India's
Third National Report
to
Convention on Biological Diversity

Executive Summary

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Ministry of Environment & Forests

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GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS

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FOREWORD

I have pleasure in presenting India's Third National Report to the Convention on Biological Diversity. This Report has been prepared in terms of the requirements of Article 26 of the Convention on Biological Diversity, to which India is a Party, and in accordance with the relevant decisions and format adopted by the Conference of the Parties to this Convention.

Biodiversity is a multi-disciplinary subject involving diverse sectoral linkages and large number of stakeholders. Therefore, any national document on biodiversity cannot be prepared without involving the concerned experts, organizations, Ministries and other stakeholders. I am happy to note that this Third National Report has been prepared adopting a consultative process, including through organization of a National Workshop.

The Report focuses on the status and trends of biodiversity and its components; impact of national actions on achievements of objectives of the Convention, goals and objectives of the Strategic Plan of the Convention and the 2010 biodiversity target, and constraints or impediments encountered in implementation of the Convention.

I congratulate all those who have been involved in this challenging task. I am confident that sharing of experiences with other Parties through National Reports will help in realizing the benefits of the Convention for the perpetuation of evolutionary processes and maintenance of life support systems on Earth.

Dated : May 29, 2006
Place : New Delhi

(A. RAJA)

सत्यमेव जयते

प्रोदीप्त धोष, पी.एच.डी.
सचिव
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Secretary

भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS

PREFACE

Preparation of National Reports is an important commitment of all Contracting Parties to the Convention on Biological Diversity. India had earlier submitted its First and Second National Reports in 1998 and 2001, respectively. National reporting is a continuing requirement under the Convention, and these reports are called for on a four yearly basis.

The Third National Report is in a questionnaire format that focuses on priority setting, targets and obstacles; Articles of the Convention (5-20), and thematic areas; and operations of the Convention. Preparation of National Reports helps us to monitor and review the status of implementation of the commitment as a Party, along with identifying gaps in our capacity, constraints, and impediments encountered in implementation of the Convention. This information provided by Parties, however, is not to be used either to rank performance or to otherwise compare implementation between individual Parties.

The Third National Report has been prepared in consultation with various stakeholders. I wish to place on record my appreciation for the diligent efforts put in by Mr. Desh Deepak Verma, Joint Secretary and Dr. Sujata Arora, Additional Director, in the preparation of this document.

Dated : 26th May, 2006
Place : New Delhi

(Prodipto Ghosh)

जहाँ है हरियाली।
वहाँ है खुशहाली।।

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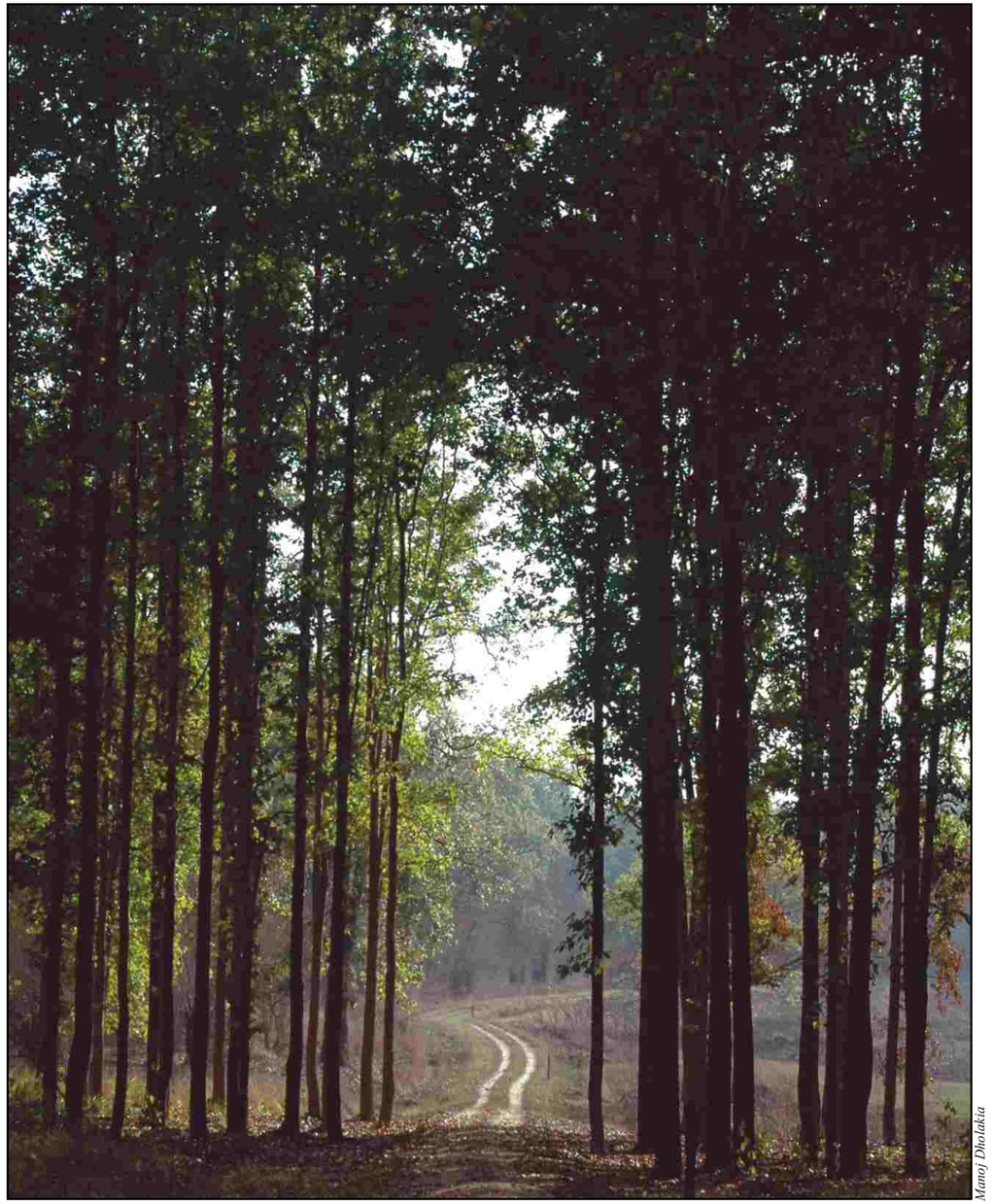


Manoj Dholakia

Kanha National Park. India's strategies for conservation of biological diversity of ecosystems, habitats and biomes comprise providing special status and protection to biodiversity rich areas. India has a Protected Area network of 94 national parks and 501 wildlife sanctuaries covering 4.74% of the total geographical area of the country.

Executive Summary

Biological diversity, or biodiversity, encompasses the variety of all life on earth. Biodiversity manifests itself at three levels: species diversity, which refers to the numbers and kinds of living organisms; genetic diversity, which refers to the genetic variation within a population of species; and ecosystem diversity, which is the variety of habitats, biological communities and ecological processes that occur in the biosphere.

The biodiversity we see today is the outcome of over 3.5 billion years of evolutionary history, shaped by natural processes and, increasingly, by the influence of humans. Biodiversity forms the web of life of which we are an integral part and upon which we so fully depend. Conservation and sustainable use of biodiversity is, therefore, fundamental to ecologically sustainable development. Extinction of species and gradual changes in ecological communities is a natural phenomenon. However, the pace of extinction has increased dramatically as a result of human activities. Ecosystems are being fragmented or eliminated, and several species are in decline. The fragmentation, degradation and loss of habitats pose serious threats to biological diversity. It has been estimated that species have been disappearing at 50-100 times the natural rate and this is predicted to rise dramatically. These losses are irreversible and pose a threat to our own well-being, considering our dependence on foodcrop and medicines and other biological resources.

