several activities under the Strategic Plan for Nong Bong Kai Wetland Management, 2005-2006 were implemented as shown in the following table.

Implementation of Activities	Activities implemented		Expenditure	
	Number	Percent	Baht	Percent
Classified by year of implementation				
• Activities implemented in 2005	28	54.90	2,077,020	31.46
• Activities implemented in 2006	23	45.10	4,524,972	68.54
Classified by type of activities				
• Program Activities	23	45.10	3,201,812	48.50
• LIF	28	54.90	3,400,180	51.50
Classified by purpose of activities under the Strategic Plan for Wetland Management, covering seven mandates				
• Overall ecological rehabilitation	20	39.22	3,184,005	48.22
• Management and follow-up	9	17.65	1,226,006	18.60
• Conservation of water fowls	8	15.69	798,983	12.10
• Quality of water	5	9.80	762,300	11.54
• Rehabilitation of fish habitat	5	9.80	441,573	6.68
• Building awareness	2	3.92	130,000	1.96
• Quantity of water consumption	2	3.92	59,125	0.90
Total	51		6,601,992	

Krabi Estuary, Krabi Province

Various activities under the Strategic Plan for Krabi Estuary Management, 2005-2006 were executed as follows:

Implementation of Activities	Activities implemented		Expenditure	
	Number	Percent	Baht	Percent
Classified by year of implementation				
• Activities implemented in 2005	13	29.55	2,935,505	28.90
• Activities implemented in 2006	31	70.45	7,221,919	71.10
Classified by type of activities				
• Program Activities	19	43.18	3,790,060	37.31
• LIF	25	56.82	6,367,364	62.69
Classified by purpose of activities under the Strategic Plan for Wetland Management, covering seven mandates				
• Reinforcement of a body of knowledge on wetland management according to Ramsar Guidelines	10	22.72	1,711,460	16.85
• Conservation and rehabilitation of wetland ecology	9	20.45	3,300,935	32.50
• Public relations and dissemination of wetland knowledge	9	20.45	2,469,322	24.31
• Strengthening effectiveness and mechanism in operation following policy and law enforcement	6	13.64	1,043,550	10.27
• Promotion and development of eco-tourism activities	6	13.64	824,152	8.11
• Reinforcement of competence and effectiveness of private sector and entrepreneurs	2	4.55	431,600	4.25
• Management and control of effects of activities on development and utilization	2	4.55	376,405	3.71
Total	44		10,157,424	

Financial support from Thailand includes 6,969,240 Baht (in cash) and 1,325,896 Baht (in kind), making a total of 8,295,136 Baht.



The First Step and Steps to Follow

Conservation and Protection of Wetland Areas



*Wetland in Nong Bong Kai Wildlife Non-Hunting Area
Chiang Rai Province*

The Management and Protection of Wetland Areas Project has spearheaded the conservation of fishery resources at Nong Bong Kai by subsidizing activities that were carried out step by step, as follows:

- * Founding the Chiang Saen Lake Fishery Group in the latter part of 2003, gathering fishermen from Ban Koo Tao, Ban Doi Chan, Ban San Ton Pao, Ban Pang Mod Puang, Ban Doi Kam and Ban Doi Sri Kaew, as well as those from adjacent villages in Mae Chan District. They were assembled to talk and define rules, regulations and measures in support of the conservation of local fishery resources and to reach a mutual agreement on sustainable fisheries.

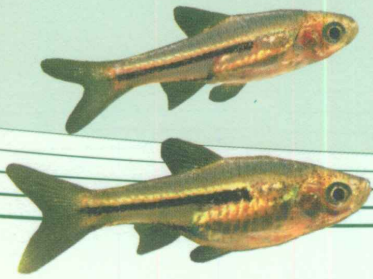
- * Strengthening the competence of group members by means of training and study visits, including an excursion to observe fish breeding as well as provision of equipment and tools used in related activities

- * Promoting activities that focused on the participation of local communities, mainly under the guidance of fishery groups, in order to create a sense of ownership and ensure the project's sustainability. Fishery groups took part in meetings and planning sessions as well as in determining implementation guidelines for the sustained conservation of fishery resources at Nong Bong



Conservation of Fishery Resources

at Nong Bong Kai



Kai. These included work plans and guidelines to eradicate exotic plants and animals, such as Giant Touch-me-not, Hyacinth and Giant Snake-head Fish, guidelines for the expansion of conservation zones for various fish species, plans to issue notices concerning relevant rules and regulations, plans to plant lotus for the rehabilitation of ecological systems as well as agreements on fishing and the use of fishing tools.

