

Aspects of Socio-Environmental Problems Resulting from Hill Cutting in the City of Chittagong, Bangladesh: Local People's Perspectives

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Abstract: Chittagong city besets with a tremendous natural environment. Hilly areas in and around the Chittagong city make the city an environment friendly city. But recently through arbitrary hill cutting, the city becomes an environmental fragile city of Bangladesh. For this reason, the present study takes an attempt to identify the resulted problems of hill cutting in the city of Chittagong from the view local people. Especially the study focuses on spatial pattern of hill cutting areas in the city, uses of hill cutting areas and nature of uses of hill cutting soil and the nature of socio-environmental consequences arises due to hill cutting problem in the city. No hills in the city are found to be untouched from hill cutter. This hill cutting habituate is causing loss of scenic beauty of the city of Chittagong. Different areas of the city are facing various environmental hazards due to unplanned hill cutting. Soil erosion, drainage congestions and change of biodiversity and climatic conditions are the most common environmental perils caused by hill cutting. The study also shows that wetland in and around the city of Chittagong has been filling up in the last couple of years. Hundred years old ponds in the city were also been filled up by hill cutting soil. The study recommending enforcing existing laws effectively to stop hill cutting in the city.

Key words: Environmental problems, hill cutting, fragile city, Bangladesh

INTRODUCTION

Hilly areas in and around the city of Chittagong are considered as the main indicator of beauty of the city. Many physical environmental parameters viz. hills, rivers, ocean and lakes make the city of Chittagong a beautiful one in the world. The city stands on the bank of the river Karnaphuli and is bounded by the Bay of Bengal on its western side. This coastal city has a very distinctive topography and occupies at least eight geomorphic units^[1]. About 100 years ago, Chittagong city was surrounded by some 200 hills^[2]. In the British period many British administrators built their houses on the top of the hills. Hill cutting in the Chittagong area was started at that time. The judge court building of Chittagong city was built on the top of Parir hill by the British government. Other administrative, college and public buildings were set up on the top of hill at that time. The trend of hill cutting in the city was accelerated from the early of 1980s^[2]. It was intensified mainly for the development of real estates and manufacturing of bricks. Recently hill cutting is considered as one of the major environmental problems in Chittagong city as wetland in and around Chittagong city has been filling up in the last couple of years by hill cutting soil. Hundred years old ponds in the

city were also been filled up by hill cutting soil. However, these ponds are being used for fishing cultivation and for using the fire fighting^[3]. Specially, rivers and canals in and around Chittagong city are being rapidly filled and Karnaphuli River is deposited with silts due to cutting of hills and hillocks threatening the normal activities of Chittagong port. On the other hand, the partly razed hills are also becoming a threat to public safety posing risks of collapse as the city witnessed several deaths caused by landslides in the previous decade^[4]. In the last 30 years over 100 hills disappeared from Chittagong city and surrounding areas due to illegal hill cutting. Besides, at present more than fifty hills are in dangerous situation. Nearly 100 people died by landslides due to hill cutting that caused serious ecological and environmental disaster^[5]. Soil erosion, drainage congestions and change of biodiversity and climatic conditions are the most common perils by hill cutting^[6]. The main canal for water drainage of the city *Chaktai* canal usually silted by hill cutting sand in every year during rainy season. Silt trap evacuated in this canal with the financial support by World Bank was destroyed in the same year by hilly sand^[7]. Though cutting of hill was prohibited by building act-1952, building act-1990, Chittagong Development Authority Declaration-1995, master plan of United Nations

Development Program (UNDP) for Chittagong city^[7] but unplanned and uncontrolled hill cutting are going on with various environmental hazards in this region. As the similar situation in India Goa Heritage Action Group, a conservation group, fear that cutting of the hill cause environmental damage, a disturbance in the flow of rainwater during the monsoons, erosion of soil and destruction of existing vegetation. This conservation group also completed the listing of the heritage buildings in the Panjab in October 2000. It is important to think and act locally, regionally and globally about environmental problems. On the other hand, no systematic effort until this time was being taken to protect hilly areas in the city. Besides only a few researches were conducted to identify spatial pattern of hill cutting areas and resulted socio-environmental consequences and urban hazards due to hill cutting problem in the city.

The objectives of the present study are:

- to understand the nature and spatial pattern of hill cutting in the city of Chittagong.
- to identify the socio-environmental problems of hill cutting in the city as perceived by local people.

