Community Movement and Communication for Anticipation of Volcanic Eruption and Covid 19

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Abstrak

For many years, people are finding ways in anticipating disasters such as volcanic eruptions that happen frequently in Mount Merapi Area. Many early warning systems had been installed; however, casualties still took place. This study examined the community's expectations of and responses to disasters, considering the resilience of people in the affected area. Through this research, the researcher would like to know how the Merapi slope community communicates and anticipates disasters in a better way than in the past. The paper analyzes the concept of online and offline communities and the Social Construction of Technology (SCOT) while summarizing recent applications in the theory and practice of community movement and communication. A qualitative ethnography approach was used as a research method, and data were collected using in-depth interviews and participatory observation. The research results showed that this community movement for evacuating refugees spread fast because it was supported by the strong local cultural-based values and social construction in communication technology. These local values also helps significantly during the Covid-19 pandemic in 2020. Although the communication within an online community acted as an accelerator, the combination of online and offline communities created a much more responsive, coordinated, and durable social movement. From the theory perspective, the local community engaged in the social construction of technology in using tools for disaster management.

Keywords: *offline and online community, social movement, COVID-19 pandemic, social construction of technology*

INTRODUCTION

The world's largest island nation, Indonesia, which is situated between the Indian and Pacific Oceans, frequently suffers the consequences of numerous natural disasters, including earthquakes, tsunamis, and volcanic eruptions. Since the 2004 tsunami, Indonesia has seen at least one significant natural disaster every month on average, including earthquakes, tsunamis, volcanic eruptions, and climate change-related events. Since the 13th century, when earthquakes and volcanic eruptions were first documented, Indonesia has struggled to deal with the effects of natural calamities. The people of Indonesia have experienced numerous natural catastrophes, including over a dozen

significant natural disaster events in the past 30 years, just from 1990 to the present (OCHA, 2020)

The area around Mt. Merapi in Central Java, Indonesia, was subjected to a string of intense volcanic eruptions between October 26 and November 5 of 2010. These eruptions eventually led to frequent ash and lava discharges as well as the development of massive eruption columns that sent many pyroclastics flows onto densely inhabited areas situated along the volcano's slopes. Along with the seismic activity, there was intense rainfall that led to lahars, which may be quite dangerous. The 1872 Mt. Merapi eruption, which had previously been this volcano's greatest recorded eruption, was smaller in scale than the 2010 Mt. Merapi eruptions. The Indonesian government issued evacuation orders affecting 19,000 people before the start of these eruptions, raising the alert to its maximum level (Muir, J.A. et al, 2020). After large eruptions in 2010, 2013, and 2018, Merapi was active again in March 2020, which led to people's evacuation.

Simultaneously, the COVID-19 pandemic was confirmed to have spread to Indonesia, causing large-scale social restrictions (Bean, 2020). This was a complex problem for refugees leaving their homes and being vulnerable to the disease. In response to this situation, a large-scale social movement was taken to resolve these problems.

Taking examples from Japan as a country that is always prepared for disasters (Susilo.D., et al, 2020), communities in Indonesia must take action, and local people in the Mount Merapi area since 2010 had initiated a social movement. The movement in this context reflects people's efforts in form of people mobilization in organizing collective action to anticipate disaster. Combining the movement with the rapid development of technology, expectantly more people can be saved and society can prepare for potential catastrophe. The technology in many forms has been utilized in Hurricane Katrina, USA (Dimitruk, 2007), Turkey (Korkmaz, 2010), Chennai Tamil Nadu, India (Kuppuswamy, 2012), Nepal (Gautam, D., Prajapati, J., Paterno, K.V. *et al.*, 2016), and Pacific Islands (Hills, J. M., Michalena, E., & Chalvatzis, K. J., 2018), South Africa (2022) and Zimbabwe (Chiimba, E. G. & Verne, J., 2022) among others.

