

A REVIEW OF THE FOREST STATUS IN BANGLADESH AND THE POTENTIAL FOR FOREST RESTORATION FOR WILDLIFE CONSERVATION

Md. Abdur Rashid¹

ABSTRACT

Forestry plays a significant role in Bangladesh, contributing to the livelihood and subsistence needs of the predominantly rural population. It provides a source of energy, supplies forest products such as fuel-wood, fodder, timber, poles, thatching grass, medicinal herbs, construction materials and contributes to the conservation and improvement of the country's environment. About 2.6 million ha or 18% of Bangladesh's total land area of 14.8 million ha is categorised as forestland which includes state forestland (2.2 million ha) and private homestead forest (0.27 million ha). The six pan-European criteria have been taken as terms for sustainable forest management of Bangladesh in this paper. This paper aims to provide qualitative and quantitative information on the factors that characterise the state of sustainability of forestry in Bangladesh.

BACKGROUND

Bangladesh is a Unitary and sovereign Republic, known as the People's Republic of Bangladesh; it gained its independence on March 26, 1971. Bangladesh occupies a unique geographic location (20°34'N – 26°38'N latitude to 88°1'E – 92°41'E longitude) – spanning a relatively short stretch of land between the mighty Himalayan mountain chain and open ocean. The broad physiographic regions are classified as – flood plains occupying about 80%, terrace about 8% and hills about 12% of the land area. The 1998-99 national census recorded a population of 129.1 million, a density of 755 persons per sq km. Bangladesh enjoys generally a sub-tropical monsoon climate. Winter begins in November and ends in February. In winter, temperatures fluctuate from minima of 7.22°C-12.77°C to maxima of 23.88°C-31.11°C. The monsoon starts in July and continues until October. The monsoon accounts for 80% of the total rainfall. Average annual rainfall varies from 1,429 mm to 4,338 mm (BBS 1996).

Bangladesh, being a tropical country, enjoys a wide range of bio-diversity covering both wild and cultivated land. Of the total area of Bangladesh (147,570 sq. km.), agricultural land makes up 64%, forest lands account for almost 18%, whilst urban areas are 8% of the area. Water and other land uses account for the remaining 10%.

¹ Deputy Conservator of Forest, Divisional Forest Officer, Forest Extension Division, Dhaka.

GENERAL DESCRIPTION OF THE FORESTS

Of a total area of 2.46 million ha under forest, about 1.46 million ha are under the management of the Forest Department. Approximately 0.73 million ha are depleted and denuded state-owned forests, known as *unclassified state forests*, under the control of the civil administration and subject to various disturbances, particularly through shifting cultivation by tribal people, since time immemorial. The remaining 0.27 million ha are homestead forests (see Table 1).

Table 1. Forest Classification

Organisation-wise distribution	Area of Forests (million ha)	Percentage of forest land against total area of the country
Forest managed by Forest Department (National Forests)	1.46	10.15
Unclassified state forests (managed by civil department)	0.73	5.06
Village homestead	0.27	1.88
Total		17.09

Source: Laskar, 1998

National production forest is located in the hilly region of Chittagong, Cox's Bazar & the Chittagong hill tracts and also in the tidal plain to the Southwest and to a small extent in the Modhupur and Barind tracts. These are not only inadequate and unevenly distributed throughout the country, but also yield is very low. Due to heavy population pressure, national forest is not only shrinking but is being depleted through theft of forest produce, encroachment and uncontrolled grazing. About 0.27 million ha of homesteads are located in 68,000 villages. Such areas provide a fragmented forest resource base. Due to the population explosion and high prices of forest produce, these village woodlots are also being rapidly depleted. Consumption rates of timber, 0.01076 m³/per head and firewood, 0.0654 m³ per head, are very low compared with those of other developing countries; yet the annual felling rate greatly exceeds the annual increment, leading to profound adverse effects on the environment. If the rate of depletion is allowed to continue, particularly in the northern part of the country, all unclassified state forests will be converted into barren savannah-land. In that condition, it would be extremely difficult to rehabilitate the land suitable for human use.

Forest area by type

A forest type is the unit of vegetation, which possesses (broad) characteristics in physiognomy and structure sufficiently pronounced to permit of its differentiation from other such units. This is irrespective of physiographic, edaphic or biotic factors.

