

Scenario of hill cuttings in and around the Chittagong City of Bangladesh

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ABSTRACT

This paper reveals that the Chittagong City is dotted with numerous hills and hillocks, and has gained a peculiar and typical landscape because of these hills. Moreover, it has given the city some environmental advantages with its green vegetation clad slopes and fertile valleys. It also reveals that the city is growing very rapidly and the urban population also increasing alarmingly in the recent years. The rapid urbanization and industrial growth have turned the Chittagong to a most densely city in the South Asian region. In order to facilitate this urban growth tremendous pressure has been exerted on the limited land surfaces in and around the city. These have led into an increasing spree of excavations and cuttings of hillocks and hills in Chittagong City areas. In the present paper, the causes, nature and effects of these unwise human interferences in nature have been examined and analyzed.

Keywords: Excavation, hills and hillocks, inundation, landslide, water logging

Received: 2 December 2010

revision accepted: 5 April 2011

GENERAL CONSIDERATIONS

Chittagong seaport plays a significant role both in the national and international trade and commerce in the South-East Asian countries. In respect of geographical location of Chittagong City between SAARC and ASEAN countries and as the gateway of the Ganges Delta and Indian sub-continent the significance of this port city is very significant. Moreover, the agglomerate of huge number of people the structural growth of the city of Chittagong expanded along the northern bank of Karnafuli, tertiary foothills and coastal plains of the Bay of Bengal (Islam 1978). But in the recent decades the indiscriminate and ruthless removal of earth materials from the smaller hills in the different parts of the city has appeared as one of the most alarming environmental degradation areas of the country. This imprudent and illegal practice of hills cutting has turned the environment into a most hazardous geomorphological process such as deflation, washing, slow and rapid mass movements, solifluction etc. in and around the city (Alen 1903).

STUDY AREA

The present study area is the city of Chittagong and its adjoining areas (Fig. 1). It is located at the south-east part of the country and covers an area of about 240 sq. km. However, the Chittagong Statistical Metropolitan Area (CSMA) covers about 1,000 sq. km (Alam 2009) and the area under the present study comprises the whole of the metropolitan city of Chittagong, which covers a total of

240 sq. km. The length of Chittagong City is about 20 km. and width 12 km. Most of the part of Chittagong City is developed on the foot of the tertiary hilly regions of the south-eastern part of Bangladesh. However, some of the adjoining areas and low-lying areas have recently been brought under the structured areas of the city for increasing the rate of urban growth in the Chittagong City.

OBJECTIVES OF THE STUDY

The main aims of the present study are:

- (i) to find out the present hills cutting situation of the city and adjoining areas,
- (ii) to assess the impact of hill cuttings and excavations on land surfaces in Chittagong, and
- (iii) to make some suggestions for taking necessary measures to ensure a sustainable environment of the port city Chittagong.

METHODOLOGY

The present study has been done on the basis of both primary and secondary data in and around the city of Chittagong. The data have been collected by empirical field study, photographic techniques, interviewing with pre-designed schedules with local people. Scheduled interviewing was conducted on 30 adult people in vulnerable areas of hill cuttings of the city irrespective of their income, sex and religion. Primary data were collected from major

