



## **Building Networks for Emergency Response Policies and Strategies in Hazardous Area of Mountain Slamet: Case Study in Pemalang District Central Java**

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### **ABSTRACT**

As introduction can be said that the initial assumption estimates the number of people affected by eruption of Mount Slamet in hazardous area are 215,953 people (BPBD Central Java, 2016). Unfortunately, there is a general tendency where people do not know how to act or respond to disasters. This research is urgent to discover the main determinant that can be used to make emergency response policies and build disaster reduction networks. In this framework the authors formulate several important issues, How to create a model of disaster reduction networks in disaster-prone areas (KRB) of Mount Slamet? Qualitative approach is used as methodology to answer research questions for understanding and describe a comprehensive and complete picture and the detail in case of disaster risk reduction. Theoretically, McEntire, David A and Gregg Dawson (2010) once said that disaster management requires the integration of policies, programs and execution involving many individuals and groups. The result of this study are; first, disaster risk cannot be solved by the government itself, but requires synergic cooperation from government, private and community elements. Second, participative model (networks) has made in disaster risk reduction networks in disaster-prone areas (KRB) of Mount Slamet. Discussion about the result product the recommendations: 1) It is required to allocate more unexpected funds for overcoming disaster. 2) It is required for regular coordination to update the contingency plan documents in accordance with the progress including updating the data on the availability of resources.

**Keywords:** Policy; Reduction; Disaster Risk; Networks and Eruption.

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### **1. Introduction**

Simple observations of the various disasters in Indonesia always show the same picture of a condition of unexpected reactive and spontaneous attitude expressed by society and government. There is a general tendency where people do not know how to act or respond to disasters. Recapitulation of

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Disaster Event Data between the periods 2014 to 2018 shows an increasing trend. BNPB (National Disaster Management Agency) released statistics on disaster occurrence in Indonesia.

Table 1.

*Disaster statistics in Indonesia throughout 2014 – 2018*

No.	Disaster Data	2014	2015	2016	2017	2018
1.	Number of Events (Occurance)	1.967	1.582	2.342	2.862	2.426
2.	Dead and missing (soul)	568	240	522	378	4.231
3.	Victim suffer, evacuate (soul)	2.680.133	1.180.000	3.050.000	3.220.000	3.060.000
4.	Damage to settlements (units)	51.577	24.365	70.000	98.302	339.969

Source: BNPB (2017)

Mount Slamet with a height of 3,428 meters above sea level is the highest mountain in Central Java and the second highest in Java. This mountain belongs to the areas of Brebes, Banyumas, Purbalingga, Tegal, and Pemalang, Central Java.

There are at least 2 (two) kinds of potential hazard disasters faced by the community around Mount Slamet, namely the primary threat and secondary threat. Primary threat potential is a volcano eruption type stromboli reaches a radius of 10 kilometers from the top of gravel and hot clouds. The potential secondary threat is the threat of ash rain that covers a radius of tens of kilometers from the peak and the descent of cold lava after eruption on the rivers that head on the slopes of Mount Slamet.

The number of people living in KRB (disaster-prone areas) KRB (disaster-prone areas) II of Mount Slamet and I is about 215,953 people (Center for Volcanology and Geological Hazard Mitigation, 2015). They are spread over the areas of Brebes, Banyumas, Purbalingga, Tegal, and Pemalang, Central Java. Seeing the extent of the affected area then the threat of catastrophic eruption of Mount Slamet can not be considered light. The potential for casualties and material loss will be substantial in the absence of effective disaster of risk reduction measures.

Based on preliminary observations then the formulation of research problems are as follows, How to create a model of disaster reduction networks in disaster-prone areas (KRB) of Mount Slamet?

