

ZONING DESIGN FOR SUSTAINABLE ECOTOURISM MANAGEMENT PLAN STRATEGY IN BOGANI NANI WARTABONE NATIONAL PARK, INDONESIA

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Background:

Indonesia has a large forest area, but unfortunately almost all of the forest conservation areas in Indonesia have to deal with encroachment. According to data from the Directorate General of Forestry Planning (2008) over a period of 1997-2005 in the conservation area, there has been a reduction in the land cover of forest areas into non-forest area of 480,000 hectares or about 1.7% of the total of protected areas.

Ecotourism is often considered to be a potential strategy to support conservation of natural ecosystems while, at the same time, promoting sustainable local development (Ross & Wall, 1999). With ecotourism activities, the conservation area is able to create more jobs. In general, ecotourism requires less investment for infrastructure development, but needs more services than other tourism. The acquisition of great economic value can be used for conservation of natural resources. And community involvement in ecotourism activities will ensure the safety and sustainability of these resources.

For ecotourism to fulfil its potential and generate sustainable benefits, protected areas must implement a planning framework to guide and manage the activity. Therefore, a zoning design should be made for ecotourism development in order to achieve a sustainable ecotourism development program.

Objectives:

The objectives of this research are; (1) to identify the ecotourism objects and activities potencies in the Bogani Nani Wartabone National Park; (2) to identify the targets or systems (species, natural communities or ecosystems) and the stresses that reduce their ecological viability, sources of those stresses (threats), and the relevant stakeholders; and (3) to examine the appropriate ecotourism zoning design for sustainable management plan strategy.

Methodology:

Primary data will be collected through survey using questionnaire to the respondents and by conducting in depth interview with some of the respondents. Interview also will be conducted with several stakeholders such as local government, Bogani Nani Wartabone National Park officers, travel agents and NGOs. Secondary data come from general management plan of the national park, land use map, zoning map of the national park, topographic map, previous researches, official documents, report, and, unpublished document.

In general, the data will be analysed using “spatial data analysis” with Geographic Information System (GIS).

Using existing map (the national park zoning map, land use map, topographic map, etc.), I will locate the potential ecotourism objects, the sensitive or environmentally fragile site, existing infrastructure facilities, the possible ecotourism activities, and make an overlay map to visualized and classified the ecotourism potency in the National Park. For the data analysis framework, I will employ a data analysis scheme using GIS as Figure 1.

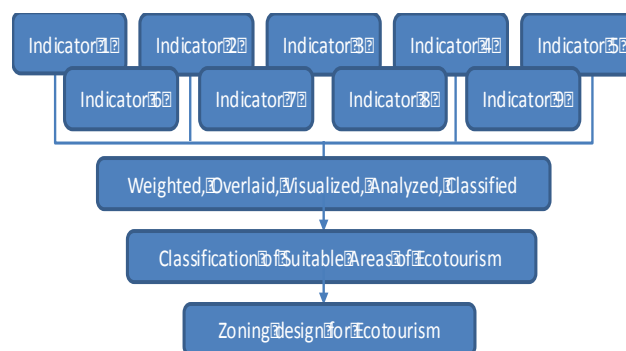


Fig. 1 Data analysis scheme using GIS

In order to analyse the suitability of each zone generated, I want to employ the suitability analysis flowchart adopting from Bunruamkew and Murayama (2012) for analysing the suitability of designated zoning system. According to Bunruamkew and Murayama (2012), the main steps to produce land suitability map for ecotourism are: finding suitable factors to be used in the analysis, assigning factor priority, weight and class weight (rating) to the parameters involved and generating land suitability map of ecotourism. In this process, experts' opinions were asked to calculate the relative importance factors involved using AHP.

The decision criteria and factors were divided into two main categories according to the land ecosystems of Bogani Nani Wartabone National Park: physical environmental and socio-economic parameters. This study selected five criteria and nine factors in the form of nine GIS-based layers in determining what areas are best suited for ecotourism development. These are landscape/naturalness (visibility, land use/cover), wildlife (reservation/ protection, species diversity), topography (elevation, slope), accessibility (distance from roads) and community characteristics (willingness to participate, settlement size). These criteria and factors were chosen based on the opinion experience and expertise of experts, surveying of authenticated literatures and analysis of historical data. The flow chart of the suitability analysis methodology is shown in Figure 2.