MATERIALS AND METHODS

To achieve the objectives, the boundary of Chittagong city Corporation (CCC) was selected as the study area. Hill cutting areas in the city were identified based on observations and top sheet study. On the basis of the extent of hill cutting, hill cutting areas were divided into three zones such as less hill cutting areas, highly hill cutting areas and extinct hilly areas. When part of a hill is cut down it is defined as less hill cutting areas. On the other hand, when more than half of a hill is cut down, it is defined as highly hill cutting areas. Once a hilly area is now defined as an extinct hilly area due to no existence of hill. Geographic Information Systems (GIS) and cartographic techniques were also used to represent the location of less hill cutting areas, highly hill cutting areas and extinct hilly areas on map.

Information regarding the nature of hill cutting and resulting consequences were collected from the local people through questionnaire survey. Besides, Focus Group Discussion (FGD) was conducted with ten local people. About 100 local people were interviewed as sample. Thus purposive random sampling processes were followed considering the length of residence in the study areas (above five years) and age factor (above 20 years) of the respondents. Secondary sources such as research reports, published documents, thesis, daily newspaper

etc. were also used for documenting existing socio-environmental condition of hill cutting areas in the city. Statistical Package for Social Science (SPSS) program was used for comprehensive data analysis.

Characteristics of the respondents: It is observed that local people had influence on hill cutting and they also knew about the consequences of hill cutting from their long time living experiences. Therefore, during the field surveys local people views regarding natural and social change in the hill cutting areas are considered. Out of the respondents, 45% are living more than 18 years in the hill cutting areas. Living period of the rest 20, 17.5, 7.5 and 2.5 % respondents in the study areas are about 8, 7, 3 and 1 year, respectively. Of the respondent, 80% were between 21-60 age group and 20% were above 60 years. In the study most of the respondents were found to be conscious and educated. About the level of education of the respondents, secondary, higher secondary, degree and degree above were 25.5, 13, 12.5 and 5% respectively. The rest were illiterate. Among the respondents, male was dominant representing 92.5% of the sample population.

RESULTS AND DISCUSSION

Present condition of hilly areas in chittagong city
hilly areas in chittagong city: Though the city of Chittagong lost a number of hills in the past years, the region is still besets with a couple dozens of hills. Now most of the hills are located in the Bayezid Bostami, Cantonment, Panchlaish and Khulshi Thanas (Third administrative unit is called thana in Bangladesh) of Chittagong city. Through field survey, a number of hills were found to be untouched in the city. These hilly areas are full of natural resources and now they are the main beauty of Chittagong city.

Less hill cutting areas: Less hill cutting areas are mainly located in Bayezid Bostami and Khulshi thana. In these areas, few brick kilns are established depending on hill cutting soil. Some aristocratic housing society is developed in Khulshi Thana by hill cutting and about eight hills in Khulshi Thana are cut down. Groups of poor people together cut some part of hills and make slum-settlement beside the hills that are very vulnerable to landslides. Besides, poor people cut some part of hills and developed slum settlement in the foothill of the Moti Jharna Road Pahar (in bengali hill means Pahar), Tunky Pahar, Bisha Colony Pahar and Balu Pahar etc.

Highly hill cutting areas: Some hilly areas are in highly vulnerable condition. Field visits and investigation reveal that now in CCC about 15-20 hills are in endangered

Table 1: Uses of hill cutting areas

Nature of uses	Frequency	Rank of uses
Planned settlement by Real estate businessman	29 (72.5)	1
Individual settlement Development	25 (62.5)	2
Road constructions	13	3
Industrial establishments	09 (22.5)	4
Wastage land	04 (10)	5
Other	01 (2.5)	6
Total	100	

Source: Field survey, 2004

Table 2: Types of uses of hill cutting soil

Types of soil uses	Frequency	Rank of uses
Raising plot areas	30 (75)	1
Filling up low areas	17 (42.5)	2
Roads construction	17 (42.5)	3
Brick kilns	04 (10)	4
Other	01 (2.5)	5
Total		

Source: Field Survey, 2004

Table 3: socio-environmental problems of hill cutting

Nature of Problems	Frequency	Percentage
Decline of bird and animal species	39	16.46
Deforestation	35	14.77
Land erosion	33	13.92
Loss of natural beauty	30	12.66
Climatic change	26	10.97
Drainage congestion	24	10.13
Silting of low areas	17	7.17
Loss of housing and other property	09	3.80
Desertification of the area	07	2.95
Loss of indigenous Resources and production	07	2.95
Human casualties	06	2.53
Human injuries	04	1.69
Total	237 (Multiple responses were counted)	

Source: Field Survey, 2004

condition. Hill cutters have already cut more than half of these hills that are mainly used for settlement development. Hill cutting of this category is found in Bayezid Bostami thana (7 hills), South Khulshi thana (7 hills) and Kotowali thana (4 hills).

