



A Landslide Tracker Methodology to Support Local Reporting of Landslides in India

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This research describes the development and pro-forma of a landslide tracker methodology (structure of questions and photos) to support local reporting of landslides in India, thus enhancing modelling of susceptibility to future landslides and India Landslide Early Warning Systems. This methodology aids in the collection of timely and representative information about landslide events using local people before such information is lost due to human clearance works or natural processes (further erosion, vegetation cover). In the framework of the UK NERC/FCDO funded LANDSLIP project 'Landslide multi-hazard risk assessment, preparedness and early warning in South Asia', a collaboration of government, academic and NGO scientists/practitioners from India and UK co-designed a questionnaire in both paper and mobile app proforma called the 'Landslide Tracker'. The Landslide Tracker was developed as a tool for gathering landslide information from different levels of local users (e.g., local officials, NGOs, students) to enhance landslide inventories in the test sites of Darjeeling and Nilgiris, India. Different users, supporting data capture within the project, have different levels of understanding and knowledge about landslides. The Tracker was developed with three user levels to reflect this variation in landslide expertise. Level 1 is available in paper format and Levels 1 to 3 in a freely available Google Play app developed by Amrita University "Landslide Tracker". Level 1 of the landslide tracker represents all users where the expertise level is not known or assumed to be limited; this comprises the most basic landslide information. This group of non-specialists represents the majority group of people capturing data within each study area. Information submitted by this user group, due to the limited knowledge and understanding of landslides in a geological context, might be assumed to have the highest degree of uncertainty and potentially the greatest amount of false information. The questions for this group utilise a simplified lexicon, with (i) location, data and time, (i) pictures of landslide material, (iii) landslide type, with finally (iv) generalised impact information. Level 2 represents more specialist users with a higher advanced understanding of landslides either from

their background training/proficiency or users that have undergone training. In general, these people are asked the same questions as in Level 1, but a more technical vocabulary is used, and more detailed information is requested, like the size of landslides. Level 3 is for trained landslide experts. They are asked a wide range of landslide questions, reflecting internationally recognised landslide glossaries and definitions, and based on the current methodology used by the Geological Survey of India. With the help of two NGOs (Keystone and Save the Hills) and the Geological Survey of India, the developed proforma (paper and mobile app), have undergone field testing. Feedback from this phase of development was essential for the improvement and update of the pro-forma. Efforts during the most recent Monsoon by the partners has resulted in over 500 landslide records being collected in the two test sites by either the app or in paper format.