Landslide Characteristics and Societal Impacts of Roadside Towns along Sino-Nepal Transportation Corridor
A Case of Kathmandu-Kyirong Highway

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Overview

- Kathmandu–Kyirong highway (KKH) is a strategic motorway built in the terrain of high tectonic and river incision belt, weak geological settings, and extreme monsoonal climate system.
- It suffers from frequent landslide hazard annually.
## Landslide characteristics

<table>
<thead>
<tr>
<th>Period</th>
<th>Nr.</th>
<th>Density/ha</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 &amp; older</td>
<td>694</td>
<td>0.383</td>
<td>0.003</td>
<td>110.139</td>
<td>0.928</td>
<td>643.691</td>
</tr>
<tr>
<td>2005-2009/2010</td>
<td>510</td>
<td>0.339</td>
<td>0.017</td>
<td>44.167</td>
<td>1.119</td>
<td>570.765</td>
</tr>
<tr>
<td>2011-2014</td>
<td>413</td>
<td>0.177</td>
<td>0.010</td>
<td>54.989</td>
<td>0.723</td>
<td>298.553</td>
</tr>
<tr>
<td>2015</td>
<td>1934</td>
<td>0.637</td>
<td>0.004</td>
<td>12.656</td>
<td>0.554</td>
<td>1071.463</td>
</tr>
<tr>
<td>2016</td>
<td>498</td>
<td>0.161</td>
<td>0.010</td>
<td>26.093</td>
<td>0.547</td>
<td>271.628</td>
</tr>
<tr>
<td>2017 &amp; 2018</td>
<td>528</td>
<td>0.186</td>
<td>0.004</td>
<td>31.215</td>
<td>0.591</td>
<td>312.152</td>
</tr>
<tr>
<td>Total</td>
<td>4,577</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,168.252</td>
</tr>
</tbody>
</table>

Continuously active area more than two periods is **626.5 ha**

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High nr. of landslides in all mapping years
Landslide and causative factors

Landslides are
- increased with incremental slope and relative relief
- more in late Paleozoic and pre-Cambrian lithological formations
- more in southern slope aspect
- more in grass lands, bushes and barren lands
- more closer to earthquake epicenters as well as streams
- more in 2000 -2500 mm rain zone (pre-quake) and more in dry steep slopes (co-seismic)
- more in the area far from roads; it is because most of the roads are in urban and sub-urban flat locations

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Societal Impacts

Six major sectors are highly impacted - transportation, price hike, and shortage of stuffs

Livelihood options - agriculture, and tourism and private business

Eight roadside towns, n=296)
Coping mechanism

Local residents are smart enough to cope with the hardship that brings by slope instability

The mechanism of coping are:

- One way transportation and walk in damaged area
- Carry goods by foot from nearby market
- Mentally prepare to reach nearby workplaces by walking
- Keep stock of goods at home
- Use savings to buy expensive stuffs in local market
- Helicopter lifting during emergency

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Mass failure is **common hazard** along Kathmandu Kyirong highway corridor.

Slope angle, relative elevation, slope aspect, lithology, land cover, stream and epicenter proximity, and rainfall have remarkable influence on mass failure.

Landslides have remarkable impact not only on **road condition** but also on **livelihood** of roadside residents.

Locals are **aware** of the **devastation** that comes with mass failure, thus acceptable risk is high.

People are **resilient** though they have very limited resources.

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Thank you