

## **LANDSLIDE RISK ASSESSMENT FOR DESIGNING THE MONITORING AND EARLY WARNING SYSTEM**

### **ABSTRACT**

Landslide is the most frequent natural disaster in Yogyakarta, Indonesia. In the mid-March 2018, a few cracks appeared in the north of the hill in the Pendoworejo Village, Girimulyo Sub-District, Kulon Progo Regency, Yogyakarta Special Province. Nevertheless, fearing the potential landslide hazard to happen due to the landslide movement in this area, the residents had to evacuate themselves.

In order to reduce the risk, some stability actions were taken. The stability analysis in this case focused on the relationship between the safety factor, velocity and fluctuation of groundwater level due to the rainfall density. Then, a monitoring and warning system was designed as a mitigation effort.

Based on the preliminary investigation on April 2018, no evidence of mass movement was found on the west and south part of the hill. On the other hand, the north part area was estimated with risk due to the occurrence of various sites of cracks. Based on the analysis result, the fluctuation of the groundwater level rose or dropped substantially before and after heavy rainfall. Likewise, the safety factor dropped about 20% with increase of landslide movement velocity by many times. In fact, the landslide risk increased in every rainy season. Hence, the risk could be more hazardous in the future.

**Keyword:** *Slope stability analysis, GIS, Field investigation, Landslide mitigation, Early warning devices*