LINKING INTERPRETATIONS WITH AMENITIES: EDUCATING VISITORS IN VOLCANIC ENVIRONMENTS

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Abstract: Volcanoes and/or its nearby areas have been major tourism attractions in Indonesia, such as the highland of Kaliurang in Yogyakarta that lies in proximity to one of the world’s most active volcanoes, Merapi Volcano; the town of Brastagi on the foot of Sinabung Volcano in North Sumatra; the still active Bromo Volcano in East Java and Tangkubanperahu Volcano in West Java. Most of these areas have high visitation, which presents challenges for area managers to consider these temporary visitors in the risk management strategies related to the potential hazards of the volcanoes and visitor safety. However, at the same time the high visitation also offers opportunities for the government to educate visitors and tourists about volcanoes and the need to protect natural resources in the volcanic environment, as well as volcano risk disaster mitigation through the interpretation facilities. This paper aims to to explore relations between related agencies in the management of tourism attraction located in volcanic environment and examine risk management strategies, in particular those related to ensuring visitors’ safety. This study also aims to explore the needs and opportunities to educate visitors and tourists about volcanoes, their significance and risks through interpretation facilities.

KEYWORDS: volcano tourism, interpretations, disaster mitigation, amenities

Background
Tourism is among the top five export earners of Indonesia along with the oil and gas sector, coals, palm oil, and rubber. International tourists’ arrival reached more than 9 million in 2014 and domestic tourism also continues to grow, with an increase in number of in-country trips made by Indonesians, from 237 million trips in 2011 to 245 million in 2012 (Ministry of Tourism and Creative Economy, 2013). Tourism is an important sector as it attracts people from other parts of the world to visit Indonesia’s natural landscapes and experience its unique cultures. However, tourism is also a highly volatile industry, which is easily affected by safety and security issues such as wars and terrorism, health issues such as SARS and
HSN1 influenza, and natural disasters. Hence in most cases, a country’s tourism industry relies on the country’s image as an attractive and safe place to visit.

On the other hand, Indonesia is one of the world’s most vulnerable countries to natural hazards, namely earthquake, tsunami, flood, landslides, volcanic eruption, extreme weather condition, extreme sea waves, drought, and forest fire. In this context, tourists are more susceptible to hazards due to their lack of understanding and experience toward places they visit or the behavior of various natural elements that exist in a destination. On the other hand, many of Indonesia’s tourism destinations are actually located in areas with higher risks of natural disasters, such as Borobudur Temple and the highland of Kalijurang that lie in proximity to one of the world’s most active volcanoes, Merapi Volcano; the still active Bromo Volcano in East Java and Tangkubanperahu Volcano in West Java; as well as Pangandaran beach – once devastated by tsunami. Among the natural disaster prone areas, this paper will focus on tourism in volcanic environment.

Indonesia is home to almost 30% of the world’s active volcanoes since it is located in the Circum-Pacific and Circum-Mediterranean belt (Figure 1). Many volcano tourism sites in Indonesia are active volcanoes that every now and then go through unstable situations due mostly to increasing volcanic activity. Bromo Volcano and Ijen Volcano (famous for its blue fire) in East Java, and Tangkubanperahu Volcano in West Java are those that have experience being declared unsafe for visitors due to increased volcanic activity. Most of these areas have high visitation, especially in peak seasons. Thus the unstable situation presents at least two kinds of challenges.

Firstly, in some volcano tourism sites, the agency responsible for monitoring the condition of volcano and determine its status whether safe, alert, or even danger, is not the same as the agency who manage the area for tourism. For example, in Tangkubanperahu Volcano, tourism is managed by the Office of Tourism and Culture, while in Bromo Volcano – which is a part of Bromo Tengger Semeru National Park – a unit under the Ministry of Forestry is responsible for managing the area. There have been times when the Volcanological Survey Indonesia or VSI (“Pusat Vulkanologi dan Mitigasi Bencana Geologi” or PVMBG in Indonesian) issues an alert status for a volcano in high visitation period for tourism, tension arises between the PVMBG and management of the volcano tourism sites.

Secondly, the presence of tourists in volcanic environment means the area managers should consider these temporary visitors in the risk management strategies related to the potential hazards of the volcanoes and visitors’ safety. This study, therefore, wants to explore relations between related agencies in the management of tourism attraction located in volcanic environment and examine risk management strategies, in particular those related to ensuring visitors’ safety. This study also aims to explore the needs and opportunities to educate visitors and tourists about volcanoes, their significance and risks through interpretation facilities.
Figure 1: Distribution of volcanoes in Indonesia (red triangle) and highlight volcanoes for this study (green triangle): Sinabung, Tangkubanperahu, Merapi, Bromo, Batur and Mahawu.

