

Study Note

Biodiversity Conservation & World Natural Heritage in Bangladesh

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방글라데시의 생물다양성 보전 및 세계자연유산

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요약 : 방글라데시는 인도히말라야와 인도차이나 경계에 위치한 아열대 몬순기후지역이며 생물다양성 핫스팟으로 알려져 있다. 식생은 활엽수림, 침엽수 및 혼효림으로 구성되어 있으며 습지와 망그로브로 이루어져 있다. 자연경관은 많은 강과 해안선 및 언덕과 농업 산림으로 이루어진 수려한 경관이다. 전 세계적 인 선라반이라 불리는 망그로브가 있으며, 이 지역은 방글라데시와 인도 중간에 위치하고 있으며, 1999년 유네스코 세계자연유산지역이다. 망그로브의 62%가 방글라데시에 위치하고 있으며, 많은 동식물이 존재한다. 그러나 많은 사람으로 인해 자연환경이 변화하고 있으며, 벌채량이 증가하고, 자연서식자가 감소된다. 이런 이유로 많은 종이 멸종에 처하게 되고 사라진 종도 많다. 이 지역 사람들은 직간접적으로 자연자원에 이익을 얻게 되며, 현재 생태관광이 주 수입원이다. 자연자원의 보호를 위해 정부는 각종 법령을 제정하고 있으며 많은 NGO가 생물다양성과 생태계 보전을 위해 노력하고 있다. 그럼에도 불구하고 현재 접경지역을 통한 오염물질과 자연재해는 방글라데시의 큰 위협요인이다.

주요어 : 생물다양성, 보전, 야생동물, 자연유산, 생태관광

Abstract : Bangladesh is a South Asian country with subtropical monsoonal climate between the intersection of the Indo-Himalayan and Indo-Chinese sub-regions, is known as biodiversity hotspot of the Asian region. The country has different types of forest like deciduous forest, evergreen forest, mixed forest, haor (wetlands) and mangrove forest. The natural beauty of the country is increased with the presence of so many rivers, longest sea beach of the world, green plants, critical hilly regions and green agricultural forest widely spread here and there. Sundarbans is the world largest mangrove forest and world natural heritage site declared by UNESCO in 1999 situated in Bangladesh and India. About 62 percent of this mangrove forest is situated in Bangladesh and there are so many plants and animals are found in this forest. To meet the increasing demand of the large population most of the natural ecosystem is now altered, deforestation rate is increased, natural habitat of the species is disturbed. Due to the imbalance of the climate and natural system many of the rare species of the

world found this region is now endangered and some of the species are extinct. Directly or indirectly they are benefited from natural resources. At present time community, based ecotourism is also an important source of income for rural poor peoples. To protect the natural resources the government is now developed so many conservation acts and policy as well NGOs are also doing work for the conservation of ecosystem and biodiversity. At present transboundary pollutants and so many natural disasters also destruct the natural resources of Bangladesh.

Keywords : Biodiversity, conservation, Wildlife, Natural Heritage, ecotourism.

Introduction

The word 'biodiversity' was first introduced by W.G. Rosen in 1985, widely used to indicate the variability of all forms of life at all levels. The Convention on Biological Diversity (CBD 1992) defines 'biodiversity' 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.' Bangladesh is committed to conserve biodiversity with CBD, in the Clause 18A of the constitution of Bangladesh mentioned, 'The State shall endeavor to protect and improve the environment and to preserve and safeguard the natural resources, bio-diversity, wetlands, forests and wild life for the present and future citizens'. Biodiversity is key to human lives and livelihoods in Bangladesh, because a large proportion of the population depend on natural resources for their survival. The National Conservation Strategy (NCS) has developed to guide the conservation and sustainable use of biodiversity of the country in a way that the country can meet the Sustainable Development Goals (SDGs) by the year 2030 (United Nations 2015). In order to meet the SDGs it is crucial to follow the NCS. The SDG 15 is 'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably

manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss', which is directly linked with the NCS. The wildlife and other biodiversity of Bangladesh is exceptionally rich as a consequence of its location in the subtropical belt at the confluence of two major biotic sub regions of the Oriental Region, Indo-Himalayas and Indo-China (Standford 1991). This country acts as an important merging and sharing habitat, land bridge and biological corridors of the flora and fauna between these sub-regions. This strategic location makes Bangladesh as one of the most ecologically important and biologically diverse landscapes in terms of migratory species, stepping stones, staging ground and flyways for wildlife movements of the region. As an example the total number of bird species in Bangladesh is nearly the same as all of Europe, which is a much bigger area (Khan 2001). The hilly area located in the southeast of Bangladesh form part of Indo-Burma Biodiversity Hotspot is one of the 34 most biodiverse areas on earth (Myers et al. 2000). The country has two biodiversity rich areas of global renown such as the Sundarbans and Tanguar Haor. In Bangladesh the main concentration of wildlife is in the natural forests and wetlands.

Problems

There are so many problems are found in Bangladesh for conservation of biodiversity. For lack of education, policy, rules & regulations and finally economical problem are major cause for biodiversity degradation of Bangladesh & this regions. Bangladesh is now faced so many direct threats on its biodiversity. The economic development and growing population accelerate the direct threats on biodiversity and ecosystems. According to the country reports of Convention on Biological Diversity (CBD, 2011) and site visits with refined interviews the direct primary eight threats on biodiversity are- 1) encroachment in protected areas 2) degradation of forests and wetlands 3) infrastructure development 4) unsustainable or illegal exploitation of terrestrial resources 5) unsustainable or illegal fishing practices 6) change in hydrological regime 7) pollution 8) invasive species. There are some indirect threats (root causes) remains related to institutional and educational activities. The main indirect threats identified in the assessment include, 1) poor institutional capacity 2) lack of coordination among different agencies 3) policy and information gaps 4) lack of enforcement 5) inadequate and poorly managed system of protected areas 6) corruption 7) lack of political commitment 8) lack of awareness 9) climate and biophysical changes and 10) lack of alternate livelihoods in sensitive habitats. As with direct threats these vary in severity from situation to situation and are not prioritized here.

Statement of the Study

Bangladesh is a South Asian country ranged from 20°34' to 26°38' north latitudes and from 88°01' to 92°41' east longitudes, located on the

Ganges-Brahmaputra-Meghan river system one of the largest delta on the earth with 147,570 square kilometers total area. Bangladesh has 106,613 square kilometers of marine area (DoE 2016) and the north-east and south-east portions of the country are hilly, about 80% is floodplain, 12% is hills, and about 8% is terrace or uplifted blocks (BBS 2014). The climate is subtropical monsoon, with annual rainfall normally ranging 1,100-5,700 mm, temperature 11-34°C and relative humidity 55-88%. Due to the climatic condition and geographic regions Bangladesh is known as biodiversity hotspot. Natural forest and wetlands are the main point of natural resources and biodiversity of this region. Hakaluki haor (wetland) is considered as ecologically critical areas in 2000 as a project site of the Community Based Haor and Floodplain Resource Management Project of IUCN Bangladesh under Sustainable Environment Management Programme (SEMP), supported by the UNDP and implemented by the Ministry of Environment and Forests during 1998-2005. The aim of the project is the improvement of the well-being of the people, sustainable development, poverty alleviation and capacity building of local communities for effective wetland resource management. Between 2001 and 2005, communities were engaged through motivation, awareness raising, establishment of community based organizations, capacity building, providing alternative income generation and other support to enhance awareness and capacity for wise use of wetland resources. The project also took conservation measures, like swamp protection and plantation, re-excavation of wetlands, establishment of fish conservation area, species conservation (e.g. *Tursiops truncatus*, *Helix pomatia*, *Haliaeetus leucorhynchus* and *Testudines*). To retain and enhance the

