Community Resilience: Lesson Learnt from Disaster Survivors in Yogyakarta Province Indonesia

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Abstract. This article describes community resilience in disaster survivors in Yogyakarta Province. Model of community resilience applied in Cangkringan, an affected districts by the Merapi eruption disaster in 2010. The aims of this research are, first, to clarify the definition of community resilience in disaster studies; second, to understand how the community resilience process in affected people, and finally to interpret the disaster as a ‘window of opportunity’ for sustainable trajectories. Participants were drawn from the inhabitants of Cangkringan districts Yogyakarta Province. It illustrates the concept model of ‘community resilience’, which is widely explored from community perspectives. This research also seeks to understand how the community resilience process can be enacted in alternative social practices. It found that number of themes emerged in community resilience integrated model includes partnership and institutional, education and engagement, available resources (personal and culture values, psychological strength), also risk and vulnerability groups in society.

Keywords: Community Resilience, Survivors, Natural Disaster

1. Introduction
Indonesia is a hazard-prone country as it is situated at the meeting point of three active plates in the world: the Indo-Australian plate in the south, the Euro-Asian plate in the north, and the Pacific plate in the east. The three plates are moving and thrusting towards one another in such a way making the area prone to natural disasters such as volcanoes, earthquakes, tsunamis. The movement of the plates also causes the area to become a tectonically and volcanically active region [2]. Thus, natural disasters occur almost every year in Indonesia, some of which hit Yogyakarta Province in October 2010 when volcanic eruption of Mount Merapi, caused many casualties and extensive property damage.

Mount Merapi eruption occurring between October and November 2010 which the impact was suffered by those residing Yogyakarta province and Central Java province. The eruption was the most powerful and the worst after its last eruption in 1870, causing a lot of casualties of both lives and properties. It was considered the worst because it had forced a total of 32 villages with a population of more than 70,000 people to leave their homes. Based on the statistical data from the National Agency for Disaster Management (BNPB), the total number of casualties caused by the eruption included 277 from Yogyakarta province and 109 from Central Java province (National Agency for Disaster Management, 2010). The data also recorded there were a total number of 2,527 refugees in Central Java province and 12,839 refugees in Yogyakarta province [2].

The 2010 Mount Merapi caused physical damages in almost all sectors including residential, infrastructure, social, and economic. It destroyed many of physical infrastructures such as houses, public places, schools, and worship places as well as the installation of water and electricity. The National Agency for Disaster Management recorded more than 2,636 units of houses in Yogyakarta province were heavily damaged, 156 houses were slightly damaged, and 632 houses were partially damaged. There were
a total 3,424 of houses in Yogyakarta province damaged as the impact of Mount Merapi eruption. Data in Central Java province recorded that a total of 174 houses were heavily damaged, slightly damaged, and partially damaged. Based on a financial study, the National Agency for Disaster Management reported the loss caused by the damage was estimated to be 3.62 trillion rupiah, consisting of 1.69 trillion rupiah (4.64%) in economic production sector, 707.42 billion rupiah (19.50%) in infrastructure, 626.65 billion rupiah (17.27%) in houses, 408.75 billion rupiah (13.22%) in cross sector, and 122.47 billion (3.38%) in social sector [2].

Disasters cause a lot of damage and changes to people who become victims. Efforts to build or increase the potential for community resilience to overcome the impact of the changes brought about by the disaster will be very important. Potential resistance in the community is called resilience in the community. Community resilience is an attempt to tackle, confront and mitigate the stress posed by the traumatic accident of disaster [3]. Community resilience development efforts in post-disaster is rated to have not yet become a focus of concentration until now, although it will be very important to be developed in community.

Preliminary research done by Akbar [1] found some psychological aspects that become a protective factor that affects the long-term psychological state after the disaster on the survivors in Yogyakarta province. These factors include social support, spirituality, effective coping and disaster experience. Psychological factors can be further developed into psychological skills that can then be built into a strength to improve community resilience.

The researches carried out about the community in the context of disaster in Yogyakarta province, among others, research by Rakham and Kuswardhani [10] concerning the empowerment of local wisdom as a resilient community model to face the disaster found that the values of local wisdom as nrimo, ngaruhke, and mutual cooperation can be empowered as capital of community resilience in the face of the earthquake in Yogyakarta. Suharta, Prasetya, and Tohani [12] found a conceptual model of disaster awareness community integrated with the Community Learning Center as a unit of non-formal education in the community, especially at the village level. From these researches it can be seen that the focus of the model of post-disaster community available is only limited on models that are conceptual, the absence of an integrated model because it is only specific to certain aspects such as the educational aspect, and also has not facilitated other aspects that are considered important in the community, for example the effort to facilitate risk and vulnerability groups based on personal / psychological strength in the community.

