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Ecotourism Pillars Enforcement to Geotourism Destination in Slamet and Serayu Mountainous Areas, Central Java Province

Mafut Munajat[1*], Ricky Avenzora[2], Dudung Darusman[3], Sambas Basuni[2]

[1]Graduate Program in Ecotourism Management and Environmental Services, Faculty of Forestry and Environment, IPB University, Academic Ring Road, Campus IPB Dramaga, Bogor, Indonesia 16680
[2]Department of Forest Resource Conservation and Ecotourism, Faculty of Forestry and Environment, IPB University Academic Ring Road, Campus IPB Dramaga, Bogor, Indonesia 16680
[3]Department of Forest Management, Faculty of Forestry and Environment, IPB University, Academic Ring Road, Campus IPB Dramaga, Bogor, Indonesia 16680

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Abstract

Nature based tourism, including geotourism, can have the status of ecotourism if they are able to enforce the seven pillars namely: 1) the ecological pillar, 2) the economic pillar, 3) the socio-cultural pillar, 4) the satisfaction pillar, 5) experience pillar, 6) memory pillar, and 7) education pillar. This study aims to analyse the perceptions of tourists towards the enforcement of the seven pillars of ecotourism in geotourism destinations. The study was conducted through a survey using a closed-ended questionnaire with a total number of respondents is 400 people. Data analysis was carried out using comparative quantitative and correlation quantitative methods. The results showed that there was still a "gap" between the pillars of sustainable development and the pillars of the basic needs of tourists. The results of the correlation test showed that the elements of the seven pillars of ecotourism had interrelationship each other. It is necessary to modify the form of geotourism implementation by increasing the aspects of guiding/interpreting for tourists and intensifying the involvement of tourists in all tourism activities. The regional approach are also applied to the development of geotourism so that it is more optimal, integrated and efficient in the use of resources.

Keyword: *perceptions, ecotourism pillars, geotourism, interpretation*

**Correspondence author, email*: *mafut_kbm14@apps.ipb.ac.id*

Introduction

The term of ecotourism is often used to refers an alternative tourism that is different in nature from conventional or mass tourism. The ecotourism product and programs should not only be associated with natural tourism objects and attractions, but also broaden its meaning as a form of tourism that supports conservation efforts, applies the principles of sustainable development and creates satisfaction and experience for tourists (Sirakaya et al., 1999; Fennel, 2002; Das & Chatterjee, 2015; Boley & Green, 2016). The International Ecotourism Society (2015) defines ecotourism as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education". Ecotourism is about uniting conservation, communities, and sustainable travel. This means that those who implement, participate in and market ecotourism activities should adopt the following ecotourism principles: 1) minimize physical, social, behavioral, and psychological impacts, 2) build environmental and cultural awareness and respect, 3) provide positive experiences for both visitors and hosts, 4) provide direct financial benefits for conservation, 5) generate financial benefits for both local people and private industry, 6) deliver memorable interpretative experiences to visitors that help raise sensitivity to host countries' political, environmental, and social climates, 7) design, construct and operate low-impact facilities, and 8) recognize the rights and spiritual beliefs of the Indigenous People in the community and work in partnership with them to create empowerment. Various definitions of ecotourism put forward by tourism experts and tourism scientists often refer to ecotourism not only as a product of natural tourism but also the basic principles that must be attached (Diamantis, 1999; Buckley, 2003; Weaver, 2005; Cater, 2006). Fung and Wong (2007) stated that the focus of ecotourism is on experience and education or learning about nature, landscapes, flora and fauna, including local culture. Furthermore, the character of ecotourism is a minimum of negative impact (low impact), saving resources (non-consumptive) and oriented to locality aspects (Dowling, 2000; Fennell, 2015). Wearing and Neil (2009) stated that ecotourism must be able to guarantee environmental sustainability (ecologically sustainable), create tourist satisfaction and take part in educational aspects.

The practice of tourism with an ecological perspective or ecotourism system can basically not only be carried out in protected areas or conservation areas but can also be carried out on any tourism object and in any area. Avenzora (2016)

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stated that basically ecotourism product or ecotourism activities can be carried out anywhere as long as seven ecotourism pillars have been raised, namely: 1) the ecological pillar, 2), the economic pillar, 3) the socio-cultural pillar, 4) the satisfaction pillar, 5) the experience pillar, 6) the memory pillar, and 7) the education pillar. With the enforcement of these seven pillars, all forms of tourism activities and their values can have the status of ecotourism, whether the resources are in urban areas (eco-city tourism), in rural areas (eco-rural tourism), in the ocean (eco-marine tourism) or in the forest and mountains (eco-forest and mountainous tourism). Even thematic parks owned by the private sector, as well as sites owned by the community or the government can also have the status of "ecotourism". Furthermore, the idea of ecotourism must be seen as a principle or spirit and soul for any form of tourism product and must be accepted as an obligatory task for every stakeholders and tourism actor (Cater, 2006; Avenzora, 2008b).

