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Stakeholders engagement in emergency response of flood disasters management in District Ijen, Bondowoso Regency, Indonesia

Pelibatan pemangku kepentingan dalam tanggap darurat penanggulangan bencana banjir di Kecamatan Ijen, Kabupaten Bondowoso, Indonesia

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Abstract
The recurring flash floods in Ijen District, Bondowoso, has caused damage to houses and villages infrastructures. Flood handling requires coordination from multiple stakeholders, social enterprises and Non-Governmental Organizations. This study explores the stakeholders' involvement in the emergency response of flash flood disaster handling in the Ijen District. This study used qualitative and quantitative approaches. The study found that these stakeholders have their own aims and interests. The analysts predict that the power index value is 0.74, while the interest index value is 0.94. These two figures show that both the power and the interests of the stakeholders are very high in dealing with flash flood disasters. Despite the high values, until August 2020, the recovery process had not been completed yet. These findings are important as an evaluation of the emergency response in disaster handling and a warning that it is important to sustain the environmental condition of mountain slopes.

Keywords: disaster management; flash flood; post disaster; stakeholder engagement

Abstract
Banjir bandang yang berulang di Kabupaten Ijen, Bondowoso, telah menyebabkan kerusakan rumah dan infrastruktur desa. Penanganan banjir memerlukan koordinasi dari berbagai pemangku kepentingan, badan usaha sosial dan Lembaga Swadaya Masyarakat. Studi ini mengeksplorasi keterlibatan pemangku kepentingan dalam tanggap darurat penanganan bencana banjir bandang di Kabupaten Ijen. Studi ini menggunakan pendekatan kualitatif dan kuantitatif. Studi ini menemukan bahwa para pemangku kepentingan ini memiliki tujuan dan kepentingan mereka sendiri. Analis memperkirakan nilai indeks kekuatan adalah 0,74, sedangkan nilai indeks kepentingan adalah 0,94. Kedua sosok ini menunjukkan bahwa kekuatan dan kepentingan para pemangku kepentingan sangat tinggi dalam menghadapi bencana banjir bandang. Meski nilainya tinggi, hingga Agustus 2020, proses pemulihan belum selesai. Temuan ini penting sebagai evaluasi tanggap darurat dalam penanganan bencana dan sebagai peringatan bahwa kondisi lingkungan lereng gunung perlu dijaga kelestariannya.

***Kata kunci**: penanggulangan bencana; banjir bandang; pasca bencana; keterlibatan pemangku kepentingan*

Introduction

Being part of the Ring of Fire, Indonesia has hundreds of active volcanoes (reference is missing). On the Islands of Java, there are 19 active volcanoes, seven of which are located in East Java (Reference is missing). The seven volcanoes are all in the status of either normal (Mount Lamongan in Lumajang, Mount Kelud in Kediri, Mount Arjuno in Pasuruan, Mount Ijen, and Mount Raung in Banyuwangi), Advisory (Mount Bromo in Probolinggo), or Alert (Mount Semeru in Lumajang). Though none of the volcanoes is under warning, it is feared that an active volcano with no observable volcanic activity for an extended period might store large amounts of energy. As a result, it may produce a large eruption, such as the 3,260 meters high Mount Raung that lies along three regencies: Banyuwangi, Bondowoso, and Jember.

Active volcanoes positively and negatively impact the surrounding environment and communities, especially in disaster-prone areas. The negative impacts commonly take place during and after eruptions. These negative impacts may include; (a) air pollution, since the air is filled with volcanic ash containing harmful gases such as Sulfur dioxide (SO2), Hydrogen sulfide (H2S), and Nitrogen dioxide (NO2), as well as potentially dangerous dust particles. (b) The polluted air may also potentially cause Acute

Respiratory Infections. In addition, eruptions may also (c) disrupt human activities in the surrounding areas. Consequently, (d) eruptions would also disrupt tourism. Aside from that, (e) hot and cold lava and volcanic ashes may contain hazardous materials and can cause damage to the surrounding residential areas. (f) hot lava and pyroclastic clouds may also burn down forests, causing droughts and further damage.

On the contrary, volcanic eruptions also bring positive impacts. First, (a) volcanic ash contains beneficial nutrients for plants, making it an excellent fertile land for agriculture. Besides that, eruptions also (b) open up new economic opportunities, such as sand mining. In addition, (c) gravels and rocks that erupted from the volcano are valuable building materials. Second, forests and wildlife are damaged, but (d) it does not take long for plants to regrow on the fertile soil. Third, eruptions also often (e) produce hot springs, which is suitable for skin therapy. In addition, (f) these hot springs are rich in minerals. Lastly, (g) area with frequent eruption may become a potential site for power plant construction.

These beneficial features have drawn people to reside and establish settlements around the volcanoes. During the Dutch colonial era, mountain slopes were known as coffee belts – areas commonly planted with thorny plants, especially coffee. In history, the government prohibited people from establishing settlements on mountain slopes in Indonesia (Geertz 1963). However, people can settle on these mountain's slopes with time and government changes. These lands managed by the residents are used for farming. Even though the government has designated some mountain slopes as protected forests, human activities certainly cause environmental damages. For example, mountain slope residents commonly used for farming and may cut down trunks and tree branches for domestic use. They also hunt for honey using incinerates to drive away the bees. These incinerates can cause forest fire if they are not properly extinguished (Rustinsyah 2015).

