

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).

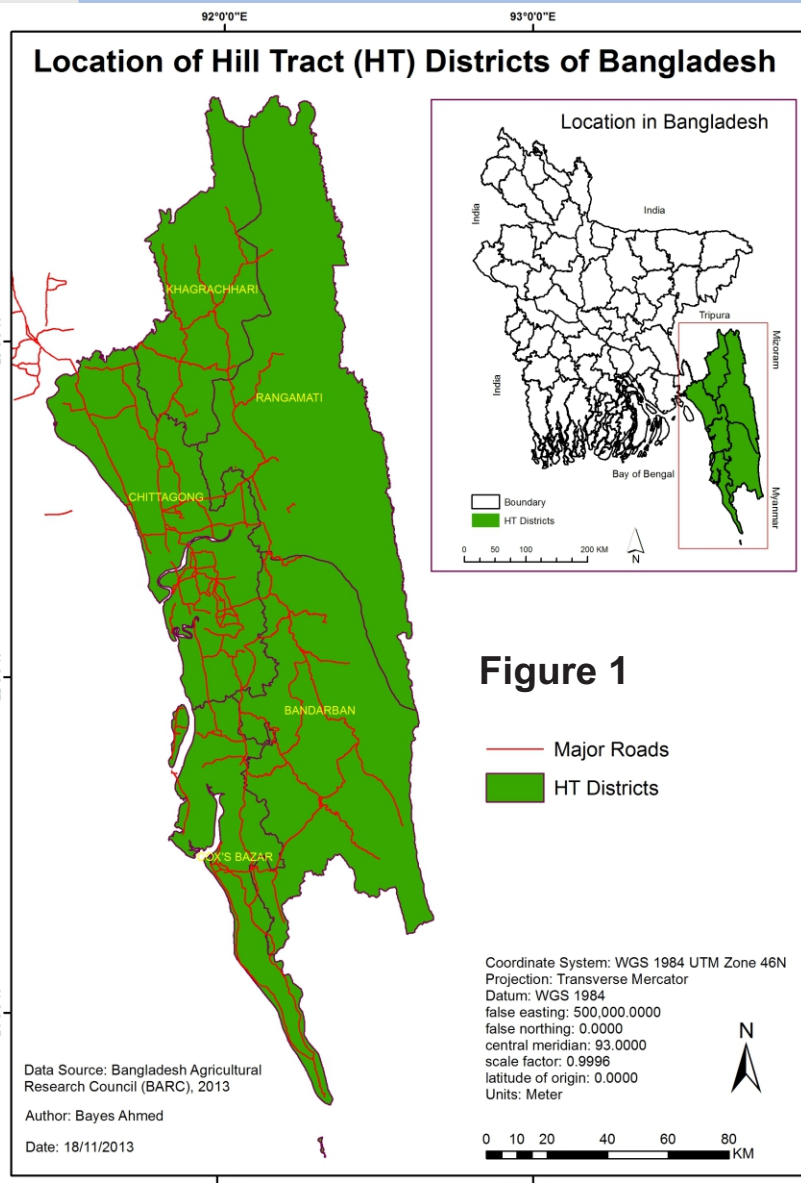
Table 1: Major Landslides in Chittagong City in Recent Years

Date	Location	Rainfall Sequence (Cumulated Rainfall)	Consequences
13 August 1999	Gopaipur, Kotwali Thana, Chittagong	435 mm – 12 days 2 – 13 Aug 1999	10 people killed
24 June 2000	Chittagong University Campus	108 mm – 8 days 17 – 24 June 2000	13 people killed and 20 injured
29 June 2003	Patiya	658 mm – 10 days 20 – 29 June 2003	4 people killed
3 August 2005	Nizam Road Housing Society of the port city's Panchlaish area	25 mm – 2 days 2-3 August 2005	2 people killed and 12 injured
11 June 2007	Mati Jharna Colony of Lalkhan Bazar, Chittagong	610 mm – 8 days 4 – 11 June 2007	128 people killed and 100 injured
10 September 2007	Nabi Nagar in Chittagong	452 mm – 7 days 4 – 10 Sept 2007	2 people killed
18 August 2008	Matijharna in Chittagong	454 mm – 11 days 8 – 18 August 2008	11 people killed and 25 injured
26 June 2012	Chittagong (Lehubagan area and Foys lake surroundings)	889 mm – 8 days 19 – 26 June 2012	90 people killed and 150 injured

Source: Department of Disaster Management, Bangladesh; Bangladesh Network Office for Urban Safety (BNUS) & Asian Disaster Preparedness Center (ADPC), Bangladesh, 2012.

