Developing Dynamic Web-GIS based Early Warning System for the Communities Living with Landslide Risks in Chittagong Metropolitan Area, Bangladesh

BUET-Japan Institute of Disaster Prevention and Urban Safety (BUET-JIDPUS)
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Welcome

to the Workshop Presentation on

Developing Dynamic Web-GIS based Early Warning System for the Communities Living with Landslide Risks in Chittagong Metropolitan Area, Bangladesh

Presented by-

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Background

Background

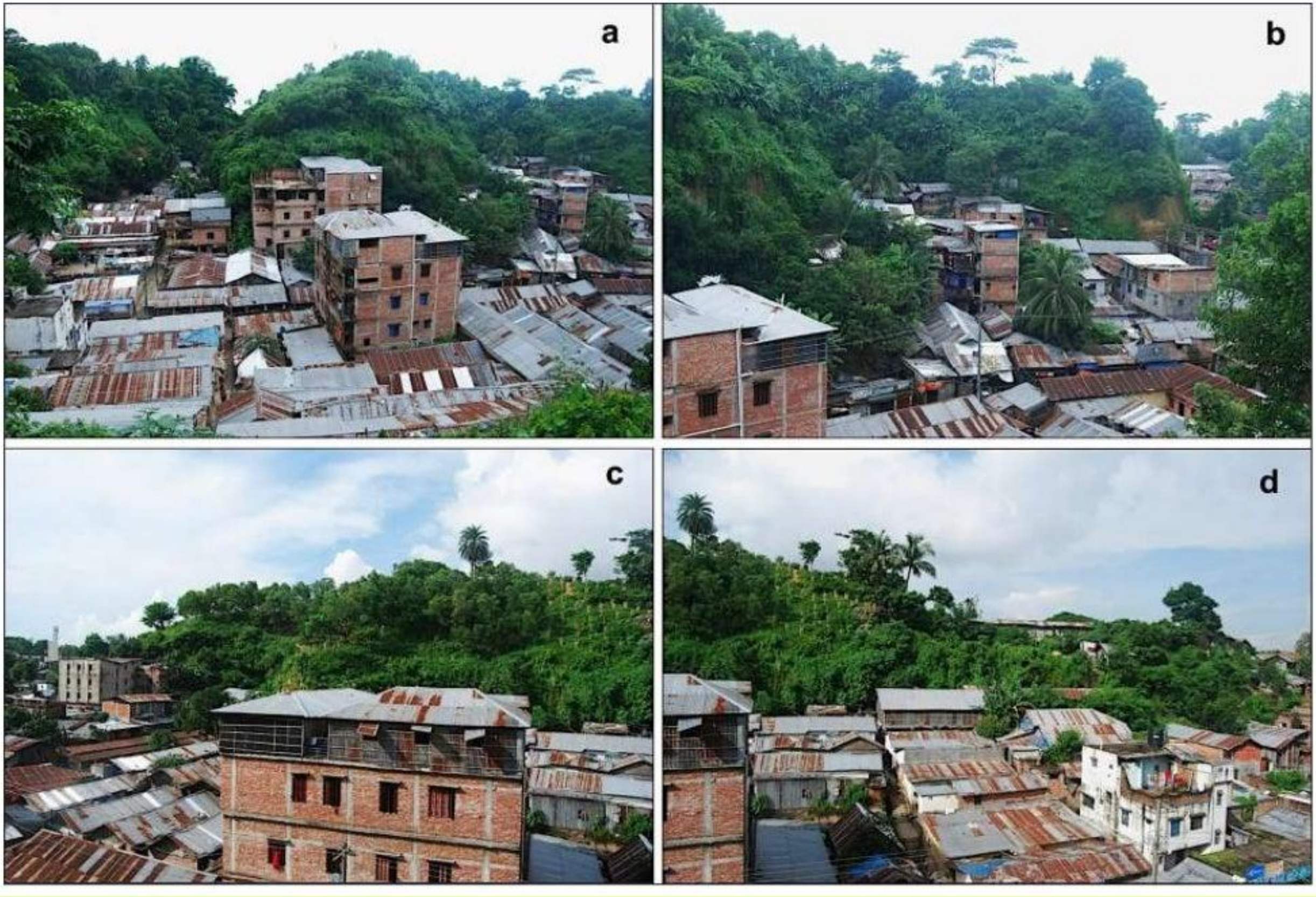
Date	Location	Rainfall sequence (cumulated rainfall)	Consequences
13 August 1999	Gopaipur, Kotwali Thana, Chittagong	435 mm – 12 days 2 – 13 Aug 1999	10 people killed
24 June 2000	Chittagong University Campus	108 mm – 8 days 17 – 24 June 2000	13 people killed and 20 injured
29 June 2003	Patiya, Chittagong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

Background

The major recent landslide events were related to **extreme rainfall intensities having short period of time**. Landslide events occurred at a **much higher rainfall amount compared to the monthly average**.

Against this backdrop, it is essential **to develop an early-warning system for the hilly communities of CMA** incorporating local knowledge.

Study Area



Activities and Result

Detail Inventory for 57 Past Landslides

Basic Information

Landslide ID :05
Landslide Location: Tanker Pahar, Moti Jharna
Coordinates: 22°20'54.27''N, 91°48'51.60''E

Datum: WGS 1984
Elevation (m): 41.18
Area of Displaced Mass (sqm): 331.84
Rainfall: Unknown


Source: *Field Survey, August 2014*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Landslide Mechanism

Type of Movement: Slide
State: Active, Reactivated, Suspended
Distribution: Advancing