Forests and distorted mountain slopes areas can result in other disasters as well, such as floods. These floods, as other disasters, are difficult to predict with accuracy. This is what happened in the slope of Mount Ijen. In January and March 2020, flash floods hit the villages, carrying mud and fallen tree trunks. These floods damaged farmer houses and other village infrastructures. Mitigating such disaster requires collective endeavor between various stakeholders and government of Indonesia. Therefore, this paper aims to explore stakeholders' engagement in the management of emergency response of flash flood in the villages of Mount Ijen slopes, Bondowoso, East Java, Indonesia.

Start from Indonesia, how the situation of volcanoes, how the environmental conditions is? In Indonesia active volcanoes for the disaster mitigation have poses a series of challenges in environmental management eruptions. Some of these impacts are human casualties, environmental damages, disruption of economic activity, and infrastructure damages (add references). However, volcanic eruptions also bring significant benefits to local residents who live around the slopes of the volcanoes. Two of the most significant benefits are fertile soil and tourism opportunities. Another, more cultural bound, reason that draws people to reside near the volcanoes is the belief that some volcanoes are sacred. For example, Mount Merapi, is considered sacred by the locals (Donovan 2010), for hesitating them to move to other place, despite the constant threat of eruption.

The un-predictability of volcano dangers is one of the challenges in environmental management and disaster mitigation. The frequency of changes includes the exact time of eruption, duration of eruption, type of eruption, and vulnerability to disaster based on geographical and demographic situations. This problem highlights the importance of planning to minimize the risk of volcano dangers to escalate into serious disasters. Some volcano disasters can last for several months, even for years. They destroy residential areas and render them uninhabitable for extended periods of time. For instance, the frequency of increased in volcanic activity and related dangers from the eruption of Mount Soufriere Hills in Monteserrat from 1995 to 1999 lasted for years (Kokelaar 2002). It has been more than fifteen years, the eruption has not been considered as normal. Yet, there is no scientist involved in monitoring the volcano activity to this day. In Peru, the eruption of Mount Ubinas in 2006-2008 caused a lingering crisis that had to be resolved by Peruvian civil authorities. This is an important lesson for other areas that also closed to active volcanoes. The case with Mount Merapi which erupts every two to five years. Mount Merapi eruption in 2010 for instance, took 353 human lives.

Disasters occur when negative impacts of dangers are not properly managed (Abarquez 2004). There are times and places in which a disaster is often seen by the people as God's destiny, but in recent years the degree and frequency of disasters have been recorded as significant (UN-ISDR 2011). Similarly, the flash floods in Mount Ijen that caused great damages. Therefore, effective emergency response is required for flash flood mitigation as not to escalate into greater risks. Flash flood mitigation is a collective effort involving several stakeholders from various elements and financial supports from different sources.

Emergency response and disaster management is a part of disaster mitigation. In accordance with statutory regulations, Article 1, paragraph 6 of Government's Regulation No. 21 of 2008 on the implementation of disaster mitigation. Disaster mitigation is a series of efforts to reduce disaster risk, through physical development, awareness, and skill improvement to counter disaster threats. There are four stages in disaster management and skills. The first stage is the initial stage before the disaster occurs. It is a disaster mitigation to reduce and minimize the risks of the disaster, for example: drawing maps of disaster-prone areas, planting trees, planting trees , and educating communities that live in disaster areas to raise their awareness and educate them for disaster management. The second stage is the planning on how to respond to the disaster. Planning is made based on previous experience or lessons from other areas with the aim of minimizing risks of the disaster, such as planning on preventing casualties, preventing damage to facilities and infrastructure, managing community resources, and training residents in disaster-prone areas. The third stage is the strategies or efforts to minimize risks when the disaster actually occurs, for example focusing on relief efforts of the disaster victims and anticipating damages caused by the disaster. Finally, the fourth stage deals with the recovery as an effort to restore environmental and social condition that are affected by the flood.

One of the difficulties in overcoming the problem of natural disasters is when disasters (eruptions, floods) happen suddenly and are difficult to handle with prediction. Despite warnings from the department of Meteorology and Geophysics, the time to get the information about disasters is often very short. During a flood, water moves quickly and is difficult to control, posing a major threat to both human life and infrastructure. This is particularly worse in damaged volcanic slopes. Heavy rainfalls often causes muddy flood, in which exposed top soil is carried away by the excessive amount of water.

Multiple factors has been associated with the increase in frequency and severity of natural disasters is largely linked to the increasing population, industrialization, climate change, and area development. Many of these 'developments' have been globally shown to increase people's exposure to disaster-related dangers by encouraging them to live in disaster-prone areas. This increases the vulnerability of people, which in turn may be forced to take environmentally destructive efforts in order to survive (Wisner et al. 2004).

Flooding on the slope of an active volcano is often make worse by geographical conditions, socio-demographical characteristics, and political factors as well. Some previous researches show that causes of flooding are heavy rainfall, topography, encroachment on river banks, institutional problems, and others. Gardner & Dekens (2007) identified three factors that influence flood disaster resilience in mountainous areas, are: (a) the mountain's ecology, in relation to its geography and hydrography, which in turn also affects its biodiversity; (b) the existence of traditional settlements – unplanned settlement patterns in form of pockets of small community settlements; and (c) the existence of natural resources which sometimes trigger political tension between highland and lowland communities.

