

CHAPTER IV

RESULTS AND DISCUSSIONS

4.1 Determination of parameters to indicate the potential of tourist site

4.1.1 *Current Situation of Prominent Sites in Sri Nan National Park*

The general information of tourism in Sri Nan national parks was collected by reviewing all kinds of published materials. The questionnaire was designed for park authorities in order to compile the data of the current situation of tourism and facilities in national park. Several aspects of information gathered were grouped into physical, natural resource, environmental and tourism data as follows (Appendix A);

Physical data: geography, location, distance from Nan Province, contact address and telephone, head officer, suitable duration for traveling, weather condition, road condition, and electricity

Natural resource data: nature trails, prominent species and prominent tourist sites

Environmental data: water supply, waste separation, solid waste and wastewater management

Tourism data: tourism activities, number of tourists, accommodation, car park (location and capacity), public relation, restaurant, restroom, security for tourists, staff, research and current problem.

Sri Nan National Park is located 60 kilometers from Nan Province, 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. 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 stay 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.

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 mist, 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 30,000-10,000 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 had 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*, *Puntilus brevis*, *Morulius chrysophykadian*, *Hemibagrus filamentus*, *Pangasianodon hypophthalmus*, *Hinicornhynchus lobatus*, *Hinicornhynchus 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 Headquarters. 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*, *Yasuhikotakia nigrolineatus* (Vidthayanon, 2005) and some of these are rare species.

The information on biodiversity, attractive flora, faunas and tourist sites, tourist site classification and tourism activities in SNNP were classified based on the definition of the Office of the National Environment Board as shown in Table 4-1. The locations of each tourist site located in SNNP are shown in figure 4-1.

Table 4-1 Tourist site classification and tourism activities in SNNP

| Type | Tourist sites | Site characteristics | Major Tourists activities |
|-----------|--|---|--|
| Landform | Sao Din Na Noi Kok Sua |  | Admiring scenery, and flora watching |
| Rapid | Kang Luang |  | Admiring scenery and picnic |
| Cave | Tam Luang |  | Cave exploring |
| Mountain | Doi Sa Mer Dao Pha Chu Cliff |  | Camping, Admiring sea of mist, sunset, and sunrise scenery |
| Reservoir | Pak Nai Fishery Village |  | Admiring scenery and relaxing |

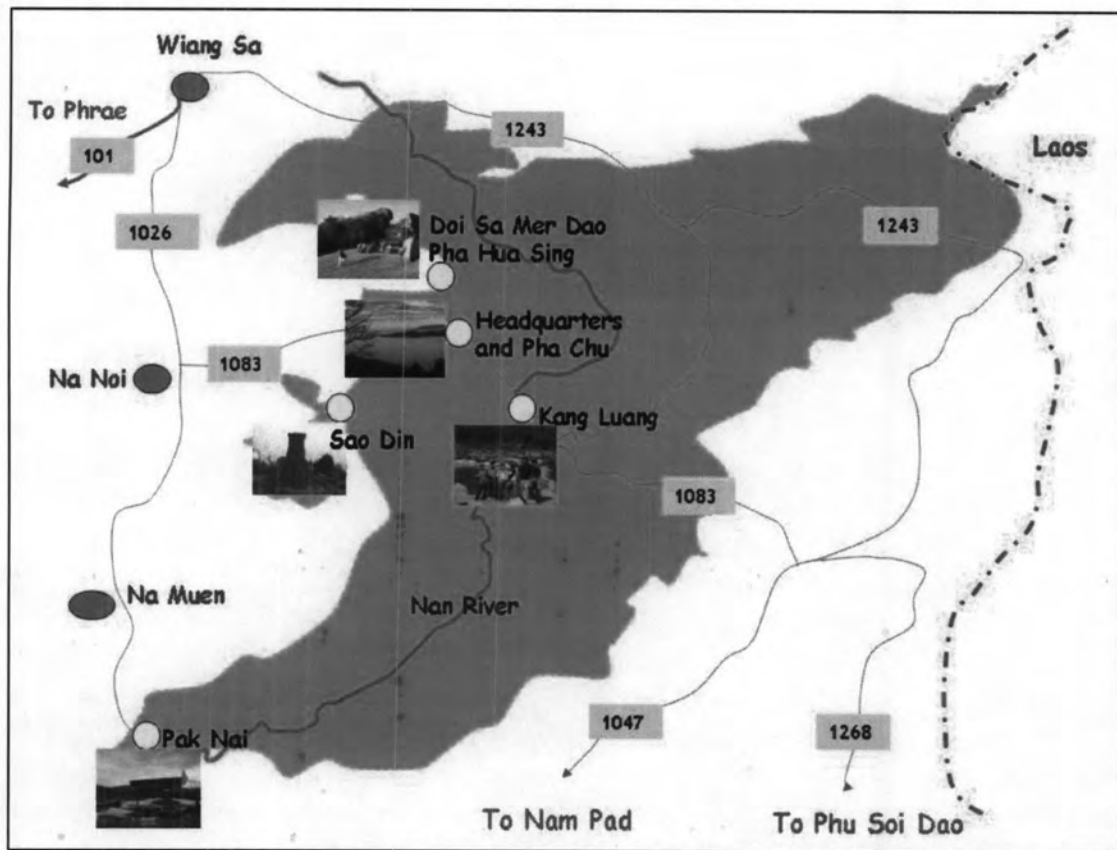


Figure 4-1 Prominent tourist sites located in Sri Nan National Park.

4.1.2 Indicators of Tourist Site Potential and Parameters

In order to identify specific indicators, the review literature of site assessment and ecological indicators including researches conducted in specific tourist site were thoroughly concerned and evaluated. The assessment of nature sites potential for ecotourism in 7 National Parks of Nan were investigated as presented in Table 4-2. Moreover, tourism impact assessment was conducted to determine the impact level that occurred in the national park by weight score method (Table 4-3).

Table 4-2 Assessment of nature sites potential for ecotourism in Nan National Park

| National Parks | Σw_i | $\Sigma r_i w_i$ | 1.Resource attractiveness | 2.Environmental awareness | 3. Ecotourism activities | 4. Accessibility | 5. Safety | 6. Conventional recreation | Σw | $\Sigma r_i w_i$ | EP | Class |
|-----------------------------|-----------------|------------------|------------------------------|------------------------------|-----------------------------|------------------|-----------|-------------------------------|-----------------|------------------|------------------------------|-------|
| <i>Rated score</i> (1-3) | | | $\frac{\Sigma r_i w_i}{w_i}$ | r11 | r12 | r13 | r14 | r15 | | | $\frac{\Sigma r_i w_i}{w_i}$ | |
| <i>Weighted score</i> | $\Sigma w_i=47$ | | | W11/5 | W12/4 | W13/1 | W14/4 | W15/5 | $\Sigma w_i=66$ | | | |
| Doi Phu Ka | | 107 | 2.28 | 3 | 2 | 2 | 2 | 2 | | 150 | 2.27 | H |
| Sri Nan | | 101 | 2.15 | 3 | 1 | 3 | 3 | 2 | | 145 | 2.20 | H |
| Mae Cha Rim | | 89 | 1.89 | 3 | 2 | 3 | 3 | 2 | | 137 | 2.08 | H |
| Tam Sa Koen | | 94 | 2.00 | 3 | 2 | 1 | 2 | 2 | | 136 | 2.06 | H |
| Khun Nan | | 64 | 1.36 | 2 | 2 | 1 | 2 | 2 | | 101 | 1.53 | M |
| Nantaburi | | 84 | 1.79 | 2 | 2 | 1 | 2 | 2 | | 121 | 1.83 | M |
| Khun Sa Tan | | 74 | 1.57 | 2 | 2 | 1 | 2 | 2 | | 111 | 1.68 | M |

