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1 To cite this article: NC Irawan *et al* 2022 *IOP Conf. Ser.: Earth Environ. Sci.* **1108** 012068

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# Environmental management and stakeholder roles in sustainable tourism development: a feasibility study

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**Abstract.** Kemalang District, Klaten, has several ecotourism-based objects, among which the famous ones are Kali Talang, Girpasang Tegalmulyo, and Embung Tirtomulyo. The three objects use natural resources as their main appeal. Thus many tourists pay for environmental services. This research focuses on managing ecosystems and natural tourism items to ensure economic, social, cultural, and ecological sustainability. The analytical approach uses a sustainable natural tourism feasibility model and assesses the role of stakeholders in constructing ecotourism objects. The research uses a purposive technique to identify the research location, then quota sampling to choose 30 for each ecotourism, for a total of 90 respondents. The researcher then continued with the accidental sampling method, the criteria for visitors were already working. This study shows that Girpasang and Kali Talang ecotourism has the potential to be developed and that stakeholders can help promote the sustainable management of ecosystems and tourism attractions. The management system and stakeholder roles for Embung Tirtomulyo ecotourism are not sustainable. Encourage community involvement to strengthen the feasibility and position of stakeholders, notably the unemployed, women, and the private sector.

## 1. Introduction

Kemalang District, Klaten Regency, Central Java Province, has several objects with an ecotourism base. Kali Talang ecotourism is in Mount Merapi National Park (MMNP), so the main attraction is the natural scenery around Mount Merapi. Girpasang Tegalmulyo ecotourism, besides having the attractiveness of rural natural scenery typical of mountainous areas, there are also suspension bridges and gondola facilities as attractions. Ecotourism Embung Tirtomulyo, the highest reservoir in the Klaten area, also functions as a rainwater catchment and water reserve in the dry season, which is another attraction, namely the view of the Mount Merapi area and the expanse of the beautiful forest that gives a sensation of freshness.

Nature tourism is increasingly in demand because it can provide satisfaction and pleasure for the community [1]. Visitors are willing to pay for environmental services to enjoy adventure and nature-based tourism objects to achieve happiness [2]. Tourist arrivals certainly have positive opportunities for the surrounding community to be active tourism actors with economic activities [3][4]. It is easier to start a business (tour guides, food stall services, photographers, street vendors, etc.), so the natural tourism development area needs more people to work there [5][6]. In addition to positively impacting the economic sector locally, tourist visits can increase regional revenues, which can then be returned to the community to develop supporting infrastructure [7]. If there is no environmental damage, the area



can serve as both a tourist destination and an educational opportunity for those concerning environmental protection [8].

The three tourist objects utilize natural resources as central to tourist attractions. Questions in the field that can arise through a study are whether management uses a sustainable ecosystem approach in ecotourism management. Not all managers use a sustainable system that balances ecological, economic, and social concerns. Managers utilize environmental services to generate income. On the other hand, managers cannot yet invite and increase awareness and the role of the community in efforts to preserve, conserve, and maintain the biodiversity of living things around the tourism object environment. Requires a comprehensive study to measure the feasibility of sustainable ecosystem management and the role of relevant stakeholders.

## **2. Variables and categories development**

### *2.1. Natural tourist attraction*

The tourist attraction has an understanding as anything that is interesting and has value so that people become interested in visiting, seeing, and experiencing it firsthand [9]. Natural tourist attraction means service that the environment can produce, either directly or indirectly, for example, food, pure raw water, raw materials; fresh air; aesthetic attractions, and spiritual experiences [10][11]. Tourists get many benefits from various ecosystem services that can be naturally enjoyed [12]. Each tourist attraction has a characteristic interest in mountain tourism attractions that visitors can experience, such as natural beauty, air coolness, the tranquility of the atmosphere, richness of biodiversity, and even gaining new knowledge [13]. Local wisdom in preserving nature has a great opportunity as an attraction for visitors [14].