capacity of ecosystem management, many village groups formed in Hakaluki Haor under SEMP were institutionalized and nurtured as Village (Ecosystem) Conservation Groups by other projects, namely the CWBMP and the CBA-ECA Project. The Empowerment of Coastal Fishing Communities for Livelihood Security Project (ECFC Project) was implemented by the Department of Fisheries between 2000 and 2006 in Cox's Bazar-Teknaf Peninsula and St. Martin's Island ECAs. This UNDP and FAO supported initiative aimed at bringing about positive qualitative and quantitative changes in the lives of poor coastal fishing communities left outside formal institutions. The project organized these fishing communities into about 250 village organizations (VO) in 117 villages. It succeeded in empowering them with self-recognition, strength of collective organization and the knowledge to manage their livelihoods and managing depleted fishery resources in the coastal areas.

Conservation of Biodiversity

Our natural resources are limited but the demand of the increasing population is increased day by day. As a result now human beings are overexploited the natural resources to meet up their increasing demands. Directly or indirectly we use the natural resources for our daily life. For this overexploitation of natural resources degraded the habitat of the wild life, reduce its food source, make it vulnerable. Due to human interference many of the wild animals are now extinct or endangered or vulnerable in condition. To protect the wild animals and plants this human interferences should be removed and national and international conservation program

should introduced and establish the rules, regulations and acts to protect the biodiversity and natural resources. In Bangladesh government and several NGOs have taken initiatives to protect biodiversity and natural resources. As well takes initiatives to provide alternative income source of the poor villagers to reduce the dependency on natural resources. In 2001-2007 under the Community Based Fisheries Management (CBFM-II) Project, 130 community based organizations were established to manage 116 water bodies in 22 districts. Part of Hakaluki Haor in Barlekha upazila was included in this country wide venture supported by the USAID. Community based management approach have different skill development initiatives like water body management, good governance, leadership and account keeping were exercised to build the capacity of the fishermen's organizations for wetland management was introduces this project. At the same time, alternative income generating options such as duck rearing, vegetable production, livestock rearing, aquaculture and cage culture were introduced to reduce people's dependency on natural resources. The project established sanctuaries for managing and enhancing biodiversity of the wetlands. The initiative showed improvement in wetland management and in fish biodiversity by the communities. Trends of fish production increased in 50 (77%) of the 64 project water bodies. Increasing trends in biodiversity was also found in more than two thirds of the monitored water bodies. Organization management at the community level and ensuring environmental governance remained a challenge. In the CBFM-II, the contribution of social capital (micro credit) was found to be effective in diversifying and increasing household income of poor fishers. The

concept was also effectively practiced in the CWBMP and the CBA-ECA Project through formation and utilization of Micro Capital Grants (MCG). The Nishargo Support Project (2003-2008) was initiated by the Bangladesh Forest Department with USAID's support and introduced the co-management approach in protected areas for wise use of natural resources. In continuation of this initiative, USAID supported implementation of Integrated Protected Area Co-management (IPAC) Project (2009-2012) in association with the Bangladesh Forest Department and the Department of Fisheries to promote and institutionalize an integrated protected area co-management system for sustainable natural resources management and biodiversity conservation. A couple of ECAs, namely Hakaluki Haor and Teknaf Peninsula were included in this project. The project revealed that by understanding the local context, a mix of strategies needed to be considered for better management of wetlands and forests. The three phased (2006-2015) Community Based Sustainable Management of Tanguar Haor Project (Tanguar Haor Project) aimed at establishing an effective co-management process for sustainable management of haor resources to create an opportunity for development of life and livelihoods of the people living in this Ramsar Site. This Swiss Agency for Development and Cooperation (SDC) supported project formed 73 Village Community based Committees (VCC) covering 77 out of 88 villages and brought 4,774 households out of 10,205 households to the co-management of this ECA. A sustainable fish harvesting system and resource sharing mechanism was developed involving community and local administration. The co-management model worked with project support as institutions from

village to district levels took and implemented decisions on resource management. Alternative income generating activities were supported by the Social Capital Management (SCM, fund made up of savings and grants) and the Livelihoods Implementation Plan (LIP). Participation of women in income generating activities was encouraging. A total of about 5,000 community members were trained on 65 trades of alternative income generation activities (e.g. small business, livestock rearing, vegetable cultivation, ecotourism, and poultry rearing) with 45% female participation. About 50% households of Tanguar Haor participated in the community organizations, and about 7,100 people received membership with 25% women members. Awareness building and conservation effort taken by the project through sanctuary declaration and plantation are expected to significantly contribute to biodiversity conservation.

