

Lanslide Risk Management in the City of Semarang with Community based

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Abstract: The objective of this research were (1) analyzing risk landslides disaster management in Semarang City, (2) analyzing how the role of education in the risk landslides disaster management in Semarang City. Population of this research are community who living in the Semarang City. The variables researched included 2 variables: (1) landslides disaster risk management variables; (2) The variable role of education in landslide disaster risk management in Semarang City. Research sample determined by *purposive*, it's choosing people who live in areas that have experienced an avalanche or landslide potential in the region of 200 people. Data analysis was done by scoring. The results of the research show that (1) landslide disaster risk management that occurs in the research area has three variations, that low risk management level, medium risk, and high risk management level; (2) The role of education in landslide disaster risk management in Semarang City included in the medium criteria. The results of the interview explained that although the level of education was quite high, and the role of education in the medium criteria, but the level of public awareness of the disaster was still low.

1 INTRODUCTION

The number of natural disasters in Indonesia which have caused great loss of belongings and fatalities, show that a disaster risk management in Indonesia is still far from expectation. Therefore, the disaster risk management should become a concern for all levels of societies, especially those living in disaster-prone areas (BPBD, 2017).

Landslides frequency in the city of Semarang has been increasing. In 2012, the case of lanslides rises from 39 to 123 cases in 2014. This occurrence is always followed by an escalation of fatality and loss of properties due to the lack of disaster risk management (BPBD, 2015). Hence, the condition needs a more serious attention.

According to Sadisun (2006) disaster management is an integrated, dinamic, and sustainable activity, carried out during the period of pre-disaster until post-disaster. Muta'ali (2014) explains that the main focus in disaster management is a concrete step expected to obtain safety from disaster and to have a post-disaster fast recovery. As said comprehensively by Khan and Khan (2008) the definition of disaster management is sum total of activities, programs and measure which can be taken

up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses.

Basically, the activities of disater management covers 3 stages: (1) pre-disaster stage, which includes (a) non-disaster situation, and (b) disaster-prone situation. Pre-disaster activities are prevention and mitigation; (2) emergency response stages, that are carried out during a disaster; (3) post-disaster, activities done after disaster, including recovery, reconstruction and rehabilitation.

Disaster risk is the potential loss arising from a disaster in an area within a certain period of time that can be in the form of death, injury, illness, life threatening, loss of security, refuge, damage or loss of property, and disruption of community activities (Law of The RI Number 24 year 2007).

As stated by BAKORNAS disaster risk is the interaction between vulnerability and the threat that exists. The extent of the risk can be expressed in the amount of loss that occurs for a certain level of events. Risk disaster in an area depends on some factors, such as; (a) nature (geography/geology), (b) neighbourhood vulnerability towards phenomena (condition and numbers of buildings), (c) regional strategic context, (d) community willingness for emergency response and reconstructing.

According to Rahmat (in Purnomo, 2010) disaster risk management is all activities, covering the aspects of planning and overcoming disaster before, during, and after a disaster. Disaster risk management or known as *Disaster Risk Management Cycle* is aimed to (a) avoid life loss, (b) minimize disaster victims distress, (c) give information to society and authorized party about disaster risk, (d) decrease damage of main infrastructures, belongings and los of other economic resources, (e) provide protection to refugees or people who have lost their places when their lives are threatened, (f) accelerate recovery.

Disaster risk management is disaster management as an applied science seeking, of which by sistematically observing and analyzing disasters to improve measures, related to prevention, mitigation, inventory, emergency response and recovery. Managing disaster assistance is important for the top management, which includes *planning, organizing, directing, coordinatng* and *controlling* (Khan and Khan, 2008).

Flanagan (1993) said that risk management is a system aiming to identify all risks, which are conducted in bussiness activities or projects enabled to overcome or control risks. The risk management process' framework has several stages, started from risk identification, risk classification, risk analysis, mitigation actions and risk management.

Disaster risk management is an applied systematics of management policy, procedure, and training, that include: ensuring disaster related matters, identifying disaster risk that may emerge, analysing, evaluating, and overcoming it. A constant observation and research will enable disaster risk management (Godschalk in Muta'ali, 2014).

