CHAPTER 3

SECTORAL AND CROSS-SECTORAL INTEGRATION OR MAINSTREAMING OF BIODIVERSITY CONSIDERATIONS

3.1 INTRODUCTION

India, over the past 60 years, is witnessing transition from predominantly rural based agrarian society into a diversified economy. India's planned approach to socio-economic development and poverty eradication has underlined sustainability of natural resources. Conservation and resource management is integral to India's development plans. A sound environmental policy and legal framework is in place in the country. Recent economic liberalization policies have seen new strides in technology upgradation, cleaner fuels, efficiencies in production and environmentally sound practices. The planning process also seeks to diversify the economy further into industrial and service sectors, while accelerating the growth rate. Development has to be long-standing and inclusive, involving both the private and public sectors as partners. The national planning process emphasizes promotion of people's participatory institutions and social mobilization, particularly through empowerment of women and other disadvantaged sections of the society, for ensuring environmental sustainability of the development process. Socio-economic development consists of increase in the production, distribution, sale and consumption of food, goods and services. The planning process in India seeks to increase wealth, and thereby, human welfare, and provide a safety net for the environment.

In this background, India is continuing its efforts and taking effective and appropriate measures to integrate biodiversity concerns into relevant sectoral and cross-sectoral plans, programmes and policies in conformity with the provisions of the CBD.

The objective of mainstreaming biodiversity is "to internalize the goals of biodiversity conservation and the sustainable use of biological resources into economic sectors and development models, policies and programmes, and therefore into all human behaviours" (GEF, 2004). The significant elements of mainstreaming biodiversity in overall developmental sectors are as follows:

- In production landscapes/seascapes and within economic sectors related to natural resource use, such as agriculture, forestry, fisheries, IAS control, wildlife conservation, ecotourism, etc.
- Integration of biodiversity values into enabling environment (policy, legislation, programmes, activities that *inter alia* include land use planning, economic incentives, international trade, capacity building, research and technology).
- Involvement of diverse stakeholders through partnerships of NGOs, community groups, government, entrepreneurs and industry.
- Sustainability of PA network through rationalization, consolidation and expansion.
- Regional and international cooperation for conservation and management of biodiversity through various extant and evolving bilateral agreements and MEAs.

3.2 MAINSTREAMING BIODIVERSITY IN PRODUCTION LANDSCAPES/SEASCAPES AND SECTORS

3.2.1 Agriculture

Some illustrative examples undertaken for mainstreaming agro-biodiversity are as under:

- The National Policy for Farmers 2007 **(Box 3.1)** underpins the importance India accords to the integration and mainstreaming of agro-biodiversity considerations.

Box 3.1: Objectives of National Policy for Farmers (2007)

- Protect and improve land, water, biodiversity and genetic resources essential for sustained increase in productivity, profitability and stability of major far ming systems by creating an economic stake in conservation.
- Strengthen the bio-security of crops, farm animals, fish and forest trees, etc.
- Address major constraints experienced by farmers related to breed, feed and fodder, healthcare and remunerative prices for that produce.
- Management and economic use of the EEZ for a variety of economic activities, including fisheries.

- The PPV&FR Act, 2001 recognizes and protects the rights of farmers for their contributions in conserving, improving and making available plant genetic resources for the development of new plant varieties and has created a corpus fund called national gene fund, for the conservation and development of plant genetic resources and benefit sharing.
- The MoA established PPV&FR Authority to deal with issues of recognizing and protecting the rights of farmers. PPV&FR has awarded five farming communities/farm families with the certificate of "Plant Genome Savior Community Recognition" in February 2007.
- India ratified the ITPGRFA in June 2004. Its coverage includes 35 crop genera and 29 forage crops and establishes the multilateral system for the facilitated access to plant genetic resources for food and agriculture, including fair and equitable benefit sharing arrangements.
- India is one amongst the seven Asian countries to have signed an agreement with Food and Agricultural Organization (FAO) to participate in the regional cooperative project "Establishment of the National Information Sharing Mechanism on the Implementation of the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (PGRFA) in Asia and the Pacific Region". The project aims at promoting the implementation of Global Plan of Action (GPA) at national and regional levels and mechanism for gathering and sharing information, as well as priority setting for GPA implementation.
- India has acceded to the agreement for the establishment of GCDT in October 2006 (www.croptrust.org).
- Various centres of ICAR and ICFRE are actively involved in Integrated Pest Management (IPM) programmes, which include, IPM of mandated species in nurseries and plantations with special reference to bio-pesticides and microbial pesticides; upgradation and computerization of National Insect Reference Collection (NIRC); management of potential insect pests and diseases of important medicinal plants grown in arid and semi-arid regions, ecological studies of seed insect pests; relative resistance of neem provenances to insect pests and mites, and their bio-management in arid areas.

- The MoA is promoting organic farming which supports greater biodiversity than comparable systems. An example of the State of Sikkim illustrates the point **(Box 3.2)**.

Box 3.2: Sikkim – One of the organic states

- Substantially reduced subsidy on chemical fertilizers
- Two Government farms converted to Centres of Excellence for organic farming - Nazitam (East District) and Melli Dara (South District); selected 100 bio-villages with EM technology in 2006-07 increasing the acreage from 3000 acres to 6500 acres which means 26,000 tonnes of EM compost and 65 tonnes of bokashi used in the field; Additional 100 numbers of villages have also been included for conversion into bio-village through EM technology.
- Encouraging farmers for the production of rural compost on massive scale by providing necessary assistance; assistance is being provided to about 5,500 farmers to develop the compost units in their fields.
- The use of bio-fertilizers is being propagated through demonstration on the farmers' fields. A biofertilizer production unit is already constructed at Mazitar using the funds provided by NEC; undertaking capacity building of the officers and field functionaries in organic farming and seed production.

In response to India's National Policy on Agriculture, two projects that follow ecosystem approach have been implemented **(Box 3.3)**.

Box 3.3: Projects that follow ecosystem approach – two examples

National Agriculture Innovation Project (NAIP)

The NAIP responds to the GOI's objectives as expressed in India's National Policy on Agriculture, and its R&D priorities match national and sectoral priorities, encourage creative local level systematic needs assessment and envisage integrating sub-projects in a systems mode to meet local level requirements. It focuses on:

- Agricultural diversification to cover precision farming, small farm mechanization, resource conservation technologies and protective cultivation.
- Livestock and fisheries production as 'sunrise sectors' to involve genetic up gradation, nutrition, management, disease surveillance and control, etc.
- Genetic resources and bio-prospecting to cover continued improvements in germplasm (plants, animals including fish and microbes) and improved nutritional value of staple foods.
- Enhance farmers' capacities to use and conserve natural resources and indigenous knowledge in an efficient and sustainable manner.
- Pesticide misuse and development of IPM best practices for all types of crops including new races, pathotypes, strains and biotypes.
- Value addition and post-harvest processing to enhance the global competitiveness of Indian agriculture.

Conservation and Management of Pollinators for Sustainable Agriculture Development

The components and activities of this project are:

- Development of knowledge base.
- Extension and promotion of pollinator friendly management practices.
- Capacity building.
- Public awareness, mainstreaming and information sharing.

3.2.1 Major institutions, missions and projects

National Bureau of Plant Genetic Resources

NBPGR is mandated to plan, conduct, promote, co-ordinate and take lead in activities concerning collection, characterization, evaluation, conservation, exchange, documentation and sustainable management of diverse germplasm of crop plants and their wild relatives. The major contributions of NBPGR include: i) maintenance of 37,94,000 accessions of germplasm belonging to 2045 species; ii) DNA fingerprinting for 33 crops comprising 2,215 varieties of national importance undertaken and fingerprint database developed; iii) establishment of 10 regional stations/base centres/quarantine centres spread over different phytogeographic zones of the country; iv) active collaboration and linkages with over 57 national active germplasm sites situated at different crop based ICAR centres and SAU; v) developed four online databases *viz*., "NORV" (notified and released varieties of India - "IINDUS" (Indian Information System), Information Sharing Mechanism for the PGR-"GPVR" (Germplasm and Plant Varieties Registration); and vi) capacity building on biosafety and biosecurity issues.

National Bureau of Agriculturally Important Microorganisms

NBAIM promotes mainstreaming microbial biodiversity by undertaking projects on i) molecular and functional diversity of microorganisms isolated from extreme environments; ii) assessment of genotypic diversity of Bacillus and Bacillus- derived genera in Indo-Gangetic plains; iii) germplasm collection and characterization of antagonistic microorganisms of soil borne fungal pathogens; and iv) microbial diversity analysis of soils contaminated with industrial effluents, etc.

National Bureau of Animal Genetic Resources

The major achievements of NBAGR, among others, include, i) development of conservation models and performance and economics of AnGR; ii) molecular characterization of genes responsible for immune response and milk performance of indigenous AnGR; iii) evaluation of genetic diversity and characterization of candidate genes involved in heat tolerance; and iv) building DNA fingerprinting profiles.

National Bureau of Fish Genetic Resources

Besides establishing live gene banks of fish genetic resources, NBFGR has developed sperm cryopreservation protocols of prioritized fish species, prepared national fish seed certification document, established IPR and Patents Cell and is set to further strengthen standardization of fish database, characterize and sequence prioritized species and develop diagnostic kits for exotic pathogens.

National Bamboo Mission

The main objectives of NBM are: i) to promote the growth of bamboo sector; ii) increase the coverage of area; iii) promote marketing of bamboo and bamboo based handicrafts; iv) establish synergies among stakeholders; v) develop and

disseminate technologies through a seamless blend of traditional wisdom and modern scientific knowledge; and vi) generate employment opportunities for skilled and unskilled people, especially unemployed youth.

3.2.2 Livestock genetic resources and animal husbandry

India lays major thrust on cattle and buffalo breeding, and livestock production including fish and fish products. The major initiatives and achievements include:

- Substantial increase in fish production as a result of setting up of NFDB.
- Implementation of a national project for improvement of poultry and small animals, among others, envisages conserving threatened breeds of livestock.
- A central sector scheme on fodder development provides assistance in grassland development.
- Central Fodder Development Organization is involved in propagation and production of certified seeds, production of pasture species, seed storage and processing, improved agronomic package of practices, etc.
- Establishment of central poultry development organizations which are meant to provide quality chicks, diversify poultry development, monitor feed quality and impart training.

3.2.3 Forestry and wildlife

With 2.4% of world's geographical area, India at present is supporting 16% of global human population and 18% of cattle population. Forests meet nearly 40% of the energy needs of the country, of which more than 80% is utilized in rural areas. It is estimated that about 270 million tonnes of fuelwood, 280 million tonnes of fodder, over 12 million cubic meter of timber and countless non-timber forest products are harvested from forests annually. India duly recognizes that augmentation of forest resources provides an opportunity to optimise broad-based development and poverty reduction of the forest-dependent communities. Important initiatives in this regard are as follows:

- The NAP has shown good results in extending forest and tree cover with people's participation with the twin objectives of decentralising forest management and extending the forest and tree cover. The Twelfth Finance Commission recognised that the entire nation has the responsibility to maintain forests as a national wealth, and recommended a grant of Rs.10,000 million spread over the period of 2005-2010, over and above regular allocations for maintenance of forests.
- The forestry sector is also being strengthened through various schemes, institutional mechanisms, legislations and policies (**Table 3.1**).
- The Constituion (73rd Amendment) Act, 1992 provides for the management of certain types of forests through PRIs.
- Mandatory clearances are required for undertaking any non forestry activity involving the diversion of forestland under the Forest (Conservation) Act. Such diversions are subject to strictest scrutiny which, among other things include, provisions for compensatory afforestation and payment of net present value of the land being diverted.
- The GOI has enacted the Forest Rights Act for empowering the tribal communities and other forest dwellers, and for protecting their access and use of forest resources.
- EPA, 1986 provides for the declaration of certain important ecologically fragile areas abutting forests/PAs as eco-sensitive zones.

Table 3.1: Major central sector schemes to promote forests and forestry sector in India

Central schemes in forestry sector	Objective
Integrated Forest Protection Scheme	• Assist all states for prevention and control of forest fires; strengthening of infrastructure; preparation of working plans / survey & demarcation.
Monitoring and evaluation of forestry development projects	• Conservation of forests, and assigned tasks related to the FCA.
National Afforestation and Eco-Development Board	• Involves non-forest department organizations including para-military, defence and other such organizations in tree planting; incentives for tree planting for farmers, students etc.; inclusion of tree planting in annual plans of other Ministries and allocation of funds under natural resources related and employment generation schemes.
National Afforestation Programme	• Regeneration and eco-development of degraded forests and adjoining areas on watershed basis; consolidating and strengthening JFM and extending forest and tree cover; filling up the demand-supply gap of timber, small wood, fuelwood and NTFPs; support jhum site rehabilitation and horti-silviculture in the north eastern states.
Eco-Task Forces	• Ecological restoration in highly degraded and fragile areas of most difficult terrains, involving over 10 battalions and ex-servicemen
Gregarious Flowering of Bamboo in North-East	• Ensures adequate regeneration of bamboos in flowered area, utilisation of flowered bamboos, generation of employment for the people, avoiding famine and spread of epidemic
Conservation & Management Scheme of Mangroves, Coral Reefs and Wetlands	• Conservation and protection of the mangrove ecosystem, coastal wetlands; afforestation of degraded mangroves; maintenance of genetic diversity; and creation of awareness.
Support to Research and Training Institutions (ICFRE, IIFM, WII and IPIRTI)	• Generating knowledge imparting training of field personnel. Thrust areas - standardization of agro-forestry models, package of practices, efficient utilization of forest products, social aspects of forestry, economic valuation of ecosystem services and climate change.
Gram Van Yojana Scheme	• Involves PRIs in afforestation by increasing tree cover on non-forest lands with a focus on poverty and inclusive growth.
Scheme for Forest Extension and Marketing Support	• To cover about 500 districts of the country; establishing integrated Forest Extension Centres and high input nurseries on tree and NTFP; imparting training to farmers, providing technical know-how, quality planting material, market information. Actuarial support to farmers on the line of National Agricultural Insurance Scheme.
Scheme for Augmentation of Bamboo Resources	• Provides impetus to raise bamboo crop in over 2.5 mha of degraded bamboo forests and promote income generation activities.
Scheme for Conservation of Medicinal Plants	• An area of 4 mha is proposed for *in-situ* conservation per year; to preserve and produce endangered medicinal plants, the *ex-situ* conservation in 10,000 ha area is proposed.
Scheme for Forest Information Management and Resource Assessment	• Develop a system of easy access for planning, management, research, extension, etc.
Integrated Development of Wildlife Habitats	• Development of PAs, ComR and ConR, Protection of wildlife outside the PAs, recovery of critically endangered species and habitats.
Project Tiger	• Inclusive conservation strategies of tiger and its habitats
Project Elephant	• Conservation, strengthening and creation of corridors for elephants

India's rich wildlife resources offer numerous opportunities for ensuring livelihood security and development of wildlife based small enterprises to grow and flourish following the twin objectives of conservation and sustainable development. Some such examples that help to promote mainstreaming of biodiversity considerations especially through active involvement of local communities are detailed as under.

Promotion of wildlife based eco-tourism

NWAP clearly recognizes the importance of people's support for wildlife conservation, livelihood security and establishing new PA categories, etc. It further emphasizes that eco-tourism must primarily

involve and benefit local communities. In this context, some of the important initiatives include: formulation of a 'Wilderness Tourism Policy' for PAs and other forests (Karnataka); advances in wildlife based eco-tourism (Madhya Pradesh, Kerala, Himachal Pradesh, Sikkim, Uttarakhand, etc.); transforming poachers into protectors and involving them in ecotourism programmes (Periyar Tiger Reserve, Kerala and Manas BR, Assam); promotion of home stays to encourage community based tourism (Hemis National Park and other areas of Trans-Himalayan zone in Jammu and Kashmir).

Livelihoods from non timber forest products

NTFPs play a pivotal role in the lives of large number of forest dependent communities. The central and state governments provide a strong backup to strengthen institutions like Tribal Co-operative Marketing Development Federation of India Limited; the Girijan Co-operative Corporation, Andhra Pradesh; formation of the large Adivasi Multipurpose Societies, JFMCs and EDCs so as to improve the economic status of the poor NTFP collectors.

Medicinal flora and fauna

The collection and trade in medicinal plants constitute a major share of livelihood means of the forest dwellers in India. Over one and a half million practitioners of the ISM&H in the oral and codified streams use medicinal plants, animal and mineral products in preventive, promotive and curative applications. A large number of medicinal plants (> 6500 species) are collected and used by local health healers and households and used as a livelihood strategy. Foundation of Revitalization of Local Health Traditions (FRLHT) has established 13 community owned enterprises for value addition and marketing of collected and cultivated medicinal plants in seven states.

Besides, traditional Indian Ayurvedic medicines account for 70% share of the formal medicine market in India. The domestic trade in Ayurvedic and herbal products in the country is about Rs 23 billion and is expected to substantially increase by 2010.

Realizing the potential of mainstreaming medicinal plant use, India has established NMPB, with an aim to bring in the much-needed coordination among different players for development of medicinal plant sector. Further, at the state level, SMPBs have been or are being set up. Considering that the sector is still new, the Governments at national and state levels are taking effective measures to create market opportunities with appropriate fiscal and policy support.

3.2.4 Inland waters and marine fisheries

Realizing that development of fisheries sector is entirely dependant on the conservation and management of water bodies such as lakes, rivers, coastal and marine scapes, the MoEF is making concerted efforts to mainstream efficient conservation measures for their sustainable utilization. The major programmes

for the restoration of ecological health are summarized in **Table 3.2**.

Table 3.2: Major schemes and programmes for mainstreaming of inland waters and marine fisheries

Scheme/Programmes/Plans	Key features
National River Conservation Programme	• Covering 34 rivers in 20 States: Ganga (59 towns), Yamuna (21 towns) and NRCP for other rivers (Mahanandi, 1; Gomti and Damodhar, 15 and others 64 towns)
National Lake Conservation Plan	• Prevent pollution from point source; *in-situ* measures of lake cleaning; catchment area treatment and lake-front eco-development; public awareness and public participation; 42 lakes in 12 states have been covered.
National Wetland Conservation Programme	• Develop policy guidelines for implementing programmes of conservation and management of wetlands, mangroves and coral reefs; identify priority wetlands for intensive conservation, management and research. Maintenance of genetic diversity especially of the threatened and endemic species; creation of awareness among the people.
Water Quality in River And Lakes (Monitored by Central Pollution Control Board in four major river basins and lake waters).	• MoEF and MoUD working together for conservation and management of water. The NRCD, MoEF focuses on integrated river conservation plan and the MoUD, on river conservation works in coordination with MoWR, MoRD, MoA, etc.
Development of Marines Fisheries Infrastructure and Post Harvest Operations	• Financial assistance to poor fisherfolk for inclusive and sustainable development of the sector

3.3 ENABLING ENVIRONMENT

3.3.1 Policies and legislations

The important national policies for environmental management include the NFP, 1988; the National Conservation Strategy and Policy Statement on Environment and Development, 1992; the Policy Statement on Abatement of Pollution, 1992; and the NFP, 2006. Some important sectoral policies such as the National Agricultural Policy, 2000; National Population Policy, 2000; and National Water Policy, 2002; are also relevant for environmental management. All of these policies have recognized the need for sustainable development in their specific contexts and formulated necessary strategies to give effects to such recognition. The NEP seeks to extend the coverage, and fill in the gaps that exist, in the light of present knowledge and accumulated experience. It does not displace, but builds on the earlier polices. The objectives, principles and strategies of NEP are presented in **Box 3.4**.

