INTEGRATION OF ENVIRONMENTAL MANAGEMENT SYSTEM FOR ECOTOURISM DEVELOPMENT IN SRI NAN NATIONAL PARK, NAN PROVINCE, NORTHERN THAILAND

T. Utarasakul¹, C. Lekprayoon, A. Pradatsundarasar and K. Thirakhupt²

1. Inter-Department of Environmental Science, Chulalongkorn University, Bangkok (THAILAND)
2. Department of Biology, Faculty of Science, Chulalongkorn University, Bangkok (THAILAND)

Received September 13, 2007     Accepted December 18, 2007

ABSTRACT

Sri Nan National Park is one of the famous tourist destinations, located in Nan Province, Northern Thailand. The area of Sri Nan covers 934 square kilometers, making up with massive mountains and hill ranges with several spectacular natural environments. To date, the tourist number in Sri Nan has been increasing and so does the negative impacts on its natural environment. Therefore, this research intends to integrate the concept and principles of environmental management system to develop an ecotourism management in Sri Nan National Park. Environmental management system provides a method to integrate functional elements toward the four principles of Ecotourism: nature-based tourism, sustainably managed tourism, environmentally education-based tourism and community participation-based tourism. Prominent environmental aspects such as number of tourist, water consumption, garbage loads, parking area, and camping site were selected. At present, tourists consume water about 10.8 liters/person/ day and generate wastes 0.6 kg/person/ day. The suitable number of tourists to stay over night camping at Doi Sa Mer Dao and Pha Chu are approximately 550 persons/day. In addition, the results of this study will be used to develop suitable tourism activities and the management plan for ecotourism using holistic approaches.

Key Words : Environmental management system, Ecotourism, Social climate, Sri Nan National Park, NGOs

INTRODUCTION

In the early 1970s, the Club of Rome had presented for the first time how limited resources could set limits to growth in “our common future”. Environmental protection topic became a major issue in the 1990s after the concept of sustainable development has been introduced¹. Such concept is often associated with the sustainable agriculture, sustainable forestry, sustainable tourism and sustainable community developments².

Ecotourism has been defined as a form of sustainable tourism, which was expected to serve as a tool for both conservation and development³. The World Conservation Union’s (IUCN) Commission on National Park...
and Protected Areas describe Ecotourism as “environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features—both past and present) that promotes conservation, has low visitor negative impact and provides for beneficially active socio-economic involvement of local populations”\(^4\). Ecotourism is usually considered to be not only nature-based tourism, but also responsible travel to natural areas that conserves the environment and improves the well-being of local people. The International Ecotourism Society (TIES) determined an outline for the principles of ecotourism in Oslo Statement of Ecotourism 2007. The principles of ecotourism includes minimizing environmental impact, building an environmental and cultural awareness and respect, providing positive experiences for both visitors and hosts, providing direct benefits for conservation, providing financial benefits and empowerment for local people, and raising sensitivity to host countries political, environmental, and social climate\(^5\).

In Thailand, ecotourism is composed of 4 major key elements: nature-based tourism, sustainably managed tourism, environmentally education-based tourism and community participation-based tourism\(^6\). Ecotourism became an alternative approach to the traditional tourism under the assumption that it minimize negative impacts but maximize benefits for the local people and their environment. As a result, many researches and sustainable techniques have been conducted on tourism topic in order to reduce its negative impacts and promote sustainable tourism development. In addition, the concept of environmental management system (EMS) was applied to encourage environmental friendly activities not only in industrial sector but also in natural resource management and tourism. The EMS method has been widely used, particularly in large hotels or hotel chains, to help conduct baseline studies, train staffs, and set up an achievement and monitoring system for the selected environmental targets such as reduction of pollution, and usage of water and electricity\(^7\). Consequently, EMS concept, when integrated with various environmental aspects, is absolutely applicable for developing ecotourism in the national parks.

Nan Province is located in the Northern part of Thailand (Fig. 1). Nan currently has seven national parks, covering approximately 4,863 square kilometers. The appreciation of beauty and fascination of its natural environment is currently the prime interest among tourists. As with this aspect of interest, increasing numbers of tourists seem to realize the importance of nature conservation, and ecotourism has become more and more popular recently\(^8\). In 2004, 445,988 tourists visited Nan and 94.53% were Thai\(^9\). Among all tourists who visited Nan, 61,308 or 13.75% visited Sri Nan National Park (SNNP) which was the highest number of tourists compared to other national parks\(^10\). The area of Sri Nan, covering 934 square kilometers, made up with massive mountains and hill ranges with several spectacular natural environments. Many types of forests and tremendous species of flora and faunas exist within the park.

