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Biodiversity of Moulvibazar
The Aesthetic Equilibrium at Jeopardy

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Abstract: *Biodiversity is variation of life at all levels of biological organization. Concerns about biodiversity are relatively new. Only during the last quarter of the twentieth century did scientists begin to appreciate the vast number of organisms found on Earth. We are an integral part of nature; our fate is tightly linked with biodiversity. Protecting biodiversity is essential to human survival, especially food security.*

Bangladesh is rich in both floral and faunal diversities evident in a varied range of ecosystems starting from the northern and eastern hills to the southern seas; most deciduous forests to the mangroves and different agro-ecosystems spread over the wetlands, flood plains as well as the hills. Rampant use of chemical fertilizers, unplanned urbanization and pressure of over population has caused a great depletion of biodiversity in Bangladesh over time.

Moulvibazar district under Sylhet division is rich with natural resources. Forest Coverage of Moulvibazar is 25398 Acres. Government has taken different initiatives to protect its biodiversity in a number of sites. But the main responsibility lies on the people of this district. They have to be aware of the significance of conserving biodiversity. They are not aware of the significance of conserving biodiversity.

Industrialization and urbanization is taking place at the cost of human lives. To protect ourselves and, to ensure safety and wellbeing of the posterity we have to adopt Ecologically Sustainable Development before it is too late.

1.0 Introduction

Biodiversity found on Earth today is the result of 4 billion years of evolution. The origin of life has not been definitely established by science, however some evidence suggests that life may already have been well-established a few hundred million years after the formation of the Earth. Until approximately 600 million years ago, all life consisted of archaea, bacteria, protozoans and similar single-celled organisms.

The term 'Biodiversity' refers to the wide range of organisms-plants and animals-that exist within any given geographical region. That region may

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consist of a plot of land no more than a few square meters or yards, a whole continent, or the entire planet. Most commonly, discussions of biodiversity consider all the organisms that interact with each other in an extended geographical region, such as a tropical rain forest or a subtropical desert.

The economic development of a country is closely related to environment but although the environmental degradation had started long back in the post industrial revolution era, only recently this has become the pivot of attention at national and international level. Concerns about biodiversity are relatively new. Only during the last quarter of the twentieth century did scientists begin to appreciate the vast number of organisms found on Earth and the complex ways in which they interact with each other and with their environments. Biologists have now discovered and named about 1.7 million distinct species of plants and animals. As many as 50 million species, however, are thought to exist.

1.1 Objective

For the study, mainly, the biodiversity of Moulvibazar district has been focused. Some information and data about the biodiversity of Bangladesh is mentioned here only to compare the present condition of the district of Moulvibazar with the overall scenario of the country.

This study wishes to

- identify the present state of biodiversity of Moulvibazar.
- find the obstacles that impedes implementation of government policy to conserve biodiversity.

1.2 Purpose of the Study

The purpose of the study includes examination of the strategy of the government, the steps taken by the District Forest Office and the mind set of the people of Moulvibvazar in this regard.

1.3 Methodology

The study has been done through policy and data (primary/secondary) analysis. The District Forest Office, IPAC Office, Moulvibazar and different sites (Baikka Beel, Hail Haor and Lawachara National Park) have been visited. Different stakeholders through interview gave their opinions. They are either main player of the game or the victims of the

circumstances. These include, interview with the Deputy Commissioner (DC) of Moulvibazar, Upazila Nirbahi Officers (UNOs), Moulvibazar, Assistant Commissioner of Forest Department (ACF), Moulvibazar and IPAC personnel.

Secondary data were extracted from different books and papers on biodiversity conservation need, published booklets of IPAC, reports of Convention of Biological Diversity (CBD) and International Union for Conservation of Nature (IUCN), newspapers and websites.

1.4 Limitations of the Study

Although the government of Bangladesh is trying its utmost to conserve the biodiversity and protect the landscape, people know very little about the concept of biodiversity and its significance. Besides, inadequate information and data are the major impediments of this study. Moreover, it is a sample study and can not be treated as complete government study.

2.0 Definition

Biodiversity is the variation of life forms within a given ecosystem, biome, or for the entire Earth. Biodiversity is often used as a measure of the health of biological systems. The biodiversity found on Earth today consists of many millions of distinct biological species, which is the product of nearly 3.5 billion years of evolution[1].

"Biodiversity" was coined as a contraction of "biological diversity" in 1985, but the new term arguably has taken on a meaning and added its own aspects. A symposium in 1986 and the follow-up book BioDiversity (Wilson 1988), edited by biologist E. O. Wilson, and heralded the popularity of this concept. Ten years later, Takacs (1996, p.39) described its ascent this way: "in 1988, biodiversity did not appear as a keyword in Biological Abstracts, and biological diversity appeared once. In 1993, biodiversity appeared seventy-two times, and biological diversity nineteen times". Fifteen years further on, it would be hard to count how many times "biodiversity" is used every day by scientists, policy-makers, and others.

