Increasing Community Awareness of Natural Disasters in the Context of Disaster Mitigation in Kalinongko Hamlet, Pagerharjo, Samigaluh, Kulon Progo

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Abstract. Kalinongko Hamlet is a hamlet located in Pagerharjo, Kulon Progo, Special Region of Yogyakarta. Kemesu Hamlet has a geographical location in the Pagerharjo area. Pagerharjo Village has boundaries with Magelang Regency in the north, Ngargosari Village in the south, Banjarsari Village in the east, and Purworejo Regency in the west. Kulon Progo Regency including Pagerharjo Village, especially Kemesu Hamlet, is one of the districts that has the potential for disasters such as floods, tsunamis, earthquakes, landslides, droughts, and volcanic eruptions. Based on data obtained from BNPB, the Pagerharjo area has a high potential for landslides and drought. On the other hand, also based on data obtained from BNPB, the capacity to deal with landslides was in the medium and low categories in dealing with drought hazards. Therefore, efforts need to be made to increase the capacity of the community in Pagerharjo Village, especially in Kalinongko Hamlet, in dealing with potential landslides and drought disasters. This PKM KKN PPM activity seeks to increase community capacity in dealing with disasters through socialization and Discussion Group Forums (FGD). Resource persons for this activity are planned from disaster actors either from the campus or from the Regional Disaster Management Agency (BPPD). With this disaster socialization and FGD activity, it is hoped that it can increase the community's capacity to deal with potential disasters. The output of this PKM is published in the mass media, seminar forums, and activity videos.

Keywords: disaster mitigation, natural disaster, disaster management

1 Introduction

Indonesia is in the Pacific ring of fire. Indonesia is a confluence of four tectonic plates, namely the Asian Continental Plate, the Australian Continent, the Indian Ocean Plate, and the Pacific Ocean [1]. This condition causes Indonesia to experience disasters often. One of the provinces that has a lot of disaster potential is D.I. Yogyakarta, as many as 12 of the 13 potential disasters mentioned by BNPB (Badan Nasional Penanggulangan Bencana / National Board for Disaster Management). Kulon Progo Regency is one of the districts that has the potential for disasters including floods, tsunamis, earthquakes, landslides, droughts, and volcanic eruptions. Based on the Disaster Prone Index issued by BNPB in 2011, all

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districts and cities in DIY are included in areas that have a high Disaster Prone Index, as shown in Table 1 [2]. Yogyakarta Special Region is an example of many areas that are prone to landslides, especially in Kulonprogo Regency which is part of the Menoreh hills [3].

<table>
<thead>
<tr>
<th>Regency</th>
<th>Score</th>
<th>Vulnerability Class</th>
<th>National Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleman</td>
<td>97</td>
<td>High</td>
<td>3</td>
</tr>
<tr>
<td>Bantul</td>
<td>90</td>
<td>High</td>
<td>49</td>
</tr>
<tr>
<td>Kulon Progo</td>
<td>80</td>
<td>High</td>
<td>90</td>
</tr>
<tr>
<td>Gunung Kidul</td>
<td>76</td>
<td>High</td>
<td>120</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>74</td>
<td>High</td>
<td>135</td>
</tr>
</tbody>
</table>

Landslides are natural disasters that often occur in Indonesia with an average of around 92 events each year [4]. Landslides occur due to disruption of the stability of the soil or rock making up the slope, so that the mass of soil or rock making up the slope or the mixture of the two experiences downward movement [5]. There are several factors that cause landslides which include: geological conditions, hydrology, topography, climate, and weather changes that can affect slope stability which results in landslides [6,7].

The death toll caused by landslides in Java alone is very high, due to the high frequency of landslides and the high vulnerability of the community [8,9]. Based on data from DIBI BNPB 2019, in less than ten years there have been 30 landslides in Kulonprogo Regency [9,10]. Based on the number of incidents, it shows that Kulonprogo Regency is one of the regencies in Java that often experiences landslides [9,11].

Apart from landslides, drought is a disaster that often occurs in Indonesia. Drought is a disaster that occurs every year due to the alternation of dry and rainy seasons that occur in Indonesia. One area that is often affected by drought is Kulon Progo Regency [12]. Basically, Kulon Progo Regency can be said to be an area prone to drought. Based on a 2014 report from BNPB, the obtained data indicated that the northern part of Kulon Progo Regency has a high level of landslide and drought hazard as shown in Figure 1 and Figure 2.

![Landslide Hazard Level Map in Northern Kulon Progo Regency](image)
On the other hand, the level of community capacity in dealing with disasters is low to moderate, as shown in Figures 3 and 4 [13]. This community includes the people in Pagerharjo Village, especially the people in Kalinongko Hamlet. Therefore, it is necessary to increase public awareness and responsiveness in responding to the potential for this disaster. Hence, it can be used as one of the efforts in disaster risk mitigation/reduction.

**Figure. 2.** Drought Hazard Level Map in Northern Kulon Progo Regency.

**Figure. 3.** Map of Community Capacity Levels in the Northern Part of Kulon Progo Regency in Facing Landslide Hazards.
From Figures 1 to 4, it can be concluded that the level of potential for landslides and drought in Kapanewon Samigaluh is in the medium to high category, with a dominant high. As for Pagerharjo Village, the level of landslide and drought hazard is in the moderate category. However, the community's capacity to deal with potential landslides and drought is in the medium to low category. Therefore, it is necessary to increase the capacity of the community to deal with potential landslides and droughts.

