

# The sustainable management priority of ecotourism mangrove Wonorejo, Surabaya-Indonesia

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**Abstract.** Wonorejo Mangrove Ecotourism is one of several tourist attractions in Surabaya. Through years, the number of this tourist attraction's visitors has increased significantly. However, this condition has not followed yet by a management system that consider the principle of conservation which caused environmental quality decrease such as mangrove damage and reduced natural resources. The purpose of this study is to determine the priority factors that influence the success rate of sustainable ecotourism based on stakeholder preferences and to formulate a strategy of ecotourism management. This research use Analytical Hierarchy Process (AHP) and qualitative descriptive method. The discussed aspects include environmental conservation, institutional management, education, economics, and community participation. The results of this study indicate that the factor that has a high influence in reaching a successful ecotourism is the factor of environmental conservation. Thus, management priorities should be focused on environment aspect. The management strategies that should be taken include rehabilitation of conservation area, enhancement of mangrove use monitoring, law enforcement, establishment of a management consortium, ehancement of synchronized coordination and interaction between stakeholders. The result of this research is expected as a reference for the government, especially in improving the spatial plan of the research area.

**Keyword:** *Sustainable Ecotourism, Mangrove, AHP*

## 1. Introduction

Ecotourism is a part of sustainable tourism activities and is a professionally trained, learning and learning element as an economic resource, which takes into account cultural heritage, participation and increase the income of local people and undertakes efforts to conserve natural resources and environment. [1]

The city of Surabaya is a city that has 2 ecotourism namely Kawasan Ekowisata Mangrove Gunung Anyar dan Kawasan Ekowisata Mangrove Wonorejo (KEMW). KEMW is one of the potential tourist attractions in Surabaya. KEMW has the potential of natural beauty and cultural richness of high value in the ecotourism industry market. Based on visitor data obtained from Mangrove Information Center (MIC), the number of visitors of mangrove ecotourism in 2011 was 6,076, in 2012 as many as 5,943 people, and in 2013 was 6,211 people. [2]



Based on the data it can be seen that the number of visitors has increased by 4% in 2013. This shows that the ecotourism of mangrove wonorejo is not in accordance with the characteristics of ecotourism according to [1] which states that the operational characteristics of ecotourism management is the number of low group entourage (low volume) . Nugroho also added that the high number of ecotourism visitors will disturb the organism's life cycle, destroy habitat and loss of biodiversity.

This is in contrast to the goal of ecotourism itself that restore the function of mangrove forest and preserve the environment. The change of conservation area into ecotourism area has an impact on the decrease of environmental quality such as damage to mangrove wonorejo, decreasing of shrimp catch and decreasing of peksia species. [3]

Based on data from Surabaya Environment Status 2011, the total area of mangrove land in Wonorejo is 51,380 ha with good land area of 37,374 ha and damaged land of 14,006 Ha. Predicted, the number of damage will continue to increase if not controlled immediately. In addition, the Head of Agriculture Department of Surabaya City, Joestamadji stated that two hectares of mangrove area in Surabaya is badly damaged by the waste. Meanwhile, one farmer claimed to often find garbage strewn and twisted in the stem of mangrove stems on the river bank. (antaranews.com, May 16, 2015). In addition to mangrove land damage that continues to increase due to waste, ecotourism activities also lead to reduced biota that exist there, one of which is the species of bird Peksia. Based on data of bird observers, the number of species that exist there are 170 species, but now live about 70 to 80 species. The decrease of this bird makes the caterpillar population increase so mangrove will be mangrove (antaranews.com, 13 May 2012).

Hermawan in [4] added that the decline of bird species is caused by the mistake of managers in using boats for ecotourism activities. Hermawan said, the boat used to drive tourists is a fairly large boat with a bright red color that makes birds fear and eventually move to another place. In addition, the impact of this boat activity is reduced shrimp catch, crab catch, and fish. Fishermen who used to catch as much as 2 kg, are now reduced to 2 ounces to 8 ounces per day. So the income of fishermen will be reduced. In addition to some of the above problems, Hermawan also mentioned that ecotourism management has not fully involved the local community. Community involvement is still passive. [4]. Ecotourism should meet several principles such as environmental conservation, local community participation, economy, education and sustainability.[5]

Based on the facts in the above description, it can be concluded that the determination of ecotourism area into a conservation area has not fulfilled the eco-tourism principle especially the principles of environmental conservation, and the principle of involvement of local communities. This can not be ignored simply because it will have a negative impact on the environment and threaten the sustainability of ecotourism itself. Therefore, this study aims to determine the priority of ecotourism management in order to determine which management should be prioritized first. The study considers the preferences of the Government as a stakeholder in controlling the utilization of space; private preferences as investment actors related to infrastructure development; manager preference as executor in field and community preference as observer and also ecotourism observer. So with this research, it is expected to provide input for the government in preparing the Master Tourism Master Plan document.

