

LAHAR RISK MAPPING OF BANAHAW VOLCANO, SOUTHERN LUZON USING LAHARZ

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Abstract

Banahaw Volcano is one of the 24 identified active volcanoes in the Philippines. With the growing population around its vicinity, it is important to produce hazard map and risk maps for Banahaw Volcano. Geographic Information System (GIS) tools could be utilized to determine the hazard areas in case of lahar flows. Risk assessment based on population of barangays can be determined using the Population Exposure Index (PEI), Population Risk Level (PRL) cohorts, and land area. Early versions of volcanic hazard maps were generated based on the information of type and extent of deposits, river channels and topography. This study explored the use of LaharZ as a tool in generating a hazard map for Banahaw Volcano which can be assessed for risks. Input parameters for the LaharZ include estimated volume, stream threshold, slope value, cone apex type and flow type. Risk assessment of the hazard map produced in LaharZ confirmed that a total of 18 municipalities and three cities, and 402 barangays for both Laguna and Quezon provinces could be affected by future syn--eruption type of lahar from Banahaw Volcano. Results also showed that the lahar flow paths could affect farther municipalities along the North--northwest, Northwest, Southwest and Southeast areas of Banahaw Volcano. A consideration for identification of possible evacuation sites and preparedness plans, and proper siting of critical facilities outside of the proximal hazard zone are highly recommended accompanied by conducting more comprehensive researches about Banahaw Volcano for additional resources that may have greater accuracy.

Keywords: Lahar, Risk, Mapping, Banahaw Volcano, LaharZ

1.0 INTRODUCTION

Lahar is an Indonesian term that describes the geologic hazard which is a hot or cold mixture of water, ash and rock fragments from volcanic eruptions. Large volumes of lahar can crush or bury anything on its path. Lives can be lost, and buildings and valuable agricultural land can be partially or completely buried (USGS Volcano Hazards Program, n.d.)

The Philippines sits in a tectonically active region frequented by earthquakes and volcanic activities (Aurelio, M., et al., 2000), and according to PHIVOLCS, Banahaw Volcano is one of its 24 active volcanoes. With the growing population along its base, studies on hazards and risk assessment should be prioritized (Punongbayan, 1993).

Geographic Information System (GIS), software which can produce maps, has tools which are useful and have great potential in assessing volcanic hazards (Yeats, 2014). In this study, the extension tool, LaharZ, was used to map the potential laharflow paths of Banahaw Volcano.

This study aims to provide information on the possible extent of potential lahar flow paths, and assess the possible effects and risks these lahars can have on the affected people, agricultural land and infrastructures present.

2.0 METHODOLOGY

This quantitative research used a methodology designed to correlate data gathered in the outcrop description and samples collected with the existing geologic and hazard maps to produce risk maps of Banahaw volcano. The methodology designed utilizes the following parameters, lahar volume, stream threshold, slope value, cone apex type, and type of flow, using LaharZ to produce variants of risk maps.

3.0 RESULTS AND CONCLUSION

The different risk levels were classified based on their population as of August 1, 2015, which was taken from the Philippine Statistics Authority (PSA). The preliminary result map shows only the risk associated with syn--eruption lahar, and would still need field validation for confirmation and to account the neglected man--made structures that would affect the lahar flow.

The generated lahar flow path traversed and affected 18 municipalities, three cities and 402 barangays, affecting a total of 1,103,072 people. The whole area of the barangay would be accounted as affected regardless of the size actually affected. Comparing with existing geologic and lahar hazard maps, most of the lahar paths conformed, while new paths were created.

The risk levels of the affected barangays ranged from 1--2 due to having a Volcano Hazard Level 2.

4.0 REFERENCES

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