

UDC 332

**STRENGTHENING SOCIAL CAPITAL TO BUILD DISASTER RESILIENT COMMUNITY:
A STUDY ON TENGGER COMMUNITY IN NGADIREJO, SUKAPURA OF PROBOLINGGO
REGENCY, INDONESIA**

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ABSTRACT

The paradigm of disaster management in Indonesia is still centered on the government as the only institution that provides physical aid during emergency phase when in fact, the community is an essential element in disaster management. Community's response to disaster is a critical social capital in disaster management. Survival ability of Tengger Community in Ngadirejo Village, Indonesia against disaster threats is inseparable from their religious system, norms, and values. This type of capacity will become capital during and after natural disaster occurred. The aim of this study is to analyze the social capital of Tengger Community in Ngadirejo Village and the role of the social capital to build community resilience in facing the 2010-2011 eruption of Mount Bromo. This research used qualitative approach and focused on types of social capital (bonding, bridging, linking), as well as economic, socio-cultural, and environmental resilience. The result of this study showed that the Tengger Community had survival capacity through strong ties of bonding, bridging, and linking social capital applied during the eruption of Mount Bromo. The capacity was also applied to rescale the situation after the eruption.

KEY WORDS

Disaster management, disaster community resilient, social capital, Mount Bromo, volcanoes.

Indonesia is located on the track of ring of fire in the Pacific Ocean area, and as the consequence, earthquakes and volcanic eruptions frequently occurred in the country. As the country with the longest ring of fire in the world, Indonesia has 127 actives volcanoes (Bachtiar, 2017). One of the active volcanoes in Indonesia is Mount Bromo. Mount Bromo is one of the most strategic destinations in East Java Province, Indonesia. Despite of its frequent eruptions, Mount Bromo remains an attracting tourist destination for both domestic and foreign visitors.

The first recorded Mount Bromo eruption was one took place in 1804. Based on data from the Geological Agency of Ministry of Energy and Mineral Resources (2014), Mount Bromo erupted in a few days, which is considered as a short period. As an example, in 1860, the mountain erupted for three days (June 12-14, 1860). However, the eruption of Mount Bromo could also last a month or more constantly. The longest eruption ever recorded I the history of Mount Bromolasted nine months from the end of November 2010 to July 2011 (Geological Agency of Ministry of Energy and Mineral Resources, 2017).. According to that data, Mount Bromo eruption is unpredicted with the shortest rest of less than a year and the longest break of 16 years.

Despite knowing the danger of eruption, the community living around Mount Bromo continue doing their daily activities. Ngadirejo, a village in which Tengger Community lives, is only four kilometers away from Mount Bromo and thus, became the most damaged village when the mountain erupted between 2010-2011. The villagers chose not to evacuate themselves even though that village was struck by ash and sand for nine months (Yuanjaya, 2014). According to Herawati (2014), although no one was killed during the 2010-2011 eruption of Mount Bromo, which lasted between November, 2010 and July, 2011, the

eruption caused severe damage on people of Ngadirejo's farm. They had to stop working on their farm. Furthermore, all of their houses were destroyed by the buildup of volcanic dust.

People's response to disaster events is an important social capital in disaster management. According to Fukuyama (2002), social capital is a capacity that comes from a common belief in a community or certain parts of it. As an addition, Hasbullah (2006) explained that social capital is not built only by one individual, but a tendency in a group to socialize as an important part of values that belong to those communities.

Fukuyama (2002) stated that religion, traditions or historical experiences are the sources of social capital. The majority of Tengger Community believe in a very strong religious system, guide for Tengger community on how to behave and how to treat other human beings, nature, and the creator. Aldrich & Meyer (2014) noted that every type has a power of relationship and varied network, so the result of individuals and communities will be different.

That power of relationship and network exists within the society becomes an essential element of disaster resilience that then will become capital to anticipate, overcome and recover society from disaster. A focus on resilience means putting greater emphasis on what communities can do for themselves and how to strengthen their capacities, rather than concentrating on their vulnerability to disaster or environmental shocks and stresses, or their needs in an emergency (Twigg, 2009). This capability is needed by the community who lives in the disaster area, such as the Tengger Community in Mt. Bromo area.