1. *Tropical evergreen forests*: characterised by high tree species richness; lofty and dense evergreen forests 60-65 m tall; leaves tend to be of medium size, rather thick, entire and rarely hairy or much divided.

Mean annual temperature	22.22°-25.55° C
Mean annual rainfall	254 cm
Mean annual humidity	83%

Source: Champion, 1965

2. *Tropical semi-evergreen forests*: contains an appreciable proportion of deciduous trees (60-65 m tall). The larger trees are possibly more commonly buttressed than in evergreen forest. The soil is more freely drained in drier sites.

Mean annual temperature	24.4° C
Mean annual rainfall	241.3 cm
Mean annual humidity	75%

Source: Champion, 1965

3. *Tropical moist deciduous forests*: characterised by closed, tall forest (around 30 m tall). All dominant species are deciduous, Bamboos are very rare and only restricted to wet sites.

Mean annual temperature	22° C-24° C
Mean annual rainfall	203.2 cm
Mean annual humidity	80%

Source: Champion, 1965

4. *Tropical littoral and swamp forests*: all tropical mangrove forest situated in the south-west corner of Bangladesh, which comprises 41% of the total forest of the country and which is the main abode of the national heritage of Bangladesh, the home of the carnivore, the Royal Bengal Tiger (*Panthera tigris tigris*). This forest contains species of *sundari* (*Heritiera fomes*), *passur* (*Carapa melucensis*), *baen* (*Avicennia officinalis*), *kankra* (*Bruguiera gymnorrhiza*), *goran* (*Ceriops roxburghiana*), *keora* (*Sonneriatia apetala*), *golpatta* (*Nipa fruticans*) etc.

Mean annual temperature	23.88° C-35° C
Mean annual rainfall	165-177 cm
Mean annual humidity	75-80%

Source: Champion, 1965

DESCRIPTION OF THE WILDLIFE OF BANGLADESH

The wildlife of Bangladesh includes amphibians, reptiles, birds, animals and plants, including 300 endemic species. Approximately 5,700 species of vascular plant include 300 tree species. In the case of birds and mammals, wildlife refers only to undomesticated species. There are approximately 840 wildlife species in Bangladesh. These include 19 amphibian species, 124 reptile species, 578 bird species and 119 mammal species. Among the birds, 199 species are migratory (AKHOND, 1999).

Amphibians

Amphibian species include 2 species of toad and 17 species of frog. The most common or very common and widely distributed species of amphibians are I) Common Toad/*Kuno Beng* (*Bufo melanostictus*), II) Skipper Frog/*Kotkoti Beng* (*Rana cyanophlictis*), III) Bull Frog/*Kola Beng* (*Rana tigerina*), IV) Cricket Frog/*Jhejhe Beng* (*Rana limnocharis*).

Reptiles

These species have a rich and quite diverse composition in Bangladesh. They include freshwater turtles and tortoises, land tortoises and sea turtles in the Order Chelonia; lizards and monitor lizards under Suborder Lecertilia (Order Squamata); snakes in the Suborder 'Ophidia' (Order Squamata) and crocodiles and gavials in the Order 'Crocodylia'.

Birds

The birds that are commonly found in Bangladesh are predominantly dependent on large trees. Most birds live on the trees and build nests in the branches of the canopy and in holes.

Fowls and Pheasants

In the very recent past Red Junglefowl (*Gallus gallus*) was present in all kinds of forests (except mangrove plantations), but now it is reported absent in the Bhawal-Madhupur Sal (*Shorea robusta*) forests. Kalij Pheasant (*Lophura leucomelana*) and Peacock-pheasant (*Polyplectron bicalcaratum*) were common in the forests of Chittagong, Cox's Bazar and Chittagong hill tracts. These species are now rare, due to habitat degradation. Two Peafowl species (*Pavo cristatus* and *P. muticus*) formerly inhabited forest areas, but are now extinct.

