

BOEUNG THOM INTEGRATED WETLAND MANAGEMENT

PURPOSE

This case study reviews efforts in Cambodia to manage natural resources in a sustainable manner. An initiative by responsible Cambodian government agencies and local communities supported by international donors to protect and conserve important wetland

habitat in Kampong Cham province is detailed. Particular attention is given to factors which contributed to the success of this multi-stakeholder collaborative effort and on management strategies, best management practices and education programs employed to provide better protection of wetlands, flooded forests, wildlife and birds through promotion of sustainable irrigation, agricultural and fishing.

ETP1 COURSE TOPIC COVERAGE:

- ▶ SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL AWARENESS
- ▶ ENVIRONMENTAL SCIENCE IN THE MRB
- ▶ INTEGRATED RESOURCE AND ENVIRONMENTAL MANAGEMENT (IREM) CONCEPTS AND BENEFITS
- ▶ DEVELOPING EFFECTIVE IREM IN THE MRB
- ▶ IREM PRACTICAL TOOLS FOR IMPLEMENTATION

ISSUES

Specific issues highlighted by this case study are:

1. Poor understanding of the importance of wetlands and long-term neglect in protecting and conserving this natural resource in Cambodia has resulted in over-harvesting of wetland resources
2. Accelerated degradation of wetland habitat has been a consequence of open access to wetland resources by local communities
3. Government regulations to protect the environment must be supported by local communities if they are to prove effective
4. Efforts to protect and conserve wetlands by eliminating unsustainable practices must be linked with initiatives to improve living standards in local communities by providing alternative sources of income

LEARNING OBJECTIVES

On completion of this case study, participants will be able to:

- Discuss the ecological value and function of the Boeung Thom wetland
- Identify wildlife and bird species supported by the wetland and adjacent flooded forest habitat
- Provide examples of how existing management practices are threatening valued ecosystem components at Boeung Thom

- Describe factors which are contributing to unsustainable use of natural resources by local communities
- Summarize the process involved in preparing an action plan and the management framework established to protect and conserve wetlands at Boeung Thom
- List the stakeholders and interested parties involved in this process
- Discuss the intended role of village development committee (VDCs) in wetland management and protection
- Give examples of management strategies and best management practices which could be adopted to provide better protection and conservation of the Boeung Thom wetland

PROJECT SUMMARY

Introduction and Background

Boeung Thom is a lake by definition in the wetland classification system. The Lake is situated in the middle reach of the Mekong River in Cambodia, approximately 15 km southwest of Kampong Cham town. The lake system encompasses the three districts of Prey Chhor, Kong Meas and Kampong Siem. The name Boeung Thom is sometimes incorrectly used interchangeably with Fishing Lot 2 – the latter actually encompasses a large area including the Prekabao stream 18 km further west.

The surface area of Boeung Thom Lake fluctuates seasonally, covering 35 km² in the wet season compared to 14 km² in the dry season. Boeung Thom has a catchment area of 217 km² and receives water from six main tributaries, four entering from the south connecting Boeung Thom with the Mekong River, and two from the north, that carry run-off from other catchments. Early in the rainy season, May to July, rainwater from the catchments fills the Lake and flows south into the Mekong. From mid-July to September, when the water level in Mekong is high, the Mekong flow reverses northward into the Boeung Thom system via three main tributaries – Prek Peam Knong, Prek Svay, and Prek Thmey. During periods of extremely high water in the Mekong River, a fourth tributary, Prek Roka Koy, also gets filled. Starting in October, the water flows reverses, and the Lake system again drains into the Mekong River. At this time, there is also a westward flow out of the system via Prek Krabao, which eventually reaches the Tonle Sap River at Kampong Chnang.

Natural Resource Use and Management Issues at Boeung Thom

Population Demographics

Administratively the communities surrounding Boeung Thom comprise 62 villages under 6 communes of 3 districts. The total population is 45,045 people. Wetlands are under ever-increasing pressure by population growth (3% per year) in the Boeung Thom area. The combination of population growth and widespread poverty in local communities places significant pressure on remaining flooded forest and

the limited agricultural land available for food production (Figure 1). Population growth has resulted in rapid clearance of flooded forest for paddy rice production and raising of livestock has been increasing at a proportional rate. Additional destruction of flooded forests also results from fuel wood collection, the only energy source available to local communities. Consequently, flooded forest in Boeung Thom has fallen dramatically to 151 hectares from 1600 hectares in 1992.