## 2. Methods

### 2.1. Research variable

The principle of ecotourism is a principle that must be met in the development and management of ecotourism. Sustainable ecotourism should cover 3 aspects including social aspects, economic aspects as well as environmental aspects. Medina (2005) in [6] The point is that ecotourism must contribute to the development of the shopping so it must be economical, sensitive to the environment and in

accordance with the local socio-cultural conditions. Here are 3 aspects that must be fulfilled in realizing sustainable ecotourism according to Wall in [6] :

- Sustainability of ecotourism environment
- Sustainability of ecotourism social culture
- Economic sustainability of ecotourism

Then UNESCO said that there are 5 important elements that become the principle of ecotourism in order to guarantee the preservation of the environment and improving the welfare of local communities. The principles include: a) providing experience and education to tourists; b) minimize negative impacts that may damage the environment; c) involve the community in the management and implementation. d) provide economic benefits, especially to local communities; and e) survival and sustainability. [5]

TIES revealed that the principle of ecotourism consists of: a) minimizing the impacts of ecotourism activities; b) building environmental awareness; c) Providing experience and education for tourists; d) Providing economic benefits for conservation; e) Providing financial benefits to local communities, f) as well as increasing cultural, political and social sensitivities. [7]

The explanation on the principle of ecotourism is also expressed by Low Choy and Heillbron (1997) that the underlying factor factors that limit the determination of the main principles of ecotourism consist of five factors such as Environment, community, education and experience, management, sustainable. [8]

Based on the results of the synthesis of literature, as for the variables that can be used in this study are environment conservation variables, education, community participation, economy, and institutional management. The variables are obtained from the comparison of several theories and considered relevant to this research and can support in achieving the research objectives.

## 2.2. Method of collecting data

The data collection method is done by primary survey and secondary survey. The primary survey was conducted by field observation and in-depth interviews with several related stakeholders including government groups (Agriculture and Food Security Office of Surabaya and Bappeko Surabaya), management group (MIC field coordinator, field jogging track coordinator, pier field coordinator), community groups (Mangrove Farmer Group), and private sector (Street Vendor). Secondary surveys were conducted with survey of literature and agency surveys.

## 2.3. Analysis Method

In determining the priority of management, researchers need to explore some of the existing factors in the research area so that it needs to explore first of the characteristics related to management using content analysis. After that, the AHP analysis process to determine management priorities is adjusted to the existing problems. Thus, furthermore it can be formulated the handling mechanism or management strategy using qualitative descriptive analysis. Here is a more detailed explanation of the analytical methods used in the study

**Table 1.** Analysis Methods

Research Purpose	Analysis Methods	Analysis Purpose
Determining priority factors that influence the success of ecotourism management based on stakeholder preferences	Analytical Hierarchy Process	To know the influential priority factor to realize the success of ecotourism management
Formulate ecotourism management strategy based on the principle of ecotourism	Descriptive qualitative	Formulate the ecotourism management strategy based on the results of the analysis conducted in the previous stage.

### 3. Result and Discussion

#### 3.1. Determination of priority factors that influence the success of ecotourism management of mangrove wonorejo based on stakeholder preferences

In determining the priority factor factors that influence the success of ecotourism management of mangrove wonorejo, the Analytical Hierarchy Process (AHP) method is used. This method is used to determine the priority of influence so it can know the priority of management to do. Based on AHP analysis, it can be seen that the factors that have a high influence is the factor of environmental conservation. Here are the results of AHP analysis related to management priority level assessment.

**Table 2.** Priority Level of Management

Factor	Weight Value
Environment Conservation	0,397
Education	0,270
Community Participation	0,123
Economics	0,108
Institutional management	0,102

Given its very high influence in realizing the successful management of ecotourism, the environmental conservation factor is a factor that should be prioritized. This is in accordance with the existing conditions. Because based on the results of analysis on goal 1, environmental conservation factor is a factor that has many problems that require more intensive management. In addition, given that ecotourism is eco-based tourism, so the attention to the environment should be the main thing for the manager. While the factors that should be prioritized the second order is institutional management. The characteristics of institutional management on the results of the 1st objective analysis indicate the unclearness of ecotourism managers. The management is still divided and stand alone and does not have a clear legal umbrella. This needs special attention from the government so that in the future the institutional system of ecotourism has legal and sheltered by a clear legal entity. While the factors that have the lowest influence is the factor of community participation. This does not mean that the factor should be ignored, but overall, the factor factor is a factor that must be taken into account in realizing an ideal ecotourism management.