The study can be considered timely since the Indonesian government has started to develop the potential of geotourism, which includes tourism in volcanic environment. Geotourism is defined as tourism that focuses on geological aspects of the place (Brahmantyo, 2014). One of the milestones in the development of geotourism in Indonesia, was the declaration of Batur Caldera in Bali as the Global Geopark by UNESCO under the Global Geopark Network in 2012. Moreover, there is the increasing need to raise people’s awareness toward volcano-related risks in the overall country’s disaster management strategy. Cases such as people trespassing restricted area of Sinabung Volcano in the midst of its eruption in 2014, which resulted in deaths were examples of how important it is to raise disaster risks awareness among Indonesians. In addition, at the time of writing this paper, at least three volcanoes are having eruptions in Indonesia, namely Sinabung Volcano in North Sumatra with prolonged eruptions since 2013, Raung Volcano in East Java whose eruptions cause closures of major airports in Surabaya, Bali, and even Lombok in holiday season, and Gamalama Volcano in North Moluccas which also causes airport closure in the province’s capital, Ternate. Volcano eruptions are the consequences that the country needs to deal with, being the home to volcanoes that forms part of the world’s ring of fire. The methods employed in this study are direct observations to volcano tourism sites (Sinabung, Tangkubanperahu, Merapi, Bromo, Batur, and Mahawu volcanoes) that were conducted between 2012 to 2015; and interviews to officers from PVMBG and area management.

Tourism and Disaster Management in Volcanic Environment

According to Cohen (2011), there are still few research and publications available concerning the interface between disaster and tourism. Tsai and Chen (2011) explore various theories related to different kinds of natural disaster risk analysis mechanisms, with the goal of establishing a rapid risk assessment model suited to the tourism industry. A few years earlier, Faulkner (2001) argued that the reason why little progress had been made in advancing understanding of tourism disasters was the limited development of the theoretical and conceptual frameworks required to underpin the analysis of this phenomenon. He then developed tourism disaster management framework (TDMF), which highlighted the stages in disaster process and what to do in each stage (Faulkner 2001) and illustrated in Figure 2.
The TDMF has the advantage of outlining phases of disaster and responses that need to be taken in each phase and key strategies in managing tourism disaster, as the followings (Faulker, 2001:144):

1. **Pre-event**: when action can be taken to prevent or mitigate the effects of potential disasters
2. **Prodromal**: when it is apparent that a disaster is imminent
3. **Emergency**: the effect of the disaster is felt and action is necessary to protect people and property
4. **Intermediate**: a point where the short-term needs of people have been addressed and the main focus of activity is to restore services and the community to normal
5. **Long-term recovery**: continuation of previous phase, attending to items that could not be attended quickly. Post-mortem, self-analysis, healing.
6. **Resolution**: routine restored or new improved state establishment.

This study tries to apply the TDMF in the context of volcano tourism in Indonesia and identified elements of the disaster management response as well as principal ingredients of the disaster management strategies.

### a. Pre-event phase

In the pre-event phase, risk assessment for volcanic environment is conducted by the PVMBG. This research center, under the Ministry of Energy and Mineral Resources, monitors the condition of volcano and issue warning when necessary. PVMBG also produces Volcanic Hazard Map and hands it to area management and other relevant agency such as the Regional Disaster Management Authority (“Badan Penanggulangan Bencana Daerah” or BPBD in Indonesian). In the pre-event phase, precursors must also
be set up by establishing disaster management organization, in this case led by BPBD in local or provincial government level.

In the case of tourism in volcanic environment, the framework suggests to identify relevant public/private sectors/organizations, i.e. local government, research agencies such as the PVMBG as well as universities, tourism industry associations, e.g. Indonesian Hotel and Restaurant Association (PHRI), Association of Indonesian Travel Agencies (ASITA), Indonesian Congress and Convention Association (INCCA), Association of Indonesian Recreational Parks) and establish coordination framework & communication system. The framework also suggests to develop, document and communicate disaster management strategy, and educate industry stakeholders, employees, customers, (tourists), and community. However, a study by PVMBG reveals that information about volcanic hazard as well as evacuation route is not necessarily visible to visitors or tourists (temporary visitors) in volcanic environment (Weningsulistri et al, 2014). There is also no specific disaster management plan for temporary visitors, but there is disaster management that applies to people living in the surrounding area, which applies also for temporary visitors.

b. Prodromal phase
When volcanic disaster is imminent, PVMBG through its monitoring stages should inform the status of a volcano. There are four levels that describe the status of a volcano, from level 1 that represents an active but normal status, to level 4 when the volcano is near eruptions. In the case of increasing volcanic activity and consequently increasing status, area managers should make this information available to public and take necessary actions, which may include temporary closing of the area.
Problems sometimes arise when the status of a volcano has increased to level 2 or 3 in holiday or peak season and the area manager has been suggested to close the area for visitors. According to PVMBG officials, this kind of situation has resulted in tension between area managers and PVMBG. Thus, it is important to develop a continuous effort to raise awareness among all stakeholders.