Extinct Hilly Areas in Chittagong City: Since the last forty years, some hilly areas located in the heart of the city are vanished. It is hard to believe that once upon a time there were hills in these areas. Most of the extinct hill cutting areas were located in Panchlaish, Bayezid Bostami, Kotowali and Khulshi thanas.

Persons behind scenario of hill cutting problems: During the focus group discussion, local people informed that a group of people stays in the behind of hill cutting. The influential rich people, businessmen specially land developers, real estate businessman, politician and police personnel are many times found to stay in the behind side. Before hill cutting, the culprit of hill cutter communicate with local elites and miscreants by giving them interest in the area, then they manage the police in charge and local civil administration of the respective hilly areas. Therefore, it is reported that hill cutting occur in broad daylight during patrolling of police personnel. The present field survey indicates that real estate developers, personal house constructors, political persons, brick kiln owner and administrative persons are responsible for continuous hill cutting problem in Chittagong city. The above quarter of people use local poor people as day laborer for hill cutting and the poor works in this risk job expecting that they can occupy the hill cutting areas for their residences. There are also cases where poor make their residence by cutting of hills. As a result, a number of slums such as Shahjahan Shaheber Pahar Bosti (in Bengali bosti means slum), Dev Pahar Bosti Batali Bosti etc have been developed beside the hilly areas in the city. From the daily newspaper reports of last couple of years it is counted that slum dwellers of hilly areas are the victims of landslides in the city.

Ownership of hilly areas: In the field observation it is found that some hills under the Chittagong city corporation are in control of individual owner and company ownership. Most of the privately owned hilly areas are vanished. Private owners cut and sell soils of hills under their control and later they construct residential buildings or sell the area for commercial purposes. Some private owned hills such as Taz company hill, Sandwip Colony hill were cut and vanished. But hills in cantonment areas and under the authority of railway are safe due to governmental ownership.

Uses of hill cutting areas: High urban population growth demands increasing housing facilities in the commercial city of Bangladesh. As a result, real estate businesses in recent times are getting high priority in the city areas. The present field survey shows that hill cutting areas are primarily used by real estate businessmen for planned settlement purposes and also by individual settler (Table As for example, Bivarvi Hill Housing Society, a very nice housing area established by hill cutting in the

Chatteswari road, beside Chittagong medical college hospital. Besides, vanishing hilly areas a lot of housing society develop in Chittagong city. Map overlays indicate that the present map of Chittagong city greatly differs with that of 1983. These hill cutting areas are now using for residential and commercial purposes such as Taz Company Building in Chawkbazar and Jalalabad Housing Society in Jalalabad areas. Besides, Bangladesh Cooperative Housing Society, Khulshi Housing Project, Garibullah Housing Society, Dreamland Housing Society are developed through cutting of hill in those areas. Field observation also reveals that settlement besides the hills are expanded by cutting of hill in the nearby areas.

Uses of hill cutting soil: Field surveys indicate that hill cutting soil are mainly used for raising residential plot, filling up low lands roads construction and brick kiln purposes (Table 2). Some hilly areas had already been destroyed in developing residential areas while the rest of the hills are gradually being destroyed for the same purpose. Over the last forty years, about fifty ponds, a number of canals and a few marshy areas have been filled up by hill cutting soil in the city of Chittagong. As for example, Raja pukur (local name of a pond), near the Cheragi Pahar (local name of a hill) filled up by hill cutting about twenty five years ago and individual settler occupies the pond areas. The brick kilns in and around the Chittagong city are using soil of hill cutting. During field investigation, it was observed that brick kiln and hill cutting are going hand by hand in the highly vulnerable hilly areas. According to Department Of Environment (DOE), there are about two hundred thirty brick kilns in the city of Chittagong and some of these brick kiln are using hill cutting soil.

Socio-environmental problems of hill cutting: Local and conscious people of Chittagong city identifies hill cutting problem as a main environmental problem in the area. Continuous and arbitrary hill cutting disrupting conservation of natural resources in the city. Besides, hill cutting also creates social unrest and health disaster in the city. Therefore, resulted problem of hill cutting in the city can be classified as follows:

- Environmental degradation (Biodiversity loss, land erosion)
- Natural resources depletion and wastages
- Social problems (Quarrel, eviction and health problems)