## 2. Methodology

Qualitative research is used to understand the complex human and social problems, to describe a comprehensive and complete picture and the detail that comes from the informant in a natural state as it is. The type of data in this study is a combination of qualitative data and quantitative data. With regard to the type and source of data, this study has:

a. Primary Data: Qualitative primary data obtained through interviews and observation of the object of research. While the quantitative primary data obtained by using the questionnaire. This primary data relates to disaster risk reduction of Mount Slamet.

b. Secondary Data: Secondary data is data obtained from documentation of policy products on disaster risk reduction. The selection of informants is based on the dominant role taken during the risk reduction activities in the disaster prone areas of Mount Slamet, especially in Pulosari District, Pemalang Regency.

As platform theory, this research referred to (Anderson, Holcombe, Holm-Nielsen, & Della Monica, 2014; Correa, Ramírez, & Sanahuja, 2011; Di Gregorio & Soares, 2017; Parsons et al., 2016; Rappold et al., 2014; Rufat, Tate, Burton, & Maroof, 2015). Analysis of Disaster Risk Management classified A Contribution to the Creation of Public Policies. The World Bank Columbia and GFDRR (Global Facility for Disaster Reduction and Recovery). The focus of research is directed to variables: 1) The Role of Territorial Administration in Disaster Management, 2). Role of Sectoral Administration in Disaster Management and 3) Public and Private Sector Responsibility in Disaster Management. The research conducted in Colombia yields the following conclusions: 1). Conceptual progress that explains the relationship between disaster

management and development has not been achieved at the policy level, let alone integrated as an integral part of public administration 2). Disaster risk is increasing in urban and rural areas along with the lack of implementation, monitoring of tools and implementing policy planning and poor management of irrigation. If it is related to the research that will be conducted then this research is equally studying disaster risk management in the context of public administration. The difference lies in the theoretical approach in which (Campos, Martinho, & Paiva, 2013) highlights the aspects of public policy-making and the role of administrators, whereas researchers will look at it with actor-network theory approaches linked to disaster risk reduction. Another difference is that in previous studies highlighting only the role of administrators, this study will examine the relationships and roles of various actors in disaster risk reduction.

(Tsakiris, 2014) S, published 12 April 2012, linking The Actors throughout the Disaster Management Cycle by Agreement on Objective: A New Output Oriented Management Approach. This paper illustrates that disaster risk management is often fragmented due to lack of coordination between the actors involved. This output-oriented approach is bottom up in flood disaster management in Dortmund (Germany), forest fires in Greece and Italy. As proven that coordination between experts, stakeholders and decision-makers is necessary to ensure the inclusion point of all diverse and competitive values, including the number of opinions and claims.

Disaster is not a new phenomenon of humankind (Kusumasari & Alam, 2012). According to Kamus Besar Bahasa Indonesia, disaster means something that causes or causes distress, loss or suffering. While natural disasters mean that the disaster caused by nature (Fillah, Ishartono, & Fedryansyah, 2016). According to (Suarda, 2016) on Disaster Management, disaster is an event or series of events that threaten and disrupt the life and livelihood of the community caused by both natural and / or non-natural factors and human factors resulting in the occurrence of human lives, damage environment, property loss, and psychological impact. Disaster is a meeting of three elements, namely the threat of disaster, vulnerability, and ability triggered by an event.

Disaster risk reduction (DRR) is a systematic effort to identify, assess and mitigate disaster risks. DRR aims to reduce socio-economic vulnerability to disasters and deal with environmental hazards as well as other hazards that pose vulnerability (Twigg, 2004).

There is now a law on national disaster management (Pemerintah Republik Indonesia, 2007). The law serves as a basic guideline that regulates authority, rights, obligations and sanctions for all organizers and stakeholders in the field of disaster management. According to (Pemerintah Republik Indonesia, 2007), the implementation of disaster management in the event of potential disasters includes: (a) preparedness (b) early warning and (c) disaster mitigation.

Volcano disaster management will work well if carried out in an integrated manner between volcano monitoring that produces accurate visual and instrumental data, modern equipment, early warning systems, good communication equipment and supported by correct understanding and awareness.