Mimosa pigra

An example of an innovative strategy to decrease loss of flooded forest is the substitution of wetland species such as the shrub *Mimosa pigra* to meet local fuelwood needs. This invasive species is regarded as a noxious weed that can invade valuable wetland habitats, particularly flood plain and swamp forest habitats. The most devastating effect of *Mimosa* is the formation of mono-specific, dense thickets that completely replace the native vegetation by preventing seeding of perennial vegetation. Although local people have long regarded this species as useless, and even worse a hinderance to agriculture, they are now being encouraged to utilize *Mimosa* as fuelwood. Knowledge transfer to local communities from other countries has demonstrated that dried *Mimosa* cuttings are easily burnt to meet day-to-day energy needs. In this way, pressure on critical flooded forest habitat can be significantly reduced.

Pressure on the flooded forest at Boeung Thom has been exacerbated by the repatriation of farmers and soldiers following the recent cessation of fighting in Cambodia. Prior to 1995/1996, the south and west of Boeung Thom was controlled by the Khmer Rouge. Since their mass defection, the improved security in the area has made flooded forests more accessible, resulting in increasing levels of flooded forest clearance, wildlife harvested and fishing. The areas most affected include Boeung Prolit, Rolum Por Dam Boeung Kol – these areas located south and southwest of Boeung Thom, were once considered the richest in fish and wildlife.

Commercial and Subsistence Fishery

The Boeung Thom fishery is open access with fishers originating from many surrounding communities. Large-scale commercial fishing occurs at Fishing Lot 2 in addition to open-access subsistence fishing by local communities. Conflict between commercial lot operators and subsistence fishers is pronounced with the lot operators having the concession rights to the most productive fishing areas. Local communities respond by heavily harvesting remaining marginal fishing areas.

Overall the Boeung Thom system is estimated to provide in excess of 1,000 tonnes of fish to four different districts of Kampong Cham province. Fish landings in one section of Boeung Thom averaged been 400 tonnes between 1990 and 1998 with higher catches of occurring in 1997 (450 tonnes) and 1998 (747 tonnes). The catch in 1998/1999 was significant lower at 168 tonnes. Fish productivity is closely correlated with flooding levels in the Mekong River with a high flood resulting in more fish and a low flood less fish.

Species diversity at Boeung Thom is high compared to other lake wetland resources in Cambodia but has declined significantly since 1990. This decline has been attributed to a combination of: (i) loss of fish breeding habitat; (ii) changes in wetland ecosystem function due to destruction of flooded forest; (iii) impeded fish migration caused by the decreased depth of lakes and creeks; and (iv) overexploitation of fish including use of illegal gear such as electro-fishing. Provincial fisheries department records and anecdotal evidence from local people show that some species, such as the Mekong Giant catfish, Giant barb and Juliet's Golden Price barb, have disappeared from the lake system altogether. Dolphins which have previously been observed in the Boeung Thom wetland's, have not been sighted for a long time.

Efforts to date by national, provincial and district fisheries authorities have been largely ineffective in controlling unsustainable fisheries practices at Boeung Thom. However, recent fisheries reforms which reduced the size of Fishing Lot 2 and allocating these areas for subsistence fishing by local communities are expected to help address concerns about over-fishing (Figure 2).

Subsistence Agriculture

Communities surrounding Boeung Thom survive primarily by fishing and subsistence agriculture. Conditions are generally poor for agricultural purposes with drought conditions being common. Many natural ecosystems are threatened with destruction, primarily because of sustainable exploitation and negative impacts of development activities. Despite the low productivity of the land, agriculture has expanded rapidly to meet demand for food by local communities. Improved security in this area previously controlled by the Khmer Rouge has resulted in approximately 1,000 hectares of land being cleared since 1997 with 2/3 allocated to dry season rice and the remaining for crop production. An indirect but important impact of increased agricultural land use has been increasing use of pesticides and herbicides to control pest outbreaks. Run-off of these agro-chemicals to the Lake is now considered a major threat to the Boeung Thom ecosystem.