Wildlife

The International Union for Conservation of Nature (IUCN) Bangladesh published the findings at a program titled 'Updating Species Red List of Bangladesh' held in Dhaka. The Threatened Species of the IUCN Red List is a universally acclaimed index of the world's endangered animals that includes conservation status and extinction risk of animals. The latest Red List status of the wildlife in Bangladesh that has been assessed over the last two and half years was disseminated by this event. Among 1,619 assessed species, 50% of species are found as least concern, 2% as regionally extinct, 3% as critically endangered, 11% as endangered, 9% as vulnerable, and 6% as near threatened. Thirty one species are found as extinct from the country including 11 mammals,

19 birds and 1 reptile. The red list was published as part of Bangladesh Forest Department's project entitled 'Strengthening Regional Cooperation for Wildlife Protection (SRCWP)' funded by The World Bank. The sub-project was implemented from December 2013 to June 2016 to reduce the current knowledge gap of conservation and risk of existing species status by updating the previous Red List of Bangladesh which was published in 2000. List of Endangered and vulnerable Animals of Bangladesh are respectively Asian Elephant (*Elephas maximus*), Banteng (*Bos javanicus*), Blue Whale (*Balaenoptera musculus*), Capped Langur (*Trachypithecus pileatus*), Fin Whale (*Balaenoptera physalus*), Ganges River Dolphin (*Platanista gangetica gangetica*), Hispid Hare (*Caprolagus hispidus*), Hoolock Gibbon (*Bunipithecus hoolock*), Particolored Flying Squirrel (*Hylopetes alboniger*), Tiger (*Panthera tigris*) and Asiatic Black Bear (*Ursus thibetanus*), Asiatic Golden Cat (*Catopuma temminckii*), Assam Macaque (*Macaca assamensis*), Barasingha (*Cervus duvaucelii*), Blackbuck (*Antelope cervicapra*), Clouded Leopard (*Neofelis nebulosa*), Dhole (*Cuon alpinus*), Dugong (*Dugong dugon*), Eurasian Otter (*Lutra lutra*), Fishing Cat (*Prionailurus viverrinus*), Gaur (*Bos frontalis*), Humpback Whale (*Megaptera novaeangliae*), Irrawaddy Squirrel (*Callosciurus pygerythrus*), Mainland Serow (*Capricornis sumatraensis*), Northern Pigtail Macaque (*Macaca leonina*), Sloth Bear (*Melursus ursinus*), Smooth-coated Otter (*Lutrogale perspicillata*), Stumptail Macaque (*Macaca arctoides*) (2004 IUCN Red List of Threatened Animals). A small project entitled 'Ecology of the Bengal tiger in the Sundarbans, Bangladesh' was implemented in 1999 by IUCN-Bangladesh with teachers and students from Jahangirnagar University and University of Dhaka. There is no other initiatives found in Bangladesh to conserve

Table.1. Extinct Mammals of Bangladesh (11 species)

No.	Extinct Mammals	Scientific Name
1	Striped Hyaena	<i>Hyaena hyaena</i>
2	Gray Wolf	<i>Canis lupus</i>
3	Wild Buffalo	<i>Babalus Bubalis</i>
4	Indian Rhinoceros	<i>Rhinoceros unicornis</i>
5	Blackbuck	<i>Antilope cervicapra</i>
6	Banteng	<i>Bos javanicus</i>
7	Javan Rhinoceros	<i>Rhinoceros sondaicus</i>
8	Sloth Bear	<i>Melursus ursinus</i>
9	Nilgai	<i>Boselaphus tragocamelus</i>
10	Sumatran Rhinoceros	<i>Dicerorhinus sumatrensis</i>
11	Swamp Deer	<i>Rucervus duvaucelii</i>

