Preliminary Assessment of Nature-Based Tourism Resources in the Buffer Zone of Bach Ma National Park, Vietnam

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Abstract The buffer zone plays a key role as an ecological barrier for protected areas. Socio-economic conditions of the residents relate not only to the development of provincial regions but also to the success of conservation strategies for the protected areas. Recent studies revealed that the local communities surrounding Bach Ma National Park, Vietnam, especially ethnic minority communities that utilize forest resources for their economic livelihoods, could contribute to biodiversity loss. Alternative livelihoods could be an effective solution to reducing their dependences on forest resources. In this study, we employed a GIS-based criteria approach to evaluate nature-based tourism resources. Forest management units in the buffer zone within Dong Giang District, Quang Nam Province were chosen as study units. Twelve meetings with sixty local representatives were organized to identify potential destinations. This study proposed three criteria for the assessment of the suitability to tourism development. The first criterion is "attraction", which is scored by evaluating diversity of landscape, destination potential, and topographic characteristics. The second criterion is "accessibility", which evaluated the distance from main road to tourism resources, and the third is "adaptation", which is scored based on local legal scenarios pertaining to land use management and usage. These criteria led to the identification of eleven potential destinations and eight forest management units, which have a high potential for nature-based tourism development. The results of this study show that there are bright prospects for improving local livelihood by the tourism development in the buffer zone.

Keywords nature-based tourism resource assessment, livelihood, forest, Bach Ma

INTRODUCTION

Bach Ma National Park in Vietnam contains significant biodiversity (7% and 17% of all fauna and flora, respectively). However, the park and its buffer zones have faced many threats leading to biodiversity loss and forest degradation (Huynh et al., 2016). The buffer zones are defined as areas contiguous to protected areas and established to prevent or reduce negative impacts upon the areas (Decision No. 186, 2006). The buffer zones of Bach Ma National Park are located inside the transition zone of northern (Sino-Himalayan, Indo-Burmese) and southern (Malesian) floras, which has been assessed as an important "Floristic Biodiversity Centre" for the Indochina region (Tran and Ziegler, 2001). It is within three districts in two provinces and covers an area of 58,676 hectares. This area contains two mountainous districts, which include communities of ethnic minorities (Van et al., 2016), who have been classified into a poor socio-economic group by the government during many successive generations (Decision No. 73, 2016). Thanh and Sikor (2006), and Nguyen et al. (2016) indicated that the ethnic minorities have historically inhabited the nearby forests and utilized the forest resources for their livelihoods. Considering the dependence of the local communities, it is difficult for forest management organizations to achieve sustainable management without negatively affecting the livelihoods of those communities (Hong and Saizen,

2019). Therefore, the investments in local livelihood development should strive to reduce forest dependence and facilitate sustainable forest conservation.

Investments in agriculture or agroforestry are often encouraged to enhance rural areas and reduce forest dependence; however, the effects of the investment are limited due to local conditions. Chung et al. (2015) revealed that agricultural activities on household-scale farmlands relied entirely on weather conditions and the lack of irrigation water in the dry season was a significant challenge in the highland areas of central Vietnam. Meanwhile, Masud et al. (2017) reported that regional resources, such as natural landscapes and local culture were key components for developing tourism. The concept of ecotourism emerged in the early 1980s and was evaluated as an effective tool to create funds for nature conservation, improve local economy and raise awareness on nature conservation for local communities (Toko, 2016). Therefore, the evaluation of regional resources for ecotourism may contribute to the development of new livelihoods, which could in turn reduce forest dependency in the study area.

OBJECTIVE

The specific objectives of this study were to 1) investigate nature-based tourism resources through a community-based approach, and 2) determine appropriate areas for nature-based tourism development based on resource assessment.

