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The Interpretation of Structural and Cultural Mitigation for the People of South Slope Merapi Volcano

Nugroho Hari Purnomo

*"Department of Geography Education, Faculty of Social Sciences, State University of Surabaya
Ketintang Campus, Surabaya, Indonesia"*

Abstract

Since 1960's the government of Indonesia has intensively built structural mitigation infrastructure on the slopes of Merapi before it erupted in 2010. In the other hand, the community has been introduced cultural mitigation inherited by their ancestors. The problem is the way how they understand both mitigation models.

This study aims to determine people's interpretation towards cultural and structural mitigation before and after the eruption of Merapi volcano in 2010. The study used in-depth interviews method to victims of Merapi eruption in 2010, who live in disaster prone areas (KRB) II and III on the southern slope of Kepuharjo and Umbulharjo village, Cangkringan, Sleman, Yogyakarta. The hermeneutic analysis is applied to interpretative ideas associated with an analog understood from the oral and textual data. The analysis is supported by the historical literature, which gives an overview of Merapi for its community in the past.

The study results that people's interpretation of cultural and structural mitigation in Merapi society can be divided into two based on time before and after its eruption in 2010. The first groups or ones with ideas before the eruption, cultural mitigation is more meaningful for them and after eruption they combine it as an integrated cultural and structural mitigation. While the second community, before and after eruption, they have already made sense of integrated cultural and structural mitigation. In cultural mitigation, in interacting with nature, they understand about the fate of life that comes from the Javanese philosophy and beliefs of the Merapi volcano. In structural mitigation, the government constructs people to make sense that based on scientific rationality their life with nature on the slopes of Merapi volcano can emerge a risk of disaster anytime.

Keywords: interpretation, mitigation, cultural, structural.

A. Background

Mitigation is a series of efforts to reduce disaster risks not only through physical development but also awareness and capacity improvement to deal with threat of the disaster¹. Mitigation measures to reduce disaster risk for the people who live in disaster-prone areas. Mitigation activities can be done through (1) the implementation of spatial planning, (2) regulation of development, (3) infrastructure development, (4) building settlement, and (5) providing education, counseling, and training, both conventional and modern.

In general, mitigation can be divided into structural and non-structural. Structural mitigation is the external side of society related to the system of government public policy, in the form of infrastructure and non-infrastructure. Since 1960's until just before the eruption of Merapi volcano in 2010, the government has very intensively developed structural mitigation infrastructure built on the slopes of Merapi volcano. Some

structural mitigation activities are (1) preparation of disaster-prone areas map, (2) sabo dams, and (3) development of early warning systems.

Meanwhile, in their own communities, for generations of their ancestors, they have known non-structural mitigation or called as a cultural mitigation. Cultural mitigation is the internal side of communities associated with the system of local life in the form of wisdom interacting with the natural environment. Cultural mitigation activities reflect the internal factors that are expressed through cultural norms and rituals of life.

Before and after the eruption of Merapi volcano in 2010, the two forms of mitigation disaster have been constructed in public perception of people in the southern slope of Merapi. The matter was the extent to which people make sense of the two forms of mitigation, especially before and after the eruption of Merapi volcano in 2010. This study aims to determine people's perception towards cultural and structural mitigation before and after the eruption in 2010. The study provides an overview of mitigation for people lives after they have a big eruption.

B. Research Methods

The study is based on the inductive logical with qualitative analysis, the research procedures which produce descriptive data obtained from observable speech, writing, and behavior of people who serve as research subjects ². The main sources of data as the instruments are victim residents of Merapi eruption who live in disaster prone areas (DPA) II or III, based on the map DPA in 2002 ³ – Kepuharjo and Umbulharjo village, Cangkringan, Sleman regency, Yogyakarta province. The main criterion is habitable homes by light to moderate repairs. Specifically, the informants are people who live in Pelemsari, Pangukrejo, and Kopeng sub-village, whose settlements are immediately adjacent to the forefront border of the pyroclastic field resulted by eruption in 2010. In this study, heads of household are selected to become the main source of information as well as adult family member as supporting informan. The experiment was conducted a half year after the eruption when emergency response phase was over, around May - June 2011.

