

# **Crisis communication capacity for disaster resilience: Community participation of information providing and verifying in Indonesian volcanic eruption**

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Strengthening community capacities is important to significantly increase community resilience after a shock. In the phase of disaster resilience, relief activities generally are focused on aid distribution, physical and economic recovery to stabilize the affected community. Yet, building the community capacity for crisis communication has not been prioritized; meanwhile it can accelerate the social capital in disaster resilience. By selecting Jalin Merapi (Merapi Circle Information Networks) in the 2010 Merapi eruption as a case study; this study captures how local communities can empower themselves through participation in providing, sharing, and verifying the information within their social network. Data has been collected by in-depth interviews with the local communities' members and focus-groups with appointed officials in Merapi volcano. Jalin Merapi has developed a collaborative system with community radio stations and local communities as reliable information sources and direct verifiers. A media convergence of 14 communication technologies enables a broad spread of information about refugees' real needs within and beyond the local communities. As the result, the refugees could receive adequate aid based on their current situation and culture. Hence, they can quickly recover themselves and furthermore foster the resilience process within the affected communities in general. Finally, this study is trying to acknowledge the challenges for strengthening the community capacity for crisis communication with bottom-up approaches, based on their knowledge and vulnerabilities in disaster resilience.

*Keywords: ANZTSR 2014, community capacity, community radio, crisis communication, jalin merapi.*

## **I. Introduction**

Performing crisis communication in volcanic disaster can be more challenging than other natural disasters, because it influences and involves the communities who have been living at the volcano slope for generations. They usually have developed their own beliefs and indigenous knowledge about the volcano; and they might be unique from one to another between communities who live in different parts of the volcano slope. They also usually perceive the volcano as a part of their culture and their daily life. Moreover, it is frequently complicated by bureaucracy requirements, especially in most developing

countries. Indonesia is considered one of the most vulnerable countries with the highest risk of natural disasters in the world. One of them is volcano eruption. Indonesia itself has 3000 km volcano belt that consist of 127 active volcanoes. The number represents 13% of active volcano in the whole world (PVMBG, 2014); hence, 68% of global volcanic risk exists in Indonesia (GVM, 2014). Mount Merapi is one if the most active volcanoes in Indonesia and also is considered as one of the most active volcanoes in the world. It erupts every 4 years in average; and the 2010 eruption was the largest eruption since the 1870s. The 2010 Merapi eruption was resulting 353 casualties, 350.000 refugees; and affecting areas with a population of 1.335.885 people (Mei et al., 2011).

Being aware of Merapi's danger, local communities have been developing their indigenous knowledge, organization, and communication systems to reduce the risk (Birowo, 2010). These actually are the existing community capacity in disaster management. However, many interventions that aim to improve community capacity in disaster are only based on standard emergency procedures without effective measurement and do not take account of the initial stages of the target community's capacity. Many scholars' works, such as those of Doan et al. (2012), Gao et al. (2011), Schellong (2007), Spence et al. (2009), and Tanner et al. (2009) have showed that demand for information significantly increases in a crisis. Therefore, empowering community members to help themselves through accurate information and mechanisms to connect with others is a fundamental need. An effective circulation of accurate information, moreover, can be a vital form of assistance for controlling panic and be a reference for effective aid based on the affected communities' real needs (BBC, 2012; Tanesia, 2007; WHO, 2001).

This study investigates a case of Jalin Merapi (*Jaringan Informasi Lingkar Merapi* – Information Networks of Merapi Circle) as a well-proven representative case to capture the capacity of local communities to provide, share, and verify information in the 2010 Merapi (BBC, 2012; OCHA 2013; Reuters, 2010). Jalin Merapi was considered to be the primary information resource by the community, even more reliable than television and quicker than the authorized information. This high level of trust increased voluntary participation and drove collective actions to help the refugees, especially in the form of information sharing for direct distribution of aid. Since the area of community-based crisis communication is still under researched, this study is expected to enrich the literature of crisis communication and disaster management, particularly in developing countries.