Global concern about loss of species and ecosystems found expression in the International Convention on Biological Diversity (CBD). The CBD, one of the key agreements adopted during the Earth Summit held in Rio de Janeiro in 1992, is the first comprehensive global agreement which addresses all aspects relating to biodiversity. The CBD, which has near universal membership with more than 189 countries as its Parties, sets out commitments for maintaining the world's ecological underpinnings, while pursuing economic development. India is a Party to the CBD. The Convention, while reaffirming sovereign rights of nations over their biological resources, establishes three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.

India signed the Convention on 5th June 1992 and ratified it on 18th February 1994.

Biodiversity is not distributed evenly or uniformly across the globe. Certain countries, lying wholly or partly within the tropics, are characterized by high species richness and more number of endemic species. These countries are known as megadiverse countries. India, one of the identified megadiverse countries, is rich in biological diversity and associated traditional knowledge. With only 2.4% of the land area, India accounts for 7-8% of the recorded species of the world. Over 45,000 species of plants and 89,000 species of animals have been recorded so far. The wide variety in physical features and climatic situations have resulted in a diversity of ecosystems such as forests, grasslands, wetlands, coastal and marine (mangroves and coral reefs) and deserts. India is also an acknowledged centre of crop diversity.

India is also rich in traditional knowledge associated with biological resources. This traditional knowledge is both coded, as in the texts of Indian systems of medicine such as Ayurveda, Unani and Siddha; and non-coded, in which case it exists in the oral undocumented traditions.

India has had a long history of conservation and sustainable use of natural resources and, over a period of time, has developed a stable

organizational structure for environment protection. Strategies and plans for conservation and sustainable use of biological resources based on local knowledge systems and practices are ingrained in Indian ethos and way of life. This is reflected in individual practices as well as social systems prevalent at different times in India's history. Modern India, as the world's largest democracy, is a testimony to this as environment protection is enshrined in the Constitution of India (Article 48A and Article 51A(g)). Numerous and wide-ranging policies, programmes and projects are in place, which directly or indirectly serve to protect, conserve and sustainably use the country's biological resources. As a Party to the Convention on Biological Diversity, India has taken wide-ranging steps towards developing policies, enacting legislations and implementing programmes towards conservation and sustainable use of its biological resources.

India's Third National Report to the CBD has been prepared in terms of the requirements of Article 26 of the Convention on Biological Diversity, and in accordance with the relevant decisions and format adopted by the Conference of the Parties to this Convention.

This Report focuses on the status and trends of biodiversity and its components, and impact of national actions on, and constraints encountered in, the implementation of the Convention. Recognizing that biodiversity is a multi-disciplinary subject with diverse sectoral linkages, the Report has been prepared through a consultative process and a national workshop involving concerned experts, organizations, Ministries and other stakeholders.

ARTICLES OF THE CONVENTION

India's Third National Report provides detailed information about Indian compliance vis-à-vis Articles 5-20 of the Convention.

Article 5 - Cooperation

The Ministry of Environment & Forests (MoEF), the nodal Ministry for the CBD, is also the nodal agency in the country for United

Manoj Dholakia

Wild Ass (*Equus heminous khur*) is one of the world's most endangered mammals. Its last habitat is the Rann of Kachchh, in western India.

Nations Environment Programme (UNEP), South Asia Cooperative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and World Conservation Union (IUCN). It is also the nodal agency for international agreements relating to environment, in particular biodiversity, such as Convention on International Trade in Endangered Species (CITES), Convention on Wetlands of International Importance, Convention on the Conservation of Migratory Species of Wild Animals, UN Framework Convention on Climate Change (UNFCCC), Commission on Sustainable Development and United Nations Forum on Forests.

The Ministry also handles bilateral cooperation matters relating to regional bodies, such as Economic and Social Commission for Asia and the Pacific, South Asian Association for Regional Cooperation (SAARC) and SACEP. MoEF also deals with bilateral MoUs/agreements on environment with several other countries. India is a member of the Group of Like Minded Megadiverse Countries (LMMC), which holds nearly 70% of all biodiversity. India, as the Chair of LMMCs for a two-year period from March 2004 to March 2006, coordinated the activities of this group, especially on issues relating to the implementation of the CBD.

MoEF is continuously taking steps to harmonize national policies and programmes in implementation of various Multilateral Environment Agreements through wide-ranging consultations with concerned Ministries, State Governments, Non-Governmental

Organizations (NGOs), experts and other stakeholders. Mechanisms have also been developed within the MoEF to ensure close coordination among different units dealing with these agreements.

Article 6 - General Measures for Conservation and Sustainable Use

India's strategies for conservation and sustainable utilization of biodiversity comprise according special status and protection to biodiversity-rich areas by declaring them as national parks, wildlife sanctuaries, biosphere reserves or ecologically fragile and sensitive areas; off-loading pressure from reserve forests by alternative measures of fuelwood and fodder need satisfaction; afforestation of degraded areas and wastelands; *in situ* conservation of habitats and ecosystems; creating *ex situ* conservation facilities such as zoos, gene banks, etc. A number of policies, strategies and action plans relevant to biodiversity conservation are in place, including the Biological Diversity Act 2002 and the National Environment Policy 2006. A National Biodiversity Authority (NBA) has been set up for implementation of the Biological Diversity Act.

Survey and inventorization of the floral and faunal resources are carried out by the Botanical Survey of India (BSI) and Zoological Survey of India (ZSI), along with other organizations like Forest Survey of India, Wildlife Institute of India (WII), Fisheries Survey of India, National Bureau of Plant Genetic Resources (NBPGR), National Bureau of Animal Genetic Resources (NBAGR), National Bureau of Fish Genetic Resources (NBFGR), Bombay Natural History Society (BNHS), Salim Ali Centre for Ornithology and Natural History, Foundation for Revitalization of Local Health Traditions (FRLHT), National Institute of Oceanography, Central Marine Fisheries Research Institute, universities and other centres. Approximately 4.74% of the total geographical area of the country has been earmarked for extensive *in situ* conservation of habitats and ecosystems.

A Protected Area (PA) network of 94 National Parks (NPs) and 501 Wildlife Sanctuaries (WLSs) has been created. The results of this network have been significant in restoring viable populations of large mammals such as tigers, lions, rhinoceros, elephants, etc. To conserve the representative ecosystems, a Biosphere Reserve Programme is being implemented. Fourteen biosphere reserves are in operation, of which four have garnered international recognition. Specific programmes have also been launched for scientific management and wise use of wetlands, mangroves and coral reef ecosystems. Internationally significant wetlands are declared as Ramsar sites under the Ramsar Convention. Under the World Heritage Convention, natural sites are declared as World Heritage sites. Large mammal species-targeted projects (e.g. Project Tiger, Project Elephant) have been under implementation, based on the perception of threat to them. Gene Sanctuaries for preserving the rich native diversity of citrus, musa, rhododendrons and orchids have also been established. *In situ* conservation of medicinal plants is being undertaken by various government and non-government organizations. To complement *in situ* conservation, attention has been paid to *ex situ* conservation measures through setting up of botanical gardens, zoos, deer parks, safari parks, aquaria etc. A Central Zoo Authority (CZA) has been set up to secure better management of zoos. Under a plan scheme on 'Assistance to Botanical Gardens', one time assistance to botanical gardens is provided to

Ashok Dabhi

Rauvolfia serpentina (Sarpagandha) is well-known in Ayurveda, Unani and other traditional systems of medicine. However, over-harvesting has led to it being declared an endangered plant. It is listed under CITES Appendix II.

strengthen and institute measures for *ex situ* conservation of threatened and endangered species in their respective regions.

