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Assessing the Geo-Hazards and their Impacts on Sustainable Transport System in Nepal

Geo-hazards are directly associated with road safety and sustainability and, thus, have been attracting attention from the academia, policy makers and other stakeholders globally. This study aims to assess the geo-hazards and their associated implications and highlights the approaches for the sustainable transport system in Nepal. The study was carried out by reviewing literatures on contemporary geo-hazards and accompanying transport safety measures including policy interventions and achievements. It further covers current practices related to road safety assessment through various peer reviewed scientific journals, handbooks, manuals and government policies, key informants' opinions regarding risk reduction and management from sustainable perspectives. Variation is noticed in terms of frequency, magnitude and severity of geo-hazards in different geological regions of the country. For instance, the low-land area (the terai region) is at a high risk of inundation, whereas the hilly regions (Siwalik and Mahabharata) remains mostly at the risk of intense soil erosion, rock fall, landslides and floods. On the other hand, the Himalayan region is at constant risk of glacial lake outburst flood which is one of the unique and presumably the most devastating. Noticeably, most of the geo-hazards are likely to occur during the monsoon season (June to September) impacting huge loss of lives and properties. For instance, more than 60% of the road accidents occur in the earthen roads during the monsoon season. Approximately 31% of all these fatalities and serious injuries are associated with long-distance route accidents mainly in hilly areas. Annually, an average of ten thousand accidents related to public transportation occur where, around 2100 people lose their lives and thousands get injured. Sadly, most of the victims involve productive age in between 15-49 years. The road traffic injuries ratio for fatal, major and minor is found 1:2:2. Long-distance driving in the mountain terrain, lack of knowledge of sharp angle turnings, narrow earthen roads without proper drainage, intense rainfall, poor visibility, inadequate safety barriers, insufficient road signs, poor road design and maintenance along with inappropriate construction, natural stress relief and weakening of rocks through progressive weathering are closely related to the road accidents and fatalities. After restructuring of the nation in the year 2015, the constitution of Nepal has given ample rights to the local governments and they are speeding up road construction without following the principle of sustainability which seems to be one of the major risk concerns for road safety. A few interventions such as crash and wire barriers, slope stabilizing and bioengineering, strip and divider in multilane highways, jute netting and retaining structure are under practice in Nepal. However, these interventions have limited impact on risk reduction in road transport sector. Therefore, strong legal provisions and will power at federal, provincial and local levels of governments and their effective implementations will play pivotal role for the sustainable and resilient transport system in Nepal.

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