

MANAGEMENT AND ASSESSMENT OF
ENVIRONMENTAL CONSERVATION
IN LANDSLIDE AREAS
IN KARANGKOBAR DISTRICT,
BANJARNEGARA REGENCY,
JAVA PROVINCE

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A B S T R A C T

The high potential of natural disasters is basically a reflection of natural phenomena that are geographically very distinctive for Indonesian soil territory. One of the recent disasters that happened was the landslide. Banjarnegara is the most vulnerable regency in Central Java Province, and Karangkoobar District is the most vulnerable landslide in Banjarnegara (Karnawati, 2014). The landslide disaster that occurred in Jemblung, Sampang Village, Karangkoobar District is one of the many landslide that used as the discussion. Like the flash flood disaster in Garut, West Java, Wednesday dawn 21 September 2016 which is reminds the landslide that occurred in Banjarnegara (Ganjar Pranowo, 2016). This study aims to reveal how 1) the effect of landslide on environmental degradation in Karangkoobar District, Banjarnegara Regency; And 2) conservation efforts that have been done as landslide mitigation in Karangkoobar District, Banjarnegara Regency. The method used is survei method. The data collected are primary data from field observation and secondary data from related departments and previous research. Based on the research results obtained information: various efforts have been made during and after the landslide. Evacuations and assistance flow from various parties, but the most effective is direct assistance in the form of money or goods directly delivered to the victims. Victims of Jemblung landslide relocated to Suren, Ambal Village in Karangkoobar District. The former landslide settlement has been reforested while the landslide hill is still like a landslide. Landslide in Karangkoobar has increased the awareness of various parties and encourage various disaster mitigation efforts that have not been implemented before. The mitigation efforts undertaken are simple

EWS installation, and disaster-prone village training which is still limited to the middle-class village landslide and the first-class village landslide in Karangobar District.

KEYWORDS : landslide, Banjarnegara, Karangobar, Jemblung Landslide, disaster mitigation

INTRODUCTION

Background

According to Law Number 24 Year 2007, disasters are events or series of events that threaten and disturb the lives and livelihoods of the community caused by both natural and non-natural factors as well as human factors resulting in human casualties, environmental damage, property loss objects, and psychological impacts. Disaster is a meeting of three elements, namely the threat of disaster, vulnerability, and ability triggered by an incident (Saputra, 2015).

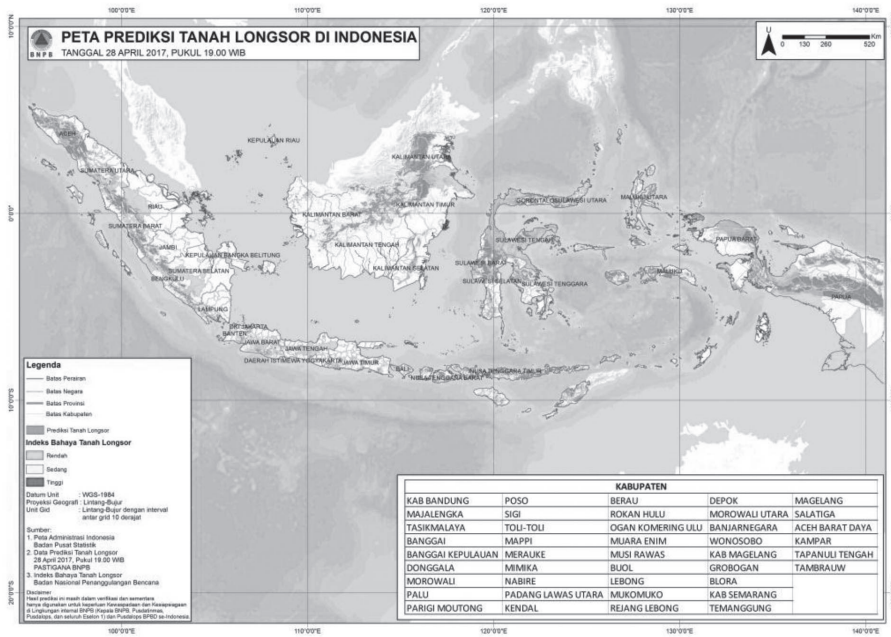
Disasters are grouped into three types, namely natural disasters, non-natural disasters, and social disasters. Indonesia is a country that has three types of disaster. The natural potential of disasters in Indonesia such as earthquake, tsunami, flood, landslide, volcanic eruption, drought and others have an impact on environmental degradation. Non-natural disasters include technological failures, epidemics and disease outbreaks, while social disasters include social conflicts and terrorism (Rahman, 2015). One of the recent disasters that occurred among them was landslides (read: landslides in the past month occurred in various cities accessed at <http://www.liputan6.com/tag/longsor> on October 25, 2016).