Biodiversity = Biological Diversity = Number, variety & variability = of living organisms

[1] Chapman, A.D. (September 2005). "Numbers of Living Species in Australia and the World". Australian Biological Resources Study. http://www.environment.gov.au/biodiversity/abrs/publications/other/species-numbers/01-introduction.html

"Biological diversity" or "biodiversity" can have many interpretations and it is most commonly used to replace the more clearly defined and long established terms, species diversity and species richness. Biologists most often define biodiversity as the "totality of genes, species, and ecosystems of a region". An advantage of this definition is that it seems to describe most circumstances and present a unified view of the traditional three levels at which biological variety has been identified:

- genetic diversity
- species diversity
- ecosystem diversity

This multilevel conception is consistent with the early use of "biological diversity" in Washington, D.C. and international conservation organizations in the late 1960s through 1970's, by Raymond F. Dasmann who apparently coined the term and Thomas E. Lovejoy who later introduced it to the wider conservation and science communities. An explicit definition consistent with this interpretation was first given in a paper by Bruce A. Wilcox commissioned by the International Union for the Conservation of Nature and Natural Resources (IUCN) for the 1982 World National Parks Conference in Bali[2]. The definition Wilcox gave is "Biological diversity is the variety of life forms...at all levels of biological systems (i.e., molecular, organismic, population, species and ecosystem)..." Subsequently, the 1992 United Nations Earth Summit in Rio de Janeiro defined "biological diversity" as "the variability among living organisms from all sources, including, 'inter alia', terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems". This is, in fact, the closest thing to a single legally accepted definition of biodiversity, since it is the definition adopted by the United Nations Convention on Biological Diversity.

For geneticists, biodiversity is the diversity of genes and organisms. They study processes such as mutations, gene exchanges, and genome dynamics that occur at the DNA level and generate evolution. Consistent with this, along with the above definition the Wilcox paper stated "genes are the ultimate source of biological organization at all levels of biological systems..."

[2] Wilcox, Bruce A. (1984). In situ conservation of genetic resources: determinants of minimum area requirements. In National Parks, Conservation and Development. Proceedings of the World Congress on National Parks, J.A. McNeely and K.R. Miller. Smithsonian Institution Press, pp. 18-30.

2.1 Why Biodiversity Conservation is Important?

"Biodiversity," according to the biologist Peter Raven, "keeps the planet habitable and ecosystems functional." While the history of this term is relatively short, it already has raised important, distinctive, philosophical issues. Some of these are entangled in the very definition of "biodiversity". A challenge is the reconciliation of process-based and elements-based perspectives on biodiversity. Overall, the major issue for biodiversity is how its conservation may be integrated with other needs of society.

Protecting biodiversity is essential to human survival, especially food security. Stocks of commercially important fish are crashing around the world, threatening both the livelihoods and the health of millions of people in the world's poorest countries who depend on them.

Declines or extinctions of insects and animals that pollinate plants can lead to severe consequences for crop yields, with profound impacts on economies and human health, as well as damaging countries' abilities to be self-sufficient.

Nature provides mechanisms to both reduce the spread of disease and to treat it. Numerous plants, animals and microorganisms produce compounds that have been used to develop drugs to deal with illnesses ranging from cancer to headaches to depression. Many animals eat disease-causing mosquitoes and other insects.

Ecological Values: All living creatures are supported by the interactions among organisms and ecosystems. Loss of biodiversity makes ecosystems less stable, more vulnerable to extreme events, and weakens its natural cycles.

Economic Values: A biologically diverse natural environment provides humans with the necessities of life and forms the basis for the economy. Everything we buy and sell originates from the natural world.

Cultural Values: Most people feel connected to nature, often for reasons that can be hard to explain. Some feel a strong spiritual bond that may be rooted in our common biological ancestry. Others are inspired by its beauty. Human cultures around the world profoundly reflect our visceral attachment to the natural world. Thus cultural diversity is inextricably linked to Earth's biodiversity.

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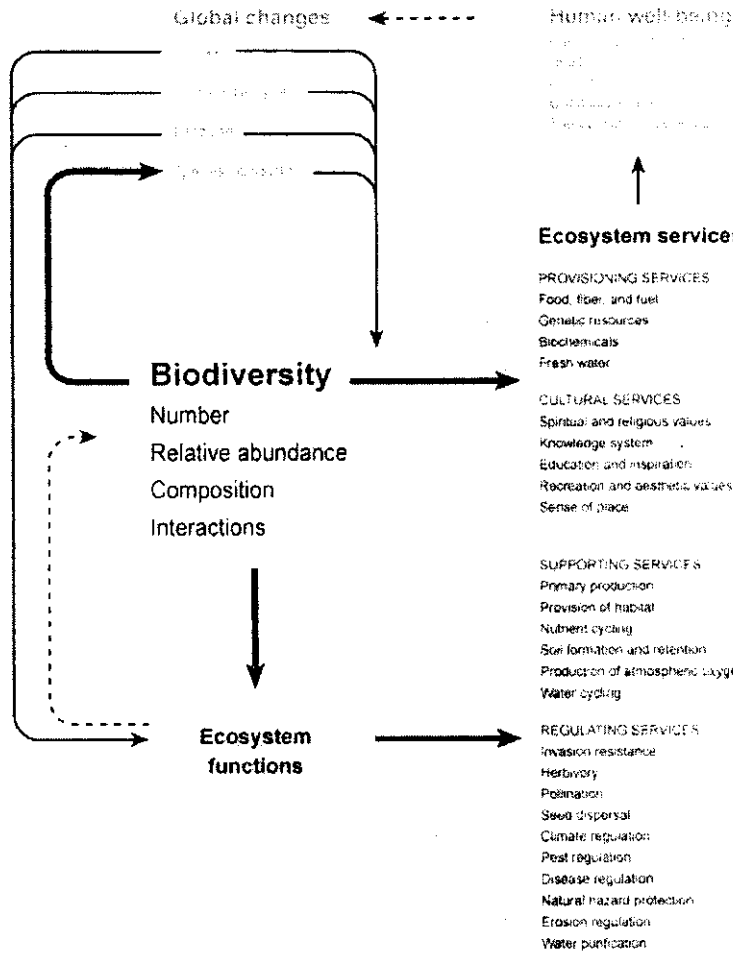
Biodiversity also supports a number of natural ecosystem processes and services. Some ecosystem services that benefit society are air quality, climate (both global CO2 sequestration and local), water purification pollination, and prevention of erosion.

