

VIENTIANE URBAN WETLAND CONSERVATION AND PROTECTION

PURPOSE

This case study examines how urban development in Vientiane, Lao PDR is resulting in the destruction of urban wetlands. Course participants will learn how a combination of poor environmental awareness and low priority given to wetland conservation in planning for the city's growth and development have

accelerated degradation and destruction of wetlands in and around Vientiane. The important hydrological and ecological functions and economic value of wetlands (e.g., water supply, flood control and flow regulation, nutrient retention, wastewater treatment, fisheries, aesthetics) will be highlighted in arguing the critical need for enhanced conservation and protection of urban wetlands in all Mekong River Basin riparian countries.

ETP1 COURSE TOPIC COVERAGE:

- ▶ SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL AWARENESS
- ▶ ENVIRONMENTAL SCIENCE IN THE MRB
- ▶ DISTURBANCES TO AQUATIC ECOSYSTEMS IN THE MRB
- ▶ CUMULATIVE EFFECTS ASSESSMENT (CEA)
- ▶ INTEGRATED RESOURCE AND ENVIRONMENTAL MANAGEMENT (IREM) CONCEPTS AND BENEFITS
- ▶ IREM PRACTICAL TOOLS FOR IMPLEMENTATION

ISSUES

Specific issues highlighted by this case study are:

1. Poor environmental awareness as a contributing factor in loss of urban wetlands
2. The scope and limitations of planning responses in protecting wetlands
3. The critical importance of protecting remaining urban wetlands before their functional capacity has been irredeemably diminished
4. Long-term economic costs of wetland degradation and destruction

LEARNING OBJECTIVES

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

- Define 'wetland' and list their identifying characteristics
- Give examples of each of the major wetland functions (i.e., hydrology, ecological)
- List urban development activities which are impacting wetlands in and around Vientiane and in their own cities
- Detail the environmental consequences of urban wetland loss in Vientiane
- Itemize the short- and long-term economic costs of wetland loss in Vientiane

- Suggest possible planning and management responses to conserve and protect urban wetlands
- Identify day-to-day actions which could be taken by individuals to conserve and protect urban wetlands

PROJECT SUMMARY

Introduction

Extensive areas of wetland used to be found in Vientiane province, Lao PDR. These wetlands historically linked into a network which was recharged annually by natural streams, rivers and groundwater. Today, the wetlands have been fragmented into at least nine different remnants, five of which (i.e., That Luang, Nong Tha, Nong Chanh, Nong Duang and Nong Boen) are situated in and around the city of Vientiane. As the city has progressively developed and expanded to accommodate a growing population, the remaining wetlands have become increasingly isolated and their capacity to function effectively has been greatly diminished.

Major wetland functions which are of direct importance to Vientiane city residents include waste assimilation and groundwater recharge. Wetlands also provide critical habitat for fish and wildlife. Although fish protein constitutes a large part of the local diet (i.e., an estimated 70% of food protein in Lao PDR comes from aquatic resources), the role of urban and peri-urban wetlands in providing breeding, rearing and feeding habitat for capture fisheries in and around Vientiane is poorly understood.

Arguably, a lack of understanding of the ecological and economic value of wetlands is a key contributor to their rapid destruction in Vientiane. The low priority given to conservation and protection of urban wetlands is a consequence of shortsightedness of planners, environmental managers and the public in failing to recognize the economic value of the city's wetlands and the poorly understood hydrological and ecological functions of wetlands.

Threats to Vientiane's Urban Wetlands

Loss of urban wetlands in Vientiane has resulted from the cumulative impact of multiple factors. General threats to all of the city's remaining wetlands are briefly characterized in the following sections.

Physical Destruction and Drainage

Large areas of wetlands in and around Vientiane have been indiscriminately filled to create additional land for residential and commercial building construction. The sequence of wetland loss typically begins with fragmentation of wetlands due to road construction following by piecemeal reclamation for individual construction projects until the entire wetland disappears. Other smaller wetlands around the city have been lost to dumping of solid waste. In addition to direct filling of

wetlands, development-related changes to the hydrological regime has seriously harmed some wetlands. For example, construction of a system of drainage ditches in the city has caused some wetlands to dry out.