Anthropogenic global warming also has the potential to cause flooding (Zhang et al. 2013, Tabari 2020). Under the influence of climate change and human activities, some regions such as Africa, North America, and South Asian Republics, will face major flooding (Winsemius et al. 2016, Kirchmeier-Young et al. 2020). On a global scale, deaths from floods and flood-affected populations have increased (Hu et al. 2018). With global warming, the risk of floods and losses due to floods will increase (Guo 2017, Dottori et al. 2018). Previous studies examined flood risk using historical disaster data (Black et al. 2002, Benito et al. 2004, Rodda 2005), indicator systems (Stefanidis et al. 2013, Hu et al. 2017), and simulations scenarios (Prudhomme et al. 2010, Feyen et al. 2012, Bisht et al. 2016, Li et al. 2016). This study seeks to examine the stakeholders' involvement in the emergency response of flash flood disaster handling in the Ijen District. Disaster management and mitigation is a collective efforts that involve a number of stakeholders such

as Government disaster response team and non-governmental organizations. In understanding the stakeholders which are actors who have position, power, and interest in relation to a specific purpose (Freeman 1984). Grimble & Wellard (1997) emphasize that stakeholders have key position and influence to power. According to Morgenthau (1997), power is the capacity or ability to direct or influence the behavior of others. In this case, power indicators in flood management include authority, capability, capacity, credibility, and mass mobilization. Stakeholders have an interest in flood management so as not to carry greater risk. According to Bryson (2004), added that interest is the will, the desire, that a person or group has for an activity. It varying their interests in relation to the handling of and recovery from a disaster. The indicators of such interests are hopes, aspirations, and potential benefits.

Furthermore, stakeholders in the effort of controlling the disaster problems in Bondowoso Regency are determined and regulated in: (a) cooperation agreement between the regency and East Java department of Regional Disaster Management Agency; and (b) disaster management in regency level as detailed in Bondowoso. These regulations illuminate that the stakeholders are those from the villages and outside the villages, including the government, private institutions, social enterprise, Non-governemntal organizations (NGOs), communities, and individuals. Despite these regulations, the actual implementation is subjected to on-field conditions and necessities.

Research Method

This research was conducted in villages affected by muddy floods in District Ijen of Bondowoso Regency, Province of East Java in Indonesia. Muddy floods in this area are caused by heavy rainfalls and the damaged forest area on the slopes of the mountain. The following Figure 1 is a map of the research area, Bondowoso Regency.

Bondowoso regency is divided into 23 districts, with ten sub-districts and 209 villages. The area is at an average altitude of 253 meters above sea level. The largest district is District Ijen, with an area of 207,200 km^2, occupying 13.28% of the total area of Bondowoso regency. It is also the highest area with an altitude of 1,130 meters above sea level, and the area farthest from the capital city of Bondowoso regency, at a distance of 74 km. Furthermore, the district Ijen is located on the eastern border of the regency and is directly adjacent to Banyuwangi and Situbondo regencies.

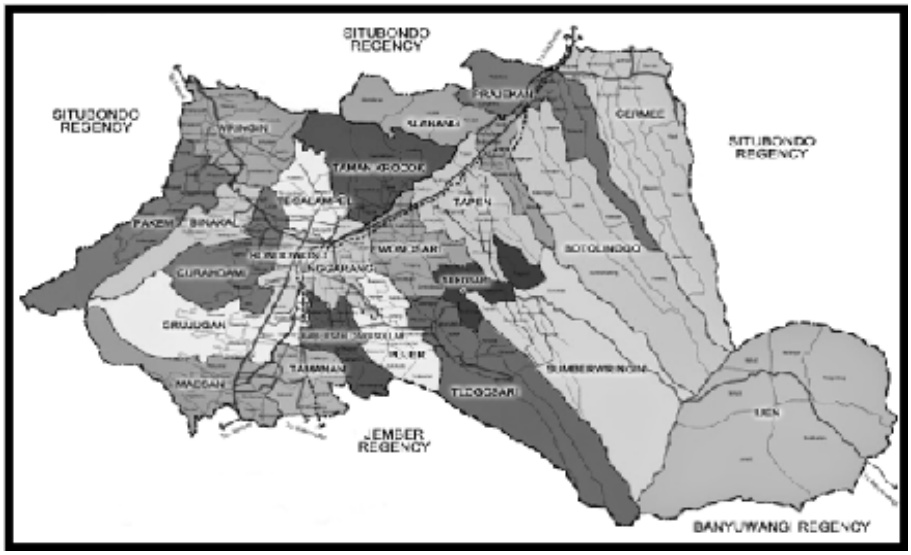

Figure 1.
Map of Bondowoso Regency
Source: bondowoso-org.blogspot.com

On January 29, 2020, at 13:30 in western Indonesia time, a flash flood of water and mud hit Kalisat and Sempol villages of Ijen. On March 13, 2020, there was another flood in the area. The flash floods were due to heavy rain on Mount Suket and the deforested slope. The deforested slope results from the

changing land use and forest fires on Mount Suket. The fact that there is no water-retaining embankment in the area adds to the factors. The flash floods brought thousands of cubic of materials, including fallen tree trunks and stones, which add to the danger. According to the identification records of the Bondowoso regency BPBD, the impact of the floods caused damages to houses, animal enclosures, and infrastructure, among others. The following Table 1 highlights the impacts of flash floods in Ijen district.

