The Development of Nong Harn Chalermphrakiat Park for Lotus Species Collection, Ecological Tourist Attraction and Local Economic Development

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Abstract: The purposes of this study were to investigate and develop Nong Harn Chalermphrakiat Park to be a source of lotus collection including eco-tourism destination. Publication and education of people in lotus species through academic exhibition and printed material was also studied. Mixed was employed in this research. The physical survey showed that Nong Harn Chalermphrakiat Park is the wetland area and suitable for growth and collection of the lotus species. Moreover, 5 species of tree, 8 species of floating plant and 6 species of aquatic animal were found. In terms of quantitative research, respondents strongly agreed on developing Nong Harn Chalermphrakiat Park as the source of lotus species collection, eco-tourism destination and local economic development (mean = 4.22). The respondents also strongly agreed that tourism would have positive impacts on their community (mean = 4.25); meanwhile, perceived negative impacts of tourism were less concerned than perceived positive impacts (mean = 3.31). After a feasibility study on investigated the development potentiality in the area, the researchers had started to develop this area in order to make it more scenic and prompt to serve visitors. Furthermore, the researchers have conducted academic exhibition and public relations in order to publicize and educate people. In this study, to avoid the long-term development cost, the project needs to make a proper management plan with an emphasis on 3 important elements (3A): Area, Activities and Authorities.

Key words: Nong Harn Chalermphrakiat Park, Nong Harn Noi, eco-tourism, local economic development, respondents, lotus species collection

INTRODUCTION

In fiscal year 2000, Kasetsart University, Chalermphrakiat Sakon Nakhon Province Campus, Sakon Nakhon, received an expenditure (3 million baht) for dredging of Nong Harn Noi, which is also called Nong Harn Chalermphrakiat Park and the ridge construction. In addition, this study was supported by the Royal Irrigation Department for 30 million baht in order to develop Nong Harn Noi as an academic center of education and research for freshwater animals, aquatic plants, lotuses etc. The name of Nong Harn Noi was granted by His Majesty the King to honor the 50th anniversary of the King's accession to the throne.

The area of Nong Harn Chalermphrakiat Park is about 280 acres which is about 5 km away from Kasetsart University. This area is close to Nong Harn Lake which is separated by highway no. 22. The main objectives of this research are to develop a freshwater animal research and environment, international training center and a botanical garden. Moreover, Nong Harn Chalermphrakiat Park is the scenic area due to its natural and beautiful resources for development of ecotourism. In addition, Nong Harn Chalermphrakiat Park also is a source of lotus collection, of which lotus flowers are bound to humans for a long time. As the result, the researchers surveyed the area of Nong Harn Chalermphrakiat Park of Kasetsart University, Chalermphrakiat Sakon Nakhon Province Campus, Sakon Nakhon, to collect the information of Nong Harn Chalermphrakiat Park for the development of lotus collection and an education center in the northern part of the northeastern area. Also, the study of feasibility development of the Nong Harn Chalermphrakiat Park is one ecological tourist attraction of Sakon Nakhon province. Ecotourism is characterized by a primary desire to study specific elements of nature in sensitive

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environments. The ecotourism industry involves the systematic development and marketing of nature-oriented travel packages, which can increase the visits of people and will be the center of community education.

The International Ecotourism Society (TIES) describes ecological tourism as responsible travel to natural areas which conserves the environment and improves the welfare of local people. Ecotourism is about creating and satisfying a hunger for nature, about exploiting tourism's potential for conservation and development and about averting its negative impact on ecology, culture and aesthetics (Western, 1993). The main aims of this research are to study and develop the Nong Harn Chalermphrakiat Park as the lotus collection and an ecological tourist attraction, as well as advertise lotus by means of exhibitions and publication. Objectives of the study are:

- To collect data and information of Nong Harn Chalermphrakiat Park
- To collect data and information of the opinion of communities conducted by means of questionnaire

MATERIALS AND METHODS

Study site: Nong Harn Chalermphrakiat Park is located in Sakon Nakhon province, which is the largest natural water source of the northeastern part of Thailand. This park area is about 280 acres. Administratively, Nong Harn Chalermphrakiat Park covers the area of 10 districts of Sakon Nakorn province is about 5 km from Kaseteart University, Chalermphrakiat Sakon Nakhon Province Campus, Sakon Nakhon.