Style: Single
Water Content: Moist
Material: Soil/Earth

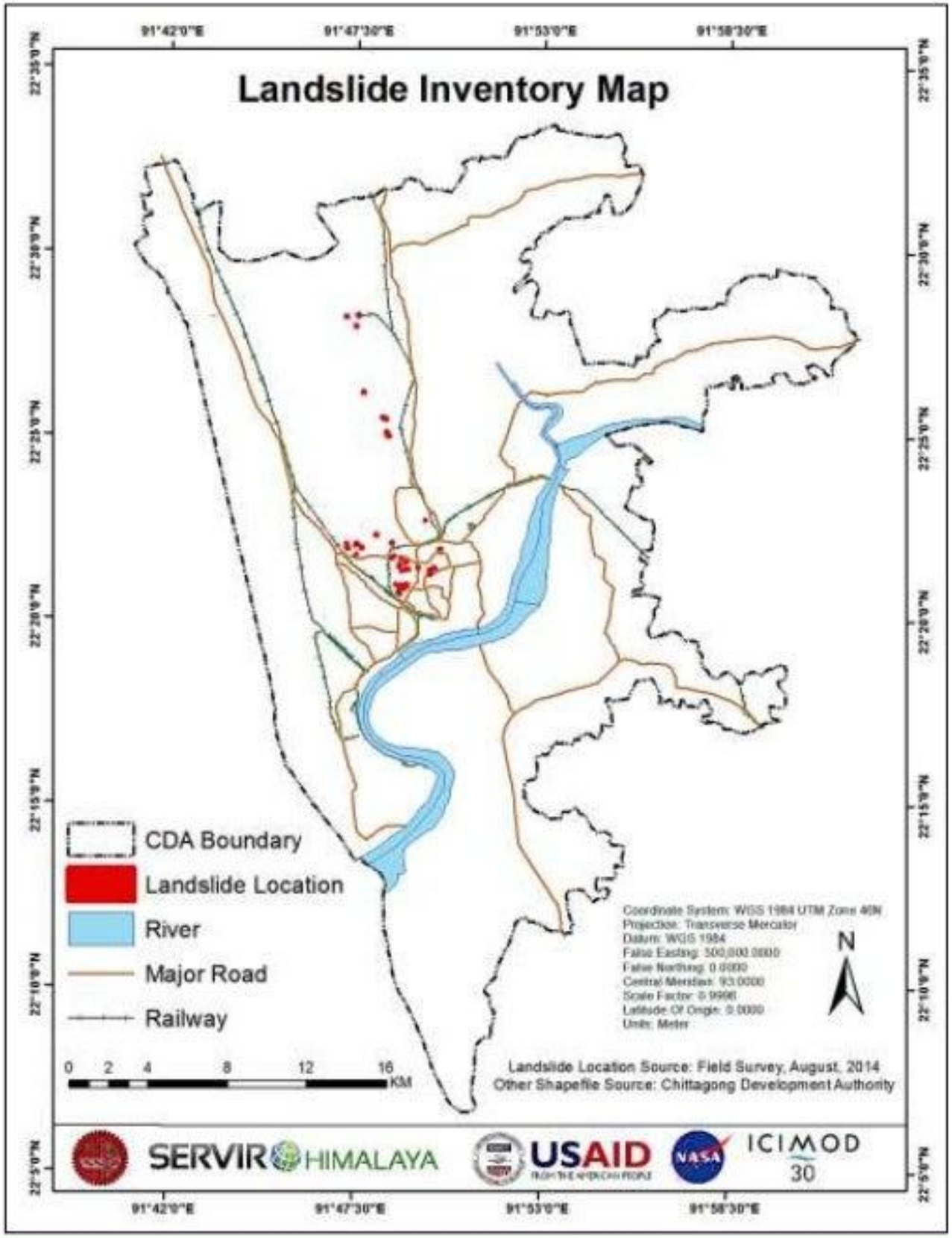
Land Cover/Use Type (%):
Herbaceous vegetation is the Primary land cover of Tanker Pahar. Forest/ woodland type is also visible in this hill.

Causes of Movement:
Hill cutting is the major issue that caused landslide in this area and intense rainfall acted as a triggering factor for landslide.

Land Slide History and Future Risk of Landslide

Landslide in this site occurred in 1982, 1989,1991,1994,1996 and 2013. 10 houses got damaged and almost 22 people died due to landslide at different periods. Utility facilities were highly damaged in this incident. Economic activities were hampered so does the social life of people. Environment has been found to be severely damaged. Still there are many houses located at the down slope of the hill. Soil of this site has been found to be sandy. The escapement slope is found to be near vertical. The failed mass is a part of upper portion. Vertical Slope characteristics can be considered as a contributing factor to future landslide for this hill. Settlements located at the down slope of this hill are at a huge risk of massive landslide. The risk is high (Field survey, August 2014).

Landslide Inventory

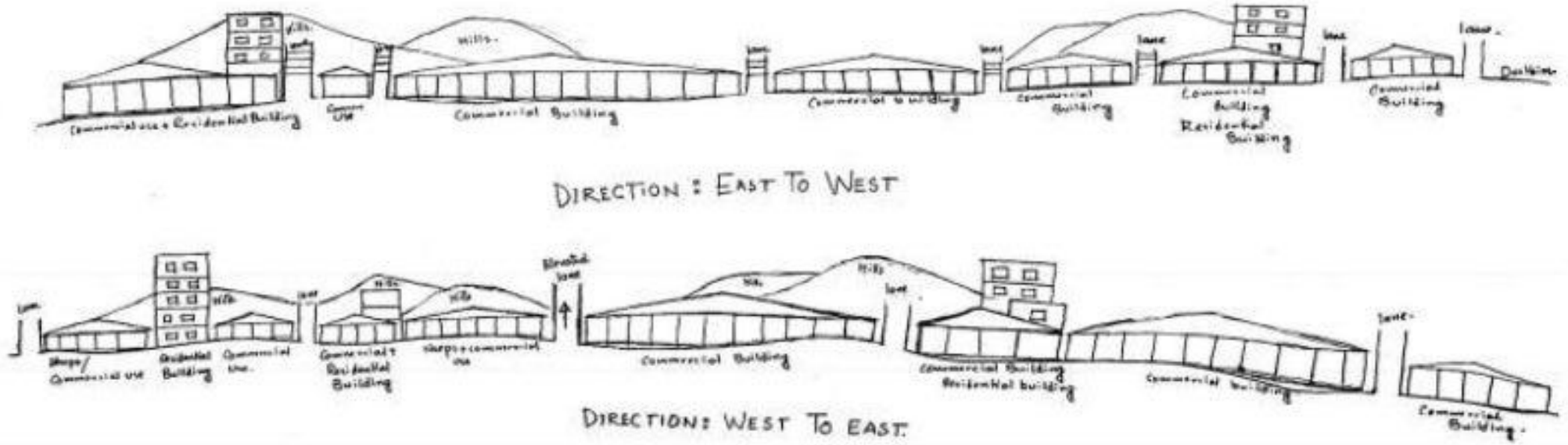


Questionnaire Surveying

Name of the study area	Total Population	Sample size
Moti Jharna	52000	248
Batali Hill	13000	142
Golpahar	33000	114
Goachibagan Medical Hill	5000	86
	Total sample size	**590**