LITERATURE REVIEW

Social Capital and Disaster Resilient Community

Social capital includes received and perceived support (Kaniasty & Norris, 2009). According to Radu (2018), social support can come from family, friends, neighbors, agencies, public institutions, non-governmental organizations. Citizen participation and leadership are comprised of voluntary or volunteer organizations, and the mass assault after a disaster (Barton, 2005). A sense of community includes shared values and mutual concerns among community members, as well as a perception of needs fulfillment (Zakour & Swager, 2018). According to Fukuyama (2002), the informal values and norms shared among members of a group allow their cooperation.

Some scholars separate social capital into three main types (bonding, bridging, and linking) (Aldrich, 2012a; Szreter & Woolcock, 2004). First, bonding social capital refers to relationships amongst members of a network who are similar in some form (Putnam, 2000). Bridging social capital describes acquaintances or individuals loosely connected that span social groups, such as class or race, these are more likely to display demographic diversity and provide novel information and resources that can assist individuals in advancing in society (Aldrich & Meyer, 2014). Then the third type is linking social capital, which connects regular citizen with those in power. Scholars have defined this type of network as embodying norms of respect and networks of trusting relationships between people who are interacting across explicit, formal, or institutionalized power or authority gradients in society (Szreter & Woolcock, 2004). The bonding, bridging, and linking social capital in the area allowed residents to not only coordinate their rebuilding processes internally but to ensure that their voices were heard by the city government and other relevant institution (Aldrich, 2012).

Social capital has gained intellectual currency as a means to understand the relative strength of families and communities (Hawkins & Maurer, 2010). Disaster scholars have used social capital to understand the trajectory of individuals (based on what resources are accessed through social networks) as well as communities (based on levels of trust, collective action, and other public goods) (Aldrich & Meyer, 2014). Using the existing studies on the Wenchuan earthquake, Zhao (2007) investigated the impact of the structure of the spring festival network on funding receipt for housing reconstruction from various sources, including own financial assets, loans from banks, borrow from relatives and friends, and government disaster aid (Wei & Han, 2018). Aldrich & Meyer (2014) also explain that social networks provide financially (e.g., loans and gifts for property repair) and non-financial

resources (e.g., search and rescue, debris removal, childcare during recovery, emotional support, sheltering, and information).

Danar & Pushpalal (2014) described resilience as a system, the more resilience the system is, the more persist it is. Resiliency theory concentrates on access to and use of resources after disaster strikes (Zakour & Swager, 2018). There are four types of community adaptive resources or capabilities, namely (1) economic development, (2) social capital, (3) information and communication, and (4) collective action (Norris et al., 2008; Zakour & Gillespie, 2013). Economic development is a prerequisite for social capital and information/communication adaptive capacities. In turn, social capital and information/communication are prerequisites for collective action (Norris et al., 2008).

Community disaster resilience is the linkage of quality resources to outcomes of wellness (Norris et al., 2008). Community resilience can be understood as the capacity to (1) anticipate, minimize and absorb potential stresses or destructive forces through adaptation or resistance; (2) manage or maintain certain basic functions and structures during disastrous events; and (3) recover or “bounce back” after an event. Burton (2012) explained a set of indicators for community resilience, namely economic, institutional, infrastructure, community capital, and environmental resilience. Cutter et al. (2008) also identified indicators or dimensions of resilience; they are ecological, social, economic, institutional, infrastructure, and community competence. Perera et al. (2017) in their study adopted five dimensions or domains of resilience, economic, environmental, institutional, social, and technological dimensions. Resilience refers particularly to processes during disaster conditions, especially disaster recovery (Zakour & Swager, 2018). It means that the recovery process is an important step to community resilience. No community can ever be completely safe from natural and man-made hazards, and thus, it may be helpful to think of a disaster-resilient or disaster-resistant community as the safest possible community that has the knowledge to design and build a natural hazard context (Twigg, 2009). Community resilience in this study refers to social capital owned by Tengger community in their effort to recover in terms of economic, socio-cultural and environmental aspect after the eruption of Mount Bromo.

METHODS OF RESEARCH

In this study, qualitative approach was used to describe the social capital of Tengger Community to build disaster resilience during and after the eruption of Mt. Bromo. This study focuses on three types of social capital, namely (1) Bonding, (2) Bridging, and (3) Linking, and three types of community resilience, namely economic, socio-cultural, and environmental. The researcher was the main instrument in data collection. The instruments were interview guide, a recorder, and a notebook.