This paper investigates community resilience model by a group of affected people in Cangkringan sub-district, Sleman district, Yogyakarta province. Community resilience is an approach to the case of people to investigate the community-led reaction to the Merapi eruption disaster. Community resilience encompasses individual preparedness as well as establishing a supportive social context in communities to withstand and recover from disasters.

2. Purpose
The aims are, first, to clarify the definition of community resilience in disaster studies; second, to understand how the community resilience process in affected people, and finally to interpret the disaster as a ‘window of opportunity’ for sustainable trajectories [5]. The research questions were the following:

a. How does people in Cangkringan district in affected area enact community resilience processes towards sustainable trajectories?
b. How can this case study contribute to an understanding of community resilience?
c. What model of community resilience that implemented in this area?

3. Methods
Researcher followed two research strategy to identify community resilience practices employed at the local level. The first phase focused on documentary sources to identify the actions taken at the community and state level in response. A second phase of the research involved interviews to triangulate the documentary sources with the practices of people who experienced the disaster. In identifying the
research participants for this study researcher employed a snowball technique to seek interviewees with firsthand experiences of enduring Merapi eruption in the past.

The instrument used in this research is two namely survey and interview. The survey was conducted to determine the community needs and circumstances of the post-disaster in Yogyakarta province. The second instrument is the interview. Interview is used to collect data on people's perceptions of readiness, capability, and the local potential as an initial effort for the community resilience development of post-disaster. The results of these surveys and interviews will be baseline data in the research, and then become important information in the research. The respondents of this research consists of representatives from each group of citizens that includes fathers, mothers, adolescents, and the elderly. The number of respondents in this research is 150 people comprising 60% male and 40% female.

4. Results

Communities have an important role in the process of disaster resilience. Community resilience is a response to the disaster, which focuses on balance in community between intervention policy of formal institutions that are top-down up to facilitating the needs of the expectations of the grassroots. Community resilience not only is a top-down policy rules that are formal, but also emphasizes the processes that are bottom-up of autonomous process based on abilities, skills, and behavior action raised by the people of the region [6, 8]. Community resilience rooted in community’s capacity to improve the social infrastructure, the initiative of the community, as well as to manage human resources and local community resources [11]. Community resilience is a process and not an outcome [7].

Disasters can cause the appearance of a spontaneous reaction and voluntarian applying solidarity independently. Even if people do not have enough resources to deal with disasters or not formally authorized coming from institutions, collective action that comes from local resources is a way that can be done to overcome the effects of the disaster. Community resilience is a process that comes from grassroots and spontaneous reactions in overcoming the effects of traumatic events e.g. disaster [13].

Here are the data obtained based on interviews conducted in the community: The number of people in Kaliadem village around 100-500 residents with a percentage of 60% male and 40% female. The language used in everyday life is Javanese and Indonesian.

In the community agree that there are those who rated responsible for disaster preparedness / emergency response:

| Responses       | Amount | Percentage |
|-----------------|--------|------------|
| Yes             | 90     | 60%        |
| None            | 45     | 30%        |
| Do not know     | 15     | 10%        |

Parties who interact/relate/communicate/responsible for disaster preparedness/emergency response in the community is:

| Responses                                                                 | Amount | Percentage |
|---------------------------------------------------------------------------|--------|------------|
| The Department of Health (national or local level, health centers or community health workers) | 52     | 35%        |
| Civil Protection                                                          | 30     | 20%        |
| National Disaster Management Office                                      | 23     | 15         |
| United Nations                                                           | 0      | 0          |
| NGO                                                                       | 37     | 25%        |
| I do not know                                                             | 0      | 0          |
| Other                                                                     | 8      | 5%         |
Community access to information on the Internet:

| Responses                          | Amount | Percentage |
|------------------------------------|--------|------------|
| Many people have access to the internet | 45     | 30%        |
| Few people have access to the internet  | 105    | 70%        |
| No one has access to the internet   | 0      | 0          |

Natural disaster that often occurs in Kaliadem Village community is:

| Responses                          | Amount | Percentage |
|------------------------------------|--------|------------|
| Eruption of Mount Merapi           | 150    | 100%       |

Health problems experienced by people when a disaster occurs are:

| Responses                          | Amount | Percentage |
|------------------------------------|--------|------------|
| Severe injury                       | 0      | 0          |
| Epidemic of a disease               | 45     | 30%        |
| Damage to health clinics             | 0      | 0          |
| Contamination of water/water shortages | 45   | 30%        |
| Lack of food                        | 45     | 30%        |
| Other                              | 15     | 10%        |