NAPCC identifies measures that promote development objectives while also yielding co-benefits for addressing climate change effectively. It outlines a number of steps to simultaneously advance India's development and climate change-related objectives of adaptation and mitigation. The eight national missions envisaged in NAPCC are listed in **Box 3.5**.

Box 3.4: NEP – Objectives, Principles and Strategies

Objectives	Principles	Strategies
• Conservation of critical environmental resources • Intra-generational equity: livelihood security for poor • Inter-generational equity • Integration of environmental concerns on economic and social development • Efficiency in environmental resource use • Environmental governance	• Human beings are at the centre of sustainable development concerns • The right to development • Environmental protection is an integral part of the development process • The precautionary approach • Economic efficiency	• Regulatory reforms • Enhancing and conserving environmental resources • Environmental standards, management systems, certification, and indicators • Clean technologies and innovation; • Environmental awareness, education and information; • Partnerships and stakeholder involvement; capacity building; research & development; • International cooperation; review of policy; review of implementation

Box 3.5: NAPCC –National Missions

- **National Solar Mission –** to significantly increase the share of solar energy in the total energy mix while recognizing the need to expand the scope of other renewable and non-fossil options such as nuclear energy, wind energy and biomass.
- **National Mission for Enhanced Energy Efficiency** – to enhance energy efficiency, four new initiatives will be put in place.
- **National Mission on Sustainable Habitat –** to make human habitats sustainable through involvements in energy efficiency in buildings, management of solid waste and model shift to public transport.
- **National Water Mission –** to ensure integrated water resource management helping to conserve water, minimize wastage and ensure more equitable distribution both across and within states.
- **Nation Mission on Sustaining Himalayan Habitats –** to evolve management measures for sustaining and safeguarding the Himalayan glaciers and mountain eco-system.
- **National Mission for Green India –** to enhance ecosystem services including carbon sinks and will be taken up on degraded land through direct action by communities, organized through JFMCs and guided by the SFDs.
- **National Mission on Sustainable Agriculture -** to make Indian agriculture more resilient to climate change.
- **National Mission on Strategic Knowledge for Climate Change –** to enlist the global community in research and technology development and collaboration through mechanisms including open source platforms.

The EIA Notification, 2006 and CRZ Notification, 1991, attempt to ensure that environmental concerns are integrated in developmental activities in order to achieve sustainable development, and exemplify India's progressive approach to factor in biodiversity concerns into developmental process **(Box 3.6)**.

Box 3.6: EIA Notification, 2006

The EIA notification, 2006 has adopted some progressive measures to make the environmental clearance a democratic and more transparent process. The developmental projects have been classified into two categories – one to be dealt with at the Centre and the other by the State level expert appraisal committees. Live recording of proceedings of public hearings has been made mandatory to ensure transparency.

Some other important policy and legal initiatives relating to biodiversity are as below:

- Enactment of the BDA, 2002 and Biological Diversity Rules, 2004 to give effect to the provisions of the CBD, including those relating to ABS **(Box 3.7)**.

Box 3.7: National Biodiversity Authority (NBA)

- The NBA established in October 2003 pursuant to Section 8 of the BDA
- Focuses and advises GOI on conservation of biodiversity, sustainable use of its components and securing equitable sharing of benefits arising out of the utilization of biological resources.
- Regulates access to biological resources and associated traditional knowledge for research and/or commercial purposes, bio-survey and bio-utilization as well as transfer of research results, seeking IPR and third party transfer of bio-resources.
- Advises the State Governments in the selection of areas of importance as biodiversity heritage sites and measures for the management of such sites.
- Has constituted expert committees to perform functions such as laying down the procedure and guidelines to govern the activities such as Access and Benefit Sharing (ABS), Prior Informed Consent (PIC), Mutually Agreed Terms (MAT), Intellectual Property Rights (IPR), list of normally traded commodities, establishment of heritage sites and their management, national designated repositories and safeguarding of traditional knowledge respecting the Article 8 (j) of the CBD.
- May take measures necessary on behalf of GOI to oppose the grant of IPR which do not adhere to the PIC and MAT.
- Coordinates the activities of the State Biodiversity Boards and large number of local level Biodiversity Management Committees by providing them with technical guidance and financial assistance.
- Commissions studies and sponsor investigations and research on preparation of PBRs to document the rich valuable knowledge of local people on biodiversity and conducts capacity building programmes.

Source: www.nbaindia.org

- A separate regulations for BRs is being prepared under the provisions of EPA, 1986.
- A draft Notification on EIVs has been issued under EPA, 1986.
- The CRZ Notification, 1991 recognizing the mangrove and coral reef areas as ecologically sensitive providing them protection of the highest order. Under the promotional measures, the GOI has identified 38 mangrove and four coral reef areas/ sites for providing financial assistance to the States/UTs for intensive conservation and management.
- "Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/ Genetically Engineered Organisms or Cells" have been notified in 1989 under EPA, 1986.
- Guidelines for sustainable development and management of brackish water aquaculture have been drawn up. State Governments like Andhra Pradesh and Tamil Nadu have aquaculture guidelines at the local level also.

- Continued implementation of NAP - the flagship afforestation scheme of the MoEF.
- Reconstitution of National Board of Wildlife 2007 to make it broad based.
- Establishment of the National Forest Commission in 2003 for the overall improvement of forestry sector. The Commission submitted its Report in 2006 **(Box 3.8)**.

Box 3.8: Report of National Forest Commission

- Took a view for long term betterment of forests and wildlife in India as well as safeguarding the interests of the forest dependent communities and also maintained the national commitment for ecological security of the country as mandated in NFP
- Forests are all encompassing; be it wetlands, grasslands and ecological services and water.
- Reviewed forest policy, goals and constraints of forestry sector, examined forest related international instruments, forestry research, relation between forestry and industry and forests and local communities.

- Creation of a NTCA, 2006, to strengthen efforts in management of Tiger Reserves.
- Creation of a WCCB, 2006, to strengthen institutional mechanisms to control wildlife crimes.
- The Science and Technology Policy Statement, 2003 has been announced following in the footsteps of the Scientific Policy Resolution (1958) and Science and Technology Policy Statement (1983). The key points of the policy are briefly given in **Box 3.9**.

Box 3.9: Strategy and implementation plan – S&T Policy (2003)

- Science and technology governance and investment
- Optimal utilization of existing infrastructure and competence by networking of existing infrastructure.
- Strengthening of the infrastructure for science and technology in academic institutions.
- New funding mechanisms for basic research
- Human resource development
- Technology development, transfer and diffusion
- Promotion of innovation
- Industry and scientific R&D: for increasing synergy between academia and industry, 'Autonomous Technology Transfer Organizations' would be created in academic institutions to facilitate transfer of know-how generated to industry.
- Indigenous resources and traditional knowledge
- Generation and management of intellectual property
- Public awareness of science and technology
- International science and technology cooperation
- Fiscal measures

3.3.2 Institutional mechanisms

Towards achieving the long term goals of various programmes and policies for mainstreaming of biodiversity, India has recognized the need of a strong multi-disciplinary, holistic and integrated approach, and has responded positively by providing a broad based sectoral or cross-sectoral institutional structure ranging from national, state, district to village level. While execution at state level is ensured by relevant departments such as SFDs, agriculture and horticulture departments, irrigation departments, science & technology departments, etc., various specialized national/state level institutions ensure R&D backup on the relevant subjects. An example of strengthening cross-sectoral development in forestry is presented in **Figure 3.1.**

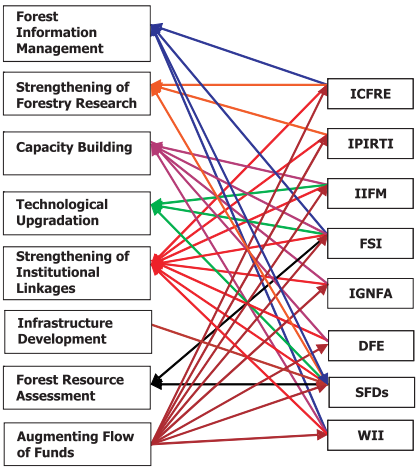


Figure 3.1: Cross sectoral institutional structure in forestry sector

Another example of cross-sectoral coordination is the implementation of the wetland programme which follows multiple models based on the specific needs.

- In some states, it is being executed by the SFDs and/or Environment or Urban Development; in some others, by the Department of Irrigation or Science and Technology or Fisheries.
- Considering the complexities of the implementation issue, state level steering committees have been constituted with a broad base representation including communities, NGOs and academics.
- Several States have already constituted authorities for execution of the programme in their respective states. Notable among these are, Chilka Development Authority in Orissa (mandated to manage all identified lakes in the State); Loktak Development Authority, Manipur; Shore Area Development Authority, Andhra Pradesh; Lakes and Waterways Development Authority, Jammu and Kashmir; Lake Development Authority, Karnataka; and Lake Conservation Authority, Madhya Pradesh.

3.3.3 Allocation of financial resources

Realizing that adequate financial resources are essential to achieve the targets of sectoral and cross sectoral integration of biodiversity, India has made specific provisions for its Plan activities. MoEF, being the major player covering the sector, provision of Rs 100 billion (approximately US$ 2 billion) has been made in the XI Plan (2007-08 to 2012-13), as against Rs 595 billion (approximately US$ 1.2 billion) made under 10th plan (2002-03 to 2006-07) allocations. Sector wise provisioning of available funds under 10th Plan is shown **(Figure 3.2)**.

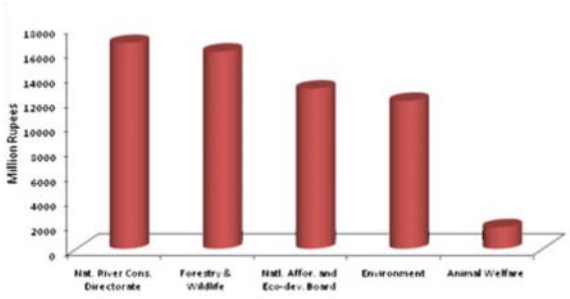


Figure 3.2: 10th Plan Outlay for different sectors of the MoEF

In order to promote excellence and outstanding contributions in environmental conservation, the MoEF provides for incentives in the form of various awards (**Box 3.10**).

Box 3.10: Incentives: fellowships and awards

- Indira Gandhi Pryavaran Puraskar: to organizations/individuals in recognition of significant contribution in the protection of environment.
- Pitamber Pant National Environment Fellowship: to encourage excellence in any branch of environmental sciences.
- Amrita Devi Bishnoi Wildlife Protection Award: to individuals/institutions pertaining to rural communities for significant contribution in wildlife protection.
- Rajiv Gandhi Wildlife Conservation Award: for significant contribution in protection and conservation of wildlife.
- The Janaki Ammal National Award on Plant/Animal Taxonomy: for outstanding contribution in the field of plant/animal taxonomy.
- Indira Priyadarshini Vriksha Mitra Award: for outstanding contributions in afforestation and wasteland development in eight categories.

Considering another important sector agriculture, the eleventh plan strategy of inclusive growth rests upon substantial increase in public sector outlay. The XI plan allocation is projected at Rs 5,48,010 million (approximately US$ 1.1 billion) as against Rs 2.05 billion (approx. US$ 4.1 billion) for Xth plan.

The MoEF provides financial assistance to State/UT Governments for the implementation of the various central programmes relating to biodiversity conservation including several cross-cutting priority programmes. An overview of one such sector is given in **Box 3.11**.

Box 3.11: NRCP, NLCP and NWCP- An overview

NRCP: A sewage treatment capacity of 869 million litres per day (mld.) and 753 mld has been undertaken under Ganga Action Plan and Yamuna Action Plan, respectively. Likewise, under various river action plans, pollution abatement works have been undertaken in 14 states covering 30 rivers and 68 towns.

NLCP: Over 33 projects for conservation of 49 lakes have been approved in 13 states and conservation works for 11 lakes have been completed.

NWCP: Number of wetlands under the programme increased from 27 in 2004 to 115 in January 2009. A number of regional workshops are held to sensitize people about values and functions of wetlands.

Recognizing that the entire nation has the responsibility to maintain forests as a national wealth, the recommendations of the 12th Finance Commission providing a grant of Rs 10 billion (approx. US$ 0.2 billion) spread over a period of 2005 – 2010, are being implemented. This is in addition to the regular Plan allocations.

3.3.4 Capacity building

As capacity building is an important tool for achieving the goals of conservation and sustainable use of biodiversity, India has taken several initiatives in this regard. Notable initiatives of capacity building in different sectors are given below:

- In-house training courses of varying duration on remote sensing, GIS and application of global positional system in forest survey; specialized training to officers on spatial referencing of Monitoring

of Illegal Killing of Elephant (MIKE) data; enhance and improve the technical capacity required at the national level to monitor SFM and biological diversity.

- Development of National Forestry Database Management System.
- Extensive capacity building activities for efficient management of field trials of GM crops covering 16 states where field trials are being undertaken.
- Study on applied rates and import duties of forestry products for multilateral and bilateral trade agreements.
- Training programmes in collaboration with different academic institutions/research organizations/ State Governments/NGOs on various components of wetland conservation.
- 12th World Lake Conference (Taal 2007) under the aegis of International Lake Environment Committee (ILEC) Foundation organized by the MoEF, where Jaipur Declaration, stressing on wise use of lakes and wetlands was adopted.
- Implementation of AICOPTAX.
- Organizing district level inter-departmental linkage workshops for promoting linkage of NAP with other developmental programmes to ensure sustainability of JFM.
- Under NGC programme, about 84,000 eco-clubs (school/colleges) supported by the MoEF and implemented through state nodal agencies.
- During 2007-2008, over 10,000 organizations associated with the NEAC.
- The MoEF has formulated Media Action Plan, producing television programmes 'Bhoomi' and 'Sarokar' covering community effort in environmental protection, water conservation, water pollution, afforestation, herbal pesticides, bio-medical waste, bio-diesel, air pollution, etc.
- Staging shows of street play by Centre for Education and Voluntary Action (CEVA) spreading awareness on environmental degradation in various states. Since 2007, 'Vatavaran', a competitive environment film festival is being held.
- Environmental appreciation courses developed by Indira Gandhi National Open University (IGNOU) are being used as distance education material.
- Under Global Learning and Observation to Benefit the Environment (GLOBE), 1,800 trained teachers in the country covering 16 states were given hands-on training on various environmental parameters.
- Other awareness programmes include: i) Observance of Earth Day to increase public awareness on environment, ii) Inter eco-club school competition, iii) Students environmental congress, etc.
- Nation-wide programs are organized during Wildlife Week, Earth Day, World Forestry Day & World Environment Day.
- TRAFFIC India has conducted a training needs assessment for wildlife enforcement officers on wildlife crime in 2007.

Highlights of capacity building initiatives on biosafety are given in **Box 3.12**.

Box 3.12: Highlights of some of India's capacity building initiatives on biosafety

Improved capacity for risk evaluation and management: Training of experts in risk management, capacity enhancement for molecular diagnostics to detect LMOs and capacity development to increase India's potential to monitor transboundary movements of LMOs including a study undertaken by ICGEB on environmental risk assessment, socio-economic considerations and decision making support for LMOs.

Strengthening of laboratories for analytical detection of LMOs: Infrastructure was provided to selected laboratories/ organizations, such as, Central Food Technological Research Institute (CFTRI), NBPGR, National Research Centre on Plant Biotechnology (NRCPB) and G B Pant University of Agriculture and Technology, Pantnagar.

Biosafety Clearing House (BCH) and enhanced information sharing and public awareness: In compliance with Article 20 of the Cartagena Protocol on Biosafety which mandates to establish a BCH by each Party, India established the BCH under the project.

Further, various organizations in the country offer specilaized courses for capacity buiulding, some of which are given below:

Indira Gandhi National Forest Academy (IGNFA)

Induction training in the form of two years diploma and certificate courses for the newly recruited state forest services officers into the Indian Forest Service; IFS officers and Foreign Trainees undergo training in advanced forest management and policy and legal issues.

Indian Plywood Industries Research and Training Institute (IPIRTI)

IPIRTI conducted various diploma courses and vocational courses to meet the human resources development needs of mechanic wood industries, postgraduate programmes in forest management and natural resource management are also offered.

Wildlife Institute of India (WII)

Through the postgraduate diploma course in wildlife management, training is imparted in biological and ecological management, eco-development and human dimension aspects of wildlife conservation, taking into consideration the skills required for dealing with the present conservation situation and needs.

Indian Institute of Forest Management (IIFM)

The Institute offers management development programmes to practicing managers, foresters and policy makers in India and other Asian countries, on concepts and techniques relevant for the forestry, development and environmental sectors.

G.B. Pant Institute of Himalayan Environment and Development (GBPIHED)

The Institute undertakes capacity building programmes for rural masses and other stakeholder groups on mountain-specific environment friendly technologies for improvement of livelihood options and conducts orientation courses and training workshops for teachers and students on conservation education.

Botanical Survey of India (BSI) and Zoological Survey of India (ZSI)

The two organizations have regular capacity building programme in the taxonomy of plants and animals, respectively, leading to the award of degree of Doctor of Philosophy. In addition, they also organize in-service training programmes for academicians and foresters from time to time.

Centre for Environmental Education (CEE)

CEE hosted 4th International Conference on Environmental Education (organized by GOI and co-sponsored by UNESCO and UNEP in November 2007), in which 97 countries participated. Collaborative programme of UNICEF, Nehru Yuva Kendra (NYK), and National Service Scheme engages college youth in environmental education and awareness campaigns.

CPR Environmental Education Centre (CPREEC)

CPREEC brings out four issues of the quarterly newsletter ECONEWS, and has published abstract volumes on Sacred Animals of India, Sacred Water Bodies of India along with a number of video films for use in training programmes. The Centre has also undertaken a Green School Initiative on environmental education and training programmes on biodiversity conservation focusing on teachers, students, NGOs and animators.

Environmental Information System (ENVIS)

ENVIS is a comprehensive network in environmental information collection, collation, storage, retrieval and dissemination to varying users which include decision-makers, researchers, academicians, policy planners, research scientists, etc. At present, it consists of a chain of 76 network partners out of which 46 are on subject-specific and 30 are on State related issues.

Information Facilitation Counter (IFC)

The MoEF has been set up an IFC to disseminate information on its activities.

Despite such a diversified base for capacity building to promote sectoral and cross-sectoral mainstreaming of biodiversity, there is a felt need to upscale the feedback mechanism/ process and make it as an integral component of all capacity building initiatives.

3.3.5 Land use planning

All the Five Year Plans have emphasized the need for efficient use of land, water and other natural resources for accelerated as well as sustainable economic development in the country.