One of the ideas of ecotourism is causing minimal environmental damage on tourist sites \(^11,12\). Especially in mountain tourism, tourists are attracted to the mountainous destination for many reasons, including cool climate, clean air, unique landscapes and wildlife, scenic beauty, local culture, history and heritage, and nature-related activities and sports. Consequently, tourism may have a wide impact on mountain ecosystems, communities and economics\(^13\). To date, the tourist number in SNNP has been increasing and some negative
impacts on the natural environment have appeared without appropriate management plan.

Therefore, the main objective of this research is to apply an environmental management system for the ecotourism management in SNNP. In this study, EMS was applied as a method that integrate functional elements to achieve the principles of Ecotourism which further evaluate, manage, and reduce the negative environmental impacts in the tourist area.

MATERIAL AND METHODS

Environmental Management System (EMS) was applied to SNNP from April 2005 to April 2007. Environmental aspects in SNNP were identified and ecotourism management plan was developed based on the four components of Ecotourism as showed in the following:

Nature-based tourism

The data of attractive flora and fauna found at the tourist sites were collected and the tourists’ appreciation in nature was surveyed using specifically designed questionnaire.

Sustainable management

The information of tourist activities, statistics and behaviors were collected. Some environmental aspects such as water usage, wastewater treatment, waste management, garbage loads, energy consumption, number of vehicles, parking area, infrastructure, accommodation, and carrying capacity were thoroughly investigated.

Environmentally educative tourism

Baseline information on flora, fauna, and tourist sites in SNNP were collected. Additionally, the enhancement of ecotourism activities, nature trail, eco-camping sites, and media coverage program were also developed in the prominent tourist sites.

People participation

The stakeholders participated in this research were divided into two groups, local
people (tourists, local people and park officers), and policy makers (government, sub-district administration organization, tourist agency, NGOs, and local academic institutes). Relevant stakeholders were interviewed for the suggestions on ecotourism development.

**RESULTS AND DISCUSSION**

Environmental aspects in SNNP were identified in this study (Table 1). The identification results were divided into four major groups based on ecotourism components as follows:

<table>
<thead>
<tr>
<th>Environmental Aspects</th>
<th>Type of Tourist Sites in Sri Nan National Park</th>
<th>Restaurant</th>
<th>Accommodation</th>
<th>Restroom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Landform</td>
<td>Rapid</td>
<td>Cave</td>
<td>Mountain</td>
</tr>
<tr>
<td>Number of tourists</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Garbage</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Water usage</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Wastewater</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Energy</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Car park</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Carrying capacity</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Two parameters, the number of tourists and the amount of garbage, were mentioned in every type of tourist sites, whereas the others such as water usage, wastewater, energy, car park capacity and carrying capacity were focused in some related areas.

**Nature-based tourism**

The information on biodiversity, attractive flora, faunas and tourist sites were focused. Tourist site classification and tourism activities in SNNP are shown in Table 2.

SNNP has Nan River flows in north-south direction through the valley surrounded by intricate mountain range. Mixed deciduous and dry dipterocarp forests are commonly found along both banks of the river while hill evergreen, dry evergreen, and pine forests are dominantly on the mountain. In addition, the information of popular tourist sites in SNNP was thoroughly reviewed and investigated as followed;

Pha Chu Cliff covers 2,775 square meters of camping site and provides good viewpoint overlooking at the sea of mist and Nan River below. The flagpole on the cliff is the highest pole in Thailand. More than 500 tourists stayed overnight camping during long weekend particularly in winter season. Due to the massive tourists visiting Pha Chu for camping without limit regulation, some problems such as the lack of camp site and car park, and water shortage occurred in the area.
Table 2: Tourist site classification and tourism activities in Sri Nan National Park