Geotourism is one of the variants of natural tourism that has been developing in the last three decades (starting in the 90s). One or two decades younger than the emergence of ecotourism (70s to 80s). The emergence of geotourism was initiated by geologists and earth science expert and became more massive in its development with the emergence of the geopark program (Hose, 2012; Hose & Vasiljević, 2012; Newsome et al., 2012). Newsome and Dowling (2006) defined geotourism as tourism that focuses on geological and landscape aspects that can be used to conserve earth heritage and study geological heritage sites. Furthermore, Dowling (2014) stated that the geotourism paradigm is to understand the abiotic (non-biological) environment, to build greater awareness of the biotic (biological) environment, flora and fauna and the cultural environment of the community in the past and present. The focus of geotourism activities is to invite tourists to better appreciate and understand various natural phenomena such as rock outcrops, faults of the earth's plate, volcanic phenomena, natural phenomena in karst ecosystems and the potential for natural disasters such as earth movement, landslides, earthquakes and tsunamis so that the awareness arises to involved in conservation efforts and mitigate potential natural disasters.

Indonesia is a country in the Southeast Asia region that has a very abundant potential for geotourism attraction. Geotourism objects in Indonesia are spread over several geoparks and conservation areas, such as national parks and nature tourism parks. There are at least 5 UNESCO global geoparks, 14 national geoparks, 54 national parks, and 112 natural tourism parks that have the potential to be developed for geotourism products in Indonesia. The Slamet and Serayu mountainous areas is one of the geotourism destinations in Indonesia which has very diverse types of geotourism attractions, ranging from volcanic phenomena, craters, geothermal, karst ecosystems, caves, rock outcrops, natural monuments, geological sites, and panoramas. Not only geotourism attraction, this area also has a fairly complete forest tourism attraction, ranging from mountainous forest types to coastal or mangrove forest types.

Studies on the perceptions of tourists in relation to the enforcement of the seven pillars of ecotourism on geotourism product are still rarely carried out. This study aims to evaluate the enforcement of the seven pillars of ecotourism in the geotourism destinations Slamet and Serayu mountainous areas, Central Java Province. The results of this study are expected to be used to formulate a sustainable geotourism development program that makes the ecotourism system a spirit in its management.

Methods

Study area This research was conducted at the geotourism destinations in Slamet and Serayu mountainous areas, Central Java Province as shown in Figure 1.

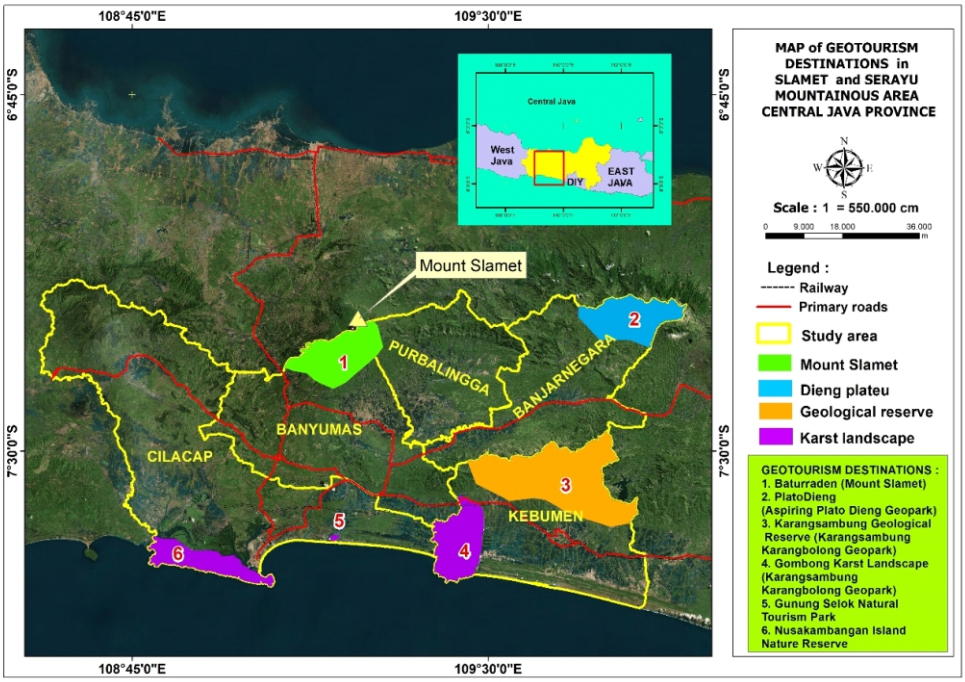

Figure 1 Study area at the geotourism destinations in Slamet and Serayu mountainous areas of Central Java Province.

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Administratively, these geotourism destinations are located in five regencies, namely Banjarnegara, Purbalingga, Banyumas, Cilacap, and Kebumen (BARLINGMAS CAKEB agglomeration). This research was conducted from November 2020 to February 2021.