Considering that India possesses 16% human and 18% livestock population of the world on only 2.4% of the land, a long-term perspective plan on land use is important. Further, the existing database on land use needs to be upgraded periodically. Therefore, strengthening of the database, using traditional cadastral surveys, modern remote sensing techniques, GPS, GIS and computerization of land records is being given priority. Similarly, it is necessary to strengthen the monitoring mechanism to document the on-going land use changes. Towards fulfilling these requirements, several Ministries are undertaking various measures. As an example, some of the cross-cutting initiatives of MoA which provide appropriate enabling

environment for sectoral and cross-sectoral integration for land use are given below:

- Scheme on Macro Management of Agriculture is being implemented in states through State Land Use Board.
- GOI provides 100% assistance for another centrally sponsored scheme of MoA on All India Soil and Land Use Survey.
- Central sector scheme of National Land Use & Conservation Board provides for the formulation of national land use policies, perspective plan for optimum utilization of land resources and undertakes overall review of the progress of implementation of ongoing schemes and programmes.
- Various other programmes, such as soil conservation for enhancing productivity of degraded lands in the catchments of flood prone rivers, reclamation of alkali soils; soil conservation for enhancing productivity of degraded lands in the catchments of flood prone rivers, and other projects like Uttar Pradesh sodic land reclamation project with World Bank assistance, watershed development project in shifting cultivation areas of north eastern states, etc., are being implemented.

3.3.6 Research and technology

Among various initiatives to support sectoral and cross sectoral research and technology backup for mainstreaming biodiversity, following are some of the major initiatives:

- Establishment of BGIR at Noida, to cater to the need for conservation of endangered species and build public awareness. This was identified as a "Green Channel" project under National Jai Vigyan Mission of the Ministry of Science and Technology, GOI.
- The programme on assistance to botanic gardens focuses on *ex-situ* conservation of rare endemic plants. It has also promoted the establishment of lead gardens in different phytogeographic zones of the country.
- A scientific methodology for estimating tiger population (including co-predators, prey animals and assessment of habitat status) has been evolved and mainstreamed.
- Environmental research programme of the MoEF covers prevention, abatement and control of pollution. It also reviews and initiates new projects on ecosystem research, Eastern and Western Ghats research and economic and social issues.
- Several interdisciplinary projects have been taken up under the NNRMS such as: i) national projects on snow and glaciers; ii) mapping of WLSs/NPs; iii) forest type mapping; and iv) coastal/ mangrove/coral reef studies.
- Nineteen research projects on various aspects of wetland conservation under implementation.
- National Institute of Research in Mangroves and Coastal Bio-resources proposed to be established near Sunderbans in West Bengal.

- Ten SFRs published so far based on the interpretation of remote sensing satellite data.
- Forest cover maps on different scales kept in public domain and used by SFD officials.
- A new National Forest Inventory designed and adopted since 2002.
- A number of innovative afforestation programmes of NAEB are being implemented by government departments, urban local bodies, PRIs, public sector undertakings, autonomous bodies, NGOs, etc.
- ETF battalions have been raised by deploying ex-servicemen for ecological restoration of terrains rendered difficult due to severe degradation and inaccessibility.
- Seven regional centres of NAEB located in various universities and national level institutions promote sustainability of JFM.
- Physical and mechanical properties of more than 500 species of Indian timbers have been evaluated.
- Protocols developed for propagation of important medicinal plants.
- Design of solar heated kiln developed and standardized for accelerated seasoning of timber compared to air drying; about 200 commercial units have so far been installed.
- Rajpath and Central Vista Tree Conservation Project in New Delhi and development and maintenance of tree avenues in Commonwealth Games village.
- Studies on molecular ecology of Indian fauna indicated that large mammal population in the Western Ghats show genetic differentiation across the Palghat gap that has acted as a bio-geographic barrier.
- Populations of leatherback turtles are being monitored using conventional tagging, satellite telemetry and genetic analysis.
- Monitoring population structure of elephants of Mudumalai WLS.
- Participatory natural resource monitoring in selected villages in Uttara Kannada district has helped in understanding changes and taking corrective action.
- The monitoring of climate change and forests in India projects a shift towards wetter forest types in northeastern region and drier forest types in northwestern region in the absence of human influence.
- Evaluation of butterfly communities as bio-indicators in Western Ghats.
- CEMDE has developed strategies to restore mined-out areas, eradicate lantana and restore landscapes.
- A Centre of Excellence has been established in Madras School of Economics to build capacities in environmental economics and undertake studies in natural resource accounting.
- Research activities have been initiated by the FRLHT on medicinal plants which include: i) creation of bio-cultural repository; ii) establishment of ethno-medicinal plant demo garden; iii) pharmacognostic studies on prioritized medicinal plants; iv) distribution mapping using GIS and identification of issues concerning traded medicinal plants; and v) outreach training and educational material on plants of Indian Systems of Medicine.
- CZA has identified 61 different critically endangered wild animal species for coordinated conservation breeding programmes in Indian zoos.

- A National Referral Centre has been established at Indian Veterinary Research Institute (IVRI) for providing super speciality services and diagnostic facilities for better health care of wild animals in Indian zoos.
- National Bioresource Development Board (NBDB) under DBT prepares digitized inventories of plant, animal, microbial, and marine resources, supports establishment of Centres of Excellence, training activities and demonstrations, for the development of bioresources for special areas such as north-eastern region, Himalayan region, coastal & island ecosystems, desert region, Indo-Gangetic plain and Peninsular India and promotes knowledge empowerment and human resource training **(Box 3.13)**.
- The NBRI through the use of bioinformatics has initiated development of plant diversity databases under collaborative research programme to: facilitate the study on conservation of Indian biodiversity through comprehensive database of all Indian plants on web (www.plants-of-india.org); update and upgrade the legume database of South Asia; establish a herbarium database and network the herbaria of India; undertake computational analysis of genomics and proteomics databases; and act as plant diversity information centre for India and undertake diploma courses in bioinformatics; and strengthen the linkages with national (DBT's Biotechnology Information System network) and international (International Legume Database & Information Service (ILDIS), UK) programmes, thus facilitating biotechnology research in India.
- CCMB is pursuing a major and unique research programme La CONES with the help of DBT, CZA, CSIR and Government of Andhra Pradesh as its partners. The project known as La CONES is aimed at the conservation of endangered animals through the use of biotechnological intervention. Under LaCONES, monitoring of genetic variation using techniques such as DNA fingerprinting, establishment of cell banks and gene banks through cryo-preservation of semen, eggs and embryos of endangered species, and the development of assisted reproductive technologies are being undertaken. The LaCONES has been honoured as a member of the International Consortium of the Frozen Arc, an international depository of DNA representing the Indian subcontinent.

Box 3.13: Major R&D initiatives of NBDB

Digital inventorization

- Preparation of digitized inventories of all bioresources covering medicinal plants, other economically important plants, animal, marine and microbial resources.
- Establishment of a fully functional laboratory with state-of-the-art equipment for GIS and database management in Bangalore.
- Compiled data sets on 2,500 species. The data is now available at a resolution of 25x25 km grid map for the entire country.
- Preparation of digitized inventory of marine resources (collection of information on 3,700 and put in the digitized format).
- Collection of information for more than 42,000 microorganisms. It is expected to include data for more than 50,000 microorganisms in the database.

Natural dyes

- Initiation of All-India coordinated research project on prospecting for food grade natural dyes from bioresources, with six participating institutions.
- Surveys in temperate ranges of NW Himalayas and tropical areas of northern portion of Western Ghats.
- Using standard color index developed by the Royal Horticulture Society of Kew (London) as many as 46 colour shades were observed.
- Colouring matter was reported for the first time from 92 plants species. Twenty five Himalayan plant species have been identified as potential sources for colouring matters that are in high demand in food processing.
- The colouring matters isolated from *Thalictrum javanicum*, *Meriandra strobilifera* and *Rumex hastatus* are suspected to be new and novel ones.

Botanical pesticides

- Initiated All-India coordinated research project on development of environment friendly and plant-based pesticides with nine participating institutions.

- CSIR has initiated one of the largest coordinated programmes on drugs, which is based on India's rich bio-resources and its traditional knowledge. This initiative involves 20 CSIR laboratories, 13 universities and also institutes of traditional medicinal systems. This path-breaking programme has so far screened 23,000 samples and identified 44 potential bio-active molecules.

- TKDL is a collaborative project between CSIR, Ministry of Science & Technology, and Department of AYUSH, MOHFW and National Informatics Centre (NIC) for developing computerized database of documented traditional knowledge available in ancient texts **(Box 3.14)**.

Box 3.14: Traditional Knowledge Digital Library (TKDL)

Implemented by CSIR through a team of interdisciplinary team of experts from traditional medicine, patent examiners, IT experts and other scientists and technical officers, TKDL involves:

- Documentation of the knowledge available in public domain on traditional knowledge from the existing literature related to Ayurveda, Unani, Siddha and Yoga, in digitized format in five international languages which are English, German, French, Japanese and Spanish.
- Systematic arrangement for retrieval data of about 25,000 sub-groups (related to medicinal plants,minerals, animal resources, effects and diseases, methods of preparations, mode of administration, etc.) though innovative system of Traditional Knowledge Resource Classification.

Major achievements and recognition

- Out of total of 142 books (224 volumes) in different disciplines of traditional system of medicine used for transcription, 2,03,800 have been transcribed.
- Prevents misappropriation of traditional knowledge at International Patent Office.
- The story of TKDL has been covered in both international print and electronic media
- TKDL effort in the fields of traditional knowledge has been appreciated by World Intellectual Property Organization (WIPO).
- World Health Organization (WHO) has recognized the effort and recommends the replication in other countries
- Incorporating TKDL among international search authorities and other offices while processing patent applications recommended
- TKDL has become a model for other countries on defensive protection of their traditional knowledge.

3.4 PARTICIPATION OF NGOs

A large number of NGOs are actively involved in integration and mainstreaming of biodiversity considerations. A select list of relevant NGOs and their activities is summarized in **Table 3.3**.

Two examples of initiatives taken by of NGO's with the support of government agencies are given in **Box 3.14** & **Box 3.15**.

Table 3.3: Some NGOs involved in biodiversity related activities

S. No.	Name of NGO	Major thrust area
1.	Applied Environmental Research Foundation, Pune	Preserve indigenous knowledge and practices linked to environment protection; conservation awareness programmes; mainstream biodiversity.
2.	Ashoka Trust for Research in Ecology and the Environment, (ATREE), Bangalore	Magnitude, patterns, and causes of degradation and loss of biodiversity; sustainable models of natural resource use that reconcile conservation goals with livelihood needs.
3.	Assam Science Society, Assam	Environmental education training through camps for teachers and students
4.	BAIF Development Research Foundation, Pune	Regeneration of degraded resources; wasteland development research; encourage the use of non-conventional sources of energy.
5.	Beej Bachao AndolanTehri Garhwal, Uttarakhand	Conservation of indigenous seeds for promoting agricultural diversity; rejuvenate traditional farming practices.

Table 3.3: Some NGOs involved in biodiversity related activities (Contd.)		
S. No.	**Name of NGO**	**Major thrust area**
6.	Bombay Natural History Society (BNHS), Mumbai	Disseminate knowledge on flora and fauna; Study wildlife related problems; conserve wildlife and its habitat; conduct studies of certain endangered spp.; impart environmental education.
7.	Centre for Environmental Education (CEE), Ahmedabad	Create environmental awareness on conservation of biodiversity and eco-development.
8.	Centre for Science and Environment (CSE), New Delhi	Investigative research and educational work in the field of pollution, forest, wildlife, land and water use; bring out various publications.
9.	C.P.R. Environment Education Centre, Chennai	Environmental education and awareness campaigns on solid waste management.
10.	Dasholi Gram Swarajya Mandal, Gopeshwar (Uttarakhand)	Encourage forest conservation and the use of forest products for self employment; Build embankments in the catchment areas and to plant trees.
11.	Darpana Academy of Performing Arts, Ahmedabad, Gujarat	Spread environment education through dance, drama and puppetry; 'Jagruti', a school project for environmental empowerment.
12.	Development Alternatives, New Delhi	Pollution monitoring and control; waste recycling management; wasteland development; appropriate technology.
13.	Friendicoes, Society for the Eradication of Cruelty to Animals,New Delhi	Animal rescue, feed and medicate all injured, abused and ownerless animals; promote adoption programmes for animals; sterilization of stray dogs.
14.	Friends of the Doon,New Delhi	Preserving and rehabilitating the environment of the Doon valley; advocacy and support to cases against limestone mining; environmental education.
15.	Gene Campaign, New Delhi	Public education, training and capacity building focusing on livelihood security of rural and adivasi communities.
16.	Green Future Foundation, Pune	Promote environmental protection, energy and ecological conservation and pollution control; impart environmental education and training.
17.	Gujarat Ecology Society, Vadodara	Biodiversity conservation, coastal and marine ecology and ecological restoration.
18.	Indian Association for Environmental Management, Nagpur	Educate people to encourage the conservation of the environment ; water pollution control activities and environmental management.
19.	Indian National Trust for Art and Cultural Heritage (INTACH), New Delhi	Preserve Indian cultural and natural heritage; undertake water-harvesting projects in urban areas; Restoration of the ecological balance.
20.	International Collective in Support of Fisher Workers, Chennai	Sea turtle conservation; fisheries in Orissa; marine PAs.
21.	J&K Environment and Wasteland Development Society Works, Jammu	Afforestation in the wasteland areas.

Table 3.3: Some NGOs involved in biodiversity related activities (Contd.)

S. No.	Name of NGO	Major thrust area
22.	Kerala Sastra Sahitiya Parishad, Thrissur	Creating awareness about water and energy conservation; encourage use of non-conventional energy sources such as smokeless chulhas, etc.
23.	Kalpavriksh, Pune	Conducts research in environmental problems; imparts environmental education by forming a network of nature clubs; conducts bird watching expeditions and nature trails.
24.	Ladakh Ecology Development Group, Leh	Promote ecological and sustainable development harmonious with the traditional cultures of the area; encouraging the use of renewable energy sources, promoting organic farming.
25.	Madras Naturalists Society, Chennai	Study environmental problems; Impart environmental education; organise visits to sanctuaries in Tamil Nadu
26.	M S Swaminathan Research Foundation, Chennai	• Coastal systems research; biodiversity, biotechnology, sustainable agriculture; education, communication, training and capacity building.
27.	Narmada Bachao Andolan, Dhule	• Educate those directly affected by large development projects, such as tribals, on the social and environmental impact of such projects.
28.	Nilgiri Wildlife and Environment Association, Tamil Nadu	• Conserve the natural resources of the Nilgiri and preserve wildlife and the habitat; Impart environmental education and conduct tree planting, bird watching, and soil conservation programmes.
29.	Orissa Environmental Society, Bhubaneshwar	• Conduct research, seminars and workshops on forest and wildlife protection; organise eco-development camps.
30.	Rajasthan Environment Preservation Society, Jaipur	• Pollution control; afforestation, ecological and environmental preservation; promote social forestry and plantation and to clean the ponds, lakes and reservoirs.
31.	Ramakrishna Mission Lokashiksha Parishad, West Bengal	• Wasteland areas restoration of bundhs in the Sundarbans riverine areas; conduct studies on the status, expectation and contribution of non timber forest products; promoting the use of smokeless chulhas; extensive tree plantation.
32.	Srishiti, New Delhi	• Promote conservation and enrichment of the environment; conservation of Delhi Ridge through community participation; coordinated the Asian midwinter waterfowl census for northern India.
33.	The Energy and Resources Institute (TERI), New Delhi	• Develop innovative and cost effective solutions for sustainable development; enhance networking for sustainable interventions; realize potential for national and international leadership in the fields of energy, environment, other natural resources.
34.	Theatre in Education Company,New Delhi	• Environment education through theatre.
35.	Tiger Link, New Delhi	• Conservation of tiger habitat; tiger newsletter.
36.	Uttarkhand Seva Nidhi, Uttarakhand	• Spreading environmental education and training.
37.	Vanarai, Pune	• Promote environmental protection and afforestation; environmental education; promote smokeless chulhas and gobar gas plants.

Box 3.14: Community led Whale Shark conservation along the Gujarat Coast

Whale Sharks travel thousands of kilometres every year from far-off shores to visit the coast of Gujarat. In the past, local fishermen have traditionally hunted them for oil to waterproof their boats and for their meat for export. Whale Shark comes under the Schedule 1 of the WPA, 1972, wherein hunting of Whale Shark leads to an imprisonment of 3-7 years and a fine of not less than Rs. 10,000/-. To address the issue of conservation of Whale Shark, a multi-pronged campaign has been launched since 2004 by Government, NGOs and private sector.

Box 3.15: Community sets aside land for protecting elephant corridors in Garo Hills

Meghalaya supports the second largest elephant population in northeast India and majority of them are concentrated in Garo Hills which has been declared as Garo Hills Elephant Reserve by the SFD. However, *jhum* cultivation and other developmental activities have led to fragmentation and degradation of elephant habitats leading to increase conflict with humans. Being a Sixth Schedule area, the State has a typical system of forest management, wherein local communities and private persons own majority of the land. Less than 10% area comprising reserve forests, national parks, wildlife sanctuaries and protected areas is controlled by the State and remaining land is under the jurisdiction of the district council. To negate the adverse effect of fragmentation, six elephant corridors in the State have been identified. NGOs such as WTI working with Garo Hills Autonomous District Council and forest department, have actively worked with local community to join the fragmented patches for developing the corridors by donating their land for reforestation. Reforestation activities in this area have resulted in better water retention improving their water reserves as also better fish yields thereby involving other village heads (*nokmas*) to join efforts for the conservation of wildlife and augmentation of natural resources. As a result, several chunks of forest ranging from 200 hectares (Selbalgre villagre reserve forest) to 700 hectares (Mandalgre village reserve forest) have been declared as reserves. Two major landscapes, the Balphakram National Park and the Nokrek National Park are therefore in the process of being connected for both terrestrial and arboreal movement of animals with full participation of the local community and sharing of benefits accruing to the community.

3.5 PARTNERSHIP AND COOPERATION IN DIFFERENT SECTORS

- **Plant, animal, human and microbial genomics:** Some of the multilateral/bilateral institutions/ programmes under consideration in association with Ministry of External Affairs are: Joint Centers in biotechnology specially, with Germany and France; Indo-ASEAN Institute of Biotechnology in Jakarta; Indo-ASEAN Biotechnology Network; India-Singapore Joint Biotechnology Park, etc.
- **ICGEB, New Delhi:** This is an autonomous international organisation. India, the host country is a contributor along with Italy. The statute came into force on February 3, 1994. There are 65 member countries.
- **Cooperation with CGIAR Centers:** CGIAR centres have been providing support to ICAR's research activities. India has entered into MoU with 13 CG Centres including International Maize and Wheat Improvement Center (CIMMYT), International Rice Research Institute (IRRI), International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), IGPRI, World Fish Centre and International Water Management Institute (IWMI).