Participatory Rural Appraisal Surveying

(a)



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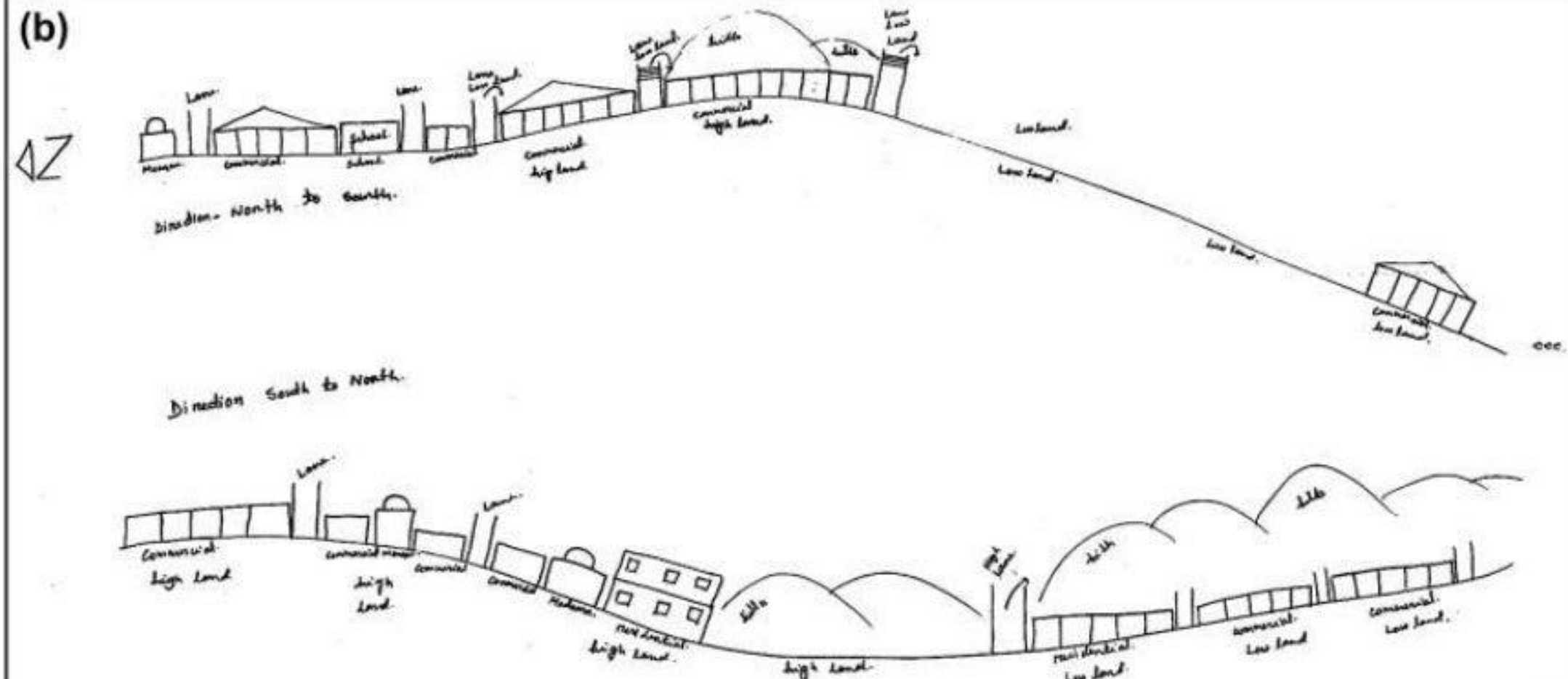
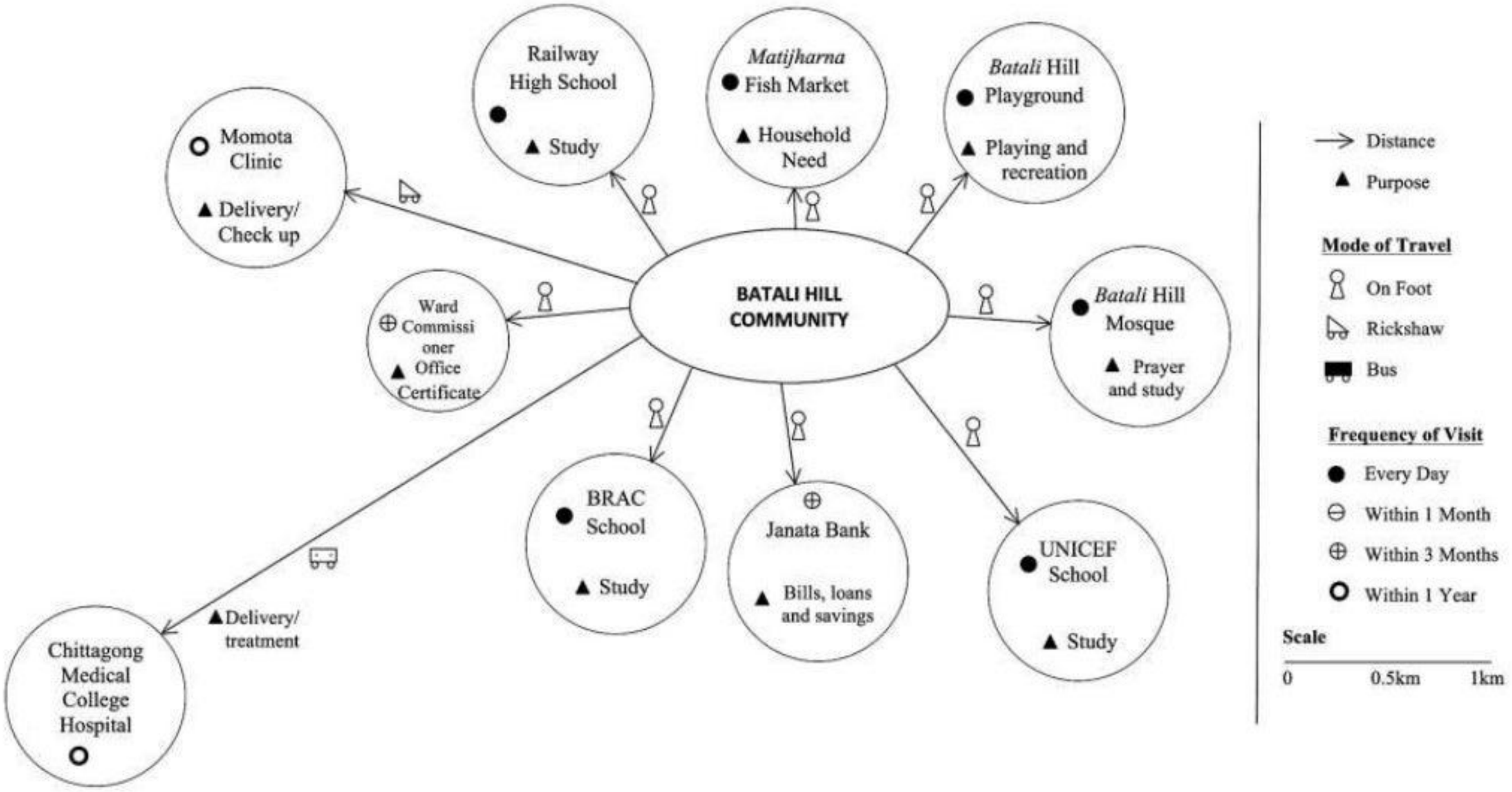