The descriptive analysis was used based on interpretation associated with an analogous meaning as understood from the oral and textual data. Hermeneutical meaning approach is applied and based on the concept of sustainable livelihoods ⁴. Experiences in life and perceived by informants and the construction of thought they understood from their ancestors, as well as knowledge of various sources of information are the sources to get their meaning. The analysis is supported by documents and historical literature, which can also give ideas how people think of Merapi volcano in the past and it develops in the present.

C. Results and Discussion

The results of in-depth interviews show that the well-known structural form of mitigation before eruption in 2010 are sabo dam or retaining sediment and the sirens or loudspeakers tower. While the presence of DPA Map of Merapi volcano in 2002 is less known by the public. At the time of Merapi volcano eruption, structural mitigation took place as suggestions from the Government through television, radio, newspapers, and village officials.

All informants interpret the existence tower sirens and loudspeakers positively, it is very useful when Merapi volcano activity increases. Decision to evacuate is determined by the sound of the sirens from the tower. In mitigation structures, the presence of the tower sirens and loudspeakers are an essential part of early warning systems.

Once, sediment retaining dam had made controversy when Merapi erupted in 2006. Pyroclastic or hot cloud in Gendol river overflow and buried Kaliadem tourism object. The overflow was suspected as pyroclastic flow hit sabo dam built on the east Kaliadem at a distance of about 4 kilometers from the peak of Merapi Volcano. Most informants agreed with it but others did not really have the same opinions. In 2010,

however, when Merapi blew the lava, their opinion was right because the sabo pockets were full of pyroclastic lava and overflowed the river channel and inundated farmland, even the settlements along the river. It made all the informants agree that sediment retaining dam was more favorable for downstream communities but dangerous to those living in the upper reaches.

Along Gendol river, the southern slope of Merapi Volcano, there are as many as 19 blocks of sediment retaining dam⁵. In 2010 eruption, pyroclastic flow through 13 sediment retention dams and stopped at dam sediment no 14 or GE-C dam (Plumbon II), about 17 kilometers from the peak of Merapi Volcano. A half year after its eruption in 2010, Merapi made flood of cold lava upon the 18th retaining sediment dam, the GE-C dam (Rogobangsan) or about 20 kilometers from the peak of Merapi Volcano, which inundated settlements and agricultural farm. It made the informants curious about the presence of sediment retaining dam or sabo.

The informants have never seen the DPA (Disaster Prone Areas) map after Merapi Volcano in 2010. Some of them say that they have heard their residence position at DPA II or III based on the map but they do not understand it in depth. Even some informants give negative meaning on the DPA map, because they have to abandon their settlement position and be relocated according to the map. Their ignorance and lack of understanding on the map are as a result of the lack of map promotion and make improper interpretation of it.

Meanwhile, cultural mitigation before Merapi Volcano eruption in 2010 known by the public was ceremonial activities. Through rituals, people are always reminded of their existence and their relationship with the environment. In addition, traditional ceremonies are communication form between people and the supernatural nature as the source of fertility and prosperity. They remind each other about many things, including the development of Merapi volcano behavior, in ceremonial activities. These things are often known as cultural mitigation. The fundamental values of the various cultural activities are the value of harmony, unity, and respect to the environment in obtaining real prosperity⁶.

One of traditional ceremonies held regularly by the informants is *Suran* – held on the 1st Suro (the first month of Javanese calendar). Another ceremony is *Nyadran* which is held on Ruwah (the eighth month of Javanese calendar). Meanwhile, *labuhan* ceremony organized every year by the Kraton Yogyakarta and led by Mbah Marijan or Merapi Volcano caretaker is not always followed by all informants. It happens also to certain ceremonial rituals related to the Merapi volcano which is hardly recognized by the informants. Quite possibly that the last two forms of ceremonies do not have any urgency to their daily lives.

Old informants state that there is a habit in every *Sura* month – Merapi volcano always sounds a roar, lava flood, or explosion. Javanese customs in the month are performing ritual to clean and wash up the body, cleaning the environment and making pilgrimages to sacred places. They think that there is a palace on the top of Merapi volcano and there are also the same activities in *Sura* month. The realization of that activity is a discharge of gas, ash, sand, and volcanic rocks, which are considered as impurities of Kraton Merapi. In addition to every *Sura*, once in 8 years or Wawu year (one of the 8 names in the Javanese calendar), Merapi volcano will regularly erupt relatively large. The view is what drives people to do ritual *Suran*, an annual feast.