- **Partnership Building through FDAs & JFMC:** Execution of NAP provides support, both in physical and capacity building terms, to the FDAs and JFMCs. Decentralized two-tier institutional structure (FDA and JFMC) allows greater participation of the community, both in planning and participation on afforestation programmes. Seven pilot projects for establishing forest-based microenterprises and promoting greater organic linkages of JFMCs with Gram Panchayats.
- **Partnership with Industries:** The Central Institute of Medicinal and Aromatic Plants, Lucknow, and Shriram Institute for Industrial Research, New Delhi, have signed an MoU on collaborative research in biological and herbal products quality standards.
- **CSIR Strategic Alliances:** CSIR has forged a collaborative programme with EU in key areas of global relevance and import such as health, biotechnology, energy, environment and nanotechnology.
- **New initiatives in agriculture sector:**
  - India signed MoUs for developing, promoting and accelerating closer collaborative efforts for development of agricultural research and education with a large number of countries, namely, ASEAN countries, Australia, Bangladesh, Belarus, Bhutan, Brazil, China, Chile, Cuba, Cyprus, Egypt, France, Iran, Iraq, Italy, Japan, Kazakhstan, Mauritius, Mozambique, Myanmar, Namibia, Nepal, New Zealand, Oman, Panama, Peru, Philippines, Qatar, Rwanda, Russia, Serbia, Sri Lanka, Surinam, Tanzania, South Africa, Uganda, Uzbekistan, UK, Ukraine, Vietnam and Zambia.
  - Genomic resources collection centre has been envisaged to collect validate and facilitate the use of useful genes and gene constructs generated in the country.
  - The huge collections in the genebank would be utilized for identifying genes and alleles conferring special traits which would be further utilized in future crop improvement programme.
- **Mangroves for the Future**: India is participating in the IUCN MFF initiative, under which it has prepared a national strategy and action plan. Six small grants and four large grants programmes have been envisaged. A national coordination body is also in place. India hosted the 4th Regional Steering Committee meeting in 2008.
- An International Dryland Ecosystem Workshop was jointly organized by UNESCO and GOI in 2007 to exchange techniques and globally available appropriate technologies for tackling problems associated with dryland ecosystem.
- **Wildlife protection and care**

1. The GOI has formulated an action plan for vulture conservation which is being implemented in collaboration with the State/Union Territory and civil society organizations.

   Under Coalition Against Wildlife Trafficking Initiative, India has joined hands with USA and other partners against wildlife crime/trafficking. This coalition is working together to combat illegal trade in wildlife and its derivatives.

- **Partnership and collaboration through GEF**

  Most of the GEF projects being undertaken in India have a strong component of mainstreaming biodiversity into production sectors and landscapes for sustainable development. **(Table 3.4.)**.

Table 3.4: GEF projects for biodiversity conservation and utilization in India

S. No.	Project title	Project description
1.	India Eco-development	Project integrates conservation and development objectives in seven threatened, priority sites representative of India's varied ecosystems. It supports improved protected area management, emphasizing joint management with local communities; the design and financing of village development plans and agreements that address the negative interactions of local communities on biodiversity and vice versa.
2.	First National Report to CBD	The project enabled the preparation of the country's first national report to the CBD.
3.	National Biodiversity Strategy and Action Plan	The enabling activity project helped to formulate a technical report for preparing National Biodiversity Strategy Action Plan.
4.	Conservation and Sustainable Use of the Gulf of Mannar Biosphere Reserve's Coastal Biodiversity	The overall objective of this project is to conserve the Gulf of Mannar's globally significant assemblage of coastal biodiversity and to demonstrate, in a large biosphere reserve with various multiple uses, how to integrate biodiversity conservation into coastal zone management plans.
5.	Capacity Building for Implementation of the Cartagena Protocol	The major objective of the project was to strengthen the capacity of biosafety regulatory framework, institutions and stakeholder groups in India, for effective implementation of the Cartagena Protocol on Biosafety.
6.	Mainstreaming Conservation and Sustainable Use of Medicinal Plant Diversity in Three Indian States	This project seeks to achieve the long-term conservation and sustainable use of India's medicinal plant diversity, particularly of its globally significant species through mainstreaming conservation and sustainable use objectives into forest management and other policies at different levels of governance.
7.	Biodiversity Conservation and Rural Livelihoods Improvement	The proposed project will build on the past participatory conservation successes, including the concluded GEF/IDA eco-development project by expanding conservation efforts to the landscape level, and integrating rural livelihoods with strengthened protected area management and more biodiversity-friendly development in the surrounding production landscapes.
8.	Conservation & Management of Pollinators for Sustainable Agriculture through an Ecosystem Approach	The project has three principal objectives: (1) develop and implement tools, methodologies, strategies and best management practices for pollinator conservation and sustainable use; (2) build local, national, regional and global capacities to enable the design, planning and implementation of interventions to mitigate pollinator population declines, and establish sustainable pollinator management practices; and (3) promote the co-ordination and integration of activities related to the conservation and sustainable use of pollinators at the international level to enhance global synergies.

Table 3.4: GEF projects for biodiversity conservation and utilization in India (Contd.)

S. No.	Project title	Project description
9.	Conservation and Sustainable Use of Cultivated and Wild Tropical Fruit Diversity: Promoting Sustainable Livelihoods, Food Security and Ecosystem Services	The overall development goal of the project is to strengthen sustainable livelihoods through improved management and utilization of tropical fruit genetic diversity. The project objective is to improve the conservation and use of tropical fruit genetic diversity in Asia by strengthening the capacity of farmers, local communities and institutions.
10.	Capacity Building on Bio-safety for Implementation of the Cartagena Protocol – Phase II	Project aims to prepare the risk assessment, management and communication strategy as well as develop the capacity of the concerned stakeholders for LMO detection.
11.	Capacity Building for Strengthening the implementation of Biological Diversity Act and Rules with Focus on its Access and Benefit Sharing Provisions	The proposed project aims at institutional, individual capacity building to effectively implement the Biological Diversity Act and Rules to achieve biodiversity conservation through implementing ABS agreements in India.
12.	Mainstreaming the Coastal and Marine Bio-diversity Conservation into Production Landscapes and Sectors of India	The proposed project intends to mainstream the concerns of biodiversity conservation into the sustainable management of marine and coastal areas.

3.6 INTERNATIONAL COOPERATION

With a deep commitment for environmental conservation and sustainable development, India has responded positively to relevant international treaties and conventions. The MoEF is the nodal Ministry for UNEP, UNDP, World Bank, United Nations Industrial Development Organization (UNIDO), UNCSD, GEF and regional bodies like ESCAP, SAARC, South Asian Cooperative Environmental Programme (SACEP), Asian Development Bank (ADB), ITPGR and EU. India has participated actively in all the major international events related biodiversity conservation over the past decades and has ratified all the major biodiversity and environment related global conventions.

3.7 OTHER CROSS-SECTORAL INITIATIVES

India has taken up several other initiatives to further augment and synergize the efforts of various ministries, departments and institutions to address issues related to poverty alleviation, education, technology innovation, etc. Such efforts facilitate sustainable development and mainstreaming biodiversity conservations. A few select examples are tabulated in **Table 3.5**.

Table 3.5: Some examples of cross-sectoral initiatives			
Sector (Ministries/ Departments)	**Scheme/Plan/ Institution**	**Outcomes**	**Relevant CBD Articles**
Rural Development (MoRD, MoEF, MoA, MoHFW, MoWR, MoPR)	NREGS (2005) – augmenting wage employment through various activities including NRM, afforestation, plantation, water harvesting, flood protection, insulating local communities on adverse effects of climate change, mandates 33% participation for women	Poverty alleviation, rural employment, watershed management, artificial recharge of ground water, desert development, development of horticulture	8(j), 10, 11, 14
Education (Central/ State Education Boards, Students)	Inclusion of environmental education in schools and college curriculum (includes modules on biodiversity conservation)	Awareness, education and training on environment related issues	13
Innovation (DST, NGOs, Innovators)	National Innovation Foundation – Documenting grassroots green innovation through "Honey Bee Network", Value addition, and dissemination	Development of sustainable technologies, fair and equitable sharing of benefits and IP management	8(j), 10 and 12
Technology transfer (DST, State and local institutions)	Technology Information Forecasting and Assessment Council (TIFAC)- development of bioprocesses and bio products, patent facilitating centre, technology up gradation and transfer	Replication of good practices in diversified agriculture, capacity building in IPR related matters and technology transfer	8 (j), 10, 12

3.8 FACILITATIVE ROLE OF JUDICIARY OF INDIA

While considering efforts for mainstreaming of biodiversity conservation, the role played by the Indian judiciary needs special mention. The facilitative role of the Indian Supreme Court in the realization of the objective of proper implementation of the conservation of the biodiversity owes its origin to the advent of public interest litigations in India. Towards this end, the judiciary interpreted provisions of domestic legislations on biodiversity subject through the instrumentalities of both the Indian Constitution and the MEAs.

In quite a few environment related cases, the court emphasized the need for balance between development and conservation. For example, in Godavarman case, the Supreme Court took note of the importance of maintaining forest cover and underscored the need for scientific management of forests.

CHAPTER 4

CONCLUSIONS: PROGRESS TOWARDS THE 2010 TARGET AND IMPLEMENTATION OF THE STRATEGIC PLAN

4.1 PROGRESS TOWARDS THE 2010 TARGET

India with a strong commitment to contribute towards achieving the 2010 target is making concerted efforts to significantly reduce the current rate of biodiversity loss. Towards this, taking into account its national priorities and needs, India has formulated a number of policies, legislations and action plans which define national goals and targets. Some of the more recent ones are as follows:

- The NEP (2006) seeks to achieve balance between conservation and development by mainstreaming environmental concerns in all developmental activities.
- Within five years of ratifying the CBD, a National Policy and Macro-level Action Strategy on Biodiversity was developed in 1999. Thereafter, preparation of micro-level action plans was undertaken through a UNDP/GEF project on NBSAP from 2000-2004. This was an extensive exercise involving a large number of people from various sectors. Subsequent to the approval of NEP in May, 2006, preparation of NBAP was taken up by revising the 1999 document so that it is in consonance with the NEP and using the NBSAP project report as one of the inputs. The NBAP 2008 defines targets, activities and associated agencies for achieving the goals.
- NAPCC (2008) outlines a number of steps to simultaneously advance development paradigms and climate change related objectives of adaptation and mitigation. Eight national missions (Chapter 3) form the core of the NAPCC and represent multipronged, long-term and integrated strategies for achieving key goals.
- In pursuance to the CBD objectives, India enacted the BDA in 2002 following a widespread consultative process over a period of eight years. The Biological Diversity Rules were notified thereafter in 2004. The Act gives effect to the provisions of the CBD. It also addresses access to biological resources and associated traditional knowledge to ensure equitable sharing of benefits arising out of their use to the country and its people, thereby contributing to achieving the third objective of the CBD. India is one of the first few countries to have enacted such a legislation. The Act is to be implemented through a three-tiered institutional structure: NBA, SBBs and BMCs. NBA was set up in 2003. Twenty two states have established SBBs, and BMCs are in the process of being set up in some states. Efforts are being made to strengthen the implementation of this Act, including through capacity building of the institutional structures under UNDP and UNEP/GEF projects.
- India has adopted NWAP to give policy imperatives for wildlife conservation.

4.1.1 Measures taken to achieve the 2010 target:

Some initiatives vis-à-vis provisional framework for goals and targets adopted in COP decisions VII/30 and VIII/15 are enumerated below.

Goal 1: Promote conservation of biological diversity of ecosystems, habitats and biomes

- Goal of achieving 33% forest and tree cover by 2012 (present cover is 23.39%). (Target 1.1, also covers targets 2.1 2.2 & 5.1) **(Figure 4.1, 4.2)**
- Scheme on NPs and WLSs modified to cover wildlife habitats outside PAs (Target 1.1. 1.2)
- Protection of sacred groves (Target 1.1. 1.2)
- Conservation of EIVs – draft notification issued (Target 1.2)
- Biodiversity heritage sites – guidelines being finalised (Target 1.2)
- Increase in coverage of PAs – (612 and 157,572 sq km)(Target 1.1, also covers targets 2.1 2.2&5.1) **(Figure 4.3)**.
- Conservation of mangroves and coral reefs (Target 1.1, also covers targets 2.1 2. & 5.1)
- 15 BRs set up, 4 with international recognition, 15 more potential sites identified. (Target 1.1, also covers targets 2.1 2.2 & 5.1) **(Figure 4.4).**
- Draft regulatory regime for wetlands (Target 1.1, also covers targets 2.1 2.2 & 5.1)

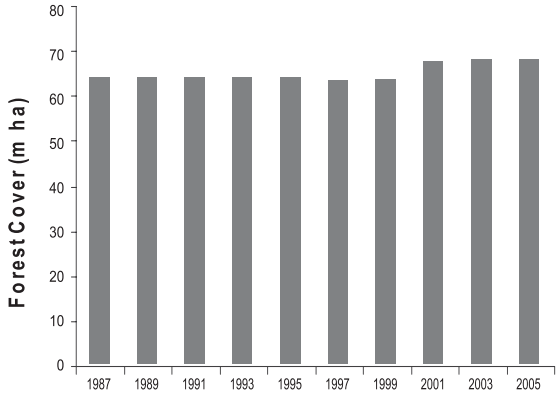


Figure 4.1: India - forest cover change over the years - maintaining a stable trend

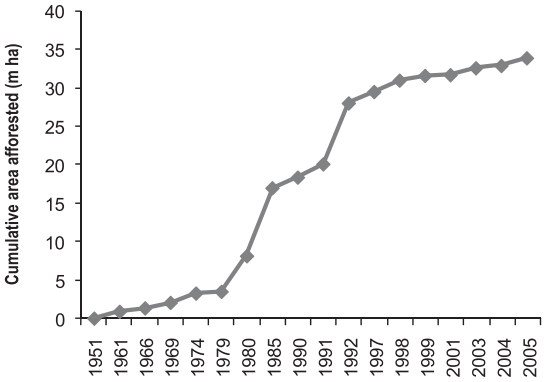


Figure 4.2: Progression in afforested area - an achievement considering the population pressure and India's unique progress as an economic power.

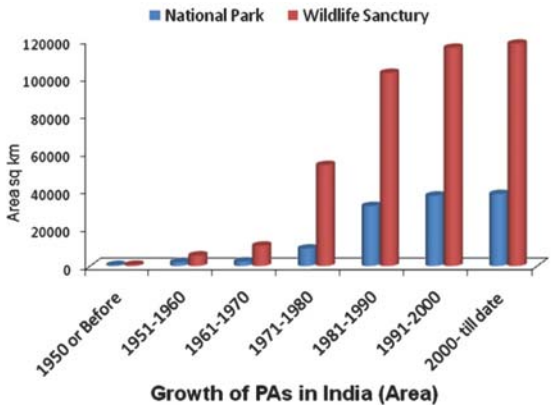


Figure 4.3: Steady increase in number and coverage area under PA network – a reflection of strong commitment to *in-situ* conservation efforts

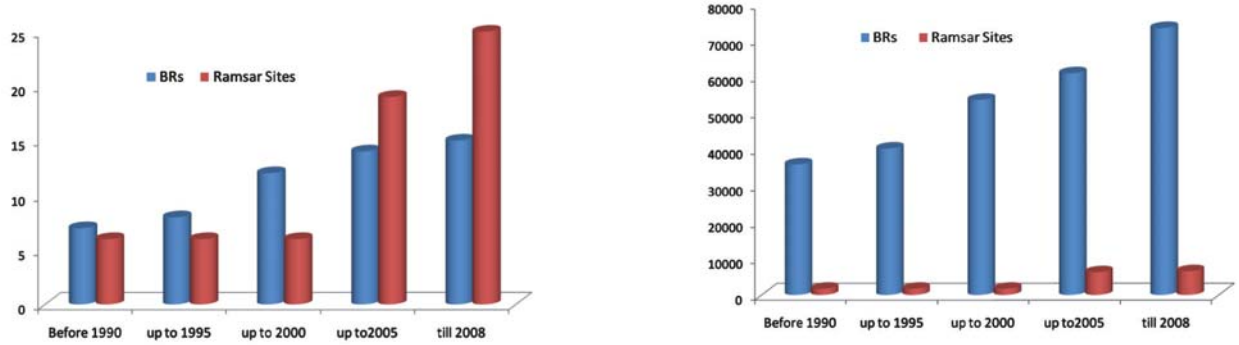


Figure 4.4: Progression in BRs and Ramsar sites in terms of number and area in km²

Goal 2: Promote conservation of species diversity

- Revised National Wildlife Action Plan (2002-16) (Target 2.1, also covers targets 1.1)
- National Tiger Conservation Authority set up (Target 2.1 also covers targets1.1)
- Eight new tiger reserves added after 2007 (Target 2.1)
- Identification and protection of IBAs (Target 2.1, 2.2) **(Figure 4.5):** Of the 466 IBAs in India, 435 support globally threatened species, 123 have biome-restricted species, while 141 qualify as IBAs because they hold rich diversity of waterbirds and 135 are potential Ramsar sites.

Figure 4.5: Identification and protection of IBAs.

- Species-specific conservation programmes, e.g. for tiger, elephant, rhinoceros, Kashmir stag, snow leopard, crocodile, musk deer, and gene sanctuaries for orchids, banana, rhododendron, citrus (Target 2.2) **(Figure 4.6, 4.7** and **4.8)**
  - The Red List of Threatened Species (IUCN 2008) states that the global wild elephant populations exhibit declining trends. However, within India, there is evidence that the large population in the Western Ghats has been increasing in recent years due to improved conservation effectiveness (www.iucnredlist.org).
  - The All India enumeration of wild population of elephants in the country was carried out in 2007, except the North-eastern States. While comparing with previous years population figures (excluding North-eastern States) the number has increased substantially (17170 in 2002 to 18663 in 2007)
  - The recent assessment of IUCN has lowered the threat category from endangered to vulnerable for the Great Indian Rhinoceros (*Rhinoceros unicornis L.*) with a justification that the rhino population showed a steady increase due to strict protection, especially in India (www.iucnredlist.org).

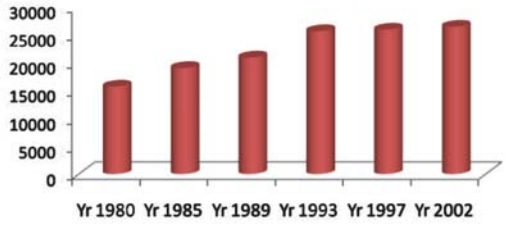


Figure 4.6: Population trends of wild elephant in India

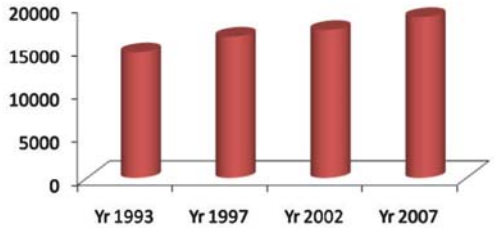


Figure 4.7: Latest population trends of wild elephant in India (excluding NE states)

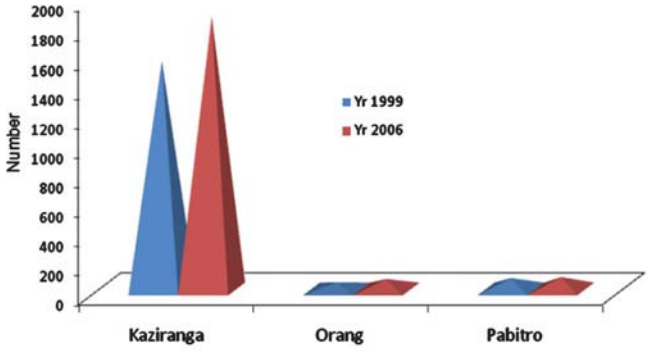


Figure 4.8: Population trends of India Rhinoceros in selected PAs

- Reintroduction of threatened species into their natural habitats, e.g., mass propagation of pitcher plant, rehabilitation of mangroves, relocation of rhinoceros (Target 2.1, 2.2).
- Propagation protocols for regeneration and promotion of cultivation for conservation of threatened species (Target 2.1).
- LaCONES established at Hyderabad.