Geotourism destinations in Slamet and the Serayu mountainous areas are natural tourist destinations with major attractions in the form of natural phenomena such as caves, craters, geothermal energy, rock outcrops, natural monuments, geological sites and panoramas of karst landscapes. There are four types of geotourism destinations in the study area, namely: 1) volcano, 2) plateu, 3) geological reserves, and 4) karst landscapes.

Data collection methods Data was obtained using a survey method with the research instrument in the form of a closed-ended questionnaire in order to obtain the correct value for each answer given by the respondent. The questions in the questionnaire were representations of various research variables measured by a scoring system following the "One Score One Criteria Scoring System" pattern (Avenzora, 2008a). The scoring for each indicator used a range of 1–7 with predicates for each score, namely: 1) very inappropriate, 2) not appropriate, 3) somewhat inappropriate, 4) average/neutral, 5) somewhat appropriate, 6) appropriate, and 7) very suitable. The pattern of meaning of each of these values can be modified as needed, for example into a range of "very low" to "very high", or a range of "strongly disagree" to "strongly agree". Data collection on tourist perceptions of the enforcement of ecotourism pillars was carried out using the accidental sampling method by distributing questionnaires to tourists who are accidentally encountered in geotourism destinations. Accidental sampling was chosen because of the unequal number of tourists in each existing tourist attraction. The total number of respondents were 400 tourists who are spread evenly in the four geotourism destinations in the research location.

Operational definitions Tourist perceptions of the enforcement of the pillars of sustainable development (ecological, economic and socio-cultural) were measured from two types of perceptions, namely positive perceptions and negative perceptions, so that six perception assessment criteria were obtained with seven assessment indicators on each criterion with details as shown in Table 1. Tourist perceptions of the pillars of tourism needs (satisfaction, experience and memories) were measured by an assessment of the quality of meeting the needs of tourists in each type of tourism related activity. There are eight types of tourism activities in geotourism destinations, namely: 1) recreation/refreshing, 2) social interaction/family gathering, 3) explore the geotourism attractions, 4) explore the forest (flora and fauna) attractions, 5) self-existence/self-actualization, 6) contemplation and spirituality, 7) health and sports, and 8) appreciation of customs and culture.

The criteria for assessing tourist perceptions of the education pillar use eight criteria, namely: 1) geological phenomena and earth science education, 2) flora and fauna diversity education, 3) traditional and cultural diversity education, 4) natural healing education, 5) history and archaeology education, 6) leadership education, 7) environmentally friendly behaviour education, and 8) natural contemplation education.

Data analysis Data analysis used comparative quantitative and correlation quantitative methods with statistical test

Table 1 Perceptions of the sustainable development pillars in geotourism destinations

Aspect	Positive perceptions	Negative perception
Ecology	1) The preservation of geological sites and natural monuments (natural heritage), 2) The reduction of mining activities, 3) The conservation of flora 4) The conservation of wildlife, 5) The conservation of the quality of the landscape, 6) The preservation of the quality and quantity water sources, 7) Maintaining the quality of the local microclimate.	1) Damage to wildlife habitat, 2) Damage to flora and forest stands, 3) Forest and land fires, 4) Pollution of rivers and water bodies, 5) Deficit of clean water, 6) Soil compaction and erosion, 7) Damage to geological sites and natural monuments.
Economy	1) Increasing local community income, 2) Increasing village income, 3) Increasing regional income, 4) Increasing PNBP, 5) Increasing tourism business investment, 6) MSME business dynamics, 7) Developing productive business groups.	1) Increasing the standard of living costs of the community, 2) Overflow of goods products from outside the region, 3) Business control by certain groups, 4) Unfair business competition, 5) Community economic disparities, 6) High costs of rehabilitation area, 7) Capital flight.
Socio-cultural	1) Openness of information flow, 2) Reduced unemployment, 3) Protection of customs and culture 4) Foreign language business, 5) Security stability, 6) Protections of local wisdom, 7) Increasing community participation in the tourism sector.	1) Degradation of social ethics, 2) The emergence of free lifestyle behavior, 3) Imitation of negative behavior, 4) Consumptive behavior, 5) Drugs, 6) Crime, 7) Changes in livelihoods.

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instruments in the form of Pearson correlation test and One Way ANOVA test using SPSS ver 20.

Result and Discussion

Validity and reliability research instrument test The results of the Cronbach's Alpha coefficient of samples was 0.714, while "deleted Cronbach's Alpha value" of tourist samples respectively were in the range of 0.642–0.747, which meant the data with sufficient reliability and validity. Based on this, the results of the perception survey can be analysed further.

Geotourist characteristics In general, tourist respondents who visited the geotourism destination in Slamet and Serayu mountainous areas were domestic tourists from the region of Central Java Province and other domestic tourists from various provinces in Indonesia. Table 2 shows that the characteristics of geotourism tourists were dominated by a young population (under 30 years old) with the type of work being self employee/entrepreneurs and students with an average income level below IDR1.6 million month^{-1}. From the aspect of education, the majority of geotourism tourists were educated at the high school level and some are Bachelors/Diploma.