Not only *Suran*, the informants also run *Nyadran* ceremony. Old informants believe that the victims of Merapi Volcano eruptions are the ones who have done wrong to Merapi Grandmother (a term for the ruler of Merapi palace), forget about ancestry and customs, as well as have a lot of sin. Ancestors here include the rulers of Merapi and the forerunner of villages nearby. Well known names of the Merapi occupants can be divided into ancestor, servant, and spirits. In order not to make mistakes, sins, and forgotten ancestors, the *Nyadran* held annually.

The two ceremonies, *Suran* and *Nyadran*, which are preserved by the informants, have deep meaning in the nature of cultural mitigation. *Suran* ceremonies cannot be separated from the natural activity of Merapi supernatural palace in each of Javanese New Year or every eight years which the vulcanologists describe as Merapi volcano eruption cycle. The ceremony could not be separated from the belief in life beyond the human realm interaction. Good harmony between people in the real world with the supernatural life in the Merapi Palace must be maintained so that people in the real world can survive and prosper. Triyoga⁷ stated that the

ceremony functions to neutralize the disaster that comes from outside the power of human beings, especially those coming from the supernatural of Merapi palace. The ceremony can lead bad spirits neutralized or converted into good ones or even helpers. In ceremonies, people get peace with spirits, embodied in eating together. They serve prayers and mantras along with offerings of food, flowers, and incense expecting spirits to repay them unobtrusive life and provide safety to residents.

Kaplan and Manners⁸ and Koentjaraningrat⁹ view cultural value system in a culture developed by Kluckhohn, the nature of human relationships with the natural surroundings, the southern slope of Merapi Volcano is included in perception to maintain harmony with nature. In other cultures, there is a view that nature as something very powerful so that people can only surrender without any efforts to change it. In the other hand, many cultures, especially modern culture see nature as something to be resisted by the people and the duty of man to conquer nature. This perception encourages people to do the ritual of festivity every year. The view of human harmony with nature has become a force for the public confidence managing the disaster. Faith is a human capital in southern slope of Merapi Volcano in adapting to the mountain, instead of avoiding or against it.

Basically, Javanese are taught not to master the nature but to adjust to the mysterious of natural life. The behavior of noticing the nature movement or *titen* is a wise conduct as a legacy of the ancestors. With *titen* behavior, they have developed many concepts of life. For example, when Merapi volcano will erupt, the signs can be seen through various medium such as the real and the supernatural. The dreams experienced by some people sometimes have to be interpreted together. Likewise, the forbidden sacred places in various locations of Merapi volcano avoided for activity, the code of actions should be maintained when people passes a certain point are the result of life experiences of the ancestors in understanding the real nature and the supernatural. This is how they appreciate their ancestors. Remembering ancestors is an effort to inherit policies once taught and the most important thing is to continue the *titen* behavior to the volcano, as the embodiment of cultural mitigation. The policy maintains harmony with nature and can be realized to the next generation¹⁰. This is what makes a visit to the ancestral graves very meaningful to society in *Nyadran* ceremonies in Ruwah.

The confidence of the cultural mitigation built through rituals is essentially to interpret wise behavior of the ancestors who noticed the dynamics of Merapi Volcano, natural environment, and the lives of people from time to time. Triyoga¹¹ and understanding of some informants, the precursor of the village started by Kyai Wonodriyo and his followers who inhabited in the 1850s, as fugitives to avoid the growing force political applied by the Dutch colonial government. After living in the surrounding areas, Kyai Wonodriyo was appointed as caretaker of Merapi Volcano and the village chief by the King of Yogyakarta Palace, Sri Sultan Hamengkubuwono VII. Kyai Wonodriyo inherited his experiences up to his last generation known as Mbah Marijan, a source of information that has been reconstructed in the cultural mitigation. These factors make people put faith in the ancestors and descendants.

However, the dynamics of the Merapi volcano eruption is a geological events that have been taking place since more than 400,000 years ago^{12,13}. The people of Umbulharjo and Kepuharjo village started to live there since 160 years ago, that's why it seems that they have not yet fully experienced with the great eruption of Merapi Volcano. Large eruption of Merapi with Volcanic Eruption Index (VEI) about 3 and 4 were in 1846 – 1849, 1872, 1930, and 1961, the region affecting human life directed to the eastern slopes of Merapi volcano or Magelang¹⁴. It makes *titen* heritage society of Kepuharjo and Umbulharjo is very limited in small eruption dynamics.