- WCCB set up (Target 2.1, 2.2).
- Taxonomy capacity building project (Target 2.1).
- Assistance to botanic gardens for conservation of endemic and endangered species (Target 2.1, 2.2).
- Support by NMPB for large scale cultivation under contractual farming system to reduce the pressure from wild populations of threatened medicinal plants (Target 2.1, 2.2) **(Figure 4.9).**

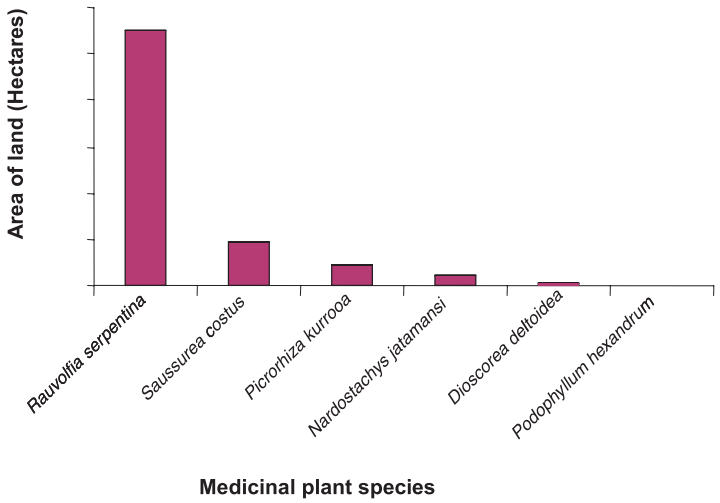


Figure 4.9: Projects supported by NMPB during the period of 2002-2006

Goal 3: Promote the conservation of genetic diversity

- National gene banks for plants, animals, insects, fish and agriculturally important micro-organisms (Target 3.1).
- Community gene banks by NGOs and others (Target 3.1).
- Research and on-farm conservation initiatives specifically with regard to medicinal plants (Target 3.1) **(Figure 4.10).**

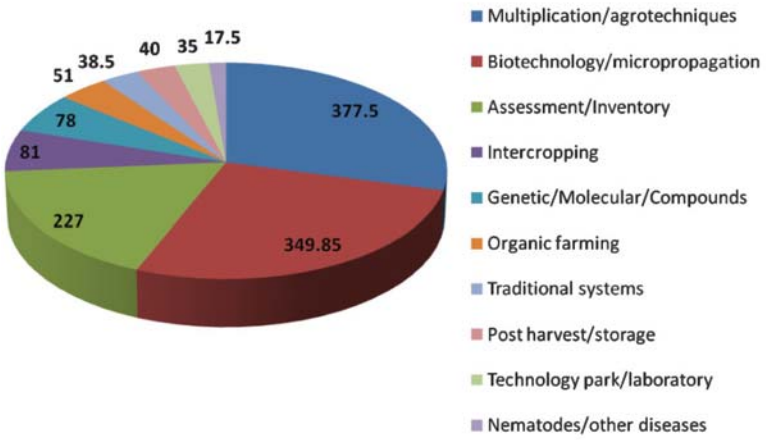


Figure 4.10: Funding provided (Rs. in lakhs) under different R&D activities by NMPB during 2000-2006

Goal 4: Promote sustainable use and consumption

- Sustainable use ingrained in Indian ethos (Target 4.1, 4.2).
- Sustainable use integrated into national decision making through policy statements (NEP, NFP, WLAP, NBAP), laws (EPA, WLPA, BDA, notification on CRZ, CMZ, EIA, eco sensitive areas), and programmes (JFM, NAEB, project on household food and nutritional security (Target 4.1, 4.2).
- All India Coordinated Research Project on under-utilized and under exploited plants (Target 4. 1).
- Honey Bee Network to protect and encourage customary use, has over 10,000 examples of customary innovations of use of TK in sustainable management (Target 4.1).
- As Party to the CITES, international trade of endangered wild species prohibited (Target 4.3).
- Progression in production of food grains and non-food grain crops, and horticulture crops (Target 4.1) **(Fig.4.11, 4.12)**.

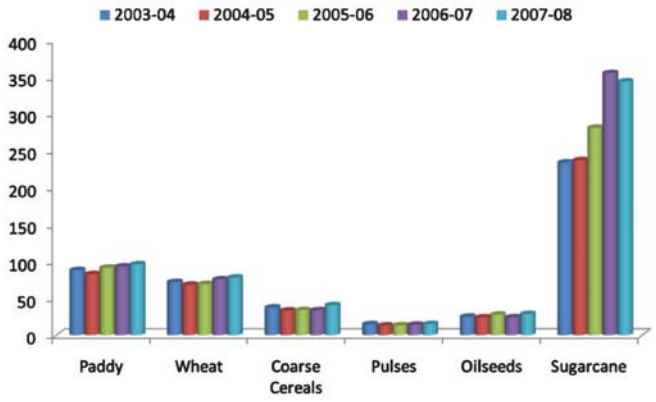


Figure 4.11: Progression in production of food grain and non-food grain crops
Source: MoA (2007-08 based on 4th estimate)

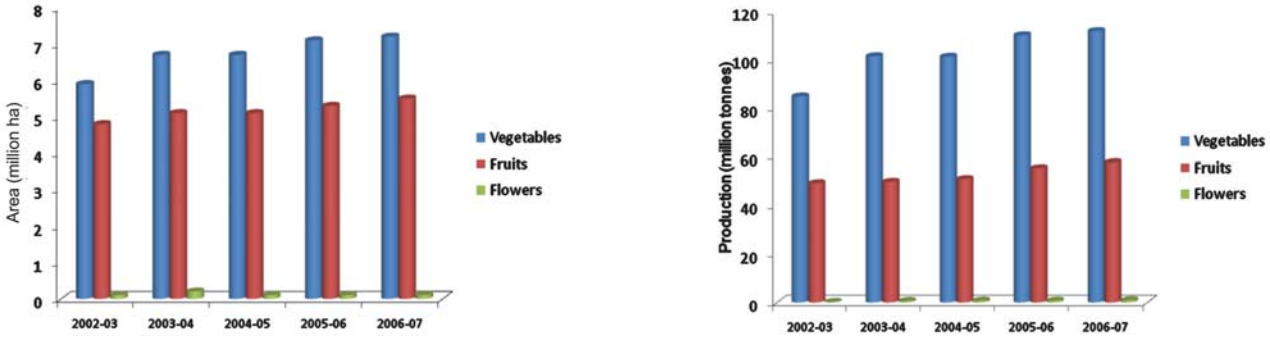


Figure 4.12: Progress in area and production of major horticulture crops over the years

Goal 5: Pressures from habitat loss, degradation reduced

- Participatory and sustainable management of degraded forest areas promoted with the help of NGOs, PRIs, etc., through programmes of NAEB (Target 5.1, 4.2, 8.1.8.2) **(Fig. 4.13)**
- Hill Area Development Programme promotes community participation to improve their livelihoods through sustainable use (Target 5.1, 4.3)

- Some public and private sector initiatives include reclamation and afforestation of mined-out areas by native species (Target 5.1, 8.1.8.2)

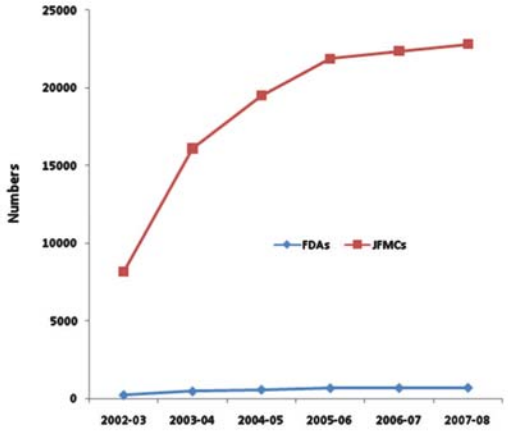


Figure 4.13: Progression in operationalization of FDAs & JFMCs under NAP

Goal 6: Control threats from invasive alien species

- Phytosanitary certificates for export, and permits for import of germplasm required under Plant Quarantine Order 2003 and DIP Act 1914 (Target 6.1).
- Health certificates for livestock to be exported required under Livestock Importation Act 1898 (Target 6.1).
- Licenses required for export of living organisms by DGFT (Target 6.1).
- Quarantine certificates required for export of wild animals/articles under WLP Act (Target 6.1).
- New scheme on Integrated Forest Protection to cover IAS (Target 6.2).
- FIS Cell set up at ICFRE (Target 6.1, 6.2).
- Implementation of IMO regulations in ballast water exchanges in practice in all major parts (Target 6.1, 6.2)
- Use of technologies for understanding IAS (Target 6.2) **(Fig.4.14)**

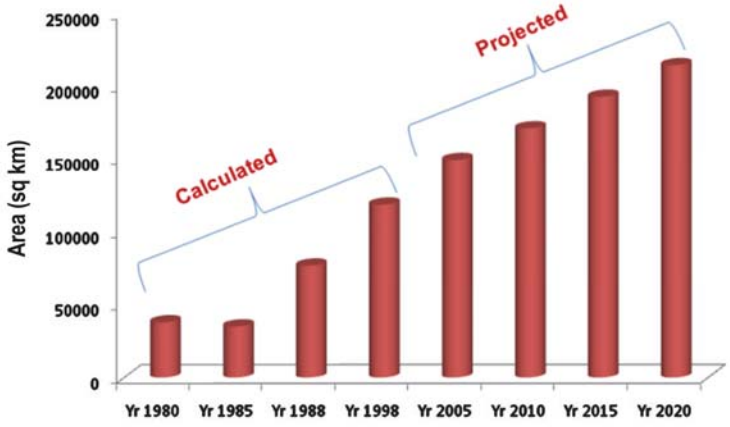


Figure 4.14: Use of technologies for understanding the process of invasion - a case study of trends and projections of *Prosopis juliflora* invasion in Banni in Kachchh

Source: Sastry & Jadav, Map India 2003

Goal 7: Address challenges to biodiversity from climate change

- Out of eight, three national missions under NAPCC relate to meeting challenges of climate change to biodiversity: National Missions on Sustaining Himalayan Ecosystem, Green India, and Sustainable Agriculture (Target 7.1).
- India is also involved in conducting research in Antarctic region as a signatory to Antarctic Treaty; India is committed in conserving the resources of southern ocean (Target 7.1, 7.2).

Goal 8: Maintain capacity of ecosystems to deliver goods and services and support livelihoods

- Participation of communities for forest conservation through JFMCs – 1,06,000 set up covering 22.02 mha of forest area (Target 8.2 and also target 4.1).
- Substantial increase in coverage area for promoting livelihood opportunities (Target 8.2, 4.1).

Goal 9: Protect traditional knowledge, innovations and practices

- Documentation of traditional knowledge (TKDL, PBRs etc.) (Target 9.1).
- Two new categories of PAs: ComR and ConR – 45 set up so far (Target 9.2).
- Setting up of BMCs for chronicling of knowledge under BDA (Target 9.1).

Goal 10: Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources

- Enactment and implementation of BDA (Target 10.1).
- Amendments of Patent Act (Target 10.1).
- PPV&FR Act (Target 10.1).
- Geographical Indications Act (Target 10.1).
- Contribution to ABS negotiations (Target 10.1).

Goal 11: Parties have improved financial, human, scientific technical and technological capacity to implement the Convention

- NEP, 2006.
- NBAP, 2008.
- Hosting of CBD meetings.
- Celebration of International Biodiversity Day.
- More than 12 projects on biodiversity for accessing GEF funds (Target 11.1).
- Programmes/courses being run on biodiversity and institutions/departments carrying out specialized biodiversity research (Target 11.1).

4.2 CONCLUSIONS AND WAY FORWARD

Undoubtedly India is vastly rich in biodiversity, being one of the top ten species-rich nations in mammals, birds, amphibians, reptiles, etc. And also no less rich in endemic diversity (Indian fish fauna alone includes two endemic families). While these figures show our strengths, there are gap areas that need to be addressed in right earnest.

While the foregoing account reflects the progress made by the country to achieve 2010 target, it is imperative to highlight major areas where India has to make extra efforts to keep pace and capitalize on

the positive trends achieved so far in other sectors. The areas that need urgent attention of all concerned stakeholders in the Indian context are given below:

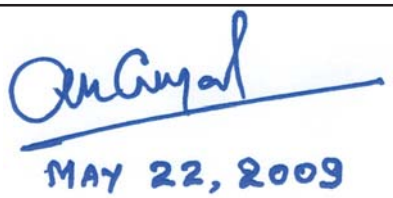
- Integrated database development at all organizational and management levels to effectively utilize the datasets as one of the important tools for decision support systems and establishment of national information system.
- Skill development at all levels, especially the ones related to i) new biotechnologies; ii) benefit sharing mechanisms; iii) contemporary tools in monitoring biodiversity; iv) biosafety protocol procedures; and v) sets of methodologies for evaluating ecosystem services.
- Encouraging and providing adequate incentives to younger generation of scientists who are willing to take up taxonomy related research.
- Monitoring and assessing biodiversity of representative landscapes need to be taken up as long – term continuous processes for robust scenario building and effective response.
- Biodiversity conservation based research projects and programmes should factor in climate change parameters at the concept through implementation.
- Development of tools, methodologies and models to assess desertification and climate change induced processes.
- Development of a national action plan on invasive alien control that takes into consideration the importance of building early warning and rapid assessments.
- Public Private Partnerships committed to respond to national and CBD goals and targets.
- Development of functional land use planning system to promote sustainability issues.
- Special incentives for promoting sustainable and rational utilization of NTFP resources including medicinal plants.
- Sustained R&D efforts to focus on underground biodiversity, genetic diversity, diversity of lower plants, functional attributes of macro and micro-habitats.
- Paucity of organizations especially those with interdisciplinary skills and expertise.
- Efforts to substantially increase international collaborations for exchange visits, information flow and quantum of funding.
- Development of innovative awareness approaches in biodiversity conservation focusing on the importance of mainstreaming.

The extent of the participation of the community groups at grass-root level affects the all round performance of the progress in implementing policies and programmes. Two examples of community efforts as an expression of the numerous initiatives taken up by NGOs and community groups to effectively minimize the loss of biodiversity and at the same time augment the resource base for developing livelihood options, are given in **Box 4.2**.

The overall progress on all the three objectives of the Convention has been commendable considering the analysis of the achievements made over the last decade and specifically during the last few years. India's commitment to further strengthen efforts to achieve 2010 target is best reflected in the XI Five Year Plan (2007-2012) document that calls upon all concerned stakeholders to effectively integrate environment considerations into policy making and action in all sectors of economy. There is a need to augment the various efforts and initiatives not only to achieve the goals and targets envisaged under the Convention but also to play a leadership role as one of the members of megadiverse nations.

APPENDIX I-A

INFORMATION CONCERNING REPORTING PARTY

Contracting Party	India
	NATIONAL FOCAL POINT
Full name of the institution	Ministry of Environment and Forests Government of India
Name and title of contact officer	Mr.A.K. Goyal, Joint Secretary
Mailing address :	Room No. 440, Ministry of Environment and Forests, Paryavaran Bhawan CGO Complex, Lodi Road New Delhi-110 003
Telephone Fax Email	91-11-24361774 91-11-24367009 akg@nic.in, akgoyal@ifs.nic.in
CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)	
Full name of the institution	Ministry of Environment and Forests, Government of India
Name and title of contact officer	Dr. Sujata Arora, Additional Director
Mailing address	Room No. 737, Ministry of Environment and Forests, Paryavaran Bhawan CGO Complex, Lodi Road New Delhi-110 003
Telephone Fax E-mail	91-11-24361601 91-11-24361601 sujata@nic.in
Submission	
Signature of officer responsible for submitting national report	
Date of submission	MAY 22, 2009

APPENDIX I-B

INFORMATION CONCERNING PROCESS OF PREPARATION OF NATIONAL REPORT

The Fourth National Report has been prepared by the MoEF through a consultative process involving various stakeholders in the Government and non-government sectors. These inter-alia include: concerned Central Government Ministries/Departments, experts, concerned organizations and institutions, and non-governmental organizations.

India has accessed GEF funds through UNDP under a UNDP/GEF project on biodiversity enabling activities for preparing the FNR. The GEF grant for this project was USD 20,000 and co-financing from MoEF was USD 20,000 (in cash and in kind). The duration of this project was 12 months. Under this project, Dr.Uppeandra Dhar was appointed as the National Consultant for assisting in preparation of the FNR.

A National Report Coordination Team (NRCT) was set up under the chairmanship of Mr.A.K.Goyal, Joint Secretary, and India's National Focal Point to the CBD. Other members of NRCT were representatives from UNDP, and MoEF's units dealing with forestry, research & policy wildlife conservation, and GEF. The Review Committee for this project was the existing interministerial-cum-expert 'Consultative Group on Biodiversity Issues' chaired by Secretary (Environment & Forests).

The MoEF had initiated the process of preparing FNR in October 2007 by requesting more than 50 Ministries/Departments, academic and research institutions, experts, members of MoEF's Consultative Group on Biodiversity Issues to provide inputs for preparing the FNR. Thereafter, following the appointment of a Consultant in September 2008, a number of interaction meetings were held with the concerned units in the MoEF as well as agencies and organizations under the overall guidance of the NRCT. A plan of action with tentative timelines was also finalized by the NRCT so as to ensure timely submission of the Report to the CBD Secretariat.

Based on the information gathered from various sources including the following written and published documents and policy papers, a zero draft of the FNR was prepared by the Consultant during end-December, 2008:

(i) Implementation of Article 6 of the CBD in India – First National Report, 1998.

(ii) India's Second National Report to the CBD, 2001.

(iii) India's Third National Report to the CBD, 2006.

(iv) National Policy and Macro-level Action Strategy on Biodiversity, 1999.

(v) National Biodiversity Action Plan, 2008.

(vi) Annual Report of the Ministry of Environment and Forests, 2007-2008.

(vii) National Forestry Action Programme – India, 1999

(viii) The Biological Diversity Act, 2002

(ix) Biological Diversity Rules, 2004.

(x) National Wildlife Action Plan, 2004

(xi) National Environment Policy, 2006

(xii) Final Technical Report of the UNDP/GEF sponsored project on National Biodiversity Strategy and Action Plan.

(xiii) Annual Reports of the concerned Central Government Ministries/Departments/ agencies, e.g. Department of Biotechnology, Department of Science and Technology, Department of Ocean Development/G.B. Pant Institute of Himalayan Environment and Development, etc.

The zero draft was discussed in a meeting of the Review Committee of the project on 28th January, 2009 under the chairmanship of Mr. B.S.Parsheera, Special Secretary, MoEF. Based on the comments/ suggestions/inputs provided by the members of the Committee, the Consultant revised the zero draft and submitted the first draft in mid-February, 2009.

Thereafter, a national workshop to discuss the first draft of India's FNR was organized by the MoEF in UNDP, New Delhi on 24th February, 2009. The workshop was well-attended by more than 70 participants, representating several concerned Ministries/Departments, Centres of Excellence, specialized institutions and agencies, NGOs, academia, NBA, UNDP, World Food Programme, etc. During the workshop, some very useful inputs/comments were received. Many of the participants subsequently also sent their comments in writing. The Consultant incorporated these inputs and submitted the second draft of FNR in the third week of March, 2009.