The objective of this research are; (1) analysing landslides disaster risk management in the city of Semarang, (2) analysing in what way education takes role in landslides disaster risk management in the city of Semarang.

2 METHODS

The research is conducted in the City of Semarang. The investigated variables are: (1) landslides risk management variable, consists of 3 sub-variables: (a) pre-landslides management, involving; landslides prevention, landslides awareness, landslides early warning, and landslides mitigation; (b) risk management during landslides, covers: victims salvage and evacuation activities, search and rescue (SAR), saving properties, fulfilling basic needs,

protection, management of refugees, rescue and recovery of infrastructures, post-disaster assessment, emergency assistance, logistical capacity and facilities for delivering aids, information communication and management, response to survivors and their handlings; (c) post-landslides management risk includes: development recovery activities (rehabilitation; giving compensation or material support to victims, recording and re-registration of reinvention), reconstruction (restructure), (2) educational role variable in landslide risk management in Semarang City.

Research sampling is purposively determined by choosing 200 population living in an area experiencing landslides or that of landslide potential. Primary data is collected by questionnaires and interview, whereas secondary one is gathered through documents in the relevant agencies. Data analysis is completed by scoring, the lowest score = 1, and the highest score = 5. The higher the score means the better disaster risk management.

3 RESULT OF THE RESEARCH

3.1 Landslide Disaster Risk Management: The Pre-disaster Phase

The sub-variable assessment of community activities in landslide pre-disaster risk management includes landslides prevention, readiness, early warning and disaster mitigation activities. The calculation result of community's activity value in landslide pre-disaster risk management, based on researched data, are dominated by a very low criteria (56,67% of the respondents studied). Some of them (33,33%) belong to the low criteria, and other 10% belong to Medium criteria. Frequency of respondent data and criteria for community activity in landslide pre-disaster risk management can be seen in Table 1.

Table 1: Data of respondent frequency and criteria for community activity in landslide pre-disaster risk management in the City of Semarang.

No	Value Interval	Criteria	Frequency	(%)
1	0 < 4,2	Very Low	113	56,67
2	4,2 < 8,4	Low	67	33,33
3	8,4 < 12,6	Medium	20	10,00
4	12,6 < 16,8	High	0	0,00
5	16,8 < 21	Very High	0	0,00
Total			200	100,00

Based on the calculation result of the average value, the lowest of community activities in landslides pre-disaster risk management is in Mijen sub-district with low criteria of 2,40. The highest value belongs to West Semarang sub-district with low criteria of 8,0. The average of the calculation result is 4,87, which means it belongs to low criteria. Data regarding the community activity in landslide pre-disaster risk management can be seen in Figure 1.

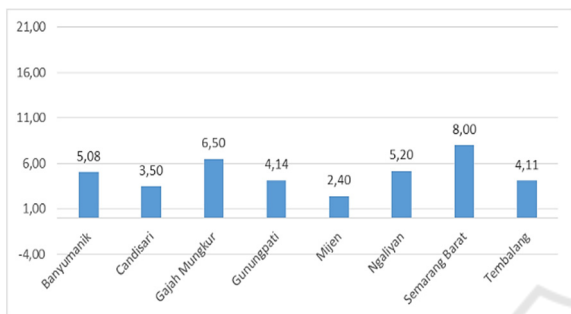


Figure 1: Graph of the average value of community activity in landslide pre-disaster risk management in every sub-district in the City of Semarang.

3.2 Landslides Disaster Risk Management: During Disaster Phase (Emergency Response and Landslides Emergency Aids)

The result of research on community activities in risk management during disaster is dominated by low criteria (117 respondents), followed by 73 respondents for Medium criteria, and only 10 respondents for the high ones. Data on respondents' frequency related to landslides disaster risk management is shown in Table 2.

Table 2: Data of respondent frequency and criteria of landslide disaster risk management.

No	Value Interval	Criteria	Frequency	(%)
1	0 < 1,6	Very Low	0	0
2	1,6 < 3,2	Low	117	58,3
3	3,2 < 4,8	Medium	73	36,7
4	4,8 < 6,4	High	10	5
5	6,4 < 8	Very High	0	0
Total			200	100,00

The result shows that the value of the risk management during a landslide disaster is 3,26, which means Medium in average. The lowest of the average value of community activities in risk management during disaster is gained by Gunungpati sub-district with low category of 2.10. Thus, the highest of the average value is for West Semarang and Gajah Mungkur sub-districts with high value category of 5,0. The detailed data is shown in Figure 2.