Population and sample: Population who live in the park area (971 families) was interviewed. The selection of respondents was done by random sampling to avoid serious bias. The size of sample was calculated by Yamane (1967) with 0.05 level of significance.

$$n = \frac{N}{1 + N_e{}^2} \tag{1}$$

$$n = \frac{971}{1 + 971(0.05)^2} \tag{2}$$

Where:
n = The size of sample
N = The size of population
e = The error of the sample size with the level of 0.05 significance

After substitution into Eq. 2, the sample size is of 283 families. As the result of the limitation of the harvest season, the sample collected was only 151 families. The questionnaire was done by means of convenience.

Tools: The method for the collection of data in descriptive research was done by closed-end questionnaire consisting of 3 parts:

Part 1: Population characteristic questions collected by the checklist of 4 questions.

Part 2: Questions concerning development of Nong Harn Chalermphrakiat Park as the lotus collection and an ecological tourism attraction for local economy collected by the rating scales of 5 levels.

Part 3: Opened-end form questions concerning the opinion of Nong Harn Chalermphrakiat Park development as the lotus collection and an ecological tourist attraction for local economic development consisting of 5 questions. The analysis of the collected data of the opened-end questions by means of fundamental statistics e.g., percentage, mean scores and SD.

Improve the landscape and prepare the area for lotus breeding by using a tractor to smooth the area. Also build the house for lotus breeding, e.g., Nelumbo, Nymphaea and Victoris. In addition, development of Nong Harn Chalermphrakiat Park to be an ecological tourism site by surveying and designing the landscape around the Nong Harn Chalermphrakiat Park. Improve the landscape following the front of the institute and develop the building in Nong Harn Chalermphrakiat Park. Collect and plant the lotus species in the region of the north of northeastern into the Nong Harn Chalermphrakiat Park. Exhibit and publicize Nong Harn Chalermphrakiat Park development including making pamphlets for education and publication.

RESULTS AND DISCUSSION

Generality and fundamental data of Nong Harn Chalermphrakiat Park: The result of the development of Nong Harn Chalermphrakiat Park as the lotus collection and an ecological tourism attraction for local economy showed that the area of the Nong Harn Chalermphrakiat Park is about 280 acres. According to the aerial photograph, Nong Harn Chalermphrakiat Park consists of the river from the east to the west but highway no. 22 separates the Nong Harn Chalermphrakiat Park and Nong Harn lake. The geography of Nong Harn Chalermphrakiat Park was wetland where forest, floating plants and freshwater animals are found as follows: the forests of the Nong Harn Chalermphrakiat Park consist of 5 species: *Grevillea robusta* A. Cunn ex R.Br., *Acacia mangium*

Willd, *Aradirachta indica* A.Juss. var. siamensis Valeton, *Cassia siamea* (Lamk.) Irwin et Barneby, *Borassus flabellifer* L. About 8 species of the floating plants were found: *Trapa bisphinosa* Roxb., *Eichornia crassipes* (Mart.) Solms, *Salvinia cucullata* Roxb, *Hydrocleys nymphoide* Buch., *Azolla pinnata* R.Br., *Pistia stratiotes* L., *lpomoea aquatica* Forsk. and *Nymphoides parvifalia* (Wall.) O. Kuntze. The freshwater animals were divided into 2 groups as follows:

- About 6 species of freshwater animals for research were found: *Clarias gariepinus, Oreochromis niloticus, Oreochromis niloticus mossambicus, Pangasianodon hypophthalmus, Pangasius conchophilus* and hybrid catfish
- About 3 species of natural freshwater animals were found: *Cyprinus arpie* (Linnaeus), *Trichogaster pectoralis, Anabas testudineus* and *Monopterus albus.* These natural freshwater animals are found in Nong Harn Chalermphrakiat Park (Duangsawad *et al.,* 1994)

According to the results of physical and biological information, Nong Harn Chalermphrakiat Park could be categorized as wetland due to its forests, freshwater animals and floating plants. Under the Ramsar convention, a wide variety of the natural and human-made habitat types ranging from rivers to coral reefs can be classified as wetlands. Wetlands include swamps, marshes, billabongs, lakes, salt marshes, mudflats, mangroves, coral reefs, fens, peat bogs or bodies of water whether natural or artificial, permanent or temporary. Water within these areas can be static or flowing; fresh, brackish or saline and can include inland rivers and coastal or marine water to a depth of six meters at low tide. Mitsch and Gosselink (2007) investigated that wetlands are sometimes described as the kidney of the landscape because they function as the downstream receivers of the water and waste from natural and human sources. Wetlands also have been called ecological supermarkets because of the extension food chain and rich biodiversity that they support.

They play major roles in the landscape by providing unique habitats for a wide variety of fauna and flora including herbs and homegrown vegetables. Regarding the definition of wetlands, wetlands are the rich of ecological system. Thus, the wetlands also include many people living near them for agriculture and fishing and then changing to be their culture relationship. Haslam (1934) investigated that there has been wide research of culture in wetlands as wetlands are always related with cultural community civilization.