Tourists under the age of 30 were around 51% and between 30 and 40 years old were around 26%. These two groups of tourists can be categorized as tourists from the young age group. Based on the origin of domicile, most tourists came from the same regency/city as the location of the geotourism destination (local and inter-regional tourists) with a percentage of around 67%, the remaining 33% were from other provinces outside Central Java Province. Because most tourists were local and inter-regional tourists with a travel radius of about 3 hours, tourism activities at these geotourism destinations were generally carried out in the form of same day visitors or daily tourist without overnight stays.

Table 2 Respondent characteristics who visited the geotourism destination in Slamet and Serayu mountainous areas Central Java Province

Characteristics	Geotourism destinations				Total	
	Mount Slamet	Dieng plateau	Geological reserve	Karst landscape	N	%
N respondent	100	100	100	100	400	100.00
Gender						
a. Male	55	62	43	56	216	54.00
b. Female	45	38	57	44	184	46.00
Marital status						
a. Married	55	65	59	33	212	53.00
b. Single	45	35	41	67	188	47.00
Education level						
a. Primary school	1	-	7	-	8	2.00
b. Secondary school	8	3	21	5	37	9.25
c. High school	53	47	51	64	215	53.75
d. Diploma (1/3/4)	12	9	3	14	38	9.50
e. Undergraduate	21	37	11	17	86	21.50
f. Post graduate	3	3	2	-	8	2.00
g. Other	2	1	5	-	8	2.00
Occupation						
a. Student	20	9	10	30	69	17.25
b. Public service	4	30	4	3	41	10.25
c. Police/army	13	9	9	20	51	12.75
d. Teacher/lecturer	1	3	-	5	9	2.25
e. State company employee	3	13	7	1	24	6,00
f. Private company employee	6	3	16	-	25	6.25
g. Farmer	1	3	-	-	4	1.00
h. Self-employee	31	25	27	30	113	28.25
i. Other	21	5	27	11	64	16.00
Monthly income (IDR)						
a. < 1.6 million	40	13	51	64	168	42.00
b. 1.6–2.8 million	20	20	19	15	74	18.50
c. 2.8–4.6 million	18	28	13	9	68	17.00
d. 4.6–7 million	18	34	11	6	69	17.25
e. > 7 million	4	5	6	6	21	5.25

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Ecological, economic, and socio-cultural pillars Ecological, economic and socio-cultural aspect were basically pillars of sustainable development that must be attached to all development sectors, including geotourism development. Figure 2 shows that the positive perception value of the pillars of sustainable development (ecological, economic and socio-cultural) in geotourism destinations was quite high (score 4 to 6), while the negative perception value of sustainable development was low (score < 4). Geotourism destinations that have the highest positive perception score in the sustainable development aspect was the geological reserves destination (score = 6.37) while the lowest score was the volcano destination (score = 4.98). In contrast, the highest negative perception score in the sustainable development aspect was the volcano destination (score = 3.96) while the lowest score was the geological reserve (score = 1.97). The tourists view that the objects and geotourism destinations they visit have high conservation value and are vulnerable to ecosystem damage so that they must be protected and preserved by all parties, including the tourists themselves.

The pillar of ecology was the main requirement so that every type of tourism product, including geotourism can be referred to as an ecotourism product that can contribute to the protection and preservation of natural resources. The mutualism symbiosis between tourism activities and conservation activities is one of the differences between ecotourism and conventional/mass tourism. However, Fung and Wong (2007) remind that conservation and tourism/recreation activities must be managed with extra care.

Basuni (2001) stated that tourism which applies ecological principles or an ecological perspective can be referred to as ecotourism product or ecotourism practices. The tourists will travel with an ecological perspective in the form of admiring and appreciating the uniqueness and beauty of biological and non-biological diversity resources, appreciating the cultural products of the local community and participating in conservation activities of natural resources and the environment. This ecological principle in tourism does not only apply to tourists but also applies to other stakeholders such as the bureaucracy, tourism businesses and the local community. By applying the principles of ecology, there will be no more failed tourism development practices (Basuni, 2001; Avenzora, 2016).

Positive economic perceptions were related to the contribution of tourism activities to increasing the economic income of the surrounding community and the national/regional economy. So far, the contribution indicators of tourism activities that often exposed were in the form of macro economic indicators such as the level of foreign exchange earnings and the gross regional domestic product (GRDP) of the tourism sector. Damanik (2013) suggested that the positive impact of the tourism economy can be directly enjoyed by the lower classes through participation, empowerment and tourism programs that are pro-poor tourism. Avenzora (2018) also suggested that the concept of communal business should begin to emerge for each type of tourism development, including geotourism. The pro-poor tourism strategy and the concept of communal business were also expected to be able to minimize the

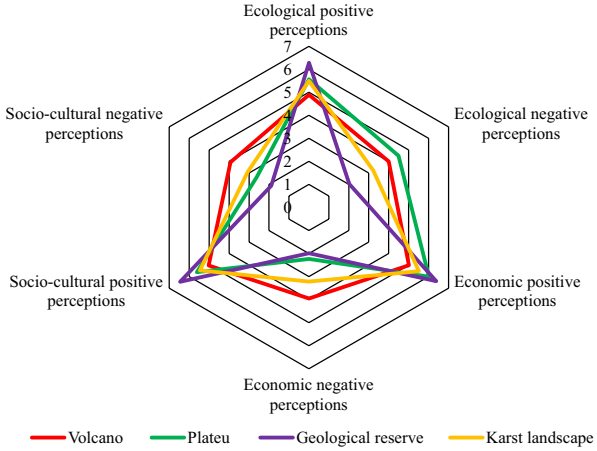

Figure 2 Sustainable pillars perceptions on geotourism development.

negative economic impacts that arise in tourism development activities.

