ABSTRACT

Landslide risk is commonly defined as a function of landslide hazard and vulnerability indicators at risk such as physical and demography with attributed damage potentials with a defined magnitude. Vulnerability estimation is an important part of this assessment; a literature review demonstrates a lack of different vulnerability studies in landslides risk research with regard to physical and demography. These approaches determine the risk associated with landslides processes of a given magnitude and are applied in regional landslide risk analyses in Kohima Town of Nagaland. Landslide inventory was the first step which includes the mapping of landslide details of part of the study area. In order to assess the landslides susceptibility, a total of eight landslide inducing parameters; slope gradient, slope aspect, curvature, elevation, lithology, land use and land cover, drainage density, lineament density and topographic wetness index were considered and prepared with the help of toposheet, high resolution satellite imagery namely WorldView II, LISS IV data and extensive fieldwork. Landslide susceptibility maps were generated by calculating the relationship between all landslide inducing factors with the inventory and was classified into five susceptibility classes based on Jenks natural breaks classification namely very low, low, moderate, high and very high. There are four objectives in this research study; firstly to create the landslide inventory based on the available government data, published article, news reports, and extensive fieldwork; the second objective is to prepare a landslide susceptibility zonation using four different model Frequency Ratio (FR), Fuzzy Gamm Operators (FGO), Analytical Hierarchy Process (AHP) and Statistical Index (SI) and validation using Area under Curve (AUC) and R-Index method to check the accuracy and consistency of the models. The third objective is to create the physical and demographic vulnerability thematic maps with the help of population data from Census Data 2011 and updated with the data from the Kohima Municipal Council in 2015. The final objective is to prepare the landslide risk analysis of the study area which was carried using the best-fitted model of Landslide Susceptibility Index (LSI) and overlain with each of the vulnerability indicators with every five classifications of LSI. Total number and different types of building were used for the physical vulnerability and demographic aspects, the total population, female population and children below six years were taken into account classifying them each with the LSI classes. Risk analysis is an important source of decision making and developmental activities in the study area. Therefore, the output results of the present study can help the developers, policymakers, and engineers for urban management, mitigating the hazard, land-use planning so as to prevent and reduce the risk of a landslide.