In the past, a social movement that uses technology has driven the formation of the online and offline community which is called *Jalin Merapi* (Merapi Pass Information Network) started in 2010 (Anam, 2011). Unlike a community that faced the L'Aquila earthquake in 2009 and it was liquified in 2014 (Tomassi and Forino, 2019), the community movements in Merapi continued in 2020 in response to both frequent eruptions and the Covid 19 disease. These rural communities around the slope of Merapi comprise volunteers, NGOs, and donors leading the social movement based on local cultural values. In the Indonesian context, the study of the way people construct technology to form online and offline communities related to social movement participation is relevant and important. It is not merely about knowledge; this study is also necessary to help solve the community's social problems. Research on how local people combine movements and technology is worth studying. This research aims to explain the form of integration among offline and online communities, social movement, and social construction on technology in anticipation of

double disasters. The study has implications for the development and improvement of people's lives. This research fulfills an identified need to investigate the effectiveness of a local community movement for evacuating refugees using its local value-based technology in response to the disaster.

Faas and Marino (2020) stated that the community could be an inspiration to signal pathways to the good and unmapped routes. Van Dijk (2006) stated that a community group is divided into organic or physical *offline* communities and virtual or *online* communities. The organic community is bound by time, place, and natural environment, and it relies on the physical contact of human beings. This community is characterized by face-to-face communication, and it has a specific structure and activity in terms of organization, language, and way of interacting. This community is relatively stable with a lot of short and overlapping communication lines and common activities. Barnard (1966) stated organic community was the irreducible unit of society, and in which social arrangement instead of individual flexibility constituted the foremost fundamental and motivational esteem-quickening society. Kingston (2020) also argued that an organic/physical community is a group of people living in the same place or having a particular characteristic in common.

The term *online* community or virtual community was started by Rheingold (2000). Twenty years later, Zoé and Permentier (2022) still argued that an online community is a group of people who connect regularly within a digital exchange environment where they can share, create, and meet, and who are organized around a shared interest. Online communities are the activity, participants, surroundings, and organization of their mode of life. A community can take many different forms, with its online deployment being just one of them, even though it significantly affects how well it performs and functions.

In addition, Agostini & Mechant (2019) argued that a virtual community is a total of people and/or trade accomplices (in association with one or more organic communities), that interact on a shared (or complementary) interest and in which the interaction is actualized by a common language and inevitably a conceivable common paralanguage, driven by a few conventions or shared standards. This is realized at the slightest in part in a computerized common space and is backed and/or facilitated by the Web or another ICT framework (which can be synchronous, asynchronous, or hybrid). In a virtual community, users' desire to contribute knowledge may increase if they feel trusted by the community, ensuring the smooth development of knowledge exchange and sharing, which is also the basis and source of the existence and growth of online communities (Renqiang and Wende, 2022). Furthermore, offline and online communities had showed that both were connected for certain purposes (Al-Saggaff, 2004; Nip, 2004; Zhang et al, 2011, Waldron, 2012; Materia, 2014; Mirlohi et al, 2019)

Social Construction of Technology (SCOT) was coined by Trevor Pinch and Wiebe Bijker (Humphreys, 2005). Both argued that social groups give sense to the technology and outline the problems in the setting of implication placed by a social group or a mixture of some groups. Pinch and Bijker perceived that the technical characteristics of technological

artifacts is formed by the social environment. Together with the emphasis on social shaping, technological determinism was rejected (Bijker, Hughes & Pinch, 1987: 12, Bijker, 2015). According to Bijker (1987), the reason for the social construction development of technology is that most people will lose the opportunity to participate in decision-making without the existence of a constructivist view of socio-technical development that allows for different choices. Finally, the technology will be almost impossible to control. (Bijker 1995a: 281). Constructivist scholars argue that inventors and other different groups play an important role, and also affect technology development. Technology, according to scholars, is a social construct. Trevor Pinch and Wiebe Bijker (Bijker, 1987) discussed this idea in the Social Construction of Technology (SCOT). Both explained that many relevant social groups (RSG-relevant social groups) are involved in the technology design, development, and implementation (Martinez, 2010).