METHODOLOGY

Interview and Community Mapping

Field surveys were conducted from May to June 2017 and July 2018 in the part of buffer zone, which belongs to Dong Giang District, Quang Nam province (Fig.1). We organized twelve meetings with sixty local representatives who are collecting forest resources for their livelihoods. Participatory mapping exercises and semi-structured questionnaires were undertaken to determine outstanding natural collection sites. General nature-based tourism resources, such as hot water springs, waterfalls, hills, and natural lakes were proposed in the meetings. A base map of local topographic characteristics was used for a mapping exercise in which the participants were asked to place colored beans on the map to indicate the locations of potential tourism sites. Descriptions of the surrounding landscape and preliminary assessment of the mentioned sites were also discussed in the meetings. Many kinds of waterfalls were mentioned so that classifications of waterfalls proposed by Bantinas (2010) was shown to participants in order to hear their description of the sites. The mapped information from the mapping exercise was subsequently digitized using ArcGIS 10.5.
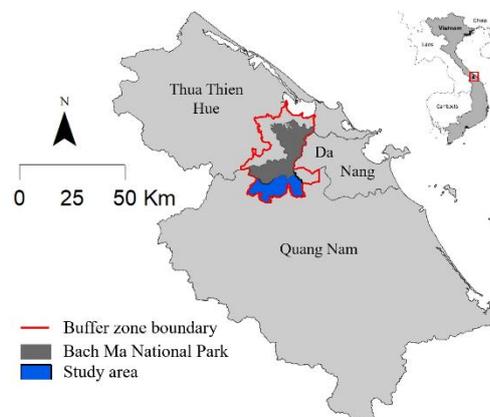
Fig. 1 Study area

Criteria of Nature-based Tourism Resource Assessment

Evaluation of nature-based tourism resources is often based on landscape quality and conditions relating to the enjoyment of visitors (Priskin, 2001). Boniface et al. (2016) stated that a tourist destination should consist of following main elements: 1) presence of attractions; 2) accessibility, facilities and services related to tourism activities; 3) political stability for tourism development; and 4) support of destination products by tourism stakeholders. In this study, three criteria were considered: *attraction*, *accessibility*, and *adaptation*.

Table 1 Criteria of attraction

Elements	Sub-elements	Score of study unit					
		Number of sub-elements					
		5	4	3	2	1	None
Landscape (*based on land use map and participant opinions in meetings*)	1. Forest scenery/view 2. Rice field scenery/view 3. Plantation scenery/view 4. Garden/field scenery/view 5. Waterbody (lake, river, etc.)	5	4	3	2	1	0
Tourism objective distribution (*based on land use map and participant opinions in meetings*)	1. Natural beauty (forest, plantation, etc.) 2. Natural phenomenon (Cave, crater, etc.) 3. Waterbody (lake, waterfall, river, etc.) 4. Cultural attraction 5. Historical heritage	5	4	3	2	1	0
Uniqueness of resources (*based on land use map and participant opinions in meetings*)	1. Forest ecosystem 2. Karst ecosystem 3. Landscape scenery/view 4. Hot water spring/waterfall/lake/river 5. Cultural and historical heritage	5	4	3	2	1	0
Value (*based on participant opinions in meetings*)	1. Ecological value 2. Knowledge value 3. Medicinal value 4. Economic value 5. Belief, cultural, and historical value	5	4	3	2	1	0
Possible tourism activities (*based on participant's opinion in meetings*)	1. Research/education 2. Hiking/tracking/climbing 3. Photography 4. Enjoying scenery 5. Viewing cultural /historical heritage attraction	5	4	3	2	1	0
Altitude (*based on DEM*)	1. > 2.000 meter (high mountain) 2. 1.000 - 2.000 meter (mountain) 3. 500 - 1.000 meter (high hills) 4. 100 - 500 meter (hills) 5. 15 – 100 meter (lowland)	5	4	3	2	1	0
Slope (*based on a transformation of DEM*)	1. > 45 (very steep) 2. 25-45 (steep) 3. 15-25 (wavy/undulating) 4. 8-15 (rather flat) 5. 0-8 (flat/level)	5	4	3	2	1	0

Rahayuningsih et al. (2016) cited the elements and sub-elements

Tourists often expect to have access to diverse, rare or unique destinations (Deng et al., 2002). In this study, the diversity of landscape, the potential to be a destination, and topographic characteristics are taken into account in the *attraction* criterion, as illuminated in previous studies (Aiping et al., 2015; Rahayuningsih et al., 2016). Rahayuningsih et al. (2016) defined a list of elements and sub-elements in *attraction* criterion of nature-based tourism assessment. We applied the list and assigned scores from 0 to 5 for forest management units based on the number of sub-elements they contain, the units are designated by the government for forest management (Decree

No. 23, 2006). Three types of datasets consisting of a land use map, *digital elevation model* (DEM) data, and the information from meetings with local representatives, were utilized for counting the number of sub-elements and scoring (Table 1).

Accessibility refers to the ease of being able to physically access destinations (Priskin, 2001). The criterion was divided into five distance ranges from a main road to the mentioned destination. The destination is assigned a score from 0 to 4 depending on the distance. The study unit's score is calculated by averaging the scores of all destinations distributing within the unit (Table 2).