Our Life Depends On.....



Source: Millennium Ecosystem Assessment

2.2 Threats to Biodiversity

Most biologists agree however that the period since the emergence of humans is part of a new mass extinction, the Holocene extinction event, caused primarily by the impact humans are having on the environment. Since the Stone Age, species loss has been accelerated above the geological rate by human activity. To feed such a large population, more land is being transformed from wilderness with wildlife into agricultural, mining, lumbering, and urban areas for humans. The rate of species extinction is difficult to estimate, but it has been estimated that species are now being lost at a rate approximately 100 times as fast as is typical in the geological record, or perhaps as high as 10 000 times as fast[3]. It has been argued that the present rate of extinction is sufficient to eliminate most species on the planet Earth within 100 years.

During the last century, erosion of biodiversity has been increasingly observed. Studies show that 30% of all natural species will be extinct by 2050[4]. Of these, about one eighth of the known plant species are threatened with extinction. Some estimates put the loss at up to 140,000 species per year (based on Species-area theory) and subject to discussion. This figure indicates unsustainable ecological practices, because only a small number of species come into being each year. Almost all scientists acknowledge that the rate of species loss is greater now than at any time in human history, with extinctions occurring at rates hundreds of times higher than background extinction rates.

The factors that threaten biodiversity have been variously categorized. Jared Diamond describes an "Evil Quartet" of habitat destruction, overkill, introduced species, and extensions. Edward O. Wilson prefers the acronym HIPPO[5], standing for;

- Habitat destruction,
- Invasive species,
- Pollution,
- Human Over Population, and
- Over harvesting.

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[3] Island Press. pp. 105. Hassan, Rashid M.; Robert Scholes, Neville Ash (2006). Ecosystems and human well-being: current state and trends : findings of the Condition and Trends Working Group of the Millennium Ecosystem Assessment.

[4] S.L. Pimm, G.J. Russell, J.L. Gittleman and T.M. Brooks (1995). The Future of Biodiversity, Science 269: 347- 350.

[5] "Hippo Dilemma". Windows on the Wild: Science and Sustainability (2005). New Africa Books.

3.0 Biodiversity Scenario of Bangladesh

Biodiversity loss is one of the environmental issues of concern of today more or less athwart the whole world. Over the past 70,000 years human beings have time and again colonized new lands and annihilated the living resource base to a sizable extent on which they themselves depended. The issue has moved steadily up the agenda over the past fifty years when there has been a price to pay. This was given impetus for the first time at the international level by the 1992 United Nations Conference on Environment and Development (the Rio Summit) at which the Convention of Biological Diversity (CBD).

Bangladesh backstops a diverse set of ecosystems, despite its relatively small geographical area. Fortunately it is bounded on the north and on the east by the eastern Himalayan and the western Myanmar hills which are centers of plant diversity as well as locations of many biodiversity hotspots (WWF and IUCN 1994-95). Bangladesh is rich in both floral and faunal diversities evident in a varied range of ecosystems starting from the northern and eastern hills to the southern seas; most deciduous forests to the mangroves and different agro - ecosystems spread over the wetlands, flood plains as well as the hills. Besides, the all-around environmental condition of Bangladesh is highly conducive for biodiversity wax. She has;

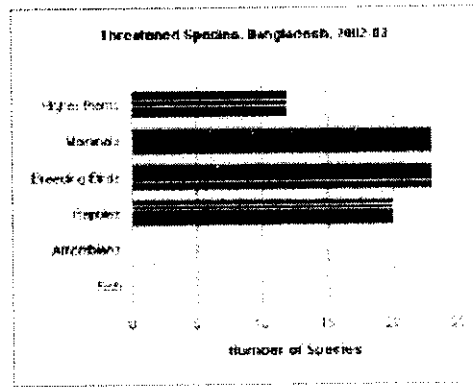
Total forest area: 871,000 hectare % of land area: 6.7%Source: www.rainforest.mongabay.com/deforestation/Bangladesh.html

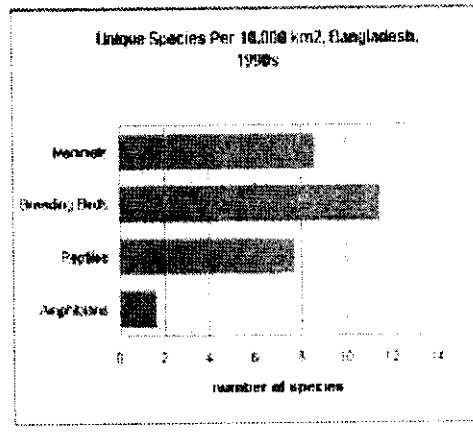
Mammals	**113**
Birds	**628**
Reptiles	**126**
Amphibians	**22**
Fishes (Fresh and Marine)	**708**
Mollusks	**400**
Vascular Plants	**5000**

Source: Dr. A. Nishat, 2000.