Aquatic birds and waterfowl

The total number of species in the Orders Podicipediformes, Pelicaniformes, Ciconiformes and Anseriformes (grebes, pelicans, cormorants, darters, herons, storks, ibises, sponbills, ducks and geese etc.) are 66, of which 24 are migrants. The commonest species in the above groups are Little Grebe (*Podiceps ruficollis*), Little Cormorant (*Phalacrocorax niger*), Darter (*Anhinga rufa*) and Large Egret (*Ardea alba*). Seventy shorebird species have been recorded in Bangladesh, of which 50 are migratory and mainly visiting Bangladesh in the winter. The commonest three species are Mongolian Plover (*Charadrius mongolus*), Curlew Sandpiper (*Calidris ferruginea*) and Black-tailed Godwit (*Limosa limosa*). Some globally threatened species, recorded in the estuaries of Bangladesh, include Spoon-billed Sandpiper (*Eurynorhynchus pygmeus*), Eastern Knot (*Calidris temurostris*), 3. Nordmann's Green-shank (*Tringa guttifer*), Asian Dowitcher (*Limnodormus semipalatensis*), Red Knot (*Calidris canutus*) and Bar-tailed Godwit (*Limosa lapponica*).

Diurnal birds of prey

Forty-eight species of diurnal birds of prey in the families Accipitridae and Falconidae have been recorded in Bangladesh. Common species include Black-winged Kite (*Elanus caeruleus*), Black-crested Baza (*Aviceda leuphotes*), Brahminy Kite (*Haliastur indus*) and Shikra (*Accipiter badius*).

Mammals

Insectivores

There are four species of insectivores in Bangladesh: the Common Tree Shrew (*Tupaia glis*), Grey Musk Shrew (*Suncus murinus*), Sevi's Pygmy Shrew (*Suncas etruscus*) and Eastern Mole (*Talpa micrura*). Of these, the Grey Musk Shrew (Chika) is widely distributed and the other species are found only in the forest in the north-east and south-east of the country.

Bats

Thirty-one bat species live in the country. However, only seven are either common such as the Leaf-nosed Bat (*Hipposideros galeritus*) or very common, such as the Flying Fox (*Pteropus giganteus*).

Primates

There are records of 11 species of (non-human) primates in Bangladesh.

Pangolins

There are records of three Pangolin species in the country, but only the Indian Pangolin (*Manis crassicaudata*) occurs in forests of south-east, especially in the forests of Chittagong hill tracts.

Carnivores

Twenty-six carnivore species occur in the country, including three species of fox and dog, three bear species, six species of civet, three mongoose species and eight cat species.

Asian Elephant

At present, the population status of elephant (*Elephus maximus*) is around 100 in Chittagong and Cox's Bazar.

Aquatic Mammals

Aquatic mammals include the Dugong (*Dugong dugong*), 3 whale species of and eight species of dolphins and porpoises.

MANAGEMENT PROCESSES

Forestry practices have remained almost the same for a long period. The only objective of management in the past was the production of wood. Revenue was the major consideration in the formulation of management practices. Little attention was given either to other components of forest ecosystems or to the socio-economic impact of management. Interactions between people and the forest were not taken into account, while formulating management plans in the past. The concept of forest management has changed drastically over the last couple of decades and it is now universally accepted that trees cannot be managed in isolation. An increasing demand for wood has also made it impossible to manage forests in a casual manner.

The situation of natural forests and man-made forests

Because of uncontrolled “*Jhuming*” (growing of agricultural crops through clearing the forests by tribal people) in the hill tracts, topsoil is being eroded and the production capacity of the land is decreasing day by day. However, the demands of people in the uplands for food and shelter are increasing, because of their increasing population. Consequently people are encroaching on more forestlands and cultivating agricultural crops in these areas and cutting valuable trees. As a result, the abode of wildlife is also decreasing proportionately. The situation has now become alarming and the Government is finding difficulties in solving this problem.

Forestland use situation

As per Government policy, forestry land should be used only for forestry purposes and none other. But in Bangladesh, reality does not allow this and at present the Forest Department controls about 1.46 million ha (10.15% of the land) which is in fact, under scientific management. An additional 0.73 million ha of land, known as unclassified state forest, is under the control of the civil administration. Shifting cultivation and unscientific management in these areas at present has led to their becoming almost barren and in need of immediate rehabilitation. Encroachment is a serious problem in our country, the main reasons being because of scarcity of agricultural land to meet the demand for food, urbanisation and industrialisation.