### 3. Research result and discussion

#### 3.1 Regional profile of research objective

Disaster Prone Area II (Hazardous Area) is an area closest to the source of danger, so it will likely be affected by immediate hazards, such as hot clouds glide, lava flows and pyroclastic flows and rain lava. Disaster Prone Area I (Alert Area) is the area that is located further away from the source of danger. This area may be hit by ash, sand and lapili rain.

Slamet volcano is formed due to the consequences of subduction activity in southern Java Island where the Indo-Australian plate infiltrated northward down the Eurasian plate. Based on the geological map, the eruption activity of Mount Slamet generally occurs in 2 periods: 1) Slamet Tua (west) and 2) Slamet Muda (east). Slamet Tua has more explosive (pyroclastic flow) activity than Slamet Muda (lava flow) does. There are about 35 scoria cones in Slamet Muda's body (d: ~ 130-750 m, h: ~ 250 m) formed by basaltic eruption activity of Slamet Muda. The Trail of prehistoric eruption material in West 20 km, East 17 km, North 16 km, and South 17 km. The Danger of Volcano Eruption is as follows Primary Hazard is a danger that directly affects the population when the eruption progresses, such as:

Incandescent lava flows may be formed due to falling or collapsing of new lava dome or piles of old materials that are still hot at the top

Heat cloud (Pyroclastic Flow): Hot clouds are most damaging than other types of hazards. Hot clouds are the mass flow of heat (300-6000C) in the form of mixtures of gases and materials. Volcanoes of fire are composed of various sizes of clumps moving down.

Then, Secondary Hazard is a hazard that occurs after an eruption such as lava; volcanic mudflow is generated due to sediment of hot eruption/rain cloud (rain) and forms a concentrated stream flowing to a lower area on the volcano slope of fire.

Finally, yet importantly, Tertiary Hazard are a hazard due to environmental damage Volcanoes (loss of catchment/forest / springs and impacts from mining), burn and damage damaged environments. Turbulent with speeds up to 100-150 km / h, the character of the eruption of Slamet Volcano in general is the eruption of ash accompanied by bursts of sekoria and incandescent, occasionally issuing lava incandescent. The eruption lasted several days, in extraordinary circumstances reaching a few weeks. Based on the analysis of visual and seismic data from the Volcanology and Geological Disaster Mitigation Center (PVMBG) on March 10, 2014 at 21.00 WIB, the status of Slamet volcano activity was increased from Normal (level I) to alert (level II). In addition, on April 30, 2014 at 10:00 am, the status of Volcano Slamet activity was raised to standby (level III). Then on May 12, 2014 at 4 pm, Slamet volcano of activity status returns to alert (Level II) and on 12 August 2014 at 10.00 am Slamet volcano status is again raised to standby (Level III).

### 3.2 The emergency response policies and strategies in disaster-prone areas (KRB) of mount Slamet

The development of disaster event scenarios is a descriptive narrative explaining the results of research and analysis of PVMBG. To get the most is likely scenario and approach realistic, as well as based on scientific data and scientifically accountable, and the potential disaster of the latest data (update).

Development of impact scenarios or impact assumptions describes the expected impacts of disasters on aspects of people's lives and livelihoods, taking into account the vulnerability and local capacity of affected communities. The development of impact scenarios can be derived from risk map data or developed from hazard maps that are covered with data on disaster-affected aspects.

The social impact assumption of trauma in the community is the cessation of teaching and learning process of religious activity and other social aspects. While the assumption of impact on the economic aspects includes disruption of the economy/trade community such as damage to traditional markets, lack of basic necessities, damage to rice fields, livestock, plantation damage and so on. The development of socioeconomic impact assumptions can not only be presented in a quantitative form (quantity) but can also be presented in the form of a discriminatory impact of disasters that disrupt the socio-economic life of the community. The impact assumption on socioeconomic aspects can be seen in Table 2 below.

Table 2.