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 trend of land cover changes (e.g. urbanization) in the hilly areas of Chittagong are assessed so that appropriate landslide mitigation strategies can be developed.

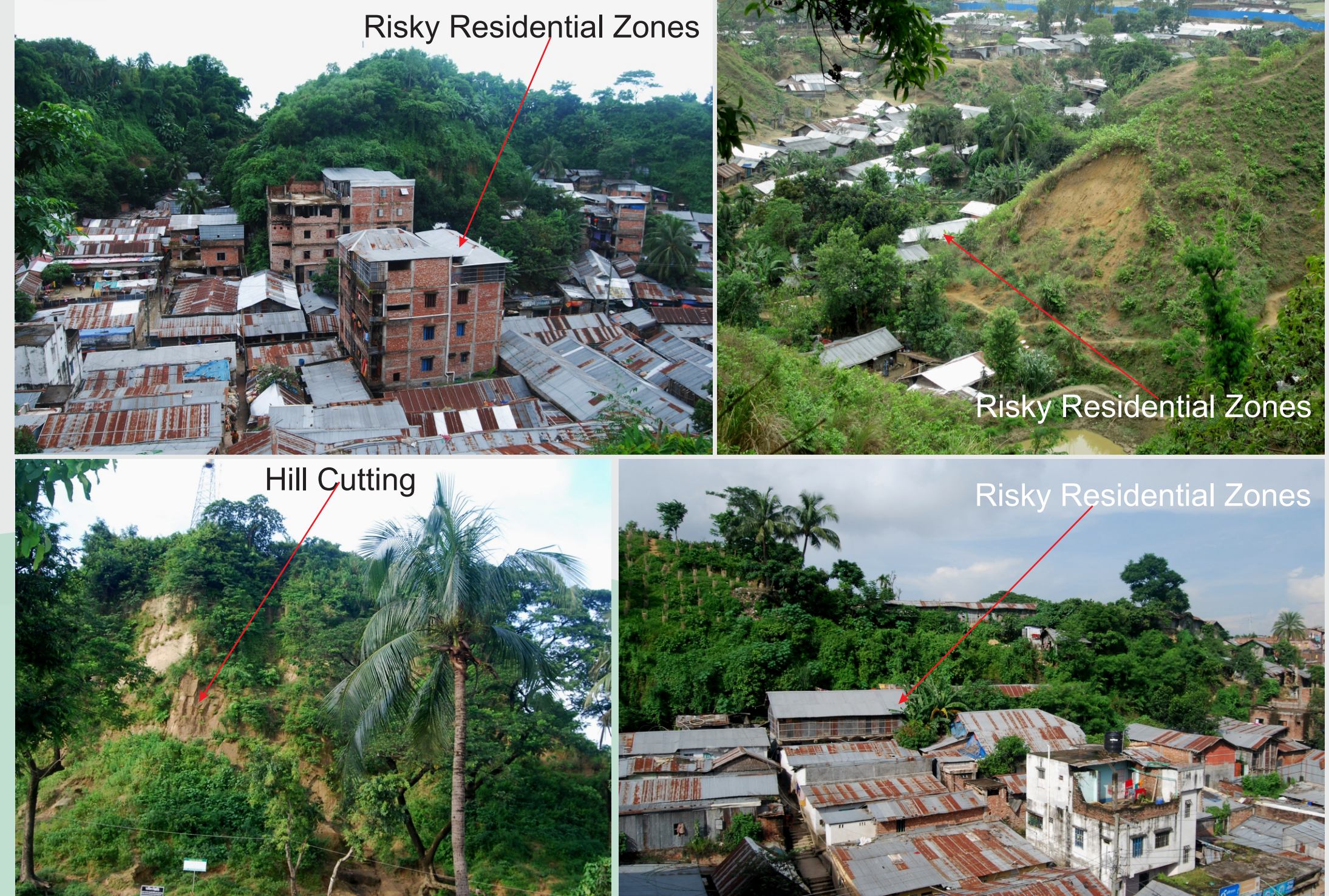


Figure 2: Landslide Vulnerable Areas of Chittagong City

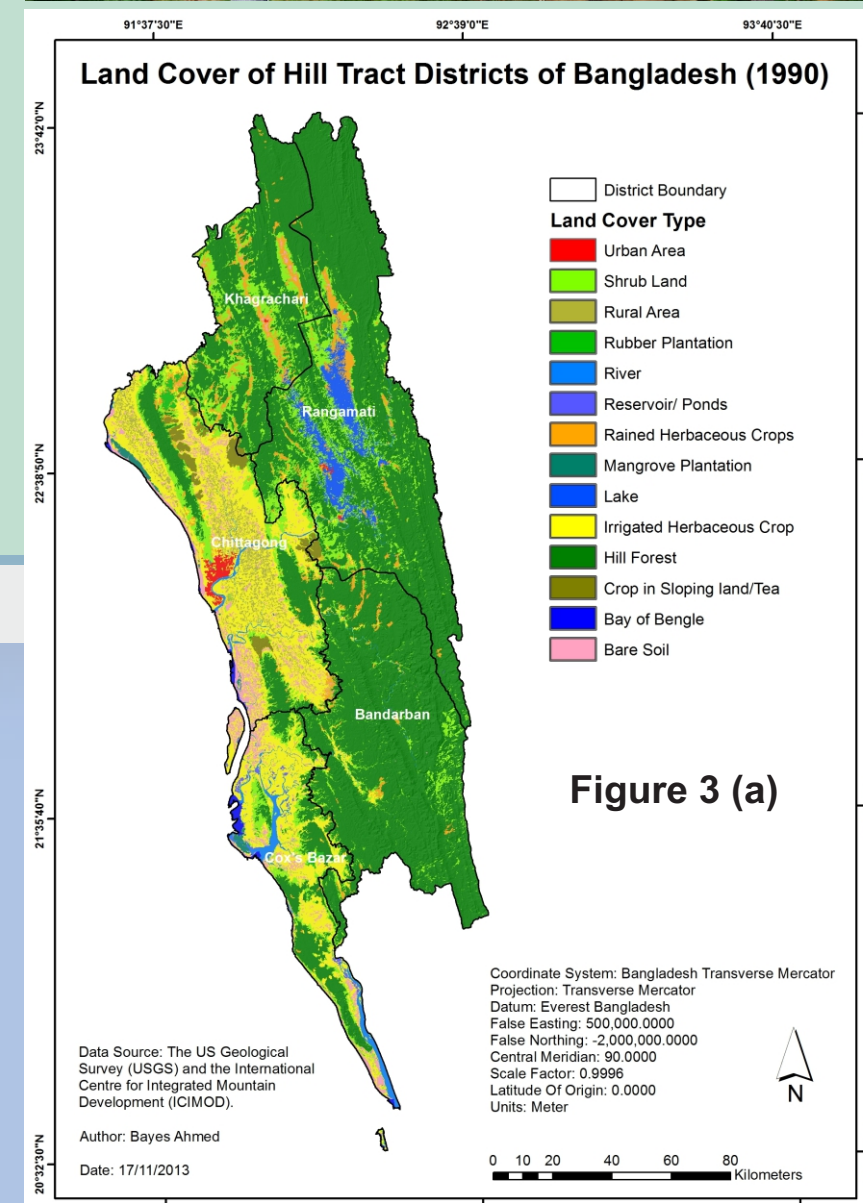


Figure 3 (a)