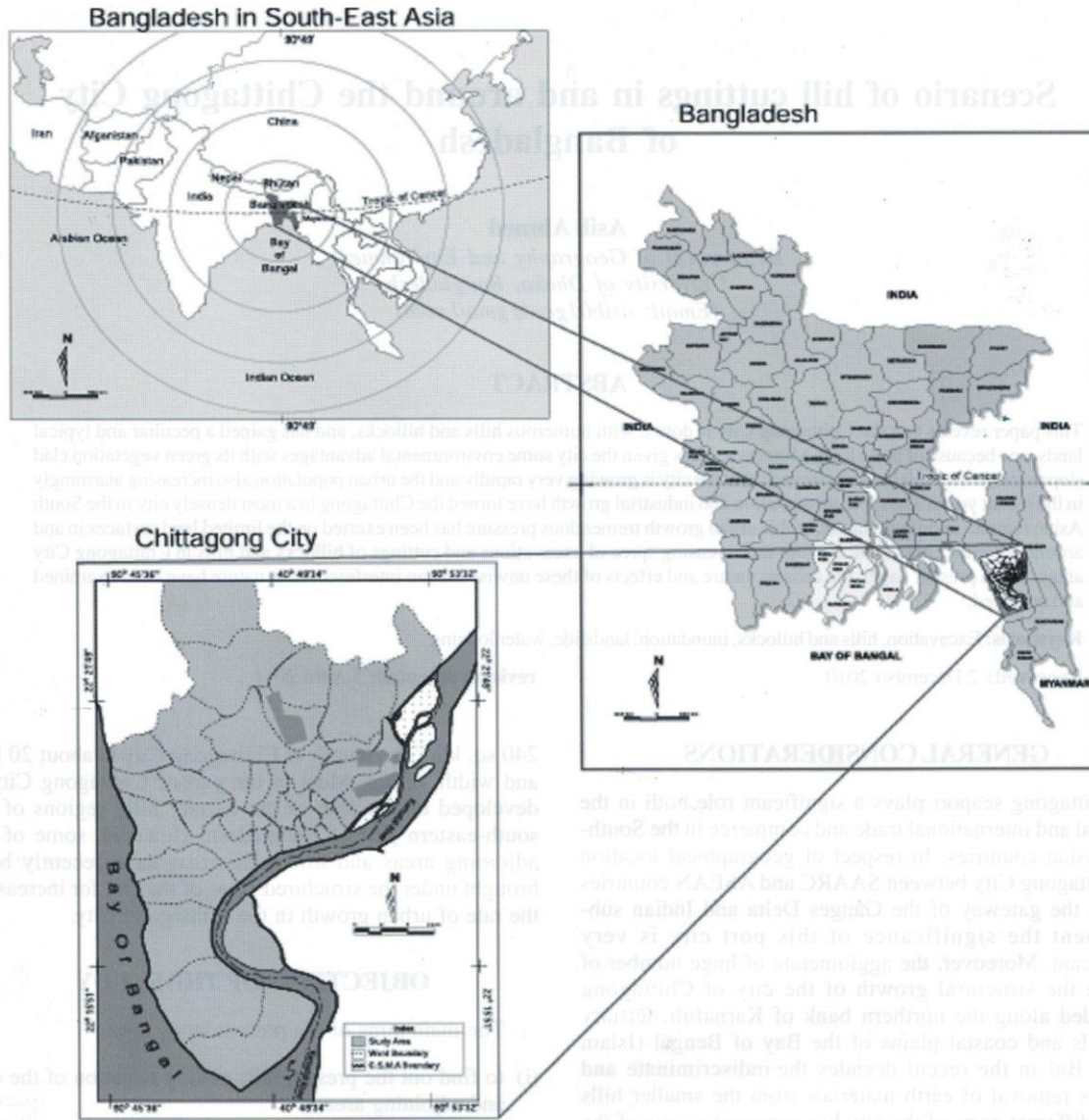


Fig. 1: Location of the study area

affected areas viz. Batali Hills, Tiger pas hills, D.C. hills, Court Building hills, etc. area. In order to examine the adverse effects of hills cutting and excavation, old and new topo-sheets, contour line maps, aerial photographs and satellite imageries of SPARRSO has been analyzed.

HILLS AND HILLOCKS OF CHITTAGONG CITY

Hills and hillocks of Chittagong City and its adjoining areas are categorized in the tertiary age of mountain formation and identified with the hill ranges of small

segment of Himalayas. At the time of formation the Himalayas ranges owing to huge pressure and corrosion between Indian Plate and Myanmar Plate the surface of Chittagong regions are formed about 25,00,000 year back. The hill ranges of Chittagong regions are peculiar of its size and shape (Brammer 1996). Among the hillocks of Chittagong City and its adjoining areas, a narrow steep of plain land is formed by the alluvium deposition of the rivers: Halda, Karnafuli, Shanka, and its distributaries. The hill ranges of Chittagong region is prolonged north to south direction. Among the hills and hillocks of Chittagong City, the Shitakunda is