Table 1 - List of Informants

Head of Ngadirejo Village	Saptono
Head of <i>Kelompok Siaga Bencana (KSB)</i> in Ngadirejo Village	Atmo Triono
Team Post of <i>Kelompok Siaga Bencana (KSB)</i> in Ngadirejo Village	Sumarlan
Member of <i>Kelompok Siaga Bencana (KSB)</i> in Ngadirejo Village	Hendra Aditia
Public Figure of Ngadirejo Village	Sisto Mulyono
Communities that affected by the eruption of Mount Bromo	- Kertono - Sukemi - Sapuk - Sunarmoko - Sekar - Sulistyorini - Kuncoro - Suheri - Erwandi - Lilik - Ketut - Heni - Reni - Riski

Source: Authors, 2019

Data collection was carried out in two stages; the first stage was carried out in September, 2018, and the second was in March, 2019. Data were collected from direct observation to Tengger Community in Ngadirejo Village, a structured interview, and documentation (pictures and interview transcriptions). Primary data were obtained through interviews with the Head of Ngadirejo Village, Head of *Kelompok Siaga Bencana (KSB)*, a disaster mitigation group in Ngadirejo Village, Team Post of *Kelompok Siaga Bencana (KSB)* in Ngadirejo Village, Member of *Kelompok Siaga Bencana (KSB)* in Ngadirejo Village; public figures of Ngadirejo Village, and 15 communities affected by the eruption of Mount Bromo.

Furthermore, secondary data were obtained through documents and journal related to social capital, disaster management, disaster resilience, news related to Mt. Bromo eruption, and some related books.

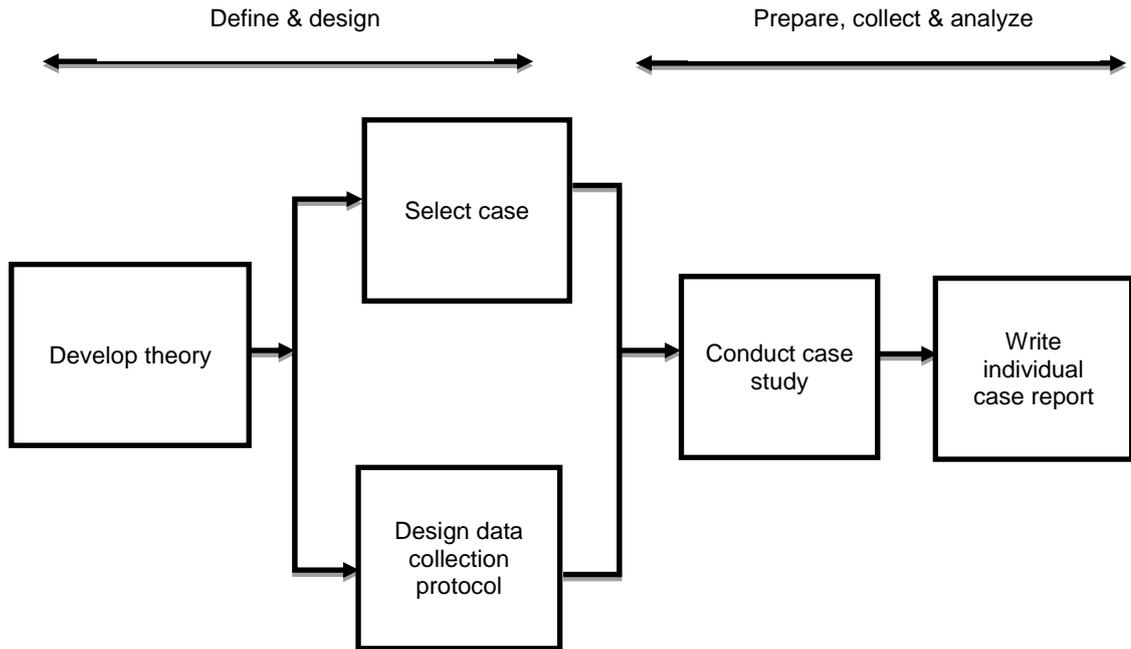


Figure 1 - Single Case Study Method
Source: Yin, 2014

Using a single case study process, this case study took place in Ngadirejo Village, Sukapura District, Probolinggo Regency. Based on Figure 1, a single case study research process consists of stages, namely developing theory, selecting cases, designing study protocols, conducting research, and writing an individual case report. The data analysis method was Robert K. Yin's case study model that is matching pattern and designing an exploratory.