### *2.2. Ecosystem management and sustainable tourism*

Developing a tourist area means a business whose activities are managing natural tourist attractions, cultural attractions, and artificial or manufactured tourist attractions [15]. Its activities include building objects with tourist attractions along with the necessary infrastructure and facilities or activities to manage existing tourist objects and interests [16]. The obstacles to advancing the potential of mountain tourism, firstly, are related to the limited human resources that can manage tourism service activities so that they run well [17]. Second, the results of observations on the management system for managing tourist sites show there are no guidelines and quality standards that tourists can feel [18]. Third, related to the facilities and infrastructure found in tourist sites are not yet up to standard and are not even available [19]. Fourth, management has not been able to integrate economic, social, and environmental aspects so that all aspects run sustainably [20]. Fifth, natural tourism is an activity that runs by utilizing natural resources and environmental management [21]. However, on the other hand, natural tourism activities have the potential to cause damage to environmental sustainability [22]. There needs to be management that can integrate economic and social aspects with environmental sustainability [23]. Sustainable ecosystem management is an approach to natural resource management that aims to ensure the long-term sustainability of ecosystem functions and services and the implementation or practice that integrates economic, social, and environmental aspects to provide benefits for current and future generations [24].

### *2.3. The role of stakeholders in the development of nature tourism*

The development of natural tourism sites, especially in mountainous locations, is often stagnant and not in demand by local and foreign travelers [25]. It needs the participation of external parties to be able to be involved in cooperation to help the growth and development of tourism objects [26]. Building the role of stakeholders can be done through voluntary cooperation patterns and mutualistic partnerships, where both parties benefit from cooperative activities [27]. Measuring stakeholder capacity in developing cooperative networks in ecotourism activities can be a baseline for the success of sustainable ecotourism management [28]. The degree of this collaborative network includes the capability to identify resources, implement programs, and help make management performance successful [4].

### 3. Methodology

This research is descriptive quantitative, and analytical, which seeks to describe or describe the phenomena studied systematically and accurately [29]. The research location was determined purposively in Kemalang District, Klaten Regency, with three ecotourism objects: Kali Talang, Girpasang Tegalmulyo, and Embung Tirtomulyo. The population of this research is tourists who visit three ecotourism objects. The quota technique determines sample size, with 30 responders per tourism object (so that the total number of respondents is 90). The sample determines the procedure for accidental sampling [30]. Researchers chose data collection techniques using interviews with questionnaires and observation as a guide [31].

#### 3.1. Measurement of the feasibility of ecosystem management and sustainable tourism

The source of the analysis method uses three combinations of guidelines for sustainable tourism practices, namely a) Guidelines for Analysis of Operation Areas for Natural Tourism Objects and Attractions (ADO-ODTWA) of the Directorate General of PHKA in 2003 [32]; b) Indicators issued by the United Nations World Tourism Organization Tourism (UNWTO) regarding Destination Sustainable Development Indicators: A Guidebook [33]; and c) Minister of Tourism and Creative Economy Regulation Number 9 of 2021 concerning Guidelines for Sustainable Tourism Destinations [34]. The equation for calculating a criterion's total value is:

$$CV = \frac{CE}{VW} \quad (1)$$

Where CV is: the score/value of a criterion; CE: is the sum of the values of the elements in the requirements; VW is: the value weight.

The CV value divides an ecotourism area's feasibility into three categories in this paper:

1. The manager is feasible to develop if the CV value is >66.7%
2. The manager is quite feasible to develop if the CV value is between 33.3%-66.7%
3. Managers are not feasible to develop if CV <33.3% [35].

#### 3.2. Stakeholder role measurement

To determine the role of stakeholders such as central and local governments, the private sector, universities, community social institutions, and non-government institutions, the researchers used response data from samples in the form of percentages according to the following formula:

$$SR = \frac{\sum F}{\sum N} \times 100\% \quad (2)$$

Where SR: the role of stakeholders; F: Number of Frequency that appears; N: Total number of respondents

This research measures six stakeholder roles: regulator, incubator, coordinator, facilitator, implementor, and accelerator. The SR value divides the role of ecotourism stakeholders into three categories:

1. Stakeholders have a high role; if the SR value is >66.6%
2. Stakeholders have a moderate role; if the SR value is between 33.3%-66.6%
3. Stakeholders have a weak role; if the SR value <33.3% [36].

### 4. Result and Discussion

#### 4.1. Feasibility of ecosystem management and sustainable tourism

**Table 1.** Variables, index, categories, and feasibility level of ecotourism

No	Variable	Girpasang			Kali Talang			Tirtomulyo		
		I (%)	C	FL	I (%)	C	FL	I (%)	C	FL
1.	Attractiveness	<b>76.4</b>	<b>3.0</b>	<b>3.0</b>	<b>63.9</b>	<b>2.4</b>	<b>2.2</b>	<b>56.1</b>	<b>2.0</b>	<b>2.0</b>
	1.1. Attraction	76.2	3	3	70.5	3	3	61.8	2	3
	1.2. Accessibility	78.8	3	3	64.5	3	2	51.2	2	2
	1.3. Accommodation	71.5	3	3	61.2	2	2	55.7	2	2
	1.4. Infrastructure facilities	82.6	3	3	60.4	2	2	64.9	2	2