## **II. Literature review**

The growing studies and literature on disaster resilience have mainly focused on economy and infrastructure recovery. Similarly, crisis communication literature is dominated by top-down organizational crisis and there is very limited literature that discusses the way interactive crisis communication can be carried out to provide accurate and rapid information in natural disasters (Coombs, 2012; Fearn-Banks, 2011; Fronz, 2012; Lerbinger, 2012). Crisis communication literature, moreover, is very much dominated by a western approach, which may generate useful lessons for countries with high levels of disaster awareness and communication technology adaption. It is by no means clear that they will be equally applicable in developing countries that have various levels of disaster awareness, various levels of technology adoption, have complicated bureaucratic processes, and been very much affected by local culture in daily communication behaviours.

Similarly, Fronz (2012) compares some crisis communication theories and finds that none of the crisis communication theories agrees that socio-cultural differentiation affects the crisis communication process. There are also some arguments among some crisis communication scholars regarding communication channels differentiation based on target audience and crisis type. Moreover, they also argue whether identifying communities' unique local knowledge and their vulnerabilities is necessary to decide effective crisis communication strategies (Fronz, 2012). This study argues that crisis management is linked to all of those aspects, particularly in developing countries.

Many scholars agree that local communities have significant roles in complying with their own demands for accurate information which represents local interests (Goodman et al., 1998; Mei et al., 2011; Palen, 2008; Palen et al., 2010; Palen and Liu, 2007); however, the communities' potential capacity in disaster resilience as active providers and seekers of information remain unexplored. Communities have capacities in the form of local wisdom, but these are often latent or unacknowledged. Thus, Adebowale and Bhullar (2009) emphasize that it is crucial to understand capacity building as an endogenous process that starts with recognising the pre-existing capacity of local communities and external agencies acting as catalysts or facilitators for the communities.

This study focuses on two particular dimensions of community capacity, which are participation and social network. The reason for concentrating on these two dimensions is because a clear understanding of how information flows locally and how people participate in their social network, is needed for effective crisis communication to help people make better life-saving decisions and mobilize the right types of external

support (OCHA, 2012). Participation itself is a very important dimension because community members' involvement is basic to developing community capacity (Goodman et al., 1998). Winkworth et al. (2009) also argue that enabling and strengthening social networks and community development activities can positively impact on individual and community capacity.

As the first responders, local communities usually have high involvement in disaster participation. Most literature on disaster participation, unfortunately, focuses on physical participation in rescue and relief activities. There is very limited literature about online participation in disasters; moreover, available research on online participation is dominated by democratic online participation. Various recent disasters, however, have shown that online communication technologies, especially social media, could expand new forms of 'backchannel' crisis communication activities (Doan et al., 2012, Dufty, 2012, Gao et al., 2011, Lindsay, 2011, Palen, 2008, Taylor et al., 2012, BBC, 2012, Nugroho, 2011, OCHA, 2013). Social media are not only an effective method for monitoring and participating in proactive public discourse, but are also tools for participatory crisis or emergency communication (Fearn-Banks, 2011). Social media broaden the scope of participation and make the community's roles more visible by modelling real social networks in a virtual environment (Schellong, 2007). They expand new forms of peer-to-peer information-seeking and information-providing behaviour in an inexpensive way to enable 'backchannel' crisis communication activities in response efforts (Earle, 2010, Palen, 2008, Palen and Liu, 2007, Westerman et al., 2012). Specifically, social media can improve social networks, leadership, and support systems that can lead to the formation of social capital for disaster resilience.

Although social media can positively impact on disaster relief efforts and community capacity; they do not automatically provide an inherent coordination capability and reliable information sharing (Gao et al., 2011). Therefore, this study is trying to acknowledge these challenges by stressing the local community's involvement with their existing communication capacity. The local communication capacity can be easily found in the form of local media. This study particularly focuses on community radio because it has stronger ties to the local community and a greater sense of their roles in community duties during a crisis (Spence et al., 2009). Community radio stations have been used in Indonesia for stages of early disaster warning, emergency response, and recovery in some natural disasters before the 2010 Merapi eruption, such as a forest fire in Central Kalimantan, a tsunami in Aceh, and a flood in South Sulawesi. However, Tanesia (2007)

claimed that these still prove inadequate because they only provide limited participation and news media broadcasts are far too general and often incorrect to be quoted.