Martinez (2010) stated Pinch and Bijker's major contribution to science and technology is that the two scholars revealed (*demystify*) the mysterious ideas of the inventor who occasionally produces something problematic to control by individual or society. In response to this, both believed that technology development is a more multifaceted process. Therefore, a multi-linear model was developed by Pinch and Bijker based on the idea that technology establishes society, but society also establishes technology. Because many players are involved, SCOT explains why some variants of technology become extinct, and other technologies survive. Both noted that social groups understand technology differently, which affects its construction (Martinez, 2010).

Technology can refer to many things, and concepts such as technology changes and technological development often bring many interpretations. According to MacKenzie and Wajcman (1985), the term technology has three meanings. The first meaning refers to physical objects or artifacts, such as bicycles, lamps, or other objects. The second meaning denotes the level of activity or process, such as steelmaking or welding. The third meaning denotes the level of knowledge known by man, such as '*know-how'* used to create something. In reality, the three meanings are intertwined and difficult to separate. The elements of the SCOT theory are defined below.

The first element is Relevant Social Groups, which refers to the institution or organization comprising individuals who may or may not be organized. The primary key here is to share a series of the same and related meanings with a specific artifact. The second element is Interpretative Flexibility. In SCOT, the technology artifacts are built and culturally interpreted. In other words, there must be flexibility in interpreting technology artifacts. This means that people view, interpret, and design artifacts flexibly. When social interaction mediates all the relevant groups to reach an agreement, such as negotiation, and an artifact no more entails the design and further development, a technology reaches stabilization and closure. The third element, Closure, in technology involves the stabilization of an artifact and problem resolution. To settle the technological controversy, the problems should be solved first. The key is whether the relevant social groups can identify the problem and resolve it by rhetoric or by redefining it. The SCOT model proposes that the negotiations between different groups are often used to construct an

artifact. The model illustrates the need to account for the socio-political context when analyzing technology. Last element is Wider Context. The task here is to study about technology artifacts within a wider context within the socio-political field. It's not much discussed in science cases, but the SCOT theory - describing the technology artifacts by specializing in the group's value - can clarify the political and socio-cultural situations of a social group's norms and values, which confirm the importance of an artifact (Martinez, 2010). Since we already know that different meanings can form different development paths, the SCOT descriptive model can operationalize the link between the external environment and also the actual technology content (Pinch et al.: 46).

This research emphasizes the importance of disaster and pandemic anticipation by local people in the Mount Merapi area. The use of technological communication tools was examined to show how the technology is constructed by society together with a combination of local values that drive social movement. For years, a social movement has created a more resilient community (Kang, Moon, Kim, and Chung, 2022) and the same approach is studied in this research both for disaster management and covid-19 pandemic anticipation.

METHODS

This research used the constructivist paradigm. Trevor Pinch and Wiebe Bijker agreed to cooperate because both were interested in the constructivist approach to technology and contribute with an integrated social constructivist approach in social and technology science studies (Bijker, 1987). This research utilized a qualitative-ethnographic research method. In-depth interviews and participatory observation were carried out to collect the data. The contents of social media texts, such as mailing lists, sites, blogs, Facebook, and Twitter, were analyzed through participatory observation. Regarding the goodness criteria in qualitative research, Patton (2002:245) mentioned that validity, meaningfulness, and insight rather than just sample size should be considered to obtain rich and reliable information.