The over-extraction of resources for livelihood sustenance along with the development initiatives without considering the issue of eco-balance has caused a great depletion of biodiversity in Bangladesh over time. Over the last 100 years, Bangladesh has lost about 10% of its mammalian fauna, 3% avifauna and 4% reptile species. IUCN Bangladesh has identified 58 species of fish, 8 species of amphibians, 63 species of

reptiles, 47 species of birds and 43 species of mammals in the country which are threatened under degree of extinction. On the other hand, Khan *et. al.* (2001) have listed 106 species of plants as endangered. The palm Corypha Taliera has been considered as critically endangered; the last surviving individuals of the species in the whole world are limited to Bangladesh. Besides, around 100 of the estimated 6000 vascular plant species in Bangladesh have been listed as threatened to date. Many others, specially the medicinal plant species are facing great pressure. About 220 species of vertebrates, including fish, amphibians, reptiles, birds and mammals have been listed in Red Data Book of Bangladesh as they are faced with the threat of extinction. However, analysis of the past research conform that species that are dependent on aquatic ecosystems are more vulnerable. In contrast, among plants the most threatened species are those found in the terrestrial forests, where endemic is also very high.





Source: Bangladesh-Forests, Grasslands and Drylands- Country Profile (Fig. 1&2).

Over the years, Bangladesh has experienced a number of threats to her biodiversity. The major threats to biodiversity in Bangladesh include loss of habitat, over harvesting of resources, increasing productivity and natural calamities etc. Yet among the threats, habitat loss is considered as the single most crucial one. Unabated population growth, development initiatives without taking environment into account, and land tenure and

user rights issues are the most significant underlying causes of this threat to biodiversity in Bangladesh. Pollution of Bangladesh's soil, air and water due to urbanization and industrialization without considering environmental issues has intensified over the last two decades and constitutes a significant threat to biological diversity. Illegal harvesting and export of medicinal plants and other economically valuable species such as reptiles and amphibians affect many ecosystems. The pressure of the rising number of people on finite amounts of land, water and other natural resources has already resulted in mounting deforestation (a reduction from 10 to 6 percent in forest cover). The World Bank and BCAS (1998) apprehends that if the current 2% per year deforestation rate is not reversed at all, the country's forests will probably disappear totally by 2020, and that will evanescence the country's old heritage of biodiversity.

4.0 Moulvibazar Perspective

The undulating topography of Moulvibazar has given it a distinct feature. Moulvibazar is rich with haors (water bodies), teagardens, and forests, natural gas, citrus and famous for its landscape adorned with the ornaments of nature. There are three big Haors namely Kawadighi, Hakaluki and Hail hoar covering a total area of 60,000 hectares. Next to the Hill Tracts, Moulvibazar is the widely hilly district in the country. Out of total 658915.71 Acre of land area the forest coverage is 25398 Acre i.e. 3.85% of total land mass. Besides, out of 154 teagardens in Bangladesh, 93 of those are located in this district[6].

4.1 Endangered Lawachara

Lawachara forest is verdant with trees and bursting with wildlife. Over there, Nature is still virgin. Under The Wild Life (Preservation) (Amendment) Act-1974 in 1996, part of the West Bhanugach Reserved Forest was declared "Lawachara National Park," which encompasses an area of 1250 hectares. The Lawachara National Park is located 60 km south of the Sylhet city in the Komalgonj Upajila of Moulvibazar District -- about 10 km away from the town of Srimangal.

Formerly a study was conducted by IUCN Bangladesh and according to the report, the major timber trees are represented by Jarul (Lagerstroemia speciosa), Chapalish (Artocarpus chaplasha), Shegun (Tectona grandis), Lohakath (Xylia dolabriformis), Kadam (Anthocephalus chinensis),

[6] District Administration of Moulvibazar.

Shimul (Bombax ceiba), Kanthal (Artocarpus heterophyllus), Champa (Michelia champaca), Chikrashi (Chickrassia tabularis), Koroi (Albizia procera), Garjan (Dipterocarpus spp.), Dewa (Artocarpus lakoocha), Gamar (Gmelina arborea), Jam (Syzygium spp.), Sundhi (Michelia oblonga), Bohera (Terminalia belerica) etc. Among exotic short-rotational trees, Acacia hybrid (Acacia sp.), Mangium (Acacia mangium), Malacanna (Albizia falcataria), Eucalyptus (Eucalyptus camàldulensis), Akashmoni (Acacia auriculilormis), are common in plantation areas. Moreover, in mid seventies an oil-palm (Elaeis guineensis) plantation was raised in a sizeable amount of area in this park with huge investment (Choudhury et. al. 2004). But now they are considered to be one of the major threats to that park as they don't bear any commercial value nor provide foods to wild animals. There are many types of bamboo such as Jai bansh (Bambusa burmanica), Muli bansh (Melocanna baccifera) and various cane like Jali bet (Calamus guruba), Golla bet (Daemonorops jenkinsianus) in the national park. Besides, there are many types of climbers, vines, herbs and shrubs.