1.5.	Safety and comfort	72.7	3	3	63.1	2	2	46.9	2	1
2.	Tourist Response	<b>81.1</b>	<b>3.0</b>	<b>3.0</b>	<b>65.4</b>	<b>2.5</b>	<b>2.5</b>	<b>53.6</b>	<b>2.0</b>	<b>2.0</b>
2.1.	Satisfaction	82.9	3	3	67.0	3	3	52.3	2	2
2.2.	Experience	79.3	3	3	63.8	2	2	54.8	2	2
3.	Sustainable Management	<b>77.3</b>	<b>3.0</b>	<b>3.0</b>	<b>59.8</b>	<b>2.0</b>	<b>2.0</b>	<b>42.8</b>	<b>1.5</b>	<b>2.0</b>
3.1.	Management structure	69.2	3	3	52.1	2	2	49.2	2	2
3.2.	Stakeholder Engagement	67.4	3	3	60.3	2	2	58.9	2	2
3.3.	Involving unemployment	88.2	3	3	63.9	2	2	30.1	1	2
3.4.	Involving women	84.5	3	3	62.8	2	2	32.8	1	2
4.	Socio-Economic Sustainability	<b>80.9</b>	<b>3.0</b>	<b>3.0</b>	<b>61.3</b>	<b>2.0</b>	<b>2.0</b>	<b>57.1</b>	<b>2.0</b>	<b>2.0</b>
4.1.	Local economic benefits	79.0	3	3	62.1	2	2	55.3	2	2
4.2.	Welfare and social impact	82.8	3	3	60.5	2	2	58.9	2	2
5.	Cultural Sustainability	<b>67.7</b>	<b>3.0</b>	<b>3.0</b>	<b>57.2</b>	<b>2.0</b>	<b>2.0</b>	<b>32.4</b>	<b>1.0</b>	<b>1.0</b>
5.1.	Protecting cultural heritage	68.1	3	3	55.1	2	2	33.1	1	1
5.2.	Preserving cultural sites	67.2	3	3	59.2	2	2	31.6	1	1
6.	Environmental Sustainability	<b>78.8</b>	<b>3.0</b>	<b>3.0</b>	<b>67.9</b>	<b>3.0</b>	<b>3.0</b>	<b>58.0</b>	<b>1.8</b>	<b>2.0</b>
6.1.	Natural heritage conservation	83.3	3	3	67.3	3	3	61.2	2	2
6.2.	Resource management	87.9	3	3	69.1	3	3	62.2	2	2
6.3.	Waste and emission management	74.2	3	3	66.7	3	3	56.7	2	2
6.4.	Energy management	69.9	3	3	68.6	3	3	33.1	1	2
<b>Average</b>		<b>77.1</b>	<b>3.0</b>	<b>3.0</b>	<b>63.1</b>	<b>2.4</b>	<b>2.3</b>	<b>50.0</b>	<b>1.7</b>	<b>1.9</b>

Source: Data processing

Note: I= Index; C= Categories (3=High; 2=Medium; 1=Low); FL= Feasibility Level (3= Potential for Development; 2= Enough Potential for Develop; 1= Not Potential for Develop)

Looking at the results of the attractiveness variable from table 1, Girpasang Ecotourism has a high score. Visitors generally give high scores on all indicators so that the manager maintains the current state. Entering the feasible category, the process of developing ecotourism by managers and stakeholders does not require significant effort. Kali Talang ecotourism has a moderate value, and visitors criticize the condition of the accommodation, infrastructure facilities, security, and comfort, which are still not supported. It takes considerable effort for managers and stakeholders because ecotourism is considered feasible. Embung Tirtomulyo ecotourism has a moderate value, and visitors criticize almost all aspects of the indicator except attractions. Even the most highly charged for safety and comfort, because there is no barrier on the edge of the reservoir so that it feels uncomfortable, there is a fear of falling.