Table.2. Extinct Birds of Bangladesh (19 species)

No.	Extinct Birds	Scientific name
1	Rusty-fronted brawning	<i>Actinodura egeroni</i>
2	Sarus Crane	<i>Grus antigone</i>
3	Pink-headed duck	<i>Rhodonessa caryophyllacea</i>
4	Bengal Florican	<i>Pelecanus philippensis</i>
5	Spot-billed pelican	<i>Pelecanus philippensis</i>
6	Red Headed Vulture	<i>Sarcogyps calvus</i>
7	Indian Peafowl	<i>Pavo cristatus</i>
8	Spot-breasted Parrotbill	<i>Paradoxornis guttaticollis</i>
9	Lesser Florican	<i>Sypheotides indicus</i>
10	Rufous-throated Partidge	<i>Arborophila rufogularis</i>
11	Grey Francolin	<i>Francolinus pondicerianus</i>
12	Black-breasted Parrotbill	<i>Paradoxornis flavirostris</i>
13	Swamp Francolin	<i>Francolinus gularis</i>
14	White-winged Duck	<i>Ascarcornis scutulata</i>
15	White-bellied Heron	<i>Ardea insignis</i>
16	Greater rufous-headed Parrotbill	<i>Psittiparus bakeri</i>
17	Bar-tailed Tree Creeper	<i>Certhia himalayana</i>
18	Green Peafowl	<i>Pavo muticus</i>
19	Greater Adjutant	<i>Leptoptilos dubius</i>

our tigers. Extinct species of Bangladesh are given Table 1 for extinct mammals (11 species) and Table 2 for extinct birds (19 species) and one reptile species also extinct.

Community Involvement for Biodiversity Conservation

According to Biodiversity Conservation and Social Protection Project's (CBA-ECA Project) approach and philosophy People living in and around the Ecologically Critical Areas (ECAs) are at the Centre of the Community Based Adaptation. These people depend on the natural resources, mainly on forest and aquatic resources for their lives and livelihoods. The effective engagement of the community is important in all conservation efforts in ECA. Natural resources management demands several successive, inter-dependent actions in Community engagement. People's Dependency on natural resources of ECAs and its extent of peoples have to be identified by their socio-economic status. Awareness should be developed among themselves of the declining condition of the common pool resources and necessary to improve the situation. They have to be organized to undertake interventions to protect the ECA. This organization should take necessary steps to improve their lives at present and for future generations without depleting the natural resources through alternative livelihoods. To achieve better management of ECA resources and enhance resilience of community total 68 Village Conservation Groups (28 in Hakaluki Haor ECA and 40 in Cox's Bazar-Teknaf Peninsula and Sonadia Island ECAs) were nurtured under the project of CBA-ECA. These VCGs in ECA regions were formed under the Coastal and Wetland Biodiversity Management Project (CWBMP, 2003-2011). Each VCG has an Executive Committee with 9 member, consisting of 1 president, 1 vice-president, 1 secretary and 6 members. Different trainings on different topics are received by the VCGs' office bearers like, on leadership,