Table 1.
Impacts of flash floods in the villages of Sempol and Kalisat, Ijen District

Type of damage	Description
Houses	Sempol Village: 98 units Kalisat Village: 143 units
Animal enclosures	Sempol Village: 20 Units Kalisat Village: 20 units
Infrastructures: Mosques, embankments, bridges, clean water facilities (pipes), cart tracks, village roads, district offices, district officials' residence, public elementary school buildings, as well as toilets and washing facilities	a. Mosques: 20 units b. Embankment wall: 15 km c. Bridges: 3 units d. Clean water facilities: 14 km e. Cart tracks: 1.6 km f. Village roads: 7 km g. District office: 1 unit h. District head's official residence: 1 unit i. Primary school building: 1 unit j. Toilets and washing facilities: 22 units
Livestock: goats, cows, and horses	a. 80 goats b. 53 cows c. 11 horses

Source: Bondowoso Regency BPBD in 2020

When the floods hit, the village roads were submerged in a mixture of water, mud, and debris of trees from the mountain. The mud was almost a meter high, making it almost impossible for vehicles to pass through it. Residential houses in Kalisat and Sempol were submerged in mud as high as 50-100 centimeters. The following photos document the condition after the floods in Ijen district in Figure 2.

Figure 2.
Post-Flood Conditions
Source: Document of Bondowoso Regency BPBD in 2020

It can be seen from the Figure 2 that mud and broken tree blocked the village roads and stacked over houses. The trunks were leftovers from trees that were cut down for land clearing on the slope of the mountain. At that time, emergency response task force command took the lead in cleaning up the remaining mud and debris. The task force consisted of community members, the army, navy, and volunteers. The first stage of the cleaning was successful and public infrastructures (village roads, mosques, school buildings, and rivers) can once again functional and be available for use. However, on March 17, 2020, the COVID-19 pandemic occurred so that the government imposed PSBB (Large-Scale Social Restrictions) which prohibited gatherings in large number, in-school activities, and public prayers in Masjid, Church and others. Therefore, it is evident that not all of the community service work to clean residential houses from muds were completed at that time. As of August 2020, there were still some houses submerged in mud and sand and the owners moved their short settlement in their relatives' residents. As seen in Figure 2, a number of residents are also worried that if another high rainfall occurs, they will have to evacuate to shelters prepared by the local administration.

This study aims to examine the characteristics of the stakeholders involved in flood management. Data collection focuses on qualitative (where is quantitative) aspects related to the task force's workflow and work system in flood management. Flash flood management consists of two main activities: emergency response handling and recovery (reference). Emergency response handling includes establishing shelters and command posts to distribute aid, and evacuating the victims. Emergency response recovery includes cleaning public facilities and infrastructures hence they can be normal again, and providing assistance to the affected communities. For strengthening the results, the research also gathered quantitative data to determine the level of strengths and interest in the emergency response to manage flood disaster.

The data of this study were collected in several stages. First, the researchers conducted qualitative and participatory observations to investigate and experience firsthand information of the areas affected by the flash flood. In addition, the researchers also observed the work system of the task force in dealing with the floods. Secondly, the researchers conducted in-depth interviews with the flood victims, as well as with internal and external stakeholders, especially emergency response agencies related to flood management and flood recovery. Thirdly, the researchers also conducted focus group discussions between residents affected by the floods and the government agencies responsible in handling floods, especially the officials and staffs of local administration (BPBD). Fourthly, the researchers visualize the published documents related to flood handling, emergency response, and recovery activities. In short, the researchers used Likert scale to identify the level of power and interest characteristics of the stakeholders. For this reason, a semi-structured questionnaire was prepared for stakeholders in disaster management, and gathered data from 51 respondents.

The likert scale calculation begins by providing a score for each category. Starting from a score of one for the low category to a score of four for the very high category. Then calculate the ideal score from each category using the following formula:

Ideal score = score x number of respondents who chose

After that, add up the ideal score of each category given the symbol . Next is to calculate the interval with the following formula.

$$I = \frac{n}{s}$$

with,

I = interval (range of distance)

n = total respondents who filled out a questionnaire

s = total of categories

Then calculate the index using the following formula.

$$I_n = \frac{T_s}{Y} \; x \; 100\%$$

with,

T_s = total of ideal score

Y = highest score x number of respondents who voted

The results from Likert scale were calculated using to determine the extent of stakeholders' power and interest in the emergency response of flood disaster.

Result and Discussion

In this chapter, the discussion focuses on two sub-chapters, including: (a) Stakeholders' engagement in emergency response of flash flood handling, with a more detailed explanation regarding the establishment of task force and command center; (b) Flash flood emergency response stakeholders identification: Power and interest

Stakeholders' engagement in emergency response of flash flood handling

Establishment of task force and command center

The flood management and mitigation in Ijen District involve a number of stakeholders, including community members for inside and outside of the villages, governments, and NGOs. Stakeholders' engagement in disaster management is detailed in the appendices of Bondowoso regent decree number 188.45/145/430.4.2/2020 on the establishment of emergency response task force and command for floods, landslides, tornadoes, and hurricanes. In practice, stakeholders' involvement in disaster management is a subject to existing conditions. In addition, there are also a number of individuals and non-governmental (private) organizations participating in disaster management. The success of such management involves a number of power positions and interests.