Therefore, by engaging the community as a powerful, self-organizing and collectively intelligent force; information and communication technology (ICT) has the potential role of transforming crisis communication as the way a community to be resilience (Palen et al., 2010). Crisis communication, hence, is building a new perspective on and framing of citizen-based activities that arise out of peer-to-peer communication in a disaster context – activities that serve important tactical, community-building and emotional functions (Palen and Liu, 2007).

### **III. Methodology**

This qualitative case study of Jalin Merapi uses in-depth interviews and focus groups in four regencies surrounding the Merapi volcano. Furthermore, this study has two distinct groups of participants, who are local governments and local communities. Local communities, who consist of the representatives of community radio members, Jalin Merapi volunteers, NGO staff, were interviewed regarding to their involvement in Jalin Merapi networks in the 2010 Merapi eruption. Representatives of Jalin Merapi audiences, which are also the members of the local communities, were interviewed regarding to their experiences of Jalin Merapi media selection and its effectiveness. The governmental officials, who are responsible in Indonesian formal disaster management, participated in focus groups to explore disaster management policies and communities' contribution in the mechanism of a formal disaster management.

Thirty five indepth-interviews and two focus groups (attended by 14 participants) were carried out at the Merapi volcano area, which is administratively located in two provinces, Yogyakarta Special Region and Central Java - Indonesia. It covers four districts: Sleman, Magelang, Klaten, and Boyolali. Specifically, they took place in four sub-districts surrounding the Merapi volcano, which were affected by the 2010 eruption and represent each district: Selo in Boyolali, Dukun in Magelang, Salam in Magelang, Kemalang in Klaten, and Cangkringan in Sleman. In addition, the community radio stations that triggered the Jalin Merapi are located in these particular areas.

### **IV. Findings of on-going work and discussion.**

Since the local communities have been living around the Merapi volcano for generations, they have developed their indigenous knowledge and local wisdom that is

very much affected by Javanese culture. The Merapi volcano itself is located at the middle of Java island of Indonesia and frequently considered as the “heart” of the Javanese cultural environment. Local communities of Merapi volcano have unique patterns of culture and mythology. They are relatively homogeneous in terms of ethnicity and religion, closely engaged with Javanese traditions, using Javanese language as daily language, having close kinships, and practicing mutual communal aid. The majority have an agricultural livelihood and the rest are engaged in mining, tourism and government (ESDM, 2014).

Jalin Merapi was established in 2006, based on the intention to solve the historical problem of information sharing within the Merapi communities. It engaged three local community radio stations: K FM in Dukun-Magelang, Lintas Merapi FM in Deles-Klaten, and MMC FM in Selo-Boyolali. However, before its establishment, there had been existing initiative within the Merapi communities called The Association of Merapi Volcano Belt (*Paguyuban Sabuk Gunung Merapi – Pasag*). It has been accompanying the locals in developing their awareness to the Merapi hazards. Particularly, it initiated the community capacity to develop a circular response to address the challenge of government administrative differences in Merapi slope.

The lack of warning information had been a historical problem within the community. Previously, they rarely got any early warning information from the local government and it caused many casualties when an eruption occurred. Local community, hence, built the awareness in the importance of information sharing. Since 1990s, radio communication has become the most used medium to provide and sharing the information of Merapi within the Merapi community. It is mostly used for early warning for eruption and lahar. Although radio communication is suitable for two-ways communication, it is increasingly sufficient because it only covers one-to-one point and is considered as an expensive means by the community. Therefore, community radio was introduced in 2000s and strongly contributed to the development of Jalin Merapi. Community radio is technically more suitable to maintain the two-ways communication function and to simultaneously extend the coverage from point to multi-points.

The communities living in the villages located near the summit of Merapi were already prepared to face an eruption of Merapi (Mei et al., 2011). Several disaster risk reduction programs such as evacuation drills had often been conducted in the Merapi regions by different institutions. Regardless of the adequate level of community preparedness capacity, the authorized contingency plan was not able to cope with the

Merapi eruption in September – December 2010. The Merapi eruption started from the 26 October 2010 and it became more explosive in 29 October – 5 November 2010. During the eruptions, 130 million cubic meters of materials were erupted and the pyroclastic flows flowed hundred times until 15 kilometres away to the south-eastern parts of Merapi. The communities at the Merapi slope were basically instructed to evacuate many times. After the extension of the safety zone up to 20 kilometres from the summit, the local authorities were overwhelmed by the scale of the disaster and the number of people to be evacuated. It was basically chaotic because of lack of information about where to re-evacuate. This case shows that the capacity of information providing and sharing is significant in disaster management.