* Zoning areas for the conservation of fishery resources, based on common decisions reached by fishery groups, fishermen from Chiang Saen-District and the Sub-Committee on Wetland Management in Chiang Rai Province.

* Initiating the "Home for Fish" Project at Nong Bong Kai Wetland in March-April 2006 to conserve and restore the ecological system of Nong Bong Kai Wetland, to promote the participation of local

communities in managing fishery resources, to provide a haven for breeders of aquatic animals, as well as to announce the designation of the "Fish Home" area as the community's conservation zone for aquatic animals, leading to the designation of a larger fish home area in Nong Bong Kai, totalling six rais in Pasak and Yonok Sub-districts, and to provide more spacious habitats and spawning areas for aquatic animals.

The conservation of fishery resources at Nong Bong Kai underscores the importance of community participation, in accordance with the decisions and plans of fishery groups, resulting in the sustainability of fishery resources at Nong Bong Kai Wetland.



Contamination

arising from the widespread use of chemicals to control Golden Apple Snails found in the area has affected the environment and health of farmers. As a result, local farmers have started to produce bio-fertilizer by composting Golden Apple Snails, thus helping to solve and ease their negative impacts, as well as to reduce production costs for local farmers living in the vicinity of Nong Bong Kai. Composting operations were initially carried out in April 2003, with the following objectives:

- * to replace chemical fertilizer with snail-fermented liquid fertilizer used in rice paddy and farm and garden plots,
- * to replenish soil that has deteriorated because of the use of chemical fertilizers, and
- * to improve the quality of water in Nong Bong Kai.

During the period 2004-2006, the Management and Protection of Wetland Areas Project subsidized a budget for activities to be implemented step by step, emphasizing a participatory process based on decisions and plans made by local communities, thus bringing about sense of ownership of the project and ensuring the sustainability of project activities, as detailed below:

- * Establishing in 2003 bio-fertilizer groups in 15 villages in the project areas, that is, Yonok and Pasak Sub-districts. They cooperated in setting up Golden Apple Snail bio-fertilizer groups in every village and campaigned among farmers in villages around the Nong Bong Kai wetland area to gather Golden Apple Snails which were destroying rice fields. The Sub-district Administration Offices of Yonok and Pasak allocated an initial budget for every village under the Snail-composted Liquid Fertilizer Fund.

Member farmers from each village donated 100 Baht per family to be used in gathering Golden Apple Snails.

- * Hosting study visits to strengthen the competence of leaders of bio-fertilizer groups, including study visits to observe composting and the production of bio-liquid fertilizer at the Bio-Agriculture Center in Sing Buri Province, Royal-initiated Bio-extract Fertilizer Center at Chon Buri Province, and to establish a bio-fertilizer network among mangrove conservation groups in Trat Province, enabling the farmers to obtain new knowledge and techniques in forming groups and networks to boost the market for bio-extract fertilizer.

- * Organizing activities to produce snail-fermented bio-extract fertilizer and to set up demonstration fields in 15 villages, in each of which an administrative committee and appropriate regulations were set up. The activities were managed through a revolving fund whose members have been recruited and selling bonds in order to raise the capital. An administrative committee and regulations were also established for each village and bio-extract fertilizer was distributed to interested farmers and members at a reasonable price in order to bring money back to the said fund.