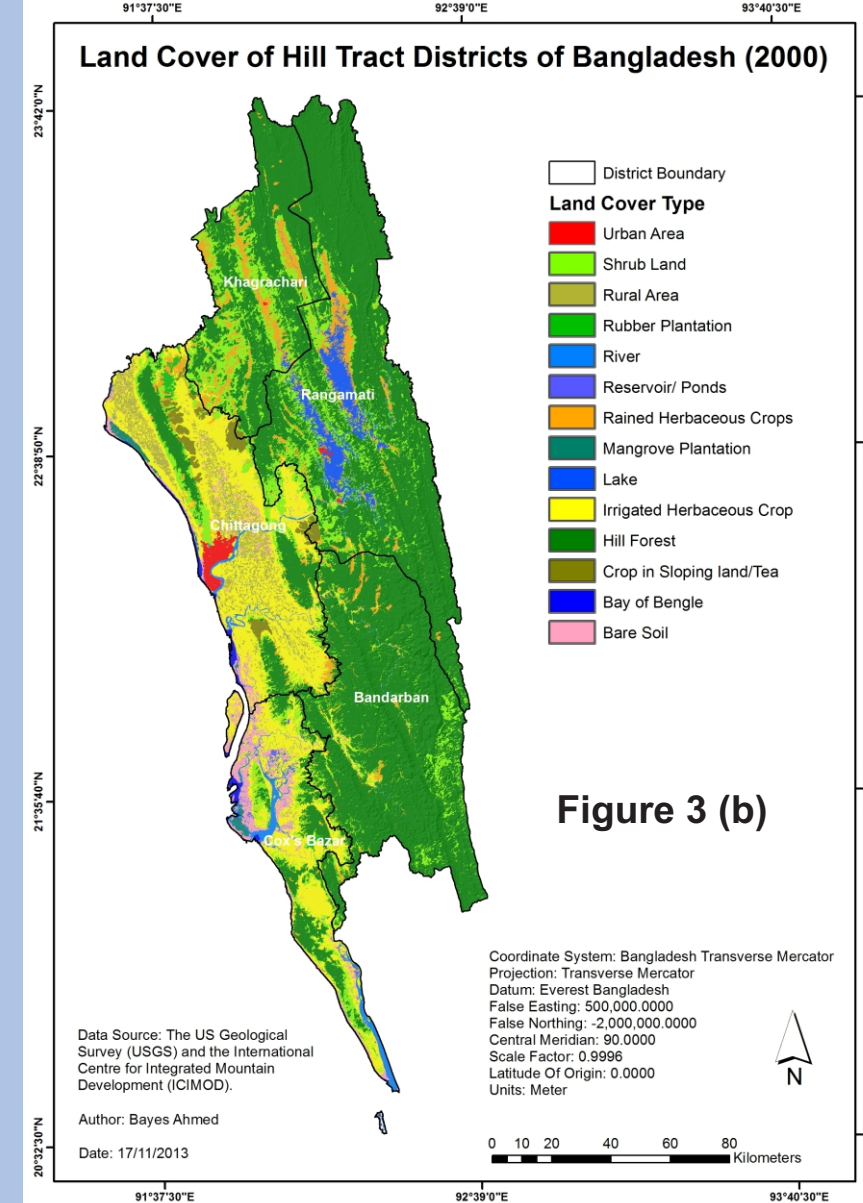


Figure 3 (b)