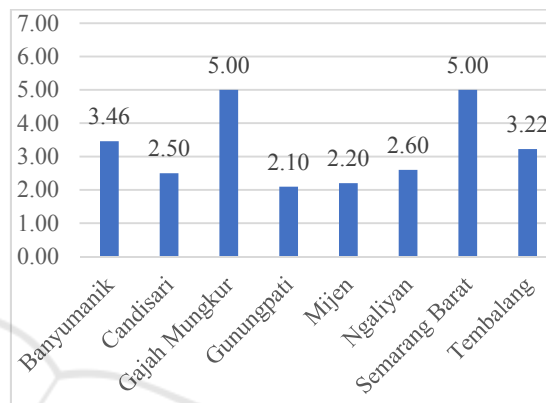


Figure 2: Graph of average value per sub-district related to risk management during landslides.

The outcome value of risk management of landslide disaster (emergency responses and landslides emergency aids) based on respondents answers, West Semarang sub-district owns the highest value. Activities that belong to the community in managing risks during landslide disasters are: (a) community efforts to evacuate family members or disaster victims to safer places; (b) there are parties assisting in the evacuation process during disaster; (c) there is a data gathering on the number of fatalities and material losses due to the landslides; (d) availability of assistance from other parties during disaster; (e) the community can find out the form of assistance needed when a disaster occurs; (f) the community participates in reporting the event of disaster. However, from 200 respondents being studied, the activity percentage is still in the low criteria for 58,3%, and Medium for 36,7%. While the high criteria is only 5% of the surveyed respondents.

3.3 Landslide Risk Management: Post-disaster Phase

The calculation of the value of community activities in disaster risk management in the aftermath of the landslide disaster results mostly in the low criteria

(73.3%), some others are in the medium criteria (21.7%) and high criteria (5%).

The outcome result of the average value in landslides post-disaster risk management is the medium criteria (1.24). For more details, the respondents' frequency data and criteria for disaster risk management in the post-disaster phase of landslides can be seen in Table 3.

Table 3: Respondents' frequency data and criteria for disaster risk management in the post-disaster phase of landslides.

No	Value Interval	Criteria	Frequency	Percentage (%)
1	0 < 0,6	Very Low	0	0
2	0,6 < 1,2	Low	147	73,3
3	1,2 < 1,8	Medium	43	21,7
4	1,8 < 2,4	High	10	5
5	2,4 < 3	Very High	0	0
Total			200	100

The average value of community activities for landslides post-disaster risk management at the lowest level is in Gunungpati District with low criteria (0.67). The highest one is in Gajah Mungkur District with a high category (2.50). The detailed data about the value of community activities in disaster risk management in the post-disaster phase of landslides can be seen in Figure 3.

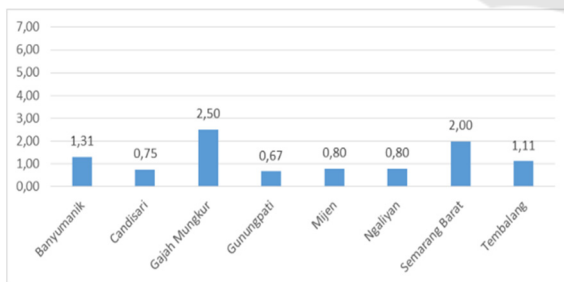


Figure 3. Graph of average value per sub-district on disaster risk management: phase post-landslides disaster (Source: Research Result 2017).

The results of the calculation of the value of community activities in disaster risk management during the post-disaster phase of landslides, which are based on respondents' answers, range from low to high. This shows that there are, indeed, some activities carried out by the community in the post-disaster phase of the avalanche, such as: (a) there are

recovery activities for disaster victims; (b) assistance' availability from the government for the post-disaster recovery process, (c) accessibility of reconstruction activities (rebuilding) for landslides' victims. In spite of these, the percentage of the activities carried out by the community is still in the low criteria.