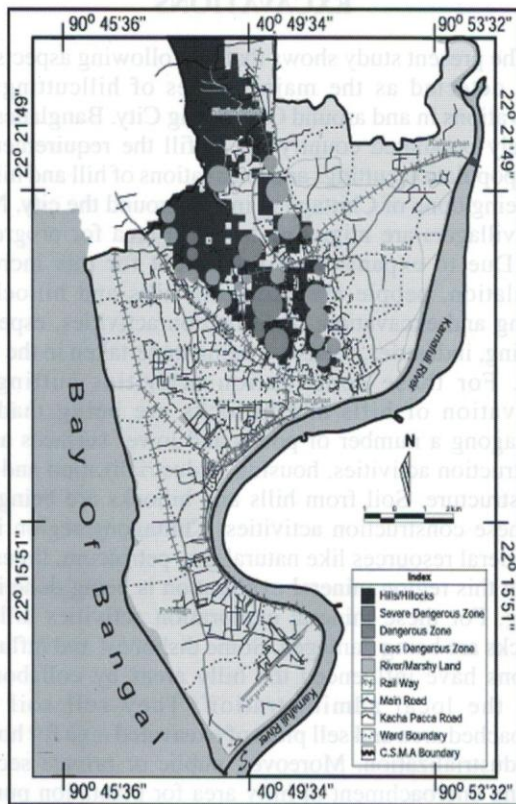


Fig. 2: Vulnerable areas of hill cutting in Chittagong City (Satellite Image and Field Survey 2010)

the highest hill ranges which is about 1,000 feet high from the sea level. The peak of Chandranath of Shittakunda hills is the highest point (i.e. 1,115 feet) of all in Chittagong regions. Besides, the Laximura peak (515 feet), Batali Hill (280 feet) and Haralomura (253 feet) are mentionable. At the Foy's Lake regions, the hills and hillocks of the north-western part of the city are about 270 feet high (Ali 1994). Except the Shandeeep out of 14 Thanas of Chittagong district, partly or most of the places are belonging hills and hillocks. About 1, 64,780 acres (28%) of the total land of Chittagong district is covered with hills and hillocks (Brammer 1996).

HILLS AND HILLOCKS OF CENTRE AND NORTHERN PARTS OF CITY

These hills and hillocks are stretched of Shitakunda hills and located between the eastern and western plain lands. A fault line divides the land formations of these hilly regions. The north western part of fault line is Nashirabad regions and this land formation is occurred few kilometers continue at the same direction. The highest place of Chittagong City is located with this land formation, which is 9 km. far from the CBD. The highest place of Chittagong is about 90

Table 1: Thana-wise non-agricultural hilly areas in Chittagong City (Bangladesh Population Census 2001 and Field Survey 2010)

Name of Thana	Non-agricultural hilly area (acre)
Mirsharai	57,326
Shitakunda	12,170
Hathazari	10,734
Fatikshari	21,734
Rawsan	5,640
Rangunia	8,710
Boalkhali	4,514
Patia	9,027
Anawara	4,258
Chandalish	8,149
Shatkania	1,630
Bashkhali	10,427
Lohagara	10,461
Total	1,64,780

meters, which is 50 meters highest from the adjoining hills. Other faults line belongs to east to western side, Panchlish and Pahartali. Enyet Bazar and Court building hills are different from these hills ranges. At the opposite of Potanga airport, height of the hills increases up to 60 meters. At the fault lines of Nashirabad and its adjoining foothills are structured for urbanization. Recently very small number of urbanization is occurring at the lower parts of hills (Bangladesh Population Census 2001).

SIGNIFICANCE OF CHITTAGONG HILLS

The hills of Chittagong are natural ornaments as well as bounties of the country. A significant percentage of tea-plantations of the region are located in these areas. Although presently most of the areas of these hillocks are almost clear yet a few areas still contain some valuable rich forests. Besides, being tourist attractions these picture sque hillocks help maintain the ecological balance in the region. *Tillas* reduce the severity in intensity of storms also. Only a few decades ago the Chittagong hillocks were nice sanctuaries and were abound with various rare wild animals and birds. Now a day however, most of these species are either endangered or totally extinct. Valuable mineral resources like natural gas petroleum, limestone, boulders etc. occur in these *tillas* areas of Chittagong (Rizvi 1952). Fertile valleys of the *tillas* and adjacent foothill surfaces are suitable for horticulture. Recently extensive rubber plantation has developed in some *tillas* areas of Chittagong.

HISTORY OF HILL CUTTING

There is no relevant data or information about starting the hill cutting in Chittagong City, though the city has originated before 80 A.D. In 1517 Arabs, Chinese, Burmese made relationship with the people of Bengal by using ancient seaport of Chittagong (Karim 1963). At that time, the Chittagong seaport was known as *Porte Grende* (larger port) to the Portuguese. In 1760 East India Company occupied the Chittagong City and established the settlement in the city. Historian thought that the British interferences of removing the plants and cutting down the hills for making their residential houses, administrative building and commercial buildings. Moreover, the trend of hill cutting increasing at the last seventeenth and it become alarming at eighteenth (Alan et al. 1990).