*Assumption impact oneconomic aspects of disaster erupsi volcano Slamet Pemalang district*

No.	Economic Aspect	Number	Threat	Criteria Damage/Injury		
				Light weight	Medium	Weight
1	Traditional Market	1	1	-	-	1
2	Rice Field	166,84	166,84	-	-	166,84
3	Agricultural Product	-	-	-	-	-
	Rice	2.290	2.290	-	-	2.290
	Corn	2.400	2.400	-	-	2.400
4	Ternak (Cow & Buffalo)	306/4	306/4	-	-	30/0
	Goat	9836	9836	-	-	90

Source: BPBD Kabupaten Pemalang

Environmental impact assumptions may include pollution and environmental damage such as pollution of water sources, residents, air and smoke pollution, damage to plantation land, etc. The impact assumption on environmental aspects can be seen in table 3 as follows.

Table 3.

Assumption of impact on the government service aspect of disaster of mount slamet eruption in pemalang district.

No	Neighbourhood Aspect	Amount (Ha)	Threatened(Ha)	Damage Criteria			
				Light (Ha)	Medium (Ha)	Weight (Ha)	Not Damaged (Ha)
1	Rice Fields	166,84	166,84	-	-	166,84	-
2	Gardens	4.217,17	4.217,17	-	-	4.217,17	-
3	Yard	1.046	1.046	-	-	1.046	-

Source: BPBD Kabupaten Pemalang

No	Aspect of Service	Length of disorder function (hari)	Description
1.	Clekatakan Village office	7 Days	Roof village office collapsed
2.	Batursari Village office	7 Days	Defective equipment
3.	Penakir Village office	7 Days	Document is corrupted
4.	Gunungsari Village office	7 Days	The authorities evacuated
5.	Jurangmangu Village office	7 Days	
6.	office	7 Days	
7.	Gambuhan Village office	7 Days	
	Siremeng Village office		
	PKD (health centre) 7		
	villages impacted		
	PUSTU (health centre) 6		
	villages impacted		

Source: BPBD Kabupaten Pemalang

Assumption of impact on the aspect of government service in the form of disruption of service to the public due to the damaged office building, damaged equipment, documents, and officers who participated become disaster victims / displaced. The assumption of the impact of government service aspects can be seen in Table 3.

In order to handle the victims caused by the eruption of Mount Slamet eruption, Pemalang District Government will set the policy and emergency response strategy. Emergency Response Policies and Strategies are emergency response principles or respond to emergency response situations in accordance with disaster scenarios and predetermined disaster impact scenarios. It is an explanation of the general objectives to be achieved by each cluster in emergency management. While strategy is an operational technical activity must be done to achieve the goal. The purpose of emergency management is focused on life-saving, management and coordination of emergency response, basic needs fulfillment, evacuation, health, the fulfillment of logistics and improvement of vital facilities and infrastructure and public facilities as soon as possible.

Therefore, the policy that will be pursued is:

Establish an emergency response time of 14 (fourteen) days.

Mobilize all resources and potentials available for use in emergency response, and participatory.

Coordinate disaster management activities are undertaken by various governments, private and public institutions, in management and control, management of aid up to the proper storage and distribution on target.

Conducting disaster management activities with evacuation activities, saving victims, and health services.



Implementing the activities of disaster response with evacuation activities, basic needs such as food, clothing, shelter, and toilets and clean water

Implementing livestock business (cattle, goats, buffalo and others) can be saved.

Provide comprehensive security in disaster areas, refugee camps, gathering points, evacuation routes, aid distribution channels, and relief warehouses, as well as other vital areas.

Monitor and report losses incurred by disasters, both property and life.

Then, The strategy for emergency response is:

Establishment of Master Posts as well as Field Post in affected sub-districts to accommodate and provide information about the current situation and condition related to the eruption of Mount Slamet eruption.

Instructs all Disaster Management teams to carry out their tasks accordingly;

Prioritize first aid to vulnerable groups, ie the elderly, children, hospital patients, the disabled, and pregnant women

Preparing all health care facilities (Ambulance, Medical personnel, Medicines) and public services (logistics, public kitchen, toilets, clean water, tents, blankets, etc.)