Data of Informants

Occupation	Number of People
Youth leader in Deles Hamlet Klaten Regency, LM radio owner	1
MMC Merapi Radio Coordinator	1
Coordinator of Combine Resource Institution (NGO)	1
Staff of Combine Resource Institution	1
Coordinator of Jalin Merapi	1
Head of Village in Cangkringan, Sleman, Jogjakarta	1
Culturalist, humanist, local music artist	1

RESULT AND DISCUSSION

Local values around the Merapi slope community

In the field observations, the social problems and anticipations reflect Javanese culture's values and ultimately encourage social movements in the Merapi slope. The 5 (five) values recorded in the Merapi eruption management in 2010 and 2020 in the regions observed are as follows. The first is Sambatan (Mutual Cooperation). Consistent with Javanese culture and values, local villagers, informal leaders, and volunteers noted the cooperation of the Merapi eruption management in 2010. Solid cooperation was formed because of the experience of managing the Bantul earthquake in 2006. The separation of northern Jogjakarta accommodating modern culture and the southern part of Jogjakarta supporting the local culture proved successful during the Bantul earthquake in 2006. In the past, the 'north' community has been allowed to live in a modern environment but responded to a call to spontaneously help families in the south region whose homes had been destroyed in Bantul (the south part of Jogjakarta) by sending 300 trucks for housing rehabilitation. The fast response was also reflected in Merapi in 2010 through the movement of various elements in the society such as Jalin Merapi, Paguyuban PASAG (*Paguyuban Siaga Gunung* – Mountain Alert Group) Merapi. The south part of the Jogjakarta community assisted distressed families in the northern part of Jogjakarta without the leader's orders. In 2020, a Sister Family program (*Paseduluran Keluarga*) was developed in response to a volcanic eruption by allocating refugees to new families in a different area. Although these families did not know each other, mutual understanding was built. The house owners shared food and other necessities with the refugees.

The second value found in this research is independence. People in Jogjakarta and Merapi slope are also known for independence in dealing with everyday problems. Limited government support in providing facilities in the past has built resilience in the face of difficulties. For example, the lack of public transportation and access to Jogjakarta and the surrounding of Merapi was diminished with the use of private bicycles and motorcycles. This independent culture has been rooted in society for a long time, led by informal leaders and supported by many community members.

The third local value is non-materialism. The Java community on the Merapi slope does not measure wealth by money or possessions but by harmony and no conflict in society. To help a person, Jogjakarta people often do it without ulterior motives. In the disaster anticipation context, non-materialism is also reflected in the amount of money and goods even coming from people who are still in need. If those people are unable to help financially, all are more than willing to help with energy.

Resignation to Mother Nature is the fourth value. The resignation value in Javanese culture is still much reflected in the population of Mount Merapi slopes. Locals did not view the Merapi incident as a disaster. Instead, the majority of the people perceive it as a routine occurrence by mother nature that requires locals to move temporarily, as has done for generations. This kind of anticipation helped many post-disaster recoveries, and it was very useful in the smooth cooperation with other parties.

The fifth local value is spontaneity. The spontaneity values arising during the Merapi eruption management in 2010 were unique. The number of volunteers coming from all regions and levels in Indonesia without ulterior motives was astonishing. Often, these groups sacrificed almost anything for helping families in distress. A sense of ownership and diversity of cultures exist in Jogjakarta, and the environment itself also encouraged the community's spontaneity. The values above are still preserved in the Merapi slope community, and all encouraged the formation of the PASAG (*Mountain Watch Society)* Merapi community.

The formation of the community movement

Area of Deles hamlet, Sidorejo village, Kemalang sub-district, Klaten Regency. The lack of information, which the current government of New Order controlled, initiated the villagers' movement to obtain information about the disaster. The information was available only through Handy Talkie which only the head of sub-district, police, or citizens belonging to amateur radio organizations could use. The limited access hindered anticipatory action when there was a disaster. Finally, Sukirman, a youth leader in Deles hamlet, Sidorejo Village, Kemalang sub-district, Klaten regency, set up a community radio named Lintas Merapi FM to provide the much-needed information. He soon invited his colleagues and eventually established a network in four districts and on the Merapi slope named PASAG (association of Mount alertness) community Merapi (offline communities). Since then, this radio broadcasts regular information about volcanoes in between music programs to inform the listeners about how to rescue and live in KRB (Disaster Prone Region) and how much time is required to evacuate, among other topics. The station also educates the people about different types of volcano eruptions. This information is broadcasted randomly rather than at a particular time to prevent the listeners from changing radio channels during certain hours devoted to information or news. Since this approach was more effective and informative, state radio started to imitate it.