Thereafter, a small group of officers of the MoEF, comprising of Dr.Sujata Arora, Mr. Pramod Krishnan, and Dr.J.R.Bhatt, and the GEF Consultant, Dr.Nayanika Singh, worked on the second draft to further refine the same. Necessary approvals from the Government were obtained on the revised final draft of the FNR. The approved version of the Report was submitted electronically to the CBD Secretariat on 22nd May, 2009, which is the International Day for Biological Diversity.

APPENDIX II

FURTHER SOURCE OF INFORMATION

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APPENDIX III-A

OVERVIEW OF PROGRESS TOWARDS TARGETS OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION

The Global Strategy for Plant Conservation (GSPC) adopted by the COP in decision VI/9 contains 16 targets. In accordance with decision VII/10 calling for integration of these targets into the reporting framework for the Third National Report, India had provided detailed information on implementation of GSPC in its Third National Report. A brief updated overview of progress towards the 16 targets contained in the GSPC is given below:

S. No.	Target	Progress in implementation
1.	Target 1. A widely accessible working list of known plant species, as a step towards a complete world flora	The BSI, along with some other national laboratories and academic institutions has an ongoing programme on survey and inventorisation of plant diversity. A working list of such plant groups as Angiosperms, Gymnosperms, Pteridophytes, Bryophytes, Lichens, Algae and Fungi is available, but information on lower groups of plants (Bryophytes, Lichens, Algae and Fungi) is widely scattered. Lack of adequate number of taxonomists for different taxonomic groups of plants, especially lower groups, and lack of opportunities for trained taxonomists is a major constraint. Capacity building in taxonomy in areas where adequate expertise is not available, e.g. lower groups and some other specialized group of plants is therefore being taken up.
2.	Target 2. A preliminary assessment of the conservation status of all known plant species at national, regional and international levels.	A preliminary assessment of the conservation status has been done in case of flowering plants, Pteridophytes and few Bryophytes only. About 1,500 species of Angiosperms, and some Gymnosperm, Pteridophytes and Bryophytes have been preliminary assessed as rare and threatened. Red Data sheets on 1182 species, based on pre 1994 IUCN categories, have been prepared and 708 Red Data sheets have been published in four volumes of Red Data Books brought out by BSI so far. The IUCN Red List has included 1236 plant species from the country under various categories of threat as per its 1997 criteria. Recently a red list of 1255 threatened vascular plant species in India has been compiled. A pictorial identification manual of plant species included in different appendices of CITES as well as those in Negative List of Export has been prepared by the ENVIS center of BSI. Development of digital database on Threatened plant of India has been initiated.The BSI, along with some other national organizations and some NGOs e.g. FRLHT have ongoing programmes on survey and inventorisation of rare, endangered and threatened species of flora alongwith their conservation status.Various organizations mandated for specific biogeographic zone or ecosystems have paid special attention for the identification and conservation of threatened species in identified hotspot areas of the country. For example, a detailed Atlas of Endemics of the Western Ghats has been prepared by Institut Francais de Pondicherry. Also, the studies reveal that IHR represents 121 (20.8 out of a total 583 threatened plants (Red Data Book species) in India. The GBPIHED has recently come-up with an assessment of endemic plant species in 50 temperate families of the IHR. The analysis provides distribution maps, status and conservation priorities of endemic plants in the Himalaya.

S. No.	Target	Progress in implementation
3.	Target 3. Development of models with protocols for plant conservation and sustainable use, based on research and practical experience.	The BSI, through advisory services like identification of species/habitat needing conservation intervention, continuously helps in development of such models. Recently an in-country programme "Investing in Nature -India" has been initiated by Botanic Garden Conservation International (BGCI), WWF and Earth watch in collaboration with NBRI, Lucknow under which a number of botanic gardens have been initiated for the purpose. MoEF also initiated a one time grant for creation and augmentation of facilities in a chain of botanic gardens across the country to develop model protocols for conservation under its "Assistance to Botanic Garden Programme".Ten botanical gardens under BSI have *ex situ* conservation programme. The BGIR, Noida, is mandated for conservation of endangered plants of the country. The medicinal plants being displayed/conserved at BGIR also includes some plants that Are included in the CITES appendices. Besides a number of other gardens attached with other national organizations and academic institutions have implemented the ex situ conservation programmes with financial assistance from the MoEF. In some states, like Karnataka, Maharashtra, etc., MPCAs are being developed by the FRLHT, Centre of Excellence of MoEF, in collaboration with SFDs and the local people.Awareness programmes, public education and distribution of educational material/plant materials, etc. are some of the measures being undertaken in the gardens of the BSI, especially at BGIR.Physical verification of the conservation of targeted species is used as an effective indicator for monitoring.Lack of adequate information on the conservation biology and edaphic requirements of the targeted species are major constraints.
4.	Target 4. At least ten percent of each of the world's ecological regions effectively conserved.	India already has an elaborate PA network, comprising 96 NPs and 509 WLSs, covering approximately 4.74% of the total geographical area of the country. To provide more adequate coverage to biological diversity, it is envisaged to increase the number of NPs to 163 and WLSs to 707 covering 5.74 per cent of the total area. Besides, there are 15 BRs, 27 TRs, 5 WHS, 25 Ramsar sites, 309 Forest Preservation Plots, a large number of Sacred Groves and a few Gene Sanctuaries.Curtailment of almost all consumptive uses of resources from the protected areas has at times led to conflicts between conservationists on one hand and various stakeholders on the other hand.
5.	Target 5. Protection of fifty percent of the most important areas for plant diversity assured.	A multi-pronged strategy has been adopted to provide protection to important plant areas through in-situ and *ex-situ* programmes. Enactment of legal provisions of various kinds of protected areas in form of NPs and WLSs, ComR and ConR, heritage sites etc. has been undertaken by the government. There are about 605 PAs where a wide range of biodiversity has been protected across various ecosystems spread all over the country. The processes of strengthening this network are going on through identifying new PAs as well as new categories of PAs by involving local communities.The BDA vide section 37.1 provides for setting up of areas of biodiversity importance, as biodiversity heritage sites, in consultation with the local bodies. Gene banks and botanical gardens have been established for conservation of plants.
6.	Target 6. At least thirty percent of production lands managed consistent with the conservation of plant diversity	Efforts are being made to ensure that management of all production lands is consistent with the conservation of plant diversity.

S .No.	Target	Progress in implementation
7.	Target 7. Sixty percent of the world's threatened species conserved *in- situ*.	Several ongoing programmes promote *in situ* conservation of threatened species.The BSI has an ongoing programme for assessment of plant diversity in protected areas of the country.So far, plant diversity in nine BRs (Nanda Devi, Great Nicobar, Gulf of Mannar, Nilgiri, Manas, Dibru-Saikhowa, Kanchendzonga, Simlipal and Pachmarhi), 55 NPs, 27 TRs and a few WLSs has been documented.The documentation of the plant diversity in protected areas has been made one of the primary objectives of BSI.
8.	Target 8. Sixty percent of threatened plant species in accessible ex situ collections, preferably in the country of origin, and 10 percent of them included in recovery and restoration programmes.	Collection and preservation of crop genetic resources is being done by the NBPGR, New Delhi. National Gene Bank of the NBPGR presently comprises a Seed Repository, holding nearly 1,45,000 accessions; Tissue Culture Repository having 800 accessions, and has 1000 samples cryopreserved in liquid Nitrogen. NBPGR is assigned the task of collecting the germplasm and maintaining them in seed banks and field gene banks, for short and medium term preservation. The Bureau also supplies these genetic materials to both Indian and foreign agencies, on request, exclusively for research purpose only. BGIR, Noida, has recently set up a seed bank specifically for the indigenous tree species of the country; this initial setup has about 200 holdings.The BGIR has also planned recovery programmes for some endangered species such as Cycas beddomei. The BSI, with the Indian Botanic Garden, Howrah, BGIR, Noida and nine experimental botanic gardens attached to its circle offices across the country, has an ongoing programme of collection, introduction, multiplication, maintenance and scientific study of rare and threatened, medicinal and economically important species of plants. Presently, this network of gardens is serving as a repository of an estimated 1,50,000 live plants belonging to about 4,000 largely indigenous and selected highly valued economic exotic species. This includes over 250 endemic and threatened species and a number of wild progenitors of cultivated crop plants. In addition, the DBT has initiated a number of programmes relevant to ex situ conservation of biodiversity, such as germplasm facilities, tissue culture pilot plants, biocontrol agents, biofertiliser, clean technologies and bioinformatics. Some of the important National Facilities sponsored by the Department are: National Facility of Microbial Type Collections at Chandigarh; Blue-Green Algae at IARI, New Delhi; for Marine Cyano-bacteria at Tiruchirapalli; Plant Tissue Culture Repository at NBPGR, New Delhi besides the Tissue Culture Pilot Plants of multiplication of Forest Trees at National Chemical Laboratory, Pune and TERI, New Delhi. Besides under the G-15 initiative of the Gene Banks of Medicinal and Aromatic Plants (GEBMAP), three NGBs have also been established at CIMAP, Lucknow, NBPGR, New Delhi and TBGRI, Thiruvananthapuram. In addition, plant tissue culture laboratories have also been established by many organizations, like the BSI, ICFRE, Dehradun and Bangalore; GBPIHED, Almora; NBRI, Lucknow; CIMAP, Lucknow, TBGRI; State Forest Department of Arunachal Pradesh and several university departments, etc., for rapid mass propagation of selected rare, threatened and economically important plants species.To strength and supplement in situ conservation efforts, India has also undertaken measures for ex situ conservation of both wild as well as domesticated plants, especially the threatened species. The major facilities of ex situ conservation are the botanic gardens, field gene banks, seed banks, cryobanks, tissue culture repositories, etc. At present there are 150 organized botanic gardens or large parks in the country, of which 33 gardens (including the historical Indian Botanic garden of the BSI) are managed

S. No.	Target	Progress in implementation
		by the Central or State Governments; 70 gardens and parks are in public domain and 40 gardens are run by the Universities.
9.	Target 9. Seventy percent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained.	As elaborated under Target 8, collection and preservation of the crop genetic resources is being done by the NBPGR, New Delhi. The NBPGR also supplies these genetic materials to both Indian and foreign agencies, on request, exclusively for research purpose only. The BGIRNoida, has recently developed an Economic Plants Section displaying tree species of high economic value primarily for public education; the species grown in the section are properly labeled, with valid scientific name, common name and socio-economic uses.
10.	Target 10. Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems.	Even though there are no management plans available for the alien species, efforts are on to improve the understanding about these species through research programmes such as the one on Mikania forest weed in the Western Ghats of India by Kerala Forest Research Institute. Lack of sufficient information is a major constraint to develop the national targets on alien species. The BSI, under its ongoing programme on survey and documentation of plant resource of the country also documents the alien species, and reports, from time to time, new such records in Indian flora. Various measures have been put in place for management of alien species (may see **Box XII**). However, the problem of alien species is much more dynamic due to natural spread of the alien species through seed dispersal mechanisms, etc. The high levels of dynamism displayed by the biological systems is an important constraint. The measures need to respond according to the changing behaviour of the response and impact of the alien species.Use of some alien weeds, such as, *Lantana,* by basket weavers in some districts of Tamil Nadu who have been in this business for more than 50 years. Realizing serious threat to forest ecosystems, the Asia Pacific Forestry Commission (APFC) has also incorporated the information on forest invasive species as compiled by ICFRE in APFIS Network.
11.	Target 11. No species of wild flora endangered by international trade.	A list of plant species in international trade is available with the DGFT. To regulate the trade of endangered species of plants, a Negative List, comprising 29 species/ group of species, is in force since April 01, 1998. India is also a party to the CITES, and has WPA and the BDA in place. Some of the wild plants threatened by trade or over-exploitation at local level have been included in the relevant Schedule of the WPA. Fourteen species (*Saussurea costus*, *Nepenthes khasiana*, *Cycas beddomei*, *Renanthera imschootiana*, *Vanda coerulea*, *Paphiopedilum charlesworthii*, *P. druryi*, *P. fairreanium*, *P. hirsutissimum*, *P. insigne*, *P. spicerianum*. *P. venustum*, *P. villosum* and *P. wardianium*) are listed in Appendix I of CITES as well as Schedule VI of the WPA; 13 species/groups (*Podophyllum hexandrum*, *Dioscorea deltoidea*, *Rauvolfia serpentina*, *Aquilaria malaccensis*, *Picrorhiza kurrooa*, *Pterocarpus santalinus*, *Taxus wallichiana*, *Nardostachys grandiflora*, species of *Aloe*, *Cyathea*, and all species of family Orchidaceae, Cycadaceae (except those included in Appendix I) and Cactaceae are listed in Appendix II of CITES, and 29 species/group of species are listed in Negative List of Export.

S. No.	Target	Progress in implementation
		BSI has an ongoing programme of assessment of endangered plant species and based on threat perceptions, trade data, etc., it proposes, through the MoEF, their inclusion in different Appendices of CITES or the Negative List of Export. The WPA and BDA also help in achieving these targets. Illegal collection of threatened plants is still not a cognizable offence, except those listed in Schedule VI of WPA, or if collected from a protected area. This is a major lacuna. Untrained staff of various enforcement agencies like Forest Department, Customs, Coast Guards, etc., who fail to identify the consignment, does not help the matter either.
12.	Target 12. Thirty percent of plant-based products derived from sources that are sustainably managed.	Through integrated programmes on ecosystem such as JFM programmes, sustainable extraction of plant based products such as NTFPs have been undertaken. Development of techniques of sustainable extraction are ongoing such as tapping of gum karaya. There are several efforts addressing sustainable management of plant products. The important legislations related to forests and biological diversity are stringent enough to control the unsustainable harvests. According to, section 36C of the WPA. (1) The State Government may, where the community or an individual has volunteered to conserve wild life and its habitat, declare any private or community land not comprised within a NP, sanctuary or a ConR, as a ComR, for protecting fauna, flora and traditional or cultural conservation values and practices and "36A. (1) The State Government may, after having consultations with the local communities, declare any area owned by the Government, particularly the areas adjacent to National Parks and sanctuaries and those areas which link one protected area with another, as a conservation reserve for protecting landscapes, seascapes, flora and fauna and their habitat. The BDA provides for mandatory consultation of the local level BMCs by the NBA and State Biodiversity Boards on all issues relating to conservation and sustainable use of biological resources.To deal with the complexity of socio-cultural situations in the country is an important challenge to establish newer institutions like BMC, ComR and ConR, etc.
13.	Target 13. The decline of plant resources, and associated indigenous and local knowledge, innovations and practices that support sustainable livelihoods, local food security and health care, halted.	The NEP, 2006 envisages: Universal adoption of community based practices such as JFM, Van Panchayats and their variants, in forest management, with assured participation of women, through-out the country, rationalization of restrictions on cultivation of forest species outside notified forests, to enable farmers to undertake social and farm forestry where there risk-return-term profiles are more favourable than cropping: promote site-specific eco-development programmes in fringe areas of PAs, to restore livelihood and access to forest produce by local community, owing to access restriction in PAs; strengthen the protection of areas of high endemism of genetic resources, while providing alternative livelihood and access to resources to local communities who may be affected thereby; integrated wetland conservation into sectoral development plans for poverty alleviation and livelihood improvement; encourage cultivation of traditional varieties of crop and horticulture by promotion of organic farming, enabling farmers to realize a price premium; promote sustainable tourism through adoption of best practice norms for tourism facilities and access to ecological resources and multistakeholder partnership to enable local communities to gain better livelihood; consider particular unique mountain scapes as entities with incomparable values, in developing strategy for their

S. No.	Target	Progress in implementation
		protection; mainstream the sustainable management of mangroves into forestry sector regulatory regime, ensuring that they continue to provide livelihood to local communities; and promote good practices norms in all relevant sectors to conserve natural resources and reduce adverse environment impacts.
14.	Target 14. The importance of plant diversity and the need for its conservation incorporated into communication, educational and public-awareness programmes.	The NEP, 2006, seeks to : mainstream scientifically valid environment content in curricula of formal education, besides non-formal programmes such as adult education; conduct special mid-career training programmes for groups with special responsibilities (e.g. judiciary, policy makers, legislators, city and regional planners, etc) ; and prepare and implement a strategy for enhancing environmental awareness among general public and special groups. The MoEF interacts actively with the University Grants Commission (UGC), National Council for Education, Research and Training (NCERT) and the Ministry of Human Resource Development (MHRD) for introducing and expanding environmental concepts, themes, issues etc. in the curricula of schools and colleges. Environmental concepts, themes, issues etc. have been introduced in the curricula of schools and colleges. The BSI organizes exhibitions, film shows, slide shows and brings out thematic publication for creating public education and awareness. The ICFRE organizes forestry extention programmes, including transfer of technology, public awareness, extension of technical support to State Forest Departments, NGOs etc. These activities are taken through short-term courses and seminars, publication of brochures, books and pamphlets, production of films and other audio-visual programmes, adoption of villages for developing social forestry and agro-forestry models and transfer of technology. FRI, IIFM and WII impart training on environment, forest and wildlife management. Other organizations/NGOs with activities aimed at creating environmental and conservation awareness among all section of society are CEE, CPREEC, NMNH, ZSI, etc.
15.	Target 15. The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy.	The NEP, 2006 seeks to: review the present institutional capacity in respect of enforcement of environmental laws and regulations, and prepare and implement programmes for enhancement of capacities as required; incorporate in all environmental programmes a capacity development component, with sufficient ear-marked funds; and ensure continuous upgradation of knowledge and skills of scientific and technical personnel involved in environmental management in public institutions through dedicated capacity building programmes.AICOPTAX: organizes training in plant and animal biosystematics. Under NGC Programme about 84,000 eco clubs (school colleges) are supported by the MoEF and implemented through State Nodal Agencies. This programme has helped in inculcating interest and understanding of school children in biodiversity related issues.Various specialized organizations (e.g. IGNFA, IPIRTI, WII; IIFM; GBPIHED, and the centres of excellence [e.g. CEE; CPREEC, etc.] along with various NGOs are involved in différent type of capacity building programmes in the country.
16.	Target 16. Networks for plant conservat-ion activities established or strengthened at national, regional and international levels.	The country has a well-established network of protected areas, botanic gardens and institutions for conservation activities effectively supported by legislative and policy framework.

APPENDIX III-B

PROGRESS TOWARDS ACHIEVING TARGETS OF THE PROGRAMME OF WORK ON PROTECTED AREAS

The Conference of the Parties to the CBD at its seventh meeting, vide decision VII/28 had confirmed that the protected areas were essential for achieving the three objectives of the CBD. Accordingly, a Programme of Work for Protected Areas (POWPA) was adopted during COP VII. The overall purpose of the POWPA is to support the establishment and maintenance by 2010 for terrestrial and by 2012 for marine areas of comprehensive, effectively managed, and ecologically representative national and regional systems of protected areas that collectively, *inter alia*, through a global network contribute to achieving the three objectives of the Convention and the 2010 target to significantly reduce the current rate of biodiversity loss at the global, regional, national and sub-national levels and contribute to poverty reduction and the pursuit of sustainable development, thereby supporting the objectives of the Strategic Plan of the Convention, the World Summit on Sustainable Development Plan of Implementation and the Millennium Development Goals.