Based on the follow-up and evaluation for the year 2004, 15 villages were subsidized by the Management and Protection of Wetland Areas Project, to the amount of 406,839 Baht, (26,150 Baht from fund members and 192,000 Baht from the Tambon Administrative Organization). The initial budget was 624,773 Baht in total. The members of the Golden Shell Snail Composted Bio-extract Fertilizer Fund came from 463 households, out of 2,337 households in 15 villages (or 19.8 percent), owning 6,732 rai of agricultural land. In the past, 3,429 bags of chemical fertilizer were used, with a value of 1,714,500 Baht. In the farming season in 2004,



Bio-Fertilizer from Golden Apple Snail

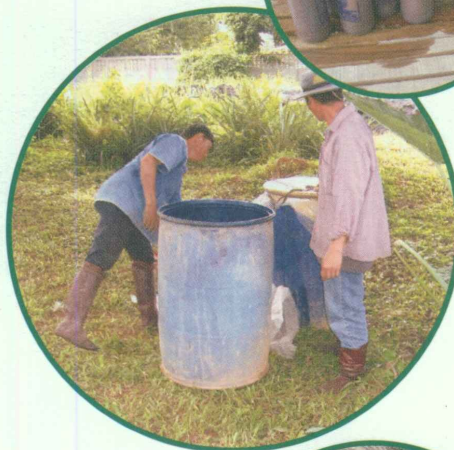
at Nong Bong Kai



farmers used the composted bio-extract fertilizer in 3,120 rais of agricultural land (or 46.3 percent of the total agricultural land). In this case, they were able to reduce the amount of chemical fertilizer used to 1,767 bags, valued at approximately 883,500 Baht (that is, 500 Baht/bag). In short, farmers cut their production costs.

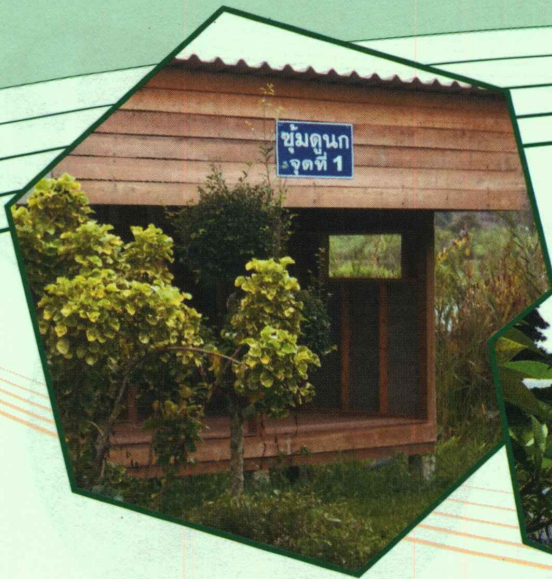
The follow-up and evaluation in 2005 on the use of the golden shell snail bio-extract fertilizer in 15 villages in Nong Bong Kai showed that membership had increased from 463 households in 2004 to 569 households (or 17.70 percent of the total number of 3,213 households). In 5,749 rais of agricultural land, 2,149 bags of chemical fertilizer were used, roughly equal to 1,289,400 Baht in value. Moreover, in the production season in 2005, the farmers used bio-extract fertilizer made of golden shell snail in their agricultural land (some 3,120 rais in total or 84.38 percent of the total agricultural land of the members). It was evident that the farmers were able to decrease their use of chemical fertilizer to 1,379 bags, valued at approximately 827,400 Baht. In brief, farmers were able to reduce their production costs.

In addition, in 2006 representatives of the bio-fertilizer group had an opportunity to draft a strategic plan for 2006 and proposed a project to procure two sets of tablet-punching machines and grinders, a set for Yonok Sub-district and the other for Pasak Sub-district. The project was approved by the drafting committee, a sub-committee on provincial wetland and a scrutiny committee on budget proposal. This was considered as continuation of the implementation of the Nong Bong Kai bio-fertilizer group, providing members in 15 villages easy access and inexpensive fertilizer, manufacturing fertilizer and distributing it to members within the village and adjacent communities.



All mentioned activities are implemented with the cooperation of the Management and Protection of Wetland Areas Project, Yonok and Pasak Sub-district Administration Offices, Chiang Rai Province and farmer members, with a focus on the decision-making process and community participation. Home-made bio-fertilizer helps to improve soil quality, reduces environmental pollution, enhances soil utilization in a sustainable fashion, and cuts production costs, leading to more profit or incomes and a better quality of life.