RESULTS AND DISCUSSION

Social Capital of Tengger Community in Ngadirejo Village

Ngadirejo Village community survived the longest eruption of Mount Bromo which lasted for roughly 9 months. The community decided to stay in their houses in order to save their houses from a volcanic dust Mount Bromo blew for 24 hours non-stop. The residents were worried that their houses would collapse if they did not clean the volcanic dust pilling upon their roofs.

The existence of bonding social capital is generally characterized by high levels of similarity in demographic characteristics, attitudes, and available information and resources (Aldrich and Meyer, 2014). In line with Aldrich and Meyer, Hawkins and Maurer (2010) also stated that when natural disaster struck, almost all communities benefit from several types of

homophiles (similarity) bonds that help their safety or they are helped by others in their networks.

One of the residents, Sukemi explained that:

"Yes, men and women are cleaning the roof together. When we cleaned the room in the morning, Mount Bromo would blow some more volcanic dust in the evening. The residents helped each other"

Besides that, Suheri also revealed:

"Rain helped cleaning the streets from the volcanic dust. Rain took the dust away. So when it rains, our streets were clean. "

Every day, the residents of Ngadirejo worked to clean their houses and the streets from volcanic dust. This behavior is a manifestation of a sense of shared fate and affection. The residents feel that they should help their neighbors when they had finished cleaning their houses. According to Aldrich and Meyer (2014), strong relationships allow this type of social capital to provide social support and personal assistance, especially when disasters struck. A strong relationship between communities was established through mutual cooperation.

Hawkins and Maurer (2010) found that bonding is very relevant in daily activities and for logistical aid. Kamal and Hassan (2018) also explained that close relatives not only supported each other in terms of evacuation, but they also provided food needed to survive. The mutual aid and mutual help were also reflected in the activities of the *Kelompok Siaga Bencana (KSB)*, a disaster mitigation group in Ngadirejo of which members are youth and local community leaders.

Hendra Aditia, one of the members of *Kelompok Siaga Bencana (KSB)*, stated that:

"We manage logistical assistance from the government and distribute it. Our group work voluntarily to remove the sand that blocks the road".

As an addition, Sumarlan, the Team post of *Kelompok Siaga Bencana (KSB)* mentioned:

"I used to go around looking for residents who looked for grass for their cattles. When I have gallon of water with me, I share the water with them. When I have food or snacks, I also give the food to them".

This local disaster mitigation group consists of volunteers whose responsibilities are to remove the volcanic dust that covered the road, managed and distributed aid in the form of food and drinking water from the government for the residents of Ngadirejo. Volunteers might bring helpful contributions, but they also might be potential liabilities (Barsky et al., 2007; Rivera & Wood, 2016; Linell, 2014).

Conversely, according to Aldrich and Meyer (2014) bridging social capital describes acquaintances or individuals who are loosely connected who reach social groups, such as class or race. Tengger Community is spread in 4 districts in East Java, Probolinggo, Pasuruan, Malang, and Lumajang.

Atmo Triono explained:

"The mutual cooperation of Tengger Community is very strong. Tengger Community in East Java lives in four regencies, right here in Probolinggo, Pasuruan, Malang, and Lumajang. The Tengger communities in Pasuruan, Malang and Lumajang always care about us. They send vegetable and rice without us asking for their help"

Strong bond has been established between Tengger Community in Ngadirejo Village and Tengger Community in Ngadas Village, Malang Regency. It is represented through how much they care about each other and mutual cooperation by providing food. Fukuyama (2002) explains that religion, tradition or shared historical experience are sources of social capital. The majority of Tengger Community are devoted Hindus and Hinduism teach its followers to treat other human beings well.

Furthermore, Aldrich and Meyer (2014) explain that the relationship is more likely to display demographic diversity and provide new information and resources that can help individuals in advancing society.

Saptono mentioned the residents of Ngadirejo received various types of assistance from various regions:

"We received assistance from public institutions, private organizations, and also from neighboring villages. At that time it was from Pasuruan Regency and Malang, Ngadas, Ngadiwono, and Wonokitri Village".

In accordance to Saptono, Sapuk also stated that:

"Ranu village, Ngadas village, Malang, and Ngadiwono Tosari village sent vegetables, such as cabbage, potato, and onions, and rice also. The most important thing is that the vegetables are fresh vegetables. They donated their crops here".