Environmental degradation: In the last thirty years, a significant number of hills have been extinct by hill cutting under the jurisdiction of Chittagong city Corporation. Hilly areas in the heart of the city have been disappeared because of the high land value. High-class residential buildings and commercial institutions were established in the hill cutting areas. Soil erosion, drainage congestion biodiversity loss and climatic change are the major environmental perils due to hill cutting problems (Table 3). The local people opined that loss of biodiversity is the most dangerous environmental problem in the hill cutting areas. About 90 ponds were found filled up due to hill cutting problem. These ponds had been using for fire fighting in the city for long time. Ponds, lake, marshy areas and rivers in and around the city are filling up by hill cutting soil. Most of respondents reported that due to hill cutting isostatic imbalance are hampering. They also viewed that hill cutting is accelerating the earthquake intensity in Chittagong region. This healthy city of Bangladesh is losing its natural beauty due to continuous hill cutting and the city is also losing its good natural drainage condition due to congestion of soil of hill cutting (Table 3). The aged and conscious local people opined that in some areas climatic change resulted from the loss of hilly areas and natural vegetation and is adding to the city's temperature day by day. In recent years, severity of cold and heat has increased due to loss of hill and vegetations. Deforestation and degradation of land are another serious environmental problems resulted from hill cutting. Apart from creating climatic imbalance, this results in the tragic extinction of countless living species. Frequency and intensity of natural disasters in the Chittagong city also increases due to lost of hilly areas and vegetation.

Regarding hill cutting problems, deforestation, loss of bird and animal species and land erosion gets the highest position in the combined ranking (Table 3). Besides, soil erosion is another common problem in these partly hill cutting areas. The hill located beside the Garibullah Shah Mazar is a remarkable example of partly hill cutting area and the erosion of the hill is causing water logging in the surrounding areas. Deforestation leads to loss of bird and animal species and it also leads to landslide due to erosion of soil of hilly areas. On the other hand, land erosion causes drainage congestions in some places of the city.

Natural resources depletion and wastage of resources: Once hilly areas in the city contain lots of wooden trees, medicinal trees, fruit trees and many important species of birds and animals.

Local people opined that in Dev Pahar (a hill lost its most of the part by hill cutting) areas due to loss of hills, birds and animals decreases markedly and in some cases it is also observed that some birds and animals were extinct. Once the hilly areas in the region was full of forest resources with many fruit and medicinal trees and animals. Due to loss of dense forest areas, medicinal species of plants are lost in the city of Chittagong. Thus it seems that hill cutting is accelerating ecological imbalance in the city. Field survey indicates that some areas after hill cutting remain wastage. Land erosion is another common problem of hill cutting and it makes the areas infertile due to loss of humus on topsoil. In some areas due to hill cutting problems, production of fruit trees and crops have been decreased remarkably.

Social problems: There are group of people who conduct hill cutting in Chittagong city. It is reported that sometimes quarrels occur among power groups and day laborers during hill cutting. In some cases affluent group conflict to capture hilly areas for the need of soil and low economic class fight with each other for their residential needs after hill cutting is done. Sometimes, hill cutting soil is used for the raw materials of brick kilns that unhealthy brick kilns in turn pollutes environment in the surrounding areas. As a result, the inhabitants residing the neighboring brick kilns are faces serious health disasters. The local people opined that polluting brick kiln's environment creates etching, diarrhea and nerve problems in these areas. As for example, the local people of Sandwip colony are facing these health problems seriously.

CONCLUSIONS AND RECOMMENDATIONS

Arbitrary hill cutting in Chittagong city has drawn attention of different governmental agencies, civil society and many researchers. The city has lost its natural beauty through hill cutting during the past two couple of decades and about 50 % hills of the city have been vanished. Most of the cases privately owned hills were vulnerable to hill cutter. Hill cutting causes drainage congestion, water logging in some areas, filling up of ponds and marshy areas, land slide and land erosion, loss of biodiversity etc. Soil of hill cutting areas are using for the raw material of brick kiln and filling up of marshy areas. On the other hand, hill cutting areas are used for settlement purposes. Hill cutting is an urgent issue for Chittagong city to maintain ecological balance and restoring beauty of the city. Forming committee by local people, police and administrative personnel and political persons to stop hill cutting problem is a popular public opinion. Awareness creation and enforcement of legal acts are

other two popular public opinions to stop hill cutting problems. Hilly soils are used for brick kiln and housing purposes. Hill cutting soils are used for raising housing site, filling up of marshy areas and for brick kiln. In this perspective, to satisfy public demand alternate sources of soil should be created.

There are proper acts to stop hill cutting in the city. Though cutting of hill was prohibited by building act-1952, building act-1990, Chittagong Development Authority Declaration-1995, master plan of United Nations Development Program (UNDP) for Chittagong city^[7] but the problem is enforcements of the legal acts. The enforcement of legal acts can stop hill cutting problem properly. But efforts of Chittagong city Corporation (CCC) and Chittagong Development Authority (CDA) for controlling hill cutting problems are very poor. The present study recommends taking programs to create awareness among the people and enforcing the laws to control the problems.

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