In the Master plan of Chittagong City in 1961, the Chittagong City is divided into four zones and it suggested for cutting down some hills and removal its soil for construction the new settlement. As a result, hill cutting trend increasing from seventeenth decades and it became endangered within the next decade. After the liberation war, Chittagong seaport becomes the main seaport of Bangladesh and its handles the major imports and export goods of the country. Due to agglomerate of huge numbers of population and maintaining accommodation for the new comers, huge hill cutting tendency has been grown among the people, though they were not enough concern about the adverse effects of removal the soil or stone from the hills. However, hill cutting inclination of Chittagong City, decreases due to awareness of adverse effects of it and environmental degradation after the 19th century.

DISTRIBUTION OF HILL CUTTING AREAS OF CHITTAGONG CITY

Among the hills and hillocks which are becoming endangered due to human interference i. e., hill cutting, removal of soils from the earth surface viz. the eastern part hills of Bizid Bostami, hills of Southern Khulshi, Foy's lake areas hills, Chittagong cantonment areas hills, Tiger pass hills, Batali hills, CRB hills, Motijharna hills, Telegraph office hills, D.C hills and Court building hills etc (Fig. 2).

Besides these hills, some other places' hills also are becoming extinct viz. Civil Surgeon hills, Kumudin hills, hills of Nag-nagini, Chakma bazaar hills, Turning point hills of Ishpahani, Mr. Markot hills, Railway hills, Goal Pahar, Chashma hills, Barger hills, Jalalabad hills etc. In Mirsharai, Fatikchari and Shitakunda Thanas of Chittagong district, most of the places are covered with hills and hillocks (Table 1).

CAUSES OF HILL CUTTINGS AND EXCAVATIONS

The present study shows that the following aspects have been detected as the major causes of hillcuttings and excavations in and around Chittagong City. Bangladesh is a densely populated country. To fulfill the requirements of over population cuttings and excavations of hill and hillocks are being done of Chittagong in and around the city. Now a day, villagers are migrating to urban area for progressive life. Due to expansion of settlement for this increased population, people are damaging hills and hillocks by cutting and excavation. Construction activities, especially housing, industries, roads are being undertaken in the urban area. For these construction activities cutting and excavation of hills and hillocks are being made. In Chittagong a number of ponds and lower surfaces are for construction activities, housing, industrialization and other infrastructure. Soil from hills and hillocks are being used for these construction activities. Chittagong region is full of mineral resources like natural gas, petroleum, limestone, etc. In this region mineral exploration is being done in full swing. For these mineral exploration activities hills and hillocks are being damaged. Some dishonest and influential persons have influenced the hilly areas by collaborating with the local administration. They sell soil from encroached area and sell plots of excavated area for housing or industrialization. Moreover, public or private sector is making encroachment of hilly area for plantation purpose. Local people of Chittagong used to dig the hilly areas to collect the root crops.

EFFECTS OF HILL CUTTINGS

The adverse effects of hill cutting and excavation on land surfaces are multifarious. Some of the important and noteworthy impacts are listed viz. effects on physical or a biotic environment, flood and water logging, changes in micro-climate, increase in temperature and intensity of storms may cause imbalance in geological, tectonic and tectonic situation which may cause earthquake, landslide and soil erosion.

EFFECTS ON BIOTIC ENVIRONMENT

Effects on biotic environment are destruction of biodiversity, extinction of endangered rare wildlife species i.e. birds, animals and insects, easy spread of diseases, changes in ecological chain and food web, breaking of the eco-balance, etc.

EFFECTS OF HILL CUTTING ON CULTURAL AND ECONOMIC ENVIRONMENT

Effects of hill cutting on cultural and economic environments are forest resources, soil fertility, and loss of life and property by landslides and erosion, damage to

agricultural fields, increase in the frequency and intensity of floods and water logging, disruption of communication, damage of historical and religious shrines or spots. The present study apparent that indiscriminate spree of hill-cuttings and the associate removal of the earth materials have been going on in the hilly areas of the north-eastern region of Bangladesh. The major affected areas are mainly around the city of Chittagong. The main causes of these human events are population increase, expansion of settlement mainly in the urban areas, construction activities, especially housing industries, roads (spaces), filling of the lower areas, mineral exploration activities, illegal encroachments for plantation or other purposes, digging for foods (root-crops), etc.