H = High potential for ecotourism

M = Moderate potential for ecotourism

Table 4-3 Risk assessment analysis in national parks of Nan

| National parks | Impact on wildlife | Impact on flora | Impact on environment | ΣW_i | $\Sigma R_i W_i$ | 1. Impact on ecosystem | 2. Impact on culture and community | 3. Impact on ancient remain | ΣW_i | $\Sigma R_i W_i$ | Impact of tourism | Class |
|--------------------------|--------------------|-----------------|-----------------------|-------------------|------------------|------------------------------|------------------------------------|-----------------------------|-------------------|------------------|------------------------------|-------|
| <i>Rated score (1-3)</i> | R16 | R17 | R18 | | | $\frac{\Sigma R_i W_i}{W_i}$ | R19 | R20 | | | $\frac{\Sigma R_i W_i}{W_i}$ | |
| <i>Weighted score</i> | W16/5 | W17/4 | W18/5 | $\Sigma W_i = 14$ | | | W19/5 | W20/5 | $\Sigma W_i = 24$ | | IP | |
| Doi Phu Ka | 1 | 3 | 2 | | 27 | 1.92 | 2 | - | | 37 | 1.54 | M |
| Sri Nan | 2 | 2 | 3 | | 33 | 2.36 | 2 | - | | 43 | 1.79 | M |
| Mae Cha Rim | 2 | 1 | 3 | | 29 | 2.07 | - | 2 | | 39 | 1.63 | M |
| Tam Sa Koen | 2 | 1 | 2 | | 24 | 1.71 | 2 | - | | 34 | 1.42 | M |
| Khun Nan | 2 | 2 | 2 | | 28 | 2.00 | 1 | - | | 33 | 1.38 | M |
| Nantaburi | 2 | 1 | 2 | | 24 | 1.71 | 2 | - | | 34 | 1.42 | M |
| Khun Sa Tan | 2 | 2 | 2 | | 28 | 2.00 | 1 | - | | 33 | 1.38 | M |

M = Moderate Impact from Tourism

The results showed that, Sri Nan National Park was rated in high level for ecotourism as same as Doi Phu Ka, Mae Cha Rim and Tam Sa Koen National Park where as Khun Nan, Nan Ta Bu Ri, and Khun SaThan National Park were rated in moderate level. Sri Nan was rated as high potential level due to the efficiency of environmental awareness, accessibility, and safety indicators. Moreover, from tourist statistics, Sri Nan had the highest number of tourists visited compared with other national parks because of the variety of natural tourist sites and beautiful natural scenery. This attractiveness may cause unexpected effects to the natural environment if proper management plan lackey.

Therefore, risk assessment analysis was also conducted in order to determine the impact level that occurred in each national park by focusing on 3 mainly impacts including of impact on ecosystem, culture and community, and ancient remain. The result showed that, all national parks were rated as having moderate risk from tourism activities. Among this, Sri Nan National Park had the highest impact compared to others. The serious impact was the impact on environment which occurred in major tourist sites in high tourist season.

Consequently, Sri Nan was selected to study particularly in assessment of tourist site potential and application of environmental management system for ecotourism development. In addition, the significant indicators from previous data was applied and investigated in the prominent tourist site of Sri Nan.

Recently, Sri Nan National Park has 5 types of tourist sites classified based on the definition of Office of National Environment Board, Thailand. The indicators that indicate the potential of tourist site for ecotourism in Sri Nan National Park have been categorized based on 4 components of ecotourism. The result of this study established 20 indicators which can indicate tourist site potential for ecotourism as shown in Table 4-4. Six indicators of nature based tourism,

8 indicators of sustainable management tourism, 4 indicators of environmentally educative tourism, and 2 indicators of people participation were identified. The selected indicators were separated in two groups which are common indicators for every types of tourist site and specify indicators for each tourist site.

Benchmark for identifying the levels of indicator's significant and criteria was followed by Thailand Ecotourism Site Standard (ERIC, 2006), Nature Site Evaluation Techniques (ERIC, 2003), WTO indicators of Sustainable Development for Tourism Destinations (WTO, 2004), related researches and literature reviews. The evaluation form for common indicators was developed and shown in Appendix B-1.

The evaluation form to determine indicators of mountain, landform, reservoir, and rapid was developed as presented in Appendix B-2 - B-5, respectively.



Table 4-4 Indicators of tourist sites, Sri Nan National Park

| Tourist sites Indicators | Landform | Rapid | Cave | Mountain | Reservoir |
|--|----------|-------|------|----------|-----------|
| Nature-based tourism | | | | | |
| Uniqueness of the site | S | S | S | S | S |
| Occasion for visit | C | C | C | C | C |
| Aesthetic value | S | S | S | S | S |
| Diversity of flora and fauna | S | S | S | S | S |
| Popularity of the site | C | C | C | C | C |
| Route scenery | C | C | C | C | C |
| Sustainable management | | | | | |
| Road condition | C | C | C | C | C |
| Distance from the main road or Headquarters | C | C | C | C | C |
| Safety | S | S | S | S | S |
| Environmentally negative impact | S | S | S | S | S |
| Waste management | C | C | C | C | C |
| Water quality | | S | | | S |
| Parking area | C | C | | C | C |
| Infrastructure and accommodation | | | | C | C |
| Environmental Education | | | | | |
| Environmentally educative activities | S | S | S | S | S |
| Environmentally educative media | C | C | C | C | C |
| Knowledge in environment and ecology of staffs and tour guides | S | | S | S | |
| Research and database | C | C | C | C | C |
| People Participation | | | | | |
| Income from tourism to local people | C | C | C | C | C |
| Local people involved with planning and tourism management | C | C | | C | |

Note: C = Common indicators,

S = Specific indicators

4.2 Tourist Site Assessment in Sri Nan National Park

4.2.1 The designed of form and methodology for tourist site assessment in this study

The ranking criteria for tourist site potential were identified as shown in Table 4-5. For evaluation or to assess tourist site potential, the evaluation form and scores were established for each indicator as show in Table 4-6 and divided into 4 major groups. When the evaluation process is complete, total scores will be compared with the standard level.

Table 4-5 Criteria and potential level of tourist site

| Scores | Level | Symbol |
|----------|-----------|--------|
| 80 - 100 | Excellent | 😊😊😊😊😊 |
| 71 - 80 | Very high | 😊😊😊😊 |
| 61 - 70 | High | 😊😊😊 |
| 51 - 60 | Medium | 😊😊 |
| ≤ 51 | Low | 😊 |

Table 4-6 Indicator assessment form

| TYPE | INDICATORS | SCORES | TOTAL |
|----------------------------------|--|------------|-------|
| Nature - based Tourism | | | |
| Common | Occasion for visit | 5 | |
| Common | Popularity of the site | 5 | |
| Common | Route scenery | 5 | |
| Specific | Uniqueness of the site | 5 | |
| Specific | Aesthetic value | 5 | |
| Specific | Diversity of flora and fauna | 5 | |
| Total | | 30 | |
| Sustainable management | | | |
| Common | Road condition | 5 | |
| Common | Distance from the main road or Headquarters | 5 | |
| Common | Waste management | 5 | |
| Common | Parking area | 5 | |
| Specific | Environmentally negative impact | 5 | |
| Specific | Infrastructure and accommodation | 5 | |
| Specific | Safety | 5 | |
| Specific | Water quality | 5 | |
| Total | | 40 | |
| Environmental Education | | | |
| Common | Environmentally educative media | 5 | |
| Common | Research and database | 5 | |
| Specific | Environmentally educative activities | 5 | |
| Specific | Knowledge in environment and ecology of staffs and tour guides | 5 | |
| Total | | 20 | |
| People Participation | | | |
| Common | Income from tourism to local people | 5 | |
| Common | Local people involved with planning and tourism management | 5 | |
| Total | | 10 | |
| Total score of indicators | | 100 | |

4.2.2 Tourist Site Assessment in Sri Nan National Park

The evaluation forms for tourist site assessment in SNNP have been designed and were evaluated in prominent tourist site. Table 4-7 shows result of evaluation scores at Doi Sa Mer Dao, Pha Chu, Sao Din, Kang Luang, and Pak Nai Fishery Village which have been evaluated during low tourist season in summer and high tourist season in winter.