Landslide is a product of the process of disturbance of balance which causes the movement of soil and rock mass from a higher location to a lower location. Movement of landslide material that is relatively fast causing casualties and property of the population is called natural disaster landslide. The factors causing landslides are naturally include surface morphology of earth, lithology, soil, slopes, and high intensity of rainfall. In addition, landslides are affected by human activities such as land conversion, agricultural land use, and settlements. Unsuitable land use such as dense settlements in the slopes will burden the slopes, potentially causing landslides. High rainfall relatively also increases the potential of landslides. The landslide threatens the safety of the human life and affects human survival.

Indonesia, which is part of hilly and mountainous areas, caused some parts of Indonesia to become prone areas of landslide events. The high intensity of rainfall and the occurrence of frequent earthquakes will naturally trigger the occurrence of landslide disaster (Suranto, 2008). Furthermore, the

potential spread of landslides in Indonesia is presented in Figure 1. as follows.

Figure 1. Map of Landslide Prediction in Indonesia



Source: BNPB, 2017

Based on the map (Figure 1.), Banjarnegara including one of the Regency that became the location of landslides in Indonesia.

Landslides have recently increased in frequency. In 2003 there were 266 landslides and in 2013 there were 822 landslides. The impacts caused by landslide and flood in 2003-2013 total of the deaths as many as 5.650 people or an average of 514 people per year, while 1.5 million people on average are displaced and suffered (Nugroho, 2014, Utomo, 2015). Center for Volcanology and Geological Hazard Mitigation in Suryoatmojo, (2009) suggests that there are 918 landslides prone locations scattered in various regions including: Central Java as many as 327 locations, West Java as many as 276 locations, West Sumatra as many as 100 locations, North Sumatra as many as 53 locations, Yogyakarta as many as 30 locations, West Kalimantan as many as 23 locations, the rest are spread in NTT, Riau, East Kalimantan, Bali and East Java. The potential of landslides are highest in Central Java, West Java and East Java provinces, while the fewest in Banten province (Table 1).

Table 1. Landslide Potential Forecast in Java Island]

No.	Province	Regency/City	Potential Landslide
1.	Central Java	Banyumas, Batang, Kendal, Purwodadi, Tegal, Boyolali, Karanganyar, Magelang, Pati, Pekalongan, Semarang, Purworejo, Wonosobo, Banjarnegara, Cilacap, Purbalingga, Pemalang, Brebes, Kebumen, Jepara, Kudus, Wonogiri	Medium-High
2.	Banten	Padeglang dan Lebak	Medium-High
3.	West Java	Bogor, Sukabumi, Cianjur, Bandung, Garut, Purwakarta, Subang, Sumedang, Tasikmalaya, Ciamis, Majalengka, Kuningan, Cirebon	Medium-High
4.	DIY	Yogyakarta, Kulonprogo dan Gunung Kidul	Medium-High
5.	East Java	Ngawi, Tuban, Magelang, Madiun, Poorogo, Pacitan, Trenggalek, Kediri, Tulungagung, Madang, Lumajang, Probolinggo, Jember, Situbondo, Bondowoso, Banyuwangi	Medium-High

Source: Pusat Vulkanologi dan Mitigasi Bencana Geologis (2006); Suryoatmojo (2009 in Utomo, 2015)

Banjarnegara is one of the regency in Central Java province with medium to high landslide potentials (Table 1). Based on the Journal of Landslide Mitigation in Banjarnegara Regency (Rahman, 2015), Banjarnegara is a regency that has a mountainous area with high landslide risk. On Thursday (December 11, 2014) and Friday (December 12, 2014), at least a landslide occurred in 25 locations, although on a small scale. Landslide occurred on Friday afternoon (December 12, 2014) in Jemblung, Banjarnegara Regency (located in a small valley behind of hills).