Water Pollution

Dramatic increases in contaminant loading in run-off from developed areas of the city have significantly decreased wetland water quality. Major wastewater streams entering urban wetlands are untreated storm water and sewage discharges. In addition, direct dumping of household wastes and industrial effluents is of increasing concern. Impacts of decreased water quality on fish, other aquatic organisms and water birds are not as yet well understood.

Overexploitation

Remaining wetlands are subject to increasing pressure. Unsustainable harvesting of fish in some of the larger wetlands is thought to be occurring as evidenced by observed reductions in catch success and fish size.

Major Wetlands at Risk in Vientiane

Specific risks to major wetlands located in and around Vientiane are examined in this section.

Nong Chanh

The Nong Chanh wetland covers an approximately 12 hectare area in the center of the city. This wetland is an important historical landmark because Vientiane was named Nong Chanh prior to being colonized by the French. The wetland was probably part of the old Mekong River channel and most water drained into the Hong Khe tributary before discharging into the That Luang marsh. Consequently, the Nong Chanh wetland has historically had an important flood retention function within the river.

Nong Chanh is located immediately adjacent to the busy Morning Market which is an important outlet for food and other goods sold in the city. Many of the people living in the area actively use the wetland. Water hyacinths, *Ipomoea aquatica*, are harvested for food and several other aquatic plants such as *Eichornia crassipes* and *Lemna* spp are utilized as animal and poultry feed. Fishing is common and there is some agriculture in fenced off areas or under houses that are built around the wetland perimeter. Although much of the food is for subsistence consumption, some is sold in the nearby Morning Market, providing good incomes for some households. Of concern from a health perspective, is the practice of local residents of using the water from the wetlands for bathing and possibly for washing produce or other food sold in the market.

Water quality monitoring and surveys of aquatic biota at Nong Chanh, undertaken since 1990 by the Department of Forestry Wetland Management Program and by the Mekong River Commission, has shown that there is a high vegetation biomass and elevated contaminant and nutrient concentrations associated with domestic wastewater discharges.

The Nong Chanh wetland has also been badly affected by changes to the hydrologic regime and by infilling. The wetland was recently divided by the Hong Thong stormwater canal (i.e., part of a major infrastructure project in Vientiane). Reclamation of the wetland for construction of houses and business remains unchecked as no permits are required for developing in the wetland. Ownership of the Nong Chanh wetland is unclear – although it is reputed to be owned by two individuals, unauthorized use of the wetland by developers is common. Clarification of land ownership will be essential before any actions can be taken to protect and restore the wetland.

Nong Tha

Nong Tha is another wetland situated in Vientiane municipality, approximately 3 km from the center of the city. Although its exact size is not known, the Nong Tha wetland is estimated to cover approximately 25 ha. This highly productive wetland is used extensively by the local population for commercial and subsistence purposes. Aquaculture, plant harvesting and fishing are common activities, with the same plant species as described for Nong Chanh being harvested. Fish productivity is thought to be high in comparison with the Non Chanh wetland.

The Nong Tha wetland is increasingly being impacted by residential encroachment which has resulted in extensive filling of its northern portion for house construction. No permitting requirements or enforcement activities are apparent to prevent the continued development of this wetland.

That Luang

The That Luang marsh is one of the largest wetlands in peri-urban Vientiane covering an area of 68 km². It is one of several depressions in the 500 km² Houay Mak Hiao catchment and tributary, which are flooded during the rainy season. In the southern part of the That Luang marsh, the Houay Mak Hiao meanders for 53 km before it flows into the Mekong River.

Approximately half of That Luang's 2,000 hectares is under hoe cultivation. In addition, an estimated 15,000 people are involved with fishing-related activities on both commercial and subsistence levels. Fish ponds are generally located along the margins of the marsh.