The results from tourist site assessment were evaluated and identified the potential level for ecotourism as presented in Figure 4-2.

Table 4-7 Tourist site assessment in Sri Nan National Park

| TYPE | INDICATORS | SCORES | TOURIST SITES | | | | | | | | | |
|----------------------------------|---|------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------|
| | | | Sa Mer Dao | | Pha Chu | | Sao Din | | Pak Nai | | Kang Luang | |
| | | | Low | High | Low | High | Low | High | Low | High | Low | High |
| Nature - based Tourism | | | | | | | | | | | | |
| Common | Occasion for visit | 5 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| Common | Popularity of the site | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 |
| Common | Route scenery | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 |
| Specific | Uniqueness of the site | 5 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 4 |
| Specific | Aesthetic value | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 |
| Specific | Diversity of flora and fauna | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 5 |
| Total | | 30 | 21 | 21 | 23 | 23 | 24 | 24 | 20 | 20 | 23 | 23 |
| Sustainable management | | | | | | | | | | | | |
| Common | Road condition | 5 | 2 | 2 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 5 |
| Common | Distance from the main road or Headquarters | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 0 | 0 | 2 | 2 |
| Common | Waste management | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 |
| Common | Parking area | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 |
| Common | Infrastructure and accommodation | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 2 | 2 | 3 | 3 |
| Specific | Safety | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 2 | 2 |
| Specific | Environmentally negative impact | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 3 |
| Specific | Water quality | 5 | 3 | 3 | 3 | 3 | - | - | 5 | 5 | 5 | 5 |
| Total | | 40 | 27 | 27 | 32 | 32 | 30 | 29 | 22 | 22 | 24 | 24 |
| Environmental Education | | | | | | | | | | | | |
| Common | Environmentally educative media | 5 | 3 | 3 | 4 | 4 | 5 | 5 | 2 | 2 | 1 | 1 |
| Common | Research and database | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 2 | 2 | 3 | 3 |
| Specific | Environmentally educative activities | 5 | 1 | 1 | 5 | 5 | 5 | 5 | 1 | 1 | 0 | 0 |
| Specific | Knowledge in environment and ecology of staffs | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 2 | 2 |
| Total | | 20 | 11 | 11 | 16 | 16 | 19 | 19 | 8 | 8 | 6 | 6 |
| People Participation | | | | | | | | | | | | |
| Common | Income from tourism to local people | 5 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 1 | 0 |
| Common | Local people involved with planning and tourism | 5 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 |
| Total | | 10 | 3 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 3 |
| Total score of indicators | | 100 | 62 | 62 | 75 | 76 | 78 | 77 | 54 | 54 | 57 | 56 |

Note: The detail of evaluation forms presented in Appendix B

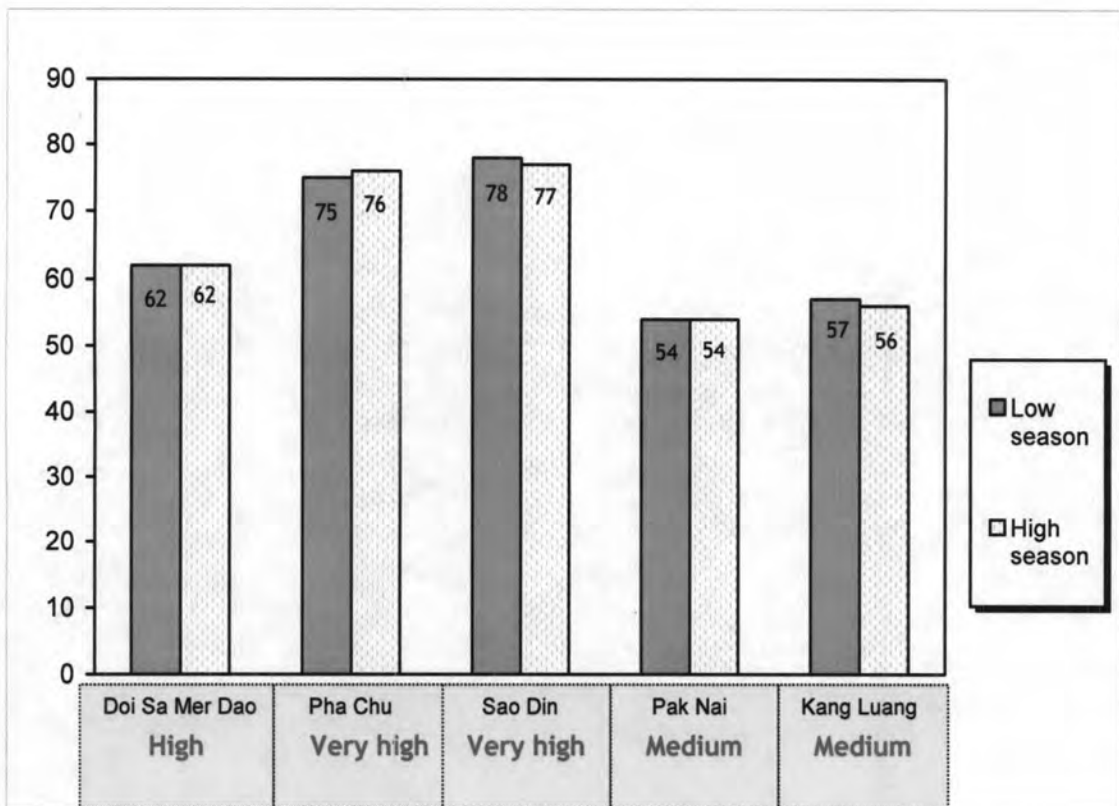


Figure 4-2 Potential of tourist sites in SNNP

Pha Chu Clift and Sao Din Landform were rated as having very high potential for ecotourism, while Doi Sa Mer Dao was in good potential and Pak Nai and Kang Luang were in medium potential.

The tourist season has little effect for ecotourism potential in tourist site; most are equal except Pha Chu, Sao Din and Kang Luang. The significant indicators varied by tourist seasonal are environmental impact and income from tourism to local people. In tourist season, especially long weekend in December, some local people bring their food, crafts, local fruits and souvenirs for selling to tourists. At the same time, negative environmental impact such as garbage appearance at Sao Din during high tourist season was occurred.

When looking in detail for each group of indicators, Doi Sa Mer Dao was rated only 21 from 30 in nature-based tourism indicators due to occasion for visit, uniqueness of the site and diversity of flora and fauna indicators. In the past, Doi

Sa Mer Dao was corn field and the owner donated this mountain to the park as a consequence of the beautiful scenery for camping, and admiring beautiful sea of mist, sunrise and sun set. For other indicators of sustainable management, environmental education, and people participation, Doi Sa Mer Dao is possible to have more potential if the road condition, car park and more environmental activities are improved.