The Jemblung landslide in Karangobar District of Banjarnegara Regency occurred approximately 3 years ago, but deep sorrow still kept in mind. In addition, until now Karangobar (Thursday, May 25, 2017) was still continue to occur even though small landslides are almost found along the slopes in Karangobar. Therefore, comprehensive efforts are needed to reduce the risk of natural disasters, one of them by reviewing landslide events. Landslide assessment activities need to be done to inform the community so that mitigation measures can be undertaken.

Methodology

The study was conducted in Banjarnegara Regency, located between 7°12'-7°31'LS (South Latitude) and 109°29'-109°45'50 "east longitude. Banjarnegara is on a mountainous route in the central part of Central Java Province to the west that stretches from west to east. The boundaries of Banjarnegara Regency administration are as follows.

- a. North : Pekalongan Regency and Batang Regency
- b. East : Wonosobo Regency

- c. South : Kebumen Regency
- d. West : Purbalingga Regency and Banyumas Regency

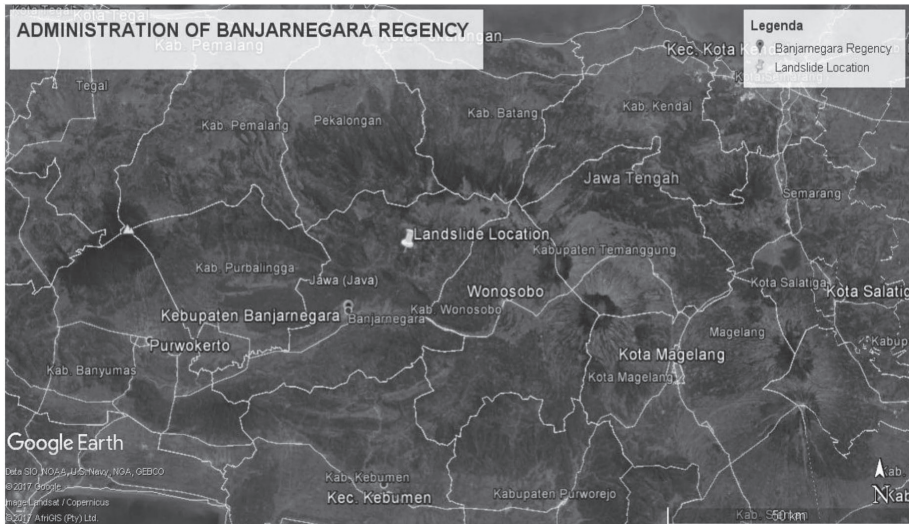


Figure 2. Administration of Banjarnegara Regency, Location of Study.

This research is field research to answer research question. The method used in this study is a survei method that emphasizes primary data surveis on various object studies in the field and supported by some secondary data of previous research results and instansional data. This research will use purposive sampling technique that the researcher has determined the place or the targeted informant, in this research is the Badan Penanggulangan Bencana Daerah Banjarnegara Regency (BPBD Banjarnegara Regency) and the public figures around the vulnerable / affected locations of landslide disaster in

