

Forest genetic resources and management in Bangladesh – status, needs, challenges and actions required

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Introduction

Forests are known to be critically important habitats in terms of genetic resources they contain and also in terms of ecological functions they serve. Bangladesh is a small country; forests constitute about 16% of the total land areas, of which now only 6% are believed to be covered with diversified forest genetic resources. It supports over 5000 species of vascular plants, huge number of lower plants (algae, fungi, bryophytes and pteridophytes), some 113 species of mammals, 628 species of birds, 126 species of reptiles, 22 species of amphibians, 708 species of fresh water and marine fish, and over 400 species of mollusks (IUCN 2002). Again, these species have genetically unique populations including valuable forest genetic resources. But according to recently published IUCN Red Books, 13 species of vertebrates are now extinct in Bangladesh. In addition to that 64 species of vertebrates, 40 species of mammals, 38 species of birds, 21 species of reptiles and 23 species of fish are critically endangered. Out of 6000 plant species found in the terrestrial forest ecosystem of this country, around 100 species have been listed as threatened, the most threatened, rare and endemic (Nishat and Alam 2004). Around 220 species of vertebrates, including fish, amphibians, reptiles, birds and mammals, listed in the IUCN Red Data books of Bangladesh have been facing with various threats of extinction. The number of threatened species is increasing. World Conservation Monitoring Center (WCMC) (1999) reported that in 1994, the number of threatened species in Bangladesh was 60, but in 1999 it has increased to 176.

Organizations relevant to forest genetic resources (FGR)

The Department of Forests, under Ministry of Environment and Forest (MOEF), is a specialized body dealing with the management of forest reserves, wildlife, protected areas and large-scale afforestation and reforestation.

Bangladesh Forest Research Institute (BFRI) is another specialized body for FGR conservation under MOEF dealing with *in situ* and *ex situ* conservation of plant genetic resources in their research plots.

Bangladesh Council for Scientific and Industrial Research (BCSIR) is a specialized body, under the Ministry of Science, Information and Communication Technology, dealing with *ex situ* conservation of industrially important plant genetic resources particularly of medicine, dye, tannin, spices, etc.

Other than these specialized government departments, a small number of NGOs, and the Departments of Botany, Forestry and Agriculture in the national universities are also dealing with forest genetic resources and their conservation. The NGOs dealing with FGR conservation in Bangladesh include the Nature Conservation and Management (NACOM), the Center for Natural Resources Studies (CNRS), the Bangladesh Center for Advanced Studies (BCAS), and the Center for Sustainable Development (CFSD).

IUCN is an international body in Bangladesh doing activities related to genetic resources of agricultural, wet land, marine and forest genetic resources conservation in the country.

National Task Force

There is still no affiliated/recognized body or institution in Bangladesh that handles FGR conservation issues. However, the Bangladesh Agriculture Research Council (BARC) is serving as a national coordination body for Plant Genetic Resources conservation along with FGR. BARC generally coordinates all research organizations of the country, universities and departments for research in different fields of agriculture, fisheries, livestock, and forestry including FGR conservation.

Biodiversity Research Group of Bangladesh (BRGB), the IUCN (The World Conservation Union), the Forum of Environment Journalists of Bangladesh (FEJB), the Bangladesh Paribesh Andolon (BAPA), and the Bangladesh Environmental Lawyers Association (BELA), are some of the organizations active in conservation of FGR.

National policies relevant for FGR conservation and management

The national forestry policies and programmes are of particular relevance to FGR conservation and management in Bangladesh because the Forestry Department directly administers over the almost entire national forest areas of the country. These policies and programmes also generally have a pervasive influence on all aspects of forestry activities and marketing of forest produce and products.