The implementation of the emergency response was based on the emergency status of flash flood disaster in Ijen District. The decree institutes the establishment of a Task Force and a Command Center (SATGAS-POSKO) for flash flood disaster management in Ijen District headed by the commander of Kodim (district military command) 0822 of Bondowoso regency. On January 30, on day after the flood, emergency response activities were carried out with the following work divisions: (a) cleaning of the remaining flood material in the villages of Sempol and Kalisat; (b) activation of SATGAS- POSKO to support activities for cleaning up remaining materials, inventorying, and distributing equipment and assistance.

The duties of the main POSKO were: (a) to record receipt of donations, store logistics, and distribute aids; (b) to operate soup kitchens serving food and nourishments; (c) to carry out cleaning of debris and flood materials; (d) to provide equipment for the cleaning; (e) to maintain security; (f) to provide health assistance for those in need; (g) to assist in visit protocols for inspections by government officials; and (h) to provide information to other stakeholders in the mitigation effort of flood disaster. Meanwhile, cleaning duties were taken care of by the SATGAS, which involve TNI (Indonesian National Armed Forces), Polri (Indonesian National Police), and community members. Cleaning duties were carried out in three sectoral divisions, as seen in Table 2.

Personnel in charge of the POSKO for emergency response included: (a) TNI members, especially from KODIM (District Military Command), (b) Indonesian Navy personnel, (c) Satpol PP (Civil Service Police Unit), (d) Regional Health Office, (e) BPBD, (f) Regional Social Service, (g) Senkom Police Partners (groups in Indonesia that inform and assist the country's security forces and provide information to the public about national security issues), (h) Indonesian Scouts, (i) Banser (Multipurpose Ansor Front – a military wing of the youth organization Ansor Youth Movement affiliated with Nahdlatul Ulama), (j) Kokam (Muhammadiyah Youth Force Alert Command – a military wing of the youth organization of Muhammadiyah), (k) Indonesian Red Cross, (l) Indonesian Amateur Radio Organization, (m) Indonesian Inter-citizen Radio, and (n) Quick Response Team. The POSKO provided 24-hour services divided into three shifts: shift one starts from 06:00 to 14:00; shift two starts from 14:00 to 22:00; and shift three starts from 22:00 to 06:00. Each sector involves approximately 40 individuals per shift.

Table 2.
Individuals involved in cleaning duties

Sector number	Unit involved	Number of person involved	Description
Sector 1	TNI members	60 individuals	Cleaning alleys and houses
	Polri members	40 individuals	
	Local residents	40 households	
Sector 2	TNI members	60 individuals	Cleaning rivers and houses
	Polri members	40 individuals	
	Local residents	40 households	
Sector 3	TNI members	60 individuals	Cleaning alleys and houses
	Polri members	40 individuals	
	Local residents	134 households	

Source: Report of POSKO-SATGAS of Bondowoso Regency BPDB in 2020

To carry out the cleaning process of flood materials that include mud and large trunks that blocked houses, roads, and other facilities (schools, mosques, etc.), the Head of BPBD and the SATGAS Command asked for equipment from related offices and agencies. Some of these offices and agencies were the Public Works and Housing Office (Bondowoso PUPR), Medco Company, Roads and Highway Office, East Java Binamarga Office, East Java Water Resources Office, Pertamina (National Gas and Oil Company), and PTPN XII (National Plantation Company). Upon evaluation of the flash flood management activities, on Monday, February 3 2020, the cleaning for flood materials and debris was completed, and the POSKO and SATGAS were disbanded.

After the recovery, further handling was handed over to the village under the guidance and monitoring from the emergency response task force of the flash flood disaster in Ijen District. In addition, there was still the central POSKO team that distributed aids and donations to villagers, which later distributed them to the victims. Material aids and donations included food, beverages, clothes, and school supplies. In addition, donations came from individual members of the community, private and governmental institutions, companies, and others.

Flash flood emergency response stakeholders identification: Power and interest

The emergency response in handling flash floods involves several internal, external, direct, and indirect stakeholders. According to their position, there are two categories of stakeholder profiles: primary and secondary stakeholders. Primary stakeholders have the authority to induce change, influence policy and its implementation, and configure activities in the emergency response. Primary stakeholders include: (a) local government officials who commit to implementing the regulations in disaster management; (b) officials who take part in the emergency response task force established by the government; (c) the affected village heads and their staffs; (d) head of the district; (e) individuals and government institutions acted as partners of the task force; and (f) residents affected by the floods. Secondary stakeholders include religious leaders, private institutions, individuals, and community members not directly affected by the floods. These secondary stakeholders commonly have the same position and are prepared to join the coalition to support flood disaster management. These stakeholders might come from inside or outside the affected villages.

According to their position, stakeholders involved in handling emergency flood impacts have different levels of power and interest. Stakeholders have the power to influence and manage success in handling floods and their impacts. According to Morgenthau (1997), power is an ability that a person or a group has to influence other parties to get something they are interested in, and it can be achieved with or without force. Regarding handling flash floods in the villages in the Ijen District, power influences the handling of flood disasters, the impact of disaster risks, and others. There are several indicators of stakeholder power, including authority, capability, credibility, capacity, and mass mobilization.