Furthermore, related to positive socio-cultural perceptions were related to the impact of tourism activities such as employment, poverty alleviation, preservation of customs and culture, local arts as well as increasing insight and association. In addition to the positive socio-cultural impacts, many criticisms have been given by tourism experts to the negative socio-cultural impacts of tourism activities. Pitana and Gayatri (2005) stated that the negative socio-cultural impacts that often appear on tourism activities were cultural erosion, security disturbances to the influence of moral decadence due to imitating the liberal lifestyle of tourists.

Dowling (2011) stated that the basic principles in the practice of geotourism include applying the principles of sustainability and contributing to locality (locally beneficial). Geotourism activities as much as possible have a very small negative impact on the preservation of natural resources and on the other hand must provide contributions and benefits to local residents, both economic benefits and social benefits. Furthermore, in order to obtain direct benefits from geotourism development, local residents must be actively involved in the form of cooperation and empowerment in all geotourism activities.

Satisfaction pillars Figure 3 shows that the score of satisfaction with a positive value (score > 4) was only found in tourism activities related to recreation/refreshing, social/family interaction and self-actualization. The lowest satisfaction score was on tourism activities related to health and sport. Satisfaction score for tourism activities related to nature attractions (forest tourism attractions and geotourism attraction) was still low category (score < 4). In terms of the type of destination, the type of volcano destination has the highest satisfaction score (score = 4.73), while geological reserve destinations have the lowest satisfaction score (score = 3.63).

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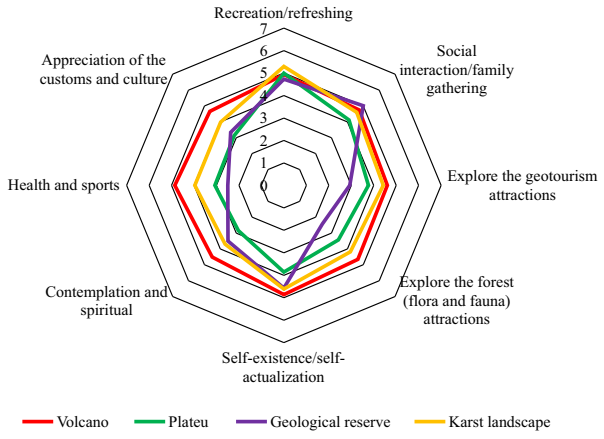

Figure 3 Satisfaction pillars perceptions on geotourism development.

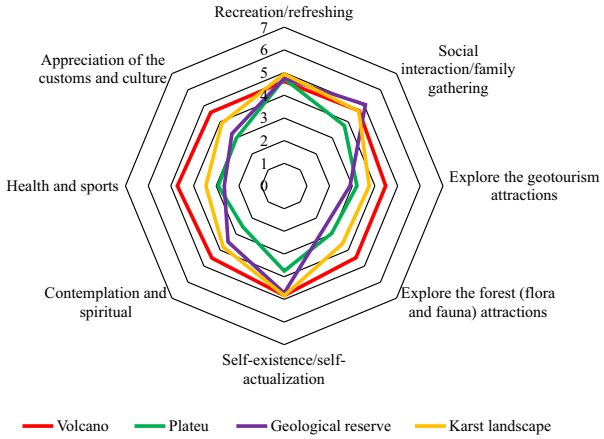

Figure 4 Experience pillars perceptions on geotourism development.

Experiences pillars As presented in Figure 4**,** the score of experience with a positive value (score > 4) was only found in tourism activities related to recreation/refreshing, social/family interaction and self-actualization. The lowest experience score was on tourism activities related to forest tourism attractions (score = 3.40). Experience score for tourism activities related to geotourism attraction also was low category (score = 3.59. The type of volcano destination has the highest experience score (score = 4.61), while plateau destinations have the lowest experience score (score = 3.36).

Memories pillars As shown in Figure 5, the memories scores with a positive value (score > 4) was only found in tourism activities related to recreation/refreshing, social/family interaction and self-actualization. The lowest memories score was on tourism activities related to forest tourism attractions (score = 3.39). Memories score for tourism activities related to geotourism attraction also was low category (score = 3.58. The type of volcano destination has the highest memories score (score = 4.63), while plateau destinations have the lowest memories score (score = 3.29).