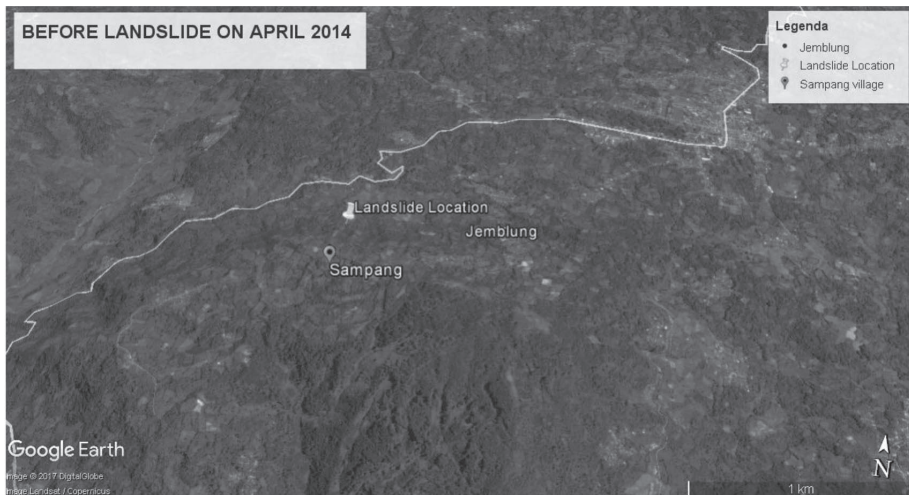




Figure 3. Location of Study, before and after landslide

Banjarnegara Regency. In addition, researchers also conducted observations at the study site. Further data is processed and analyzed to get the description that became the basis in the discussion of landslide disaster and its impact in the research area. Survei was done on May 25, 2017. Data collected was primary data: field data, depth interview data, secunder data: various data from instansionals.

RESULT AND DISCUSSION

Karangkobar District is located in the northern part of Banjarnegara Regency, composed of Kendeng mountains with bumpy and steep reliefs. Geological Expert of Universitas Gadjah Mada Dwikorita Karnawati (2014) said that Karangkobar district is the most vulnerable zone of landslide in Banjarnegara Regency, Central Java. Furthermore, the most vulnerable area in Central Java is Banjarnegara, and in Banjarnegara the most vulnerable to landslides is in Karangkobar (already entering the red zone from the lightest).

Karangkobar is considered the most vulnerable because it has a loose soil structure with a steep slope position. The area is also traversed by a fault line that leads to the bonding of rocks as the foundation of the soil, fragmented and fragile. Moreover, the type of rock is also a slippery clay rock when exposed to water. Type of Soil in Karangkobar consists of 58% Latosol and 42% Grumusol clay-textured. Latosol soil is a type of land that is vulnerable to landslides because of its less dense and easy to experience weathering.

Springs in Banjarnegara regency are generally located in the lower (southern) area, the highest point in Rakit District (42 points), while the hilly areas are located in Pejawaran, Pagentan dan the half of Banjarmangu. Karangkobar is above Banjarmangu. Groundwater is a very important potential besides surface water. Groundwater is the water that occupies the



Figure 4. Photo of the landslide Dusun Jemblung Karangkoobar, May 25, 2017

cavities within the grain within the rock. Groundwater is closely related to the geological environment of a region, thus known as hydrogeological conditions.

An addition, after observing the surrounding vegetation, the hill is covered by a buffer plant: trees. Various discussions occurred, related to the causes of landslides in Banjarnegara.

Thick layers of soil that cover by sufficient dense vegetation why is there still an landslide? Various arguments presented: there are arguments that landslide occurred in Banjarnegara caused by high rainfall intensity before the incident. Another opinion, that the landslide that occurred due to the slope



Figure 5. Mr. Sutomo, 25 Mei 2017

of the land that exceeds 30% with soil structure is loose when the land is open, rain falls, the soil eroded by water runoff causing erosion. Another answer adds, that the soil structure consisting of a fault with the gaps of the water way makes the soil bondage is not strong enough to disintegrate the slope potentially.

The rain that continued for two days caused the hill to collapse and swept the village of more than 300 people. About 200 people can save themselves. Meanwhile, approximately 100 people were buried, 35 houses consisting of about 82 families (Rahman, 2015).



Figure 6. Erosion on open land, May 25, 2017

Various analyzes may be presented to explain the mechanism of landslide in Karangkoobar. The facts indicate that on open hills or slopes there was no land cover occurring in a landslide, although on a small scale, occurring along the return journey from Jemblung Village down to Banjarmasinu. Landscape Karangkoobar that hilly should not be used as a resident areas, moreover until the land conversion of the original trees land becoma vegetable plantation land.

Landslides that cause environmental degradation or environmental degradation that causes landslides? The answer to that question is that the Karangkoobar area is already established as a disaster prone area. The existence of socio-cultural society that is not aligned to the label of the condition of the prone area of landslide will push the landslide potential into landslide incidents. The next question would be to point out which cause and caused environmental degradation, humans or nature? Of course the answer is human. Based on the point of view of the answer, humans were active actors while



Figure 7. Land use as vegetable farming land

nature was passive object. However, it has been agreed that disaster always brings about the impact of environmental damage (including components of social life) and even death. Thus, in terms of disasters and their impacts: the occurrence of landslide causes changes in the environment in the form of environmental damage and wider environmental degradation (from the human point of view as a victim).

