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Resilience of Ecotourism Activities to Climate Change, Case Study: Nyarai Tourism Destination, Padang Pariaman

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Abstract: Nature-based tourism is vulnerable to climate change, so it is necessary to build the adaptive capacity of tourism system. Nyarai ecotourism site is a nature-based activity which vulnerable to environmental degradation and threatened by climate change. This study aims to assess the resilience of people who actively involved in implementing ecotourism against climate change at the Nyarai tourist attraction. This study used a quantitative analytical approach by survey method for specified sample of 117 tour guide populations. Primary data collection was done by interviewing through a questionnaire and analyzed descriptively. This research found the three lowest scores were on the criteria of economic resilience i.e existence of local projects in tourism activities (4.34), developing of new tourism products and activities (4.41), and providing local products for tourists (4.41). However, economic, social, ecological, and governance resilience have to work together increasing tourism activities that lead to sustainable development and climate resilience.
Keywords: ecotourism, resiliency, climate change

1. Introduction

Ecotourism is one of the programs initially intended to be responsible for travel activities that preserved the environment, improved the welfare of the population, and involved educational activities. However, the utilization of nature as potential asset in tourist facilities often has negatively impacted the environment. Many ecotourism practices are carried out 'shallowly' (greenwashed ecotourism) by claiming the term 'green', even though they prioritize profit over ecological considerations and even damage natural areas [1].

Climate change is a serious threat to tourism because affected the sustainability of tourism activities [2]. Nature-based tourism is an activity that is vulnerable to this condition, so it is necessary to build the adaptive capacity of tourism system, especially from local communities [3], [4]. The Intergovernmental Panel on Climate Change (IPCC) has stated clearly that human activities are the leading cause of climate change. The tourism sector needs resiliency to anticipate this issue [5]. Thus, the manager of ecotourism activities needs to adjust and maintain the concept of ecotourism. This is an effort to resilience from climate change as purpose to maintain sustainability of their activities in the future.

Previous studies have stated that the implementation of good ecotourism will increase resilience from climate change. By utilized protected forests area, there will be some environmental risks due to tourism activities. The reduced quality of the environment will contribute to climate change, thus impacting the sustainability of tourism activities themselves [5].

Previous research has found that local ecosystems will have an impact due to climate change [6]. Uncertain climatic conditions will cause a shift in the rainy season and drought, shift the tourist season and affect the economy of local communities [7]. Other studies have also found that the social and environmental dimensions are more resistant to climate change. A strong community will contribute to protecting the environment in anticipating climate change [8].

Nyarai tourism object is one of the ecotourism concepts sites in West Sumatra. This location utilizes protected forests as tourism activities such as tracking, swimming, fishing, and rafting [9]. Those activities are vulnerable to environmental degradation. It will be threatened by climate change, so all managers need to understand resilience to climate change well so that the tourism activities carried out can be sustainable. From this background, this study aims to assess the resilience of the people who are actively involved in implementing ecotourism against climate change at the Nyarai tourist attraction, Padang Pariaman Regency.

2. Methods

This study used a quantitative analytical approach using a survey method to a specified sample of 117

people from 168 tour guide populations. The sample selection was carried out using a systematic random sampling method. Primary data collection was done by interviewing through a questionnaire because this is considered as the best method to produce quality data. Secondary data collection is done by tracing reports and documents related to research.

Respondents will be interviewed about their resilience to climate change (Each question is rated using Likert scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always). Respondents will be asked about resilience to climate change in the implementing ecotourism as many as four criteria and twenty-one indicators. The four criteria are economic, social, environmental, and governance resilience.

Quantitative data processing is carried out with the initial stages of editing the data to check its completeness. Then the data is coded into numeric data or numbers to facilitate further statistical analysis. The answers of each respondent in the form of codes are entered into computer software using a data processing program. If all data from the data source has been entered, it needs to be rechecked to see the possibility of code errors or incomplete data. Corrections are made according to the answers listed on the questionnaire.

Univariate data analysis was carried out by measuring the average of each criterion from the variables. The mean score is obtained from each question by summing up all the answer scores and dividing by the number of respondents (117 people). The difference of score percentage of statement approval, the value is obtained from the total score for each level of assessment divided by the number of respondents and then multiplied by 100.

3. Results and Discussion

Climate change is expected to harm the tourism industry as the climate is one of the leading tourism resources that shape and drive its success [10]. In recent times, many natural disasters caused by climate change also affected to tourism stability [11], [12]. The pattern of tourist flows, both domestic and international, is also expected to change in line with large-scale changes due to climate change [13]. Areas that have high quality and quantity of tourism activities can also be vulnerable to the threat of climate change because they are industries that are highly dependent on climate indicators [14].