At Pha Chu Clift, it was rated as very high potential for ecotourism because this area has been developed for more than 10 years to promote tourism. Therefore, accommodation, road condition, infrastructure, information center including media have been provided for tourists. To develop Pha Chu for better potential, it has to improve waste management system, establish more activities for tourists and searching alternative ways to enhance the collaboration of local people and national park.

Sao Din Landform was also rated in very high potential level. Sao Din is very unique by itself. In addition, with the interesting plant species "Dig Diam" and "Yah Khem Na Ri Ka", it can be a magnet for tourists to visit and add the higher scores for nature-based indicators. Environmental education indicators of Sao Din were rated in very high scores of 19 from 20, because of appropriate management. Nature trail with the interesting spot, map and information of plant species, archeology, especially staff who's very familiar in history of Sao Din made this place worthy to visit. Another alternative to develop Sao Din more attractive and has more potential for ecotourism is to establish the linkage activities between local people and tourists.

Pak Nai Fishery Village was rated as medium potential due to many reasons. The significant indicators are distance because Pak Nai is located 60 kilometers far from headquarters. Moreover, Pak Nai is still lacking of environmental friendly

activities and media. So, feasibility to improve Pak Nai's potential is to develop some tourism activities for tourists, providing map and information of species by enhancing research conducted in biodiversity of the reservoir.

Kang Luang was also rated in medium potential. The prominent reasons are because of inappropriate waste management, few information and caution about safety for tourists, none of environmental educative activities and media. However, most tourists only need to relax and admiring the scenery, therefore the park officer is encouraged to take care of this area in natural way with more concerning on safety and waste management.

4.3 Environmental Management System for Ecotourism Development

An environmental management system was applied for ecotourism development 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. EMS was applied to SNNP from December 2005 to December 2007. Environmental aspects in SNNP were identified and ecotourism management plan was developed based on the four components of ecotourism as following;

4.3.1 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 (Appendix C). Environmental aspects in SNNP were identified in this study (Table 4-8). One of the attractiveness in SNNP for tourists is to admiring sea of mist, sunrise and sunset, so the average sunrise and sunset time is recommended to display at prominent camping sites (Figure 4-3).

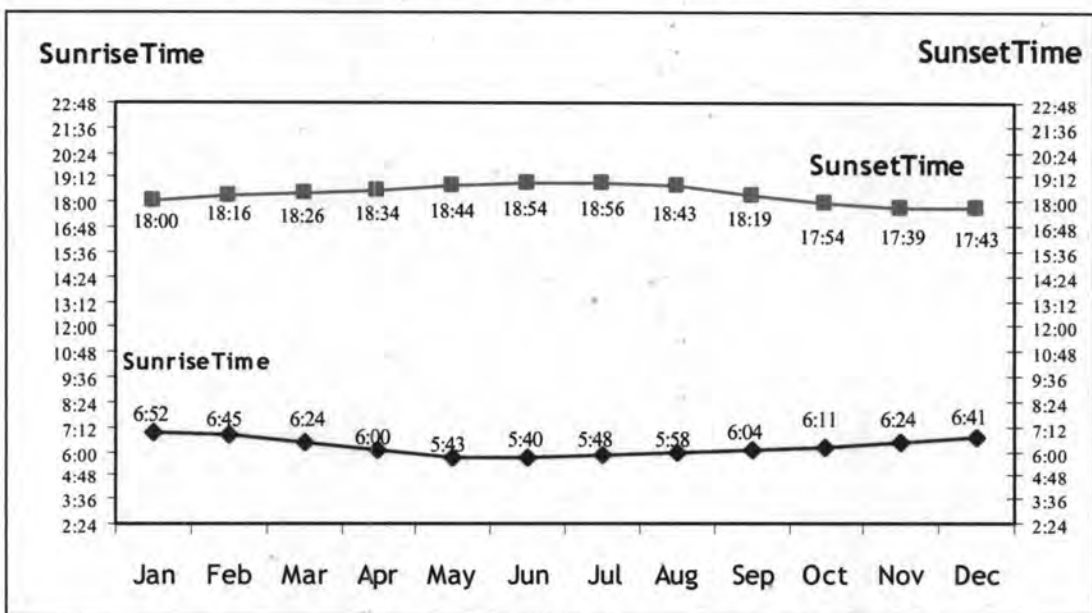


Figure 4-3 Average Sun rise and Sunset time in Nan Province 2007

Source: Thailand Meteorological Department, 2007

Table 4-8 Environmental aspects in Sri Nan National Park.

| Environmental Aspects | Type of Tourist Sites in Sri Nan National Park | | | | | Restaurant | Accommodation | Restroom |
|-----------------------|--|-------|------|----------|-----------|------------|---------------|----------|
| | Landform | Rapid | Cave | Mountain | Reservoir | | | |
| Number of tourists | ● | ● | ● | ● | ● | | ● | |
| Garbage | ● | ● | ● | ● | ● | ● | ● | |
| Water usage | | | | ● | ● | ● | | ● |
| Wastewater | | | | ● | ● | ● | ● | ● |
| Energy | | | | ● | | | ● | ● |
| Car park | ● | | | ● | | | | |
| Carrying capacity | | | | ● | | | | |

Some environmental aspects such as number of tourists and garbage are proposed to concern in every types of tourist site, whereas water usage, waste water, energy, car park, and carrying capacity were suggested in specific areas. Mountain was highly recommended for monitored every environmental aspect.

The information on biodiversity, attractive flora, faunas and tourist sites were focused. At Sao Din, 134 plant species were found and have been identified into 113 genera and 57 families (Bunma, 2004). There were 17 useful plant species, among these 9 species are used as food, 5 species for medicine, and 3 species used in another purpose.

Based on questionnaire surveyed, tourists were interested in unique species such as Dig Diam "*Gardenia Turgida* Roxb" and Yah Khem Na Li Ka "*Heteropogon contortus* (L.) Roem&Schult" at Sao Din, and Chan Pha "*Dracaena loureisi* Gagnep" at Pha Chu Cliff. There are a lot of wild animals inhabiting in the park such as banteng, gaur, serow, muntjac, binturong, pheasant, monitor lizard, elephant, bear, deer, barking dear, tiger, wild pig, wild dog, big-headed turtle, birds, snakes, and peacock which ve been recorded nearby Nan River.

At Kang Luang many fish species have been found such as *Hemibagrus filamentus*, *Puntilus brevis*, *Morulus chrysophykadian*, *Hemibagrus filamentus*, *Pangasianodon hypophthalmus*, *Hinicorhynchus lobatus*, *Hinicorhynchus siamensis*, *Micronema apagon*, *Channa micropeltes*, and *Oxyeleotris marmoratus* . As same as Pak Nai Fishery Village, many fish species have been recorded, such as *Rasbola* sp., *Ompok krattensis*, *Pangasianodon gigas*, *Mastacembelus armatus*, *Syncrossus helodes*, *Yasuhikotakia Nigrolineatus* and some of these are rare species.

4.3.2 Sustainable Management

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

The information of tourist activities, statistics and behaviors has been collected. More than 78% of tourists visited SNNP between December and April (Department of National Park, 2006) for camping, admiring sea of mist, sunrise and sunset (Figure 4-4).