<table>
<thead>
<tr>
<th>Type</th>
<th>Tourist sites</th>
<th>Site characteristics</th>
<th>Major tourist activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landform</td>
<td>Sao Din Na Noi</td>
<td>Admiring scenery, and flora watching</td>
<td></td>
</tr>
<tr>
<td>Rapid</td>
<td>Kang Luang</td>
<td>Admiring scenery and picnic</td>
<td></td>
</tr>
<tr>
<td>Cave</td>
<td>Tam Luang</td>
<td>Cave exploring</td>
<td></td>
</tr>
<tr>
<td>Mountain</td>
<td>Doi Sa Mer Dao</td>
<td></td>
<td>Camping, Sea fog, sunset, and sunrise scenery</td>
</tr>
<tr>
<td></td>
<td>Pha Chu Cliff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir</td>
<td>Pak Nai Fishery Village</td>
<td></td>
<td>Admiring scenery and relaxing</td>
</tr>
</tbody>
</table>

Doi Sa Mer Dao camping site covers area approximately 1,520 square meters. Doi Sa Mer Dao is presently a popular tourist destination, especially during new year festival 2006, more than 700 tourists stayed overnight camping in order to admiring sea of fog, sunrise and beautiful sunset.

Sao Din Na Noi Landform is the natural wonder, resembling a small version of the Grand Canyon, covers 32,000 square meters. Sediments from the streams flew past the basin, created by the drift and collapse of the earth crust or the erosion by the rain, accumulated and formed into pinnacle shapes. Geological
evidences showed these pinnacles dated back to the late Tertiary period, about 3,000-10,000 years ago. This site was presumably seabed at the time. The discovery of stone bracelets and ancient axes, now kept at Nan National Museum, implied that the old Stone Age people might have lived there. Moreover, Sao Din was recorded in the Unseen in Thailand due to the remarkable species, *Gardenia Turgida* Roxb. (in Thai “Dig Diam”), which always shake itself when touched at any branches. Consequently, during high season, more than 1,500 tourists visit Sao Din daily.

Kaeng Luang Rapid contains natural islets carved by the Nan River. Rock knoll and long white beach reveal themselves in summer. At Kaeng Luang many fishes species have been found such as *Hemibagrus filamentus*, *Puntius brevis*, *Morulius chrysophyedian*, *Hemibagrus filamentosus*, *Pangasianodon hypophthalmus*, *Hinicorhynchus lobatus*, *Hinicorhynchus siamensis*, *Micronema apagon*, *Channa micropeltes*, and *Oxyeleotris marmoratus*.

Pak Nai Fishery Village was once a small village by the Nan River, located 60 kilometers from the park Headquarter. Construction of Sirikit Dam has changed Pak Nai into a fishery village by creating the inland lake encircled with green mountain ranges. Restaurants on the rafts serve freshwater fish from the reservoir. Many fish’s species have been recorded in Pak Nai, such as *Rasbola* sp., *Ompok krattensis*, *Pangasianodon gigas*, *Mastacembelus armatus*, *Syncrossus helodes*, *Yasuhioktakia Nigrolineatus* and some of these are rare species.

**Sustainable management**

The information of tourist activities, statistics and behaviors has been collected. More than 78% of tourists visited SNNP between December and April for camping, admiring sea of fog, sunrise and sunset. Among this, 49.15% stayed overnight camping. Presently, SNNP has two camping sites covering 4,295 square meters and the car parks close to camping sites are not enough to support the tourists during high season. Examples of environmental problems caused by tourist impact are the lack of camping site and car park, water shortage, waste management, and overcrowding. Therefore, this research was conducted to assess the optimum carrying capacity of the camping sites and car parks. Furthermore, behaviors and resources consumption of the tourists were also investigated (Table 3).

Study results showed that tourists need the space of at least 1.87 square meters per person in the camping area. Due to the water shortage problem during high season, limiting factor of the optimum number of tourists is the water supply. As a consequent, the suitable number of tourists that should stay overnight camping in SNNP is approximately 550 persons per night.

Looking at the tourist behavior aspect, most tourists like to visit SNNP during winter when the weather is very cold (5-20 degree Celsius). As a result, they consume water only for necessary activities such as cleaning dishes and toilet use. Only 10.8 liters of water was estimated to be consumed per person per day. However, wastewater from canteen and toilets are discharged straight to the environment without wastewater treatment system. Therefore, to reduce the environmental impact, usage of chemical detergent should be avoided.