3.4 Landslide Risk Management in the City of Semarang

The variable assessment of community activities in landslide disaster risk management in Semarang City is a total assessment of all sub-variables of risk management, applied for pre-disaster - during disasters - and post-disaster landslides. The results of the assessment in each sub-district can be seen in Figure 4.

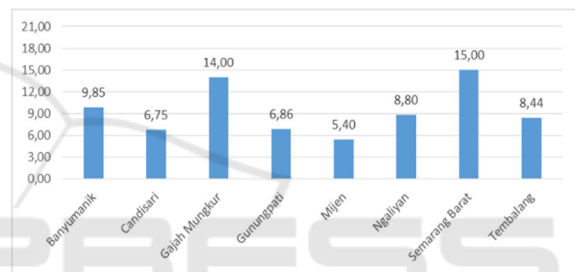


Figure 4: Graph of average value of community activities in landslides management risk in the City of Semarang.

Figure 4 explains that community activities for landslide disaster risk management in Candisari Subdistrict, Gunungpati District and Mijen Subdistrict are in low criteria. Whereas those in Banyumanik, Ngaliyan and Tembalang sub-districts are measured medium. West Semarang District and Gajah Mungkur Subdistrict have high criteria. Thus, the average value of community activity in Semarang City in landslide disaster risk management is included in the medium criteria with a value of 9.39.

3.5 Role of Education in Landslide Disaster Risk Management in Semarang City

The role of education in landslide risk management is inseparable from the condition of education in the community. The description of the conditions of the education level of the respondents studied can be seen in Table 4. Based on that, it can be explained that the education level of respondents in the research area is still dominated by Medium criteria

or 35.5% of respondents studied have graduated from high school / vocational / MA. Whereas those who graduated from junior high school are included in the low criteria for 25.5%. The respondents graduated from elementary school belong to very low criteria as much as 24.5%. Other respondents having higher education level or graduated from D1, D2, D3 are relatively small at 5.5%, and those with very high education or graduated with a Masters degree are 9%.

Table 4: Condition of respondents educational levels in reseached area.

No	Education	Number (people)	(%)	Criteria
1	SD	49	24,5	Very Low
2	SMP	51	25,5	Low
3	SMA/SMK	71	35,5	Medium
4	D1, D2, D3	11	5,5	High
5	SI, S2	18	9	Very High
Total		200	100	

The calculation result of the value of education role in lanslide disaster risk management in Semarang City based on research data is dominated by medium criteria (38.50% of the respondents studied). While others (28.50%) of the surveyed respondents are included in the low criteria, 25% of them are in the very low criteria. Only 6.5% of the respondents have high criteria and 1.5% have very high criteria. In details, the respondents' frequency data and the criteria for the role of education in landslide risk management in Semarang City can be seen in Table 5.

Table 5: The role of education in landslide risk management in the City of Semarang.

No	Value Interval	Criteria	Frequency	(%)
1	0 < 1,4	Very Low	50	25
2	1,4 < 2,8	Low	57	28,50
3	2,8 < 4,2	Medium	77	38,50
4	4,2 < 5,6	High	13	6,50
5	5,6 < 7	Very High	3	1,50
Total			200	100,00

4 DISCUSSION

The research outcome of pre-landslide disaster risk management is dominated by a very low criteria,

that is 56,67% of surveyed respondents, 33,33% belongs to low criteria, and 10 % is included into medium. This result shows that the community activities for prevention, readiness, early warning, and landslide disaster mitigation are still very low (insufficient). This means that the community unpreped to encounter the landslide disaster due to their lack of attentiveness. Rationally, during its occurrence, landslide disaster causes such a great loss, both properties and fatalities.