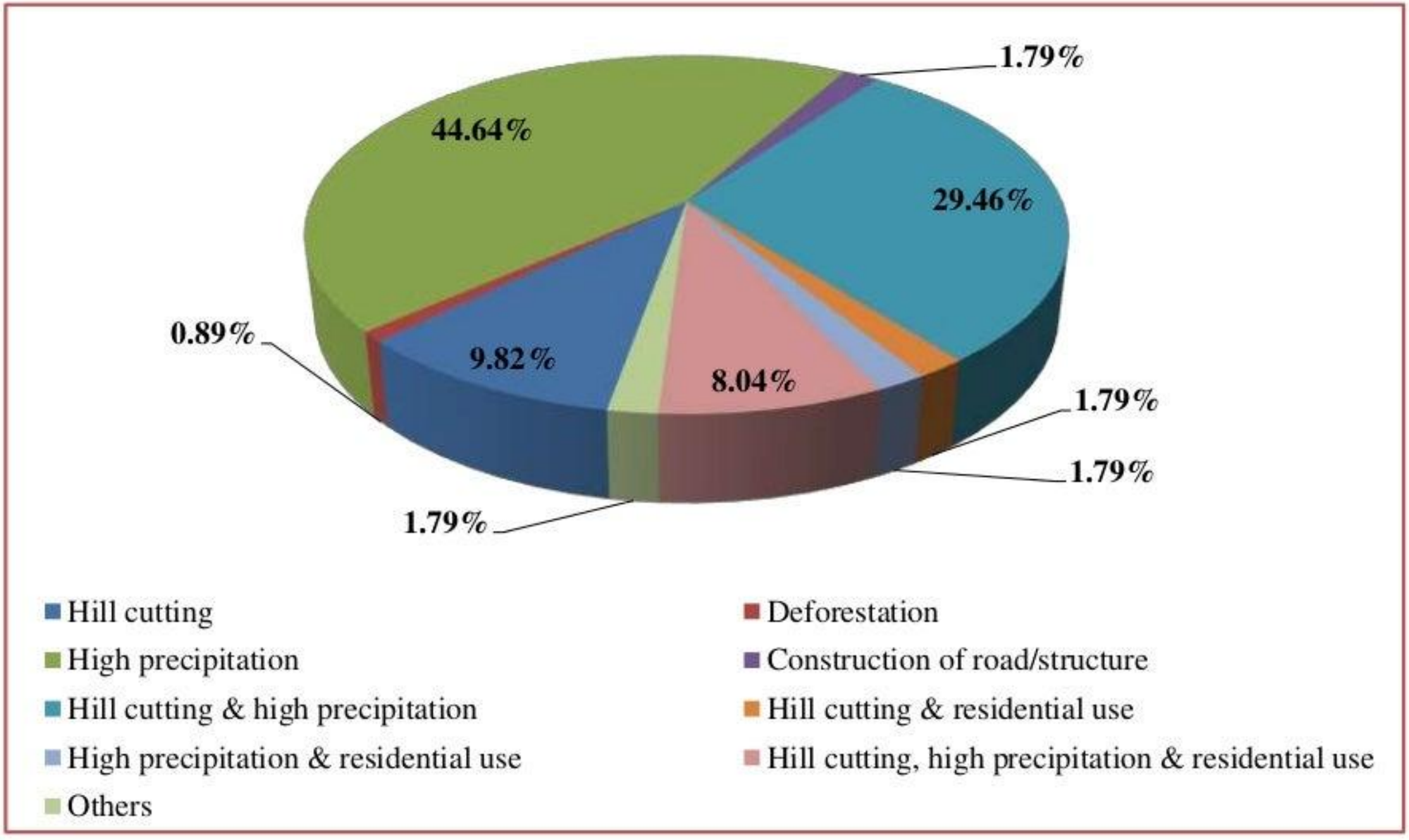


Participatory Rural Appraisal Surveying



Cause of landslide:

High precipitation and hill cutting



Activities and Result (Social Aspect of Landslide Risk Management)