The Birds' Friends Group was formed by youth leaders in the vicinity of the lake. They took part in all sorts of activities and learned about the problems of migratory birds and some indigenous birds that feed on rice in rice fields and are hunted by farmers' traps. This group of youth leaders recognized that if the assault of the birds continues, the migratory birds will not show up and will probably disappear from the area for good. This has given rise to the idea of saving migratory birds by means of conserving and rehabilitating their food sources around the lake. Bird conservation youth leaders from the two sub-districts comprised in-school students and non-formal education students from high schools in 15 villages and from schools in municipal areas of Chiang Saen Sub-district, as well as out-of-town university students who returned to their hometowns during school breaks and those who were not of school age, from both sub-districts. The group has asked for subsidy from the Management and Protection of Wetland Areas Project.

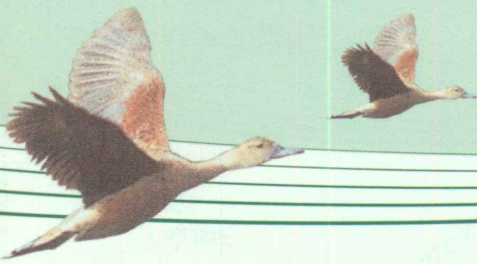


The project has subsidized the implementation of various activities in conserving water birds at Chiang Saen Lake during 2004-2006. These included promoting the establishment of Birds' Friends Group, strengthening the capacity of group members through training and study visits, providing bird watching equipment, building up bird watching sites, as well as providing academic support by which experts are employed to explore the status of water birds in Chiang Saen Lake, printing manuals for bird watching at Chiang Saen Lake, publicizing bird watching sites through the media and notice boards, training volunteer guides to promote bird



Conservation of Water Birds

at Chiang Saen Lake



watching at Nong Bong Kai wetland, and hosting a ritual ceremony to welcome water birds. The nature of promoting project activities places emphasis on the participatory process, essentially based on decisions and plans of the Birds' Friends Group so that they get a feeling of ownership that is favourable to the sustainability of project activities.

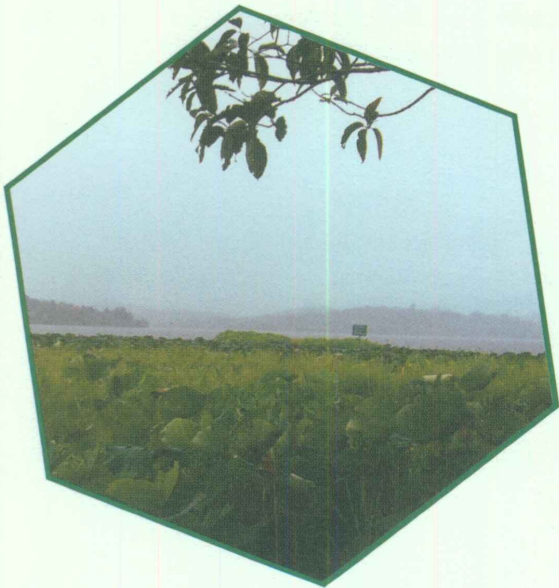
Apart from activities run by the Chiang Saen Birds' Friends Group, the group also worked with other agencies in implementing pertinent activities, including the following:

- * To coordinate with the Chiang Saen Lake conservation volunteer group to grow perennial plants and bird plants around the rim of the lake by members from several groups representing 15 villages;

- * To host a workshop meeting for cattle (water buffalo) owners, fishery groups and water user groups to draw up an agreement in order to zone a proper area for raising animals and not to encroach into vital bird watching areas;

- * To coordinate with many external bodies and agencies, such as the Biodiversity Center, Chiang Rai Rajabhat University and Lanna Bird Watching Club, to survey birds in Chiang Saen Lake and exchange knowledge of wetland ecosystem with other areas in Chiang Rai Province;

- * To cooperate with the Lanna Bird Watching Club annually in many activities. For example, the Club provides training in bird watching and techniques to count birds in the lake in the cool season every year so that the members of the Birds' Friends Group have a good chance to exchange new ideas with the Club consistently.