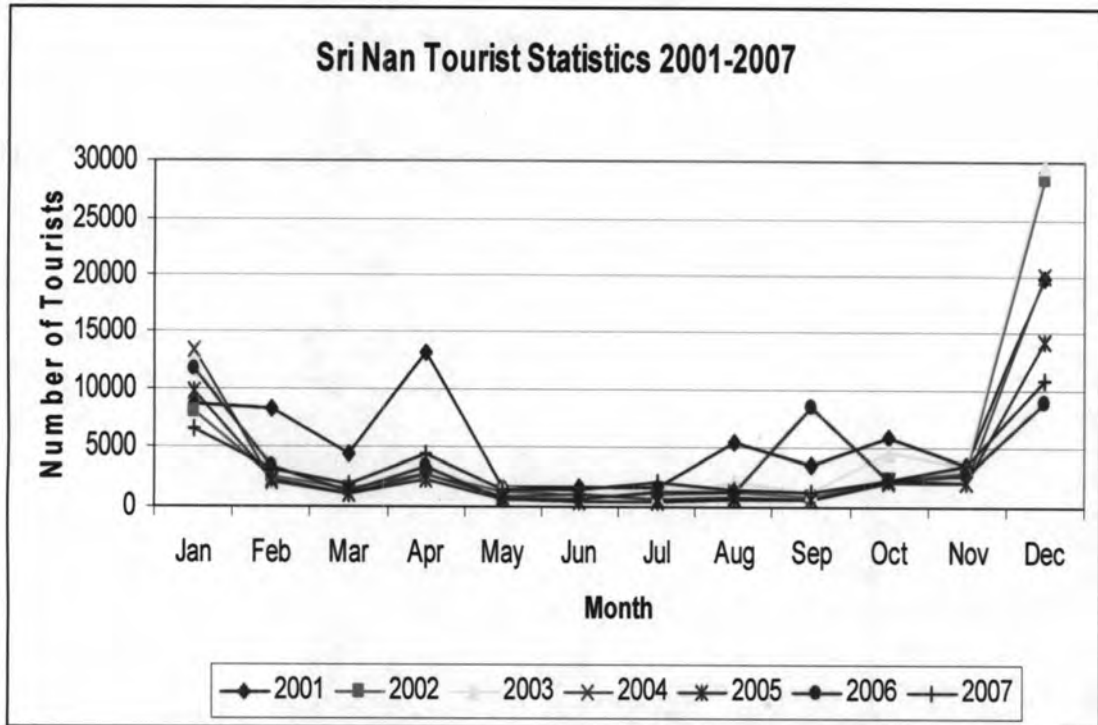


Figure 4-4 Tourist statistics in Sri Nan National Park from 2001-2007

Among this, 49.15% stayed overnight camping. Presently, SNNP has two main camping sites, Doi Sa Mer Dao and Pha Chu, covering 4,295 square meters and the car parks close to camping sites are not enough to support the tourists during high season (Figure 4-5). Examples of environmental problems caused by tourist impact are the lack of camping site and car park, water shortage, waste management, and overcrowding. Therefore, behaviors and resources consumptions of the tourists were also investigated (Table 4-9). Furthermore, this research was conducted to assess the optimum carrying capacity of the camping sites and car parks (Table 4-10).



Figure 4- 5 Camping site and car park at Doi Sa Mer Dao Mountain

$$\text{Camping area} = \Sigma (1+2+3) = \Sigma (500 + 435 + 43) = 1,520 \text{ m}^2$$

$$\text{Car park area} = 1,551 \text{ m}^2$$

Table 4-9 Data of tourists at Doi Sa Mer Dao during new year 2006-2007

| Number (maximum) | 2006 | 2007 |
|------------------|------|------|
| Tent | 141 | 211 |
| Car | 89 | 130 |
| Tourists | 643 | 811 |

Determination of Carrying Capacity

Physical Carrying Capacity (PCC) is defined as the maximum number of visitors that can physically fit into a defined space, over a particular time and can be expressed according to the following formula:

$$PCC = A \times V/a \times Rf$$

In this study, optimum space for tourists for relaxing is approximately 2 square meters per person (Florida Department of Environmental Protection, Division of Recreation and Parks) and the average length of stay for tourists which are approximately 1 night (tourist's statistics). Therefore, the physical carrying capacity at Doi Sa Mer Dao and Pha Chu was calculated as follow:

$$\text{Doi Sa Mer Dao} = 1520 \times 0.5 \times 1 = 760 \text{ tourists}$$

$$\text{Pha Chu} = 2775 \times 0.5 \times 1 = 1,387 \text{ tourists}$$

Table 4-10 Resource consumption of tourists in camping site at SNNP

| Aspects | Average Standard | Current Situation | Status |
|--|---|---------------------------------------|------------------|
| Camping area (2m ² /person) ^a | Doi Sa Mer Dao = 760 | Doi Sa Mer dao = 811* | Exceed |
| | Pha Chu = 1387 | Pha Chu = 561 | Lower |
| Area of tent (m ² /tent) | 10 (3 persons) ^b | 7(4 persons) | |
| | Doi Sa Mer Dao = 152 Pha Chu = 277 | Doi Sa Mer Dao = 211 Pha Chu = 120 | Exceed Lower |
| Water consumption (liters/person) | One -day trip: 19 Camping: 114 ^b Camping: 145 ^c | 10.8 | Lower |
| | Doi Sa Mer Dao = 250 Pha Chu = 312 | Doi Sa Mer Dao = 811 Pha Chu = 561 | Exceed Exceed |
| Waste generated (Kg/person/day) | One day trip: 0.02-0.06 ^b Camping: 0.06-0.45 ^b | 0.60 | Exceed |
| Car area(m ² / car) | > 12 ^b | 12.8 | Normal |
| Numer of cars | Doi Sa Mer Dao = 129 | Doi Sa Mer Dao = 130 | Exceed |
| | Pha Chu = 60 | Pha Chu = 65 | Exceed |

Sources:

* Maximum number of tourists

^a Florida Department of Environmental Protection, Division of Recreation and Parks.

^b The study of Carrying capacity in Khao Yai National Park. Asia Lab and Consultant. Final Report.

^c German Federal Agency for Natural Conservation (GFANC), 1997.

Study results showed that tourists need the space of at least 2 square meters per person. From the physical carrying capacity, Doi Sa Mer Dao is possible to support 760 tourists and 1,387 tourists at Pha Chu. During New Year, Doi Sa Mer Dao had tourists visited exceed the capacity. However, due to the water shortage problem during high season, limiting factor of the optimum number of tourists is the water supply.

At present, water supply in the water storage tanks for tourists at Doi Sa Mer Dao is 2700 liters and 3370 liters at Pha Chu. The meter was established at each camping site for calculating the water consumption of tourists.

Water consumption of tourists at camping sites are different based on the location, in Mediterranean region tourist consumes water approximately 145 liters/ tourist/ day (Gosling, 2001) while at Khao Yai National Park, the water consumption of tourist is 114 liters/ tourist/ day. In this study, most tourists like to visit SNNP during winter when the weather is very cold (5-20 degree Celsius). As a result, they consumed 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. As a consequent, the suitable number of tourists that should stay overnight camping in SNNP is approximately 550 persons per night.

However, wastewater from canteen and toilets are discharged straight to the environment without wastewater treatment system. Therefore, to reduce the environmental impact to fragile protected area, usage of chemical detergent should be avoided. Thus, the environmental friendly cleanser was provided to SNNP staff and tourist during high tourist season (Figure 4 - 6).



Figure 4-6 Environmental friendly cleanser for staff and tourists

Waste management system is also considered in the study. Waste characteristics in SNNP showed that 49% of the total waste generated by tourists was organic. Recyclable wastes such as plastic, glass bottle, polyethylene, and aluminum can comprised to another 51% of the total waste (Figure 4-7). Therefore, waste separation should certainly be implemented in the national park.