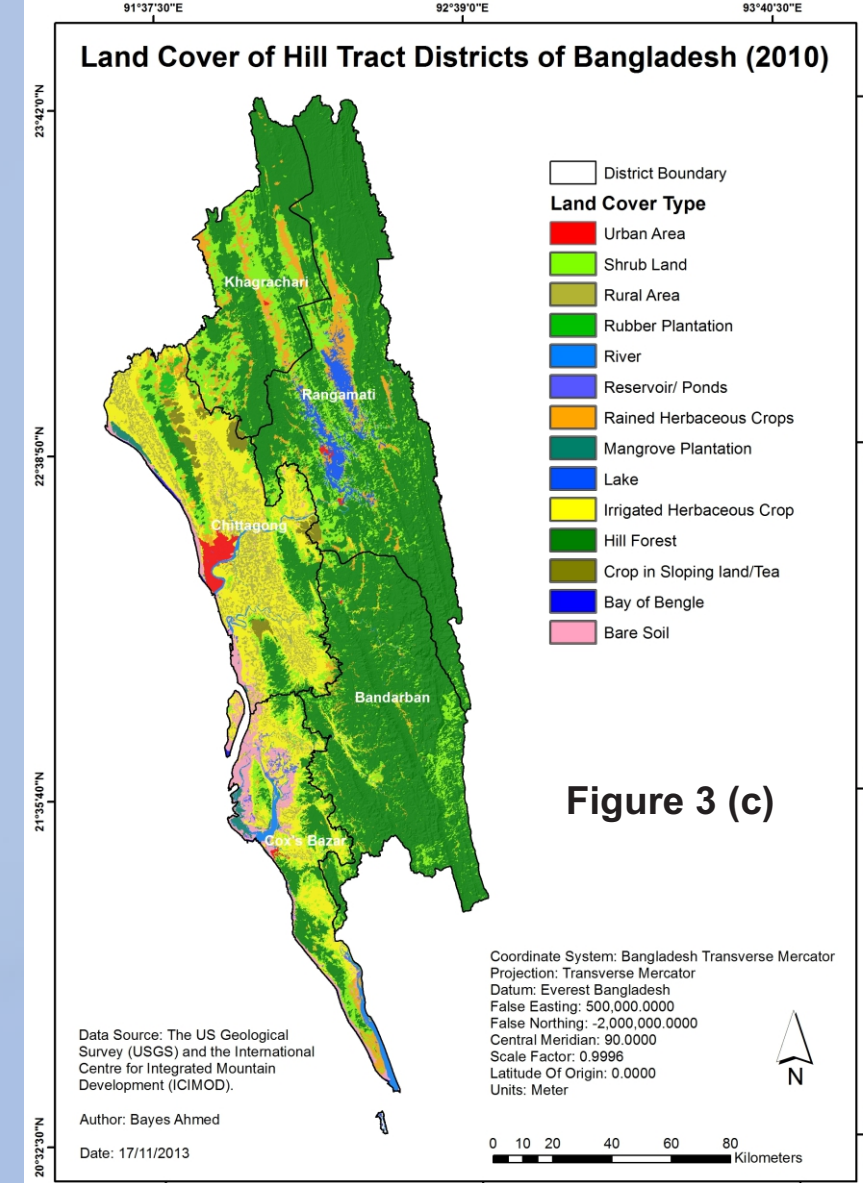


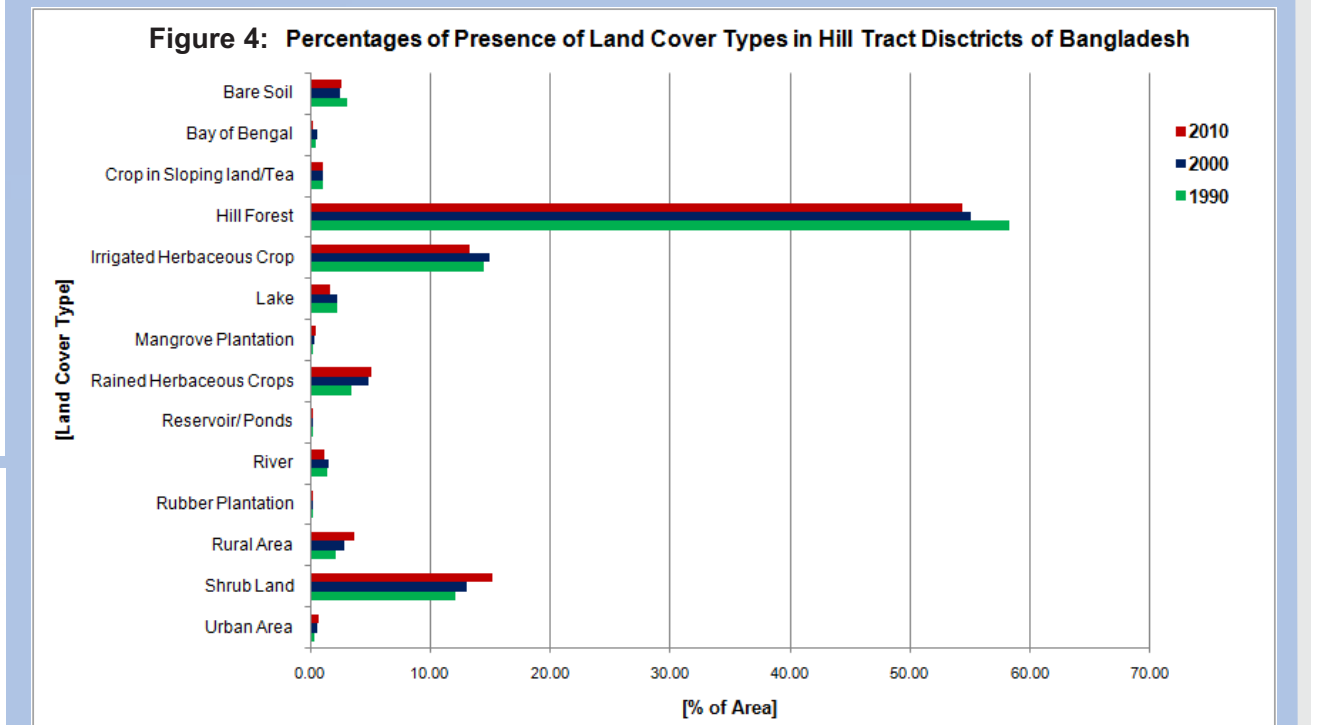
Figure 3 (c)

5. Objectives of the Research

- To understand human adaptation to landslide risks under condition of rapid urbanization in fast growing cities.
- To understand the processes and mechanisms of landslides in Bangladesh.
- To understand the current landslide hazard management strategies undertaken by the formal and informal authorities.
- 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.

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