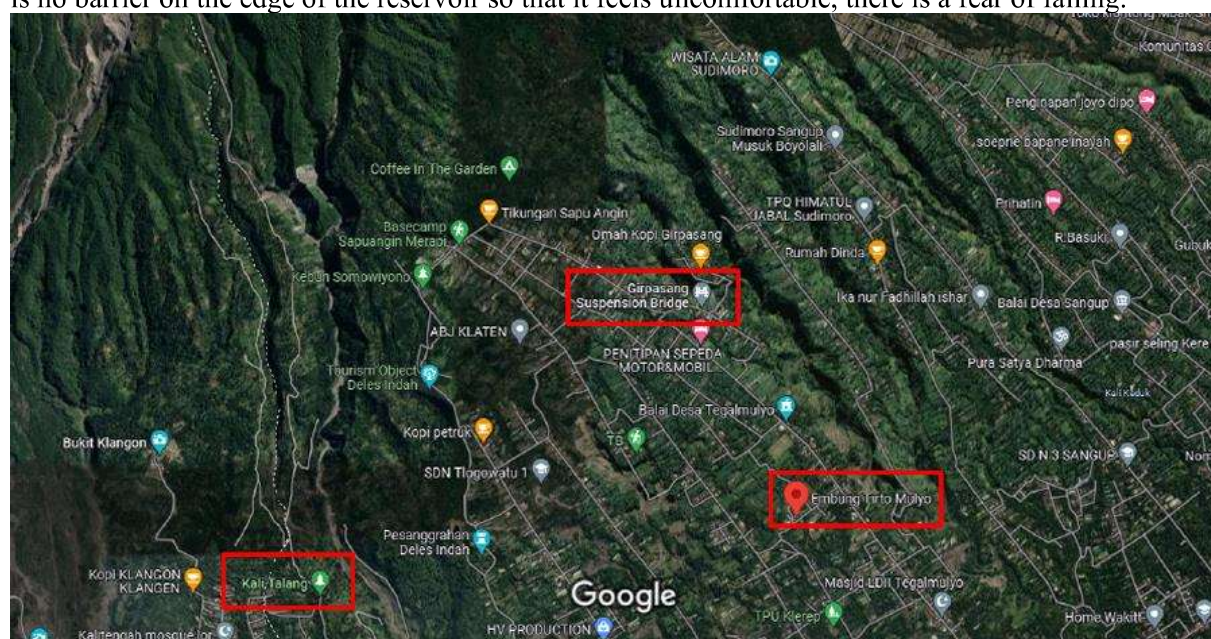


Figure 1. Ecotourism location in Kemalang District, Klaten

The tourist response variable from table 1, Girpasang ecotourism, is highly valued. Visitors are satisfied and get more experience when enjoying objects. Establishing tourist objects is practical for management and stakeholders because it requires minimum effort and offers a few attractions. Kali Talang ecotourism has a moderate value. Visitors are satisfied with the tourism objects but criticize the lack of experience gained during their visit because they only enjoy the scenery. Management and stakeholders need additional effort and development strategies by completing attractions and ancillary to provide different tourist experiences. Embung Tirtomulyo ecotourism has a moderate value where visitors are less satisfied and have less experience with ecotourism objects. Management and stakeholders need additional efforts and development strategies such as attractions, ancillary, and amenities from tourist sites.

The sustainable management variable from table 1, Girpasang ecotourism, is highly valued. Visitors are satisfied with sustainable management because the indicators show exciting results, such as the ability to absorb unemployment and empower women. However, the feasibility position is on the borderline, so the opportunities for collaboration with stakeholders can still increase. For ecotourism in Kali Talang, visitors are not satisfied with the unclear management structure of the person in charge and the job descriptions of members of the organization. Cooperation between management and stakeholders must improve the system and organizational training to achieve satisfactory performance. Embung Tirtomulyo ecotourism faces a more complex situation because it still uses simple management not based on performance. Improvement and management of ecotourism require better efforts through corporate training or stakeholder involvement.

In the socio-economic sustainability variable from table 1, only Girpasang ecotourism does not experience problems because it can impact the local economy. On the other hand, the ecotourism of Kali Talang and Tirtomulyo is at a medium level, meaning that the activity has already had an impact but still needs cooperation with stakeholders to be able to increase the feasibility of sustainable tourism activities. The role of promotional collaboration, especially with local governments, academia, and the private sector, is very helpful in increasing the level of eligibility.

Looking at the results of the cultural sustainability variable from table 1, even though Girpasang ecotourism is already in the proper category, it is around the borderline in the medium type attached to the Talang River. Based on observations, several cultural-based local events are included in the routine schedule of ecotourism objects, but only at certain times. Tourists cannot enjoy every time due to budget constraints. Usually, management cooperates with local governments near the provincial government's birthday or near the day of the proclamation of Indonesian independence around August. Meanwhile, the community needs cultural performances at all times, so the evaluation of Embung Tirtomulyo is low. Many visitors expect that local wisdom, especially the culture of environmental preservation, which is the heritage of their ancestors, can be one of the exciting attractions and can provide its own experience.