The opinion of community for area development Improvement of Nong Harn Chalermphrakiat Park: According the closed-end form questionnaire, the results of the study revealed that most of respondents in the study area strongly agree in the development of Nong Harn Chalermphrakiat Park as planting lotus species and ecological tourist attraction were 4.38 and 4.36, respectively, followed by the properly of the area in front of building as the area for lotus collection (mean = 4.26), properly of lotus planting layout (mean = 4.08) and the properly of designing area (mean = 4.04) were shown in Table 1.

Development of Nong Harn Chalermphrakiat Park as ecological tourist attraction: According the closed-end form questionnaire, the results of the study revealed that most of respondents in the study area agree in the improvement of public utility and participation of local community for development (mean = 4.15), followed by development of Nong Harn Chalermphrakiat Park as ecological tourist attraction including solid waste management in the area (mean = 4.14), the properly of scenery for ecological tourist attraction (mean = 4.08) and development of transportation and accession (mean = 4.05) and were shown in Table 2.

Effect of the development of Nong Harn Chalermphrakiat Park as lotus collection and ecological tourist attraction for local economic: According the closed-end form questionnaire, the results of the study revealed that most of respondents perspective in the study area were strongly agree that tourism will bring the positive impacts

Table 1: The opinions of communities for the improvement of Nong Harn Chalermphrakiat Park

Area opinions	Mean±SD	Level
Suitable for planting lotus species	4.38±0.79	Strongly agree
Suitability of the area in front of building as the area for lotus collection	4.26±0.85	Agree
Suitability of designed area	4.04±0.82	Agree
Suitability of lotus planting layout	4.08±0.85	Agree
Suitable for ecological attraction	4.36±0.86	Strongly agree
Overall	4.22±0.83	Strongly agree

Table 2: The opinions of communities for the development of Nong Harn Chalermphrakiat Park as an ecological tourist attraction

Tourist atttraction	Mean±SD	Level
Solid waste management	4.14±1.11	Agreed
Development of transportation and accession	4.05±1.13	Agreed
Improvement of public utility	4.15±1.14	Agreed
Participation of local communities for development	4.15±1.16	Agreed
Suitability of scenery for ecological tourist attraction	4.08±1.17	Agreed
Overall	4.11±0.92	Agreed

to their community (mean = 4.25). The positive effects can be ranked by distribution of agricultural product (mean = 4.30), followed by improvement of local community and distribution of human-made product (OTOP) (mean 4.25), increasing outcome of local community (mean = 4.22) and making jobs to local community (mean = 4.21). Meanwhile, the respondent perspective in negative impacts from tourism are less concerned than positive impacts (mean = 3.31). The negative effects can be ranked by increasing the pollutions e.g., solid waste, water pollution and air pollution (mean = 3.38), followed by damaging of ecological system (mean = 3.28) and lacking of earning distribution (3.27) were shown in Table 3.

The opinion of community on development of Nong Harn Chalermphrakiat Park as ecological tourist attraction: According to the opened-end form questionnaire, the results of the study revealed that the community of Nong Harn Chalermphrakiat Park gave the various of their opinions that can be divided of the opinions into 3 groups: the qualify of the area, ecological system and economic were shown in Table 4.

The opinion of benefit on development of Nong Harn Chalermphrakiat Park as ecological tourist attraction: According to the opened-end form questionnaire, the results of the study revealed that most of the respondents in the study area were increasing economic growth and employment to community, also increased the trading (67.5%), followed by social and traveling benefits (12.5%) and educational benefit (7.5%) were shown in Table 5.

The opinion of negative effects on development of Nong Harn Chalermphrakiat Park as ecological tourist attraction: According the opened-end form questionnaire, the results of the study were analyzed by content analysis which was divided into 4 main groups. The most negative effects in the study area was pollution problems (70.83%), followed by social problems (12.50), traffic jam (8.33) and deterioration of ecological system (8.33) were shown in Table 6. Based on the results, the respondents agreed on the development of Nong Harn Chalermphrakiat Park as lotus collection and ecological tourist attraction for local economy. This project gives advantages rather than disadvantages and people in this area prefer to share their own area with tourists. Then, promotion toward economic development is greater than minor social problems. In addition, the results showed the same trend as Doxey's Index of Irritation in Pre-Euphoria Stage, which indicated that visitors seek to merge with the local community, host communities welcome tourism and commercial activities grow in tourism (Doxey, 1976).