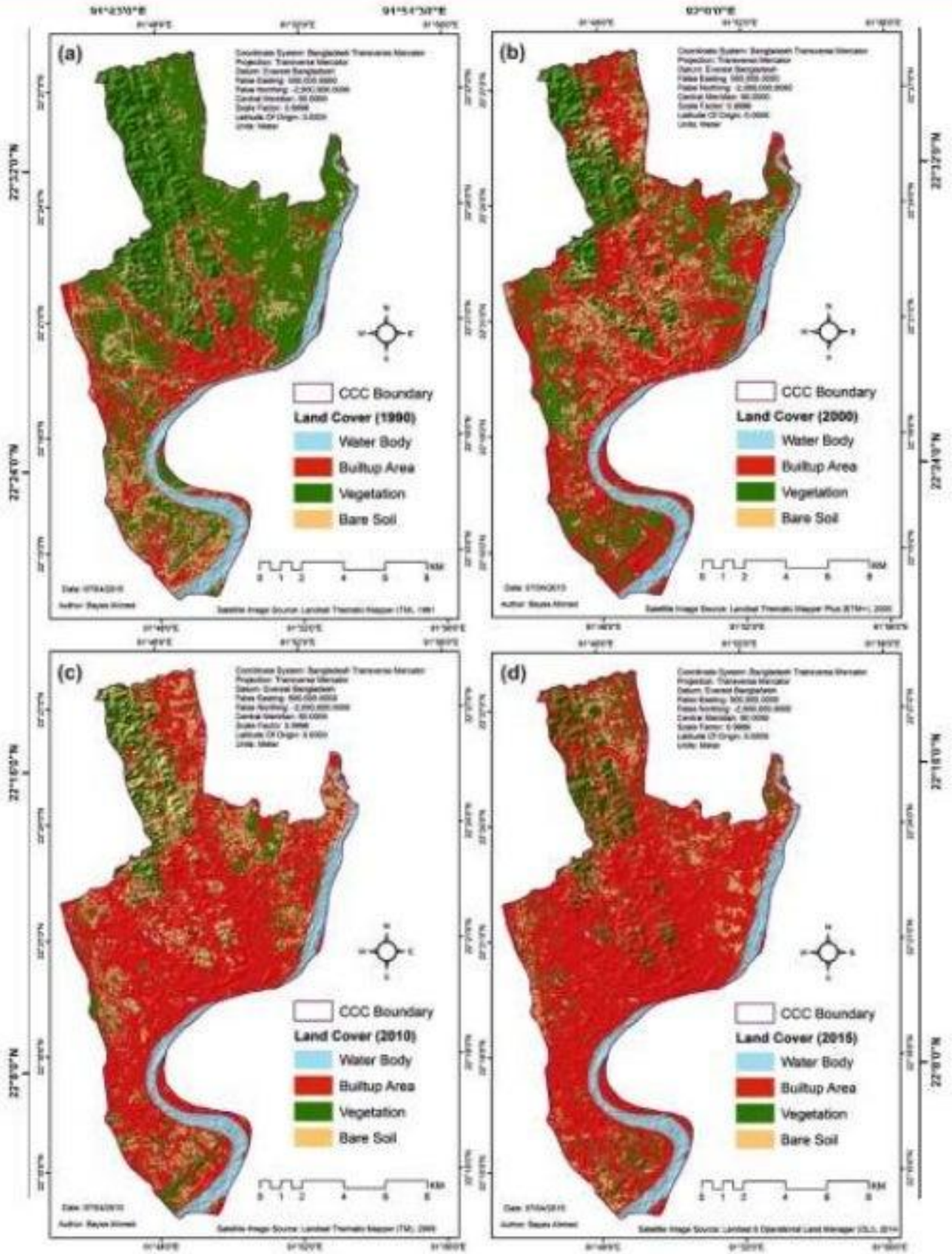
Early warning system:

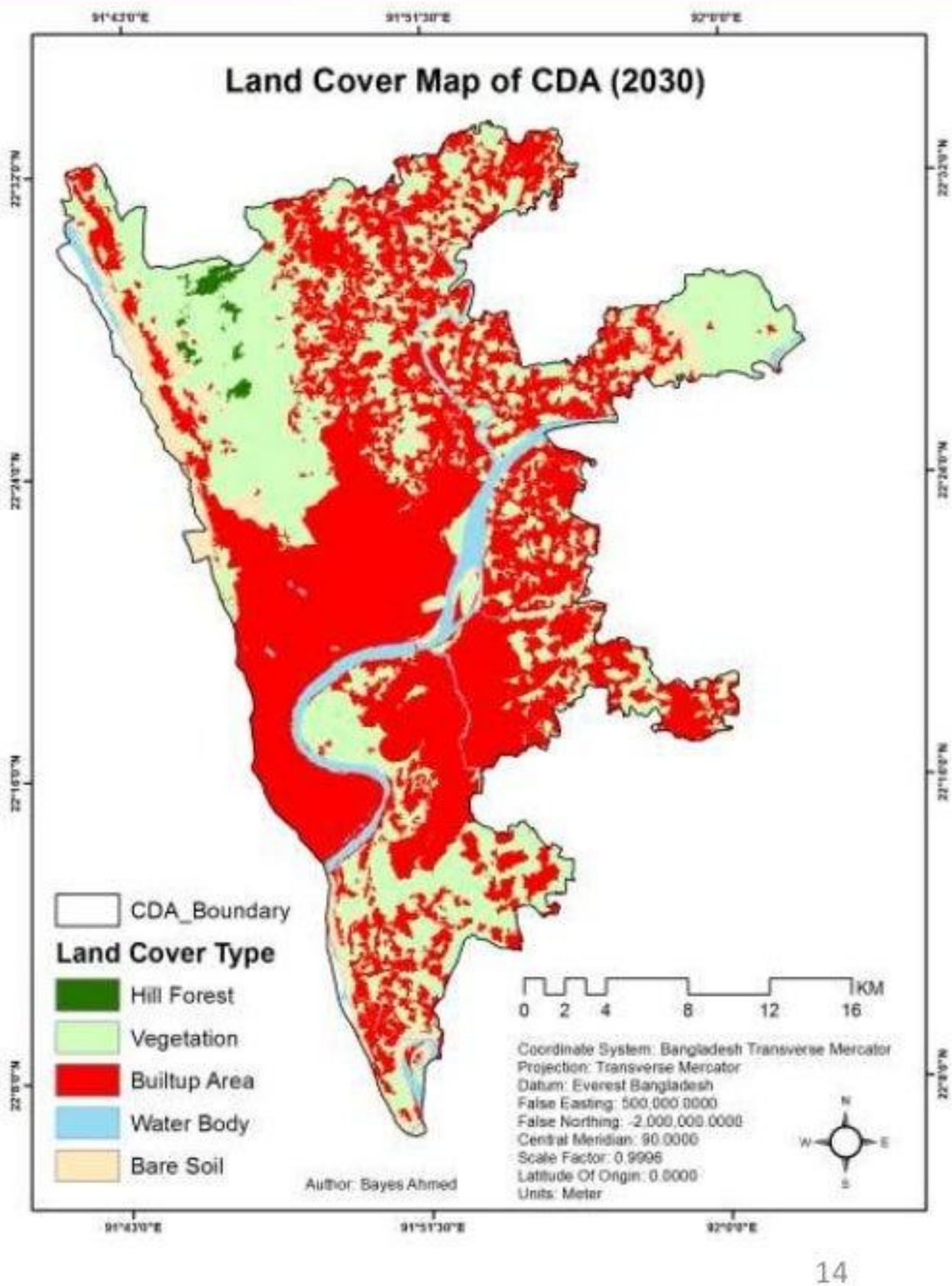
- Announcement through mike (**72.5%** said).
- **81.25%** respondents **stay at their houses** after getting warning.
- **81.45%** respondents **do not have contact number** of the nearest fire service/ police station/ volunteer groups/ emergency services/ relevant agencies for emergency purpose.
- **One person** attended training in nearby school.

