

OBSERVATION ON RECENT OCCURRED CATASTROPHIC LANDSLIDE AT RANGAMATI TOWN, CHITTAGONG HILL TRACTS

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ABSTRACT

In rainy season's landslide is a common phenomenon in the mountainous regions worldwide. However, the landslide is also responsible for damage of housing, roads, farmlands, human lives and so on. On 13th June 2017, a major landslide was occurred in the Rangamati hill district and its surrounding areas, Bangladesh and caused death of more than 120 human lives and displaced more than 3000 people, killed animals, destroyed roads, bridges, farmlands and houses. This study will try to identify the causes of landslides in this region and provide some solutions to mitigate these kinds of landslides. From physical survey, primary and secondary data it has been found that severe intense rainfall, deforestation, hill cutting for infrastructure development, unplanned development and change of land use have caused these landslides. The paper concludes with some broad suggestions on adaptation strategies of people as well as suggestions for policy interventions to reduce landslide hazard vulnerabilities for South East Asia.

Introduction

Bangladesh is recognized as a high density population country in the world and it is low in natural resources and prone with natural disasters (Alam, Nishat, & Siddiqui, 1999; Gunter, Rahman, & Rahman, 2008). In recent time, changes in climate condition made our country more vulnerable to various kinds' natural disasters and environmental hazards. The common vulnerable disaster in this country is flood, cyclone induced storm surges, droughts and river bank erosion (Sultana, 2013). Moreover, landslide has become a newly added burning issue. Rangamati is a hilly region with ravines and cliffs and situated in the south-eastern part of Bangladesh and bordered with India and Myanmar (Council, 2017; Rasul, 2007). In the history of Chittagong Hill Tracts (CHT), Bangladesh on 13th June 2017, major landslides occurred in Rangamati region and caused more than 120 deaths and losses of huge homesteads. Field survey was conducted at different locations of Rangamati municipal area, Rangamati Sadar Upazila, Kaptai upazila and Kawkhali Upazila from 14th to 30th June, 2017 by the authors. Several discussions were conducted regarding landslide issues with the landslide affected people, local experts in different sectors, elderly personals from July 2017 to August 2017. From field survey, discussing with landslide affected people, experts, and studying secondary data, this research will try to find the probable causes landslide in Rangamati Region, its impact and how to mitigate this natural hazard through indigenous and modern knowledge.

Landslide and its impact in Rangamati

Shaikh et. al (2015) pointed out that landslides usually occur on steep slopes however, they might also occur in areas with low relief or slope gradient. In last ten years major landslides occurred in India, Philippines, China, Japan, Indonesia, Nepal, Guatemala and USA and caused death of thousands of lives (Sultana, 2013). On 13 June 2017, landslides occurred in Rangamati district and affected the municipal area most which is responsible for death of 120 people, animals, damages of agricultural fields, properties and livelihood. Beside Rangamati sadar upazila, Kawkhali, Bilaichari and Kaptai Upazila was also affected by this calamity and estimated property damage of two thousand crore taka (Channel24, 2017b). Besides property and assets loss; lifeline facilities such as electricity, road and water transportation system was disrupted. Sentimental value of the communities were affected due to the reduction of quality of life, deaths of family members and or relatives, and the destruction of personal belongings (Shaikh, Gunjal, & Chaple,

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2015). Disaster had a profound impact on people's emotional wellbeing affecting their feelings, thoughts, actions, and relationships. Figure 1 shows the devastation of landslides happen in Rangamati area on 13th June 2017. It is estimated the total damages property in Taka is about 2000 crore (Hasan, 2017).

Probable causes of landslides on 13th June at Rangamati

Last four decades' huge amounts of population were shifted from plain lands of different districts of Bangladesh to hilly areas of CHT by Bangladesh government. About 67.95% population growth rate was recorded in CHT region in these decades while national growth rate was about 3 to 6% among them Bengali plain land people increase 9% to 49% (Bangladesh bureau of statistics, 2015; Channel24, 2017a; Perth, 2017a). Due to this increased population, natural resources consumption for housing materials was rapidly increased and triggered deforestation in this area. CEGIS & WaterAid Bangladesh reported that 3 lakh 62 thousand 36 hector forest in Chittagong Hill Tracts are obliterated from 1989 to 2017 (Iftexhar, 2017).



Figure 1(a)



Figure 1(b)

*Source: Field survey 2017.

In figure 1: (a) and (b) shows Land slide affected areas in Rangamati. Vegetation protects the top hill soil and makes hill slope stable, reduce of plantation in the hilly areas caused landslides in Rangamati on 13th June 2017 (Pertha, 2017a; Sultana, 2013). Furthermore, at recent periods hill cutting, illegal and unplanned development was occurring in the landslide affected area. Mayor, Rangamati municipality pointed out that in the landslide affected area 95% houses are illegally constructed and did not maintained any building codes (Channel24, 2017c). From field survey, it was clear that affected houses were built with tin, wood and cheap materials. Moreover, construction of these houses did not follow local indigenous techniques which naturally used in the same region. Houses were built by cutting the hill top by loosening top hill soil sometimes hills are cut down 90-degree angle. At present some hills are being cut down by land grabbers and this kinds of indiscriminate hill cutting are responsible for landslides in hilly areas (M. Rahman, 2010). Heavy rainfall triggers landslide worldwide. Soil compaction is loosed by heavy rainfall and increases weight of top soil of hill, on the other hand gravity pulls this heavy soil and causes landslides (Gunter et al., 2008; T. Rahman, 2012). Rangamati was receiving rainfall since "mora cyclone" which was occurred on 30th may 2017. After Mora there was regular raining in the Rangamati region. On 11,12 and 13th June 2017 Rangamati received 564mm rainy water during short time period which is the highest in its history and probably triggered landslides (Network, 2017; Weather office, 2017).

