

Debris flow hazards in Malaysia: The need for comprehensive mapping and risk assessment

KOMOO, Ibrahim^{1*}, LIM, Choun-Sian¹, Tajul Anuar Jamaluddin¹

¹Southeast Asia Disaster Prevention Research Institute (SEADPRI-UKM), Universiti Kebangsaan Malaysia

Debris flow is quite common in hilly and mountainous areas. In Malaysia, it is the life-threatening landslide disaster, the type of landslides that killed many lives compared to other landslide types. While many natural debris flows have occurred in areas without human settlement, there were at least 15 cases of killer debris flows since year 1994, at least 137 people were killed. Several major debris flows events in Malaysia were (1) a multiple-landslide cum debris flow flooded a major highway in Genting Sempah, Selangor killed 21 road users that were in their idling vehicles when the road was blocked by a small landslip. The debris flow started from landslides at the headwaters of the steep mountain flanking the highway; (2) a debris flow devastated a local village in Pos Dipang, Perak in 1996, 44 people died. The debris flow nucleated by several landslides in the upper valley scouring the valley, subsequently created temporary dams along the river before the village. The village was eventually swept away by overwhelmed debris flood when the temporary dams broke; (3) in Johor, Vamei-Typhoon storm with the strength that capable of uprooting trees and heavy rain attributed to several induced landslides then debris flow in Gunung Pulai in the year 2001. Four houses were swept away by the debris flood and 5 were killed, due to debris accumulated before a bridge across the river broke, and; (4) in 2002, 16 lives perished when debris flow buried their village in Ruan Changkul, Sarawak. It buried an 8-unit long house, the 20,000 cubic meter debris was initiated from a landslide on the agricultural land on top of the hill. More recently, in August 2011, a debris flow in Sungai Ruil, Cameron Highlands buried 4 houses at a foot slope, 7 killed while 2 injured; the houses were situated 150m away from the source of the landslide.

In Malaysia, the debris flow landslide is becoming an alarming disaster as development are encroaching the fringe of highlands and mountainous areas. The hazards from the adjacent slopes or upstream located far away has yet to be considered in many risk assessment. Only a limited mapping and identification of debris flow were carried out at very local scale while there are many places in Malaysian topography of mountainous and dissected hilly terrain are vulnerable to debris flow. Currently, research on debris flows in Malaysia is still very limited to post-disaster investigation within the areas of debris flow where disasters occurred, particularly if death is involved.

A nation-wide mapping is proposed to be carried out to delineate areas of potential and vulnerable to debris flows. The first level of national mapping will rely on topographical and geological data to identify elements that are susceptible to debris flow with emphasising on the basin geometry, geomorphology, modelling of run-out distance of a debris flow and at-risk cultural elements.

Keywords: debris flow, landslide, Malaysia, debris flood