Looking at the results of the environmental sustainability variable from table 1, the ecotourism of Girpasang and Kali Talang deserves attention; namely, the manager is very focused on preserving the environment because he is aware of the principal capital of tourist attractions. This awareness affects environmental conservation measures and local regulations not to carry out deforestation. Even strictly prohibiting animal hunting to illegal capture is a shared commitment between management, local communities, and stakeholders. The community has local wisdom in carrying out resource management, which takes one for two, two for four, four for sixteen, and so on as an unwritten rule. This verbal management lesson is very inherent. Damage to water resources or forests can cause disasters such as water pollution, flooding, erosion, landslides, and other unexpected things. It also realizes that the preservation of nature is an integral part of the attractions visitors enjoy, and they are willing to pay for satisfaction. Many problems arise in Embung Tirtomulyo because management is still simple, so conservation and environmental preservation activities are not going well. Intensive guidance from stakeholders is essential to improve conservation activities and resource management.

#### 4.2. The role of stakeholders in realizing ecosystem management and sustainable tourism

Looking at the results of stakeholder roles from table 2, in Girpasang ecotourism, only NGOs and the general public are still not optimal. Kali Talang ecotourism is quite interesting because the role of NGOs and academics is maximal in realizing sustainable ecosystems and tourism. Tirtomulyo ecotourism, the central government, and academia can take a more likely role in the development and technical benefits of reservoirs, while the interests of stakeholders are still not maximized.

**Table 2.** Percentage and categories of stakeholder roles

No	Stakeholder	Girpasang		Kali Talang		Tirtomulyo	
		%	Cat.	%	Cat.	%	Cat.
1	Central government	77.5	3	63.0	2	90.0	3
2	Local government	80.5	3	60.0	2	55.0	2
3	Non-governmental organization	58.5	2	75.5	3	35.0	2
4	Academics and Practitioners	85.5	3	88.5	3	75.0	3
5	Private	75.5	3	65.0	2	20.0	1
6	Public	45.5	2	57.0	2	25.5	1

Source: Data processing; Cat.: Categories (3= High; 2= Medium; 1= Low)

The central government in the three ecotourism objects takes more of a role as a regulator, incubator, coordinator, facilitator, and accelerator but not as an implementer. The bridge construction carried out by the Ministry of Public Works is aimed at the technical side as a means of crossing, while the general public and ecotourism management precisely capture business opportunities for tourist attractions. The community responded positively to this through government and community cooperation. The local government also does not take on the role of the implementer. NGOs do not take on the part of the regulator. Even in Tirtomulyo, they only take on the role of facilitator, incubator, and accelerator. Academics take on more functions in research and community service but do not take on the part of implementers. Academics are more incubators of tourism business development in the three ecotourism. In general, the private sector, represented by drinking water treatment companies, does not act as a regulator and implementer, so it can further strengthen the company's CSR role in assisting local tourism development. The general public is not directly involved but is willing to become accelerators by paying for environmental services and taxes/contributions that the regions will use to build facilities and infrastructure to support feasibility.

## 5. Conclusion

Girpasang ecotourism has a moderate development plan because it is a sustainable tourism object. Management establishes relationships with many stakeholders to determine the direction of development. For cooperation that is not yet optimal, the principle of sustainability in the future can still reach the level of expectation. Regarding environmental sustainability performance, management and stakeholders can carry out ecological conservation and preservation and involve the community. The absorption of unemployment and women positively affects economic, social, and environmental sustainability. Kali Talang's ecotourism development is included in the feasible category and does not experience ecological sustainability problems, although it still needs minor improvements. On the other hand, even though it is in the proper category, management and stakeholders are still experiencing social, economic, cultural, and management sustainability issues. Of course, this problem needs to be resolved with intensive cooperation between management and stakeholders, significantly increasing the role of central and local governments. Developing the feasibility of tourism objects must lead to priority scales, such as empowering people who have not worked and women. Embung Tirtomulyo ecotourism development is categorized as reasonably feasible. There are still many problems faced by management and stakeholders to be better in the future. Strengthening requires active control participation through preparing systems and job descriptions based on performance. Encouraging community involvement is an alternative to improving the feasibility and roles of stakeholders, especially the community and the private sector.



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