- **Suggestion on Landslide Disaster Management:**

- Permanent relocation,
- Awareness building,
- Stop hill cutting,
- Engineering measurement/constructing retaining wall, tree Plantation,
- Leveling the hills

Landover Modeling





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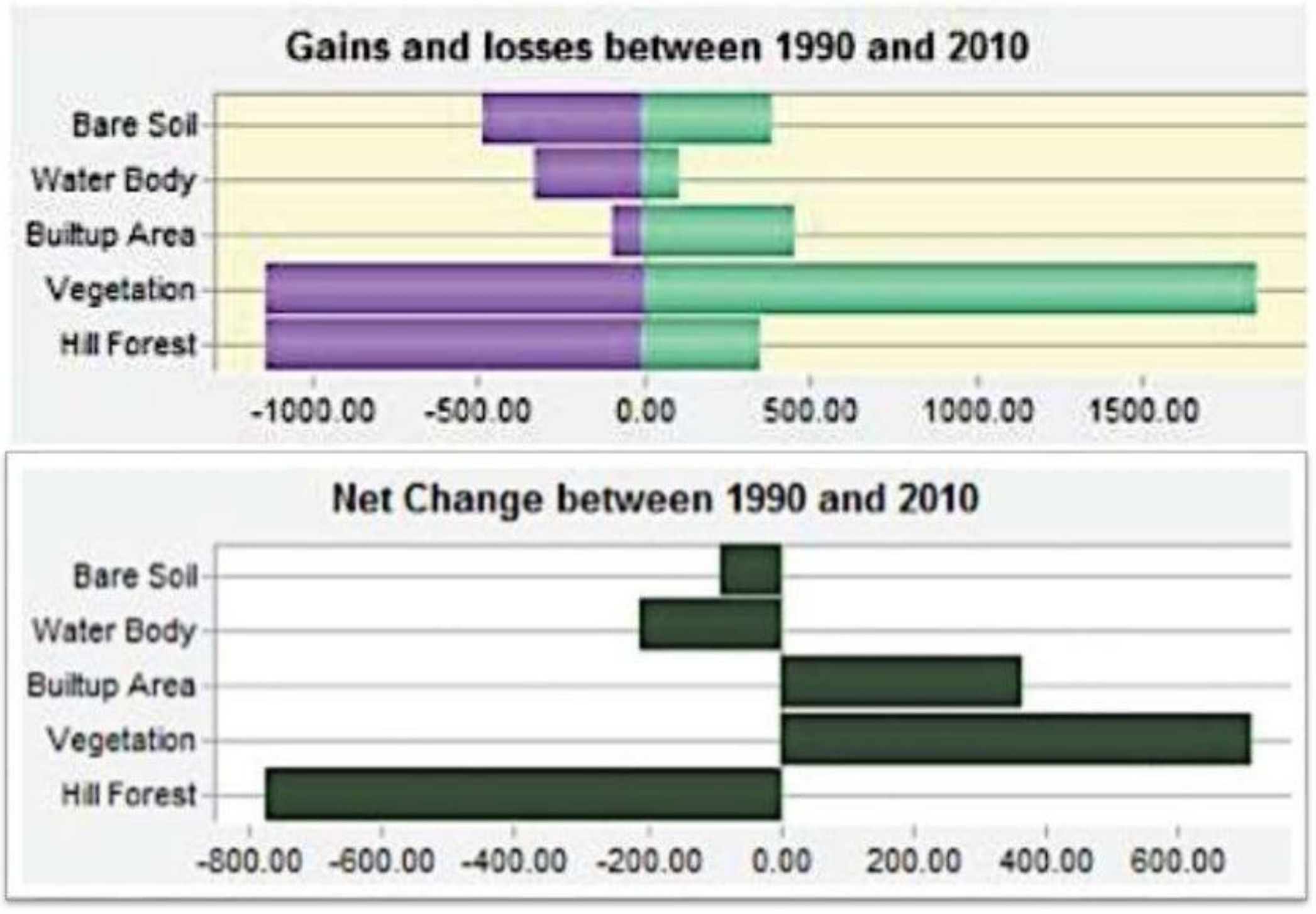