Authority is a power given to individuals or groups in carrying out their functions to take actions, have authority, and make regulations to control others. Capability is the ability of individuals or groups to use their skills to comprehend situations and provide relevant solutions. Credibility is a condition in which individuals or groups are trusted and given responsibility. In this case, the individuals or groups have a reputation for solving problems. Capacity is the ability of a person or group to absorb, analyze, and provide solutions. Finally, mass mobilization is the ability to muster and mobilize many people. Each of the power indicators is measured in Table 3.

Table 3.
Level of power of the stakeholders

Power Indicator					Category level
Authority	Capability	Credibility	Capacity	Mass Mobilization	
√	√	√	√	√	Very high
√	√	-	√	√	high
√	√	-	√	-	Medium
-	-	-	√	-	low

Source: Morgenthau (1997), with adaptation

Based on Table 4, the stakeholders' power index can be summarized.

Table 4.
Stakeholders' power indicators and power index

Stakeholders	Type of stakeholder	Power indicator					Category level
		Authority	Capability	Credibility	Capacity	Mass mobilization	
Governor of East Java	Primary	√	√	√	√	√	Very high
Regent and Deputy Regent	Primary	√	√	√	√	√	Very high
Commander of Military District Command 0822 Bondowoso as the commander of the task force	Primary	√	√	√	√	√	Very high
Regional Secretary of Bondowoso Regency as deputy commander	Primary	√	√	√	√	√	Very high
Bondowoso Regency Police Chief as deputy commander II	Primary	√	√	√	√	√	Very high
Head of the BPBD as secretary I	Primary	√	√	√	√	√	Very high
Administrator of Perum Perhutani KPH Bondowoso as secretary II	Primary	√	√	√	√	-	High
The district head as a field executivew	Primary	√	√	√	√	√	Very high
The police chief as a field executive	Primary	√	√	√	√	√	Very high
The Sub-District Military Commander (Danramil) as a field executive	Primary	√	√	√	√	√	Very high
Assistant for Perhutani as a field executive	Primary	√	√	√	√	-	High
Assistant for Government and People's Welfare of Bondowoso Regency as member	Primary	√	√	√	√	-	High
Head of the Bondowoso PUPR as member	Primary	√	√	√	√	-	High

Stakeholders	Type of stakeholder	Power indicator					Category level
		Authority	Capability	Credibility	Capacity	Mass mobilization	
Head of the Bondowoso Regional Health Office as member	Primary	√	√	√	√	-	High
Head of the Bondowoso Regional Social Service as a member	Primary	√	√	√	√	-	High
Director of Regional General Hospital Dr Kusnadi Bondowoso as member	Primary	√	√	√	√	-	High
Head of the Bondowoso Satpol PP as member	Primary	√	√	√	√	-	High
Director of Bondowoso Regional Water Utility Company as member	Primary	√	√	√	√	-	High
Head of Legal Division at the Regional Secretariat of Bondowoso Regency as member	Primary	√	√	√	√	-	High
Head of the Technical Implementation Unit for Forestry of East Java in Jember as member	Primary	√	√	√	√	-	High
Head of the Prevention, Preparedness and Emergency Division for Bondowoso BPBD as a member	Primary	√	√	√	√	-	High
Head of the Fire and Community Protection Division of the Satpol PP as a member	Primary	√	√	√	√	-	High
Officer of the Operations Section at the Military District Command 0822 Bondowoso as a member	Primary	√	√	√	√	-	High
Head of Operations at the Bondowoso Police as member	Primary	√	√	√	√	-	High
Chief Ranger of Bondowoso Perhutani as member	Primary	√	√	√	√	-	High
Chairman of the ORARI, Bondowoso branch as a member	Primary	√	√	√	√	-	High
Chairman of RAPI, Bondowoso branch as a member	Primary	√	√	√	√	-	High
Chairman of SENKOM, Bondowoso Regency as member	Primary	√	√	√	√	-	High
Five staff from Bondowos BPBD as members	Primary	√	√	√	√	-	High
Disaster Volunteers in affected villages	Primary	√	√	√	√	-	High
Disaster Volunteers from Ijen District	Primary	√	√	√	√	-	High
Village Head and staff	Primary	√	√	√	√	√	Very high
Community leaders	Primary	√	√	√	√	-	High
Social and religious organizations in the village	Primary	√	√	√	√	-	High
East Java BPBD	Primary	√	√	√	√	-	High

Stakeholders	Type of stakeholder	Power indicator					Category level
		Authority	Capability	Credibility	Capacity	Mass mobilization	
National government	Primary	√	√	√	√	-	High
Scouts, Bondowoso branch	Secondary	-	√	√	√	-	Medium
Banser	Secondary	-	√	√	√	-	
Kokam	Secondary	-	√	√	√	-	Medium
Ten members of the Indonesian Red Cross, Bondowoso branch	Secondary	-	√	√	√	-	Medium
Five members of ORARI, Bondowoso branch	Secondary	-	√	√	√	-	Medium
Forty volunteers from Bondowoso District Health Office	Secondary	-	√	√	√	-	Medium
The villages' and district's women's organization	Secondary	-	√	√	√	-	Medium
School teachers	Secondary	-	√	√	√	-	Medium
Employees from private and government companies	Secondary	-	√	√	√	-	Medium
Employees from government offices	Secondary	-	√	√	√	-	Medium
NGOs	Secondary	-	√	√	√	-	Medium
Religious Social Organizations	Secondary	-	√	√	√	-	Medium
East Java provincial government	Primary	√	√	√	√	-	High
Others (individuals, social organizations inside or outside Bondowoso)	Secondary	√	√	√	√	√	Medium