Irrigation

During the Pol Pot regime, a massive number of dams and dykes were built to irrigate rice fields and dramatically increase agricultural production. The number of dams around the Boeung Thom wetland increased from ten dams in the 1960's to forty-two by 1978. These structures ranged from small dykes a few hundred meters in length to large dykes up to 2 km in length. Today, only a small number of these structures are usable for irrigation due to siltation caused by high sediment loads in flood waters from the Mekong River. Siltation has been exacerbated by sediment loss from upland forest due to clearing for human activities. Release of silt-laden waters to the Mekong River is also hampered by the numerous small dams. Remaining channels are silted and blocked at some locations and smaller lakes in the Boeung Thom system are becoming progressively shallower.

Wildlife

Catching and hunting of wildlife by communities surrounding Boeung Thom has traditionally only been for local consumption. This situation changed in the early 1990's with harvesting of wildlife for sale in larger markets, including export via a organized network of middlemen, having risen sharply since 1993. Destructive capture methods and indiscriminating killing of birds by poisoning and trapping has raised serious concerns about the viability of some remaining populations of endangered birds.

Overview of the Boeung Thom Integrated Wetland Management Initiative

Responding to the numerous threats to wetlands at Boeung Thom required a multi-faceted integrated management strategy which emphasized decentralization of planning and management responsibility to local communities. In this section, the role played by local people from three target villages in wetland management at Boeung Thom is examined.

The activity described is part of a larger initiative by the Cambodian government, supported by the international donor community (e.g., Mekong River Commission and Danida) to protect and conserve wetlands in Cambodia. The overall objectives of the initiative are to:

1. Enhanced capacity of relevant line institutions in wetland inventory and management
2. Develop a wetland mythology that is compatible with that in other riparian countries on the lower Mekong River Basin (i.e., Laos, Thailand and Vietnam)
3. Enhanced involvement of selected communities in sustainable wetland management

Objective 3, as highlighted in this case study, involved the integration of local communities in wetland management in Boeung Thom, Kampong Cham province. Seven steps were specified for local stakeholder involvement in wetland management.

Step 1 – Information Gathering and Presentation

Presentations to local government representatives, villagers and fishing lot operators on the current understanding of the wetlands at Boeung Thom including a description of the wetland system, resources use, stakeholders, and threats to wetland. The presentation included results of studies undertaken to examine lake siltation, hydrology, fisheries, flooded forest, and use of agro-chemicals. The presentations were intended to provide an understanding of wetland value and functions and how unsustainable human activities are increasingly threatening Boeung Thom.

Step 2 – Meetings with User Groups

Meetings with individual users groups to identify key issues to be addressed. User groups at Boeung Thom include fishers, dry season rice farmers, and subsidiary crop growers. The objective of this exercise was to engage these users groups through dialogue and informal discussion as a precursor to involving the local community in specific management activities as part of a co-management approach. It was recognized that understanding the true nature of the key problems through discussions with these stakeholders is crucial in determining how best to respond to issues. Superficially, problems may appear easy to resolve, but identification of the core issues, and approaches to address these, necessitates a more integrated approach.

Step 3 – Stakeholder Consultation

A local stakeholder workshop was then held to review current and future management options. The workshop was attended by representatives of all stakeholder groups and interested parties to develop a management plan that attempted to address the roots causes of problem, and at the same time ensuring that all stakeholders benefit from management measures. Problems and contributing factors examined during the workshop are summarized in the following table.