Conservation and sustainable use of biodiversity and benefit sharing have been integrated into various relevant sectoral and cross sectoral plans, programmes and policies. MoEF consults concerned ministries, departments, institutions and NGOs as major partners for developing and implementing national strategies on conservation and sustainable use of biodiversity. Environmental Impact Assessment (EIA) and Special Economic Zone clearances, pollution control, education and awareness programmes, and programmes of Ministries and Departments of Agriculture, Rural-Urban Development, Water Resources, Energy, and Science & Technology have integrated sustainable use and benefit sharing principles.

The Government of India attaches high priority to the promotion of Research and Development (R&D) in multidisciplinary aspects of environment protection, biodiversity conservation and research in climate change. The MoEF, Ministry of Science and Technology, Ministry of Agriculture, Ministry of Human Resource Development, Ministry of Health and Family Welfare, and Indian Space Research Organization are the main Ministries of the Government of India that promote and undertake climate and climate change related research in the country. India has established the National Clean Development Mechanism Authority for according host-country approval to CDM projects as mandated under UNFCCC.

Article 7 - Identification and Monitoring

The BSI and the ZSI are primarily responsible for the survey and inventorization of flora and fauna of the country. The Survey organizations have covered about 70% of the country's terrestrial areas by field surveys and published, over the years, documents on flora and fauna at national, state and, in some cases, district levels and for selected ecosystems. Besides, extensive reports on inventories of resources indicating levels of biodiversity in selected areas have also been brought out. The Surveys have also published Red Data Books on threatened species.

Manoj Dholakia

Bengal Tiger, India's National Animal. Species oriented special conservation programmes, such as Project Tiger, have been in place in India for the past several decades.

Programmes of inventorization of floral components at ecosystem level for forest ecosystem, grassland ecosystem, wetland ecosystem, coastal and marine ecosystem, mangrove ecosystem, and desert (both hot and cold) ecosystem; and faunal components at ecosystem level for Himalayan ecosystem, freshwater ecosystem, estuarine ecosystem, marine ecosystem, tropical rainforest ecosystem, terrestrial ecosystem, desert ecosystem, and island ecosystem have been initiated. Genetic level studies have been undertaken mainly for crops and their wild relatives, selected domesticated animal species, and some large mammals.

Biodiversity characterization is monitored at landscape level by using remote sensing and GIS tools in biodiversity rich areas of the country. Some programmes have been undertaken for monitoring key threats to biodiversity. Studies are underway for using indicators for national level monitoring for biodiversity.

India has committed itself to capacity building in taxonomy, for which basic assessments of needs and capacity in taxonomy at the national level have been made. An All India Coordinated Project on Taxonomy is presently being implemented for building capacity in taxonomy for identified gap areas. Bilateral and regional collaborative programmes in inventorization and capacity building have also been initiated.

Article 8 - *In situ* Conservation

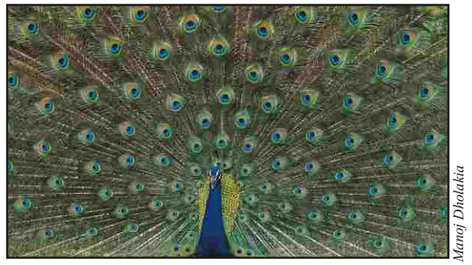
The existing network of 94 NPs and 501 WLSs covers 4.74% of India's geographical area. The goal is to establish 163 NPs and 707 WLSs covering 5.74% of geographical area. The National Environment Policy, 2006 envisages expansion of the PA network to give fair representation to all bio-geographical zones. The monitoring committee of the National Wildlife Action Plan (2002-2016) periodically monitors the status of establishment and management of PAs in the country. There is a felt need to review establishment and management of marine PAs. At present there are 31 marine PAs, and over a 100 PAs include inland water ecosystems.

The MoEF plans, promotes and coordinates all the forestry and wildlife programmes focusing on biodiversity conservation in different thematic and geographical areas. For further strengthening of conservation measures, a sustainable financing plan for PAs is needed. India has adopted the World Commission on Protected Areas - Management Effectiveness Evaluation (MEE) framework at two World Heritage sites, Kaziranga NP and Keoladeo NP. Further technical and financial resources are needed for establishing MEE processes in all 595 PAs of the country. Efforts are on towards integrating broader landscapes into conservation activities and incorporating biodiversity concerns within EIA frameworks. Efforts to identify institutional and legislative gaps and assess management capacity needs are underway.

The Joint Forest Management (JFM) programme in the country has emerged as a powerful tool of sustainable forestry in India. Forest Development Agencies (FDA) have been set up at the forest division level to undertake holistic development in the forestry sector with people's participation. A decentralized two-tier institutional structure (FDA and JFM Committee) allows greater participation of the community, both in planning and implementation, to improve forests and livelihoods of the people living in and around forest areas. The village is reckoned as a unit of planning and implementation, and all activities under the programme are conceptualized at the village level. This approach also significantly empowers the local people to participate in the decision-making process furthered by steps like formation of Forest Protection Committees and Eco-development Committees. India has implemented an Eco-development project in seven states with focus on building capacities for PA management to conserve biodiversity and ensure people participation. Programmes for conservation of wetlands, mangroves and coral reefs; special regional development programmes in Garo Hills and Western Ghats; Non-timber Forest Produce (NTFP)-based species conservation programmes in states of Madhya Pradesh, Orissa, West Bengal and Jharkhand; species conservation programmes like Project Elephant, Kashmir Stag, Snow Leopard, Crocodile, musk deer are examples of other initiatives towards *in situ* biodiversity conservation.

Article 8(h) - Alien Species

Invasive alien species pose a serious threat to biodiversity. In India, a multi-agency and multi-programme approach, involving several Ministries and agencies, is being followed for regulating introductions and managing invasive alien species. Major activities include regulation of introduction of exotic living materials, their quarantine clearance and release for research and direct use. In general, Ministry of Agriculture deals with cultivated plants, fish and farm livestock including poultry. It also has projects on



Manoj Dholakia

Peacock, India's National Bird. The male of the peafowl species, peacocks are most notable for their beautiful iridescent blue-green plumage, which they display as part of courtship.

eradication and management of invasive weedy plants, pathogens, pests and harmful fish. MoEF deals with all forest materials and wild animals. It also supports and coordinates programmes on eradication/control measures/utilization of such species in different forest areas, conducts national surveys on their spread, and prepares reports on damage caused and restorative measures. MoEF is in the process of developing a country report of invasive species under a project of the Food and Agriculture Organization (FAO).

For regulation of introductions and management of alien invasive species, there is a need to improve coordination and networking of all concerned Ministries and relevant sectors. Towards this, much more funding and policy support is required.

Article 8(j) - Traditional Knowledge and Related Provisions

India is rich in traditional knowledge associated with biological resources. This traditional knowledge is both coded, as in the texts of Indian systems of medicine such as Ayurveda, Unani and Siddha; and non-coded, which exists in the oral undocumented traditions.