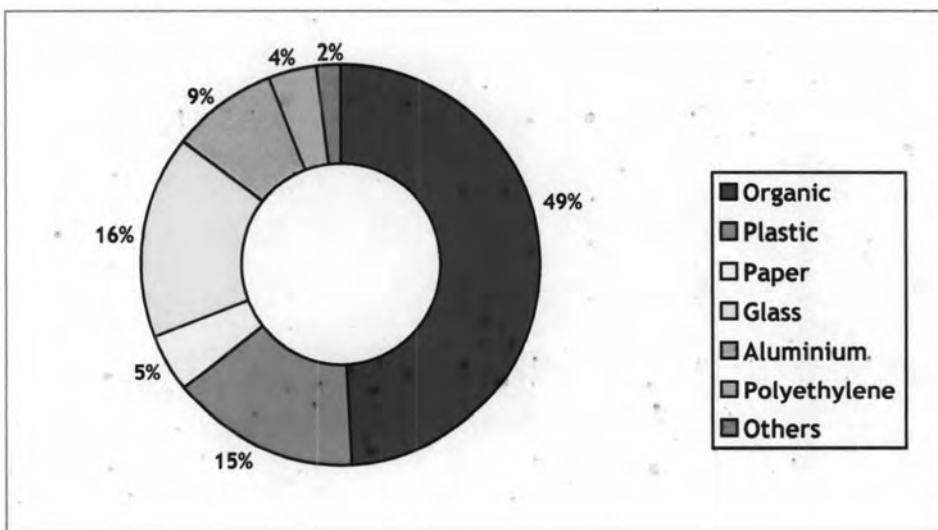


Figure 4-7 Percent of waste generated in Sri Nan National Park

Currently, solid waste from SNNP was transferred to open burning in Na Noi District; therefore the waste separation was established. The organic wastes and non-toxic should be transferred to landfill and open burning, while other wastes should be transferred to the recycle process. In addition 20 garbage bins, bags and environmental awareness sign for encourage tourists to separate waste were inaugurated for SNNP (Figure 4 - 8).



Figure 4-8 Garbage bins provided for Sri Nan National Park

From observation after waste separation implementation to the park, some tourists collaborated to separate their wastes. However, some of them can not notice the symbol when they disposed the garbage in night time. Many tourists improved their behaviors and had responsibility to bring garbage back, especially for the recycle such as bottles and aluminum can.

Environmental friendly cleanser was also received good attitude from staff and tourists. They were used this product instead of their own cleanser during their stay in the park. Therefore, this implementation was able to reduce some severe environmental impacts to national park and nearby ecosystem during high tourist season. Moreover, the mitigation can also apply to other national parks in order to initiate tourist's environmental awareness for ecotourism development.

4.3.3 Environmental education

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.

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 mist 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 between living species in the ecosystem because they can not save and conserve the nature without loving and understanding the value of natural environment.

Some materials and book were arranged to the park such as eco-camping guidebook, bird guide, stream detective's package, telescopes, star maps, and environmental friendly game (Figure 4- 9). Eco-camping book was initiated awareness of tourists and staffs about enhance their alternative ways to reduced environmental impacts with simplified techniques (Appendix D).

Many tourists were interested in eco-camping guidebook and some of them will spread this idea to their family, friends and colleagues. Telescope for star observation is suitable environmentally educative activity for tourists to discover

beyond the universe, especially at Doi Sa Mer Dao and Pha Chu. From provided materials to support the idea of eco-camping site in SNNP, tourists are encouraged to learn more in environment and ecosystem and can be changed their behaviors from tourists to become eco-friendly tourists. This circumstance can indicate that the successful ecotourism development in SNNP is due to suitable environmental management system.

4.3.4 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.

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 (Figure 4-10). 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.



Figure 4- 9 Telescopes, star maps and environmental friendly game for SNNP



Figure 4 - 10 Local people sell food and local products at tourist site



4.4 Tourist characteristics and perceptions based on specific questionnaire

Tourist characteristics, behaviors, and perceptions in Sri Nan National Park have been conducted by specific designed questionnaire. The data was collected at prominent tourist sites in Sri Nan which are Sao Din, Doi Sa Mer Dao, Pha Chu, Kang Luang, and Pak Nai Fishery Village during New Year 2006, 2007, and 2008. A Total of 372 questionnaires were evaluated, tourist's characteristics were classified in Table 4 - 11.

Table 4 - 11 General information of tourist's characteristics in SNNP

| | Characteristics | Tourists | Percentage |
|--------------------|-------------------------|----------|------------|
| Gender | Male | 193 | 51.9 |
| | Female | 179 | 48.1 |
| | Total | 372 | 100.0 |
| Age (years) | Below 15 | 12 | 3.20 |
| | 15 - 20 | 37 | 9.90 |
| | 21 - 25 | 50 | 13.40 |
| | 26 - 30 | 100 | 26.90 |
| | 31 - 40 | 98 | 26.30 |
| | More than 40 | 75 | 20.20 |
| | Total | 372 | 100.00 |
| Level of Education | Primary school | 10 | 2.70 |
| | Secondary school | 60 | 16.10 |
| | Bachelor degree | 248 | 66.70 |
| | Master or higher degree | 46 | 12.40 |
| | Others | 8 | 2.20 |
| | Total | 372 | 100.00 |
| Occupation | Student | 70 | 18.80 |
| | Government officer | 35 | 9.40 |
| | Organization | 12 | 3.20 |
| | Research | 3 | 0.80 |
| | Self employed | 71 | 19.10 |
| | Company officer | 169 | 45.40 |
| | Other | 12 | 3.20 |
| | Total | 372 | 100.00 |

Table 4 - 11 (cont.)

| | Characteristics | Tourists | Percentage |
|----------------|-----------------------|----------|------------|
| Coming from | Bangkok | 175 | 47.04 |
| | Nan | 43 | 11.56 |
| | Samut Prakarn | 21 | 5.65 |
| | Chonburi | 21 | 5.65 |
| | Pathumthani | 15 | 4.03 |
| | Uttaradit | 12 | 3.22 |
| | Suphan Buri | 11 | 2.96 |
| | Others | 74 | 19.89 |
| | Total | 372 | 100.00 |
| Time | First time | 254 | 73.4 |
| | 2 times | 56 | 16.2 |
| | 3 times | 18 | 5.2 |
| | More than 3 times | 18 | 5.2 |
| | Total | 346 | 100.00 |
| Transportation | Car | 184 | 50.70 |
| | Pick up | 54 | 14.90 |
| | Four-wheel | 47 | 12.90 |
| | Van | 46 | 12.70 |
| | Public transportation | 15 | 4.10 |
| | Motorcycle | 13 | 3.60 |
| | Bus | 3 | 0.80 |
| | Other | 1 | 0.30 |
| | Total | 363 | 100.00 |

Among 372 tourists, 51.80 percent were male and another 48.10 percent were female. The ages of prominent tourist groups were between 26 - 30 years; followed by 31- 40 years, and more than 40 years which are 26.90, 26.30, and 20.30 percent, respectively. The education information showed that 66.70 percent graduated bachelor degree and the major group has been working as company officer as much as 45.40 percent.

When focus at the place of tourist coming from, it is very interesting that almost 50 percent of tourists came from Bangkok and nearby provinces such as Samut Prakarn, Chonburi, and Pathumtani where as only few tourists 11.56 percent came from Nan. It showed that Sri Nan National Park is very popular for tourists from Bangkok and most are office people who came to relax during long weekend. In addition, more than 70 percent of tourists visited Sri Nan for the first time, showing that the promotion and advertisement is very important to encourage the new coming tourist. The percentage of tourist return is 26.60 even Sri Nan is quite far from Bangkok.

The information of transportation was showed that 78.5 percent of tourist traveled by private transportations which are cars, pick up, and four - wheel vehicles. Only 4 percent were traveled by public transportation.