Waste management system is also considered in the study. Waste characteristics in SNNP showed that 50% of the total waste generated by tourists was organic. Recyclable wastes such as plastic, glass bottle, polyethylene, and aluminum can comprised to another 50% of the total waste. Therefore, waste separation should certainly be implemented in the national park. The organic
wastes should be composed while other wastes should be transferred to the recycle process.

Environmental education
The information on prominent flora, fauna and tourist sites were collected in SNNP. The attractive tourist sites are Sao Din Na Noi, Pha Chu, Doi Sa Mer Dao, Kaeng Luang and Pak Nai Fishery Village. The major purpose of tourists visit in SNNP is for admiring sea of fog and relaxing in natural beauty environment by staying overnight camping at Pha Chu and Doi Sa Mer Dao. Tourist activities in SNNP are presently focused on camping and admiring the beautiful scenery. As a result, some environmental friendly activities such as eco-camping, star observation, landscape interpretation, bird watching, environmental youth camp should be developed in SNNP. These activities encourage tourists and young generation to discover beyond the nature. The way to increase natural resources protection awareness among tourists is to enhance their understanding on relationships of living species in the ecosystem because they can not save and conserve the nature without loving and understanding the value of natural environment.

People participation
The stakeholders in SNNP who participated in ecotourism development include national park officers, tourists, local people, tourism operators, and local academic institutes. The in-depth interview and questionnaire revealed that people understood the concept of ecotourism and took human impact on environment into consideration. Currently, the park officers come from the area close to the national park. Local people also involved with tourism activities by selling their local food, seasonal fruits, and local handicraft to tourists. Some of them have involved throughout the ecotourism process beginning with planning and participating in tourism activities, evaluating tourism impact, and monitoring situation of natural resources in the national park.

Table 3: Resource consumption of tourists in camping site at Sri Nan National Park

<table>
<thead>
<tr>
<th>Information</th>
<th>Unit</th>
<th>Maximum Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camping area*</td>
<td>1.87 m²/person</td>
<td>2,296 persons (based on camping site area)</td>
</tr>
<tr>
<td>Water consumption</td>
<td>10.8 liters/person/day</td>
<td>Support 250 persons/day (Doi Sa Mer Dao)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support 312 persons/day (Pha Chu)</td>
</tr>
<tr>
<td>Waste generated</td>
<td>0.6 Kg/person/day</td>
<td>-</td>
</tr>
<tr>
<td>Tent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>7 m²/tent (4 persons)</td>
<td>613 tents</td>
</tr>
<tr>
<td>Car</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>12.8 m²/car</td>
<td>121 cars (Doi Sa Mer Dao)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65 cars (Pha Chu)</td>
</tr>
</tbody>
</table>

*Ref: Adapted from visitor carrying capacity guidelines16.
CONCLUSION

From this study, EMS can solve some environment impacts from tourism in SNNP by integrating the holistic approaches. The major problems occurred during high tourism season are camp site and car park limitation, water shortage, and waste management. To solve such problems, the integration of environmental techniques has been applied and investigated in the study area. Baseline information on carrying capacity, solid waste management, water consumption, and eco-camping site were thoroughly studied. The recommendations for ecotourism development in SNNP are:

♦ Develop public transportation to SNNP during long weekends. For example, provide shuttle bus at Na Noi District.
♦ Provide a car park at the junction to Sao Din Na Noi and a station for bicycle renting. This will enhance tourists to enjoy and appreciate the local community along the way to Sao Din.
♦ Provide tourists an opportunity to learn the local lifestyle by offering a short tour guide on handicraft making, local food cooking, Lanna musical instruments playing, and Lanna language learning. These activities maybe provided at popular tourist attraction sites.
♦ Agro-tourism can also be developed near Sao Din Na Noi. Tourists may visit Tamarind orchard and buy local products from local people.

Finally, to achieve the long term of ecotourism development, SNNP needs to continue developing and monitoring tourism situation and its impacts on regular basis by staffs and local stakeholders.

ACKNOWLEDGEMENT

This project was supported by Korean Foundation for Advanced Studies (KFAS) and the Graduate School of Chulalongkorn University. Special thanks extend to the staff of Sri Nan National Park, tourists and local people, who has provided important informations, helped and given consent to this work.

REFERENCES


Foreign Subscribers
may send their money through

WESTERN UNION | MONEY TRANSFER
Service

Good environment
is
Good health