Instead of fully relying on governmental responses, the community itself needs to build community capacity for disaster resilience, promote the local “voice”, encourage the ability to be critical in a “bottom-up” way, and by serving the interest of local communities. Therefore, Jalin Merapi has been developing a collaborative system with community radios and local communities as reliable information sources and direct verifiers, in order to strengthen community capacity in crisis communication. The Jalin Merapi itself is a network. It does not interrupt the original ways of how the community members communicate each other. It connects the communities and the community media that work within them. This principal was strategically constructed mainly based on each community’s characteristic, such as: Javanese culture, levels of communication technology adaption, media preferences, daily communication behaviours, and level of trust among community’s members.

In previous eruption in 2006, Jalin Merapi had been providing the capacity to support information needed by the community. However, since the 2010 eruption was bigger than the previous ones, Jalin Merapi engaged other two community radios. They were Gema Merapi FM in Cangkringan-Sleman and Lahara FM in Salam-Magelang. By involving the last two radios, Jalin Merapi had successfully connected each districts to form a circular response in the Merapi slope; as previously it only connected three out of four districts. Unfortunately, because of the regulation and the equipment’s characteristics, community radio only covers particular area. The Indonesian government particularly regulates that community radio’s exposure only covers areas within the radius of 2.5 km. If the communities need to deliver important information to wider audience, hence, the technology (of community radio) is not insufficient.

Based on the existing media within the local communities, Jalin Merapi selected a media convergence that was consisted of fourteen traditional and new communication technologies. Each medium was strategically used for certain purposes and displayed in Jalin Merapi's website so each community's members could determine his/her own media preference. In addition, communities also often transfer information from one medium to another in order to leverage their collective capacity (BBC, 2012, Palen, 2008). Therefore, the media convergence aimed to share the information that used to be restrictedly heard by limited groups to wider audience.

The Jalin Merapi actually did not create a new technology in the media convergence. They had been created by the community themselves and existing within them. Regarding to the assumption that every community members have their own media preferences based on their own reasons, Jalin Merapi did not focus only on one particular medium. Each medium has its own users and audience. The Merapi people tend to use SMS in their daily life and radio communication particularly for information sharing about Merapi activities. Meanwhile, the wider audiences tend to use social media to get information about Merapi. Therefore, Jalin Merapi tried to connect every community members through with their media convergence.

Mainly, the Jalin Merapi used internet-based interactive media, especially website, Twitter and Facebook to reach wider audience. The characteristics of social media as being open and interactive can help the community to share and even recognize their own local wisdom, which often being latent or unacknowledged. Thus, capacity building can be started from the pre-existing capacity of local communities and be facilitated by external agencies. However, although the usage of social media in recent disasters has been proved as important channels to provide information on situational awareness and some opportunities for assistance on individual level; there is another argument not to rely only on the social media in crisis communication, especially in responding to a disaster. It is because they do not automatically provide an inherent coordination capability and reliable information sharing (Gao et al., 2011). Moreover, there is always an overload of information when a disaster has occurred. Consequently, this creates demands for continual organizing, monitoring of credibility, and additional verification on the response effort (Palen et al., 2010, Palen and Liu, 2007).

The local community itself has the capacity to answer the demands. Unfortunately this capacity tends to be ignored and people easily assumed that the supremacies of social media can answer all challenges of crisis communication. Therefore,



community capacity in the form of local media is still required to be involved in the media convergence. Moreover, people eventually tend to primarily rely on their social networks to validate, interpret information and to collectively decide their behaviour (Bunce et al., 2012). Jalin Merapi, therefore, still involved community radios as the part of the communities for their capacities in information sharing. They also involve individuals who understand the local reality, live in the affected area and accurately voice the victims' interest (Birowo, 2010). Because of being run by individuals who are also part of the local community, they have close relationships with the community and accurately represent local content. So, the involvement also has been effective to build trust among the community's members. In addition, the usage of local language had significant role in building trustworthiness within Jalin Merapi network for its authenticity as local-based information.