The reasons to visited SNNP and tourism activities were classified into 12 topics which are relaxing, wildlife watching, flora watching, bird watching, rafting, research/study, admiring sea of mist, admiring scenery, bicycle riding, trekking, photography, waterfall relaxing, and other reasons (Table 4 - 12).

Table 4 - 12 Reason of tourists for visiting Sri Nan National Park and their activities

| Activities | Reason to visit | | Tourism's activities | |
|----------------------|-----------------|------------|----------------------|------------|
| | Frequency | % of cases | Frequency | % of cases |
| Relaxing | 319 | 85.8 | 296 | 79.6 |
| Admiring Sea of mist | 222 | 59.1 | 250 | 67.2 |
| Admiring scenery | 218 | 58.6 | 245 | 65.9 |
| Photography | 176 | 47.3 | 230 | 61.8 |
| Flora watching | 40 | 10.8 | 61 | 16.4 |
| Trekking | 21 | 5.6 | 34 | 9.1 |
| Wildlife watching | 17 | 4.6 | 18 | 4.8 |
| Bird watching | 16 | 4.3 | 28 | 7.5 |
| Rafting | 6 | 1.6 | 8 | 2.2 |
| Studying | 4 | 1.1 | 6 | 1.6 |
| Bicycle riding | 6 | 1.6 | 3 | 0.8 |
| Waterfall relaxing | 2 | 0.5 | 6 | 1.6 |
| Others | 12 | 3.2 | 9 | 2.4 |

More than 85% of tourists came to SNNP for relaxing followed by admiring sea of mist (59.1%), admiring scenery (58.6%), and photography (47.3%) which was correlated with their activities at SNNP. Therefore, to enhance ecotourism activities, passive ecotourism should be developed based on tourist's behavior and interest. Tourist's behaviors and attitudes were representing in table 4 - 13.

Table 4 - 13 Tourist's behaviors and attitudes in Sri Nan National Park

| Tourist's behaviors and attitudes | | Tourists | Percentage |
|-----------------------------------|-----------------|----------|------------|
| Overnight | Yes | 337 | 90.60 |
| | No | 35 | 9.40 |
| | Total | 372 | 100.00 |
| Length of stay | One day trip | 35 | 9.40 |
| | 1 night | 262 | 70.40 |
| | 2 nights | 51 | 13.70 |
| | 3 nights | 17 | 4.60 |
| | 4 nights | 4 | 1.10 |
| | 5 nights | 2 | 0.50 |
| | 8 nights | 1 | 0.30 |
| | Total | 372 | 100.00 |
| | Average | 1.33 day | |
| Crowded impact | High impact | 140 | 37.90 |
| | Moderate impact | 167 | 45.30 |
| | Low impact | 37 | 10.80 |
| | No impact | 25 | 6.80 |
| | Total | 369 | 100.00 |
| Garbage bin | Enough | 160 | 44.20 |
| | Not enough | 202 | 55.80 |
| | Total | 362 | 100.00 |
| Willingness to bring garbage back | Agree | 260 | 72.8 |
| | Disagree | 97 | 27.2 |
| | Total | 357 | 100.00 |

Table 4 - 13 (cont.)

| Tourist's behaviors and attitudes | | Tourists | Percentage |
|---|--------------|----------|------------|
| Willingness to pay for waste management | 10 Baht | 18 | 23.70 |
| | 20 Baht | 28 | 36.80 |
| | 30 Baht | 6 | 7.90 |
| | 40 Baht | 4 | 5.30 |
| | 50 Baht | 12 | 15.80 |
| | 100 Baht | 7 | 9.20 |
| | 150 Baht | 1 | 1.30 |
| | Total | 76 | 100.00 |
| Mode | 20 Baht | | |
| Average | 33.29 ± 3.33 | | |

Interestingly, more than 90 percent of tourists stayed overnight in SNNP with average length of stay approximately 1 night by camping. When asking about the perception of crowded situation during high tourist season, more than 82.20 percent answered that it had moderate to high impact. Therefore, the carrying capacity, and regulations at the camping site should be considered especially during high tourist season.

55.80 percent of tourists suggested that the garbage bin still was not enough and 72.80 percent was willing to bring garbage back after their visit otherwise tourists recommend paying for waste management. Thus, opened questionnaire was designed for their attitudes, tourists willing to pay average 33.29 ± 3.33 Baht/person and major group of tourists agreed to pay at 20 Baht/person which is similar rate as the national park fee. Therefore, the environmental fee for tourists who visit national park should be set between 20 - 40 baht.

The results of tourist attitude and infrastructure in SNNP were show in Table 4 - 14.

Table 4 - 14 Tourist's attitude in infrastructure

| Attitude | | High | Medium | Low |
|-----------------------------|----------------|------|--------|------|
| Appreciation | Accommodation | 161 | 185 | 14 |
| | % | 44.7 | 51.4 | 3.9 |
| | Restaurant | 53 | 231 | 59 |
| | % | 15.5 | 67.3 | 17.2 |
| | Visitor center | 186 | 164 | 13 |
| | % | 51.2 | 45.2 | 3.6 |
| Necessary of infrastructure | Restaurant | 142 | 163 | 51 |
| | % | 39.9 | 45.8 | 14.3 |
| | Accommodation | 119 | 158 | 71 |
| | % | 34.2 | 45.4 | 20.4 |
| | Telephone | 132 | 121 | 88 |
| | % | 38.7 | 35.5 | 25.8 |
| | Tent for rent | 170 | 146 | 34 |
| | % | 48.6 | 41.7 | 9.7 |
| | Car park | 250 | 96 | 16 |
| | % | 69.1 | 26.5 | 4.4 |
| | Electric | 150 | 140 | 59 |
| | % | 43.0 | 40.1 | 16.9 |

More than 50 percent of tourists had medium appreciate in restaurant and accommodation where as 51.20 percent had highly appreciate in visitor center. Most necessary infrastructure in the national park should compose of telephone or signal of mobile phone, tent and accessories for rent, car park, and electric, while restaurant and accommodation aspects were evaluated in medium necessary. The suggestions and recommendations from tourists were grouped in Table 4-15.

Table 4 - 15 Tourist's appreciation and suggestions in Sri Nan National Park

| | Topics | Frequency | Percentage |
|---------------------------|---|-----------|------------|
| Tourist's appreciation | | (n = 324) | |
| | Sea of mist | 111 | 34.26 |
| | Panoramic scenery | 88 | 27.16 |
| | Staff friendly and service mind | 49 | 15.12 |
| | Beautiful atmosphere, landscape | 43 | 13.27 |
| | Fresh, cool, and clean air | 43 | 13.27 |
| | Clean toilet | 40 | 12.35 |
| | Natural environment | 32 | 9.88 |
| | Calm, few tourists, unique of Sao Din | 21 | 6.48 |
| | Sunrise, sunset, comfortable to stay and camping | 17 | 5.25 |
| | Coffee corner service | 12 | 3.70 |
| | Star observation, Pha Hua Sing | 7 | 2.16 |
| | Pha Chu, Doi Sa Mer Dao, viewpoint | 7 | 2.16 |
| | Others | 11 | 3.40 |
| Impact to ecosystem | | (n = 142) | |
| | Construction of infrastructure | 40 | 28.17 |
| | Garbage | 22 | 15.49 |
| | Road | 16 | 11.27 |
| | Restaurant | 14 | 9.86 |

Table 4 - 15 (cont.)

| | Topics | Frequency | Percentage |
|--------------------------------|--|-----------|------------|
| Impact to ecosystem (cont.) | Unlimited tourists | 10 | 7.04 |
| | Electricity | 9 | 6.34 |
| | Illegal logging | 8 | 5.63 |
| | Over development | 7 | 4.93 |
| | Car park | 5 | 3.52 |
| | Others (e.g. noise, camping site) | 12 | 8.45 |
| Recommendation for development | | (n = 188) | |
| | Keep it natural as present | 38 | 20.21 |
| | Enlarge camping site, fine new one | 33 | 17.55 |
| | Enlarge car park area | 23 | 12.23 |
| | Develop landscape, plant more tree, colorful flower, garden | 22 | 11.70 |
| | Promotion in tourist magazine, website | 16 | 8.51 |
| | Increase and check quality of toilet | 14 | 7.45 |
| | Limited number of tourists, enhance tourism activities | 12 | 6.38 |
| | Add more signs to the park, develop new view points, improve road condition, prepare sleeping bag for rent, zoning at camping site | 8 | 4.26 |
| | Others | 17 | 9.04 |

Tourists highly appreciated sea of mist, panoramic scenery, staff's friendly and service mind, beautiful landscape, cool and fresh air, clean toilet, natural environment, calm, the uniqueness of Sao Din, the comfortable to visit and camping, coffee service, respectively.