The criterion of *adaptation to local legal condition* was considered with respect to the local legal documents on forest management and usage. This criterion was scored from 0 to 3 based on the regulations mentioned in these documents regarding the community's access to different forest types (Table 2). Generally, the access was determined by the function of forests. For instance, the special-use forest is designed to conserve the natural forest ecosystem and genetic sources; thus local community's access here is limited completely (Decree No. 117, 2010). The access in the protection forest has more flexibility, but still can be restricted in some cases to prevent erosion, desertification and to maintain its function of regulating climate. While access in the production forest is limited for environmental protection, residents have limited access because its main function is to produce and trade timber and non-timber resources (Decision No. 49, 2016).

Finally, the suitability of study units to nature-based tourism development was delineated by a sum of scores from *attraction*, *accessibility*, and *adaptation to local legal condition*. Five classifications of suitability were used, as shown in Table 3.

Table 2 Criteria of accessibility and adaptation to local legal condition

Criteria	Distances to main road (km)					Land use			
Element	0-5	5-10	10-15	15-20	>20	Farmland and others	Production forest	Protection forest	Special-use forest
Score	4	3	2	1	0	3	2	1	0

Table 3 Assessment of nature-based tourism resource by criteria

Criteria	Classification				
	Very low	Low	Moderate	High	Very high
Attraction	0-7.0	7.0-14.0	14.0-21.0	21.0-28.0	28.0-35.0
Accessibility	0-0.8	0.8-1.6	1.6-2.4	2.4-3.2	3.2-4.0
Adaptation to local legal condition	0-0.6	0.6-1.2	1.2-1.8	1.8-2.4	2.4-3.0
Suitability	0-8.4	8.4-16.8	16.8-25.2	25.2-33.6	33.6-42.0

RESULTS AND DISCUSSION

Spatial Distribution and Description of Nature-based Tourism Resource

Eleven potential sites were identified and mapped in the meetings. These sites were digitized and a map was generated to show the locations of nature-based tourism resources (Fig. 2). We identified 2 types of tourism resources, waterfalls and hot water springs, which have been deemed significant by tourism planners and managers because of their high attraction to visitors (Prasetyo et al., 2017). In this study area, there are 7 types of waterfalls, and *slide* and *tiered* waterfalls are common (Table 4).
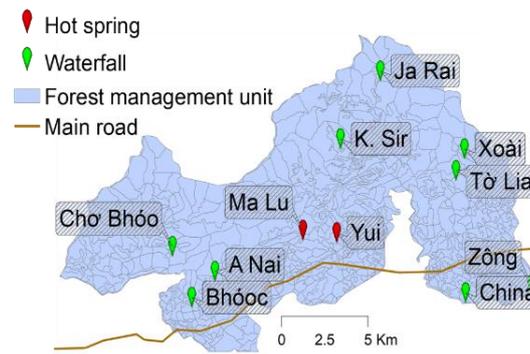
Fig. 2 Location of potential sites

Table 4 Description of nature-based tourism resource

Type		Local name	Description
Waterfall	Fan	Thác Chơ Bhóo	The fall looks like a fan, its the base is much wider than the top.
	Curtain	Thác Bhóoc	Wide breadth, thin flow, and its height is taller than the width.
	Cascade	Thác Tơ Lia	The fall descends gradually on sloping rocks, a series of small steps in quick succession is observed.
	Slide	Thác Chơ Run	The fall is thin and descends on a smooth, inclined surface.
		Thác A Nai	
	Horsetail	Thác China	The fall is very high, looks like a horsetail, with a spreading tail.
	Tiered	Thác Zông	The height of flow decreases with the stratification of rock.
		Thác K.Sir	
	Punchbowl	Thác Ja Rai	The fall is short, small, and spreads out in a vast basin.
Spring	Hot water	Suối nước nóng Yui	Since the spring links to a freshwater spring, water's temperature is safe for bathing.
		Suối nước nóng Malu	Since the spring links to a freshwater spring, water's temperature is safe for bathing. It stems from a high mountain where *Cotu* people believe that the mountain gods are dwelling.