Improvement of landscape on the development of Nong Harn Chalermphrakiat Park: As the results from the development of Nong Harn Chalermphrakiat Park as the ecological tourist attraction, surveying and designing for improving the scenery of the area to be cool and pleasant for ecological tourist attraction by improving the landscape in front of Research and Development Building. Nong Harn Chalermphrakiat Park is the kind of wetlands which the bodies of water permanent but is not smooth. Then, the researchers improved the area for suitable the lotus planting followed by Wanichanon (1997). The

Table 3: Effects of the development of Nong Harn Chalermphrakiat Park as lotus collection and ecological tourist attraction for local economy

Positive effects	Mean±SD	Level
Increasing economic growth	4.25±0.69	Strongly agree
Creating jobs for local communities	4.21±0.79	Strongly agree
Increasing income of local communities	4.22±0.83	Strongly agree
Distribution of agricultural products	4.30±0.75	Strongly agree
Distribution of OTOP	4.25±0.84	Strongly agree
Overall	4.25±0.75	Strongly agree
Negative effects		
Increasing pollutants (e.g., solid waste, wastewater and air pollution)	3.38±1.34	Moderately agree
lacking of earning distribution	3.27±1.32	Moderately agree
Deterioration of ecological system	3.28±1.29	Moderately agree
Overall	3.31±1.32	Moderately agree

Table 4: The qualifications of development of Nong Harn Chalermphrakiat Park as lotus collection and ecological tourist attraction

Qualifications	No. of opinions	Percentage
Area (e.g., travel convenience, nearby Ta Rae community, easy access)	28	57.14
Ecological system (water abundance for lotus breeding, plenty of floating plants)	17	34.69
Economy (e.g., earning distribution to community)	4	8.16
Overall	49	100.00

Table 5: The opinions of benefits on the development of Nong Harn Chalermphrakiat Park as an ecological tourist attraction

Benefits on communities	Amount of opinions	Percentage
Economy (e.g., economic growth and employment)	27	67.5
Society (e.g., participation of communities on natural conservation, strong communities and worthiness)	5	12.5
Traveling (e.g., increasing tourist attraction site)	5	12.5
Education (e.g., source of knowledge on lotus, center of knowledge on ecological system)	3	7.5
Overall	40	100.0

Table 6: Negative effects on the development of Nong Harn Chalermphrakiat Park as an ecological tourist attraction

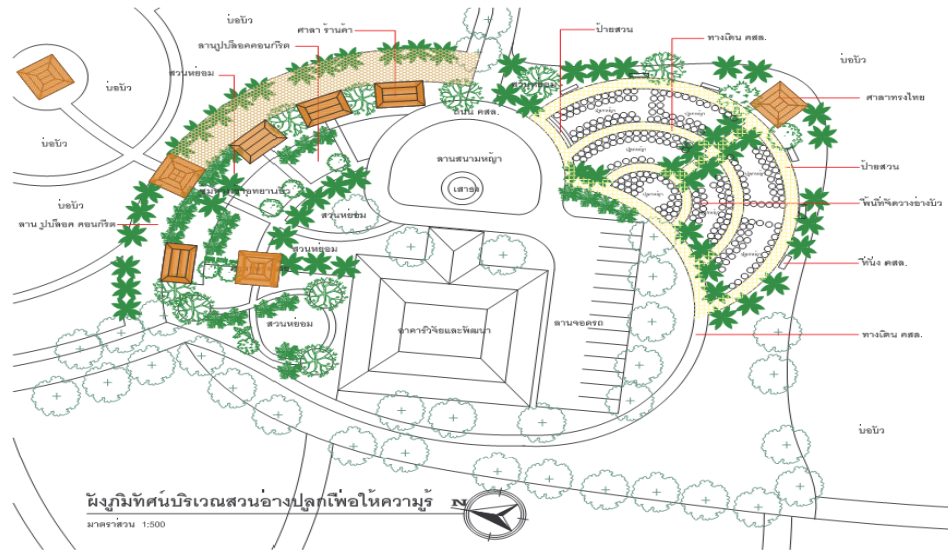| Negative effects	Amount of opinions	Percentage
Pollution problem (e.g., solid waste, wastewater, noise pollution)	17	70.83
Social problems (e.g., gangs up)	3	12.50
Traffic jam	2	8.33
Deterioration of ecological system (e.g., ecological damage)	2	8.33
Overall	24	100.00