The National Forest Policy, amended and approved in 1994, gives topmost priority to biodiversity conservation. Policies relevant to the biodiversity conservation are as follows:

- Biodiversity of the existing degraded forests will be enriched by conserving the remaining natural habitats of birds and animals.
- National responsibilities and commitment will be fulfilled by implementing various international efforts and government ratified agreements relating to global warming, desertification and control of trade and commerce of wild birds and animals.
- Through the participation of the local people, illegal occupation of the forest lands, illegal tree felling and hunting of wild animals will be prevented.
- The forest resources shall be managed in an ecologically sustainable manner ensuring species diversification and continuous improvement of environmental conditions.
- Specific ecosystems like fresh water catchments, which also support fisheries, riverbank forests, mangroves and char lands will be stabilized and managed for multiple use by the legitimate resource managers.
- About 20% of the country's land areas will be brought under tree cover.
- Conservation of ecosystems and biodiversity will be the principal function of all remaining forests of natural origin. They will be properly zoned to regulate their protection, management and sustained utilization.
- Apart from these, emphasis will be given for sustainable production of wood and fuel materials, oil seeds, spices, fiber, rubber, medicine and other goods for the economic development of the country.

Updates and happenings since 2003

- a. Draft copy of wild life protection law (2003) has been prepared.
- b. Strategic action plan for biodiversity conservation has been finalized.
- c. A systematic policy, legal and administration refinement has been undertaken in the forestry sector for smooth implementation of the forestry sector master plan.
 - Traditional forestry has been shifted towards participatory forestry and multi-product forestry, and there is also a shift from "stand management approach" to "ecosystem management approach".

- d. The new projects relevant for FGR conservation are:
1. Forestry sector project.
 2. Establishment of experimental agar (*Aquilaria agallocha*) plantations.
 3. Bamboo, cane and patipata development project.
 4. Sundarban biodiversity conservation project.
 5. Forest resources conservation of Madhuppur Gahr.
 6. Reforestation of degraded Ramgahr - Sitakunda Hill.
 7. Development of Kaptai National Park.
 8. Development of Dulhazara Safari Park.
 9. Biodiversity conservation and development of Bamerchara - Danerchara Hills at Banskhal.
 10. A study on behavior and ecology of the tiger in the Sundarban Reserve Forest.
 11. Coastal and wetland biodiversity management at Cox's Bazaar and Hakaloki Haor.
 12. Biodiversity conservation, marine park establishment and development of eco-tourism at St. Martine Island.

Others

BFRI has been conserving forest genetic resources in their experimental plots in different field stations all over the country. Conservation is in the form of plantations of many indigenous and exotic species and provenances in experimental plots, which allows for silvicultural study and monitoring of genetic variability. These *ex situ* conservation plots will ultimately transform into seed stands. There are some preservation plots in the natural forest areas, which are also maintained for silvicultural study, monitoring of genetic variability, seed collection and genetic resources conservation.

Happenings in forestry seed trade

There are many agencies and traders in Bangladesh involved in agricultural and floricultural seed trade including export and import of seeds. But these agencies are not involved in forestry seed trade. The Seed Orchard Division of Bangladesh Forest Research Institute produces quality seeds from their seed orchards, seed production areas (SPAs) and plus trees (PTs) but in a very limited scale. These seeds are distributed to the Forest Department, private planters and NGOs involved in seedling production and plantation establishment. With the rapid development of nursery business in the country many local vendors now getting involved in forest tree seed trade. But quality seeds of forest species are really scarce in the country.

Examples and case studies

Forest genetic diversity is very important to the livelihood of a vast majority of rural people of Bangladesh. Most of their subsistence is closely related to the forest genetic resources, particularly of non-timber forest products (NTFP). The most prominent FGRs that supports the livelihood of the rural mass are bamboo, rattan, patipata (*Clinogyne dichotoma*), reeds, medicinal plants and many other plants and plant parts such as shoti (*Curcuma zeodoria*), *Zingiber* spp., dhkishak (*Polypodium* spp.), bon begun (*Solanum* spp.), leaf of *Nipa fruticans*, date palm (*Phoenix sylvestris*), palmyra palm (*Borassus flabellifer*), hoglapata (*Typha elephantina*), keya pata (*Pandanus* spp.), Joir-pata (*Licula peltata*), *Cycas pectinata*, *Lycopodium* sp., etc.

In the hilly areas the tribal people mostly depend on forest products as a source of food, fodder, medicine, construction materials, agricultural implements, etc. Many FGR are domesticated in the plain lands, homesteads, marginal lands, and fellow lands, and these resources also play a vital role in maintaining the livelihood of rural people. It is estimated that the 30 400 ha homesteads provide 85% of wood, 90% of fuelwood and 90% of

bamboo consumed in Bangladesh. In addition, many non-traditional fruits such as ashphal (*Nephelium longona*), amra (*Spondias pinnata*), domur (*Ficus sp*), kau (*Garcinia Cowa Roxb*), latkan (*Baccurea ramiflora*), borta (*Artocarpus lucucha*), pannaya gola (*Flaccurtia jangomas*), add additional income to the rural poor and contribute to their subsistence.

