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Role of geoscientist in sustainable highland development in Malaysia

FATIN FARIHAH BAHARUDIN*, WAN NUR 'AFIFA WAN MUSTAPA, HASNIDA MOHAMED HANIFFA, NORAZIANTI ASMARI

Geoxpert Sdn Bhd, No. 37-3, Jalan Usj 21/10, 47630 Subang Jaya, Selangor, Malaysia
* Corresponding author email address: fatinbaharudin97@gmail.com

Abstract: Above a million Malaysian were affected by natural disasters over the last two decades where landslides and flooding were the highest geological disasters recorded. Malaysia is fairly safe from tremor-induced landslides given the ideal geographical location outside the Ring of Fire. Previous studies conclude that Malaysia's landslides are mainly affected by improper design, and construction and maintenance errors in highland development. Thus, this has raised concerns on sustainability practices of highland development in Malaysia as geological disasters in highland areas have been occurring continuously since 1919. This shows that improper development persists regardless of the slope properties, buffer zones, and other contributing geological factors. Stopping constructions or development in highland areas is not an option for big cities like Kuala Lumpur and Penang as most suitable low-lying areas are limited and already crowded with roads and buildings. Therefore, this paper emphasizes on the need for geological input from geoscience practitioners to support the sustainable development of highland areas in accordance with the United Nations Sustainable Development Goals, and current guidelines and legislations. Studied landslides

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are secondary data collected from previous published journals, books, related agencies, and internet searches. The historical landslides studied and classified according to the Varnes Landslide Classification (1978) show that there are urgent demands for geological input in future highland development as similar patterns of errors and failures were observed from previous disasters. The errors include insufficient ground investigation, improper understanding of soil and slope properties, poor drainage designs, and unsuitable geotechnical decisions to uphold and strengthen the slope. A full-time supervision from geoscience experts is vital in hill-site projects as altered terrain could vary the slope properties and affect its stability. Plus, having a good practice throughout the development processes aligns well with the United Nations Sustainable Development Goals as a sustainable city should be safe from hazards, and able to provide career opportunities for its citizens.

Keywords: Geoscience, geohazard/geological disasters, landslide, sustainable development, highland, Sustainable Development Goals