The PoWPA consists of four interlinked programme elements, viz., 1) direct actions for planning, selecting, establishing, strengthening, and managing, protected area system and sites; 2) governance, participation, equity and benefit sharing; 3) enabling activities; and 4) standards, assessment and monitoring. All these are intended to be mutually reinforcing and cross-cutting in their implementation and are developed to avoid unnecessary duplication with existing thematic work programmes and other ongoing initiatives of the CBD, and to promote synergy and coordination with relevant programmes of various international organizations. In conformity with the CBD guidelines and keeping in view the national policies and mechanisms in place, India's progress in achieving these targets is detailed as under:

Goal 1.1. To establish and strengthen national and regional systems of PAs integrated into a global network as a contribution to globally agreed goals.

Target: *Establish a global network of comprehensive, representative and effectively managed national and regional PA system.*

- India's national PA system is based on a conservation-planning framework and in accord with the Biogeographical Classification of India (10 *'Biogeographic Zones'* and 27 *'Biogeographic Provinces'*.
- India currently has 99 NPs, covering an area of around 39,155 km^2, (1.19% of country's geographical area) and 513 WLSs, covering an area of around 1,18,417 km^2, (3.60 % of country's geographical area).
- 612 NPs and WLSs, covering an area of around 1,57,572 km^2, (4.8 % of country's geographical area).
- Through an amendment to the WPA, 1972 in 2003, two more categories of PAs – ConR and ComR- established. These are largely community oriented PA governance initiatives. So far, India has established 43 ConR and 4 ComR.

- India has special flagship programmes for the conservation of tiger, elephant and snow leopard. These operate on a large landscape and have led to the recovery of these species and conservation of their habitats. India currently has 37 TRs and 26 ERs.
- India has established a WCCB in 2007 to combat illegal trade in wildlife and its derivatives.
- India has established the NTCA in 2006 to strengthen tiger conservation efforts.
- The terms *'comprehensive'*, ecologically representative and effectively managed' though not legally defined are well understood. The WII, a premier training and research institution, maintains a *'National Wildlife Database'*, that provides up-to-date information on the PA network of the country.
- As per the 'Biogeographical Classification of India', 19 out of the 27 *'biogeographic provinces'* are adequately represented in the PA system of India. The 7 under represented *'biogeographic provinces'* are 3A, 4A, 6C, 6E, 7B, 8A and 9B.
- India's NPs correspond to IUCN PA Category II and WLSs correspond to IUCN PA Category IV.
- Since the adoption of the POWPA, India's PA network has increased by 15 per cent.
- Although NWAP (2002-16) envisages 10% of the geographical area of the country under PA coverage, the extent of the formal PA network, at present, is limited to 4.8%. However, it is pertinent to mention that almost all government owned forests and other important ecosystems, which are outside the PA network (around 20 % of the geographical area of the country), are under some kind of conservation planning. The management planning in such areas does take into account the broad principles of conservation. Similarly, there are several examples of community driven conservation initiatives in the country. If all these are taken into account, it can be seen that around one-fifth of the geographical area of the country is under some kind of broad based conservation planning.
- Expansion of PA network is envisaged in the NEP, 2006. In order to strengthen and consolidate the existing wildlife conservation/management efforts, the Central Government has launched a modified national scheme - titled 'Integrated Development of Wildlife Habitats' in 2008. Apart from providing support to PAs, the scheme extends financial and technical support to high value biodiversity formations outside the formal PA network (traditional and customary conservation practices like CCAs in all types of tenurial status) and also provide for initiating recovery programmes for select critically endangered species.
- Recommendations are in place to establish additional protected areas (67 new NPs and 203 new WLs) to make it more biogeographically representative. However, due process as per the provisions of the WPA and other relevant legislation needs to be followed for the establishment of new PAs. More efforts are needed to plan and establish new *'Marine Protected Areas'* to further strengthen conservation of rich and varied marine and coastal biodiversity of the country.

Goal 1.2. To integrate protected areas into broader land- and seascapes and sectors so as to maintain ecological structure and function.

Target: *All protected areas and protected area systems are integrated into the wider land and seascape, and relevant sectors, by applying the ecosystem approach and taking into account ecological connectivity and the concept, where appropriate, of ecological networks*

- The need for adopting the ecosystem approach and establishing/managing PAs in the regional context is well understood. And efforts are on to adopt them in practice notwithstanding difficulties in integrating PAs in broader land and seascapes.
- A GEF aided "India Eco-development Project' was implemented in select tiger landscapes in the country to integrate the concerns of PA management into the wider landscapes. The results of this project have clearly shown that improving the livelihoods of local people has significant positive impact on the ecological health of the PAs. The lessons learnt through the implementation of the same have been incorporated into the national wildlife legislation and schemes.
- In consonance of these efforts, the MoEF, GOI has initiated the planning of another GEF aided 'Biodiversity Conservation and Rural Livelihoods' project under which six landscapes have been identified around PAs to demonstrate the utility of the ecosystem approach/landscape level planning for PA management.
- GOI has also prepared a programmatic approach for "mainstreaming biodiversity conservation into the production sectors in costal and marine environments particularly in and around the PAs".
- Management Plans of PAs are also been developed applying the 'ecosystem approach', which provide for a core-buffer strategy for wildlife conservation. It is envisioned that whereas the core areas/ critical wildlife habitats are to be largely inviolate in nature, co-existence agenda is to be promoted in the buffer.
- NEP (2006) envisages ensuring that human activities on the fringe areas of PAs do no degrade the habitat or otherwise significantly disturb wildlife. Towards following it up, the process of establishing eco-sensitive zones around the PAs at appropriate distance from the boundary of the PAs is being undertaken. In such areas, developmental activities are to be regulated so that such activities have minimal adverse impact on the PA.

Goal 1.3. To establish and strengthen regional networks, TBPAs and collaboration between neighbouring protected areas across national boundaries.

Target: *Establish and strengthen by transboundary protected areas, other forms of collaboration between neighbouring protected areas across national boundaries and regional networks, to enhance the conservation and sustainable use of biological diversity, implementing the ecosystem approach, and improving international cooperation.*

As per the decision taken in the meeting of the National Board for Wildlife held on 15th October 2003, the MoEF constituted a Task Force with representatives from the Ministry of External Affairs, Ministry of Home Affairs and other relevant stakeholders with a mandate to identify potential areas that can be declared as TBPA. Thereafter a national consultative process for planning and establishing 'Transboundary PAs' has been initiated.

Five TBPAs have been identified for enhancing regional cooperation with neighbouring countries and twenty four PAs feature in the regional network of Transboundary PAs, under the IUCN framework for TBPAs.

A provision for the implementation TBPAs has been incorporated in the national wildlife scheme on Integrated Development of Wildlife Habitats. The framework for implementation under this, *inter alia*, include identifying and promoting common values, developing co-operative agreements, promoting

coordinated and co-operative activities, involving and benefiting local people, achieving coordinated planning & PA development, working towards funding sustainability, monitoring and assessing progress, obtaining and maintaining support of decision-makers, dealing with tension or armed conflict, etc.

Besides, India is committed to take appropriate management steps for migratory species under the relevant international conventions to which it is a signatory. The important ones are as follows:

1. India has signed a MoU with the CMS on 20th February 2007 at Bangkok, for the conservation and management of marine turtles and their habitats. Accordingly, a National Marine Turtle Advisory Committee has been constituted on 25th November 2008 under the chairmanship of Secretary, MoEF.
2. India has signed a MoU with the CMS for the conservation and management of Dugongs and their habitats on 28th May 2008 at Bonn, Germany.

Goal 1.4: To substantially improve site-based protected area planning and management.

Target: *All protected areas have effective management using participatory and science-based site planning processes that incorporate clear biodiversity objectives, targets, management strategies and monitoring programmes, drawing upon existing methodologies and a long-term management plan with active stakeholder involvement.*

The issue of having up-to-date science-based management plans for PAs is being actively pursued both by the Federal (Central) and Provincial (State) Governments. Currently, approximately 39% of the NPs have management plans; 22% are under preparation and 39% have no management plans. Similarly, only approximately 34% of wildlife sanctuaries have management plans; 16% are under preparation and 50% have no management plans. However, Annual Plan of Operations (APOs) outlining protected area management interventions and funds required are prepared for all PAs.

Further, preparation of site-specific and scientific management plans through a consultative process is one of the thrust areas identified in the national wildlife schemes and programmes.

The guidance for preparation of management plans is provided through *'A Guide for Planning Wildlife Management in Protected Areas and Managed Landscapes'*. The management plans are under effective implementation, subject to constraints due to inadequate manpower and insufficient funding resources.

Consultations with relevant stakeholders and inputs from researchers are being taken to identify science-based biodiversity conservation targets. One of the best examples of this process is the present exercise of preparation of a management plan for Gulf of Mannar Marine National Park and Biosphere Reserve. The management plan preparation process is being funded by the Gulf of Mannar Biosphere Reserve Trust set up by the Government of Tamil Nadu.

The WII is conducting terrestrial islands and under-water coral reef and other marine animal surveys to update their status from the existing baseline information created by the Integrated Coastal and Marine Area Management (ICMAM) project of the Ministry of Earth Sciences and ZSI during the earlier years. There is a need to adopt a similar approach for preparing/updating management plans of other important PAs especially WHS/ BRs etc.

Goal 1.5: To prevent and mitigate the negative impacts of key threats to protected areas.

Target: *Effective mechanisms for identifying and preventing, and/or mitigating the negative impacts of key threats to protected areas are in place.*

Identifying, preventing and/or mitigating the negative impacts of key threats to PAs is a major challenge and task for the PA management. This is being undertaken at the site level in consultation and cooperation of the relevant stakeholders.

At the policy or strategic level, the GOI has enacted enabling policy and legal instruments to minimize threats which may affect the ecological integrity of PAs. The NEP, 2006, the NWAP, 2002-2016, the WPA, 1972 are some of the prominent instruments for this purpose. The MoEF is in the process of preparation of a framework for regulating activities around PAs under the provisions of EPA, 1986.

The MoEF is carrying out the Management Effectiveness Evaluation of Protected Areas in the country through independent experts using international protocols. During the 10th Plan five year plan, an evaluation of 30 PAs was carried out, which showed the following results: Very Good (7 PAs); Good (20 PAs) and Satisfactory (3 PAs). This process is being continued against measurable performance targets during the 11th Plan period after further refinement.

In 2005-06, 28 TRs in the country, covering an area of 37,761 km^2 were evaluated. The final report was peer-reviewed by IUCN and some useful suggestions to improve the methodology and process have been made*.

Goal 2.1: To promote equity and benefit-sharing.

Target: *Establish mechanisms for the equitable sharing of both costs and benefits arising from the establishment and management of PAs.*

Several Provincial (State) Governments have developed enabling legal provisions to facilitate the process and allow some benefits to be shared at the site level. However, no Federal (Central) legal framework is currently in place for equitable sharing of costs and benefits arising from the establishment and management of PAs across the country.

No assessments at a countrywide scale have been made of the economic and socio-cultural costs and benefits of PAs, particularly for indigenous and local communities.

Recently, the GOI has enacted the Forest Rights Act, 2006' for empowering the tribal communities and other forest dwellers and protecting their access and use of forest resources. However, the impact of this legislation is yet to be observed.

Goal 2.2: To enhance and secure involvement of indigenous and local communities and relevant stakeholders.

Target: *Full and effective participation of indigenous and local communities, in full respect of their rights and recognition of their responsibilities, consistent with national law and applicable international obligations, and the participation of relevant stakeholders, in the management of existing, and the establishment and management of new, PAs*

* *Review of Tiger Reserve Assessment Reports, 2005; Evaluation Reports of Tiger Reserves in India, 2006. Available at :* http://www.wii.gov.in/envis/sdnp/index.htm

To ensure full and effective participation of indigenous and local communities, in respect of their rights and recognition of their responsibilities in the management of existing and the establishment and management of new PAs, the GOI through an amendment in the WPA, 1972 has included two new legal categories of PAs. These are ConR and ComR.

ConR: "*The State Government may, after having consultations with the local communities, declare any area owned by the Government, particularly the areas adjacent to National Parks and Sanctuaries and those areas which link one protected area with another, as a conservation reserve for protecting landscapes, seascapes, flora and fauna and their habitat".*

"The State Government shall constitute a conservation reserve management committee to advise the Chief Wildlife Warden to conserve, manage and maintain the conservation reserve"

ComR: *"The State Government may, where the community or an individual has volunteered to conserve wildlife and its habitat, declare any private or community land not comprised within a NP, sanctuary or a ConR, as a ComR, for protecting fauna, flora and traditional or cultural conservation values and practices".*

"The State Government shall constitute a ComR management committee, which shall be the authority responsible for conserving, maintaining and managing the community reserve".

SFDs are in the process of identifying potential areas that could be designated as ConR/ComR. So far, 43 ConR and four ComR have been established in the country. Under the national wildlife scheme, financial and technical assistance is provided for the conservation of such areas.

Similarly, in 2008, Central Government has formulated a national wildlife scheme –"Integrated Development of Wildlife Habitats', where various CCAs have been brought under the ambit of conservation planning and support. In view of this, GOI has also formed a Committee to look into the management and funding of such CCAs with a view to identify and prioritize them. However, more efforts are needed for identifying these areas and integrating them into the national protected areas system.

Besides this, at the site level, PA managers engage and ensure participation of local communities in the management of PAs in various ways. Site-specific eco-development programmes involving local communities and aimed at generating livelihoods for conservation are now initiated in almost all PAs of the country. However, more requires to be done in this respect.

Goal 3.1: To provide an enabling policy, institutional and socio-economic environment for PAs.

Target: *By 2008 review and revise policies as appropriate, including use of social and economic valuation and incentives, to provide a supportive enabling environment for more effective establishment and management of PAs and PA systems.*

Some policy, institutional and socio-economic frameworks exist to conduct economic valuation of the goods and services from PAs. Apart from the direct and tangible benefits, a large number of indirect and intangible benefits from PAs are difficult to assess and quantify in monetary terms. Efforts are under way to develop expertise for 'Natural Resource Accounting' and implement this assessment for PAs across the country. Similarly, quantification of incentives for establishment of new PAs is difficult but the linkages between food, water, environmental security with establishment and effective management of PAs is being gradually understood by various sections of the society.

There are a few PAs in the country, where the revenue generated from the PA is recycled for PA management and local welfare. This has acted as a major boost for conservation and also for soliciting local support for conservation.

Based on the above experience, the amendment to the WPA, 1972 has provided means for the creation of Conservation Foundations in the Tiger Reserves in the country with a mandate of supporting the PA management through independent revenue generation and recycling of the same. However, this aspect needs to be scaled up further.

The major impediment is the lack of capacity and resources to undertake the task of economic evaluation of environmental goods and services emanating from the PAs. Besides this, there is a feeling that establishment of PAs also leads to hardships to local communities mainly because of (a) restriction on access and use of resources inside PAs, and (b) increase in wildlife-human conflicts. A range of strategies to mitigate wildlife-human conflicts including payment of compensation for losses suffered is being implemented, with only mixed success.

Goal 3.2: To build capacity for the planning, establishment and management of PAs.

Target: comprehensive capacity-building programmes and initiatives are implemented to develop knowledge and skills at individual, community and institutional levels, and raise professional standards.

A capacity needs assessment for protected areas management has been undertaken. The GOI has established WII as a premier training and research institution in the field of wildlife and protected area management and has provided enabling governance system and functional autonomy to fulfill its mandate. The WII organizes a wide array of regular and customized training programmes of various duration for a number of target groups not only from the forest/wildlife sector but also for policy makers, defence, customs, revenue, enforcement agencies, etc.

These capacity building programmes have led to sensitization of over 5,000 personnel on issues relating to wildlife and protected area management.

Besides WII, the SFDs are also implementing capacity building programmes either by setting up of their own training institutions or sponsoring their managers and frontline staff for training in other institutions.

The Directorate of Forest Education (DFE) also organizes a range of capacity building programmes for managers and frontline staff on forestry and wildlife management.

The WII has come up as an important regional training institution and its training programmes are being well received by the countries in South and South East Asia. The UNESCO and IUCN have also recognized WII as a regional partner institution.

More support is, however, required from international agencies for sponsoring candidates from the region to WII and for customizing thematic courses as per training needs of these countries.

Goal 3.3: To develop, apply and transfer appropriate technologies for protected areas.

Target: *development, validation, and transfer of appropriate technologies and innovative approaches for the effective management of protected areas is substantially improved, taking into account decisions of the COP on technology transfer and cooperation.*

A number of innovative approaches and technologies are being planned and implemented for effective protected area management.

Modern tools and technologies *viz.* remote sensing and GIS, IT, Wildlife Forensics, Satellite Telemetry, Camera Traps, etc., are now being used by the PAs for assessment and management of resources.

At the institutional level, WII has had several collaborative/sponsored programmes with a large number of international agencies/organizations such as FAO, UNDP, UNESCO, IUCN, UNEP, United Nations Institute for Training and Research, United States Wildlife and Fisheries Services, United States Forest Service, United States National Park Service, Norwegian Agency for Development Cooperation NORAD, ICIMOD, etc. The countries of the region are using the capacity developed at WII.

There is however a need to establish/expand the scope of regional collaboration, for which the CBD Secretariat and other international agencies can play a meaningful role.

Goal 3.4: To ensure financial sustainability of protected areas and national and regional systems of PAs.

Target: *Sufficient financial, technical and other resources to meet the costs to effectively implement and manage national and regional systems of protected areas are secured, including both from national and international sources, particularly to support the needs of developing countries and countries with economies in transition and small island developing States.*

The functional needs for wildlife and PA management have been identified at the Central as well as State levels. These have been articulated in the planning process also. For the XI Five Year Plan the total projected requirement for the Wildlife Sector at the Central level is Rs. 3660.30 crores (840 million US $). However, the actual allocation provided is only half of this.

For most PAs in India, almost all funds come from the Central and State Governments only, as other sources of funds are non-existent or minimal. A few NGOs provide small funding support to some PAs but in the national context, this support is negligible. Consequent to the 2006 amendment to the WPA, 1972, a few TRs in the country has established conservation foundations for augmenting the resources of the PA.

There is need to develop a comprehensive sustainable financing strategy for PAs so as to plug in gaps in PA funding.

Goal 3.5: To strengthen communication, education and public awareness.

Target: *Public awareness, understanding and appreciation of the importance and benefits of PAs is significantly increased.*

The MoEF is conscious of the need to strengthen communication, education and public awareness for enhancing the understanding and appreciation of the importance and benefit of PAs.

The SFDs also organize a number of nature education and other awareness programmes. The CEE plays an important role in this regard and organizes a range of programmes and activities to raise

conservation awareness. A number of NGOs such as World Wildlife Fund (WWF), CPREEC etc., are also actively engaged in this pursuit. Several PAs have established 'Conservation Education/ Interpretation Centres'. The GOI has recently introduced 'Environmental Education' in the school curriculum.

There is however, a need to review the impact of conservation education programme to measure the effectiveness in communicating the basic biodiversity values of PAs.

Goal 4.1: To develop and adopt minimum standards and best practices for national and regional PA systems.