While the order of priority variables based on the level of influence of interest can be seen as follows:

- Environmental Conservation Factor. In managing environmental conservation, there are 2 variables that must be considered namely mangrove management variables and depletion of natural resources. Based on the result of AHP analysis, the variable that has higher influence is the mangrove management variable with inconsistency value of 0 which means the error rate in this analysis is 0%. Here are the results of the assessment of the priority level of management of environmental conservation factors.

**Table 3.** Priority Level of Management Environmental Conservation Factor

Variables	Weight Value
Mangrove management	0,739
Depletion of SDA	0,261

Based on the above table most of the respondents mentioned that mangrove management has a higher influence in an ecotourism management. This is because the ecotourism of mangrove wonorejo is part of the east coast conservation area of Surabaya so that mangrove get more attention from each responder. However, it does not mean that its natural resources are ignored. A good ecotourism management should support the conservation principle by managing mangroves while maintaining and protecting existing species.

- Institutional management factors. Based on the results of AHP analysis, the variable that has a high influence in institutional management is Policy / regulation. The results of this analysis indicate that most respondents consider the policy is very important in an ecotourism management. In addition to its function as a guide, the policy also has the function of controlling the managers who are less responsible and violate the principles of ecotourism. This also corresponds to the characteristics of institutional management in the study area. Here is the result of weighting assessment of the priority level of management of institutional management factors.

**Table 4.** Priority Level of Management Institutional Management Factors

Variables	Weight Value
Policies / regulations	0,387
Budget	0,326
Organizational management	0,116
Stakeholder engagement	0,078
Tourist Management	0,059
Promotion	0,034

- Educational factors. In addition to ecological attention, ecotourism should also pay attention to educational factors. Ecotourism should be able to provide new knowledge and experiences for tourists who come. The educational factor has two variables, namely the type of educational activity and the educational facility itself. Based on the results of AHP analysis, the variable that has a higher influence is the type of educational activity. This shows that most respondents consider that ecotourism does not have to have a complete educational facility, but more importantly is the existence of educational activity itself. Here is the result of the weighting assessment of the priority level of education factor management.

**Table 5.** Priority Level of Management Education Factor

Variables	Weight Value
Janis educational activities	0,671
Educational facilities	0,329

- Economic factors. Economic factor consists of two variables namely employment opportunities and community economic improvement. These two variables can not be separated due to mutual influence. However, based on the results of AHP analysis, the variable that has a higher influence in the economy is the employment opportunity of the community. This shows that most of the respondents consider job opportunities more

important because with the existence of job opportunities then the economic increase will occur. So ecotourism management should be able to provide job opportunities for local communities to improve their economic conditions. Here are the results of the assessment of the priority level of management of economic factors.

**Table 6. Priority Level of Management Economic Factors**

Variables	Weight Value
Work opportunities	0,674
Economic improvement	0,326

- Community participation factors. Community participation factors consist of community involvement variables and local community empowerment. Based on the results of AHP analysis, the variable that has a higher influence is community empowerment. This shows that in realizing the success of ecotourism, most respondents consider community empowerment more important than engagement. But both are inseparable and mutually exclusive. The following is the result of AHP analysis related to the priority level of management of community participation factors.

**Table 7. Priority Level of Management Community Participation Factor**

Variables	Weight Value
community empowerment	0,739
Community involvement	0,261

### *3.2 Formulation of Mangrove Ecotourism Management Strategy Wonorejo Based on the principle of ecotourism*

Therefore, the handling mechanism should be focused on the aspects of environmental conservation and institutional management. Here are the strategies should be taken by stakeholders:

- Environmental Conservation
  1. Rehabilitation of mangrove conservation areas
  2. Law enforcement
  3. Improvement of environmental quality of ecotourism
- Institutional Management
  1. Operational Planning of Ecotourism Management
  2. Establishment of a management consortium
  3. Increasing institutional institutional capacity and synergetic coordination synergies
  4. Increasing the economic benefits of ecotourism
  5. Increasing community involvement in ecotourism management

## **4. Conclusion**

Based on some of the above description, it can be concluded that the factors that must be prioritized to be managed intensively is environmental conservation factor. The second is institutional management. Then the third is education. Next followed by economic factors, and community participation. Factor factors are prioritized based on the level of influence is high enough to the success of ecotourism as well as conditions characteristic problems that exist in the planning area.

Therefore, the management strategy that must be done is rehabilitation of conservation area, Law enforcement, Improvement of environmental quality of ecotourism, Operational Planning of

Ecotourism Management, Establishment of a management consortium and Increasing institutional institutional capacity and synergetic coordination synergies

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