c. Emergency phase
Emergency phase is when the effect of disaster is felt and action is required to protect people and property. In this stage, BPBD should lead the process of rescue and evacuations. According to Faulkner (2001), after risk assessment it is important to develop disaster contingency plans that identify likely impacts and stakeholders at risks (employees and customers/tourists), as well as assessing community and visitors capabilities to cope with impacts. It is also paramount that disaster contingency plans be reviewed and revised when necessary.

d. Intermediate phase
This phase is when short term needs have been addressed and the main focus is to restore services and community to normal. It is also the phase when damages are audited, the tourism site is restored, and media communication strategy is carried out to inform public about the restoration of the site or when the site is ready to be visited again.

e. Long-term recovery phase
This phase involves reconstruction and recovery, self-analysis to evaluate current disaster management plan and gathering input for revisions of disaster strategies, rehabilitation of damaged environment/facilities, counseling victims and healing, restoration of business/consumer confidence, and even development of investment plan.

f. Resolution
In this phase, routine is restored, community and visitors capabilities to cope with impacts are analyzed, and actions to avoid or minimize impacts are identified.

**Education through Tourism in Volcanic Environment**

Living in the world’s ring of fire means that Indonesians, especially those living near volcanoes must understand volcano hazards, and more importantly the significance of volcanoes and the need to protect natural resources in the volcanic environment. Visits to volcanic environment for recreational and tourism purposes, can enhance visitors knowledge about volcano if the visit provide educational value through interpretations. Interpretation is the systematic provision of information to and education of visitors, with the aim of making connections between the visitors and places, sites, natural areas, wildlife and cultures. Observations to six areas considered as volcano tourism sites that were conducted as part of this study revealed various conditions in terms of existing interpretation facilities. The areas and their existing interpretations will be described as follows:

1. **Sinabung Volcano** (2460 m above mean sea level) is located in Karo Regency, North Sumatra, close to Brastagi – a town popular among tourists. Sinabung Volcano has been having prolonged eruptions since 2013 and several villages and agricultural lands have been affected as a result. The eruptions of Sinabung Volcano sometimes affect the nearby town of Brastagi due to volcanic ash. The PVMBG establishes a monitoring station for Sinabung Volcano which is located approximately 20 km from the mountain. From the monitoring station, information about the volcano is distributed to other relevant agencies. With rich information about Sinabung Volcano and considering many informative displays available in the station, there is a potential opportunity for the PVMBG unit in Sinabung Volcano to cooperate with the Office of Tourism and Culture in Brastagi to provide widely accessible information to public and tourists about volcano.

![Figure 3. Illustration of Sinabung Volcano Observation Sites](Photos source: Authors)

2. **Tangkubanperahu Volcano** (2084 m above mean sea level) is a volcano 30 km north of Bandung, the capital of West Java Province. It last erupted in 1983. Tangkubanperahu Volcano has a high number of visitations due to its proximity to Bandung and the ease of visiting it. Tourists can hike or ride to the edge of the crater. An interpretation board about Tangkubanperahu Volcano and its geological formation is available on the site. It is provided by PVMBG as a response to a request made by the area management. The interpretation board however is situated very close to the crater, with the risk of being easily destructed when eruption occurred.
3. Merapi Volcano (2968 m above mean sea level) is probably one of the world’s most active volcanoes. It last erupted in 2014, but in 2010 its eruptions caused major catastrophes. Merapi Volcano is located close to the town of Yogyakarta, one of Indonesia’s main tourism destinations beside Bali. A very informative museum about Merapi, called Merapi Volcano Museum is built in a village on the foot of Merapi Volcano. The museum usually receives a lot of visitors during school holidays. Some visitors to Merapi Volcano Museum however complains that services in the museum should be improved, namely more guides during holiday season when the number of visitors is high and other facilities such as seating area (Wulandari, 2015).

![Figure 4. Interpretation Display in Merapi Volcano Museum](image1)

![Figure 5. Displays Aiming to Raise Disaster Awareness in Merapi Volcano Museum](image2)

4. Bromo Volcano (2329 m above mean sea level) is part of Bromo Tengger Semeru National Park (NP) which covers the Tengger massif. Bromo Volcano sits in the middle of a vast plain called the Tengger Sand Sea. A visit to Bromo Volcano typically starts with a visit to Penanjakan Viewpoint where visitors can see the view of the NP and the sun that rises over the mountains. Visitors will then go down to Bromo Volcano by passing the sand sea and climb the steps to the edge of its crater. The Bromo Tengger Semeru NP has a visitor center next to its office in Cemara Lawang Village. The center, however, is lacking information about the area as volcanic area and does not
provide any information on volcano disaster risks. The visitor center is not often visited by visitors, which perhaps due to its location that is not along the common route people use to go to Bromo Volcano (Penanjakan View Point for sunrise, Tengger Sand Sea, and Bromo Volcano).