Conduct accurate data on the number of victims, the amount of assistance needed and the assistance available and the officers who will distribute the aid.

Evacuate large livestock such as cattle, goats, buffalo, and others in danger zone to a safer location.

To instruct security personnel are to conduct security and sterilization in disaster-prone areas.

Inventory all losses / casualties caused by the disaster.

Approve assistance to Provincial and Central Government if the impact of the disaster is large enough.

Evaluate and provide accountability reports on the implementation of activities that have been implemented and follow-up planned. (source: BPBD Pemalang, 2016)

### 3.3 Disaster reduction networks

Phenomenon in the field shows that the presence of networks in disaster management has been carried out. On January 21, 2009 at Baturraden Banyumas, an agreement was established to establish "Safe Slamet" (Mount Slamet Community Alliance) consisting of elements from LPPM Universitas Muhammadiyah Purwokerto, LSM KOMPLEET, Nature lover Raden Pala, Dream-UPN Yogyakarta, Pager Gunung, LMDH (Village Society Institute Forest) Gempita, MDMC, SPKP, LMDH Jagawana, LPPSLH, RAPI (Indonesian Inter-Population Radio) Banyumas, and ORARI Banyumas. The recommendations produced by this alliance are "Internalizing Disaster Risk Reduction efforts into Regional Development plans" (UNISDR, 2009). As a start, the formation of this alliance is an important "entry point" towards the establishment of disaster risk reduction forums. September 2010 more than 20 members of the Indonesian Red Cross and a number of non-governmental organizations joined in the Mount Slamet Forum were dispatched as volunteers for the Mount Merapi disaster as well as to study the response to the disaster of volcanic eruptions. (Kompas.com10/29/2010).

From this, it can be seen that goodwill for disaster risk reduction together has been initiated from the beginning. Subsequently at the end of 2010, no less than 100 activists represented NGOs, Universities, Forest Village Community Institutions (LMDH), Village Head Associations, SAR, PMI, Scouts, ORARI, to delegates from the Brebes, Banyumas, Pemalang, Purbalingga and Tegal Regencies. These are from various agencies such as the Regional Disaster Management Agency (BPBD), Kesbangpolinmas, Bappeda, DPU, ESDM Office, and the Agriculture and Plantation Service Office held a Slamet Congress Forum (Mountain) for the purpose of disaster risk reduction (Kompas Central Java Edition, Monday 1 November 2010). This meeting confirmed the impression of a shared will that was strong enough for disaster risk reduction

A large number of stakeholders associated with the risk reduction of the Mount Slamet eruption has the potential to cause conflict. Usually, conflict arises due to the absence of tolerance and understanding of each other's individual needs (Agus Riyanto, Abdatush Sholihah, & Cahyadi, 2019). The network model is generally composed of various actors who often have overlapping and different goals (Gorard & Smith, 2004). The dissolution of BAKORWIL III which has been "overseeing" the Slamet Forum

network (Kompas.com, 2016), the release of disaster volunteers from the Slamet Forum because it does not fit the bureaucratic rigidity (interview, 2018). In addition, the low level of communication between elements of the regional government from Pemalang district, Brebes, Banyumas, Purbalingga and Tegal (Okezone.com, Wednesday January 21 2015) are some examples of the dynamics of network conflicts that have occurred.

The next problem in the Gunung Slamet PRB network is the lack of coordination so that each stakeholder tends to work independently. In fact, natural disasters often occur in locations that are borders of many administrative regions. As in the case of the rise of Mount Slamet's active is the status from standby III at the end of December 2014. Preparations for disaster should involve five districts, which are the locations of Mount Slamet namely Pemalang, Brebes, Banyumas, Purbalingga and Tegal. However, among regional heads as if they were running on their own, there was no coordination (Okezone.com, Wednesday 21 January 2015). This low coordination can be the beginning of network failure.