The 73rd Constitutional Amendment of 1993 enshrines democratic decentralization of responsibilities, wherein local bodies consisting of elected representatives, one third of whom are women, are entrusted the responsibility of safe-guarding local environmental capital stocks. As envisaged in this amendment, the Biological Diversity Act, 2002 provides for setting up of Biodiversity Management Committees (BMCs) for conservation, sustainable use and documentation of biodiversity and chronicling traditional knowledge. Mandatory consultation of BMC by NBA and State Biodiversity Boards ensures involvement of local communities in decision-making relating to Access and Benefit Sharing.

Field studies on the status, trends and threats related to the Knowledge, Innovation and Practices (KIP) of indigenous and local communities are undertaken by several institutions and organizations in the country.

Manoj Dholakia

Mangroves in the Marine National Park, Jamnagar, Gujarat. India has set up 31 Marine Protected Areas, 18 of which are fully under marine environment, and 13 are partly in sea and partly on land.

Involvement of local communities and support to them for studies on KIP are being encouraged through the preparation of People's Biodiversity Registers (PBRs) under the Biological Diversity Act, 2002. The MoEF has funded and supported the preparation of PBRs by the Indian Institute of Science for 52 sites in 8 states. The PBRs are aimed at building an open and transparent information system on biodiversity resources from village level upwards.

Other initiatives include studies on conservation and sustainable use of biodiversity, establishment of medicinal plants' parks, community conservation of indigenous animal breeds, and collection and preservation of indigenous and medicinal plants. Field studies in different parameters of traditional knowledge are being carried out by the National Innovation Foundation, Ahmedabad. As an effort to promote traditional practices and value systems in conservation of biodiversity rich areas, MoEF assisted by other organizations is undertaking maintenance of a large number of sacred groves across the country.

Indira Gandhi Rashtriya Manav Sangrahalaya (IGRMS), Bhopal launched an initiative on sacred groves in 1999, wherein *in situ* and *ex situ* conservation of sacred groves in different places in India has been undertaken. Replicas of 8 different kinds of sacred groves from various parts of the country have been established on the campus of IGRMS. The Sacred Grove Information System (SGIS) developed by National Chemical Laboratory, Pune includes type and nature of information, information sources, and validity and authenticity

of information. Currently, SGIS holds cursory information on 3,000 sacred groves from Andhra Pradesh, Maharashtra and Tamil Nadu. Data on sacred groves in other states is being gathered from various sources.

In addition, several measures, mechanisms and programmes are in place to promote effective participation of local communities. These inter alia include:

- Strengthening traditional livelihood systems of desert communities through agro-forestry and horticulture practices;
- Development of Traditional Knowledge Digital Library (TKDL), a value added digital database developed for preservation of traditional knowledge; prevention of misappropriation of traditional knowledge by breaking the language and format barriers of traditional knowledge systems, and providing access of these knowledge systems to patent examiner(s) in five international languages i.e. English, German, French, Spanish and Japanese, for establishing the prior art; and creation of linkages with modern science to initiate active research projects for new drug discovery and development, based on the time-tested traditional knowledge systems leading to more affordable health care systems for the poor;
- Setting up of Biodiversity Digital Library by Council for Scientific and Industrial Research (CSIR) and BSI for digitization of plant resources including genetic resources;
- A comprehensive computerized database on Indian Medicinal Plants developed at FRLHT;
- A methodology for Documentation and Rapid Assessment of Local Health Traditions for supporting the local knowledge about native plant names and their use for promoting primary health care of local communities;
- Building of the country's first bio-geo-cultural repository of natural resources for use by Indian systems of medicine.

India is not only supporting initiatives for the protection of traditional knowledge and ensuring access and benefit sharing, but has also been engaged in the "promotion" and "teaching" of traditional knowledge since 1950 through a large number of educational institutes across the country.

Article 9 - *Ex situ* conservation

Ex situ conservation of biodiversity in India has been institutionalized with the establishment of botanical gardens and zoological parks with the major objective of conserving components of biological diversity.

The tradition of setting up of botanical gardens dates back to over 200 years when large spaces within major cities in India were set aside for the purpose. The Indian Botanical Garden at Calcutta was established in 1787. It is now spread over an area of 110 hectares and has around 15,000 plants belonging to 2,500 species. Besides the number of privately owned gardens, there are 33 government-managed and 33 university botanical gardens in the country. BSI is attempting to network these gardens. A National Botanic Garden is presently being set up in Noida, Uttar Pradesh.

There are about 300 zoos, animal parks, and aquaria in the country. Species-oriented captive breeding programmes have been initiated in many of these zoos throughout the country. Exclusive crocodile and turtle breeding parks have been established. The CZA has been

Manoj Dholakia

Asiatic Lion. Once ranging from Greece to central India, this "King of Beasts" is now restricted to the Gir Forest in Gujarat. Efforts to identify a suitable alternative home have been ongoing since 2002.

set up under MoEF to provide guidelines to all zoos and monitor their activities. It also oversees the functioning of zoos to sensitize visitors about the need for protecting wildlife and habitats, and carry out planned breeding of endangered species for augmenting their population in the wild.

Captive Breeding Specialist Groups exist for a wide range of organisms. Besides the number of zoos and aquaria in India that conserve animals *ex situ*, NGOs have contributed by maintaining large collections of crocodiles, turtles/tortoises, snakes and lizards. Important NGO-maintained reptile parks in India are Chennai Snake Park, Madras Crocodile Bank, Pune Serpentarium and Calcutta Snake Park.

ICAR has set up a number of gene banks for the *ex situ* conservation of plants, fishes and animals under NBPGR, NBAGR, NBFGR and the National Bureau of Agriculturally Important Microorganisms.

Projects have been initiated for the reintroduction of threatened species into their natural habitats under appropriate conditions. Examples include the mass propagation of pitcher plant, mangrove species, and the effort towards relocation of Asiatic Lions in Madhya Pradesh.

India has taken measures to regulate and manage the collection of biological resources from natural habitats for *ex situ* conservation purposes so as not to threaten ecosystems and *in situ* populations of species, under the provisions of the Wildlife Protection Act and the Biological Diversity Act. There is increasing coherence of policies and programmes on conservation and sustainable use of bio-resources. However, additional fund mobilization and infrastructure development is required towards strengthening *ex situ* conservation.

Article 10 - Sustainable Use of Components of Biological Diversity

Conservation and sustainable use of biodiversity has been integrated into national decision making through policy statements, legislative measures, and programmes.

Ashok Captain

The Indian Cobra occurs throughout the Indian sub-continent. It is identified by its hood, which it raises when disturbed. It feeds on rats, small birds, frogs and bird eggs. There is a common myth that snakes drink milk, but this is not true.

Sustainable use of biodiversity is emphasized in various policy statements of the Government, notably the National Conservation Strategy and Policy Statement on Environment and Development, the National Forest Policy, the National Wildlife Action Plan and National Environment Policy, 2006. Several initiatives have been taken to implement various aspects of these policy statements. Sustainable utilization underscored in these policy statements recognizes the interdependence of local communities and people on biological resources, and emphasizes the need to draw upon the existing resources keeping long-term conservation in view.

