Landslide Susceptibility Always Happens Every Year In Banjarnegara, Central Java, Indonesia

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Abstract

Landslides are a frequent natural disaster occurring in Indonesia, especially in Java Island where few forests remain in this most populous island in the world. Village Jemblung, Karangkobar, Banjarnegara, Central Java, Indonesia have a kind of rocks of volcanic material dangerous if in the state of obsolescent. In the state of obsolescent, soil formed from the weathering of volcanic material containing numerous loam. Worsening the nature of loam of being pulpy causing land not able to withstand the burden of the ground in a slope, than there was a landslide in the Banjarnegara. The morphology of steep hills with a height of the 400 meters and having the form of a hill with a slope convex shaped circular down with the slope of land reaching more than 30 degrees and supported with the flow of water that is also great because of high rainfall to the aspect of the trigger in this area.The methodology that was used in this research was with secondary data and geology mapping. Socialization needs to be done in a sustainable way to those who live in the point do mitigation regional structural priority by doing rehabilitation and reconstruction with identification areas prone to fall and rapid mapping from various sources data, maps source, satellite images of weather data, and the location of settlement. We hope the government need to apply technology early warning system landslide disaster detection to avoid the incident, as in Banjarnegara that always occurs every year. Early detection instrument is only one component of mitigation efforts. For people who live in areas prone to disaster, of institutional strengthening, structural mitigation, and social, far more important to improve alertness and minimize losses due to natural disasters.

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Keywords: Landslides, Banjarnegara, every year

INTRODUCTION

A landslide is the movement of rock, debris or earth down a slope. They result from the failure of the materials which make up the hill slope and are driven by the force of gravity. Landslides are known also as landslips, slumps or slope failure. In general, the factors which influence whether a landslide will occur typically include slope angle, climate, weathering, water content, vegetation, overloading, geology, and slope stability. How these factors interrelate is important in understanding what causes landslides along with an understanding of the impact humans have on these factors by altering natural processes. Typically, a number of elements will contribute to a landslide, but often there is one which triggers the movement of material.

Java Island is located at the southern part of Eurasian plate margin. The India-Australian plate is moving north-ward relative to southeastern Asia, Subduction beneath the southern Indonesian Islands along the Java trench. As a result, Java region

witnesses a number of seismic and volcanic activities.

Banjarnegara district located on regions that have to the topography of hills, namely the mountains of northern and mountainous serayu longitudinal south east and west - serayu separated by river that forms the valley and the geology complex. The area of the valley of the river forming a plain serayu is relatively stable regions, while in a mountainous area south serayu serayu northern and mountainous areas that are unstable, because of steep and controlled by topography as well as various kinds of rocks have a geological structure that complex.

The recent landslide of 12 december 2014 in hamlet jemblung, sampang, karangkobar, Banjarnegara. Landslides happened is predicted to happen at 17: 30 wib and fell on a a hamlet inhabited by about 300 people of 53 the family .That occurs due to an avalanche of, residents in three villages, namely desa sletri, paweden village, and village sampang were evacuated to avoid the possibility of supplementary landslide. It is estimated that the cause of a landslide, because high rainfall in the region around, these landslides causing dozens of houses were damaged and hundreds of people were reported heaped up landslide material.

METHODS

The threshold is defined as lower boundary of rainfall for a landslide to occur. Thus, an empirical-based model is applied to define the value. Empirical thresholds are obtained studying rainfall conditions, which resulted in slope failures. Most of the proposed thresholds perform reasonably well in the region where they were developed, but can not be exported to neighboring areas. Also, their temporal accuracy remains largely untested Crozier (1999). Most commonly, the empirical thresholds correlate rainfall intensity and duration (I-D curve) and cumulative precipitation during an event. The common expression for ID threshold has the general form:

$$I = c + aD^b \quad (1)$$

where I is rainfall intensity, D is rainfall duration, and a, b and c are empirical parameters. The parameters can be determined from the best-fit of the relationship. When c = 0 Eq. (1) is a simple power law. In general, slope failure is as result of combination both rainfall intensity and accumulated rainfall. Some investigators have linked measures of the cumulative event rainfall to the average rainfall intensity, obtaining event-intensity (EI). Onodera et. al (1974), who were probably the first to propose quantitative rainfall thresholds for the initiation of landslides, further proposed a set of thresholds linking the hourly event intensity to the ratio between the average and the maximum rainfall intensity per hour. Using the similar concept of power law and rainfall intensity – accumulated rainfall record, a threshold can be also devised between rainfall intensity and accumulated rainfall.