Most of these FGR are overexploited and become scarce. Many rural people whose livelihood depend on these FGR through gathering, processing, manufacturing and marketing become jobless. As a consequence, many of them have changed their occupation, migrated to the cities seeking for jobs and many fall into the vicious circle of poverty. The scarcity of these resources seriously effect most of the poor women of the rural areas since they were involved in most of the processing and manufacturing activities, and in most cases these were their only income source.

For example, bamboo and rattan resources, the most widely used NTFPs in Bangladesh, become degraded due to overexploitation. Many people dependent on these resources through gathering, processing, manufacturing commodities and marketing are now become unemployed.

Once, joir and mathal were widely used by rural farmers instead of umbrella in Bangladesh. Many rural women were actively involved in making these commodities. Joir pata (*Licula peltata* leaves) and bamboo are the only components for making joir and mathal. Joir pata were also used as a wrapping material in the village market by botchers, molasses and tamarind sellers. Many landless poor used to maintain their livelihoods through collecting and selling this NTFP. But due to overexploitation and habitat destruction this species now become an endangered species and the people, particularly the women linked to the species for their livelihood become jobless.

Species conservation strategies

In Bangladesh, species are being conserved through *ex situ* and *in situ* conservation, protected area management, seed orchards, seed production areas, arboretum, botanical gardens, zoos, safari-parks, eco-parks, permanent nurseries and plus trees in the natural stands and plantations, training to the members of Nursery Owners Association.

The Sundarban mangrove forest has been declared as a World Heritage Site. Exotic species, like teak (*Tectona grandis*), mahogany (*Swietenia spp.*), sissio (*Dalbergia sissoo*) and hybrid acacia, are the main species in the plantation programmes in Bangladesh. The extensive use of exotics in plantation has adversely affected the conservation of indigenous genetic resources.

National Seed Center has been set-up at BFRI for the collection and distribution of quality forest tree seeds but enactment of seed policy to regulate seed production, use and trade of high quality seeds and seeds of high value species is lacking.

Strategic planning for forest tree improvement is going to be formulated. Community based forest genetic resource conservation is being implemented through nursery owners associations. Initiative has been taken to establish plantations at University campus and other educational & religious institutions.

Suggestions for FGR conservation initiatives that could involve regional collaboration:

- (a) Human Resources development for FGR conservation in the form of study tours, short-term training, post-graduate programmes, etc.
- (b) Establishment of IPGRI satellite offices in each country and promote FGR conservation and research.
- (c) Establish linkages and improve coordination among the APFORGEN member countries:
 - Every South Asian and/or Asian country should develop a FGR database. International organization like FAO, APAFRI, IPGRI, can act as coordinating

body for exchange of information, ideas, and technologies, among the member countries.

- Capacity building through international and regional cooperation schemes.
- Designing of criteria and indicator (C&I) for sustainable management of FGR in APFORGEN member countries and exchange of ideas and experiences among the member countries.
- Development of Forest Certification System in APFORGEN member countries and exchange of ideas, experience and expertise among the member countries.
- Advocacy for obtaining political endorsement at national and regional level.
- International cooperation through APFORGEN should be directed to address crucial issues on FGR consideration. The cooperation should also include joint efforts in fighting against illegal trade of FGR.

Conclusion

Forest genetic resources are of crucial importance for socio-economic development, maintaining ecological balance and environmental amelioration. They are the biological basis of security for food, cloth, shelter, medicine, energy, and are closely linked with the livelihoods of rural poor. However, the resources are facing serious threats in Bangladesh due to overexploitation, habitat destruction, forest fires, natural calamities and invasion of exotic species. The erosion of these resources poses a serious threat to the food security and livelihood. Therefore, there is an urgent need to assess and conserve the forest genetic resources. The conservation and sustainable utilization of FGR is the key for improving the forest productivity and sustainability; thereby contributing to national development, food security and poverty.

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