5. Batur Volcano (1717 m above mean sea level) is part of Batur Geopark which consists of Batur Volcano and Lake Batur. Tourists often come to an area known as Kintamani to enjoy the spectacular view of the mountain and the lake. Geopark is an area with natural heritage value and its establishment is expected to become a sustainable economic development strategy for the area through a good and realistic management structure (Global Network of National Geopark, undated). Batur Volcano Museum has been established in Batur Geopark with the aims of educating visitors, facilitating research, and serving as visitors’ attraction. Batur Geopark also provides information through interpretation boards that is located in areas often passed by visitors.

![Interpretation Display in Batur Volcano](https://example.com/interpretation-board-batur-volcano)

Figure 6. Interpretation Display in Batur Volcano (Photos source: Authors)

6. Mahawu Volcano (1324 m above mean sea level) is located approximately 25 km from Manado, the capital city of North Sulawesi. A study has been carried out in Mahawu Volcano by PVMBG to assess its potential as visitors’ attraction with disaster awareness point of view. The study identifies the need for interpretation facilities, such as information boards that deliver information about natural resources provided by volcanoes and volcano hazards.

From the above elaborations it can be concluded that conditions varied in each volcano in terms of the availability of interpretation facilities and their conditions. For instance, the highly visited Bromo Volcano (550,000 visitors in 2014) has yet to provide adequate information about its geological formation, its significance in providing natural resources and environmental services, as well as possible volcano hazards in order to raise disaster awareness. Merapi Volcano Museum with its rich and interactive information has been expected to improve its visitor facilities such as seating areas and more museum guides. Authors’ observation to the Merapi Volcano Museum also found that other facilities such as cafeteria and souvenir shop, which could be categorized as tourism amenities, had not been provided adequately in the museum.

Interview with officials from PVMBG and the study conducted by Weningsulistri et al (2014) revealed that in the management of volcano tourism site, area management and PVMBG did not necessarily cooperate in providing visitors with valuable information regarding the volcano visited. Up to now, PVMBG only provides information, for instance through interpretation boards, when it is requested by the area management. From the authors’ observations on visitors’ visiting patterns and behavior when
visiting volcano tourism sites or in the case of Sinabung Volcano, when visiting the nearby tourists town such as Brastagi that benefits from its proximity to the volcano in terms of climate, view, and natural resources; there is the need to integrate educational interpretation facilities with tourism amenities such as rest areas or view points – when condition permits. This is because quite considerable time is usually spent in such tourism amenities, which could actually be combined with opportunities to learn more about the volcano and disaster mitigation so that both enjoyment and education can be achieved simultaneously.

In particular, when considering the motivation of domestic visitors in Indonesia when visiting natural areas, as researched by Cochrane (2006), the motivations are mainly to enjoy refreshing time with families and friends in a natural environment rather than to engage in a more active activities such as exploring the area more extensively. This is reflected in the fact that area such as Penanjakan View Point in Bromo Tengger Semeru National Park is so popular or even crowded as the area gives opportunity to enjoy the beautiful view of the NP while also providing facilities such as small cafeterias and souvenir shops. Thus, this study proposes that when establishing interpretation facilities, such as information boards and museums in volcano tourism site, they must be located along the route of visitors’ flow; designed attractively to raise awareness toward the valuable resources provided by volcanoes and the potential volcano hazards; and they must be complemented by facilities (whether on site or nearby) that make the visitors’ trip more enjoyable and comfortable.

Conclusions

This study aims to explore relations between related agencies in the management of tourism attraction located in volcanic environment and examine risk management strategies, in particular those related to ensuring visitors’ safety. It also aims to explore the needs and opportunities to educate visitors and tourists about volcanoes, their significance and risks through interpretation facilities.

In exploring relations between related agencies in volcano tourism sites that are represented through the six volcanoes in this study, it was found that cooperation was still lacking in providing information to visitors, in agreeing about steps that should be taken to minimize visitors’ risks, and in developing disaster management plan for visitors. This study also suggests that when establishing interpretation facilities, they must be located along the route of visitors’ flow; designed attractively to raise awareness toward the valuable resources provided by volcanoes and the potential volcano hazards; and they must be complemented by facilities (whether on site or nearby) that make the visitors’ trip more enjoyable and comfortable.

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