$$I = m + nR^p \quad (2)$$

where I is rainfall intensity, R is accumulated rainfall, and m, n and p are empirical parameters. The authors are requested to understand the following points when preparing and submitting manuscripts of the paper.

Table 1 The rainfall – triggering landslides at Banjarnegara from 2010 – 2014

Year	Rainfall	
	Duration (day)	Accumulation (mm)
2010	255	6408
2011	241	6018
2012	132	4429
2013	186	5549
2014	273	6962

The rocks that affect the vulnerability of the avalanche not only cover the type of violence and it rocks, but more important is the rocks structures. Layered rock sloping in line with the direction of a bevel angle would have the level of vulnerability that high.Hard rock and still relatively fresh can also become vulnerable to the avalanche when she has many cracks / joint are in line with the direction of a bevel angle.Hard rock and many of the joint would be more vulnerable again when staying in the soft rocks that have the nature of the wrinkle. Areas of land and lies thick on the high also relatively vulnerable to an avalanche of because the region is really potential for

increasing the burden of a mass land because generally has the ability to absorb rainwater that is relatively high compared with rocks. On the basis of the understanding, the landslide vulnerability assessment is based on an assessment of the parameters morphometric.

The condition of soil layer and rocks on the slopes in the research that included land residual permeability relatively high with thick about three to 6 m on the surface and constituted by a hard layer of rocks breccia.The form of the field after the avalanche gelincir including the type of flat, and occurring in locations around the meeting between layers of land around the hard layer and soil or rock at the bottom.

In morphometric slope, the point of the landslide in the middle of the most mountainous, with the slope, and on the upward slope. Type the flow of , flow the ground , and all the upward slope in flowstone, type an avalanche of dominant (80 percent lower at the slope) happened, while there are in the upward slope neonatal type, the middle and lower .The aspect of the form of the 70 percent of the landslide, there is a slope that is concave and adiposis class slope 3% & 9%. Morfostruktur from the aspect research area has rock almost the same characteristics that are reflected by the weathering of rock and the condition of the structure of the relatively same landslide disaster prone.The condition that is concave and slanted slope to the point of the concentration of the flow of surface water and away a large surface expected to be an avalanche of the most decisive factor.

From an analysis of landslides parameters of the land showing large more than the slope. Solum the land the level of weathering rocks, structure layer rocks, the presence of the stump, water seepage cutting slope and indicating the level of danger landslide land getting high. The condition of soil texture, the permeability, drainage, and the use of land larger not necessarily the level of danger landslide their land is higher. From the observation field in avalanche of any location, the factors that cause an avalanche can happen this. Distinctive and not the same factors the trigger landslide despite same type, but the avalanche of increased with increasing frequency the slope of a slope, solum the ground, the rate of weathering, layer structure, the stout and seepage, and cutting the slope of that model conservation must refer to the parameters.

Table 2 The landslides occurance in 5 years

Year	Date of occurance
2010	February 13th
	March 17 th
	May 14 th
	October 21 th
2011	April 3 rd
	April 9 th
	May 4 th
	November 4 th
	November 5 th
2012	January 12 th
	November 22 th
	December 21 th
2013	December 23 th
2014	February 13 th
	December 12 th

RESULTS

The empirical thresholds are a basic element of the landslide early warning system. However, when using them, it should be combined with a real-time rainfall monitoring and instrumentation. A basic limitation that can be defined as conceptual 46 Reichenbach et al. (1998) is that thresholds inevitably represent a simplification of the relationship between rainfall and landslide occurrence. Rainfall is not the direct cause of failures which, in fact, are caused by the build-up of high pore water pressure in the slope, a phenomenon that is also related to hydraulic, physical and mechanical properties of terrain and to other environmental factors like slope, vegetation cover, and climatic characteristics of the area

The avalanche slopes related to the 100 meters tall and 500 meters wide. Landslide Type rotational may , which makes tongue of an avalanche of jumping and ripped up to as far as 600 meters .35 houses and 1 mosque (al-iman mosque) along with the take off the highway Banjarnegara-dieng heaped material until a few hundred feet landslide .308 of the population, 200 of them managed to escape .An avalanche of terrible jemblung is the largest in between the 34-point landslides other was found .Wholly situated in the region karangkobar.