The network in the disaster risk reduction of Mount Slamet is indeed still very weak. The existence of the Slamet forum as a network across districts and across actors (government, private sector, community, and universities) has long been inactive after the BAKORWIL (Regional Coordination Agency) was frozen. Because the form is only a kind of association and not a formal legal organization, the rules made in its nature are considered not legally binding (Nabiul Umam, Slamet Forum Initiator, 2018). Practically it can be said that the disaster risk reduction network of Mount Slamet is now experiencing a setback.

Based on information obtained from various sources, visually the existence of the network in Mount Slamet disaster risk reduction can be seen in the picture below.

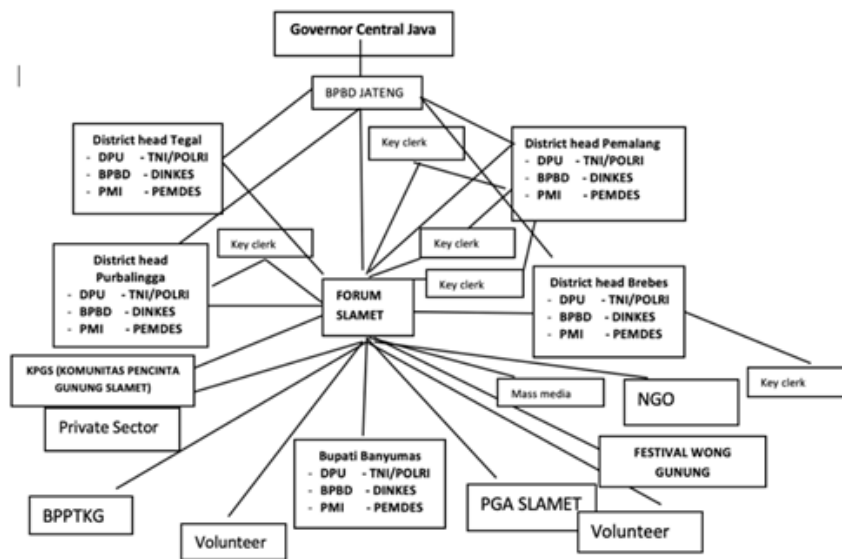


Figure 1. Existing Condition the actor network in the Slamet Volcano PRB

It is unfortunate if the existence of a disaster risk reduction network is now even weaker. The visible indicators are less coordinated emergency response activities; the small role of the parties; sectoral ego that is more advanced; relatively disproportionate budget; and lack of understanding of disaster risk reduction (source: forumslamet.blogspot.com, 2010). No more networks are seen in efforts to reduce disaster risk both by the local government and by the community.

#### 4. Discussion

Frequent disaster situations hit the condition of the community, making disaster a common and public problem that requires the presence of collective intervention actions from public administration (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). The Clear relations between disasters and public administration can be explained through a pattern of collective intervention from public administration in disaster management. First, public administration also plays practically and normatively-regulatively (through policy instruments) in various resource utilization activities; second, the public administration

is directly or indirectly responsible for situations that create losses to the community; third, the public administration is directly responsible for providing protection, handling and preventing various possible impacts of disasters on the community (Ulum, 2013). The presence of public administration in disaster management is a form of state representation that is always awaited by the community. The reference is clear, namely (Pemerintah Republik Indonesia, 2007) concerning disaster management, which requires the implementation of disaster management in a planned, coordinated, integrated and comprehensive manner.

The area around Mount Slamet is actually not only a residential area but also a place for centres of agroindustry, economy and tourism and even planned to be the centre of Geothermal Power Plants (Renkon Gunung Slamet, BPBD Pemalang, 2014 and designers, July 24, 2017). Ironically, the higher social and economic activities around Mount Slamet are not accompanied by mitigation preparedness and disaster risk reduction (Forum Slamet, 2010). While at the same time the vulnerability to the potential for disasters has begun to be displayed by Mount Slamet, namely the occurrence of mountain eruptions which are quite frequent (although small scale), forest fires; landslide; windstorm; droughts and flash floods (as quoted from PVMBG, 2015, <http://forumslamet.blogspot.com/>, 2010 and SCTV news.com, 2014). As if, we are unaware of the potential for disasters that lurk at any time.