Forest restoration in a wildlife context

Wildlife, comprising both plants and animals, is the critical component of an ecosystem and food chain. Ecological succession of plants and animals is a sequential process. For forest restoration purposes, animals can be categorised into two functional groups: a) herbivorous and b) carnivorous. Knowledge of how these groups interact can help in designing forest restoration schemes. For example, carnivorous animals are dependant on herbivorous i.e. the Royal Bengal tiger is mainly dependent on Spotted Deer (*Axis axis*).

Herbivorous animals are dependent on grasslands in the Sundarbans. The Spotted Deer & Common Barking Deer are specially attracted to *Keora (Sonneriatia apetala)* leaves and grasslands. Unfortunately, these are a scarce resource. For the management of small cats, big trees are required. Undisturbed breeding grounds and suitable habitats for feeding are key aspects in the management of wildlife.

Bangladesh possesses diverse forest ecosystems viz. tropical evergreen, tropical semi-evergreen, deciduous, tidal/mangrove and fresh water swamps. Consequently, wildlife species are highly diverse. It is evident that in well managed forests the presence of wildlife species, in terms of both abundance and the diversity of species, are much greater than in degraded ones. For instance, the Forest Department has raised successful plantations in the newly accreted coastal areas and once the plantations became established various wildlife species have naturally recolonised those areas. It is accepted that protecting existing natural forest is the best way to conserve wildlife but that forest restoration is an important second. The Forest Department is primarily responsible for this sort of habitat creation, habitat improvement and management both through establishing plantations and by creating other facilities. In addition, the Forest Department has undertaken programmes for captive breeding of some wildlife species.

Priorities for wildlife conservation:

The enactment of wildlife conservation and bio-diversity programmes in Bangladesh is the result of recent changes in thought. In addition to the Rio Declaration and Agenda 21, Bangladesh has, so far signed, ratified and acceded to 22 international Conventions, Treaties and Protocols related to the Environment and has taken several initiatives to protect fragile ecosystems and to conserve biological diversity in the country. At this moment, the Forest Department has prioritised the following actions:

- large-scale afforestation in the country's hilly, marginal & fallow land, newly accreted char-land and coastal areas;
- reforestation in denuded and degraded forest areas;
- propagation of various wildlife species;
- habitat improvement;
- capacity building;
- personnel development;
- legal measures;
- medical facilities for wildlife;
- documentation and training and
- motivation and public awareness campaigns.

Adverse factors affecting the process

The major challenge facing Bangladesh is to meet basic human needs while sustaining the very limited resource base upon which these needs depend. Bangladesh faces serious problems of over-population, extreme poverty, illiteracy and environmental degradation with natural resource depletion. These factors combine to exacerbate the scale of constant socio-economic setbacks imposed by recurring natural hazards, often of exceptional

magnitude. Over the years, the country has undergone a process of environmental degradation, which is a cause of considerable concern. This is illustrated by deforestation, destruction of wetlands and inland fisheries, soil depletion, inland salinity intrusion, water pollution etc. The major roots of man-made problems are lack of understanding of ecological principles of EIA (Environmental Impact Assessment), poverty and a lack of adequate alternatives. (REAJUDDIN, 1999). Main causes of deforestation are:

- increasing population;
- increasing demand for cultivable land;
- transfer of land for industrialisation, urbanisation and communication infrastructure;
- pilferage, the unlawful taking of forest products from the forest area;
- encroachment and
- shifting cultivation, particularly in the hill-tracts region.

Restoration measures

Under the tremendous pressure of the human population explosion, to achieve the goals of the Convention on Biological Diversity, the implementation strategies with respect to the Forest Department are to be:

1. combat desertification;
2. reduce felling and
3. create public awareness through:
 - a) motivation and training supported by research and education;
 - b) public participation in sharing the inputs and outputs in afforestation and
 - c) involvement of non-government organisations (NGO's) in the implementation of social forestry projects.

Any conservation strategy affects people and therefore conservation of biological diversity and protection of the natural resource base should be ecologically and socially sustainable. This concept is now well recognised among conservationists in addition to the narrower concept of conservation of a particular species. We should however, try to preserve the complexity and the integrity of the entire ecosystem in relation to the human context. Such initiatives can serve local populations who depend on the exploitation of natural resources and encourage them to regard an ecosystem as a sustainable resource base for the future. As it serves the interest of the local stakeholders who depend on this sustainable use of their resources, they should be involved in such initiatives.