Lawachara forest is home to the Chloroform tree, only of its kind in Asia. It is a popular myth that, that many years ago, upon approaching the tree people used to faint. There are 167 varieties of trees including Segun, Malakan, Lohakath, Raktan and associated species. Amidst the vast expanse of trees, there are also some medicinal varieties like haritaki (terminalia chebula), neem (azadirachta indica), arjun (termnialia arjuna), and bohera (terminalia belerica). There are also rubber plants (hevea bugsilensis) and different varieties of flowering plants and eye catching orchids.

Lawachara is the habitat of rich wildlife like Hoolock Gibbon (Ulluk), Capped Langurs, Slow Lorins, Pig Tailed Macaques, Orange Bellied Himalayan Squirrels, Barking Deer and Masked Civets; colorful birds, bats, deer monkeys, bears and jackals. Biological Diversity in the Lawachara National Park consists of 460 species and the Park also supports important population of rare species like Primate Gibbon and Capped Langur. Lawachara is also a habitat for wild chicken, squirrel, and python.

4.1.1 Threats to Lawachara Forest

Ecology and bio-diversity is the gem of forests. 'Lawachara National Park' is at stake because of illegal timber felling, fuel wood collection, hunting, bamboo and cane collection, and land encroachment.

There are six tea estates around the park, of which four borders the park and the other two tea estates are nearby. Instead of making demarcation fences with naturally grown trees, these tea estates have used barb-wire demarcation fences that cause a serious hindrance for the movement of most of the animal species of Lawachara. Furthermore, these tea estates have a substantial number of unemployed inhabitants.

Lawachara Reserve Forest had 407 species of animals and 167 varieties of plants in 1996. A study has found that 246 animal species of the 407 are extinct.
Source: Shaptahik 2000, Dt. November 2009.

The prevailing extreme poverty in the locality, unemployment coupled with weak law enforcement has made poor people become reliant on forest resources for meeting their needs. They enter into the national park and exploit forest resources; for fuel wood collection.

Besides, Lawachara National Park is the biggest remaining Hoolock Gibbon habitat in the country, with a census population of 49 individuals. Together with the adjacent Chautoli and Kalachara forest areas the population reaches 60 individuals in 16 family groups[7]. Hoolock Gibbons are rare and endangered species, only found in four countries in the world. They live in the higher canopy of forests and survive on leaves and fruits. The animals never touch the ground. Over the past 10-20 years, hoolocks have decreased in numbers with around 70%, according to The World Conservation Union (IUCN). In Bangladesh there are now only 200 individuals left and ¾ of them live in small populations of less than 20 individuals isolated in forest patches, from where it is impossible for them to transfer and mix with other populations. The reason for this dramatic reduction in gibbon numbers is deforestation.

Forests are cut down at an ever increasing rate and the patches that remains are small and totally isolated from one another. As illegal logging, plantation of commercially valuable trees and other human activities are reducing the number of large trees that the gibbons are depending on for travel and food. There are times of the year when no fruits are available. This has led to periodical starvation and a reduction of young gibbons surviving to adulthood.

[7] Petra Osterberg (2006), The Endangered Hoolock Gibbon of Bangladesh..

Lawachara National Park: At the Lawachara National Park, where our beautiful tropical forests hold hundreds of species, including primates, in a setting of well-established and enclosed forest. Indigenous people such as Khasia and Tipra live around here.

Forest Type: Semi-evergreen and mixed deciduous forest.

Geographical Location: Located approximately 160 Km northeast of Dhaka and 60 Km south of Sylhet in civil administration of Kamalganj Upazila Moulvibazar District. 24°30'-24°32' N and 91°37'-91°39'E.

Forest Administrative Location:

Beat : Lawachara, Chautali and Kalachara;

Range : Moulavibazar Forest Range;

Division: Sylhet Forest Division.

History of Establishment: Lawachara National Park (NP) is a part of the West Bhanugach Reserved Forest. The reserved forest was established through an order under the Forest Act. The current national park was established through a Gazette Notification (PBM (S-3) 7/96/367 on 07 July 1996). Further proposal was made for extension of the park as per recommendation of Forestry Master Plan (GoB 1992) and feasibility study carried out by FRR and DU (1996).

Area: 1531 ha.
Flora & Fauna: Plants: 167 species; Amphibians: 4 species; Reptiles: 6 species.
Birds: 246 species;
Mammals: 20 species; **Odonate Insects:** 17 species.
Key species: Hoolock Gibbon, Slow Loris etc.
Accessibility & Visitor Infrastructure: Easily accessible.

Priority Threats to the PA: Fuel wood collection by inside and outside villagers Illicit timber extraction Monoculture by exotic plant species Betel Cultivation Modification/ removal of undergrowth Unplanned tourism Gas pipeline of Unocal through the PA Encroachment.