Target: *Standards, criteria, and best practices for planning, selecting, establishing, managing and governance of national and regional systems of PAs are developed and adopted.*

A comprehensive system of standards, criteria and best practices for site selection, management and governance has not been established. However, some guidance is made available by the WII through its wide array of training programmes and library / documentation resources. More work is needed in this direction.

The MoEF has recently formalized the monitoring methodology and protocols for the 17 Tiger Range states that has been applied in the field (2006-2007). A proposal to extend and expand the monitoring methodology and protocols for the remaining states in the country to develop and implement a comprehensive and country-wide standardized monitoring system is under process of implementation.

Goal 4.2: To evaluate and improve the effectiveness of PAs management.

Target: *Frameworks for monitoring, evaluating and reporting PAs management effectiveness at sites, national and regional systems, and transboundary PA levels adopted and implemented by Parties.*

India has initiated the MEE of PAs in a systematic way, using the IUCN-WCPA framework and adapting it to suit Indian conditions. During the 10th Plan five year plan, an evaluation of 30 PAs was carried out. This process is being continued against measurable performance targets during the 11th Plan period after further refinement.

In 2005-06, 28 TRs in the country, covering an area of 37,761 km^2 were evaluated. The final report was peer-reviewed by IUCN and some useful suggestions to improve the methodology and process have been made*.

Under UNESCO-IUCN project 'Enhancing Our Heritage : Management and Monitoring for Success in World Natural Heritage Sites', the management effectiveness evaluation of Keoladev National Park, Rajasthan and Kaziranga National Park, Assam have been comprehensively carried out.

The GOI has constituted six 'Expert Evaluation' teams, which are conducting MEE of 30 PAs across the country. This evaluation is being done at three levels *viz.* (i) National (ii) State and (iii) Site.

CBD target of implementing MEE of at least 30% of each party's PAs by 2010 is being met.

The conclusions and recommendations from MEE process will be incorporated at the policy level as well as the site level to enhance the effectiveness of PAs.

ABBREVIATIONS

ABS	-	Access and Benefit Sharing
ADB	-	Asian Development Bank
AERF	-	Applied Environmental Research Foundation
AGRI-IS	-	Information System on Animal Genetic Resources of India
AICOPTAX	-	All India Coordinated Project on Capacity Building in Taxonomy
AIMS	-	Agriculturally Important Microorganims
AISLUS	-	All India Soil and Land Use Survey
APFC	-	Asia Pacific Forestry Commission
APFISN	-	Asia Pacific Forest Invasive Species Network
APOs	-	Annual Plan of Operations
ASEAN	-	Association of Southeast Asian Nations
ATMA	-	Agricultural Technology Management Agency
ATREE	-	Ashoka Trust for Research in Ecology and the Environment
AYUSH	-	Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy
BCH	-	Biosafety Clearing House
BDA	-	Biological Diversity Act, 2002
BGCI	-	Botanic Garden Conservation International
BGIR	-	Botanical Garden of Indian Republic
BMCs	-	Biodiversity Management Committees
BNHS	-	Bombay Natural History Society
BRs	-	Biosphere Reserves
BSAP	-	Biodiversity Strategy and Action Plan
BSI	-	Botanical Survey of India
BTIS	-	Biotechnology Information System
CAWT	-	Coalition Against Wildlife Trafficking
CBD	-	Convention on Biological Diversity
CCAs	-	Community Conserved Areas
CCMB	-	Centre for Cellular and Molecular Biology
CDM	-	Clean Development Mechanism
CEE	-	Centre for Environmental Education
CEMDE	-	Centre for Environmental Management of Degraded Ecosystems
CEVA	-	Centre for Education and Voluntary Action
CFTRI	-	Central Food Technological Research Institute

CGIAR	-	Consultative Group on International Agricultural Research
CIMAP	-	Central Institute of Medicinal and Aromatic Plants
CIMMYT	-	International Maize and Wheat Improvement Center
CITES	-	Convention on International Trade in Endangered Species of Fauna and Flora
CMS	-	Convention on the Conservation of Migratory Species
CMZ	-	Coastal Management Zone Notification
ComR	-	Community Reserves
ConR	-	Conservation Reserves
COP	-	Conference of Parties
CPCB	-	Central Pollution Control Board
CPREEC	-	CPR Environmental Education Centre
CRZ	-	Coastal Regulation Zone
CSE	-	Centre for Science and Environment
CSIR	-	Council of Scientific & Industrial Research
CZA	-	Central Zoo Authority
DAHD	-	Department of Animal Husbandry Dairying & Fisheries
DBT	-	Department of Biotechnology
DDP	-	Desert Development Programme
DFE	-	Design for the Environment
DFE	-	Directorate of Forestry Education
DGFT	-	Director General of Foreign Trade
DIP	-	Destructive Insects and Pests Act, 1999
DPAP	-	Drought Prone Area Programme
DST	-	Department of Science & Technology
EBAs	-	Endemic Bird Areas
EC	-	European Commission
EDCs	-	Eco-Development Committees
EDF	-	Eco-Development Forces
EE	-	Environmental Education
EEZ	-	Exclusive Economic Zone
EIA	-	Environmental Impact Assessment
EIVs	-	Entities of Incomparable Values
EMG	-	Ethno Medical Garden
ENVIS	-	Environmental Information System
EPA	-	Environment (Protection) Act, 1986
ERs	-	Elephant Reserves

ESAs	-	Ecologically Sensitive Areas
ESCAP	-	Economic and Social Commission for Asia and the Pacific
ETFs	-	Eco Task Forces
EU	-	European Union
FAO	-	Food and Agricultural Organization
FDAs	-	Forest Development Agencies
FIS	-	Forest Invasive Species
FNR	-	Fourth National Report
FRI	-	Forest Research Institute
FRLHT	-	Foundation of Revitalization of Local Health Traditions
FSI	-	Forest Survey of India
GBPIHED	-	G. B. Pant Institute of Himalayan Environment and Development
GBPUAT	-	G. B. Pant University of Agriculture and Technology
GCDT	-	Global Crop Diversity Trust
GDP	-	Gross Domestic Product
GEBMAP	-	Gene Banks of Medicinal and Aromatic Plants
GEF	-	Global Environment Facility
GIB	-	Great Indian Bustard
GIS	-	Geographical Information System
GLOBE	-	Global Learning and Observation to Benefit the Environment
GM	-	Genetically Modified
GOI	-	Government of India
GPA	-	Global Plan of Action
GPS	-	Global Positioning System
GPVR	-	Germplasm and Plant Varieties Registration
GSPC	-	Global Strategy for Plant Conservation
GVY	-	Gram Van Yojana
HESCO	-	Himalayan Environmental Studies and Conservation Organization
IAEM	-	Indian Association for Environmental Management
IARI	-	Indian Agricultural Research Institute
IAS	-	Invasive Alien Species
IBAs	-	Important Birds Areas
ICAR	-	Indian Council of Agricultural Research
ICFRE	-	Indian Council of Forestry Research and Education
ICGEB	-	International Centre for Genetic Engineering and Biotechnology
ICIMOD	-	International Centre for Integrated Mountain Development

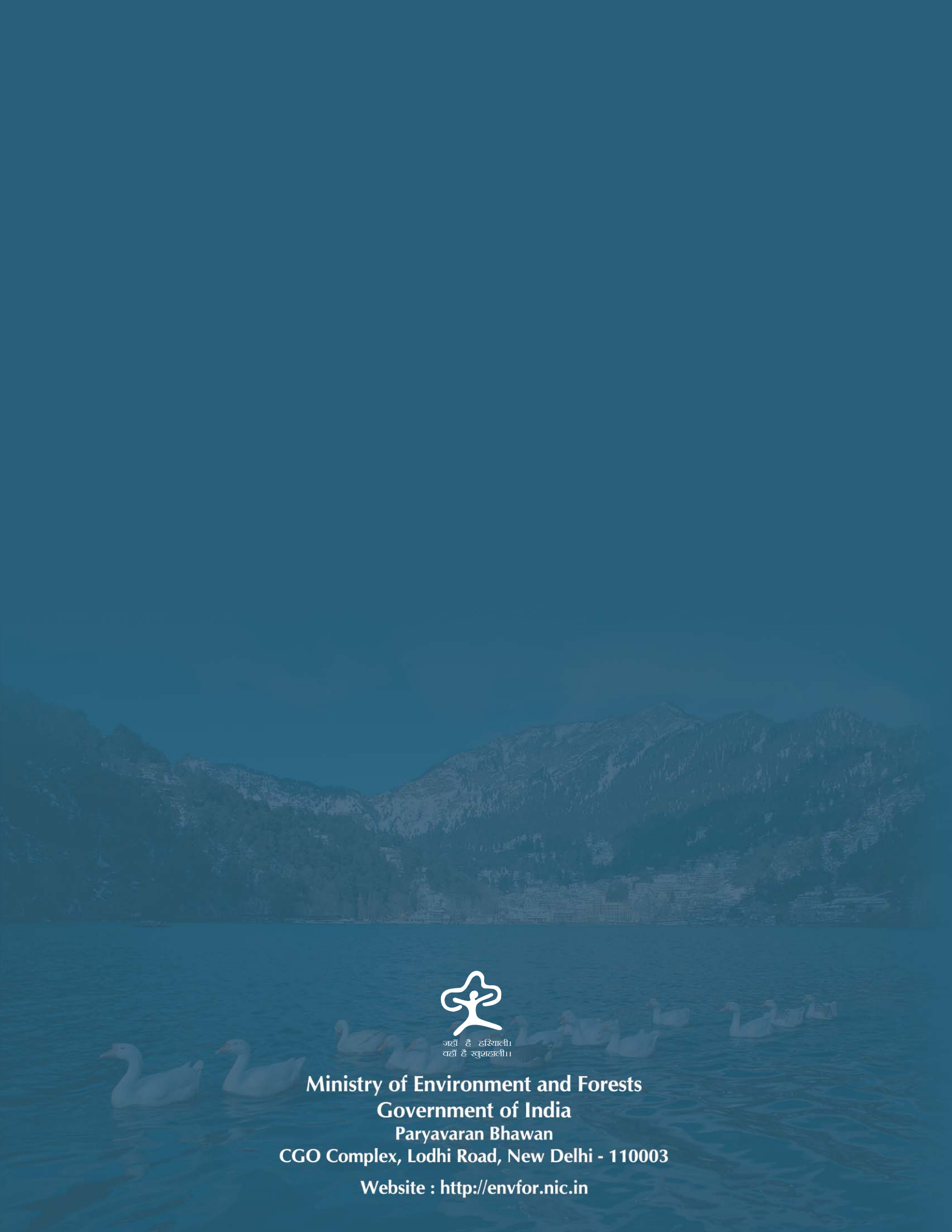
ICMAM	-	Integrated Coastal and Marine Area Management
ICRISAT	-	International Crop Research Institute for the Semi-Arid Tropics
IDA	-	International Development Association
IDB	-	International Day for Biological Diversity
IFA	-	Indian Forest Act, 1927
IFC	-	Information Facilitation Counter
IFPS	-	Integrated Forest Protection Scheme
IGNFA	-	Indira Gandhi National Forest Academy
IGNOU	-	Indira Gandhi National Open University
IHR	-	Indian Himalayan Region
IIFM	-	Indian Institute of Forest Management
IINDUS	-	Indian Information System as per DUS Guidelines
ILDIS	-	International Legume Database & Information Service
ILEC	-	International Lake Environment Committee
IMO	-	International Maritime Organisation
INTACH	-	Indian National Trust for Art and Cultural Heritage
IPGRI	-	International Plant Genetic Resources Institute
IPIRTI	-	Indian Plywood Industries Research and Training Institute
IPM	-	Integrated Pest Management
IPR	-	Intellectual Property Right
IRRI	-	International Rice Research Institute
ISM&H	-	Indian System of Medicine and Health
IT	-	Information Technology
ITPGRFA	-	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	-	The International Union for Conservation of Nature
IVRI	-	Indian Veterinary Research Institute
IWDP	-	Integrated Wasteland Development Programme
IWMI	-	International Water Management Institute
JFM	-	Joint Forest Management
JFMCs	-	Joint Forest Management Committees
JMM	-	Joint Mangrove Management
KBAs	-	Key Biodiversity Areas
KIP	-	Knowledge Innovations and Practices
KVKs	-	Krishi Vigyan Kendras
LaCONES	-	Laboratory for Conservation of Species
LEDG	-	Ladakh Ecology Development Group

LMMC	-	Like Minded Megadiverse Countries
LMOs	-	Living Modified Organisms
MAPs	-	Management Action Plans
MAT	-	Mutually Agreed Terms
MEAs	-	Multilateral Environment Agreements
MEE	-	Management Effectiveness Evaluation
MES	-	Ministry of Earth Sciences
MFF	-	Mangroves for the Future
mha	-	Million Hectares
MHRD	-	Ministry of Human Resource Development
MIKE	-	Monitoring of Illegal Killing of Elephant
MNS	-	Madras Naturalists Society
MoA	-	Ministry of Agriculture
MoD	-	Ministry of Defense
MoEF	-	Ministry of Environment and Forests
MoHFW	-	Ministry of Health and Family Welfare
MoP	-	Ministry of Power
MoRD	-	Ministry of Rural Development
MoU	-	Memorandum of Understanding
MoUD	-	Ministry of Urban Development
MoWR	-	Ministry of Water Resources
MPCAs	-	Medicinal Plant Conservation Areas
NADRES	-	National Animal Disease Referral Expert System
NAEB	-	National Afforestation and Eco-Development Board
NAGS	-	National Active Germplasm Sites
NAIP	-	National Agriculture Innovation Project
NAP	-	National Afforestation Programme
NAPCC	-	National Action Plan on Climate Change, 2008
NBA	-	National Biodiversity Authority
NBAGR	-	National Bureau of Animal Genetic Resources
NBAIM	-	National Bureau of Agriculturally Important Microorganisms
NBAP	-	National Biodiversity Action Plan
NBDB	-	National Bioresource Development Board
NBFGR	-	National Bureau of Fish Genetic Research Resources
NBM	-	National Bamboo Mission
NBPGR	-	National Bureau of Plant Genetic Resources

NBRI	-	National Botanical Research Institute
NBSAP	-	National Biodiversity Strategy and Action Plan
NCDMA	-	National Clean Development Mechanism Authority
NCERT	-	National Council for Education, Research and Training
NCR	-	National Capital Region
NDMA	-	National Disaster Management Authority
NEAC	-	National Environment Awareness Campaign
NEP	-	National Environmental Policy, 2006
NFC	-	National Forest Commission
NFDB	-	National Fisheries Development Board
NFI	-	National Forest Inventory
NFP	-	National Forest Policy, 1988
NGB	-	National Gene Bank
NGC	-	National Green Corps
NGOs	-	Non-Governmental Organizations
NIC	-	National Informatics Centre
NIRC	-	National Insect Reference Collection
NLCB	-	National Land Use and Conservation Board
NLCP	-	National Lake Conservation Plan
NMNH	-	National Museum of Natural History
NMPB	-	National Medicinal Plant Board
NNRMS	-	National Natural Resource Management System
NORAD	-	Norwegian Agency for Development Cooperation
NORV	-	Notified and Released Varieties of India
NPs	-	National Parks
NRC	-	National Referral Centre
NRCD	-	National River Conservation Directorate
NRCP	-	National River Conservation Plan
NRCPB	-	National Research Centre on Plant Biotechnology
NRCT	-	National Report Coordination Team
NREGS	-	National Rural Employment Generation Scheme
NTCA	-	National Tiger Conservation Authority
NTFPs	-	Non-timber Forest Produces
NWAP	-	National Wildlife Action Plan
NWCMP	-	National Wetland Conservation and Management Programme
NWCP	-	National Wetland Conservation Plan

NWDPRA	-	National Watershed Development Project for Rainfed Areas
NYK	-	Nehru Yuva Kendra
PAs	-	Protected Areas
PBRs	-	People's Biodiversity Registers
PESA	-	The Provisions of the Panchayats (Extension of Scheduled Areas) Act, 1996
PF	-	Protected forests
PGDC	-	Post Graduate Diploma Courses
PGPRs	-	Plant Growth Promoting Rhizo-microorganisms
PGRFA	-	Plant Genetic Resources for Food and Agriculture
PIC	-	Prior Informed Consent
POWPA	-	Programme of Work for Protected Areas
PPP	-	Public private partnership
PPV&FR	-	Protection of Plant Varieties and Farmer's Rights
PRIs	-	Panchayati Raj Institutions
PSUs	-	Public Sector Undertakings
R&D	-	Research and Development
RF	-	Reserve Forests
RS	-	Remote Sensing
SAARC	-	South Asian Association for Regional Cooperation
SACEP	-	South Asia Cooperative Environment Programme
SACON	-	Salim Ali Centre for Ornithology and Natural History
SBBs	-	State Biodiversity Boards
SC	-	Schedule Castes
SFDs	-	State Forest Departments
SFR	-	State of Forest Report
SHGs	-	Self-Help Groups
SLUB	-	State Land Use Board
SMF	-	Sustainable Management of Forests
SMPBs	-	State Medicinal Plant Boards
SRI	-	Shriram Institute for Industrial Research
ST	-	Scheduled Tribes
TBGRI	-	Tropical Botanical Garden and Research Institute
TBPAs	-	Trans Boundary Protected Areas
TERI	-	The Energy Research Institute
TIFAC	-	Technology Information Forecasting and Assessment Council
TK	-	Traditional Knowledge

TKDL	-	Traditional Knowledge Digital Library
TKRC	-	Traditional Knowledge Resource Classification
ToF	-	Trees Outside Forest
TRs	-	Tiger Reserves
UGC	-	University Grants Commission
UNCCD	-	United Nations Convention to Combat Desertification
UNCSD	-	UN Commission for Sustainable Development
UNDP	-	United Nations Development Programme
UNEP	-	United Nations Environment Programme
UNESCO	-	United Nations Educational, Scientific, and Cultural Organization
UNFCCC	-	United Nations Framework Convention on Climate Change
UNICEF	-	United Nations Children's Fund
UNIDO	-	United Nations Industrial Development Organization
UNITAR		United Nations Institute for Training and Research
USFS	-	United States Forest Service
USNPS	-	United States National Park Service
USWFS	-	United States Wildlife and Fisheries Services
UTs	-	Union Territories
VAM	-	Vesicular Arbuscular Mycorrhiza
VF	-	Village Forests
WB	-	World Bank
WCCB	-	Wildlife Crime Control Bureau
WCMC	-	World Conservation Monitoring Centre
WCPA	-	World Commission on Protected Areas
WDPSCA	-	Watershed Development Project in Shifting Cultivation Areas of North Eastern States
WHO	-	World Health Organization
WHS	-	World Heritage Sites
WII	-	Wildlife Institute of India
WIPO	-	World Intellectual Property Organization
WLAP	-	Wildlife Action Plan
WLSs	-	Wildlife Sanctuaries
WPA	-	Wildlife (Protection) Act, 1972
WTO	-	World Trade Organization
WWF	-	World Wildlife Fund
ZSI	-	Zoological Survey of India



Ministry of Environment and Forests
Government of India
Paryavaran Bhawan
CGO Complex, Lodhi Road, New Delhi - 110003

Website : http://envfor.nic.in