One of the keys to understand the environment in development activities is identify the conditions that "natural" landscape changes influenced by human activities, one of which is ecotourism activities can be predicted for its sustainability. Environmental, economic, and social aspects must synergize in every action to achieve sustainable development. Primarily in readiness to face climate change, these three issues are raised in this study, coupled with governance resilience as an essential factor in preventing further environmental problems due to climate change.

3.1. Economic Resilience to Climate Change

The lowest score on the criteria of economic resilience is a statement about the existence of local projects in tourism activities (4.34). Meanwhile, the highest score finds in support of ecotourism activities for local communities' availability of employment opportunities (4.52) (Table 1). The ecotourism activities in Nyarai have offered various types of attractions. The development of new opportunities for improving the community's economy can be done extensively, for example, by provided souvenirs and added other tourism activities that do not negatively impact the environment. Destinations where have diverse tourist attractions will be more resilient from economic risks due to climate change [7].

Table 1. Economic Resilience to Climate Change

No	Economic resilience	Mean	Percentage of Statement Approval				
			Never	Rarely	Some-times	Often	Always
1	Developing new tourism products and activities	4.41	1.7	0	6.0	40.2	52.1
2	Supporting job opportunities for local communities	4.52	0	1.7	5.1	32.5	60.7
3	Providing local products for tourists to buy	4.41	0	0	9.4	40.2	50.4
4	The existence of local projects in tourism activities	4.34	0.9	0.9	6.8	46.2	45.3

Climate change can affect economic activity in the tourism sector. For example, the detrimental effects of climate change are included changing a region's accessibility, fragility, and diversity, among other regional characteristics. Tourism development stimulates economic activity and simultaneously leads to growth in overall financial income. However, a high proportion of tourism income in total economy of lower-middle-income areas has low economic resilience. The economic structure in that region uses a tourism model based on natural resource tourism. Their original financial strength is weak and causes a low level of economic resilience that make them depend on nature tourism which affected by climate change [15]. This condition is different from high-income countries, as they are better equipped to cope various effects of climate change [14].

Therefore, it is necessary to stimulate ecotourism business development by involving residents to support new tourism and product development, including special tourism that using local assets and traditional processes. Furthermore, the use of existing community relations to support the management of ecotourism activities needs to be improved to develop and maintain existing ecotourism activities [16]. However, the increase in economic activity considers the impact on

the environment and does not treat it as an unlimited resource to support economic activity. The ecotourism activities are not limited to utilize nature as a tourist destination. There should be a restoration function after the benefits of the environment are taken to improve the community's economy [17].

3.2. Social Resilience to Climate Change

For the criteria of social resilience, the lowest score is on statements about learning from new things in the community (4.43). However, the score about asking other people for help has the highest score (4.55) (Table 2).

Table 2. Social Resilience to Climate Change

No	Economic resilience	Mean	Percentage of Statement Approval				
			Never	Rarely	Some-times	Often	Always
1	I talk to friends and relatives about the problems encountered in tourism activities	4.46	0	1.7	2.6	43.6	52.1
2	I spend time on volunteer activities in tourism development	4.49	0	1.7	2.6	41.0	54.7
3	I attend public meetings (community development, environment) in tourism development	4.5	0.9	0.9	2.6	38.5	57.3
4	I feel I am part of a community that determines ecotourism activities	4.5	1.7	0	2.6	37.6	58.1
5	I feel like I can ask others in my community for help when I need it	4.55	0	0	3.4	38.5	58.1
6	I learn new things by watching other people in my community	4.43	0.9	1.7	3.4	41.9	52.1
7	I trust people in my community	4.5	0	0	2.6	44.4	53.0

The active participation of the community in sharing new things is a form of collaborative social practice to increase social resilience. Previous research revealed that social resilience scores of communities involved in tourism activities were significantly higher than individual who does not involved in tourism [18].

It is well known that the Minangkabau community has solid social relations based on kinship [19]. Especially, communities in rural areas, such as Nyarai, usually have a more substantial level of social cohesion. Strong social networks facilitate the exchange of information and increase awareness of climate change and adaptation options. It could help boost local collective action, particularly in rural communities [8].

Social resilience is related to environmental sustainability because nature and human social relations are not explicitly separated. Social and ecological systems are constantly fluctuated that environmental education for the social resilience system needs to be carried out. In the social system, the framework of environmental governance and management could be led to environmental risks. If this problem occurs, it is necessary to innovate new things to diversify the pattern and alternative lifestyles of the community in utilize resources as maintenance of the ecosystem under the threatening of climate change [20].