Groups in community that are more affected / influence of the disaster are:

| Responses | Amount | Percentage |
|-----------|--------|------------|
| Parents   | 52     | 35%        |
| People with disabilities | 16     | 10%        |
| Children  | 52     | 35%        |
| Woman     | 30     | 20%        |

People's knowledge of presence/absence of a disaster plan:

| Responses | Amount | Percentage |
|-----------|--------|------------|
| Yes       | 30     | 20%        |
| No        | 105    | 70%        |
| Do not know | 15 | 10%        |

Challenges faced by the community in response to the disaster or what the consequences are faced with the presence of disaster include: must follow the instructions of the government, thinking about jobs, the state of livestock, thinking of the future post-disaster life, continue to keep together with other citizens. In community, in the development of disaster management planning the following parties have a very important role, namely: Village Head (Kepala Dukuh), RT, RW, Volunteers, and community leaders who participate in BNPB.

Outside the community, in an effort to prepare and implement a disaster plan are the following parties:

| Responses                          | Amount | Percentage |
|------------------------------------|--------|------------|
| National government                | 75     | 50%        |
| Agencies of the United Nations     | 0      | 0          |
The groups of volunteers 75 50%

| Does Disaster response plan have specific components of the health aspects? | Responses | Amount | Percentage |
|---|---|---|---|
| Yes | 147 | 98% |
| No | 3 | 2% |
| Do not know | 0 | 0 |

The contents of disaster planning, namely: to teach to always be alert, disaster response training, coordination is done from the government to the village head is forwarded to the community.

The community knows regarding information material about health, disaster preparedness and disaster response that comes from national authorities (government):

| Responses | Amount | Percentage |
|---|---|---|
| Yes | 150 | 100% |
| No | 0 | 0 |
| Do not know | 0 | 0 |

Information is available in a language that is easily understood and can be used in the community:

| Responses | Amount | Percentage |
|---|---|---|
| Yes | 150 | 100% |
| No | 0 | 0 |
| Do not know | 0 | 0 |

Such information helps the community to prepare and respond to disasters?

| Responses | Amount | Percentage |
|---|---|---|
| Yes | 150 | 100% |
| No | 0 | 0 |
| Do not know | 0 | 0 |

Media used by the community in receiving information regarding a disaster or emergency situation:

| Responses | Amount | Percentage |
|---|---|---|
| Newspaper | 0 | 0 |
| Family and friends | 30 | 20% |
| Television, radio | 90 | 60% |
| Internet | 15 | 10% |
| Other | 15 | 10% |

Method of the first warning or other disaster-related information distributed or disseminated to the community is through: announced through mosques, through the traditional tool that facilitates direct communication with Village Head to be distributed to the community, via the siren sounded, the village head forwarded to be delivered to all citizens. Examples of how communities prepare for or respond to disasters namely preparing important papers, preparing transportation, knowing the evacuation routes, infrastructure, preparing a full citizen vigilance. Preparedness and disaster response efforts of the community namely people already know the assembly point and ready for further evacuated. After the
information to the community and they are ready to wait for orders thus after rising status to be alert the community is ready evacuated in quick time.

Are there any laws, policies or regulations related to disaster management in the country of Indonesia?

| Responses        | Amount | Percentage |
|------------------|--------|------------|
| Yes              | 45     | 30%        |
| No               | 0      | 0          |
| Do not know      | 105    | 70%        |

Does the community have their own policies or regulations related to disaster preparedness and response?

| Responses        | Amount | Percentage |
|------------------|--------|------------|
| Yes              | 105    | 70%        |
| No               | 45     | 30%        |
| Do not know      | 0      | 0          |

Disaster issues faced by people who are not covered by the national policy or laws or community among others concerning effort to recognize the signs of nature arising such as the air temperature rises, the animals of the forest go down, already visible hotspots at the top of Mountain.

Next steps recommended to reduce the health risks in emergencies and to improve disaster preparedness are to use masks for health, provision of decent evacuation facilities, the special room for special groups (infants, children, and the elderly), preparation of personal medicine. The presence of health service posts which participate in the rescue of disaster management for example through a mobile clinic.

Who is considered to be responsible for initiating the planning process?

| Responses                                         | Amount | Percentage |
|---------------------------------------------------|--------|------------|
| Members of the community                          | 15     | 10%        |
| Community leader                                  | 120    | 80%        |
| Municipal authorities or national authorities (BPBD and BNPB) | 15     | 10%        |
| Special NGO                                       | 0      | 0          |

The parties should be involved in planning the next steps to improve disaster preparedness and to reduce health risks such as government, community leaders, NGOs, volunteers, and the School Department.