The scores of aspects of satisfaction, experience and memories on the eight tourist activities were aligned or do not show a significant difference. It can be interpreted that the relationship between aspects of satisfaction, experience and memories was linear. If the travel satisfaction score was high, then the experience and memories score was also high, and vice versa. The diversity of geotourism objects and attractions at the study site should be able to provide a high enough value for satisfaction, experience and memories for every tourist. However, if all the potential geotourism attractions were not packaged properly and presented to visitors in the form of guided tours, then what happens is "anonymity" or ignorance of the meaning of various objects seen and enjoyed by tourists. This was because the information and characteristics of the advantages of various geotourism objects need to be described through tourism interpretation and guidance instruments. The findings show that the absence of quality geotourism products and programs provided by the manager determined low score in tourist satisfaction, experince and memories. Tourist activities were still limited to ordinary recreational activities and have not been packaged in the form of programmatic tour packages and interpretation. In contast, the potential of natural attractions (forest attraction and geotourism attractions) at the study site was basically very high quality and diverse. The problem faced is that there is lack of program planning in geotourism development.

The pillars of satisfaction, experience and memories were the pillars of basic travel needs which are the right of every tourist to get them optimally. These three pillars were very important and affect the sustainability of tourist visits such as the number of visits and the desire to return to travel (willingness to revisit). Travel satisfaction was not only obtained when you are at a tourist destination, but is an accumulation of satisfaction achievements starting from the planning phase of the trip to the end of the tour activity. Avenzora (2013) stated that various study results show that satisfaction at a destination only contributes a maximum of 20–25% of total satisfaction. Yoon and Uysal (2005) stated that tourist satisfaction was determined by tourists' comparisons of their expectations of a destination and the perceived evaluative experience at the destination. While Kozak and Rimmington (2000) argued that tourist satisfaction is important in destination marketing because it influences the preference of destination, the consumption of goods and services, the number of repeat visits, word of-mouth promotion, and destination loyalty. Travel experience can be defined as tourists' exposure to the tourism environment and the interaction between service providers at the destination. It also occurs through tourists' engagement, involvement, perception and participation in events, activities, or tourist attractions at the destinations (Kim & Brown, 2012). In general, the quality of tourist satisfaction will correlate with the quality of the travel experience and the quality of travel memories (Goldman et al., 2001; Sangpikul, 2018).

A study by Kim and Brown (2012) indicated that the

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natural attractions played an important role in satisfying tourist as well as influencing the number of tourist revisit. The results of the study by Mutanga et al. (2017) reported that the visitor experience score against the interpretation program on wildlife tourism was positive (score 3.3–4.4 with a maximum score = 5). Chen and Chen (2010) argued that to provide a quality experience, tourism managers should endeavor to meet visitors' expectations with respect to components of involvement and educational aspect. The tourist experience will be more optimal if there was an interpretation program and integrative program planning.

Tourism education pillar As seen in Figure 6, the education scores for geotourism destinations with a natural attraction (geological phenomena, flora and fauna, environmentally friendly behavior and natural contemplation) was high than the other aspect. The highest score was on natural contemplation education (score = 4.60), while the lowest score was on leadership education (score = 3.37). In terms of the type of destination, the type of volcano destination has the highest educations score (score = 4.79), while geological reserve destinations have the lowest educations score (score = 3.24).

Tourism activities were learning or educational activities that are packaged with fun activities. Scientific information can be easily conveyed to the public through tourism and recreation activities. In order for this educational aspect of travel to be more optimal, the means and facilities for interpretation must be provided by the tour operator. Positive content can be inserted in tourism activities including the values of environmental care, clean and healthy lifestyles, leadership, respect for the values of local wisdom, customs and so on.

Geotourism activities were basically travel or journey that were full of activities related to education or learning. Various geotourism objects and attractions such as natural phenomena and earth/geological phenomena require sufficient explanation and interpretation so that they can be enjoyed by tourists. The uniqueness and scarcity of the object of geotourism attraction becomes more meaningful with the presence of educational/educational elements organized by the manager. Aspects of education or tourism education were elements that are the main characteristics of the nature of tourism products, both ecotourism and geotourism. Dowling (2011) stated that knowledge-based activities (geologically informative) a basic principle for geotourism development. Knowledge of geo-sciences and the interpretation of forms of earth's appearance and processes were very important in satisfying the curiosity of visitors.

In the perspective of Islam, positive tourism activities aimed at increasing awareness of their relationship with God the Creator of the universe are highly recommended to be carried out, and were a "divine mandate" that must be carried out (Avenzora, 2020). Several verses in the Qur'an include: a) Surah Al-Mulk (15), b) Surah Al-An'aam (11), c) Surah Al-Ghaafir (82), and d) Surah Al-Hajj (46) mentioned that there was an order from God to humans to take a "journey" in order to gain useful wisdom and knowledge. Ecotourism products, including geotourism, can be regarded as positive tourism products that were full of learning and educational content. Therefore, efforts to establish and develop geotourism was a commendable activity ordered by God.