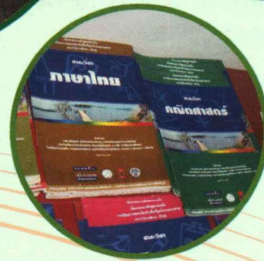
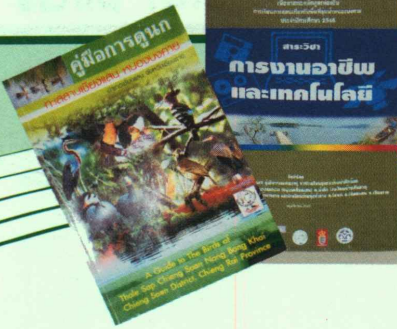


The work of the Birds' Friends Group is a good way to promote youth awareness of the need to conserve water birds in Chiang Saen Lake. It calls their attention and encourages them to conserve and save water birds in the Nong Bong Kai wetland. These will bring sustainability to a unique and important bird-watching area in Thailand.



Local Syllabus

for Wetland Learning



The Management and Protection of Wetland Areas Project is aimed at developing wetland education and a learning program in various syllabuses, including site visits by instructors to evaluate the development of wetland education and a learning program, an instructors' training program for the Nong Bon Kai wetland ecosystem to assess its importance and historical value, and an instructors' workshop for developing wetland learning in local education.

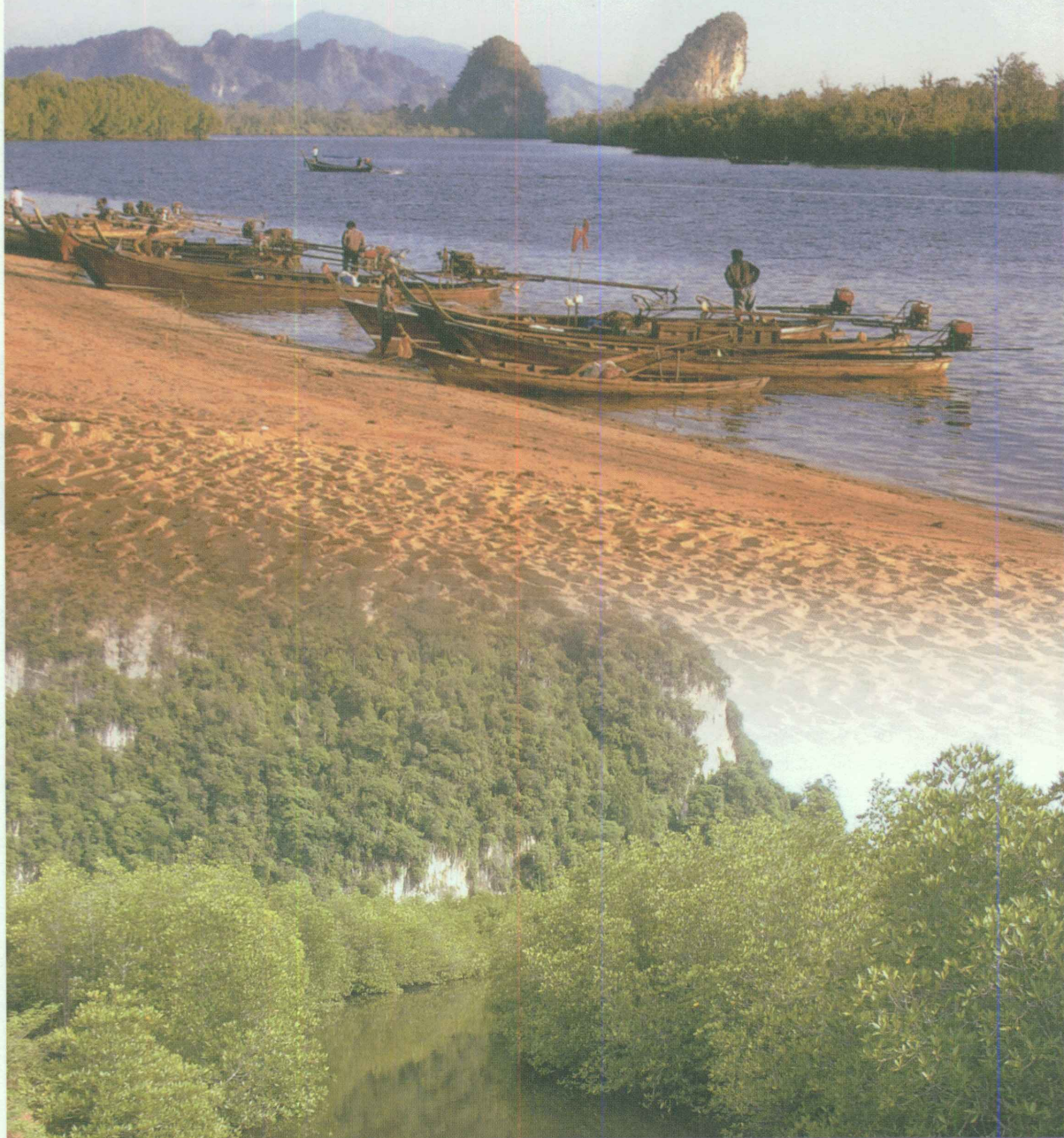
The result speaks of wetland learning in local education and the local syllabus for wetland instruction in 2004, which has been used as guidelines in 6 target schools, namely Ban Pa Sak Noi Community School, Ban Doi Chan School, Ban Thoong Fah Ham School, Ban San Tat School, Ban Rong Bok School, and Ban Pang