In accordance with appreciation of the needs and the location situations, pressure from biodiversity-rich areas and resources needs to be diverted by bringing additional areas under green cover to satisfy local demands. This is achieved by encouraging environment friendly substitutes to meet the needs, by promoting energy efficient devices, by creating awareness

and an environment to restrict use and extraction of only desired part of the organism rather than the entire organism. Remedial actions for restoration of degraded areas have been undertaken through eco-restoration programmes by involving local people. Special attention has been given to the coastal zone through Coastal Regulation Zone (CRZ) Rules, 1991 under Environment (Protection) Act.

To adopt economically effective and socially viable incentives for conservation and sustainable use of biological resources, strategies such as the use of items like wood substitutes, alternative energy sources (biogas, wind mills, solar cookers, wave energy, fuel efficient stoves, etc.), establishment of nurseries, tree planting, stall feeding, water harvesting and pollution abatement measures are being implemented.

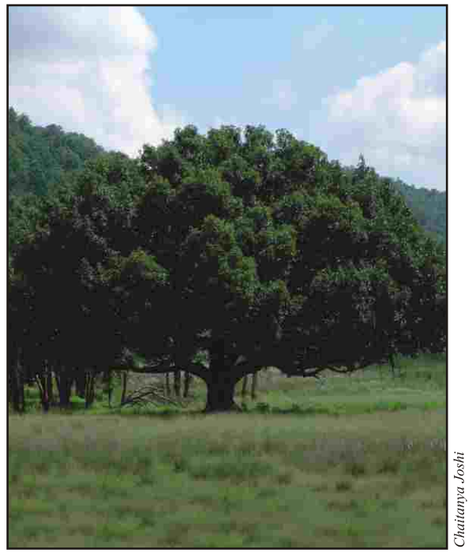
In 1994, the Government of India, under the Environment (Protection) Act, issued the EIA Notification by which EIA is mandatory for 32 selected sectors while undertaking developmental projects. The EIA Notification has been revised in September 2006 to make it more efficient, decentralized and transparent.

JFM is an ambitious government attempt at regenerating and sustainably using forests.

Some of the other initiatives include a mission mode project on household food and nutritional security initiated in 2000 and completed in 2005. The project focused on tribal areas and local communities in 10 states of India. Its aim was sustainable use of biodiversity for local communities.

All India Coordinated Research Project on Underutilized and Underexploited Plants was initiated in 1982, with the primary objective of generating improved technology and developing high yielding varieties in selected crops of future economic importance. Efforts under the project led to assemblage of over 10,000 germplasm accessions of different underutilized crops. Presently, the project is functioning at 20 centres with new crops such as jatropha, adzuki bean, faba bean, etc.

Honey Bee Network is an important example to illustrate some of the measures taken to protect and encourage customary use of biological resources in India. It is a knowledge centre as well as a network pooling solutions by people from different sectors throughout the country and the world. Honey Bee has collected over 10,000 examples of contemporary innovations and outstanding examples of the use of traditional local knowledge in the sustainable management of natural and other resources. These innovations are shared with local communities and individuals within India and in 75 other countries through the Honey Bee newsletter, which is published in eight different languages (Hindi, English, Gujarati, Tamil, Kannada, Pahari, Telugu and Spanish). Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), an NGO based in Ahmedabad, India, set up in 1993 to essentially sustain Honey Bee Newsletter and associated research and action activities, supports Honey Bee Network by linking the six



Chaitanya Joshi

Banyan *(Ficus benghalensis)* is the National Tree of India. The mighty banyan tree commands a great presence in the rural setting of India. The very size of the banyan tree makes it a habitat for a large number of creatures. For centuries, the banyan tree has been a central point for the village communities of India.

"Es" ethics, equity, excellence, environment, education and efficiency in enterprise.

National Afforestation and Ecodevelopment Board (NAEB) in the MoEF gives special attention to regeneration of degraded forest areas and lands adjoining forest areas, national parks, sanctuaries and other PAs as well as ecologically fragile areas like the Western Himalayas, Aravallis, Eastern Ghats, etc. The functions of NAEB involve evolving mechanisms for ecological restoration of degraded forest areas and adjoining lands through systematic planning and implementation in a cost effective manner. It also sponsors extension of research findings to disseminate new and proper technologies for the above. It creates awareness to help foster a people's movement for promoting afforestation and eco-development with the assistance of voluntary agencies, NGOs, Panchayati Raj Institutions and others for promoting participatory and sustainable management of degraded forest areas and adjoining lands.

Various programmes initiated by the MoEF, including National Afforestation Programme Scheme, setting up of JFM Committee, Hill Area Development Programme, etc. focus on greater participation of the community with an objective to improve their livelihoods. These programmes also help in poverty alleviation in the respective areas.

The involvement of private sector is encouraged in initiatives on the sustainable use of biodiversity. For example, both public and private sectors comprising individuals, companies, cooperatives and industry are playing key roles in the management of forests. The private sector has also demonstrated its ability to enhance the productivity of wastelands and is dominant in the areas of wood harvesting and processing. The National Environment Policy, 2006 envisages the development of feasible models of public-private partnerships to leverage financial, technical and management resources of the private sector for monitoring environmental compliance.

In pursuance of the Government of India's policy to achieve sustainability in tourism

Sekhar Dattatri

Yellow Orchid. Orchids are the largest and most diverse of the flowering plant (Angiospermae) families, with over 800 described genera and 25,000 species.

development and to ensure regulated growth of ecotourism with its positive impacts of environmental protection and community development, the government has come out with the Policy and Guidelines for Ecotourism in India, 1998. The Ministry of Tourism, Government of India and the United Nations Development Programme (UNDP) have partnered an innovative Endogenous Tourism Project, Incredible India, which focuses on the rural tourism experience, based on rural art and craft skills, cultural and natural heritage. The Project complements the Ministry's Rural Tourism Scheme that supports rural infrastructure.

The National Environment Policy, 2006 envisages paralleling multi-stakeholder partnerships for enhancement of wildlife habitat in Conservation Resources and Community Reserves to derive both environmental and ecotourism benefits; promoting sustainable tourism through adoption of best practice norms; and taking measures to regulate tourist inflows into mountain regions to ensure that these remain within the carrying capacity of the mountain ecology. These wide-ranging measures at policy as well as programmatic levels are instrumental in ensuring sustainable use of biological resources.

Article 11 - Incentive Measures

Incentives to promote and provide an enabling environment for different stakeholders to participate actively in conservation activities are an effective tool in ensuring conservation and sustainable use of biodiversity. Some

programmes in place that include such incentives are given below:

a) National, state and local level biodiversity funds to be set up under the Biological Diversity Act. This will allow separate budget allocation for biodiversity conservation at the respective levels.

b) Provision of a national gene fund under the Plant Varieties Protection and Farmers' Rights Act (PVPFRA)

c) A provision made under the Biological Diversity Act for levying cess on biological material going out of the jurisdiction of local bodies (such as Panchayats) for commercial purposes

d) National level fellowships and awards instituted to encourage people, institutions and communities to contribute to biodiversity conservation

e) Eco-development programmes undertaken to reduce anthropogenic pressure on PAs

f) Establishment of JFM committees has created a mechanism of dialogue between users and managers of biodiversity, which have helped in creating a stake in the management of the biodiversity for local communities.

g) Encouragement to private sector involvement in sustainable use of biodiversity. As a result, both public and private sectors are playing key roles in the management of forests.

Besides initiatives by NGOs, academic institutions and civil society, corporate sector has taken initiatives on a voluntary basis, under Corporate Responsibility for environment protection, especially green accounting, auditing, eco-labeling and, in some cases, through green lending practices.