Based on the results of the correlation test, it was found that all aspects of the seven pillars of ecotourism were interrelated or related to each other (Table 3). The value of correlation coefficient among the positive perception on pillars of ecology, economy, socio-culture was positive, while the negative perception on pillars of ecology, economy, socio-culture was negative. These findings can be interpreted that the pillar of ecological, economic and socio-cultural pillars have a unidirectional relationship. Quality improvement in one of the pillars of sustainable development will be followed by other aspects of sustainable development pillars vice versa. The value of correlation coefficient on sustainable development pillars (ecology, economy, socio-culture) toward tourism needs (satisfaction, experience and memories) and education pillar were

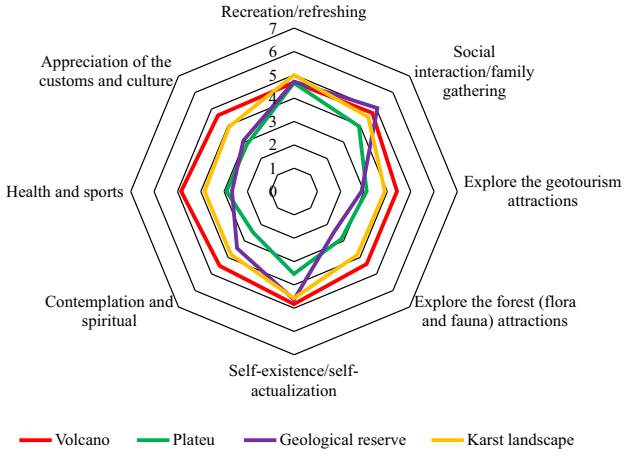

Figure 5 Memories pillars perceptions on geotourism development.

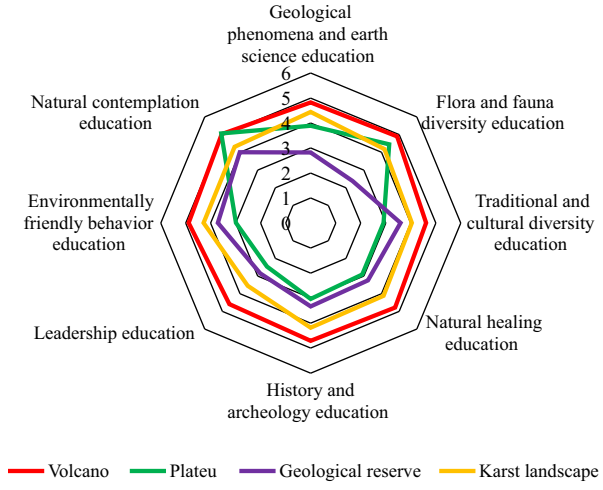

Figure 6 Tourism education pillar perceptions on geotourism development.

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negative or had an inverse or unidirectional relationship.

Under ideal conditions, the seven pillars of ecotourism on geotourism development should have a positive or unidirectional relationship. If one of the pillars of ecotourism had a high score, then the other pillars will also show a high score. With the "gap" between the seven pillars of ecotourism (sustainable geotourism), it is necessary to improve the management strategy of geotourism products at the research site. Efforts that must be made by destination managers are to make various improvements or innovations so that the quality of meeting the basic needs of tourists (satisfaction, experience and memories) becomes more optimal.

Some of the efforts that can be taken are to improve basic facilities, enrich geotourism interpretation and guidance programs and integrate with other sector developments. Geotourism business actors can also be creative by creating thematic programs in tour packages that can be offered to tourists. Aspects of involvement or participation of tourists (engagement) also need to be improved so that the quality of experiences and memories during the trip becomes more optimal and memorable for tourists. Conservation programs such as planting trees around geotourism areas and tourist donation programs (charity) will be an effective vehicle for realizing sustainable geotourism (eco-geotourism).

The geotourism destinations in Slamet and Serayu mountainous areas had four types of destination with different characters. Based on the comparative test of various perceived values of the seven ecotourism in the four geotourism destinations were significant (F value > F table), with a p-value < 0.05 (Table 4 and Table 5). On the basis of the diversity of characters in these geotourism destinations, it is necessary to develop a variety of product differentiation strategies. As a result there was no overlap or product duplication so that each destination can synergize with each other according to its competitiveness.

Table 5 shows that perception scores of ecotourism pillar enforcement in the four types of geotourism destinations were significantly different (p-value < 0.05). Each type of geotourism destination had different aspects of the type of attraction, life cycle of the destination, the intensity of regional development and management patterns. Several aspects that show similarity conditions (p-value > 0.05) are only on the aspects of the pillars of tourist needs (pillars of satisfaction, experience and memories), especially between volcano with karst destinations and plateau with geological reserves destinations.

