

Database system development of nature-based tourism in protected areas, Chiang Mai province

Mayuree Nasa, Dachanee Emphandhu, Sura Pattanakiat, and Sukumal Kitisiin

Abstract — The objectives of this study were to assess the status of nature-based tourism resources, design and develop the database system and web application for tourism resources management in protected areas, Chiang Mai province. The data contained in the database system included tourism resource potential, recreation opportunity spectrum, and physical carrying capacity of the tourism sites in Chiang Mai's protected areas. The tourism resource potential at 124 sites were assessed and classified into 72 conventional nature tourism (NT), 37 adventure tourism (AT), 5 ecotourism (ET), and 10 being qualified as both adventure and conventional nature tourism sites (NT/AT). The highest potential of the NT sites was identified as Keaw Mae Pan scoring 2.84 out of 3. While Mae Tang and Mae Cham - Tha Phra Sadej water rafting routes were the highest potentials for the AT (score 2.69), Doi Luang Chiang Dao for ET (2.46), and bicycling route Yod Doi Pui - Botanical Garden for the NT/AT (2.13). The recreation opportunity spectrum (ROS) offered nature closely related experiences in primitive (P), semi-primitive non motorized (SPNM), and semi-primitive motorized (SPM) totalling of 77 sites while 47 sited in semi-developed and developed areas offered less nature experience. The system was designed as relational database by System Development Life Cycle (SDLC) for the target group identified as tourism resources planners and managers. The database and web application was developed by MySQL and the available program in php script language, in that order. For the User Interface design, the web browser through internet connection was employed for database management. The database system testing regarding techniques and design earned the score 64%. While the evaluation score of user interface capability and the usefulness of the information contained in the database given by the expert in database development and the PA managers was 81% and 84%, respectively.

Index Terms — Database System Development, Nature-based Tourism, Protected Areas, Chiang Mai Province

1 INTRODUCTION

Protected areas (PAs) in Chiang Mai province Thailand have been popular for diverse outdoor recreation uses

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such as forest trek, bird watching, bicycling, waterfall, cave, and hot spring visits,. About 124 sites in protected areas were identified as tourism sites and as many as 2.85 million people visited them annually [1]. To help protected area managers manage recreation resources to meet visitor satisfaction and desires, there is a need for recreation resources inventory and development of a database system for management purposes related to recreational potential and experiences.

2 OBJECTIVES

1. To assess the recreation opportunity spectrum and recreational potentials for nature-

based tourism in protected areas, Chiang Mai Province,

2. To design and develop the database system and web application for tourism resources management in protected areas, Chiang Mai province.

3 METHOD

Inventory of recreational resources potentials for 3 types of nature-based tourism: conventional nature tourism (NT), adventure tourism (AT) and ecotourism (ET) was carried out in 124 sites of 22 protected areas located in Chiang Mai province. Indicators and criteria for assessment of the resource potential were developed primarily based on related literatures from [2], [3] and empirical study from within the country [4], validated by academics and practitioners as well as ground check. There are 15 indicators for NT and AT and 18 indicators for ET evaluation of potentials (Table 1). The score from the evaluation was ranked 1 to 3 as 1 is the lowest potential and 3 the highest. Weighting score method was employed for potential calculation.

In addition, the recreation opportunity spectrum (ROS) was also classified by employing the concept from [2]. The recreation opportunities of 124 tourism sites in protected areas are classified into 5 classes: Primitive (P), Semi primitive non-motorized (SPNM), Semi primitive motorized (SPM), Semi developed (SD) and Developed areas (D).