2 Methodology

In overcoming the problems that exist with partners, the PPM KKN service activities in Kalinongko Hamlet were focused on increasing public awareness and responsiveness about the potential for disasters that may occur at any time in their hamlet or village, through outreach, training, and discussion group forums. The steps/methods taken were as follows:

1. Conducted observations in Pagerharjo Village, especially in Kalinongko Hamlet, related to activities that had been carried out to reduce the risk of potential natural disaster hazards that might occur especially drought and landslide disasters.

2. Conducted deliberations with residents and community leaders to determine steps to reduce the impact of community-based drought and landslide disasters.

3. Prepared socialization materials and discussion group forums related to the potential drought and landslides and how to reduce the impacts.

4. Conducted outreach activities and discussion group forums in coordination with institutions/agencies involved in disasters such as campuses and the Regional Disaster Management Agency (BPBD) of Kulon Progo Regency. The discussion group forums’ speakers were recruited from campus practitioners or the BPBD of Kulon Progo Regency.

5. Evaluated the socialization and discussion group forum activities that have been carried out as a form of monitoring the effectiveness of these activities.
6. Together with the community, put up warning signs at points that are considered prone to landslides.

3 Results and Discussion

The results of the implementation of this community service activity have been carried out by conducting discussion group forums with speakers from BPBD Kulon Progo Regency, by the provision of written disaster tests for audiences consisting of the residents, as well as by making disaster warning signs in areas that are considered prone to disasters, especially landslides.

Documentation of the implementation of this activity can be seen in the photo below.

**Figure 5.** Disaster Outreach Activities with Resource Persons from BPBD Kulon Progo Regency.

**Figure 6.** Disaster Outreach Activities with Resource Persons from the Kulon Progo Regency RESCUE Team.
Figure 7. Installation of Disaster-Prone Signs (Landslide Disaster) at Points that are Dangerous to the Community.

The table and figure below are the final score which contains the results of the comparison between the test before socialization (pre-test) and the test after socialization (post-test) which was given to socialization participants who also acted as test respondents.

Table 2. Score Percentage of Responses to Respondents' Pre-Test Questions.

<table>
<thead>
<tr>
<th>No.</th>
<th>Age</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>30-50</td>
<td>&gt;50</td>
</tr>
<tr>
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<td>30</td>
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<td>4</td>
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<td>3</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>30</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>30</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
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<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Sum</td>
<td>30</td>
<td>26</td>
<td>14</td>
</tr>
</tbody>
</table>
Table 3. Respondents Post-Test Answer Percentage Score.

<table>
<thead>
<tr>
<th>No.</th>
<th>Male Age 30-50</th>
<th>Male Age &gt;50</th>
<th>Female Age &lt;30</th>
<th>Female Age &gt;50</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 True</td>
<td>6 False</td>
<td>1 True</td>
<td>6 False</td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td>Sum</td>
<td>27 True</td>
<td>13 False</td>
<td>41 True</td>
<td>19 False</td>
</tr>
</tbody>
</table>

A comparison of the data between the pre-test and post-test above are detailed in the bar chart below.
Figure 8. (a) Pre-Test Scores for Male Aged 30-50 Years Old, (b) Pre-Test Scores for Male Aged 30-50 Years Old. (Green = True, Red = False).

Based on the comparison of the bar chart above, 4 male respondents aged 30 to 50 years, were averagely able to answer the pre-test questions correctly by 65% out of 10 items and increased to 67% for the post-test.

![Bar chart for Male >50 Years Old](a)

Figure 9. (a) Male Pre-Test Score >50 Years Old, (b) Post-Test Score Male >50 Years Old. (Green = True, Red = False).

Based on the comparison of the bar chart above, 6 male respondents aged over 50 years old were averagely able to answer the pre-test questions correctly by 62% out of 10 items and increased to 68% for the post-test.

![Bar chart for Male >50 Years Old](b)
Based on the comparison of the bar chart above, female respondents aged under 30 years were averagely able to answer the pre-test questions correctly by 60% out of 10 questions and increased to 70% for the post-test.

Figure 10. (a) Pre-Test Score for Female <30 Years Old, (b) Post-Test Score for Female <30 Years Old. (Green = True, Red = False).
Based on the comparison of the bar chart above, 6 female respondents aged over 50 years were able to averagely able to answer the pre-test questions correctly by 53% out of 10 questions and increased to 60% for the post-test. The obstacles experienced in carrying out this activity are:

a) The schedule from BPBD speakers must be during working hours, so it was not easy to synchronize their schedule with the residents' to conduct activities in Kalinongko Hamlet.

b) Extreme weather disrupted the implementation of the discussion group forum.
4 Conclusion

The results of the PKM implementation activities in Kalinongko Hamlet are disaster workshops and pre-test – post-test on disaster knowledge whose percentage shows an increase in residents' awareness of potential disasters in the Kalinongko Hamlet area. Other result includes the installation of signs at points that are considered potentially prone to landslides. The activity also results in a collaboration among the UMY academic community, BPBD Kulon Progo Regency, and residents. This workshop is hoped to increase the preparedness and vigilance of the people of Kalinongko Hamlet and its surroundings against natural disasters.

References


[12]. Rangga Riawan Haryo Praseno Dan Gerry Katon Mahendra, 2021, Peran Pemerintah Desa Hargomulyo Kecamatan Kokap Kabupaten Kulon Progo Dalam Penanggulangan Bencana Kekeringan, Jurnal Caraka Prabu Vol.5 No. 1