Borrowing the perspective of total disaster risk management requires a mitigation strategy that is integrated into multi-stakeholder relations that involves the real role of people living in disaster-prone areas (Kusumastuti, Viverita, Husodo, Suardi, & Danarsari, 2014). The Improvement of services from the Government, regional governments, and increasing community capacity through disaster information and training needs to be done (Minister of Energy and Mineral Resources Regulation No. 15/2011). It is clear that disaster management is not only the responsibility of the government. Initiatives to form multisector and multidisciplinary networks for disaster risk reduction must also emerge from the community at the local level.

The ideal network should be built from a process of communication or relationship, sharing ideas, information, and resources on the basis of mutual trust and mutual benefit between the networked parties, which are outlined in the form of a memorandum of understanding or certain contractual agreements to achieve success together greater (Pirnejad, Bal, & Berg, 2008). For that there are several elements that must be fulfilled before networking, namely: 1) There are two or more organizations; 2) Having a common vision in achieving organizational goals; 3) There is an understanding or agreement; 4) Mutual trust and need; and 5) Shared commitment to achieve greater goals.

Appropriate network management is needed because disaster management is not only the responsibility of the government. Such understanding is in line with the conception of collaborative public leadership (Agranoff, 2007). Initiatives to form multisectoral and multidisciplinary networks for disaster risk reduction must also emerge from the local level community (source: quoted from the statement of the Head of BNPB on [kompas.com](http://kompas.com), 11/20/2008). For this reason, early preparedness in dealing with disasters is something that cannot be negotiated.

In the case of Volcanoes, Slamet is actually a normal status that is "propped" by the current PVMBG (Center for Volcanology and Disaster Mitigation), not related to activities that carry out unnecessary risks (Pemerintah Republik Indonesia, 2007) concerning Article 5 must be carried out through a) disaster management planning; b) disaster risk issues; c) delay; d) integration in development planning; e) disaster risk analysis requirements; f). enforcement of spatial plans; g) education and training; and h) requirements for technical standards for disaster management. Looking at the reality between the condition of the ideal network and the real network, we can agree to guard against the most basic disaster management efforts, namely network initiation.

The disaster risk reduction (DRR) activity itself includes a). Introduction and monitoring of disaster risk b). Disaster management participatory planning c). Development of disaster awareness culture; d). increased commitment to disaster management actors; and e). Application of physical, non-physical, and disaster management arrangements (article 37 paragraphs (2) of ACT Number 24 in 2007 concerning Disaster Management). Thus, there is no reason not to make efforts to reduce disaster risk, even though the status of the mountain is normal.

After all, discussion about the resulting product the recommendations: 1) it is required to allocate more unexpected funds for overcoming disaster. 2) It is required for regular coordination to update the contingency plan documents in accordance with the progress including updating the data on the



availability of resources. Thus it is hoped that later the theme of disaster management will no longer be a peripheral issue but will become mainstream (playing sterile) in disaster risk reduction policies in Indonesia.

## 5. Conclusion

Disaster risk of reduction networks in the disaster-prone areas of Mount Slamet in Pemalang district has not been established. Various existing actors, be they the government, the private sector, the public, the mass media or academics tend to mix independently without effective communication. For this reason, a joint effort is needed through a participatory disaster risk reduction network that includes: 1). introduction and monitoring of disaster risk; 2). disaster management participatory planning; 3). development of disaster awareness culture; 4). increased commitment to disaster management actors; and 5). the application of physical, non-physical, and disaster management arrangements. Ensure that disaster management activities are not only the responsibility of the government, but local community initiatives must also be involved so that a resilient community is formed through a risk reduction network involving all parties.

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