The database system was designed as relational database by system development life cycle (SDLC) for the target group identified as tourism resources planners and protected area managers. The database and web application was developed by MySQL and the available program in php script language, in that order. For the user interface design, the web browser through internet connection was employed for database management. The system testing and evaluation were done by the experts in database development, experts in content and data quality, and direct users including park superintendents, recrea-

TABLE 1

INDICATORS FOR TOURISM SITE EVALUATION

Indicators	Weighting score		
	NT	AT	ET
Tourism Resources			
1. Attractive and uniqueness elements	3	2	3
2. Richness of vegetation and naturalness of ecosystem	-	-	3
3. Opportunity for wildlife sighting	-	-	3
4. Landscape quality and aesthetics	3	1	3
5. Appropriateness of tourism activity related to the site characteristics and resources	2	2	2
6. Diversity of tourism activity	2	-	2
7. Micro-climate condition	3	1	2
8. Accessibility	3	-	-
9. Self reliance	-	3	-
10. Opportunity for challenge and exciting experiences	-	3	-
total	16	12	18
Facility and service			
11. Harmony of facility	3	2	3
12. Facility sufficiency	3	3	-
13. Quality of facility	3	3	3
14. Management of visitor safety	3	3	3
15. Quality of service	3	3	3
16. Interpretation: appearance, content, and interpretation method	-	-	3
total	15	14	15
Environmental and social impact management			
17. Tourism zoning	3	3	3
18. Carrying capacity determination	3	3	3
19. Measures for environmental Impact mitigation	3	3	3
20. Waste and garbage management	3	3	3
total	12	12	12
Local participation			
21. Opportunity for local people to participate in tourism management	-	-	3
22. Opportunity of local people to gain tourism benefit	-	-	3
total	-	-	6
Net total	43	38	51

Note: NT = Conventional Nature Tourism
 AT = Adventure Tourism
 ET = Ecotourism
 (-) = Not use in equation

tion management officials of the PA, and a regional national park director.

4 RESULTS AND DISCUSSION

The results from the recreation resource inventory found that there were 72 NT sites (58.06%), 37 AT sites (29.84%) and 5 ET (4.04%) while there are 10 sites (8.06%) being assessed as either NT or AT. From total of 124 sites found 24 sites in high potential, 91 and 9 in medium and low potentials, respectively.

The highest potential of the NT sites was identified as Keaw Mae Pan scoring 2.84 out of 3. While Mae Tang and Mae Cham - Tha Phra Sadej water rafting routes were the highest potentials for the AT (score 2.69), Doi Luang Chiang Dao for ET (2.46), and bicycling route Yod Doi Pui - Botanical Garden for the NT/AT (2.13). Recreation resources found in PA were mainly waterfall, forest hiking trails, bicycling routes, streams and hot springs, respectively.

As a result, tourism sites in PAs are now mainly appropriate for mainstream nature lover tourists seeking relaxing nature experiences. However, PA manager should consider increase ecotourism sites within PAs in order to accommodate more ecotourists in the future.

The ROS classification found most sites in the opportunity settings of SPM (25%) and SD (25%) equally. Secondly was in SPNM (24.2%) and the least found recreation opportunity settings was the developed area (D) (12.9%) and the primitive area (P) (12.9%). It is worth to take note that recreation opportunity classes in the PAs were diverse and mainly fell within range of SPNM to SD classes.

For database development, the PAs managers identified that all 4 tourism elements: tourism resources, facilities and services, visitor information, and administration information should be included in the database. However, the most urgent needed data for management was the information about the recreation or tourism resources such as po-

tential for recreation uses, ROS, and carrying capacity of the sites.

The database was designed as relational database for the following target groups: tourism resources planners and protected area managers. The database users were then divided into 2 groups: administrative users and general users. The administrative users must have a user name and password in order to modify or update the information in the database while general users have limited access, only read and print the data report. The database contained search engine for tourism site(s) by either PA names or key words. The database contained general information, map, photos, resource potential, ROS evaluation, facilities and physical carrying capacity of each tourism site. Figure 1 and Figure 2 showed the samples of web pages.