Other than vegetables and rice fellow Tengger Community, Ngadirejo Village community also received vegetables and rice from surrounding non-Tengger villages such as Sapikerep Village in Probolinggo Regency, Ranu Pani Village in Lumajang Regency, Ngadiwono Village and Wonokitri Village in Pasuruan Regency. Aldrich and Meyer (2014) also explain that bridging often comes from involvement in organizations including civil and political institutions, parent-teacher associations, and sports clubs, education and religious groups. Volunteers also came to help, such as fundraising for students as their parents had no income during the eruption.

The third type of network connection is linking social capital, which connects ordinary citizens with those in power (Aldrich and Meyer, 2014). During the eruption, the local government had provided a shelter in Sukapura, but the residents of Ngadirejo decided not to occupy that shelter. Kertono revealed that the Regent of Probolinggo had provided a shelter, a place evacuation in Sukapura District:

"Yes, a shelter was provided in Sukapura by the Regent. Another shelter was located in Leces, but people here don't want to be evacuated. We believe Bromo isn't dangerous for human, so we don't need to evacuate. There are no victims, no human casualties".

The government also provides clean water for bathing and washing. Sulistyorini stated that:

"The government of Probolinggo and the government of East Java send clean water here. Several trucks come every day".

Suheri also added that:

"Water was sent up here, aid from the government. They sent water using big trucks as soon as the volcanic dust hit our village".

In addition, the Indonesian National Army and Mobile Brigade Corps from various regions such as Surabaya, Sidoarjo, and Bondowoso came to help the residents cleaning the volcanic dust.

Saptono explained that:

"The National Army, Indonesian National Police and Mobile Brigade Corps members from Sidoarjo and Bondowoso were sent here at that time to help us, reducing our burden".

Sumarlan also said that:

"When I first came here, the Air Force of Surabaya wanted to come here too, help us every day".

For the first three months, the residents of Ngadirejo relied completely on aid from the government. However, when the 3-month national emergency period was over, the aid stopped coming. As the consequence, the residents began to work to fulfill their daily needs.

At the time, the piling volcanic dust destroyed one of the elementary school buildings in Ngadirejo village. For two years, teaching and learning activities were conducted in emergency tent. Then after two years, Indonesian Banks Association or *Persatuan Bank Nasional (Perbanas)* rebuilt the school. Atmo Triono described that:

"That elementary school was destroyed. Although having to study in a tent for two years, the students' performance was good. Well, then Perbanas finally helped rebuilt the school. The school is in a better condition now than it was before the eruption".

As an addition, the Ministry of Social Affairs also built a disaster post and gave some disaster training for *Kelompok Siaga Bencana (KSB)* in Ngadirejo Village. Sumarlan revealed that:

"This building is help from the Ministry of Social Affairs".

Erwandi added that:

“The Ministry of Social Affairs provided training, particularly for organizations, such as KSB. The training is about disaster mitigation and disaster management”.

Social Capital to Build Tengger Community Resilience

Zakour and Swager (2018) assert that social capital refers to individual or group resources obtained through their social networks. Social resources embedded in the network are economically valuable and important for community disaster resilience. Based on Lucini (2013), social capital is used as the main element to define and improve social resilience and to reduce social vulnerability. Dynes (2005) places social capital as the main factor for community resilience. Some researchers (Islam & Walkerden, 2014; Bihari & Ryan, 2012; Nirupa & Maula, 2013; Storr & Haeffele-Balch, 2012) on natural disasters have highlighted the importance of social capital for the preparedness, response, and recovery.

Zakour and Swager (2018) emphasize importance of resilience during both natural disaster and disaster recovery. This is also confirmed by Norris et al (2008) that the theory of resilience determines the dimensions of processes and resources needed for disaster recovery so that on time; if there are strong, excessive and quickly accessed resources, then a community is considered to have adaptive capacity or capability. The focus of resilience according to Twigg (2009) means giving greater emphasis to what communities can do for themselves and how to strengthen their capacity, rather than just focusing on their vulnerability to disasters and environmental stress, or their needs in an emergency. One element of resilience according to Twigg (2009) is the capacity of the community to recover or “bounce back” after a disaster occurs.

When the eruption occurred, volcanic dust covered and destroyed the farmland in Ngadirejo village and as the effect, the residents lost their main income. However, they have a small deposit called “*sigiran*”, livestock and some jewelry. Ketut stated how the community survived the disaster:

“That is how we survived. People in the past had to evacuate themselves. We were utilizing everything that exists. Some people used to store food in “*sigiran*” or known as barns”.