Current Practice

Rainfall Threshold for the Initiations of Landslide considers:

Duration of Rainfall/ cumulative rainfall in 7 days

Teknaf = 170mm in 1 day or 420mm in 2 days

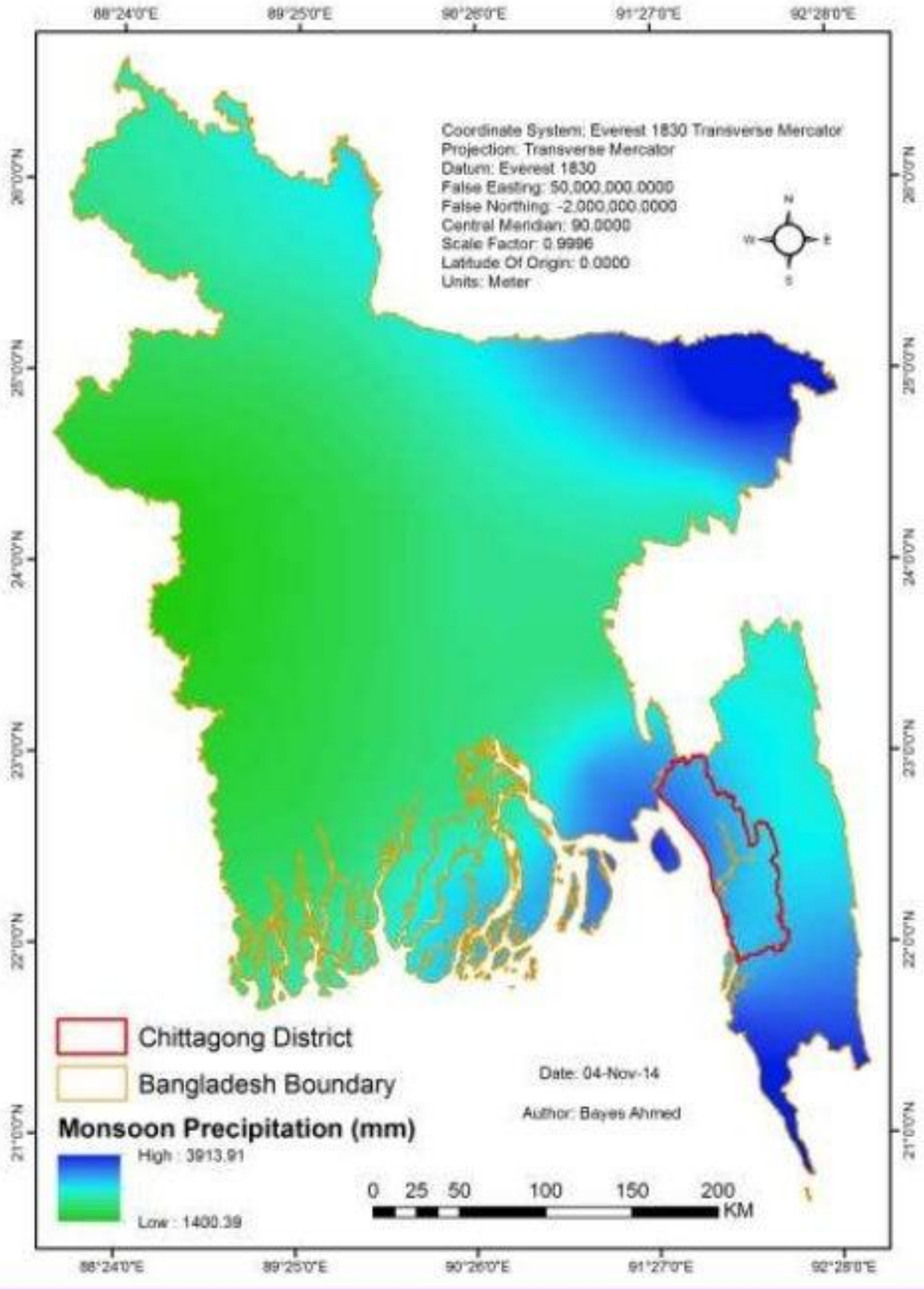
Cox's Bazar = 96mm in 1 day or 185mm in 2 days

Cox's Bazar Warning System:

50mm in 1 day = Alert
75mm in 1 day = Ready for Evacuation
90mm in 1 day = Evacuate