The pillars of ecotourism can be said to have been established if the geotourism activities are able to provide

Table 3 The correlation coefficient of the seven pillars of ecotourism on geotourism development

Aspect	a	b	c	d	e	f	g	h	i	j
a	1									
b	-.171**	1								
c	.639**	-.151**	1							
d	-.209**	.523**	-.216**	1						
e	.675**	-.219**	.716**	-.255**	1					
f	-.190**	.600**	-.206**	.847**	-.242**	1				
g	-.164**	.080	-.125*	.254**	-.105*	.286**	1			
h	-.126*	.086	-.076	.334**	-.074	.354**	.829**	1		
i	-.129**	.077	-.109*	.350**	-.099*	.370**	.825**	.915**	1	
j	-.166**	.090	-.096	.302**	-.136**	.311**	.778**	.823**	.796**	1

**. The correlation is significant at 0.01 level of significance (two way);
*. The correlation is significant at the 0.05 level of significance (two way).
Note: a = ecology positive, b = ecology negative, c = economy positive, d = economy negative, e = socio-culture positive, f = socio-culture negative, g = satisfaction, h = experience, I = memories, j = education

Table 4 Compare mean test (ANOVA) of seven pillars of ecotourism perceptions on geotourism development

Aspect	Test parameters				
	Mean	SD	Eta value	F value	p-value
Ecological positive perceptions	5.56	1.17	.419	28.029	.000
Ecological negative perceptions	3.43	1.76	.529	51.257	.000
Economic positive perceptions	5.73	1.09	.470	37.373	.000
Economic negative perceptions	2.84	1.60	.491	42.017	.000
Socio-cultural positive perceptions	5.63	1.07	.482	39.887	.000
Socio-cultural negative perceptions	2.87	1.65	.448	33.189	.000
Satisfaction perception	4.08	1.20	.388	23.441	.000
Experience perception	3.94	1.25	.375	21.579	.000
Memories perception	3.92	1.24	.414	27.268	.000
Education perception	3.90	1.49	.405	25.963	.000

Note: If F value ≥ F table or p-value ≤ 0.05 then there was a significant difference in the mean scores

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Table 5 Similarity test of seven pillars ecotourism perceptions on geotourism development

Aspect/variable	Volcano vs			Plateu vs		GR vs
	Plateu	GR	KL	GR	KL	KL
Ecological positive perceptions	.000	000	.001	.000	.968	.000
Ecological negative perceptions	.094	.000	.002	.000	000	.000
Economic positive perceptions	.000	000	.002	.033	.002	.000
Economic negative perceptions	.000	000	.001	.611	.000	.000
Socio-cultural positive perceptions	.000	000	.006	.000	.672	.000
Socio-cultural negative perceptions	.000	.000	.000	.003	.138	.000
Satisfaction perception	.000	.000	.070	.999	.000	.000
Experience perception	.000	.000	.018	.228	.000	.037
Memories perception	.000	.000	.025	.190	.000	.003
Education perception	.000	.000	.005	.655	.003	.000

Note: *p*-value < 0.05 = the mean difference is significant at the 0.05 level; GR = geological reserves; KL = karts landscape

additional knowledge, insight and enlightenment to tourists as well as the fulfilment of all aspects of tourism needs optimally, both aspects of travel satisfaction, experiences and memories. The next requirement was that geotourism must be able to contribute or have a real positive impact on the environment, local economy and the preservation of local customs and culture.

Furthermore, in order to improve the performance and optimization of geotourism development, the management unit should not only be on object or site units but should be directed at regional or inter-regional scales. The area that is used as a geotourism destination which is currently booming was the geopark area (national geopark and UNESCO geopark). Geotourism was indeed an instrument in the sustainable use of geopark areas. However, geotourism development can also be carried out across regions including conservation areas (national parks, natural tourism parks and others) which have been identical as areas for ecotourism activities. Geotourism and ecotourism products can be combined in each type of area and managed with a regional development approach.

Conclusion

In order to realize sustainable geotourism development, it is mandatory for every tourism actor to fully uphold the principles or pillars of ecotourism, namely the pillars of sustainable development (ecological, economic and socio-cultural), and the pillars of fulfilling the basic needs of traveling (satisfaction, experience and memories). To be perfect with the presence of the education pillar which is the mission of all forms of development activities including development in the tourism sector. Natural tourism activities at the geotourism destinations in Slamet and Serayu mountainous areas did not seem to have implemented the principles or pillars of ecotourism as a whole. This can be seen from the assessment of tourist perceptions of the seven pillars of ecotourism which are still categorized as low or not optimal, especially on the pillars of tourism needs such as satisfaction, memories and experiences. There needs to be an increase in basic tourism facilities and modifications to the form of geotourism by increasing the guiding/interpreting aspects for tourists and intensifying the involvement of tourists in all tourism activities. A regional approach (regional/inter-regional) must also be applied to the development of geotourism so that it is more optimal, integrated and efficient in the use of resources.

Study Limitation

This research was conducted when the Covid 19 pandemic was still ongoing, so the tourists who were selected as the respondent samples generally came from the local and inter-regional (in the same province). The perception of the enforcement of the ecotourism pillar in geotourism destinations is limited only from the perspective of one stakeholder group, namely the geotourism tourists. The accidental sampling method was chosen because of the unequal number of tourists in each existing tourist attraction and with the consideration that not all tourists are willing to become respondents for several reasons. However, with a large enough sample size (N = 400), it can already represent the characteristics and conditions of the population at the study site.

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