Source: www.nishorgo.org.

According to a survey of Nishorgo Support Project (NSP), the main occupation of Khasia community is betel leaf cultivation. The vines had grown on trees which they use as a climbing support. The management practice includes pruning of tree branches and weeding areas adjoining each vine. This activity reduces biodiversity value of the allocated area and contributes to habitat loss.

Flora and Fauna	167
Amphibians	04
Reptiles	06
Birds	246
Mammals	20

Source: USAID, 2008.

Under The Wild Life (preservation) (Amendment) Act of 1974 "National Parks" are areas of "outstanding scenic and natural beauty" whose purpose is the "protection and preservation of scenery, flora and fauna in the natural state, to which access for public recreation, education and research may be allowed." Cleaning up or breaking up land for any purpose is prohibited by Bangladesh Forest Act-1972 and commercial activities of any national or international organizations are also strictly prohibited in the national parks. US Company Chevron conducted a 3D seismic survey in the Lawachara National Park. The survey of Chevron involved such kinds of experiments which have long term adverse effects on this sensitive forest. The explosions, which are being conducted in Lawachara as a part of Chevron's survey, left the wildlife there in a hazardous position. The Daily Star (Dt. 10 May 2008) reported that being frightened by the shakes generated by the explosions, wild animals are leaving the forest at an alarming rate. In such an incident a Primate Gibbon, in an attempt to flee, jumped onto the electric cable and surrendered to death on 7th May, 2008. Cracks appeared in the walls of many houses in the area, due to explosions during seismic survey.

Chevron's survey clearly violated many provisions of the existing environment related laws of Bangladesh. The survey also violates the provisions of the United Nation's Convention on Biological Diversity (CBD)-1992 which is dedicated to conserve biodiversity and sustainable use of the same.

Furthermore, with the increase in the number of population, non-renewable resources like land are becoming scarce and valuable in monetary terms. People, for their greed to mint wealth, are cutting down trees, and grabbing forest land for commercial purpose, habitation and also agriculture.

4.2 Hill Cutting Aggression

Massive hill cutting by powerful individuals or organizations, both from public and private sectors for commercial and non-commercial purposes,

took a grave turn in recent years in more than one city and district of Bangladesh, threatening environment, natural beauty and bio-diversity of the land having wonderful geographical uniqueness. This hill cutting is going on in full swing even at the expense of the human lives!

A vested interest group of influential people, truck owners' association, contractors, brick kiln owners, real estate developers and local goons are involved in the hill cutting business. They are cutting hills and hillocks in a haphazard manner in almost all the upazilas of the district for selling earth to interested people at high prices to mint money. People are buying the earth removed from hills and hillocks to fill up low lying lands, marshes and raise the level of their homesteads.

In year 2009 all six (6) members of a family living in a shack at the foot of a hillock in Srimangal Upazila died due to mudslide. Several other huts and people were injured. Experts and local people blamed the hill cutters and demanded their punishment for such felony[৪].

Cutting of hills and hillocks indiscriminately for filling up low lands, marshes and raising the level of homesteads has been destroying the biodiversity in the hilly region of Moulvibazar.

Hill cutting is not only damaging the natural beauty of the hilly region but also this practice is blocking the natural flow of water in the canals passing through the hills, causing land slide during the rainy season and damaging tea plants and forest resources.

According to ASM Maksud Kamal (national expert, Earthquake and Tsunami Preparedness, UNDP), no risk of landslide is involved if the hills are cut with a slope of 20-30 degrees. But in most cases hills are cut with slopes of 70-80 degrees, making those hills highly unstable[৯].

4.2.1 Prohibiting Hill Cutting

The government has imposed restriction on hill cutting without permission and directed the authorities concerned to strictly execute the Building Construction Act, 1952. Despite the fact that hill cutting without proper legalization is banned, the activity goes on without fear of reprisal.

The Building Constriction Act was enacted in 1952, which was given effect from 21.03.1953, with a view to preventing haphazard erection of buildings, excavation of tanks and cutting of hills and hillocks in

৪ Office of the Upazila Nirbahi Officer (UNO) Srimangal.

৯ The Daily Star, Dt. 12 June 2007.

Bangladesh. Initially the Act did not contain any specific provision for the cutting of hills. But later on after realizing the momentous of this issue, the government amended the 1952 Act twice in 1987 and in 1990. In the Building Construction (Amendment) Act of 1990, amongst other, section 3C and 3D were inserted into the 1952 Act.

As per section 3C of the Act no person shall without the previous sanction of the authorized officer cut or raze any hill. As per this section no such sanction shall be granted unless the authorized officer or such other authority as the government may specify is satisfied that-

(a) the cutting or razing of the hill shall not cause any serious damage to any hill, building, structure or land adjacent to or in the vicinity of the hill, or

(b) the cutting or razing of the hill shall not cause any silting of or obstruction to any drain, stream or river, or

(c) the cutting or razing of the hill is necessary in order to prevent loss of life or property, or

(d) the cutting of the hill is such as is normally necessary for construction of dwelling house without causing any major damage to the hill, or

(e) the cutting or razing of the hill is necessary in the public interest.