Restoration measures by the Forest Department (FD)

Afforestation activities (Man-made forest establishment, present & past)

The Forest Department of Bangladesh has been given due importance in five-year plans for forestry development. The broad objectives are as follows:

1. increase state and homestead production of both timber, firewood and non-timber crops through afforestation, reforestation and social forestry programmes;
2. accelerate programmes for the development of short-cycle plantations for fuel-wood etc. in order to protect more valuable trees for wildlife, timber and ecosystem function in rural areas and
3. optimally exploit forest resources, without disturbing the ecological balance, to meet the demand of timber, fuel-wood, fodder and raw materials for wood based industries.

To meet the above national objectives, the Forest Department of Bangladesh has undertaken a large number of plantation projects in different zones to increase the supply of firewood and industrial wood. Plantation programmes are mostly concentrated in the newly accreted land along the coast of the Bay of Bengal, Unclassified state forests, Hill forests and inland Sal-forests. At present, the Forest Department is undertaking a very ambitious project known as the *Forestry Sector Project*. The main objectives of this are to develop tree resources and fruit-bearing tree resources in order to provide habitat for native birds, involving people directly, following benefit-sharing mechanisms. Target people from rural areas are selected through NGO's and become involved in strip plantations along roads, railways and embankments. Benefits (of agro-forestry) to the people involved are: (1) full 1st thinning (after 5 years); (2) full 2nd thinning (after 10 years) and (3) 55% of the sale value after final harvesting.

The Forest Department of Bangladesh (FD) has afforested 24,994 ha of denuded upland areas and 21,785 ha of shore front coastal areas and mud flats since 1992 (see table 2. below), the year of signing the Earth Summit 1992.

Table 2. Afforestation by FD in different eco-type since 1992 (hectares).

	Eco-type	1992-93	1992-93	1992-93	1992-93	1992-93	1992-93	Total
1.	Mangrove	4632	5032	3881	2730	2905	2875	21785
2.	Sal forest (Wood Lot)	3833	4664	2804	1340	1550	1280	15471
3.	Sal forest (Agroforestry)	756	807	2146	100	100	100	4009
4.	Denuded hill forest	4271	4276	4274	4438	4330	3405	24994
5.	Unclassified state forest	1359	4169	5216	1154	4208	2124	43229
6.	Strip plantation along roads (in km)	3577	5476	3913	944	1300	1450	16660

Source: Forest Department of Bangladesh, 2000

Habitat building

Because of recent world-wide fears about the greenhouse effect, which is now at an alarming stage, the Government has taken it seriously and formed an independent Ministry, namely the Ministry of Environment and Forestry with two departments i.e. Department of Forestry and Directorate of Environmental protection. This Ministry has undertaken several

plantation programmes both in forest areas and in marginal land and village homestead areas. It is understood that, whilst restoration is a powerful tool, protection of the remaining natural forest is the main priority for wildlife conservation. In an attempt to strengthen the conservation of flora and fauna under the biodiversity convention, two new forest divisions have been created since 1995 to manage, monitor and look after the protected areas. Besides these, more than 142,000 ha of forestland has been added to the existing protection areas (see Table 3. below).

Table 3: Protected and Park areas of Bangladesh

Name	Area (ha)	Declared protected during	Nos. of flora	Nos. of fauna
1. Ramsagar national park	52	1947	N.A	N.A.
2. Himchari national park	1729	1980	157	65
3. Madhupur national park	8434	1982	108	62
4. Bhawal national park	5022	1982	225	65
5. Lawachara national park	1250	1996	30	64
6. Tekhnaf game reserve (Elephant)	11615	1983	29	136
7. Sundarbans east wildlife sanctuary	31227	1996	29	136
8. Sundarbans south wildlife sanctuary	36970	1996	22	110
9. Sundarbans west wildlife sanctuary	71502	1996	21	116
10. Rema Kalenga wildlife sanctuary	1795	1996	107	63
11. Char Kukri Mukri wildlife sanctuary	40	1981	82	61
12. Pablakhali wildlife sanctuary	42087	1983	N.A.	N.A.
13. Rampahar sitapahar wildlife sanctuary	3026	1986	N.A.	N.A.