Furthermore, the community radios' roles are significantly useful to "bridge" the bottom-up participation because not every community member adopts the internet technology, especially in remote areas. Indonesia, in fact, has the fourth largest Facebook subscriber-base in the world with 69 million monthly active users (The Wall Street Journal, 2014) and the fifth biggest Twitter subscriber-base in the world with 29 million users (Techinasia, 2013); these numbers are concentrated in the big cities. Furthermore, since community members have different levels of technology adaption, community radio stations have been taking role as mediator of community participation. Almost 1000 volunteers involved in Jalin Merapi who were consisted of the community radios' members, the refugees, and the community's members who were not directly affected by the eruption. They also mediated the participation from the community's members who could not directly access the Jalin Merapi's media convergence.

The community participation is not only limited on the information providing and sharing, as Palen (2008) argues that participation can be in the forms of: (1) strategic or intelligence functions in providing useful information; (2) public relations of information management, in terms of receiving, verifying and circulating information to and from multiple sources; (3) the coordination of relief work. In addition, they are seen to be an effective means for organizing, pruning, promoting, coordinating new volunteers and merging with the formal efforts (Palen et al., 2010). Jalin Merapi was successfully facilitated all the forms of participation.

The Jalin Merapi also involved communities' members as "significant others" within the mechanism of verification in order to assure the accuracy of the information

they shared. The communities' members voluntarily verify the information that was mentioned in Jalin Merapi's Twitter account, especially the one related with direct aids. Jalin Merapi implemented three verification methods. First, public verification; it means that the affected community themselves gave clarification or confirmation on one particular information. Second, the Jalin Merapi's volunteers in the field; it means that they directly checked on the information accuracy in its location. Third, a professional editor; it means that a professional editor was voluntarily called the sources and had capability to identify whether the source was telling the truth or not. The result of the verification can be in two options. If it was proven accurate, it will complement the earlier data; if it was not, it will be revised and updated in Twitter and Google Docs. There were some cases in the 2010 eruption when some people were proven reporting inaccurate information; as the result, they were virally blacklisted by the Jalin Merapi's audiences. They also use the verification mechanism to counter some misleading news from the national television stations about the Merapi's condition.

Unfortunately, the accuracy of community-based information - such Jalin Merapi - has been a continuing controversy with the local government. The default principle in Jalin Merapi was that all information of refugees' needs was accurate until it had been proven inaccurate through public verification. Meanwhile the government argues that verification has to be done with a valid methodology by an authorized agency. However, in the time the information has been officially verified, it frequently takes times and does not represent the real situation when it is published. In crisis communication, the validity period of information is short. Therefore, the community also needs to have the capacity to perform real-time verification that can keep pace with the speed of situation changes.

In general, Jalin Merapi is a network that involving almost 1000 volunteers who consisted of the community radio members, the affected refugees, and the un-affected local community members. The main aim was to share accurate information about Merapi's condition, refugees' condition, refugee's location, refugee's needs and the demands of volunteers by Jalin Merapi's media convergence. By involving the locals, Jalin Merapi gained high level of trust that led to aid distributions. Therefore, aid could be distributed effectively based on the information that was provided and verified by the community themselves. As the result, the refugees could receive adequate aids based on their current situation and culture. Hence, they can quickly recover themselves and furthermore foster the resilience process within the affected communities in general.

## V. Conclusion

The Jalin Merapi combined the community's communication capacity, community radio's advantages and social media's capabilities. The combination successfully widely spread the information of refugees' real needs within and outside the local communities. However, Jalin Merapi cannot be necessarily replicated to other cases. Jalin Merapi is a community-based medium as the next step after the establishment of community capacity. The basis requirement is an agreement of mutual needs within the community themselves. It will lead to a consolidation to uniform the crisis information, in order to be easily recognized by wider audience. However, this is a conclusion of an on-going work and further analysis is still performed to explore how this community capacity in crisis communication can be effectively applied in disaster management.

## VI. Reference

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