INSTITUTE FOR RISK AND DISASTER REDUCTION

Understanding the Issues Involved in Landslide Risk Management in the Hill Tract Districts of Bangladesh

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1. Background
Urbanization is one of the most significant human induced global changes worldwide [1]. Like many other areas in the world the Hill Tract Cities of Bangladesh, are also the outcome of spontaneous rapid growth without any prior or systematic planning. This rapid urbanization, coupled with the increased intensity and frequency of adverse weather events (e.g. landslides), is causing devastating effects on the city, which also has lower capacities to deal with the consequences of climate change. Cities like Chittagong and Cox’s Bazar have been hit repeatedly by devastating landslides in recent years [2].

2. Problem Identification
In the process of urbanization, the physical characteristics of the hill tract cities of Bangladesh are gradually changing as plots and open spaces have been transformed into building areas, certain hilly areas into settlements, low land and water bodies into reclaimed built-up lands etc. Particularly in Chittagong, many urban dwellers and their livelihoods, quality of life, property and future prosperity are being continuously threatened by the risks of cyclones, sea-level rise, tidal waves, flooding, landslides, earthquakes and other hazards that climate change is expected to aggravate. These disasters have almost become the day-to-day realities for the poor and vulnerable populations that inhibit many of the most hazardous areas in the city [3]. For example, Chittagong City has been hit repeatedly by devastating landslides in recent years (Table 1).

3. Study Area Profile
The Hill Tracts (HT), the only extensive hilly areas of Bangladesh, lie within southeastern part of the country bordering Myanmar on the southeast, the Indian state of Tripura on the north, Mizoram on the east and the Bay of Bengal on the west (Figure 1). The area of the Hill Tracts is about 19,888 km². The weather of this region is characterised by tropical monsoon climate with mean annual rainfall nearly 2540 mm in the north and east and 2540 mm to 3810 mm in the south and west. The pre-monsoon season is April-May which is very hot and sunny and the monsoon season is from June to October, which is warm, cloudy and wet [2].

4. Scope of the Research
Chittagong City is highly vulnerable to landslide hazard, with an increasing trend of frequency and damage. The major recent landslide events were related to extreme rainfall intensities having short period of time. All the major landslide events occurred as a much higher rainfall amount compared to the monthly average [4]. This clearly indicates the landslide vulnerability of people living in dangerous hilly slopes (Figure 2). It is therefore essential that the study area type is increasing and hill forest is decreasing (Figure 3 and Figure 4). It indicates that people are cutting existing hills and forests to develop urban areas. Therefore, the aim is to understand the issues involved in urban disaster risk management based on the case study of recent landslide events in Bangladesh.

5. Objectives of the Research
(a) To understand human adaptation to landslide risks under condition of rapid urbanization in fast growing cities.
(b) To understand the processes and mechanisms of landslides in Bangladesh.
(c) To understand the current landslide hazard management strategies undertaken by the formal and informal authorities.
(d) To create a web-based dynamic model to monitor the landslide risks.

6. General Observation
After analysing Landsat satellite images over the past 20 years (1990-2010), it is found that urban area type is increasing and hill forest is decreasing (Figure 3 and Figure 4). It indicates that people are cutting existing hills and forests to develop urban areas. Therefore, the aim is to understand the issues involved in urban disaster risk management based on the case study of recent landslide events in Bangladesh.

7. Conclusion
Landslides are one of the most significant natural damaging disasters in hilly environments. Social and economic losses due to landslides can be reduced by the means of effective planning and management. Therefore, the outcome of this research shall help the endangered local inhabitants, urban planners and engineers to reduce losses caused by existing and future landslides by means of prevention, mitigation and avoidance.

REFERENCES

ACKNOWLEDGMENTS

Figure 1: Location of Hill Tract (HT) Districts of Bangladesh

Figure 2: Landslide Vulnerable Areas of Chittagong City

Table 1: Major Landslides in Chittagong City in Recent Years

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Rainfall Sequence (Cumulated Rainfall)</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 August 1999</td>
<td>Gopapur, Kotwali Thana, Chittagong</td>
<td>0 – 610 mm</td>
<td>10 people killed</td>
</tr>
<tr>
<td>24 June 2000</td>
<td>Chittagong University Campus</td>
<td>0 – 105 mm</td>
<td>13 people killed and 20 injured</td>
</tr>
<tr>
<td>29 June 2003</td>
<td>Patiya</td>
<td>0 – 658 mm</td>
<td>4 people killed</td>
</tr>
<tr>
<td>3 August 2005</td>
<td>Nizam Road Housing Society of the port city’s Panchlaish area</td>
<td>0 – 25 mm – 2 days</td>
<td>2 people killed and 12 injured</td>
</tr>
<tr>
<td>11 June 2007</td>
<td>Matia Ranna Colony of Lalkhan Bazar, Chittagong</td>
<td>0 – 610 mm</td>
<td>128 people killed and 100 injured</td>
</tr>
<tr>
<td>10 September 2007</td>
<td>Nabi Nagar in Chittagong</td>
<td>0 – 452 mm – 7 days</td>
<td>2 people killed</td>
</tr>
<tr>
<td>18 August 2008</td>
<td>Matijharna in Chittagong</td>
<td>0 – 454 mm – 11 days</td>
<td>11 people killed and 25 injured</td>
</tr>
<tr>
<td>26 June 2012</td>
<td>Chittagong (Lebubgan area and Foy’s lake surroundings)</td>
<td>0 – 889 mm – 8 days – 19 – 26 June 2012</td>
<td>90 people killed and 150 injured</td>
</tr>
</tbody>
</table>

Figure 3: 7. Conclusion
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Figure 4: 6. General Observation
After analysing Landsat satellite images over the past 20 years (1990-2010), it is found that urban area type is increasing and hill forest is decreasing (Figure 3 and Figure 4). It indicates that people are cutting existing hills and forests to develop urban areas. Therefore, the aim is to understand the issues involved in urban disaster risk management based on the case study of recent landslide events in Bangladesh.