The principles of this radio management were transparency and honesty to gain support from the population. This community followed the "*Kudu tandang, ora kudu kondang*" principle, which means duty must be accomplished with no compliments required. Besides conveying information, this community also designed an activity named Merapi Training Camp, training 3,600 members in disaster preparedness and the population in other mountains in Java. This was done without excessive publicity.

Area of Samiran village, Selo sub-district, Boyolali regency. A community radio established by the PASAG Merapi community, named MMC Merapi, also served as an online community on Facebook and Twitter and an offline community through handy talkie and mosque speakers. Based on the Merapi eruption experience, many things had to improve, such as media education to provide accurate information. Sinam, a community radio leader, highlighted a fatal mistake by one of the private televisions mentioning that the hot cloud had reached 6 km of Kaliurang. The distance in kilometers was counted from Jogjakarta city's center, instead of from the mountain's peak. Thanks to this misleading information, people panicked, which led to many injuries.

Besides, the PASAG community also tried to preserve the local culture by participating in a habitual activity, such as Nyadran, a home visit to maintain the relationship between villagers and ensure future cooperation. The activity helps anticipate disaster because one key to successful evacuations is communication among community members. This communication was more effective than the communication using Gong or Siren, which was more likely to cause panic.

Tegalsari village, Dukun sub-district, Magelang regency. KFM community radio in this district focuses on community empowerment by preserving values such as respect for mountains and its environments. The most important thing is that the community knows the measurements to be taken when Merapi's status changes. This custom was carried out for generations because the community prefers to reconstruct rather than relocate. After all, many villagers prefer to stay in the area whatever happens. In the past, natural signs of when Merapi was going to erupt included herds of animals going down the mountain. Now, fewer animals can be seen, and the community must discover solutions in form of an early warning system. Unfortunately, for years, the government support for information dissemination was not adequate, and finally, the community had to take matters into its own hands.

From Local Value-Based Social Movement to Community-based Communication
In its development, the Merapi slopes community, particularly PASAG (*Paguyuban Siaga Gunung*-Mountain Alert Group) Merapi, tried to solve the problem by reconstructing its own low technology and integrating it with other technologies. This effort was quite urgent, considering Merapi to erupt soon. Since 2006, these groups regularly conducted training, which continued in 2010 and 2020 in response to Covid 19 and the volcanic eruption. PASAG Merapi community members developed this 'rural technology' in anticipation of Mount Merapi without relying on the government. According to Djaduk Ferianto, a humanist, the 'local value-based' definition of technology in the context of Merapi integrates the following:

Face-to-face and word of mouth. Face-to-face communication in disaster anticipation has been done for generations by notifying the nearest neighbors of the steps to be done. Someone who knows the current situation goes around the village and informs homeowners to take certain steps to take the safe way to evacuate. The advantage is that it prevents panic; however, it cannot reach many people quickly.

Mosque loudspeakers. This tool is usually used as a caller for moslem prayers. In the disaster situation, it was socially constructed to be an early warning notification since this tool effectively notifies 500 people at one time from one place. At the same time, it also provides guidance when making a secure path away from disaster. Steps to be taken by the people to evacuate can be heard slowly and they do not trigger panic. Ironically, there is frequent electricity failures during a disaster, so the speaker sometimes does not function as expected.

Kentongan, a kind of gong from bamboo, is also a communication tool utilized in villages to inform about the village incident, for example, to gather people or inform people in case of a theft. In the context of a disaster, this gong triggers panic as people start running around anxiously and aimlessly. The kentongan contributed to many accidents, as people panicked and try to escape quickly. In some villages on Merapi slopes, the use of this tool in a disaster has been forbidden.

The mobile phone is the most popular tool for exchanging communication during volcanic eruptions in 2020, including studying from home because of the Covid-19 pandemic. In the same year, the government allocated 50 GB of data for free to every student's registered number studying at home. However, this tool's weakness is not all telecommunication providers have a powerful signal in the mountains, so the information is limited to mobile phone users using a specific card operator.