Due to this ruthless removal of earth materials from the surfaces of the hills enormous morphological, hydrological vegetation and other biological losses have been occurring the Chittagong City and its adjoining areas. Among these the most serious ones are Chittagong cantonment areas hills, Tiger pass hills, Batali hills, CRB hills, Motijharna hills, Telegraph office hills, D.C hills and Court building hills etc. Besides these hills, some other places' hills also are becoming extinct viz. Civil Surgeon hills, Kumudin hills, hills of Nag-nagini, Chakma bazaar hills, Turning point hills of Ishpahani, Mr. Markot hills, Railway hills, Goal Pahar, Chashma hills, Barger hills, Jalalabad hills, etc. If this indiscriminate of depletion of hilly surfaces continue it is feared that within a short span of time the whole region will face a tremendous environmental hazard. Extensive floods because of choking up of the drainage network of the region will increase. Salutation in the local channel floors and accumulation of sand in other low lying areas through the acceleration of erosion process affected by these cutting will further deteriorate the inundations in this region. These will naturally work behind the decay and degradations of the biotic environment as well. In order to get rid of these environmental disasters and hazards an immediate and effective check has to be enforced. Governmental efforts as well as people's participation through motivational programmers and enforcements of legal actions can play a vital role to protect the hills and hillocks for conserving the environment for the future generation and ensure the urban facilities among the city dwellers of the port city of Chittagong.

FINDINGS

Massive hills and hillocks cutting and excavation processes are continuing in the hillocks areas of Chittagong for extended the urban settlement. The main locality where these human interference have been going on are: Tiger pass hills, eastern part hills of Bizid Bostami, hills of Southern Khulshi, Foy's lake areas hills, Chittagong cantonment areas hills, Tiger pass hills, Batali hills, CRB hills, Motijharna hills, Telegraph office hills, D.C hills and Court building hills, Civil Surgeon hills, Kumudin hills,

hills of Nag-nagini, Chakma Bazaar hills, Mr. Markot hills, Railway hills, Goal Pahar, Chashma hills, Barger hills, Jalalabad hills etc. The rate of encroachments and removal of *tillas* i.e., earth materials like sands, soils and rocks have gradually increased. The study reveals that on average of hillock areas are being depleted every year through these cuttings and excavation process are continuing in full swing.

Findings of schedule survey show that process of encroachments in the hillocks gained momentum after 1970. In the very recent years on average around 800 to 1,000 trucks loads of hill materials are being removed per day from different hill areas of the district. The present study further reveals that the process of hill cuttings has been taking place almost in every hilly areas of the district. However, the intensity and volume of removal process is more in and around the hills and hillocks of Chittagong City.

Comparison of older toposheets and recent satellite imageries reveal that the surface degradation in the hillocks of Chittagong region is increasing gradually. At the same time new settlers or local influential people have illegally encroached upon the same hillock areas in different regions of the district.

Tractors, hoe and other digging tools, cave-bamboo baskets are used in these cutting and digging activities in the hills. The removed earth materials are mainly dumped or deposited into low-lying areas for filling up purposes. Some portion of these is taken to the roads and other construction sites. Most of the hillock materials are spread along the adjacent surfaces and sometimes these are transported to distant places for filling up the lower places.

SUGGESTIVE MEASURES

To ensure a sustainable environment of the city the protection and preservation of the hills and hillocks from illegal encroachments is vital. This is the high time to declare the hilly places in and around the city as an Ecologically Critical Area (ECA). It needs to manage properly the flow of migrants to the hilly areas of the city. Construction activities for unplanned urbanization in and around the city areas should strictly be controlled. With these the people should have to be aware about the adverse effects of hill cuttings. In a nutshell, the Government should have to implement tightly the rules and regulation against the situation.

CONCLUSIONS

The study shows that the hill cuttings have seriously been affected the healthy natural and environmental situation of the city recently. These interferences have prompted into rapid landslides, enormous soil erosion, depletion of vegetation and adversely causing urban water loggings and localized inundations in and around the city. As a result, drainage failure chocking up of the natural

channels and siltation in the low lands and river flows are also related to the excavations. Due to take necessary measures for a sustainable port city Chittagong the significance of the study is immense.

ACKNOWLEDGEMENTS

The author is greatly thankful to the Chittagong City Corporation authority for their support. Thanks are also due to all of my friends who helped in field data collection. The author expresses his sincere thanks to Drs. Zahid Hassan and Enamul Kabir for their helpful comments and suggestions on the first draft manuscript.

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