For scientific management of the environment and wildlife, the post of Deputy Chief Conservator of Forest (Environment) in Dhaka and two posts of Divisional Forest Officer (Environment) at the Headquarters in Khulna and Chittagong have been created, under the Forest Resource Management Project. For habitat restoration, the botanical garden at Mirpur, Dhaka and a national zoological garden in Dhaka and Chittagong have been established. The Bangladesh Rifles Peelkhana, Dhaka and the University of Dhaka are conserving wetlands, as a result there has been an increases in several species of migratory birds visiting Bangladesh every year.

Undertaking wildlife conservation programmes needs substantial financial support and the Forest Department is trying its best to manage these programmes with international assistance. We hope to provide a good environment for wildlife in the country's available habitats and thereby save them from extinction.

Bangladesh as a member of CITES

Bangladesh became a party to CITES in 1982 and, as a signatory to CITES, the provisions are strictly implemented. No wildlife or trophies or their derivatives have ever been allowed to be exported for commercial purposes. Bangladesh is also a party to the Ramsar Convention. The Bangladesh Sundarbans (a wildlife sanctuary) was declared as a

World Heritage Site under the World Heritage Convention in 1993. Bangladesh is a member of the Global Tiger Forum (GTF) and hosted the First General Assembly of the GTF during the 18th – 20th January, 2000. At this meeting, Bangladesh was elected as the chairman of GTF.

RESEARCH NEEDS

1. It is necessary to study the effects of massive uncontrolled exploitation of wildlife in relation to human populations and ecological linkages between these factors.
2. A study should be performed on the importance of mixed communities of native tree species for animals in Kaptai National Park, in order to establish better techniques for encouraging colonisation by wildlife.
3. Bangladesh has good prospects for crocodile farming; a study on crocodile farming in the Sundarbans mangrove forest should be undertaken.

CONCLUSION

Forest restoration and wildlife conservation can contribute to sustainable rural and national development. If the carrying capacity of forest ecosystems is continuously exceeded, however, they will ultimately disintegrate. The major constraints for sustainable forest management in Bangladesh are the dense human population and the high rate of population growth. But, despite many constraints, Bangladesh is trying to manage her forests sustainably and to conserve and enhance biodiversity and forest ecosystems. The concept of forest restoration for wildlife conservation may lead to new scientific interventions when practical experience of the applicability of techniques becomes available. Such interventions will broaden the scope of afforestation programmes in Bangladesh and contribute further to sustainable management of the State forests.

REFERENCES

- BANGLADESH BUREAU OF STATISTICS (BBS), 1996. *Statistical yearbook of Bangladesh* (17th Ed.) Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh. p. xxii.
- CHOWDHURY, J. H., 1998. *Earth Summit '92 and Bangladesh Forestry Sector* the Guardian 8(6): 31-33.
- AKHOND, M. A. W., 1999. *Wildlife of Bangladesh*.
- LASKAR, M. R., 1998. *Indicators of sustainable forest management in Bangladesh*.
- HABIB, M. G., 2000. *Status and conservation of Tiger in Bangladesh*, 1st General Assembly Meeting on GTF at Hotel Sheraton, Bangladesh.
- RASHID, A., 1995. *Country report, group training course in forest management and planning*, FTI Japan.

- BLOWER, 1985. *Wildlife conservation in the Sundarbans*, Sundarbans Forest Inventory Project. Bangladesh ODA and resources development country.
- REAJUDDIN, 1999. *EIA, the tools for Sustainable Development*.
- CHAFFEY, D. R., F. R. MILLER and J. H. SANDOM, 1985. *A forest Inventory of the Sundarbans, Bangladesh: Main Report*, project report no 140, Overseas Development Administration, London, pp.196.
- DAS, D. K., 1990. *Forest types of Bangladesh*, Bulletin no. 6, Plant Taxonomy Series, Bangladesh Forest Research Institute, Chittagong, Bangladesh.
- FORESTRY MASTER PLAN (FMP), 1993. *Forestry Master Plan: Environment and Landuse*, Ministry of Environment and Forest, Government of the People's Republic of Bangladesh and Asian Development Bank (TA no. 1355-BAN) UNDP/FAO BGD/88/025. ppl 175+ Appendices.
- CHAMPION, M. G., S. K. SETH and G. M. KHATTAK, 1965. *Forest types of Pakistan*, Forest Institute, Peshwar, Pakistan. p.238.