Source: CDMP-II

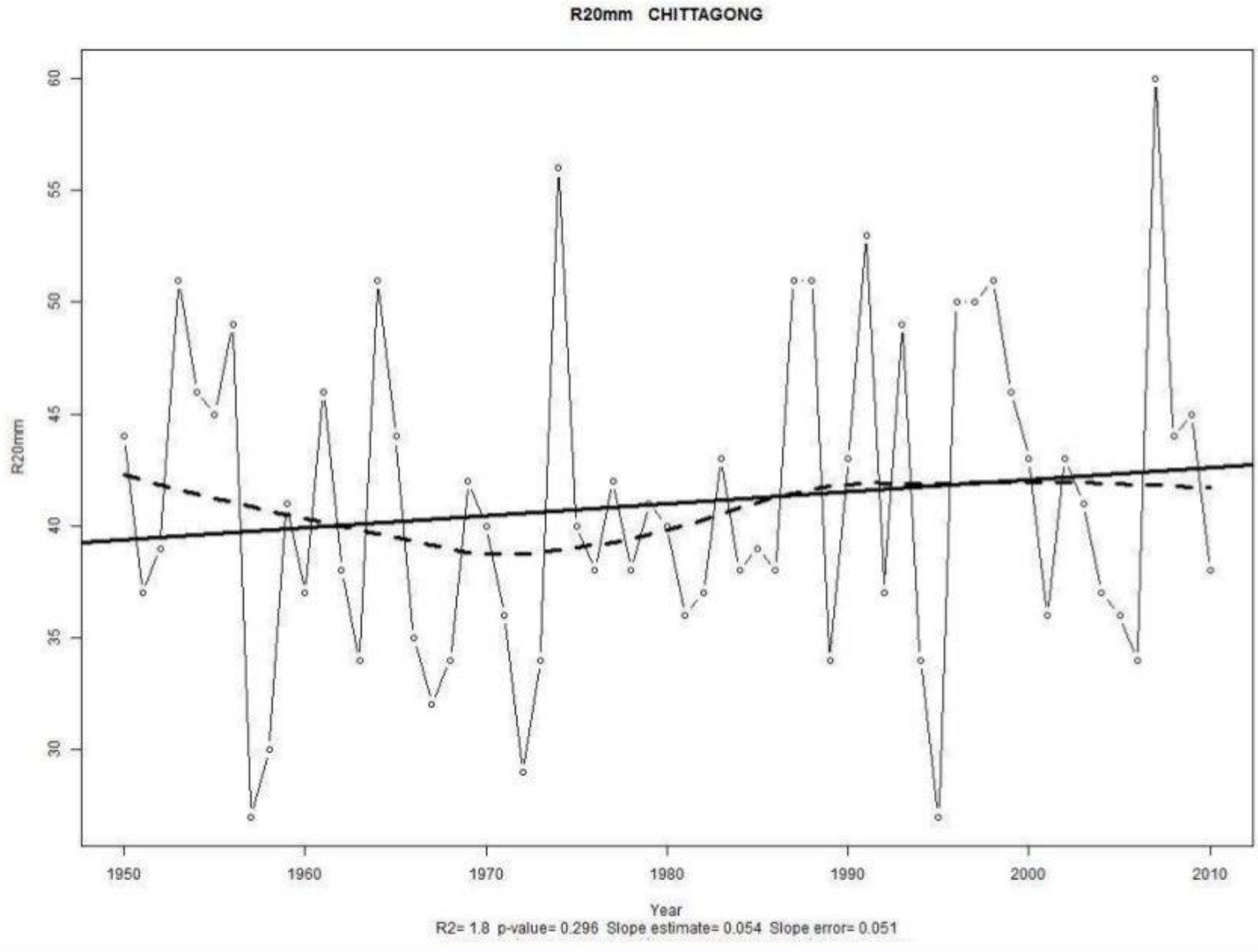
Rainfall Pattern



Year: 1950-2010
Month: April-October

Source: BMD

Rainfall Pattern



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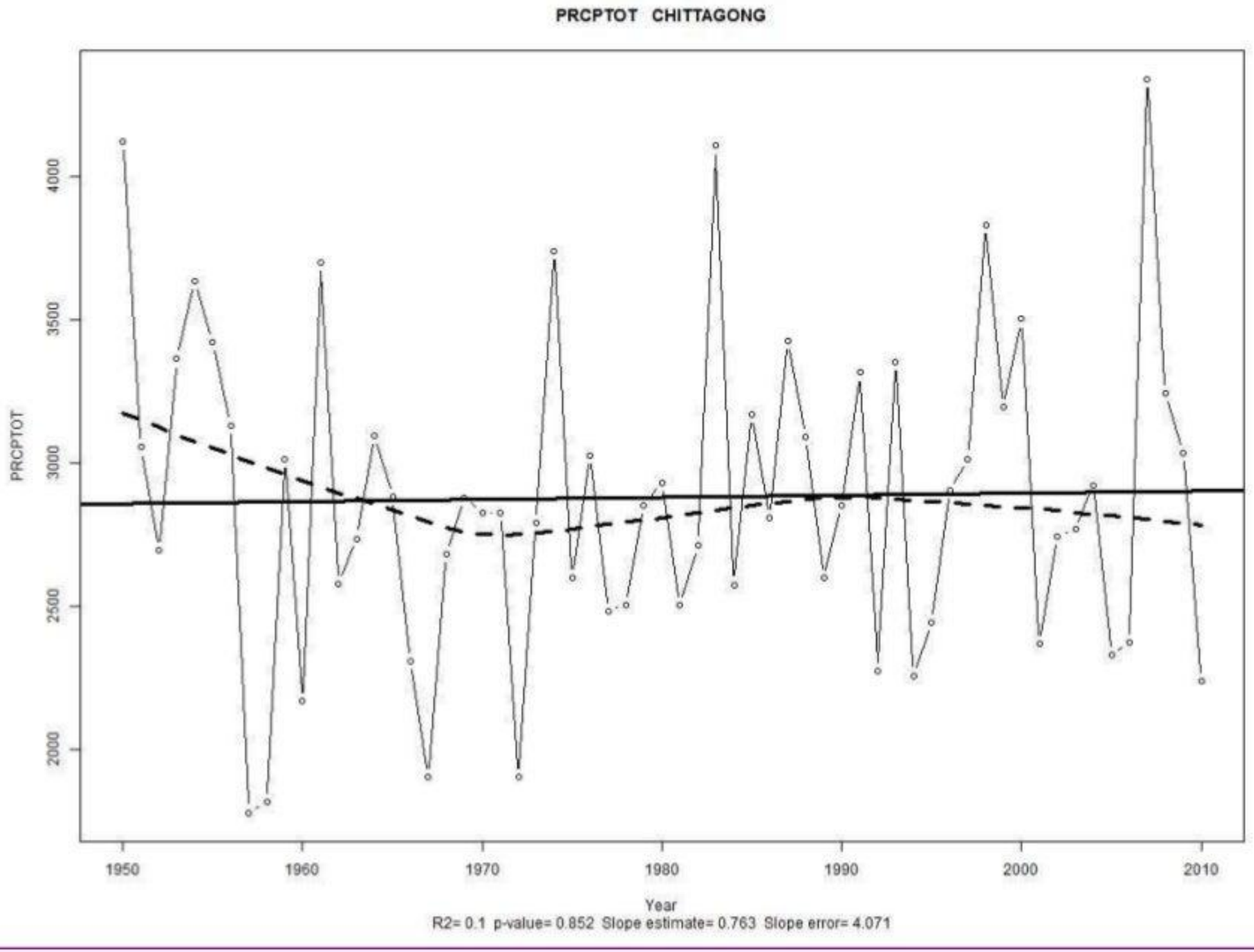

Rainfall Pattern