Mitigation of Landslide through Modern & Indigenous Knowledge

Public awareness: While on field survey, majority of the landslide affected household people in Rangamati Sadar Upazila, claim that they did not hear anything form governmental departments about landslide early warning system and no conference or seminar was conducted before the landslide. Considering the population density, natural terrain and the limitations in the current technology in local areas, early mitigation measures could help to prevent loss of lives and property damages under any natural disasters (Choi & Cheung, 2013; Juventine, 2012). Therefore, it is necessary to aware people through all kinds of available technologies.

Plantation: Trees and vegetation of forest creates bonding with the earth surface through its roots and also prevents landslides in hilly areas (Forbes & Broadhead, 2011). Researcher & Architect Mr.Hen Hen pointed out that huge amount of local tree plantation could be used to prevent landslides in affected areas (Pertha, 2017b).

Improving Surface & Subsurface Drainage: Vegetation alone could not prevent or stop a landslide,

however, removal of vegetation from hilly areas initiate landslides. Trees, grasses, and vegetation can minimize the amount of water infiltrating into the earth, slow the erosion caused by surface-water flow, and remove water from the soil (Shaikh et al., 2015). In this way vegetation helps us to discharge rain water in a proper way. While visiting, the homesteads affected by the landslides on 13th June it has been found that, there were lack of proper drainage system due to unplanned and unapproved housing.

Landscaping of Slope: Many modern techniques have evolved to protect and preserve hills from land sliding, among them landscaping is a common concept used all over the world. Landscape planning such as screen planting, vertical greening and toe planters could be provided as mitigation works for land sliding in the hilly areas and it can also develop visual impacts and environmental quality (Choi & Cheung, 2013).

Governmental Enforcement: From above it is clear that 95% landslide affected people in Rangamati area were built their houses illegally by using gaps of governmental regulations. Moreover, authorities are using “Building construction act (BCA) 1996” for any kind of house approval. BCA 1996 is more than twenty years old and have no separate rules for hilly house development. Furthermore, Rangamati municipality and its surrounding areas do not have any “Master Plans” for development yet. Unplanned, unapproved, unfriendly hilly housing are occurring under the nose of government authorities. The government should develop and enforce proper building codes and standards, so that houses are built to withstand landslide hazards (Juventine, 2012).

Indigenous knowledge in natural resource & forest Management: Conservation of natural resources to ensure sustainability is another area where indigenous knowledge is invaluable. In Chittagong hill tracts, traditional forest management techniques like- “Village Common Forest” helps with forest and nature conservation through the villagers. Forests and Mountains are recognized as the ‘sacred or protector’ by the local communities based on contributor of natural goods and shelter to the human being and other species. The forests and mountains are termed ‘sacred’ by the local communities because of religious or ancestral beliefs which instill respect for nature and nature indirectly protects local communities by giving them a lower chance of extinction from disasters (Hiwasaki, Luna, & Shaw, 2014).

Indigenous knowledge in House construction: From past local tribal indigenous houses in the hilly areas of Bangladesh were built with local available materials found in nature (Chakma & Rafi, 2001) . The traditional design of housing may not perfect for modern living, however, they protect its residents from natural disasters, animals and outsiders. These traditional houses usually built in the slop of the hills without disturbing the hill.

Concerning these issues some traditional rules and regulation are given below which is followed by the indigenous people:-

- They do not cut hills for developing houses
- They never made house between two mountainous narrow valley & end of the mountain;
- They also never made house at three path meet point;
- Vegetation provision around the house for protection of house from different natural disaster;
- Provision of natural drainage system surrounding the house;

From research, it has been found that indigenous knowledge helps to prevent soil erosion as well as prevent natural disasters. Such as, fibrous roots of the plants and rhizome system hold the earth soil stick together (Zhou, Fu, Xie, Yang, & Li, 2005). In Nigeria, bamboo plants and raffia palms had been planted by local people, to prevent the washing away of soil which causes bank erosions (Iloka, 2016).

Conclusions

Rangamati is unique place in the world in terms of its combination of hilly region, Kaptai lake, dense vegetation, livelihood of indigenous and diversified communities. Continuous migration of plain land people to the hills and trying to develop their homesteads as like plain land, trees and hills are being cut down by ignoring expert values. Moreover, unfriendly, unplanned, unapproved, illegal developments in the hilly areas and lack of proper governmental rules at present time hills are being threatened to collapse. Consequences of it landslides are common in this region now. From past researchers are trying to find solutions to mitigate landslides to save human lives and homesteads. Indigenous knowledge which is passing from one generation to another is also important to preserve hills and prevent landslides. In this context, more research is required to gather and improve our understanding about nature. However, at present we could use plantation, landscape planning, modern equipment's and proper governmental enforcement to prevent landslides.

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