Handy Talkie (HT). This device is a reliable communication tool capable of reaching an area with a radius of 3 km, depending on the contours of the earth's surface. In Merapi slopes, however, its range is further reduced due to the hilly landscape. Thus, several towers with signal amplifiers were installed to improve the coverage. Furthermore, HT is a low-cost device for reporting events in real time and is relatively easy to use. In response to Covid-19 in 2020, a handy talkie replaced mobile phones to submit and receive educational materials if the connection was disrupted due to the volcano eruption.

A radio transmitter has been used for a long time, even before television. Information is broadcasted randomly and continuously in houses while people are doing other jobs. No commercial radio transmitter is available in mountainous areas for commercial reasons, namely the number of populations and limited transmitting power. In addition to commercial radios, community radios were established per the request of residents. The radio transmitter was then built on the Merapi slope, although with limited funds. The community radio frequency is limited from FM 107 to 108 Mhz in accordance with government regulations. Finally, in 2006, three community radio stations, namely Lintas Merapi (Klaten), KFM (Magelang), and MMC (Boyolali) from Merapi PASAG, agreed to work together to form an integrated information and communication network. As an entertainment media in the past, the radio station then was socially constructed also to be an effective tool for educating people on volcano activities and early warning during the disaster. These radio activities significantly helped people evacuate from dangerous zone.

Internet (website, Facebook, and Twitter. This technology requires a computer with a modem or smartphone. Internet websites like FB and Twitter are used during the eruption of Merapi to update a current condition of a region, request assistance, request volunteers, aid allocations, and allocate volunteers.

The Unity of offline and online communities in mobilization

In anticipation of the Merapi disaster between 2010 and 2020 and in response to the Covid-19 pandemic, all tools and technologies were finally used simultaneously. During the Merapi disaster in October 2010 and November 2020, a massive social movement in form of Sambatan (mutual cooperation) to evacuate refugees was developed integrating various technologies. In areas surrounding Merapi, additional observation posts or self-help facilities were built by villagers to monitor Mount Merapi's activities. These post guards are equipped with a handy talkie to provide information to community radio. The radio announcer then broadcasts the latest information, and the listeners forward it through mosque loudspeakers. These ways were proven to be effective in evacuating refugees to safe places.

In anticipation of a greater disaster, the radios joined PASAG Merapi (*offline community*) to establish communication with Jalin Merapi (online community) to provide more current and effective information. This cooperation succeeded because PASAG Merapi has a strong mass base (offline) but less access to media, while Jalin Merapi has strong access to media but a weak mass base. This synergy is also effective in coordinating motivated volunteers with different time availabilities. The cooperation of community radio and Jalin Merapi is also beneficial for building trust with donors who often provide financial assistance. By directional allocation, all aid can be reported and accountable.

DISCUSSION

The social movement phenomenon to evacuate refugees above can be explained using some elements of the *Social Construction of Technology* theory.

Relevant Social Groups(RSG). The community forum named Paguyuban Siaga Gunung (PASAG) Merapi was established for the community on Merapi Slope in the form of social groups (*social relevant groups - RSG*) comprising the head of hamlet, community leaders, youth leaders in 10 villagers, and two regencies willing to solve the arising problems. The group goals are to exchange information and promote solidarity among people in anticipation of Mount Merapi's eruption. The groups also have different goals. For example, the head of Hamlet's group must keep people safe during a disaster. Community leaders lead the people to be ready in facing disaster, while the group of youth aims to use the knowledge to manage agriculture, maintain proper land utilization by villagers (a problem related to the National Park of Mount Merapi), and prepare the people to face unexpected events. The three groups share the meaning of technology artifact by know-how to respond to the disaster. During the Merapi eruption in 2010, these groups expanded to include NGOs, refugees, volunteers, government, and donors.