Being empowered under section 18 of the Act, the government formulated the Building Construction Rules 1996 with specific provision regarding the permission procedure for cutting of hills. The said Rules contain the application procedure for the approval of cutting of hills and the fee structure for the same. Rule 27 states that in addition to the fees, designs as required under the Rules, the applicant must also submit the following documents:

(a) clearance or NOC from the environment department;

(b) topographical or contour map of the hill;

(c) detailed design showing all the necessary development plan, protective measures etc;

On most of the occasions, the hill cutters do not obtain any clearance at all from the authority and in very few of the cases the authority takes actions against them. Besides, government had formed a committee, headed by the District Commissioner, in 1995 to restrict indiscriminate hill cutting. But unfortunately the committee is literally inactive for different complications.

Although, hill cutting is prohibited without the permission of the Directorate of Environment (DoE), only a few cases has been filed against some of the illegal hill cutters by DoE, but most of which did not see any day light for different unknown (!) reasons.

4.2.2 Cases against Hill Cutting

Name of the Court: Poribesh Adalot (Environment Court) District: Moulvibazar

Sl No.	Case No. and Date	Clauses and Offence	Name and Address of the Offender	Plaintiff, Investigator and the Present Stage of the Case	Case Disposal (Conviction/Acquitted) Nature of Conviction
01	Environ ment Case No. 06/2008	Bangladesh environment Conservation Act-Clause 15 Offence: Hill Cutting	Nawab Ali, Allauddin Ali, Village: Didarpur, Kulaura, Moulvibazar	Charge Sheet has been submitted. Plaintiff and investigator Sardar Shariful Islam.	
02	Environ ment Case No. 15/2008	Bangladesh environment Conservation Act-Clause 15 Offence: Hill Cutting	Badal Miah, babul Miah, Village: Shahbajpur, Borolekha, Moulvibazar	Charge Sheet has been submitted. Plaintiff and investigator Sardar Shariful Islam	
03	Environ ment Case No. 16/2008	Bangladesh environment Conservation Act-Clause 15 Offence: Hill Cutting	Malik Uddin, Abdul Hamid Liton, Village: Shahbajpur, Borolekha, Moulvibazar	Charge Sheet has been submitted. Plaintiff and investigator Sardar Shariful Islam	
04	Environ ment Case No. 17/2008	Bangladesh environment Conservation Act-Clause 15 Offence: Hill Cutting	Rakib Uddin, Village: Shahbajpur, Borolekha, Moulvibazar	Charge Sheet has been submitted. Plaintiff and investigator Sardar Shariful Islam	
05	Environ ment Case No. 12/2009	Bangladesh environment Conservation Act-Clause 15 Offence: Hill Cutting	Foyju Haaji, Village: Municipality of Borolekha, Moulvibazar	Plaintiff: Sardar Shariful Islam. Investigation could not be started.	
08	Environ ment Case No. 13/2009	Bangladesh environment Conservation Act-Clause 15 Offence: Hill Cutting	Saad Uddin, Village: Kthaltoli, Borolekha, Moulvibazar	Plaintiff: Sardar Shariful Islam. Investigation could not be started.	
09	Environ ment Case No. 31/2009	Bangladesh environment Conservation Act-Clause 15 Offence: Hill Cutting	Abdul Karim, Village: Shagarnal, Juri, Moulvibazar	Plaintiff: Sardar Shariful Islam. Investigation process has been started.	
10		Bangladesh environment Conservation Act-Clause 15 Offence: Hill Cutting	Mujibur Rahman, Nazrul Islam, Borolekha, Moulvibazar	Plaintiff: Sardar Shariful Islam.	The case against the Hill Cutting adjacent to the gate of Madhabkunda Eco-Park has been submitted. Number of the case was not found.

Source: Directorate of Environment (DoE), Sylhet Division.

4.3 Biodiversity of Hakaluki Haor at Stake

Hakaluki Haor is a complex wetland with 276 (approximately) interconnecting beels (low-lying depressions in the flood plain) in a shallow basin formed between the Patharia and Madhab Hills to the east and the Bhatera Hills to the west. The Hakaluki Haor is made up of beels, canals, rivers, kandas (raised land at the edge of beels and rivers in the haor basin used to be covered with swamp forest), crop lands etc. During dry season the area covered by the beels is about 4,925 hactares but during monsoon the Haor soars up to approximately 24,715.4 hactares and the entire area remains underwater for up to five months. During monsoon, all the beels unites as one large lake or haor- the Hakaluki Haor- the largest freshwater wetland in Bangladesh. The Hakaluki Haor wetland is fed mainly by the Juri/ Kontinala, Sonai/Bordol and Fanai and drains through a single outlet, the Kushyara. The haor system depends on both precipitation and floodwater as sources of water.

The degradation of Hakaluki Haor is the result of;

- Loss of reed land and swamp forest areas due to conversion to agriculture land;
- Reduction in surface area and depth due to sedimentation, drainage and diversion of rivers for irrigation;
- Degradation of reed land and grassland habitats due to grazing within the haor;
- Loss of reproductive capacity of fishes due to inappropriate fishing practices;
- Loss of genetic diversity due to increasingly intensive cultivation of High Yield Varieties (HYVs);
- Unsustainable level of fuel wood collection;
- Over-harvesting of amphibians, including turtles and frogs;
- Reduction of migratory and indigenous birds due to poaching;
- Degradation of aquatics due to agro-chemical pollution from tea estates.

