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Site Suitability Evaluation for Ecotourism Using GIS & AHP: A Case Study of Surat Thani Province, Thailand

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Abstract

The main objective of this study is to identify and prioritize the potential ecotourism sites using Geographic Information System (GIS) and Analytical Hierarchy Process (AHP) in Surat Thani Province, Thailand. This study identifies the following factors as indicators of suitability within land ecosystems: landscape/naturalness, wildlife, topography, accessibility and community characteristics. The evaluating process for ecotourism site conducted based on nine chosen criteria including visibility, land use/cover, reservation/protection, species diversity, elevation, slope, proximity to cultural sites, distance from roads and settlement size. Those factors were selected according to the professional expert's opinions. AHP was effectively used in this study to calculate the details of the factors and class weights. GIS plays a crucial role in ecotourism planning. The methodology proposed was useful to identify ecotourism sites by linking the criteria deemed important with the actual resources of the Province.

Keywords: Site Suitability Evaluation; AHP; GIS; Ecotourism; MCDM; Surat Thani; Thailand;

1. Introduction

Ecotourism has a strong connection with sustainable tourism. Sustainability depends on the relationship between tourism and environment. Suitable management for ecotourism development is essential in order to conserve and maintain the biological richness of the area as well as economic upliftment of the local people. In addition, ecotourism can be defined as an opportunity to promote the values in the protected areas and to finance related stakeholders [1]. In this respect, ecotourism evaluation should be regarded as an important tool for sustainable development of tourism in a protected area [2]. This can be judged with the help of criteria and indicators approach, which is basically a concept of sustainable ecotourism management developed in a set of principles, criteria and indicators [3]. Ideally, ecotourism should satisfy several criteria such as conservation of biological and cultural diversities through ecosystem protection and promotion of sustainable use of biodiversity with minimal impact on the environment being a primary concern [4]. GIS used for identifying location suitability and resource inventories according to environmental concern. To identify untouched areas GIS can play an important

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role [5]. However, a fundamental problem of decision theory is how to derive the relative weights of the criteria. A well-known weight evaluation method is the Analytical Hierarchy Process (AHP). This method has steps including specifying the hierarchical structure, determining the relative important weights of the criteria and sub-criteria, assigning preferred weights of each alternative and determining the final score [6]. Abidin [7] identified a set of 15 criteria and 58 indicators for sustainable ecotourism management in Taman Negara National Park (TNNP), Malaysia. The Delphi method and public survey were used to solicit opinions from an interdisciplinary panel of Malaysian experts and public groups regarding the suitable criteria and indicators of sustainability for TNNP. Bukenya [8] employed six criteria (high number of species, wildlife management potential, endangered species, potential to attract more tourists, less susceptibility to encroachment and degradation over long period) to prioritize the potential national parks in Uganda, based on the stated objectives and criteria for the development of ecotourism industry. The site specific criteria and indicators can be developed with stakeholders' participation. Boyd et al. [9] identified the following criteria: naturalness, wildlife, cultural heritage, landscape and community for ecotourism within Northern Ontario by linking their importance criteria with the actual landscape characteristics of this region. Kenan [1], using multiple criteria selected ecotourism planning activities in Igneada. The model was applied using participatory approach which consisted of 19 alternates and 28 criteria based on an ELECTRE method. Kumari et al. [10] integrated five indicators (wildlife distribution, ecological value, ecotourism attractively, environmental resiliency and ecotourism diversity) in order to identify and prioritize the potential ecotourism sites in West District of Sikkim state in India.

Ecotourism's perceived potential as an effective tool for sustainable development is the main reason why developing countries are now embracing in their economic development and conservation strategies [11]. Ecotourism emerged as an alternative form of tourism in the 1990s to mitigate the faults of conventional (mass) tourism in meeting the needs of sustainable development. It has since become widespread in Thailand and is adopted not only in natural areas but also in rural communities [12]. Ecotourism is one of the rapidly growing sectors in the tourism industry at present. Since people are traveling to original and natural regions to enjoy the landscapes, wild animals, plants etc. These actions had insignificant impact on the environment and natural resources, play role in the protection and survival of various species of plants and natural sources [13]. In many protected areas, tourism is a major activity that occurs without much planning or preparation [14]. Limiting ecotourism to such areas where the region's characteristics are most suited for ecotourism will to an extent reduce negative impacts compared to areas which are more fragile in nature [9]. It is imperative that only some areas suitable for ecotourism are to be developed and ensure that ecotourism criteria matched with the basic resource characteristics of the area. Suitable management for ecotourism development is essential in order to maximize the positive impacts and minimize negative impacts on all aspects of tourism like in Thailand. The integration of the

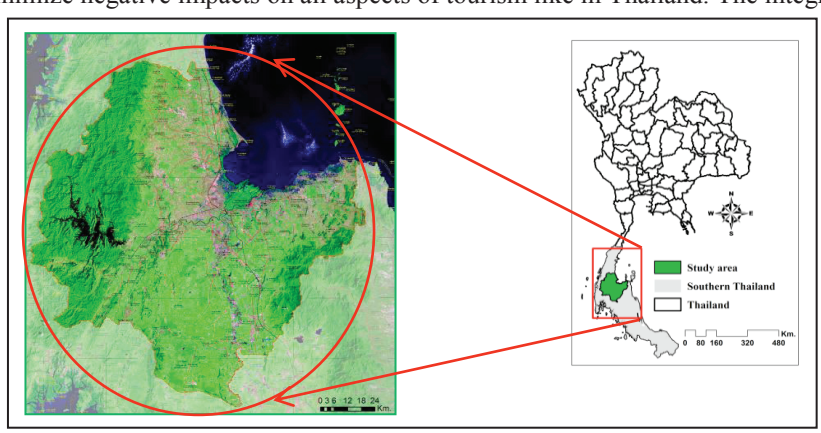

Fig. 1. Geographical location of Surat Thani Province, Thailand