The second element, Interpretive flexibility, was found when the technology artifact was constructed and interpreted including the change of some tools from its initial use such as mosque loudspeaker and radio station. The SCOT theory explains that the groups have different interpretations of an artifact to serve a purpose. In the disaster response study, *interpretive flexibility* was observed from the groups: the youths, community leaders, donors, NGOs, and government.

Meanwhile, an NGO, in this case, CRI (*Combine Resources Institution*), saw that locally based disaster response technology was necessary to be followed by aid search for donors to help coordinate the allocation by volunteers to the refugees. CRI also developed a *media cent*er as a disaster information network named Jalin Merapi. This media provides real-time information that is uploaded to social media such as websites, Facebook, and Twitter. Donors and aid coordination urgently need this information to support people in the field. On the other hand, the central government back in the 90s saw that the community wanted sirens as the early warning tool, and are activated as needed. However, the government bureaucracy took a long time to take action, which was catastrophic.

The third element was elaborated in the sense that SCOT explains that *closure* is achieved when the problems that groups face are solved. According to this theory, to achieve closure, the relevant groups use rhetorical resources to achieve an alliance with those who have similar views or to redefine the problems to obtain a common solution (Martinez, 2010).

In this process, the youth and community leader groups, PASAG Merapi, the online community, and Jalin Merapi (Inter Merapi network) utilize a combination of changed use of classic technologies (mosque loudspeakers and radio station) to direct evacuation,

transitional technologies (handy talkie, radio, and mobile phone) to distribute the newest information in the disaster area, and contemporary technologies (Internet, Facebook, and Twitter) to distribute information and assistant with aid coordination.

Wider Context, the fifth element, was examined when the political-social context of each relevant technology group has a big effect on norms, values, and meanings given. Here, the youth and community leader groups joined in PASAG Merapi to help local villagers anticipate the Merapi disaster. These big communities no longer depend on government evacuation but become independent with the help of Merapi slope villagers.

CONCLUSION AND RECOMMENDATIONS

Local values such as *Sambatan* (mutual cooperation), independence, non-materialism, resignation to mother nature, and spontaneity can support community participation in forming a social movement to solve problems. Among the modern values, such as individualism and materialism, the Merapi slope community can still maintain and utilize local, more traditional values. Cooperation, independence, non-materialism, resignation to mother nature, and spontaneity are local values that motivate residents to form and maintain social movements.

The online social movement for evacuating refugees will only be strong with the support of an offline community. The online community is merely a tool for information dissemination, but the two communities produce a more responsive, coordinated, and long-lasting social movement. The local value-based communication technology can be integrated with modern communications technology to improve the cooperation between the online community and offline community handling the Merapi eruption. In practice, this kind of cooperation is even more effective and faster than government assistance. The SCOT theory can explain the local community's disaster anticipation. However, the theoretical implication of this discussion is a critique to SCOT's idea that technology and society establish each other while the findings show only society that establishes technology. As the use of SCOT theory in western countries, focuses on creating technological innovation as a tool, this theory in Indonesia can also change the use of current artifacts. On the other hand, this theory application in Indonesia also proves one of the technical definitions referring to the 'way of doing things or 'know-how' (Mackenzie et al.).

Recommendations

The government must support the self-help community efforts to establish information networks, such as community radio and other community initiatives. The government has to foster and protect such efforts, ultimately easing the government's burden in undertaking disaster management. This kind of social movement for evacuating refugees can be replicated in other areas with modifications to suit local values. It is necessary to

encourage dialogue between the government, local communities, and the informal leader directly involved in disaster management. It can be said that informal leaders who represent the communities sometimes have more influence and gain greater trust from the public. From the 2010 lesson, the government made some improvements in 2020.

Concerning the devices, the government should review the use of sirens in disaster anticipation since these tools often cause casualties due to rising panic. If the government keeps the siren, the public must be notified that the device can only be used for non-instantaneous disaster warnings, like cold lava mudflow. For immediate early warning, the government must cooperate with the local community that is more familiar with the disaster.

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