Moh Puang School (Chiang Saen Kindergarten). Furthermore, in 2005-2006, the Management and Protection of Wetland Areas Project supported learning equipment for wetlands.

The enhancement and support of local syllabuses for wetland education are important in the campaign to promote youth awareness and understanding of the value, importance, and usefulness of wetlands, leading to wetland conservation and preservation in the future.

The First Step and Steps to Follow

Conservation and Protection of Wetland Areas



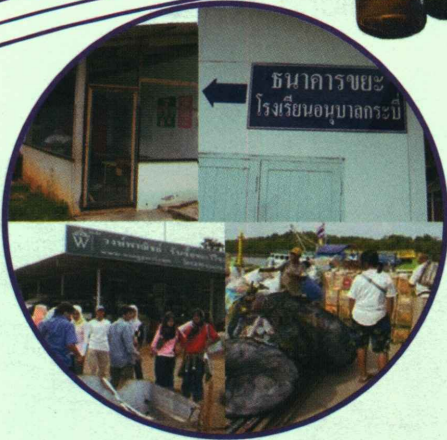
*Wetland in Krabi River Estuary
Krabi Province*

ธนาคารขยะ โรงเรียนอนุบาลกระบี่



Garbage Bank

of Klong Prasong Sub-district



The strength of the Garbage Bank is its reliance on the principle of public participation and its effective response to the needs of the community, inspiring community members to work for the common good. As well, expenditures and financial accounting are regularly monitored. Nearby are sites for field studies and sources of recyclable wastes. These make transportation and marketing convenient while also encouraging youth participation.

A problem for the Garbage Bank is the presence of wastes that are difficult to dispose, such as hazardous substances, battery and insecticides. There is also the problem of odor from organic waste. Waste disposal costs are higher as organic wastes need to be transported to municipal dumping sites.



Koh Klang is a small island that is surrounded by a mangrove forest and a winding canal that flows to Krabi estuary. Although Koh Klang is located in an urban area, along its border is a canal. Waste disposal is not a responsibility of the municipality. The growth and expansion of the community have created serious waste problems for Koh Klang. Some of the wastes are burned giving rise to a foul smell and polluting the air. Others are disposed in the sea and canal.