3.3. Ecological Resilience to Climate Change

In environmental resilience, the lowest score was found in training local communities in proper ways to improve ecological conditions (4.49). Meanwhile, the eco-friendly concept in tourism facility has the highest score (4.68) (table 3). It is necessary to prepare the population to adapt and reduce the negative impacts of climate change to increase environmental resilience. The behavior of the community, especially the managers of ecotourism site, becomes the most important things in future climate scenarios. In addition, these things are an urgent demand to survive in uncertain, vulnerable, and complex environment as a result of the occurrence of events due to climate change (temperature extremes, heat and cold waves, droughts, floods, and hurricanes). Similarly, education should train communities to carry out environmental regeneration processes that rebuild damaged natural tissues to reduce and compensate for anthropic damage [21], [22].

The theory of ecological resilience states that an environmental system can defend itself by absorbing existing disturbances. It is necessary to manage the activities in it to ensure ecological resilience. Activities to maintain biodiversity in the natural environment require the contribution of local communities who also play a role as tourism managers [23].

Table 3. Ecological Resilience to Climate Change

No	Ecological resilience	Mean	Percentage of Statement Approval				
			Never	Rarely	Some-times	Often	Always
1	Tourism activities protect the environment very well	4.56	0	0	4.3	35.0	60.7
2	Provide an effective environment for flora and fauna management	4.55	0	0	4.3	36.8	59.0
3	Manage water resources very well	4.5	0	0	4.3	41.0	54.7
4	There is a training of local communities on appropriate ways to improve environmental conditions	4.49	0	0	5.1	41.0	53.8
5	Tourism activities help reduce human activities that can damage the environment	4.56	0	0.9	2.6	35.9	60.7
6	Eco-friendly concept tourism facilities	4.68	0	0	4.3	23.9	71.8
7	Organized tourist movement	4.67	0	0	5.1	23.1	71.8

Environmental resilience plays a vital role in conserving biodiversity and reducing environmental vulnerability to threats related to climate change by reducing the unsustainable use of natural resources. Implementing environmentally friendly practices in ecotourism facilities and activities can significantly help protect the environment by promoting the efficient use of natural resources and minimize the negative impacts in environmental by tourism activities [8].

3.4. Governance Resilience to Climate Change

Furthermore, the lowest score is obtained by governance resilience in policies that adapt environmental developments (4.56). It is contrary to the involvement of local organizations in tourism activities (4.73) (Table 4). The strength of environmental governance that adapts to ecological developments will consider the collective capacity and local involvement in controlling the decision-making process. It is usually as key predictor of successful conservation and protection against climate change [18].

Table 4. Governance Resilience to Climate Change

No	Governance resilience	Mean	Percentage of Statement Approval				
			Never	Rarely	Some-times	Often	Always
1	There is a change in policy that adapts to environmental developments	4.56	0	0	4.3	35.0	60.7
2	There is good interaction between the tourism sector and tour guides	4.7	0	0	3.4	23.1	73.5
3	Local organizations involved in tourism activities	4.73	0	0	4.3	18.8	76.9

Improvements in the governance of tourism activities (effective management and local organizations) need to be carried out continuously on effective management, good communication, flexibility, collaboration, and participation increasing of local communities in decision making. Community participation in decision-making is more related to symbolic involvement because its influence is only represented through partnerships, interactions, and consultations. In other words, the participation of local communities in the planning process of ecotourism activities needs to be developed broadly [8].

Moreover, the findings of another study revealed that policymakers are still skeptical about climate change and its impact on tourism despite evidence from scientific research growing. These constraints can hinder progress in policy response measures and resilience to climate change due to insufficient knowledge to believe the influence of climate in tourism sustainability [24].

4. Conclusion

Resilience to climate change is needed due to climate risk increasing for ecotourism activities that very dependent on nature and climate. In this study, the three lowest scores were on the criteria of economic resilience, i.e statements about the existence of local projects in tourism activities (4.34), developing new tourism products and activities (4.41), and providing local products for tourists to buy (4.41). It has the riskiest factor, if ecotourism managers are not prepared to increase the diversification of ecotourism products, both goods, and services, while still maintaining the environmental sustainability. Nevertheless, economic, social, ecological, and governance resilience have to work together to increase tourism activities that lead to sustainable development and climate resilience. The risk arises if there is no resilience in quality decreasing of the ecosystem, followed by a reduction in the number of tourists and other undesirable after-effects. The responsibility for enhancing community resilience should be better integrated into tourism.

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