Source: Primary data in 2020

The power index of the stakeholders in emergency response of flash flood handling in Bondowoso is analyzed at 74% on the Likert Scale. Thus, the power index can be considered high. This high power index indicates that the stakeholders took their role and responsibility seriously and performed their tasks very well, according to their positions and obligations. Local, provincial, and central governments have performed very well by establishing the SATGAS-POSKO. As a result, they managed to optimally carry out their duties and responsibility in handling the flash floods in Ijen.

Flash floods in Ijen District had caused estimated damage of IDR 1,795,433,600, and in order to analyze the casualties, fortunately, there was nothing. In response to this, East Java Governor, through Governor's Decree, ordered the Provincial BPBD to provide financial aid. Then, through Provincial BPBD Letter Number 360/370/208.3/2020, financial aid of approximately three billion rupiahs was donated to the Bondowoso BPBD on February 24, 2020. The money was distributed through budget transfer to Bondowoso PUPR, Bondowoso Regional Social Service, and Bondowoso BPBD.

In addition to power, the stakeholders also have an interest in dealing with flash floods to not bring more severe risks. According to Bryson (2004), interest is the will or desire individuals or groups have out of an activity. The indicators of interest are expectations, aspirations, and potential benefits. The following Table 5 highlights stakeholders' interest in flood disaster management.

Data highlighted in Table 5 was then calculated using the Likert Scale and generated a result of 0.94, or 94% of the total. This number indicates that the stakeholders generally have a very high interest. It means that the emergency response of flood disaster handling in Ijen District is managed properly,

and the community members affected by the disaster can once again carry out their usual activities through the support of these partners. There was even supports coming from neighbouring villages and communities. One example is a donation of cement to rebuild the damaged houses and infrastructures.

Table 5.
Stakeholders' Interest Indicators for Flood Disaster Emergency Response

Stakeholders	Type of stakeholder	Interest indicator			Category Level
		Expectations	Aspirations	Potential benefits	
Governor of East Java	Primary	√	√	√	Very high
Regent and deputy regent	Primary	√	√	√	Very high
Commander of Military District Command 0822 Bondowoso as the commander of the task force	Primary	√	√	√	Very high
Regional Secretary of Bondowoso Regency as deputy commander	Primary	√	√	√	Very high
Bondowoso Regency Police Chief as deputy commander II	Primary	√	√	√	Very high
Head of the BPBD as secretary I	Primary	√	√	√	Very high
Administrator of Perum Perhutani KPH Bondowoso as secretary II	Primary	√	√	√	Very high
The district head as a field executive	Primary	√	√	√	Very high
The police chief as a field executive	Primary	√	√	√	Very high
The Sub-District Military Commander (Danramil) as a field executive	Primary	√	√	√	Very high
Assistant for Perhutani as a field executive	Primary	√	√	√	Very high
Assistant for Government and People's Welfare of Bondowoso Regency as member	Primary	√	√	√	Very high
Head of the Bondowoso PUPR as member	Primary	√	√	√	Very high
Head of the Bondowoso Regional Health Office as member	Primary	√	√	√	Very high
Head of the Bondowoso Regional Social Service as a member	Primary	√	√	√	Very high
Director of Regional General Hospital Dr. Kusnadi Bondowoso as member	Primary	√	√	√	Very high
Head of the Bondowoso Satpol PP as member	Primary	√	√	√	Very high
Director of Bondowoso Regional Water Utility Company as member	Primary	√	√	√	Very high
Head of Legal Division at the Regional Secretariat of Bondowoso Regency as member	Primary	√	√	√	Very high
Head of the Technical Implementation Unit for Forestry of East Java in Jember as member	Primary	√	√	√	Very high
Head of the Prevention, Preparedness and Emergency Division for Bondowoso BPBD as a member	Primary	√	√	√	Very high
Head of the Fire and Community Protection Division of the Satpol PP as a member	Primary	√	√	√	Very high
Officer of the Operations Section at the Military District Command 0822 Bondowoso as a member	Primary	√	√	√	Very high
Head of Operations at the Bondowoso Police as member	Primary	√	√	√	Very high
Chief Ranger of Bondowoso Perhutani as member	Primary	√	√	√	Very high
Chairman of the ORARI, Bondowoso branch as a member	Primary	√	√	√	Very high
Chairman of RAPI, Bondowoso branch as a member	Primary	√	√	√	Very high
Chairman of SENKOM, Bondowoso Regency as member	Primary	√	√	√	Very high
Five staff from Bondowos BPBD as members	Primary	√	√	√	Very high
Disaster Volunteers in affected villages	Primary	√	√	√	Very high
Disaster Volunteers from Ijen District	Primary	√	√	√	Very high
Village Head and staff	Primary	√	√	√	Very high
Community leaders	Primary	√	√	√	Very high
Social and religious organizations in the village	Primary	√	√	√	Very high
National Government	Primer	√	√	√	Very high
Scouts, Bondowoso branch	Secondary	√	-	√	High