Sunarmoko added that the community still has some saving left:

“Tengger people usually have gold and cattle as investment. After harvest, we do not usually save our money, but we buy gold and cattle for instance cows or goats. These are our savings. We can sell them quickly if we need money”.

In addition to the small amount of asset owned by the residents, the local government and private institutions also provided seeds for all of the residents to start farming again. Despite between 75 centimeter and 1 meter thick volcanic dust, the residents of Ngadirejo village kept working on their farmland as much as they could. The residents who live near water sources still were farming using polybags, even though their crops did not grow as well as they did before the eruption. Wardhani (2013) expressed that the Tengger community has a mechanism to survive economically through agricultural systems, *sigiran*, and deposits.

Not only did they try to start farming again, but the residents also tried to earn some income by working out in other areas such as Bermi Village in Krucil District, Probolinggo Regency; Ngadas Village in Malang Regency; Trawas District in Mojokerto Regency; Banyuwangi Regency, Jember Regency, and Kalimantan Province for several months. Hendra Aditia stated that the residents began to try to make ends meet:

“We are working in other villages and another city to fulfill our needs. First, there was someone working in Kalimantan for a few months to fulfill for his family at home”.

This shows that the community is trying to strengthen its capacity economically to make ends meet during the disaster recovery process.

In terms of socio-cultural aspects, there are traditions the community keep conducting despite of the eruption. A religious leader led prayer in Luhur Poten Temple of Mt. Bromo and all residents attended the prayer with their offerings. Purpose of the prayer is to beg for salvation. Wardhani (2013) argue that this ritual is a spiritual effort conducted by the Tengger community to connect with nature.

Wardhani (2013) explains that the Tengger community has a strong social system influenced by their religion. They continue to celebrate the Kuningan day and Kasada ceremony during the eruption. The local residents have memorized pattern of eruption, and therefore they did not consider the eruption as a problem. Sisto Mulyono, the Tengger community public figure, explained that:

“We keep celebrating Kasada Ceremony and Karo Day. Mt.Bromo eruption is not a problem. It is Sang Hyang Widhi's gift”.

Marfuah further explained that Kuningan Day also kept on being celebrated:

“Although Bromo was still erupting, we still did that. I'm sorry, that's a ceremony. It still goes on, even though there was natural disaster. I know it's hard for us to celebrate Kuningan because the volcanic dust kept coming”.

Regarding to the celebration of Karo day for a week at each other's homes during the eruption, Sunarmoko said that:

“People here say Karo Day is a party. It is like a gathering, and everyone who comes must eat the food that we served. When the principal for the offerings is enough, then we can eat. It's not fancy in 2010, because we had failed harvest. However, the point is that the public figure was here and the offerings were completed, that's it”.

Two years after the eruption, the residents were still unable to gro their farmland normally. The volcanic dust were still covering their farmland. When the rainy season came, they started planting their land. They gave more fertilizer hoping that their crops grew despite of the volcanic dust. Hendra Aditia explained that:

“It was almost two years after the eruption, and still it was almost impossible to grow crops but the community continues to try. The land finally starts to recover”.

Hendra also said that:

“The residents also work together to clean the reservoirs and irrigation system nearby”.

Besides their farmland, the volcanic dust also polluted their water reservoirs and irrigation. Thus, they worked together to clean them. Although they had previously received water from the local government, they still had to provide their own clean water. Wardhani (2013) explaind that the Tengger community has a defense mechanism that can be used to minimize risk or danger because they can form an independent society in the face of disasters.

Here is a method the Tengger Community in Ngadirejo Village used to deal with the catastrophic eruption of Mount Bromo (2010-2011):