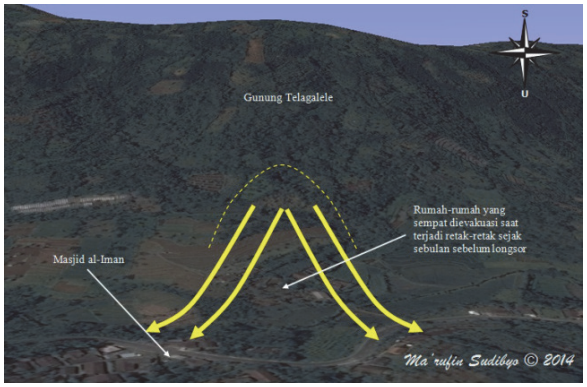

Fig. 1 A panorama jemblung hamlet, village sampang Banjarnegara and mountain telagalele based in the illustration google earth image with the direction of view to the south. Dotted line showing the estimate of the position of the origin of an avalanche of material. An arrowhead mark yellow indicate the direction of ground motion in an avalanche of the terrible disaster of the. Source: sudibyo, 2014 with the base of google earth and the information azizah, 2014.

Fig. 2 The image view of a wide (wide-field) the disaster location landslides terrible jemblung (sampang) 2014, taken central vulcanology and geological disaster mitigation per 13 December 2014 repaid. The direction of view to South East. Seems the position of the crown fall and the watering hole / a puddle right underneath it. Source: pvmbg, 2014.

Disaster potential still overshadow hamlet jemblung forward. The first came from a good family of the stem a river of lightning. If it rains, this dam will obstruct the river for a few moments before it collapsed into the deluge. While the second coming of a landslide. So here was the great pool along 30 meters was flooded as deep as 1 meter. If heavy rain pouring down, can suppress this pool of water in the soil beneath it has a soft and delicate so that erosion can happen again. Even in the worst of it, disaster scale could exceed what was hamlet jemblung.

CONCLUSIONS

In the landslide, in general, at least three factors that contribute. In the case karangkobar-merawu Banjarnegara especially in the area, the first factor is a unique geological condition. The second factor is of extreme rain and heavy rain. And the third factor is clogged up drainage so water could not be free to the potential of the landslide. First and second factor is a factor that given or is already so. So that no human can be controlled. But different from the third factor. Humans can manage the drainage of a slope, the water could be reduced so that the level of saturation. Drainage channels simple can be built for that purpose. In addition, a crack that had been formed must be buried again until flattened. Also there is no good in the excavation and the slopes, both petty let alone great, for whatever reason.

Disaster landslides always overshadow banjarnegara geology as the implications of destiny are unique. The destiny which makes land here is very fertile and can overgrown with diverse plants cultivation. The destiny that also makes them views area beautiful and cool. If managed well the two things able to raise banjarnegara *gemah ripah loh jinawi*. But the high risk of the high gains behind all the advantage count also hidden talent distress. In the hundred up to thousands of years ago, disaster potential landslides may not become a major problem as the number of people who it was rarely. But now the population has doubled, so that the greater the risk. The UGM team should be welcomed the effort to map and other institutions down to the potential landslide banjarnegara (sub-district) hamlet. Should also welcomed the idea of central java governor to local jemblung hamlet of the remaining population. The notion of local or the relocation of transmigration which still remain within the scope should be developed not only for banjarnegara jemblung hamlet after the disaster. But also for other someday some hamlets are known to have the potential of the high avalanche. One day to the victims no longer falling

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