Recognizing this fast-spreading waste problem, the Management and Protection of Wetland Areas Project has organized a meeting to discuss relevant issues with a group of ferry boat operators and drivers in Krabi city, together with members of the Koh Klang community in Klong Prasong Sub-district. Some 50 people joined the meeting. Subsequently, the Project established the Garbage Bank of Klong Prasong Sub-district in order to raise public awareness of waste separation, environmental preservation, waste reduction, and knowledge building among the youth, emphasizing waste separation and an understanding of the nature of waste residue. Furthermore, the establishment of a revolving fund for the benefit of the Garbage Bank was addressed, involving public participation in waste management. This has created livelihood opportunities for the community and tapped other sources of income, as well as encouraged visitors to the community.

This project is sustainable. Although the Garbage Bank Project, which is funded by the Management and Protection of Wetland Areas Project, is completely finished, the group continues with its work. Moreover, the revolving funds are increased from time to time. The members of the Garbage Bank are mainly from the ferry boat business. They are also concerned with other preservation activities, such as the conservation of mangrove birds and mangrove forests. The group is active and vigorous, providing a good model for community members and other people.



Community Activity on Portunid Crab Culture

in Mangrove Forest



the people were able to live in the mangrove forest area, work together to maintain the abundance of the mangroves, and become economically sufficient.

The community activity on portunid crab culture in mangrove forest supported the establishment of local conservation groups and networked with community members. The people attended a course on enhancement and conservation of mangrove forest. The project also promoted the people's understanding of the principle that the people can reside in the forest as a "forest villagers," meaning that the forest and the people can live together. This has fostered harmonious relationships between the people and the forest and promoted local community participation in natural resources management, as well as in the protection and maintenance of Thailand's abundant natural coastal and marine resources.

Mangrove Forest Development Station 27 (Ta Daeng, Krabi Province) and Krabi Provincial Administration Organization foresaw the degradation of coastal and marine resources arising from local use and poor natural resource management practices. As a result, a community activity on portunid crab culture in mangrove forest was initiated in coastal communities. The activity was started by gathering a crab culture group at Bann Lung Da, Moo 2, Tambon Kling Shun Sub-district, Nuea Klong District, Krabi Province. In these areas, the communities used to make a living from fisheries and wood cutting to produce charcoal. Following the cancellation of concessions for wood cutting and the destruction of all charcoal kilns, the people had no source of income. Mangrove Forest Development Station 27, the Krabi Provincial Administration Organization and the Management and Protection of Wetland Areas Project therefore organized a community forum in Bann Lung Da area to exchange experiences aimed at formulating conservation guidelines. As a result, the people of Bann Lung Da worked together to develop a project on portunid crab culture in mangrove forest, with a view to using the project as a model for community development in the area and an alternative for community mangrove forest conservation. Under the project,

The project's outcomes and sustainability will enable the group to network with other crab culture groups in mangrove forests in order to oversee, protect and conserve mangrove forests and coastal and marine resources in communities that are within the project area. As the communities' earnings from crab culture increase, they will become financially sufficient. The clearest outcome of the project is that the mangrove forests will be well protected and conserved by the community.



Natural Rehabilitation of Mangrove Forest

and Setting up Surveillance and Zoning Indicator System



Ban Klong Yuan Community, Nuea Klong District in Krabi Province recognizes the importance of mangrove forest. Therefore, it collaborates with the Mangrove Resources Development Station 27, the Management and Protection of Wetland Areas Project, and the Krabi Provincial Administrative Organization, to establish a natural rehabilitation of mangrove forest project, set up a surveillance and zoning indicator system that will be used with public participation to rehabilitate the mangrove forest, form a mangrove forest conservation group, and maintain the health of mangrove forests, in accordance with Her Majesty Queen Sirikit's Initiative on 11 August 2004

"...as in Krabi, I have asked the people of Krabi not to damage the mangrove forest. As I have said, preserve the mangrove forest for the sustainability of our country..."