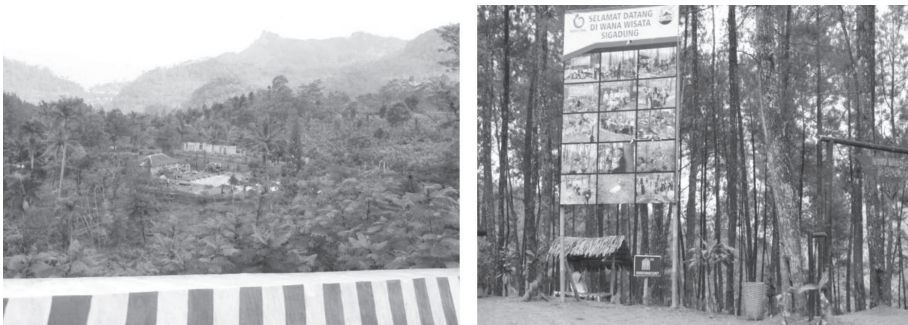


Figure 8. Tourist attractions in Karangkoobar District (that was maybe influence to landslide potential)

Based on the condition of Banjarnegara Regency that most of its area is vulnerable to disaster, it need accurate data base so that people understand the condition of the environment inhabited. Other maps needed as an important data base parts in these structural disaster mitigation efforts are rainfall maps and maps of disaster prone areas. Through this map, BPBD Banjarnegara Regency make other structural mitigation efforts, namely by the installation of early landslide detection devices; EWS. As for non-structural mitigation efforts can be the provision of information, socialization, and training and disaster simulation. All of them in order to create a tough village disaster.

There are nine programs that must be done by each village to respond to disaster, a risk analysis by creating threats, vulnerability and capacity maps; Establishing volunteer forums; Community action plans, village contingency plans; Making evacuation routes, and economic pathways for post-disaster financing (Rahman, 2015).

Various mitigation efforts have been implemented by all parties, BPBD Banjarnegara, Public Works Department Banjarnegara, SKPD Province, District, Village, communities and villagers. Stages of Landslide Mitigation, including: Mapping, Investigation, Inspection, Monitoring, Dissemination and Inspection of landslide disaster. During and After the Disaster: Emergency Response, Rehabilitation and Reconstruction. EWS installation is simple and still limit. In the other hand, village tough disaster implemented in category the middle-class-village landslide and the first-class-village landslide in Karangkoobar District.



Figure 9. Warning Signs of Avalanche Prone Areas are installed at several points on the roadside

Disaster management has been focused on disaster occurrence through relief in the form of food, shelter, and health. The main purpose of such treatments are alleviate the suffering of the victim, damage during disaster, and speed up recovery immediately.

Moving from an emergency response to risk management, this shift driven radical changes of perspective. Initially, disaster management was seen as a series of specific actions limited to emergencies, conducted by experts, complex and expensive, and fast. Now, disaster management should be seen as a package of activities whether there is an emergency or not. The emphasis is no longer on how to respond to emergencies but how to perform risk management so that the adverse impacts of an landslide can be reduced or eliminated altogether. Disaster management aspects should be integrated into everyday aspects of development and the intent of government precisely in normal times.

The goal is to improve the ability to manage and reduce risk, as well as reduce the occurrence of disasters. The activities are conducted jointly by all parties (stakeholders) with community empowerment.

Management's recommendation is to make Karangkoobar as an educational tour of Landslide Tour and as a pilot of other locations that have similar topographic to build the potential readiness of landslides. Karangkoobar is a buffer area that is supposed to be preserved its land cover in order to protect the catchment area (recharge area) for the area below it.

CONCLUSION

The condition of Banjarnegara Regency, which is mostly vulnerable to disaster, the occurrence of landslide causes changes in the environment such as environmental damage and wider environmental degradation.

Strategy of environmental management as mitigation of landslide threat in Karangobar District in Banjarnegara Regency is the form of structural mitigation and non structural mitigation, and make the location of landslide as appropriate buffer areas.

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