Numerous activities are affecting the wetland's natural functions. Examples include the construction a drainage canal through the swamp by the Vientiane municipality and the construction of a pumping station to remove water for paddy irrigation. The recently-constructed storm water drainage system for Vientiane is a major

concern as untreated storm water and domestic sewage now discharges directly into the marsh. Results of water quality studies have also indicated that seepage of saline groundwater into the marsh may be occurring which would have a dramatic impact on the marsh ecosystem. Other threats to the That Luang marsh are effluent discharges from the brewery at Salakham and encroachment by residential housing development.

Other Wetlands

In addition to the three wetlands discussed above, six other wetlands are situated in the Vientiane municipality. Two of these six located directly within Vientiane's urban area are the Nong Duang and the Nong Boen wetlands.

The Nong Duang wetland is located along the road to Vientiane's airport. Wetland species found in this wetland are generally the same as in the other wetlands and there is active fishing and plant harvesting by the local communities. Threats to this wetland include the discharge of raw sewage and construction of a new road that has effectively divided the wetland into two sections and impeded water exchange. The wetland is rapidly disappearing as a result of a recent increase in reclamation of the wetland for residential and commercial uses.

Nong Boen wetland is a badly degraded wetland which has been largely reclaimed for residential housing. Household wastes are discharged directly into the wetland. Although the wetland is badly fragmented, it continues to function as part of adjacent wetlands, as evidenced by a water flows into Nong Boen and the remnant fishery which remains. Notably, the World Health Organization and World Food Programme offices are situated on a previously reclaimed area of the wetland.

SITE VISIT METHODOLOGY

Course participants will have an opportunity to learn more about Vientiane's urban wetlands during a one day duration site visit. A briefing will be provided by resource persons from the Environment Research Institute and the Institute of Housing and Planning introducing some of the urban wetlands in and around Vientiane and development-related threats to these wetlands. Course participants will then visit representative wetlands to observe conditions and gather additional information through questions to the resource persons and local residents. During the visit, participants should consider the following questions:

- Why are wetlands important ecologically?
- What impacts are urban development projects in Vientiane having on wetlands?
- Are wetlands valued by city residents?
- Do you think that wetlands should be protected?
- Do wetlands have cultural and/or aesthetic value?
- What are the development priorities in Vientiane?

- Who is responsible for conserving and protecting urban wetlands?
- What would you recommend as appropriate planning and management responses to wetland loss?
- What will be the status of urban wetlands in 5 years? 10 years? 20 years?
- What are the short- and long-term costs associated with wetland loss?

On completion of the site visit, participants will discuss their findings with emphasis on the practical lessons learned, which reinforce sustainable development, environmental awareness, IREM and CEA theory taught in the course.

TAKE HOME MESSAGES

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

1. Urban wetlands are subject to cumulative impacts of development activities. As such, an integrated planning and management approach necessary to determine the best strategy to effectively address threats to wetlands in planning the growth of cities.
2. Wetland conservation and protection does not appear to be a high priority in Vientiane as the city continues to develop and the population grows. Possible reasons for this situation include: (i) poor planning where development decisions are made by default (i.e., it's already occurring so it's too late to act); (ii) a lack of vision in planning our cities (e.g., thinking about the livability of cities and quality of life); and (iii) failure to include non-monetary values in determining the most economically beneficial development options.
3. The ultimate success of wetland conservation and protection efforts is contingent of changing people's perceptions about the value of wetlands – encompassing both intrinsic (e.g., scenic, recreational, cultural, aesthetic) and economic values (e.g., groundwater recharge, wastewater treatment, fisheries).

REFERENCE READING

Wetland Management Programme. 1993. Excerpts from Progress Report. Lao Wetland Management Project. Mekong Secretariat.

JICA. 1990. Feasibility Study on Improvement of Drainage System in Vientiane. Draft Final Report. Volume 1 Main Report. Japan International Cooperation Agency.