Fig. 1: Schema of lotus garden for knowledge

Table 7: Nymphaea collection in Nong Harn Chalermphrakiat Park

Species	Place	Area
Roseum plenum	Pond nearby the agricultural building	Amphur Muang, Nong Bua Lamphu Province
Sacred lotus	Pond nearby the in town road	Amphur Muang, Nong Bua Lamphu Province
Mognolia lotus	Pond nearby the rice field	Ban Koh Lo, Amphur Muang, Sakon Nakhon Province
Roseum plenum	Nearby the road	Sawang Dandin, Sakon Nakhon Province
Hundu lotus	Nearby the road	Sawang Dandin, Sakon Nakhon Province

suitable area of lotus planting should be smoothly; using tractor car for adjustment. In addition, it will be appropriate for water using by plants and easy maintenance. Moreover, lotus planting should be nearby the river, pond, swamp etc. Therefore, in this study what needed to be done was to adjust the area and scenery of Nong Harn Chalermphrakiat Park as shown in Fig. 1. The area for lotus pots has to be kept for lotus knowledge and tourism. After the investigation of surveying and collecting the lotus species, the results showed that the original lotus species in the Nong Harn Chalermphrakiat Park consist of Nelumbo, Nymphaea and Victoris. Then, the researchers collected more species of lotus (e.g., Roseum Plenum, Sacred Lotus, Mognolia Lotus and Hundu Lotus) as shown in Table 7.

Furthermore, the researchers have conducted academic exhibitions and publishing them in order to publicize and educate people.

CONCLUSION

Site characteristic: The area of the Nong Harn Chalermphrakiat Park is about 280 acres. According to the aerial photographs, Nong Harn Chalermphrakiat Park consists of the river from the east to the west but highway no. 22 separates the Nong Harn Chalermphrakiat Park and Nong Harn lake. The geography of Nong Harn Chalermphrakiat Park is wetland where forests, floating plants and freshwater animals are found.

The opinion of community for area development
Improvement of Nong Harn Chalermphrakiat Park: The respondents perspective strongly agreed with the development of Nong Harn Chalermphrakiat Park as the source of lotus species collection, an eco-tourism destination and local economic development (mean = 4.22).

Development of Nong Harn Chalermphrakiat Park as an ecological tourist attraction: Most of the respondents in the study area agreed on the development of Nong Harn Chalermphrakiat Park as an eco-tourism site. The respondents also strongly agreed that tourism would bring positive impacts to their community (mean = 4.25) as follows:

- Increasing economic growth
- Creating jobs to local communities
- Increasing income of local communities
- Distribution of agricultural products
- Distribution of OTOPs

In contrast, the respondents moderately agreed that tourism would bring negative impacts to their communities (mean = 3.31) as follows:

- Increasing pollution
- Lacking earning distribution
- Deterioration of ecological system

Improvement of landscape on the development of Nong Harn Chalermphrakiat Park: After investigation of the development potentiality in the area, the area around the Research and Develop Building is ready to prepare for an ecological tourist attraction and the center of lotus knowledge. Then, the researchers had started to develop this area in order to make the area more scenic to attract visitors.

Surveying and collection of lotus in the north of Northeastern areas: After investigation of the surveyed area and collection of lotus in the north of the northeastern part, the researchers found that the most commonly found lotus in this area are 4 species consisting of Roseum Plenum, Sacred Lotus Mognolia Lotus and Hundu Lotus. Furthermore, the researchers collected more species of lotus in Nong Harn Chalermphrakiat Park (e.g., Shirler Bryne, Sunrise, Primlarp, Mungkala Ubon, Larpchiporn, Jongkolnee). Moreover, the researchers have conducted academic exhibitions and made publication in order to publicize and educate people.

REFERENCES

Doxey, G.V., 1976. When enough's enough: The natives are restless in Old Niagara. Heritage Canada, 2: 26-28.

Duangsawad, S., Y. Leenanon and D. Ratanachamnong, 1994. Natural Resources, Fishery and Fishery condition after Nong Harn Lake Recondition. Inland Fishery Research Institute, Department of Fisheries.

Haslam, S.M., 1934. Understanding Wetlands. Tayloy and Francis Inc., USA.

Mitsch, W.J. and J.G. Gosselink, 2007. Wetlands. John Wiley and Son, Inc., Canada.

Wanichanon, S., 1997. Decorational Lotus. Puankaset Printing, Nontaburi.

Western, D., 1993. Defining Ecotourism. In: Ecotourism: A Guide for Planners and Managers, Lindberg, K. and D.E. Hawkins (Eds.). Vol. 1, The Ecotourism Society, Washington D.C.

Yamane, T., 1967. Elementary Sampling Theory. Prentice-Hall Inc., Englewood Cliffs, New Jersey, USA., pp: 405.