A combined approach of positive incentives, disincentives, indirect incentives and removal of perverse incentives is under development towards ensuring adequate incorporation of market and non-market values of biodiversity into plans, policies and programmes.

The National Environment Policy, 2006 envisages setting up of mechanisms and processes to identify entities of 'Incomparable Value' in different regions. Sacred groves, biodiversity hotspots, forests with high indigenous genetic diversity and environmentally sensitive areas are to be treated as possessing Incomparable Values. The National Environment Policy, 2006 also seeks to prepare and implement an action plan on the use of economic instruments for environmental regulation in specified contexts, including those relating to unsustainable production and consumption. It also envisages creation of a National Environment Restoration Fund from the proceeds of economic instruments, user fees for access to specified natural resources and voluntary contributions. The Funds may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies and other such activities for conservation of biodiversity.

Article 12 - Research and Training

India has established a number of research and training institutions that have comprehensive programmes and activities relating to conservation of biodiversity. These include both government as well as non-government organizations. Nine 'Centres of Excellence' have been supported by the MoEF with a view to strengthening awareness, research and training in priority areas of environmental science and management. Institutions of CSIR have various

Manoj Dholakia

Demoiselle Cranes in the Rann of Kachchh. The Rann, a vast grassland and seasonal salt marsh, is spread across 27,900 sq. km. in western India. Originally an extension of the Arabian Sea, it has been closed off by centuries of silting. It harbours more than 200 bird species.

in-house and sponsored programmes that contribute to conservation and sustainable use of biodiversity.

The country has a well-defined agenda to promote and encourage research in conservation and management of biodiversity. Some of the important areas are:

a) Provision of research pertaining to biodiversity conservation in all PAs, including national parks, sanctuaries and biosphere reserves

b) Research on plant and animal biodiversity

c) Survey and research on marine biodiversity, agricultural biodiversity, fish diversity, etc

d) Conservation and management plan of NTFPs

e) Eco-tourism and livelihoods

f) Research specifically in the area of medicinal plants

Article 13 - Public Education and Awareness

Conservation and sustainable use of biodiversity is one of the thrust areas of the Government for public education and awareness. MoEF interacts actively with the Ministry of Human Resource Development and its subordinate bodies including the University Grants Commission, the National Council for Educational Research and Training, the All India Council for Technical Education and State Education Departments, for integration of content related to environmental concepts and issues in the curricula of schools and colleges. Environment Studies has been introduced as a mandatory subject in schools and colleges in India. In the area of formal education, the National Policy on Education, 1986 stresses on creating consciousness about the environment including biological diversity. In order to generate awareness regarding the need to conserve and sustainably utilize biological resources, mass media such as TV, radio and the press are being utilized extensively.

Anala

Nature camps are a wonderful way of introducing children and adults to the beauty and harmony of nature and, in the process, sensitize them to the need for conservation.

Some of the initiatives taken by MoEF in promoting environmental education (EE) and awareness through non-formal media and methods are:

- National Environmental Awareness Campaign (NEAC) that involves over 7500 NGOs across the country
- Establishment of Centres of Excellence in EE
- Establishment of the National Museum of Natural History and regional museums of natural history
- Setting up a network of over 72,000 eco-clubs in schools and colleges across the country
- Production and dissemination of films, audio-visual and popular publications on environment
- Supporting the organization of seminars, symposia and conferences on environmental issues
- Institution of awards and fellowships
- Establishment of 72 Environmental Information (ENVIS) centres that maintain theme-specific websites and databases, and publish newsletters and journals.

A range of initiatives towards facilitating discussions and education related to agro-biodiversity and medicinal plant genetic resources have been taken up by institutions such as Centre for Environment Education (CEE) and FRLHT. The UNDP-Global Environment Facility

(GEF) Small Grants Programme, with CEE as the National Host Institute, has a major thrust on stakeholders' participation for planning and execution of conservation and sustainable utilization of biological diversity. Green Governance, Corporate Social Responsibility Programmes at BNHS and other industry and corporate initiatives are facilitating information servicing, sensitization of industry and corporate decision-makers for integration of biodiversity conservation into sectoral programmes.

Interpretation activities in Kanha National Park, Bhoj Wetland and Chilika Lagoon are examples of creating state-of-the-art facilities towards public education about biodiversity components.

Conservation education programmes have been implemented related to species such as turtles, elephants and tigers. CSIR has developed national and international training programmes and networking in species-inventory techniques. The Mowgli Utsav in Madhya Pradesh is a state government supported activity that involves school children from across the state in nature appreciation and biodiversity conservation activities. There has been a special effort to develop biodiversity learning resources for visually impaired students by Arushi, an NGO based in Bhopal, Madhya Pradesh.

Through South and South East Asian Network for Environmental Education (SASEANEE) at CEE, a ten-week certificate course on Environmental Education is organized every year, which has participation from South and Southeast Asia and Africa. A module on biodiversity conservation has been a part of the course content since its launch in 1997. Till date, 84 professionals from 18 countries have been trained under this initiative. Thus, India has been able to take wide-ranging steps in strengthening education and public awareness within the country, as well as play an active role at the regional and international levels.

Article 14 - Impact Assessment and Minimizing Adverse Impacts

In order to harmonize developmental efforts with conservation of environment and ecology, India has formulated policies and legislations enabling proper assessments and adequate measures towards minimizing adverse impact of developmental activities. Such existing tools are EIA Notification, 1994, revised in 2006, and CRZ Notification, 1991. Environmental clearance based on EIA is mandatory for certain categories of developmental projects in the sectors of industry, thermal power, river valley and hydro electric power, mining, infrastructure, nuclear power, and new construction projects and industrial estates.

Ecologically Sensitive Areas are notified under the Environment (Protection) Act 1986 to impose restrictions on industries, operations and other developmental activities that have a detrimental effect on the environment of that region. It also provides for restoration of denuded areas, management of catchments, watershed areas etc. for planned development, while ensuring sustainable livelihoods for local communities and stakeholders. To address biodiversity related issues in EIA, the baseline status of biodiversity and its components are ascertained and information on habitat resilience is also collected for assessing the likely significant impacts of proposed developmental activities.

The MoEF has undertaken re-engineering of the environmental clearance process based on a comprehensive review of the existing process to make the environmental clearance process more effective and time bound. It also aims to bring about greater transparency and

CEE Photo Library

Interpretation centres at natural heritage sites, such as this one on the Bhoj Wetland in Bhopal, help to convert the visits of people to natural and cultural heritage sites into an educational opportunity in a way that is entertaining and interesting to these people.

improvement in the quality of appraisal including threats of the proposed development activity to the biodiversity, which includes genetic diversity, species diversity and ecosystem diversity, and likely displacement of fauna or creation of barriers for their movement and impacts on protected and ecologically sensitive area.

India is a party to the Rotterdam Prior Informed Consent Convention on Hazardous Chemicals, Stockholm Convention on Persistent Organic Pollutants, and Basel Convention on trans-boundary movement of hazardous wastes. Policies and programmes are in place for management of chemical emergencies, hazardous waste and solid waste. Planning and overseeing the implementation of policies and programmes on management of chemical emergencies and hazardous substances are carried to promote safe handling, management and use of hazardous substances, including hazardous chemicals and hazardous wastes, in order to avoid damage to health and environment.

