Disaster Resilience Survey in Ampang, Selangor

IDRC project members began the year with a series of social surveys to understand the impacts of geological hazards such as landslides in Ampang. An area known to host inevitable forces of nature at an unprecedented scale. These areas have experienced at least one or more hazards. The disastrous events are still remembered to this day and haunts many residents within its proximity. This allowed the project members to approach the locals for a better understanding of these hazards. The collected samples include a set of recommendations specifically on food security issues emphasized by the residents of Bukit Antarabangsa. The others highlighted the importance of government intervention in slope maintenance, information dissemination, and early warning systems (**Figure 1**)

A total of 70 respondents were interviewed from Bukit Antarabangsa, Taman Puncak Bukit Utama, Taman Bukit Permai, Ukay Perdana, etc. It was carried out with the support of the Japan International Cooperation Agency (JICA) and area-based NGO, Slope Watch Bukit Antarabangsa. The engagement with local communities enhanced our adaptative strategies against climate change. The suggested activities include forums, informal coffee shop talks, stakeholder workshops, street theatre events, local music, and cultural fest; also, content creation in the form of leaflets and social media engagements. This indicates that the affected communities are well aware of the existing threats and hopeful for a better approach from local and federal agencies to combat these emerging climatic and geological risks.

In addition, the newly developed web-based community applications were tested to observe their effectiveness in capturing disaster information and how local communities can utilize this freely-available data to improve resilience against emerging risks (**Figure 2**). For example, the IDRC researchers could observe soil erosion, cracks, etc., in Taman Puncak Bukit Utama. This information was then captured and transmitted into the web-based system. By being in the system, any stakeholder with access to the application can observe these images and use this information for further steps.

Engaging with the urban community certainly poses a significant challenge. However, with proper planning and approaches, the surveys can be completed. The support from various parties played a major role in achieving this social survey and allowed the researchers to test out the web-based applications.

Figure 1: Engaging with a local resident of Bukit Antarabangsa.

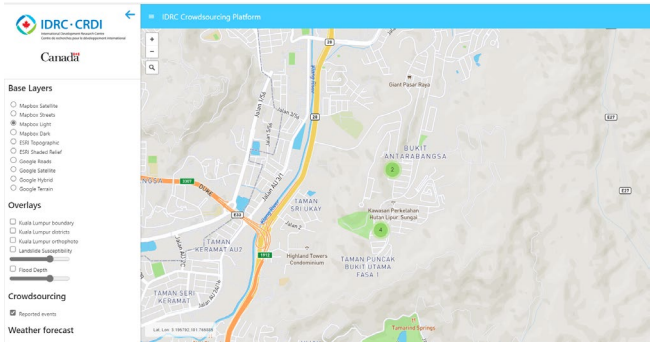

Figure 2: Testing out the web-based application in Ampang, Selangor

Research collaboration with British Geological Survey

The IDRC Project initiated collaborative work with the British Geological Survey (BGS) after they presented a talk at the Geological Society of Malaysia (GSM) and visited the Southeast Asia Disaster Prevention Research Initiative (SEADPRI) in late-January and early-February of 2023 (**Figure 1**). The geodesy and remote sensing department of BGS and IDRC researchers formed a partnership to investigate vertical land motion across Kuala Lumpur and the coastal region of Selangor (**Figure 2**).

Recent studies highlight many cities across Southeast Asia are facing subsidences due to various reasons. The common factors are human-induced actions in the form of land expansion, rapid land-use change, and groundwater extractions. Natural indicators play a significant role as well. However, in the case of Kuala Lumpur and the coastal region of Selangor, the former has major impacts, especially in the outskirts. The research discussion with BGS scientists includes developing a time-series analysis using Sentinel-1 satellite images to observe vertical land motion between 2015 to 2022 in Kuala Lumpur and the coastal regions of Selangor.

Other initiatives include acquiring declassified images and Landsat data from USGS. The freely-available information from the 1960s is required to observe the decadal change in land-use patterns prior to any industrial development as well as determining erosion and accretion pattern from the major rivers such as Sungai Selangor. Priority will be given to case study areas. Kuala Selangor is one of the regions where coastal hazards have exacerbated over time, with increasing erosion, flooding, etc., evidently from past stakeholder engagements. The subsidence data extracted from this portion will be validated with ground monuments like Global Navigation Satellite Systems (GNSS)/Global Positioning System (GPS) obtained from the Department of Survey and Mapping Malaysia (JUPEM).

The investigation also emphasized acquiring land-use change and well-log and groundwater information from freely-available Sentinel-2 satellite images and government agencies. The datasets are incorporated into a single system to develop a future projection model. This particular model may provide insights into the subsidence pattern and how decision-makers can use it for future development in these regions.

Figure 1: Key BGS researchers presented a talk at GSM (Front row, from left) Ms Poorani of the British High Commission, Dr. Clive Mitchell, Dr. Tom Bide and Dr. Alessandro Novellino of BGS, and Mr. Ahmad Nizam bin Hassan, President of GSM.

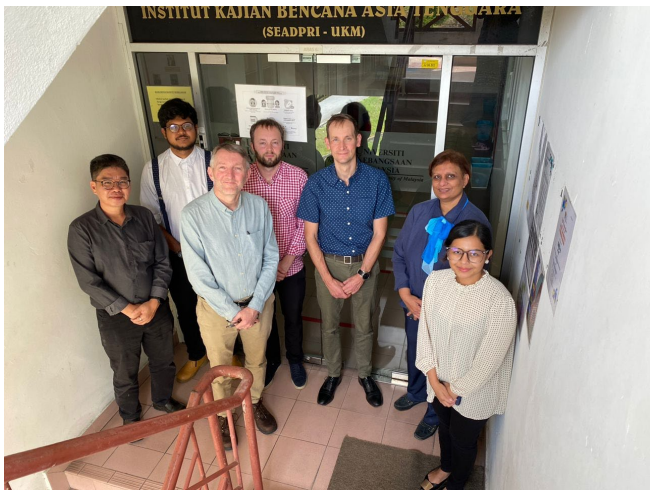

Figure 2: IDRC researchers and BGS officers meet-up at the SEADPRI-UKM office to discuss the potential for advancing novel approaches in mineral development and geohazard mapping across Malaysia and the tropics.