Class	Total Species	Threatened	Vulnerable	Endangered	Critically Endangered
Amphibia	12	07	05	02	-
Reptilia	70	43	20	19	04
Aves	417	26	02	10	14
Mammalia	59	23	06	09	08
Total	558	99	33	40	26

Source: Mr. Abdul Wahab Akanda, Wildlife Biodiversity Management Specialist (Hakaluki Haor ECA), Coastal and Wetland Biodiversity Management Project, Dt. 2000.

4.4 Unplanned Agriculture and Mindless Plantation

Around 61% of tea gardens of our home land are located in Moulvibazar. The tea estates are made on public lands. Government lease out land to the interested parties for tea plantation for a certain period of time (around 35 years) and among other conditions it includes that lessee will not let any part of the land unplanted. If a portion of the land is not suitable for tea plantation, it has to be planted with herbs, fruit trees or other plants. In most cases the tea gardens plant cash crops like rubber trees on comparatively flat lands or cultivate pineapples on the slopes of hillocks. Pineapple cultivation, in particular, causes soil erosion that ultimately results in land/mud slides. Besides, to thwart desertification and Green House Effect, foreign trees like Eucalyptus are being planted where local trees once found. Rubber trees and Eucalyptus create 'Green Desert', i.e. these trees extract so much liquid from the soil that no other plant can grow near them and also makes the soil dry.

Dr. Inam Al Huq (ornithologist and representative of Asian Bird Census) in his study in the year 2006 found that local birds do not make nests or sit on these alien trees because they are not familiar with these trees and it ultimately hampers pollination.

5.0 Findings

- People are not aware about the significance of biodiversity conservation.
- Population pressure, expansion of agricultural land, constructions of houses, roads, etc., and grazing by domestic animals are the major threats of biodiversity.
- Unscrupulous harvesting of forest resources and insufficient measures to regenerate the resources destroying biodiversity.

- Indiscriminate use of chemical fertilizers and insecticides in croplands and adoption of unplanned agricultural practices are the major cause of annihilation of the micro-organism of the soil.
- Lack of appropriate policies for proper management and expansion of wild life sanctuaries /protected areas.

6.0 Recommendations

- Enhance public awareness about the importance of conserving biodiversity and the underlying threats to biodiversity.
- Encourage individuals, organizations and governments to take immediate steps to halt biodiversity loss.
- Appropriate policy for biodiversity and its effective implication is an imperative.
- Proper education, training and research for implementing conservation strategy so far recommended.
- Innovative solutions to reduce the threats to biodiversity should be promoted.
- Collection of adequate and appropriate information will help future studies find a solution to eliminate the threats.

7.0 Conclusion

We are an integral part of nature; our fate is tightly linked with biodiversity, the huge variety of other animals and plants, the places they live and their surrounding environments, all over the world. We rely on this diversity of life to provide us with the food, fuel, medicine and other essentials we simply cannot live without. Yet this rich diversity is being lost at a greatly accelerated rate because of human activities.

The think tanks and researchers around the world apprehend that the existence of human race is at stake; human being is, in fact, the most endangered life form on Earth. We are expediting this process of extinction by damaging the Mother Nature and destroying biodiversity. There is no doubt that biodiversity conservation is essential for human survival and natural processes made possible by the diversity of life underpin the economies of all nations. But these facts are often forgotten as big wigs of the country focus on narrow, short-term agendas. However, the global importance of biodiversity now is reflected in the widely

accepted target to achieve a significant reduction in the rate of loss of biodiversity by the year 2010.

But after the industrial revolution and subsequent globalization of the food system and its marketing, it is virtually impossible for people to change their life style; stop emitting fossil fuels, discard industrial products and halt urbanization. Again, to feed the ever increasing population we have to depend on High Breeds, High Yielding Varieties that require huge quantity of chemical fertilizers and pesticides.

We can blame nature's fury for the deaths in natural disasters. But whom should we blame for the deaths in man-induced disasters? We should bring into cognizance the fact that the regular accidents in hills are not mere accidents, as they fall in a totally different category. The hill cutters should be made to realize that such "accidental" death is tantamount to murder.

In this time of dicey we need real accounting to ensure that the value of biodiversity is recognized, real funding for nature conservation, and real protection for the most threatened and important places in Earth. Time has come for the government and policy makers to frame new strategies to protect biodiversity. Moreover, we need to adopt ecologically sustainable development, i.e. '... to meet the needs of the present without compromising the ability of future generations to meet their own needs.'[10] Only sustainable development can enhance natural environment and social equity, and improve total quality of life. And it can be attained by using, conserving and enhancing our resources such a way so that ecological processes on which our life depends are maintained for a better and inhabitable world for us and the posterity.

Movement for conserving environment, therefore, should be aimed for the wellbeing of the human beings, all other living animals and plants, and to make a better world for our future generation. Year 2010 is our chance to prove that we do care about the biodiversity of the world and the existence of all life forms around us.

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