The project's target group includes 174 households, accounting for 978 people, in Ban Klong Yuan, Moo 3, Talingchan Sub-district, Nuea Klong District in Krabi Province. The target area is in the Klong Nuea Klong and Laem Krud National Forest Preservation Zone. It area covers 300 rais. The project's implementation includes a cadastral survey to determine the community's boundary, destroy weeds, carry out additional preparations for planting the mangrove forest, excavate the area to encourage growth and aquatic animal breeding and fencing.

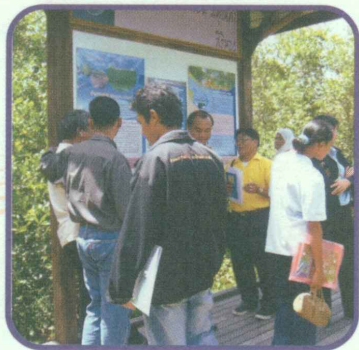
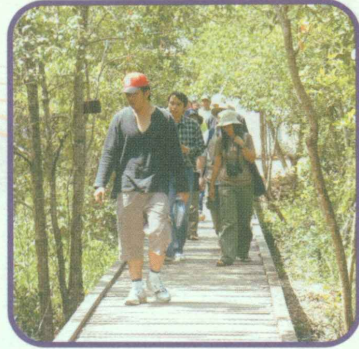
The project has designed a surveillance system and a zoning indicator system that will be used with public participation in rehabilitating the mangrove forest, setting up mangrove forest conservation groups, taking care of the forest, and reducing encroachment into mangrove forests. The project's outcomes include increased diversity of local animals and plants, reduction of encroachment into mangrove forests, prevention of damage to mangrove forest resources, increased awareness of the conservation of mangrove forest resources, setting up networks to take care, protect, and conserve marine and coastal resources, and development of eco-tourism areas.

Mangrove forests in the project area have remained healthy and well protected by relevant agencies, including the Talingchang Tambon Administrative Organization, Mangrove Forest Development Station 27, and a network of trained volunteers, mostly comprising local people, to protect mangrove forests. In the future, the network will be expanded to protect and conserve sea and coastal resources in other areas, with implementation support to be provided by relevant agencies.



The Krabi estuary watershed area consists of various watershed ecologies, such as creeks, swamps, canals, mangrove forests, mud and sand beaches, and seagrass beds. As the mangrove forest is important for watershed ecology, the Management and Protection of Wetland Areas Project in cooperation with the Mangrove Forest Resources Development Stations 26 and 27, has built sidewalks and learning signs at Watershed Development Site 27, Klong Tha Dang mangrove forest in Krabi municipality and Sri Bor Ya island mangrove forest in Nuea Klong District, in order to provide knowledge mangrove forest ecology to students and the public.

The Learning Bridge provides the public with a good understanding of watershed areas.



Local Science Curriculum, Mangrove Forest

and Seagrass Learning Sources



The Management and Protection of Wetland Areas Project in collaboration with the Krabi Educational Office and Phuket Rajabhat University have developed the Local Science Curriculum, Mangrove Forest and Seagrass Learning Sources, in the following manner.

1. Building up understanding among managers, teachers, students and community members, of the development of the local curriculum.

2. Visiting learning sources of mangrove forests and seagrass beds, responding to the needs of learners, community members and teachers, and developing an analytical plan for the local curriculum.

3. Training to enhance science skills, particularly in relation to knowledge search at learning sources, based on community participation.

4. Seeking answers from learning sources, with the participation of communities in order to gather all knowledge, including biology, the value and use of local skills, and conservation.

5. Analyzing the bottom line of the curriculum, taking into account all gathered knowledge, learning facilities, learning standard, and expected learning results, based on the principle of harmonization.

6. Developing a learning plan with activities that are based on experience and lessons learned from learning sources.

7. Developing media, in harmony with a learning plan that includes documents, posters, CD ROMs, brochures and websites.

8. Developing a system for evaluation, including science skills. Creating teacher manuals and course books.

9. Implementing, testing, improving and finding out the capacity of course books.

These two curricula are used in all schools in Krabi province in order to promote the learning system and raise awareness of conservation and recognition of mangrove forest and seagrass beds among the youth. These will build the youth's future knowledge of wetland conservation.



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