The description actually shows the weakness of cultural mitigation towards geological disaster of volcanic eruption. *Titen* are based on a very limited experience of life time. While the geological events that could lead to a catastrophic is event with longer time scale. A memorable eruption of Merapi Volcano experienced in Umbulharjo and Kepuharjo was in 2006, because the flows went directly to the village. Pyroclastic flew about 4 miles from the peak of Merapi Volcano and just destroyed the tourist area in the village of Kaliadem Kepuharjo. While in 2010 the hot clouds reached about 17 kilometers from the peak of Merapi Volcano.

In contrast, structural mitigation is not merely based on historical experience of eruption in a certain place but also study of geological history that is longer from various sectors of slopes, as well as comparison with other types of volcanoes. Structural mitigation is also organized by many aspects to allow for accuracy in the implementation of mitigation. However, the experience of the structural mitigation is more top-down which does not touch people's understanding, such as the construction of sabo dams and the presence of DPA map. This often results in disputes between communities and Government ¹⁵.

Based on the above interpretation from the informants and some supporting references, it is concluded that there are two groups of people in understanding cultural and structural mitigation before and after the eruption in 2010. First group community, before the eruption think that cultural mitigation is more meaningful for the community, and after eruption, they integrate cultural and structural mitigation. The group is represented by the informant who lives in the village adjacent to Umbulharjo village where Mbah Marijan inhabited and whose houses were damaged by the eruption on October 26, 2010. The second community, before and after eruption, society has made sense cultural and structural mitigation in an integrated way. The group consists of the informants in Kepuharjo village which is very far from Mbah Marijan's house, and their houses were damaged in the eruption on 5 November 2010.

Eruption on October 26, 2010 which resulted in the death of Mbah Marijan was an event that potentially diminishes the cultural mitigation based on Merapi caretaker confidence. Instead, it strengthens confidence in the structural mitigation appealed by the government. This condition made first group who did not pay much attention on structural mitigation, got many valuable lessons. Eruption in 2010 turned out to go beyond their estimation so far. Luckily, the government has prepared all to anticipate a major disaster although there are still many limitations. Meanwhile, other community groups have left their homes voluntarily when the government decided to act refugee and they have received information from various sources.

After eruption in 2010, people began to reconstruct the cultural and structural mitigation meaning to their lives. Physical living conditions, social, economic, cultural, and psychological communities which have been being recovered normally could help informants interpreting the cultural and structural mitigation in an integrated manner. They were not sure to Government's decision and plans concerning about the continuation of their residence. Fortunately, for everyday life, they have a toughness on their own, although it is open to obtain aid from various sources, some of which were facilitated by the Government.

A half-year after eruption, a dialogue between cultural and structural mitigation supporters will be very meaningful to the community. The informants hold the sense about the fate of life that comes from religious beliefs, Javanese philosophy of life, and beliefs in Merapi Volcano in life interacting with nature. It means that they keep cultural traditions going on. This is social capital and human capital in the face of shocks caused by the disaster.

The informants acknowledged the role of government in protecting, providing information, referrals, and assistance when Merapi volcano status increased, and when they were in a panic due to catastrophic eruption. The government role within emergency response also gives a positive meaning for the informants. They realize that what the government told was not always with particular interest. This means that the government effort in constructing them to mean, that life with nature Merapi Volcano is risky for disaster by scientific rationality, can be accepted. According to Indiyanto ¹⁶, the technical and mystical indicators in volcanic eruption refers to a similar phenomenon but use different languages to read, interpret, and communicate them.

D. Conclusions and Recommendations

The results show that the society perception of cultural and structural mitigation can be divided into two based on time, before and after the eruption in 2010. First group community, before the eruption, believes that cultural mitigation is more meaningful, while after eruption they integrated cultural and structural mitigation. The second community, before and after the eruption, make sense in an integrated cultural and structural mitigation. In cultural mitigation community interaction with nature based on life destiny oriented that

originated from Javanese philosophy of life and beliefs of the Merapi Volcano. As for structural mitigation, the government constructs the public to interpret, that life with Merapi volcano always derives risk of disaster based on scientific rationality. This study suggests that it needs more in-depth study on how to combine the structural and cultural mitigation in managing the southern slopes of Merapi volcano.

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