Stakeholders	Type of stakeholder	Interest indicator			Category Level
		Expectations	Aspirations	Potential benefits	
Banser (Barisan Serbaguna)	Secondary	√	-	√	High
Kokam	Secondary	√	-	√	High
Ten members of the Indonesian Red Cross, Bondowoso branch	Secondary	√	√	√	Very high
Five members of ORARI, Bondowoso branch	Secondary	√	√	√	Very high
Forty volunteers from Bondowoso District Health Office	Secondary	√	√	√	Very high
Private companies	Secondary	√	√	-	High
State-owned companies		√	-	√	High
School teachers	Secondary	√	√	-	High
The villages' and district's women's organization	Secondary	√	-	√	High
Employees in Government Offices	Secondary	√	-	√	High
Individual Donors	Secondary	-	√	√	High
NGOs	Secondary	-	√	√	High
Villagers affected by the disaster	Secondary	√	√	√	Very high
People of neighbouring villages	Primary	√	√	√	High
Others	Secondary	-	√	√	High

Source: Primary data in 2020

The national, provincial, and regional governments, which are part of the SATGAS-POSKO, also have a very high interest. This involvement of all layers of government enables disaster handling to run well. It also creates a good image that shows that the governments work together and work hard in dealing with the disaster. Such disasters also raise a warning to the governments that they need to properly monitor and protect the condition of the environment, prohibiting land clearing on mountain slopes. The disaster also raises awareness among the villagers that they need to protect the mountain slopes.

Figure 3.
Embankments to protect the villagers' house

Figure 4.
The repair process of houses and toilets

Figure 5.
The damaged, clean water supply center

Figure 6.
A house buried in sand and abandoned by the owner

Source: Figure 3, 4, 5, and 6, are primary data in 2020

Though it may be devastating, flash floods in Ijen district had become evidence of care and compassion, with communities inside and outside of the village coming together and helping each other. Until August 2020, observation shows that some villagers are still staying in with their relatives at the neighbouring villages unaffected by the floods. They can still not return to their homes because the cleaning process has not been completed yet. The following are examples of a house buried in sand, mud, and other debris from the floods.

The recovery process has not been completed since some cleaning and rebuilding still need to be done, as shown in the picture (see Figure 3, 4, 5, and 6). Additionally, the COVID-19 pandemic also disrupts disaster management and recovery. However, Bondowoso district government continues to monitor the affected area to minimize the possibility of any new risk or problem. One attempt to monitor and sustain the recovery process, under the coordination by Bondowoso BPBD, is establishing Disaster resilient villages. The government also provide shelters to house victims who have nowhere else to go, commonly because they do not have relatives living nearby. These victims are also still mentally and socially traumatized. They evacuate to their relatives or to the POSKO whenever there are heavy rainfalls.

As have been mentioned before, care and sympathy for the victims can easily be observed. Donations, assistances, and aids are coming from individuals and institutions, NGOs, religious organizations, and social organizations. The donations are in forms of food, beverages, clothes, building materials, school supplies, and others. Even until the disbandment of SATGAS-POSKO, donations are still coming.

Conclusion

The flash flood disasters in villages of Ijen District that occurred on January 29, 2020 and March 13, 2020 damaged houses, animal shelters, school buildings, mosques, churches village roads, and plantation areas. The loss was estimated at IDR 1,795,433,600. Several factors, including a caused the flash floods (a) high rainfall, (b) changes in the environmental condition on the slopes of Mount Ijen, and (c) changes in farming patterns, from perennials to seasonal horticultural crops. As an emergency response for handling the flash floods, a SATGAS-POSKO was established in Ijen District, Bondowoso regency, according to the Regent's Decree Number 188.45/267/430.4.2/2020 dated January 29 2020. The SATGAS framework involved several government offices, private institutions and organizations, and local communities that enable the handling and management to run well. The stakeholders worked together and availed financial support from the Provincial and the central government.

These stakeholders have power and interest. From a Likert scale calculation, the power index has a value of 0.74. This shows that the power of stakeholders is high, meaning that they have worked well according to their authority, capability, credibility, capacity, and ability to mobilize the masses in performing their duties. However, some improvements need to be made to fulfill the disaster management. One example is the improvement in equipment and facilities of BPBD's quick reaction team so that they can provide timely and quality assistance during disasters. The stakeholders' interest index also shows a very high number was around 0.94. This means that the stakeholders have a very high interest in emergency response to flash flood disasters in Ijen. They hoped that the impact of the floods could be handled properly and residents' activities would recover soon. However, until August 2020, several houses were still submerged in mud, forcing the owners to find somewhere else to stay. Due to these situations, owners were moved to their relatives in neighbouring villages. Other public facilities, such as toilets and water supply centres are also still waiting to be repaired. Unfortunately, the COVID-19 pandemic has forced the government to shift its focus and resources to fight the pandemic.

Flash floods in Ijen District become a lesson to the surrounding village communities and the local government to protect the environment on the slopes of the mountains. The study's findings have some recommendations that would be the replanting of perennial plants and trees on covering the mountain slopes.

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