The summary is derived from the opinions of the participants in the meetings

Assessment of Nature-based Tourism Resource

Among five classifications for the *attraction* criterion, only classes of moderate and high were observed, with six and five units, respectively (Fig. 3a). While some of the sites exhibited low *adaptation to local legal condition* on forest management and usage (Fig. 3b), tourism activities are still planned in the forests. Article 17 in Decision No. 17 (2015) shows that ecotourism in the protection forest can be started if the ecotourism activities meet some requirements for forest conservation. Meanwhile, it is much easier to launch ecotourism in the production forest when the planned ecotourism activities are not having negative impacts to timber and non-timber production and the soil environment (Article 19 in Decision No. 49, 2016). Accordingly, it would be better to prepare specific plans for tourism development in different forests. Furthermore, most identified sites are within a distance of 5 km to the road connecting to a neighboring city and district with high evaluation scores for *accessibility* (Fig. 3c). A suitability map built by overlaying all assessed scores shows that a significant percentage, approximately 73% (8/11), of forest management units was classified as high suitability for nature-based tourism development (Fig. 3d). Their distribution is spread widely throughout the study area, which could boost the local economy of multiple villages by tourism development.
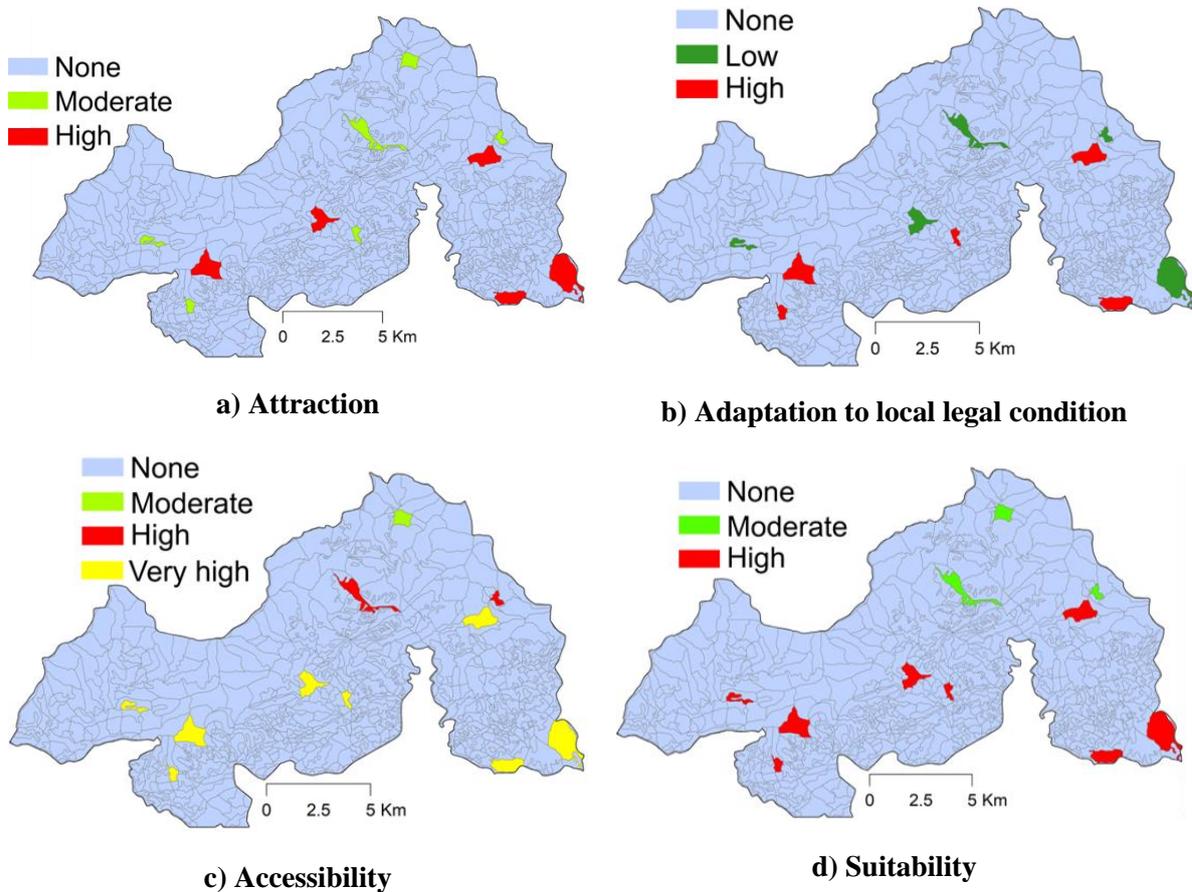
Fig. 3 Classification of forest management units based on criteria

CONCLUSION

The study proposed a GIS-based criteria approach for assessing the potential of ecotourism through investigating nature-based tourism resource and knowledge of the indigenous residents. While we did not integrate weights into the criteria in the assessment, this was to allow for flexibility for applying the criteria among various stakeholders in the future. The sites with high suitability to nature-based tourism development were identified by the proposed criteria, and they were observed in various forest types. A comprehensive plan covering all forest types for nature-based tourism development should be prepared through future work.

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