The result presents that, 117 respondents or 58.3 of the surveyed population dominate the community activities for disaster risk management and unfortunately, they belong to the low criteria. The rests are 73 respondents or 36,7% for medium criteria and only 10 respondents (5% of the surveyed) for high criteria. This means that the community activities for landslide disaster risk management is lacking and needs improving. In this case, the society are not prepared in dealing with an impulsive landslide disaster, especially during rainy season. Factually, the community activities have already been performed, for example (a) community efforts to evacuate landslide victims to a shelter; (b) community attempt to record the number of casualties and material loss due to the disaster; (c) community effort in requesting aids from other parties during the landslide disaster; dan (e) community effort to participate in reporting a landslide disaster to the authority. Nevertheless, these actions are done only by a small part of the community living in the disastrous area. In contrast, most of the people in the disaster area are still passive or have not yet carried out activities to manage landslide disaster risk, consequently landslide disaster risk management has not optimized.

Post-landslide risk management covers: activity to development recovery, rehabilitation (assistance/ material support for disaster victims, recording and recollecting data on reinvantation), and reconstruction. According to this research, community activities for post-landslide disaster risk management are mostly in low criteria (73,3 %), others go to medium criteria (21,7%) and the rest 5% is high criteria. It shows that community activites related to landslide disaster risk management is still unsatisfactory and require improvement. People are unprepared managing disaster risk, while landslide possibly occurs at anytime. It is actually reported that the community have acted out some activities, such as (a) development recovery for landslide victims, (b) community effort in gaining government assistance

for post-disaster recovery, (c) community activity for reconstruction (restructuring) of disaster's victims. These, however, are only completed by a small part of the community. The passiveness of most of the community to manage post-landslide disaster risk has made the management disaster-risk less optimal.

The role of education related to landslide disaster risk management certainly cannot be separated from the condition of community education. The education level of respondents in the research area is still dominated by moderate criteria, that is 35.5% of the surveyed respondents high school (SMA) and vocational school (SMK, MA) graduates. Eventhough the dominance of education is in moderate criteria, it should be noted that the percentage of respondents with low and very low education is still quite large, namely 25.5% of respondents are junior high school graduates or in low criteria, and 24,5% are elementary school graduates or belong to very low criteria. Total amounts of low and very low criteria for education are 50%. Meaning, although education has been dominated by moderate criteria, lack of landslides risk management happen due to the low and very low education level. Thus, it is necessarily important to enhance the level of education for improving management in disaster risk. Regarding the role of education in landslide disaster risk management, it is still dominated by moderate criteria (38.50% of the respondents studied), 28.50% of the respondents suveyed are included in the low criteria. Analysing further, the low and very low criteria have the total percentage of 53.5%. It means that the role of education in landslide disaster risk management is still in the low criteria.

Factually, it is reported that (a) there has been a effort from the community to discover causative factors of landslide, leading to great losses, (b) there have been efforts by the community to locate the landslide-prone area, (c) there have been community efforts to landslides countermeasure, (d) there have been efforts from the community to participate in the dissemination of disaster education, (e) there have been efforts by the community to take part in simulations facing landslide . However, the xisting efforts are only carried out by a small number of people in the disaster area. Whereas most of people are still not active in the management of landslide disaster risk.

The result of the interview explained that although some communities have a significantly high level of education and the role of education is in the criteria of being moderate, the level of

community concern for disaster is still low. Some people are not aware to participate in managing disaster risk, and some others simply hand over the task of disaster risk management to the kelurahan apparatus, RT heads and RW heads.

5 CONCLUSION

Based on the result of the reasearch and discussion it can be concluded that (a) the average value of community activities in Semarang City for landslide disaster risk management is included in the medium criteria with a value of 9,39. Landslide disaster risk management itself includes pre-disaster, during disaster, and post-disaster managements. Landslide pre-disaster risk management has an average value of 4.87 which means entering into low criteria. Risk management during a landslide disaster, has a moderate average value (3.26), and landslide post-disaster risk management has an average value in medium criteria (1.24); (b) the role of education in disaster risk management for landslide in Semarang City is still in the low criteria. Most of the society are passive and unaware of disaster risk management. Although some people have a high level of education, and the role of education is in moderate criteria, nonetheless, the level of public awareness to disaster is still low. If the education level of the community is better, it is hoped that the role of education in landslide disaster risk management is also increasing.

6 RECOMMENDATION

The role of education in landslide disaster risk management in the city of Semarang is indeed, still in low criteria. The community needs to work along with government and private sectors landslide disaster risk management. By having a good management, it is expected that disaster risks, such as loss of properties and lives, can be minimized.

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