Toughness education to face disaster in community: There has been available but considered not effective, it should have been made the flow of information and coordination with residents who have a vehicle, making it easier to evacuate residents when a disaster occurs, disaster simulation can be often done. Special handling at the time of the disaster occurs to risky community group (elderly, children, people with disabilities): There has not been available, so far this special group is evacuated beforehand, placement in refugee camps together with other residents. The hope is that the risky people should be addressed specifically, accompanied, served all the needs, given the special handling as well

The values that exist in the community or local wisdom related to disaster prevention/preparedness, namely: pasrah lan tawakkal (surrendering everything to God), feeling to be always protected by the God, togetherness with other citizens (urip ora urip manganese ora manganese sing penting bareng).
This research found the conceptual model of community resilience in post-disaster community namely partnership and institutional, education and engagement, available resources, and risk and vulnerability:

| Domain Areas            | Topics                                                                 |
|-------------------------|----------------------------------------------------------------------|
| Partnership and Institutional | Formal and informal relations between relevant institutions and community-based organizations (neighborhood associations, faith-based organization, business, etc) |
| Education and Engagement  | Preparedness education level, the activities carried on disaster preparedness and community resilience, perspective on the level of neighbor-to-neighbor reliance and voluntarian capacity, perspectives on the ability of community resilience and the ability to educate the community |
| Available Resources    | The values of personal / psychological strength that will be a force in the community, the resources availability of the various parties can be a force in the community, among others, family, school and other community organizations |
| Risk and Vulnerability | Activities relating to disaster preparedness, communication and response given, training and education, and community preparedness against vulnerable and risky groups such as children with special needs, the elderly, patients with mental disorders |

The results of this research can be summarized as follows:

| Domain Areas             | Research Result                                                                 |
|--------------------------|--------------------------------------------------------------------------------|
| Partnership and Institutional | • People agree that there are the most responsible parties for disaster preparedness  |
|                          | • Party responsible for disaster preparedness / emergency response in the community is the Ministry of Health |
|                          | • Parties outside the community are responsible for seeking to prepare and implement a disaster plan are national governments and volunteer groups |
|                          | • Community leaders are rated as the party responsible for initiating the planning process |
| Educational and Engagement | • Community considers the lack of knowledge about disaster management plan |
|                          | • Community needs to know about information material about health, disaster preparedness and disaster response comes from national authorities (government) |
|                          | • Community considers that disaster plan must have certain components in particular on the health aspects |
| Available Resources      | • Only a few people who have access to the Internet |
|                          | • The available information is expected in the language that is easily understood and can be used in the community |
|                          | • The available information can help people to prepare for disaster response |
|                          | • Television and radio become media which has important role in receiving information related to a disaster or emergency situation |
Community is not aware of any laws, policies or regulations related to disaster management in Indonesia

Community has its own policies or regulations related to disaster preparedness and response

Risk and Vulnerability

- Health problems experienced by the community when a disaster occurs are an outbreak of disease, contamination of water / lack of water and food shortages
- Groups in community are more affected by the disaster are parents and children

Disaster resilience should not be interpreted as an outcome but as a process. Community resilience can be seen as ‘a process linking a set of networked adaptive capacities to a positive trajectory of functioning and adaptation in constituent populations after a disturbance. It should consider sustainability the forefront of all community planning efforts in society. Community resilience defines as a process generated by grassroots groups that assume the responsibility for organising themselves in a collaborative, spontaneous and autonomous way, exploiting local skills, knowledge and resources, and using the disaster as an opportunity to ameliorate the social dynamics of the community and to enhance its sustainability [4]. The following section shows how the main elements identified in community resilience model in Cangkringan district Yogyakarta Province includes partnership and institutional relate to community based organizations, education and engagement, available resources (personal and culture values, psychological strength), also risk and vulnerability groups in society.

This is also in line with several community resilience programs implemented in other countries. Research conducted by Fois and Forino [5] described the development of post-disaster community resilience in the villages in the Pescomaggiore area, Italy after an earthquake L'Aquila in 2009. The occurred disaster becomes an opportunity for the development of community resilience in communities in the area. Studies of Colten, Grimsmore, and Simms [4] found that people in the coastal areas of Louisiana American who are as victims of cyclones and also the oil spill on the coast develop a model of community resilience after the disaster event. The development model of community resilience is based on the values of the local community and local knowledge, activities that enhance community resilience, external programs related to disaster mitigation, and post-disaster recovery programs.

5. Conclusion
A number of themes emerged in community resilience integrated model includes partnership and institutional relate to community based organizations, education and engagement, available resources (personal and culture values, psychological strength), also risk and vulnerability groups in society.

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