VCG management, MCG management, management of infrastructures, and so on. VCG members also received training on natural resource management, wildlife conservation, sanctuary management, agriculture activities and alternative income generation activities, like handicraft making, tailoring, cattle rearing, duck rearing and fish culture. Ecosystem conservation and livelihood improvement are two major activities of the VCGs as community based organisations.. All the VCGs have received Micro Capital Grant (MCG) once or twice under the CWBMP in 2008 and 2010 and once under the CBA-ECA Project in 2015. They also have monthly saving schemes (Taka 20, 50 or 100 per member), annual share scheme (Taka 100 per member) and profit from service charge applied on lend out money. Members can borrow money for a certain period with 10% service charge as per the MCG operational guidelines. ECA Management Committees at the union and upazila levels takes initiatives to manage the ECAs. Some VCGs are also found in Hakaluki Haor area, Cox's Bazar region also. In 2007, Mohammad Shafir Beel VCG in Teknaf was formed under CWBMP. Effective and good leadership has always been a key to make a community based organization work, grow and sustain. Such leadership can be seen among the CBA-ECA's VCGs. Some leaders have been continuing for very long time (e.g. Surjomukhi, Juri, and Hakaluki Haor VCGs). Udayan VCG in Pabijuri, Hakaluki Haor, was formed by a group of young people in 2006 under the CWBMP and is still led by them currently under the CBA-ECA Project. Rakhain para VCG (Cox's Bazar) is a progressive VCG consisting ethnic Rakhain community, embedded with majority Bangla speaking community. The traditional role of women and men

within their society helped move forward. Traditionally ethnic women are involved in income generating activities along with men, and do not restrict themselves within the households.

World Heritage & Ecotourism

In 1999, UNESCO declared the wildlife sanctuaries of the Sundarbans as World Heritage of Bangladesh. The Sundarbans provides both tangible and intangible benefit for the surrounding community and also enrich the national economy. The Sundarbans mangrove forest is one of the largest mangrove forests in the world, is formed at the delta of the Ganges, Brahmaputra and Meghna rivers on the Bay of Bengal (Rahman & Asaduzzaman, 2013). The major flora and fauna of Sundarbans are given respectively Sundri (*Heritiera fomes*), Gewa (*Excoecaria agallocha*), Goran (*Ceriops decandra*), Keora (*Sonneratia apetala*), Golpata (*Nypa fruticans*) and Royal Bengal Tiger (*Panthera tigris*), Spotted deer (*Axis axis*), Wild boar (*Sus scrofa*), Rhesus macaque (*Macaca mulatta*), Estuarine crocodile (*Crocodylus porosus*), numerous snakes, birds (300 spp.) and fishes. The natural beauty of the Sundarbans has attracted people a lot and community based ecotourism activities have become ahead from the business and conservation perspective. Community Based Ecotourism (CBET) is known as 'environmentally responsible travel' through undisturbed nature and enjoy the beauty that promotes conservation and provides economic benefit to the local people (Kaplan, 2013). The Sundarbans is composed of two sanctuaries (Sundarbans west and Sundarbans east) with a total area of 140,000 hectares. Two types of tourism found in the South-West coastal region adjacent to the Sundarbans. The first one is mass

tourism as a form of vessel tourism and other form is community based ecotourism. The mass tourism in the form of vessel tourism inside or surrounding the Sundarbans is degrading the environment of Sundarbans and for that the development of community based ecotourism surrounding the Sundarbans is one of the top priorities for the Forest Department. The government of Bangladesh is now developing the tourism policy with an emphasis on the community involvement and their livelihood improvement; and to protect or conservation of nature. That will contribute to the development of a healthy, responsible and sustainable type of ecotourism for the benefit of all (Islam et al, 2013). Community based ecotourism (CBET) can promote local enterprise development through continuous improvement of enterprises as well tourism sector (Iqbal et al, 2010).

Conclusions

The importance of biodiversity is most in Bangladesh because most of the people of this area depend on biodiversity for their livelihood. So it is important to develop sustainable development project for biodiversity conservation in this country by all means of people with the government. Governmental organizations have some limitations due to insufficient fund so the NGOs should take more necessary steps to improve the situations. If the people have sufficient knowledge about biodiversity conservation necessity they will also take necessary steps to protect wild life biodiversity and practice sustainable use of natural resources instead of overexploitation. All of the people of our country should take necessary education to conserve the valuable natural

resources & wildlife which are assets. At present Government of Bangladesh is also aware about this matter and started to take necessary steps to develop policy, rules & regulations to protect the wildlife and forests. Community based conservation is increased day by day and community based ecotourism will also spread widely. All peoples participation will develop this conservation process to protect our natural resources & wildlife.

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