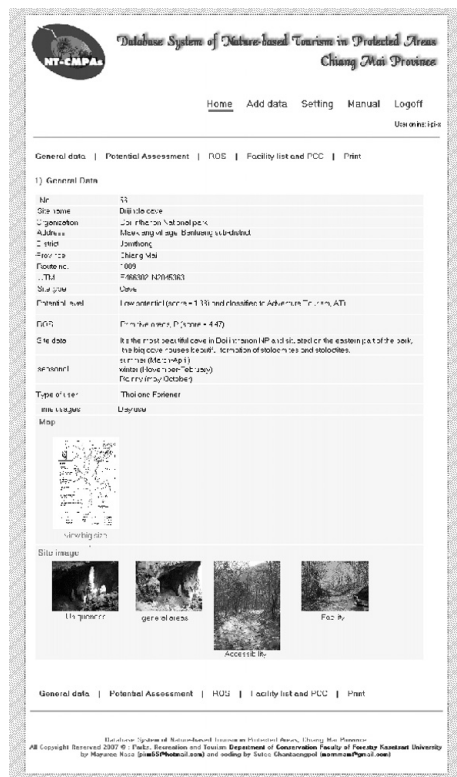


Fig. 1 The sample web page containing menus for accessing information on site potential, ROS, facilities and physical carrying capacity of tourism sites in PAs

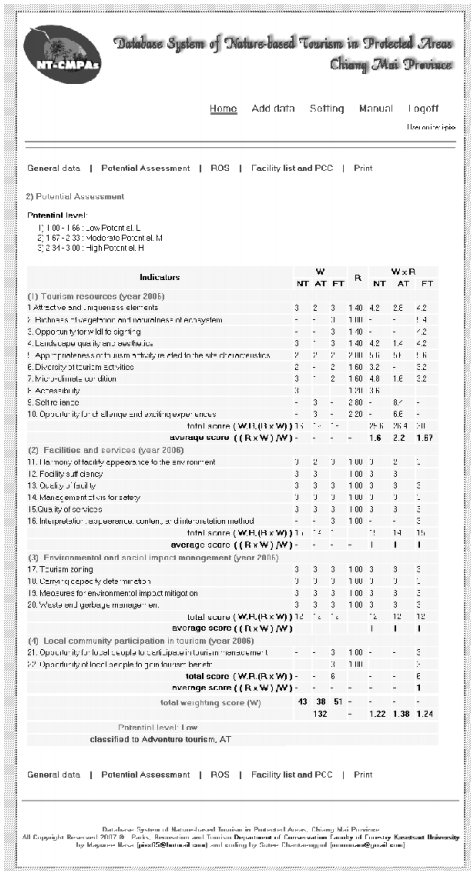


Fig. 2 Sample web page containing detail information on tourism site potential evaluation.

The experts in database development carried out the database system testing and the testing grade for the design and techniques was given as “rather good” with the score 64%. While the evaluation score of user interface capability given by the expert in database development and the PA managers was 81%. Finally, the evaluation score on the usefulness of the information contained in the database was the highest at 84%.

The weakness of this database appeared mainly on the design of the web pages that primarily for working purpose but not very attractive for general users. Further, the contents of database should include information on both user and resource components to give comprehensive information for tourism management. Information useful for tourism

management is visitor numbers, visitor characteristics, visitor expectation and satisfaction at each site.

Nonetheless, the development of the tourism resource database appeared to be a useful management tool for PA managers. Application of computer technology can help park management in terms of convenience in systematic data organization such as data updates, comparisons among sites and giving insight information for site management concerning site potentials, recreation opportunity setting, and carrying capacity.

5. CONCLUSION

The relational database system on nature based tourism in PAs contained useful information obtained from systematic recreation inventory on resource potentials, ROS, facilities and physical carrying capacity. The database system was developed as web application and primarily for PA tourism management purpose. The integration of Geographical Information System (GIS) into this relational database system as well as taking in information on visitor element is suggested to enhance usefulness of the database.

REFERENCES

- [1] Department of National Park, Wildlife and Plant Conservation, “Visitor Statistics year 2005-2007, Unpublished.
- [2] R.N. Clark & G.H. Stankey, “The Recreation Opportunity Spectrum: A Framework for Planning, Management, and Research,” General Technical Report PNW-98. USDA Forest Service, Dec. 1979.
- [3] Resources Inventory Committee – The Province of British Columbia, “Recreation Opportunity Spectrum Inventory: Procedures and Standards Manual”, <http://www.for.gov.bc.ca/ric>
- [4] D. Emphandhu, “Assessment of Nature-based Tourism Site Potential at Chiang Mai Province,” *Proc. 45th Kasetsart University Annual Conference*, pp 739-746, 2007.

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