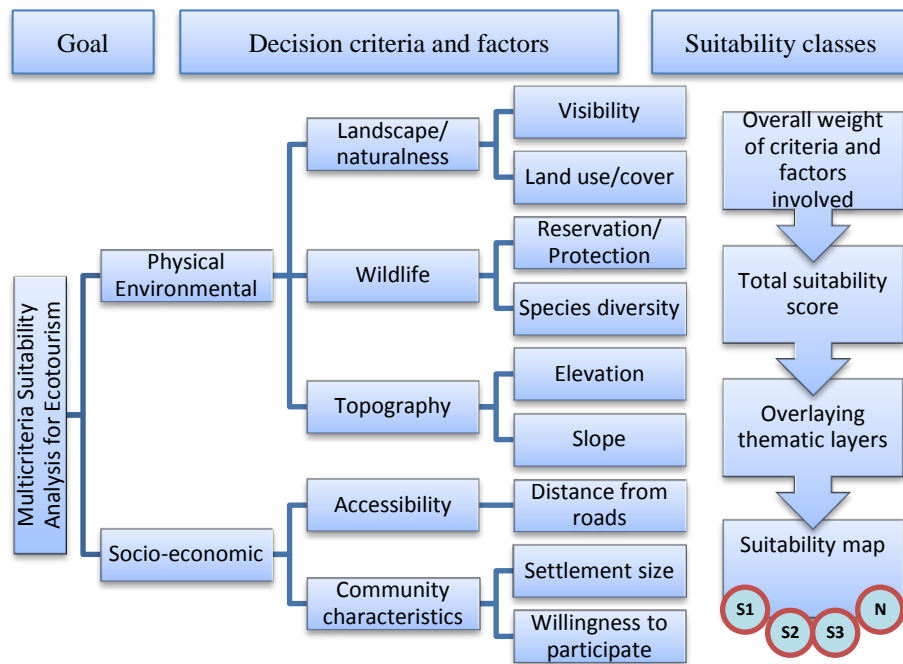


Fig. 2 Flow chart of the suitability analysis (adopted from Bunruamkew and Murayama, 2012)

First, the AHP method was applied to determine the relative importance of all selected criteria and factors. Each criterion and factor received a weight and a score, which represented its relative importance in the suitability evaluation. The total score for suitability is achieved by multiplying criterion score with its appropriate weight and adding all weighted scores. At the next stage, spatial data of the 9 factors as a set of GIS layers were overlaid together for final suitability classification for ecotourism. Further analysis was done in raster-based format and was then reclassified into 4 classes using the 'reclassify' function. Finally, the suitability map for ecotourism was produced using GIS overlay. At the end of this process, the suitability map for ecotourism development is generated. The degree of suitability of each factor classified as highly suitable (S1), moderately suitable (S2), marginally suitable (S3) and not suitable (N). Finally, a zoning map for ecotourism will be created based on the suitability map

Results and Discussion

As my research is still in progress, therefore the results in this paper are still temporary. It may be any changes when I present the final results of my research in the conference. The temporary results of my research are as follow:

Suitability Map of each Indicator

Before I make a final zoning system for ecotourism, suitability map for each indicator was created and analysed as follow:

- Landuse/cover suitability map
The result for this indicator shows that almost all of the National Park areas are suitable for ecotourism. It is because the National Park was designated for environmental protection, therefore its suit for ecotourism development.
- Reservation/protection suitability map

Reservation/protection suitability map was design according to existing zoning system in the National Park. It was designed for management purposes following the rule and regulation in Indonesia.

- Elevation suitability map
According to the elevation suitability map, it can be seen that there a quite considerable amount area that not suit for ecotourism development.

There are still 6 (six) indicators that still in progress of analysing for suitability for ecotourism. After all of the indicators are analysed, they will be weighted using judgment from several experts. This weighting process will be conducted using AHP questionnaire and analysed using Expert Choice 11 software. Finally, after all indicators are weighted, they will be overlaid using GIS to determine the final zoning map for ecotourism development program.



Fig. 3 Landuse/cover suitability map



Fig. 4 Reservation/protection suitability map

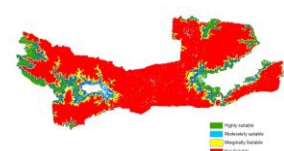


Fig. 5 Elevation suitability map

References

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