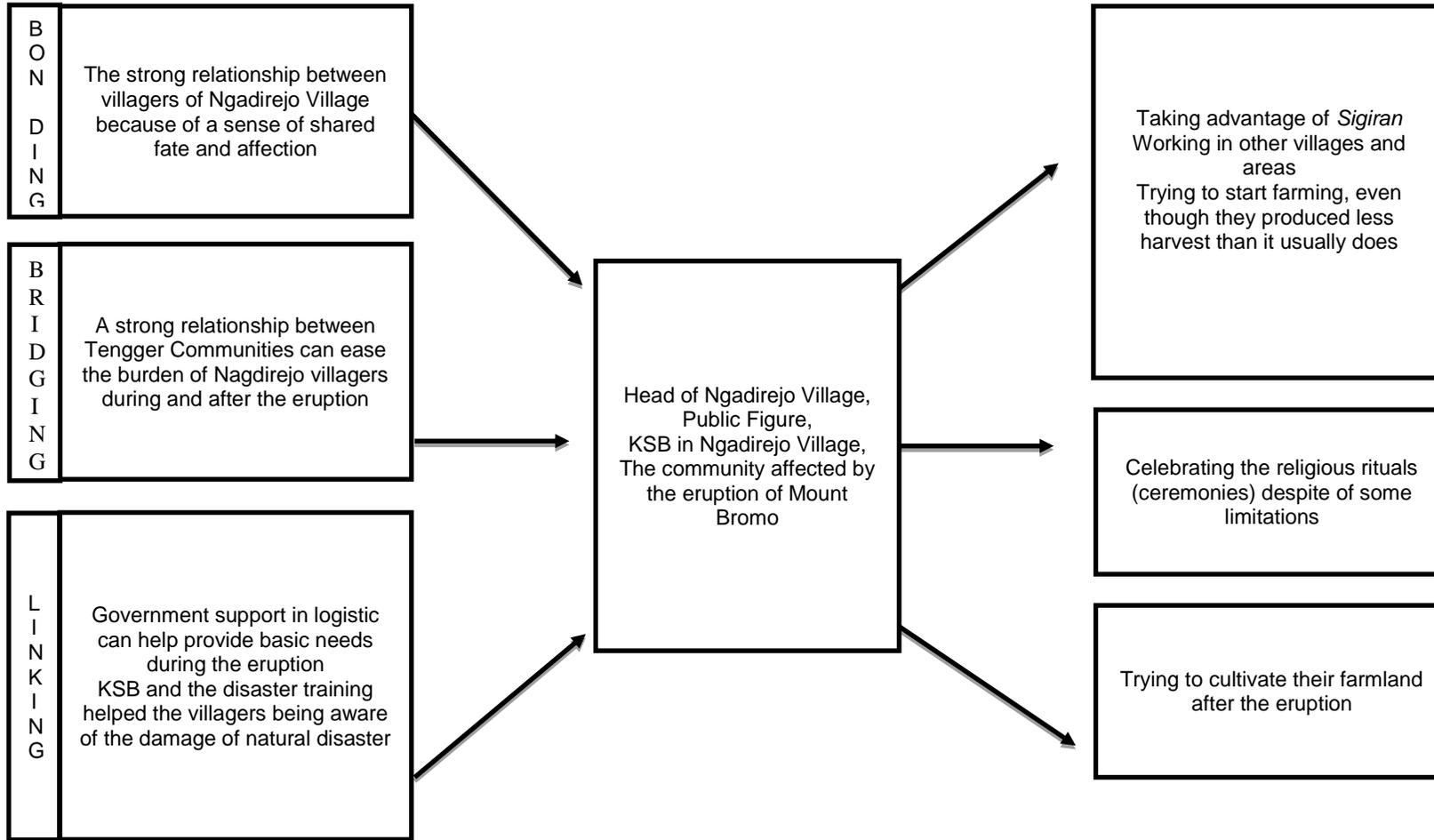


Figure 2 – A pattern of Tengger Community in Ngadirejo Village to relieve the impact of Mount Bromo eruption (2010-2011), Source: Authors, 2019

CONCLUSION

The Ngadirejo Village community has the social capacity to survive during the eruption and recover after the eruption through bonding, bridging, and linking. Social capital owned by the community plays a significant role in economic, socio-cultural and environmental resilience of the community. The capacity of the Ngadirejo village community which is a native of Tengger Community can be used as a reference to solve problems that the government has yet been able to resolve regarding disaster management, especially in the emergency response and post-disaster phase. Based on the conclusion, the authors would like to provide some suggestions for the government and the community, especially the Ngadirejo village community. The government should explore potentials of the local wisdom, and local knowledge (values, norms, ethics, beliefs, and customs) so that community can develop independence when natural disaster struck and apply disaster management system well. Ngadirejo Village community can use the disaster management pattern of the eruption of Mount Bromo (2010-2011) as guideline when another natural disaster, particularly volcanic eruption, struck.

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