Article 15 - Access to Genetic Resources

India being rich in biological resources and associated traditional knowledge, has taken three significant legislative measures for operationlization of the access and benefit-sharing provisions. These are Biological Diversity Act, 2002 and Biological Diversity Rules, 2004; PVPFRA, 2001, and the Patent Amendment Act 2005. The Biodiversity Act primarily aims at regulating access to biological resources and associated traditional knowledge so as to ensure equitable sharing of benefits arising out of their use, in accordance with the provisions of the CBD. For implementation of the Act, a three-tiered structure with a NBA, State Biodiversity Boards and Biodiversity Management Committees at local self government level has been envisaged.

The PVPFRA, 2001 and the PVPFR Rules, 2003 deal primarily with the protection of plant breeders' rights over the new varieties developed by them and the entitlement of farmers to register new varieties and also to save, breed, use, exchange, share or sell the plant varieties, which

Fritz Bachmayer (Dr. Parvish Pandya's stock)

Gobi Fish and Sea Anemone. The National Committee on Mangroves and Coral Reefs has recommended intensive conservation and management of corals in four areas, namely Andaman and Nicobar Islands, Lakshadweep Islands, Gulf of Kachchh and Gulf of Mannar.

the latter have developed, improved and maintained over many generations.

The use of Gene Use Restriction Technologies (GURTS) or terminator technology is prohibited as per the provisions of the PVPFRA. Import of GURTS products has been banned in India, and state-of-the-art containment facilities and diagnostic tools have been developed towards effective implementation of the provision.

The Second and Third Amendments to the Patent Act, 1970 provide for mandatory disclosure of the source and geographical origin of the biological material in the patent application when used in the invention. Further, non-disclosure or wrongful disclosure of the source of biological material and any associated knowledge will result in opposition to grant of patent or revocation of patents. These legislative measures with appropriate institutional mechanisms are important in ensuring regulated access to the genetic material with a view to promote conservation and sustainable use.

Article 16 - Access to and Transfer of Technology

The Biological Diversity Act, 2002 provides that prior approval of NBA is required inter alia for transferring results of research relating to biological resources obtained from India, and before applying for Intellectual Property Rights based on bio-resource or associated knowledge derived from India. Further, while granting

approvals, the NBA may impose terms and conditions which inter alia may include transfer of technology.

There are some programmes under consideration on transfer of technology and technology cooperation. A study is underway for identifying the technology transfer mechanisms for selected biotechnology products among the SAARC countries by Biotech Consortium India Limited under the sponsorship of the Ministry of External Affairs.

Assessment and analysis of the potential benefits, risks and associated costs of introduction of new technologies is done on a case-by-case basis. For example the introduction of Bt-cotton, a genetically modified crop, was done after detailed field trials, scientific risk assessments as well as socio-economic impact studies.

Appropriate information systems for technology transfer and cooperation are being developed further. National institutional and policy frameworks are needed to be developed to facilitate cooperation and access to technologies with relevance to the Convention.

Article 17 - Exchange of Information

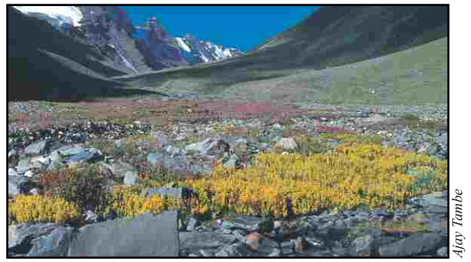
India has extensive networks among institutions across the country for information exchange. Some of these have developed mechanisms with international organizations for facilitating exchange of publicly available information towards implementation of the Convention. The information on TKDL on Ayurveda is being shared with many countries in Asia, Africa and Europe who have shown interest in replicating the model for patent granting process in their respective countries.

Article 18 - Technical and Scientific Cooperation

International technical and scientific cooperation is encouraged for various biodiversity programmes in all the concerned Ministries. The MoEF is the nodal agency in the Government of India for various environment related multilateral agreements and protocols, as well as bilateral and multilateral matters related to biodiversity. In addition, the Ministry of Science and Technology undertakes several programmes to promote international technical and scientific cooperation covering various aspects of conservation and sustainable use of biological diversity. Collaborative research among Indian Ocean rim countries, and in areas of genetic and chemical diversity including forest genetics and tree breeding, are examples of this. India is a member of Asia Pacific Traditional Medicine Network and participates in database development and sharing of Traditional Knowledge. An Indo-ASEAN project provides for exchange of scientists among member institutions. India has established linkages with the international Legume Database and Information System and Global Network of Botanical Gardens. India's ENVIS functions as the national focal point and regional service centre for South Asian countries for INFOTERRA, which is a global information network of UNEP. ENVIS has been also designated as the national focal point for the Sustainable Development Network Programme of UNDP.

Article 19 - Handling of Biotechnology and Distribution of its Benefits

While some measures have been taken to promote and advance priority access on a fair and equitable basis of results and benefits from biotechnology to those Contracting Parties that provide the genetic resources for research, India is yet to take measures for effective participation of these Parties in such research.



Ajay Tambe

Corydallis Flowers at Lalanti. This frigid landscape at 13,700 feet is transformed in a brief burst of colour which lasts about three months of the year.

Article 20 - Financial Resources

National and state budgets have allocations for biodiversity conservation programmes in various geographic as well as thematic areas. Bilateral funding channels like Swedish International Development Agency, Department for International Development, Ford Foundation and several others are available towards implementation of CBD. The multilateral channel of the GEF, through UNDP, UNEP and World Bank, is also assisting in the implementation of CBD.

Entry fees charged at National Parks and Wildlife Sanctuaries help in generating resources for conservation. Further efforts to provide financial support and incentives to activities that help in achieving the goals of the Convention include:

- Measures being developed to exempt excise and customs duty for technologies such as use of fly ash, electrical vehicles and membrane cell technology; exemption from capital gains taxes on shifting away from urban areas; and soft loans for pollution control devices
- Review of National Budget and policy to assess effectiveness of development assistance allocated to biodiversity including identification of positive as well as perverse incentives
- Enhancement of financial integration of biodiversity conservation in forestry programmes through JFM
- Linkages with biodiversity conservation made in sectors such as pharmaceuticals, agriculture, forestry, fishery and petroleum

India has sought funds from the GEF for various programmes such as preparation of the National Biodiversity Strategy and Action Plan, capacity building for implementation of Cartagena Protocol on Biosafety, *in situ* conservation, education and public awareness, conservation and sustainable use of agricultural biodiversity, etc. These are among prominent measures and sources ensuring financial resources for overall implementation of CBD in India.

Manoj Dholakia

To promote afforestation, ecological restoration and eco-development, Government of India has set us the National Afforestation and Ecodevelopment Board, with special attention to degraded forest areas and lands adjoining Protected Areas.

THEMATIC AREAS

Agricultural Biodiversity

India is bestowed with immense richness of agro-biodiversity. A large number of cereals, millets, oilseeds, vegetables and vegetable varieties have originated and are cultivated in India, making it one of the richest Centres of Origin of crop and plant diversity in the world. Equally magnificent is the richness of livestock, poultry and fish diversity.

Through the Indian Council of Agricultural Research (ICAR) and a network of other institutions, Universities and NGOs, a systems and programme-based approach to conservation of agricultural biodiversity is being followed in the country. The ICAR, which is the second largest agricultural R&D organization in the world, has contributed significantly for achieving food and nutritional security for the growing human population, focusing on marginal farmers and, at the same time, maintaining ecological balance.