In tourist's opinions, the major impact to ecosystem is construction of infrastructure such as home and unnecessary buildings which contrast to the nature. Garbage is the second impact followed by road construction, restaurant, unlimited number of tourists, electricity, illegal logging, over development and car park.

The precious recommendations from tourists to develop SNNP are very interesting and contrast. 20.21 percent would like to keep it natural and do not need any artificial development, whereas 17.55 percent recommended to develop new camping site and car park. Some of them suggested planting more trees and flowers. The tourism promotion is also recommended especially in internet and tourism magazine. Limited number of tourists, increasing tourism activities, adds more sign to the park, develop new view points, improve road condition, prepare sleeping bag for rent, zoning at camping site are very valuable comments from tourists.

From entire studied included staff's interviewed, and tourist's questionnaires, several interrelated aspects that influenced the potentiality and success of ecotourism within a national park, as well as the links between natural areas, local people, and tourism have been highlighted in the SWOT analysis.

4.5 SWOT Analysis for ecotourism development in SNNP

The SWOT analysis will be described in detail on strength, weakness, opportunity, and threat of the high potential tourist site for ecotourism which are Sao Din, Doi Sa Mer Dao and Pha Chu. The idea of how to enhance collaboration, maintain environmental quality, and increase potential of SNNP for ecotourism development by SWOT analysis were described below:

The assessment of natural resources value, tourism potential, and tourism impact evaluation can be used in SWOT analysis for planning and development of ecotourism in prominent tourist site of SNNP. The four major components were considered:

Strength: the strength of national park in terms of natural resources and tourist site diversity, flora and fauna attraction, route scenery, tourist activities, environmental educative media, aerial utilizing plan, cultural diversity, proper time to visit (tourism calendar), government policy, environmental and waste management;

Weakness: the weakness of national park includes road condition, safety, proper time to visit, tourist activities, educative media, lodging capacity, camping space, restroom availability, waste management, local community participation, and staff capacity;

Opportunity: the opportunity of a national park to be developed as a suitable tourist site composes of potential suitable tourism activities, local community participation, government policy, site advertisement, lodging management, environmental condition, and educative media development ability;

Threat: the threat for ecotourism development includes natural resources conservation, optimum tourist amount, road condition, financial support, government policy, and staff capacity.

SWOT analysis for Sao Din

Strength

- Remarkable species at Sao Din "*Gardenia Turgida* Roxb", in Thai "Dig Diam", which always shakes its top when touched at any branches, and another species is *Heteropogon Contortus* (L.) Roem & Schult or in Thai "Ya Khem Na Ri Ka", which twists itself clockwise when touched by the water. These species are very attractive for tourists.
- Sao Din has a distinctive geological landform, resembling a small version of the Grand Canyon. Geological evidences showed these pinnacles dated back to the late Tertiary period, about 30,000-10,000 years ago. Fossil and ancient tools were also discovered. Sao Din has a nature trail that is available for tourist to appreciate the beauty and history of the area.
- The local park officer at this site is an expertise on Sao Din history and geography.

Weakness:

- Due to there's no specific route, tourists are allowed to walk and touch and disturb the natural landform.
- Car park location is closed to the landform site and may disturb the fragile landform.

Opportunity:

- Provide the tourists with the guide book for nature trail and Sao Din with the information on history and background of the area, prominent species, geology, and natural resource conservation.
- Develop shuttle bus or a public transportation service at the junction to Sao Din for tourist season. In addition, non-fuel transportation such as rental carriage or bicycle is also recommended. Tourists can appreciate local life style and experience activities such as tamarind picking, weaving practice, and purchase local products. This could help local community to anticipate in tourism industry.

Threat:

- Attitude of local people and the park staffs on promoting tourism nearby national park.

SWOT analysis for Pha Chu**Strength:**

- Pha Chu Clift has the longest flag pole in Thailand and provides good viewpoint to overlook the sea fog and Nan River.
- The location of camp site and lodging is convenient for family and senior tourists. Especially, overnight camping during winter season is very impressive for the nature lovers to admire beautiful sea of mist.
- Based on the questionnaires, tourists were impressed by the park officers at prominent tourist sites for their kindness, service mind, and expertise on history and important aspects of the area.

Weakness:

- Camp space and car park area has limitation during high tourist season.
- Wastewater discharge to natural environment.

Opportunity:

- Encourage astronomy observatory with cosmic guide map and book for rent or sale. The profit made from this activity can be used for national park maintenance and improvement.
- Develop eco-camp training, such as tent set-up workshop, first-aid techniques.
- Establish waste management campaign, especially in high tourist season, by encouraging tourist to separate and minimize waste.
- Develop booklet, brochure, or website on environmental youth camp in SNNP at information center.
- Environmental friendly cleansers are recommended for tourists and staffs especially in high tourist season.
- Establish a volunteer program for the experts on bird watching, trekking, and camping to work with the park especially in high tourist season.
- Set the early booking program for camping site and zoning into quiet zone, cooking zone, and family zone.

Threat:

- Progressively increment of uncontrolled mass of tourist in the national park.

SWOT analysis for Doi Sa Mer Dao

Strength:

- Surrounded by rich biodiversity among massive mountains and hill ranges with several spectacular natural environment and forest habitat.
- Camp site at Doi Sa Mer Dao is a magnificent spot for admiring sun rise, sun set, and sea of mist with a 360 degree view angle.

Weakness:

- Road condition to Doi Sa Mer Dao, Sao Din and Kok Sua are gravel-paved, which are not appropriate for commuting in rainy season.
- Staffs and financial support for promoting tourist activities are insufficient because it is a newly announced national park.

Opportunity:

- Encourage astronomy observatory with cosmic guide map and book for rent or sale. The profit made from this activity can be used for national park maintenance and improvement.
- Develop eco-camp training, natural photograph short course workshop.
- Establish waste management campaign, by encouraging tourist to separate and minimize waste.
- Develop shuttle pick up for tourists to and from Doi Sa Mer Dao and Pha Chu in peak seasons such as New Year celebration and Father's day holiday, which can reduce the traffic problems, air pollution, and increase camping area by converting the parking space to camp sites.

Treat:

- The area of Doi Sa Mer Dao is surrounded by corn field, therefore camping site area is not possible to expand.
- Human-caused forest fire occurs in dry seasons.
- Logging occurs around national park border.
- Progressively increment of uncontrolled mass of tourist in the national park.
- In order to increase the number of tourists at camping site, the proper wastewater treatment system should be implement and provide more water supply tanks for tourists.