PROBLEM	CONTRIBUTING FACTORS
Wetland Loss	Hydrological changes due to flood control, irrigation Drainage of wetlands for agriculture Loss of biodiversity
Fisheries Declines	User access rights Boundary disputes Over-harvesting Illegal fishing gear Agro-chemical loadings
Deforestation	Over-exploitation Illegal logging Clearance for agricultural use Loss of biodiversity Excess hunting pressure
Socio-Economic	Poverty Poor awareness Lack of alternative income sources
Institutional and Legal	Lack of legislation Absence of property rights Low capacity at provincial, district and local levels Poor planning and coordination

Steps 4 and 5 – Brainstorming Potential Solutions and Management Actions

Follow-up meetings were completed with local stakeholders to reach agreement on potential solutions to the problems previously identified and to develop concrete management actions. These steps were intended to provide an opportunity for local people in and around Boeung Thom to prioritize management issues and to

select target villages to begin to implement management actions. Outcomes of these meetings were:

- Selection of loss of flooded forest, sedimentation of lakes and streams, illegal fishing activities and inappropriate agriculture practices as priority problems
- Selection of the three target villages of Thoney Khor, Prasat and Kampong Somnagn for implementation of small-scale projects and programs intended to conserve and protect wetland resources
- Establishment of village development committees (VDC) responsible for overseeing projects and programs
- Setting up a mechanism for determining and selecting the provincial departments agencies who will work with the villages in project/program implementation

Step 6 – Local Capacity Building

This step involves building of capacity among VDC members, local authorities and district government officials to help them formulate project proposals and seek funding for implementation in the target villages. Capacity building will allow local people to become involved in policy formulation and hands-on planning and sustainable management of wetlands

Step 7 – Monitoring and Follow-Up

Provision of ongoing monitoring and evaluation of project and program implementation by the VDC and local authorities was stipulated for the initiative. Results to date have been promising with unsustainable activities such as illegal fishing, lands encroachment, wildlife trade in Boeung Thom having been substantially eliminated. Key to this success was the empowerment of VDCs with enforcement authority. Recent reforms to the commercial fishery by the Department of Fisheries and the Ministry of Agriculture Fisheries and Forestry have reduced the size of fishing lots thereby allowing greater access by local communities to productive fishing grounds.

SITE VISIT METHODOLOGY

Course participants will visit Boeung Thom to learn more about the wetland conservation and protection measures being implemented by local communities. Participants will be accompanied by knowledgeable resource persons who will be able to answer questions about the model for development and management of wetland resources being implemented at Boeung Thom. Participants will also have the opportunity to interview VDC members and local people to learn about their experience with this cooperative management approach. The expected duration of the case study site visit is one day.

Participants will be organized into small groups for the visit with each group being responsible for reviewing a different aspect of the Boeung Thom project as summarized in the following table.

GROUP	FOCUS
I	Flooded forest conditions in the Great Lake
II	Fisheries management and harvesting practices
III	Wetland conservation and protection
IV	Agricultural practices and agro-chemical loadings
V	Wildlife and water birds in the Great Lake

On completion of the site visit, small groups will be asked to present their findings to the class with emphasis on the practical lessons learned by course participants which reinforce sustainable management and IREM theory taught in the course.

TAKE HOME MESSAGES

Anticipated lessons learned by course participants in completing the case study and site visit might include:

1. The importance of understanding how local communities use wetland resources and how their activities are impacting the resource as a precursor to empowering local people with both the knowledge and resources to management resources in a sustainable manner.
2. Recognizing that rural poverty is a common driver for unsustainable resource management practices by local communities, management responses should include consideration of how to diversify sources of income for the community so as to reduce pressure on local resources.
3. Alternative uses of resources should be explored by local communities to reduce pressure on valued resources (e.g., use of dried *Mimosa pigra* as fuelwood instead of wood collected from the flooded forest) through transfer of appropriate technologies from other countries.

REFERENCE READING

Anonymous. 2000. Meeting Report on First Stakeholder Discussion on Threats to Boeung Thom and Suggested Solution Between Entangled Institutions and Local Users in Kampong Cham Province. Kampong Cham Inventory and Management of Cambodian Wetlands Project.

Anonymous. 2000. Summary Report of Discussion Meeting on Solutions and Agreement Related to Boeung Thom Management in Kampong Cham Province. Kampong Cham Inventory and Management of Cambodian Wetlands Project.

Hydrology Aspects at Boeung Thom, Kampong Cham Province. In Khmer.

Study on Wildlife, Fish and Water Birds in the Great Lake. In Khmer.

Study on the Situation of the Flooded Forest at Boeung Thom, Kampong Cham Province. In Khmer.

FIGURES

