

Flood Risk Assessment in the Lower Reaches of the Bagmati River in Nepal

Tank P. Kafle¹

Department of Irrigation, Jawalakhel, Lalitpur, Nepal

ABSTRACT

Flood hazard mapping and risk assessment were conducted to identify high risk zones and priority areas for mitigation measures in the flood plain of the Bagmati river in central Nepal. A hydraulic model was used to simulate flood flows through the river and its flood plain for discharges corresponding to various return periods. The main spilling sections along the river and inundation area extent as well as flood depths in the river and flood plain were determined. The inundation area corresponding to a flood depth of greater than one metre was also computed. The flood hazard factors for each Village Development Committees (VDCs) were generated based on the total inundation area and inundation area having a flood depth of greater than one metre. For a 50 year flood, an area of 360 km² of the 87 VDCs was estimated to be affected by flood with 183 km² having a flood depth of greater than one metre. Nearly 45% of the total area of flood affected VDCs was found to be inundated. The model results were verified by making a field visit and collecting data on flood depths corresponding to the peak flood of year 2004. Vulnerability was assessed based on population density and the economic importance of land type being inundated. Flood risk factor for each VDC was determined using the flood hazard and vulnerability factors based on matrix multiplication method. Finally a flood risk map was developed that showed 17 VDCs under high risk category, 19 VDCs under medium risk category and 51 VDCs under low risk category respectively. The right bank of the river between 10 km and 30 km was identified as the main spilling reach. The results of the study could be useful for planning mitigation measures aimed at reducing flood damages.

Key Words: Flood hazard, Flood Modeling, Risk Map, Bagmati
