MULTI-HAZARD RISK ASSESSMENR OF GODAWARI MUNICIPALITY, NEPAL

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Multi-hazards pose significant risks to the communities and critical infrastructures. The interaction of multi-hazards results in compounding consequences that can exhaust the capacities and functions of the local governments [1]. Unplanned urbanization, population growth, and climate change are further limiting the resources and capacities of the municipalities. In order to manage and reduce the residual, current, and future multi-hazard risks followed by resilient development, the local governments require robust risk-informed spatial planning, considering the prevalent hazards, land use, elements-at-risk, and its associated vulnerabilities.

Multi-hazard risk assessment was conducted in Godawari Municipality, of Kailali district of Nepal. The aim was to develop a methodology for analyzing the major natural hazards prevalent in the municipality, assess the vulnerability of the communities and infrastructure to the major natural hazards, determine their degree of exposure to future hazardous events, and develop risk profiles as a basis for the land use planning processes. The simplified workflow of multi-hazard risk assessment is shown in Figure 1.

Floods, landslides, and earthquakes are the major hazards of the municipality that were modelled. Intensive field surveys were conducted to collect historical records of disasters and their impacts on elements-at-risk, such as buildings, agricultural lands, roads, and populations. An open-source, web-based spatial decision supporting tool called RiskChanges (http://riskchanges.org/) was used to analyze the exposure, loss, and risk. Different hazard layers were overlaid with available elements-at-risk layers to obtain their exposures. Losses were calculated for each hazard type, frequency class, and exposed elements-at-risk combination by multiplying their vulnerabilities, and spatial probabilities. Risks were presented in terms of Average Annual Loss (AAL) for all the elements-at-risk for various return periods.

The percentage of area exposed to different classes of multi-hazard risk are shown in the Table 1.

Table 1: Percentage of area exposed by different classes of multi-hazard risk

Hazard Risk Zone	Area (%)
Low	23.42
Moderate	49.9
High	26.65

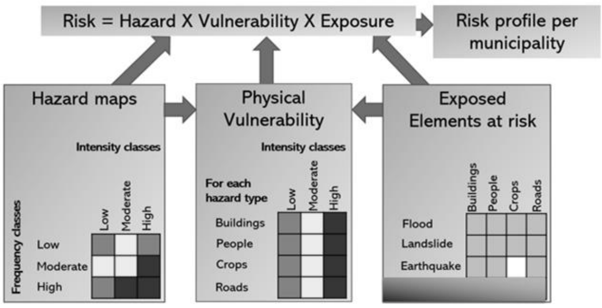

Figure 1: Simplified workflow of multi-hazard risk assessment

Interpretation of the risk assessment results is expected to assist the local government in identifying the areas suitable for future developments and allocate the resources efficiently to build back better. Regular updating of the risk components and subsequent assessments are recommended for the municipality attributed to dynamic nature of multi-hazard risks.

REFERENCES

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