In tune with our emerging needs, India is re-orienting its efforts to meet the future challenges of increased food production, while ensuring conservation and sustainable utilization. These efforts are need-based and demand-driven, and there has been a paradigm shift from a commodity and product-based approach to a systems and programme-based approach following eco-regional planning.

The ecosystem approach has been followed for genetic resource conservation and crop

improvement programmes in 21 agro-climatic zones of the country. Appropriate policy and legislative measures have been taken to ensure meeting increasing demands for food and other agricultural products and conservation of agro-biodiversity both *in situ* and *ex situ*, protection of farmers' rights through tackling issues such as bio-piracy, patents, alien invasive species, and potentially dangerous technologies such as GURTS.

The status of components of agro-biodiversity is being monitored regularly in the context of adoption of high yielding varieties in place of locally adopted varieties, changing nature of cropping systems and infrastructural development. On-farm conservation of genetic resources and diversified farming practices are being promoted to overcome some of these challenges. The negative impacts of agriculture on biodiversity, productivity and sustaining livelihoods are now getting attention and, thus, management practices, technologies and policies are being identified to mitigate the same. These include promotion of integrated crop and livestock farming, revival of traditional watershed management practices and discouraging the indiscriminate use of chemical fertilizers and pesticides. Databases and monitoring systems are being developed to support these measures.

Sustainable agricultural practices are now receiving greater attention with a renewed focus on integrated crop farming and livestock production systems for generating additional income to farm families. On-farm *in situ* conservation approach, with *ex situ* conservation providing a safety back-up, is being explored under different ecosystems with a view to developing workable models. Value-addition to agro-products (such as minor millet's fortification in biscuit-making) and horti-products is getting more popular. Support is being provided for conservation and improvement of landraces, traditionally grown farmers' varieties, native livestock breeds, best practices and associated traditional knowledge. Small-sized farm holdings, resource-poor marginal farmers, low level of investment and limited technological advances are the major challenges faced by the agriculture sector.

Forest Biodiversity

In India, forests are one of the most critical ecosystems that perform a balancing act between development and biodiversity conservation. The MoEF has formulated a National Forestry Action Programme as a comprehensive strategic long-term plan for the next twenty years to address the issues underlying the major problems of the forestry sectors, in line with the National Forest Policy, 1988. The main components of the programme are protecting existing forest resources, improving forest productivity, reducing total demand, strengthening policy and institutional framework, and expanding forest area cover.

The NAEB promotes afforestation, tree planting, ecological restoration and eco-development activities in the country with special attention to degraded forest areas and lands adjoining forest areas, national parks, sanctuaries and other PAs as well as ecologically fragile areas like the Western Himalayas, Aravallis, Western Ghats, etc.

In order to develop interconnectivity among rural development, forest conservation and employment generation in the forest-fringed villages, a number of schemes under JFM and eco-development of areas adjoining PAs are being implemented under the Five Year Plans of the provinces as well as centrally-sponsored schemes. An umbrella afforestation scheme of the MoEF called 'National Afforestation Programme' is being implemented through decentralized institutions of Forest Development

Rajashri Sarabhai

The Lion-tailed Macaque (*Macaca silenus*) is an Old World monkey that lives only in southwest India. The Lion-tailed Macaque ranks among the rarest and most threatened primates.

Agencies constituted by a federation of Joint Forest Management Committees at village micro-level.

Forest Survey of India has been conducting field inventories for estimating the growing stock (volume) and other parameters of the forests by laying out systematic sample plots. So far, about 80% of the country's forest areas have been inventoried. Indian Council for Forestry Research and Education and its institutes, WII, Indian Institute of Forest Management (IIFM), and G.B. Pant Institute of Himalayan Environment & Development are actively pursuing research on various aspects of forest biological diversity. The capacity of state forest, wildlife and environment departments needs further strengthening in this regard.

The major threats to forest biodiversity are changing land use and land management, habitat fragmentation, pressure on national resources, over-exploitation of forest and soil resources, forest fires, broken corridors, etc. Afforestation, ecological restoration and eco-development activities are the measures undertaken, with special attention being given to the regeneration of degraded forest areas and lands adjoining forest areas including PAs and ecologically fragile areas.

Research has been carried out on landscape-scale impacts of NTFP collection, grazing and burning to understand interaction between ecological and socio-economic processes and their impact on spatial and time scales. Floral and faunal flagship species conservation programmes like Project Elephant and teak forest improvement have followed the ecosystem approach. Afforestation, eco-restoration and *in situ* and *ex situ* conservation measures are aimed at reducing threats (such as changing land use, over-exploitation and habitat fragmentation) to forest biodiversity and to mitigate negative impacts.

Recognition and integration of environmental values such as carbon sequestration, water conservation and other ecological services is being undertaken in assessment, conservation and developmental planning processes.

Manoj Dholakia

Chinkara Fawn. Also known as Indian Gazelle (*Gazella gazella bennetti*). It is found in the grassland and desert areas of South Asia.

A Forest Certification Policy for products manufactured with the use of forest bio-resources is being developed. Towards reducing unsustainable consumption of biological resources, the Criteria and Indicators for forests are being finalized by IIFM. Comprehensive actions in terms of legislative measures, education, capacity building and resource allocation are being followed to address issues in forest biodiversity conservation within the country as well as in relation to other participating countries in implementation of the Convention.

Inland Water Biodiversity

Wide-ranging policies, strategies and action plans have been formulated by the Government of India, which, directly or indirectly, support wetland conservation in the country. The National Conservation Strategy and Policy Statement on Environment and Development, 1992 highlight conservation and sustainable development of wetlands, including coastal areas, riverine and island ecosystems. Specific provisions have been made under the National Water Policy, 2002 for considering ecological requirements in prioritizing water use. The National Environment Policy, 2006 envisages establishing regulatory mechanisms and conservation, sustainable use and benefit-sharing strategies for important wetlands in the country. Wetland conservation is also being integrated into sectoral development plans for poverty alleviation and livelihood improvement.

India is a signatory to the Ramsar Convention and has designated 21 Ramsar

sites. Conservation and management activities are on at 66 wetlands in 21 states of the country under the National Wetland Programme including mangrove conservation activities. Chilika and Loktak conservation models have been successfully demonstrated for multi-stakeholder-led wetland conservation and management in the region. Chilika has also won the Ramsar Wetland Conservation Award. Database development for wetlands in the country, floral and faunal diversity, and environmental flow assessment has been carried out by government as well as NGOs. Ecological and socio-economic assessments, and stakeholders' participation and education related to Coral Conservation plan have been implemented. While India took a lead role in the formulation of Ramsar guidelines on integration of wetlands into river basin management, the synergy between CBD and Ramsar Convention in India has helped to integrate various developmental sectors into the planning process at the river basin level for management of wetlands.

Marine and Coastal Biodiversity

In India, the measures to conserve coastal and marine biodiversity include developing new marine and coastal protected areas, and improving management of existing ones using an integrated conservation strategy of reducing pollutant flows, sustainable harvest and benefit sharing. At present, there are 31 marine PAs and three marine biosphere reserves. Participatory management plans for these sites are in place with effective enforcement and monitoring mechanisms. Legislative measures like the CRZ Notification, 1991 prohibit developmental activities in coastal areas and disposal of wastes in the mangrove and coral reef areas, thereby protecting them and their associated biodiversity. India is implementing Integrated Coastal Area Management through the CRZ Notification, 1991 which has provisions to protect critical marine and coastal ecosystems, including mangroves and coral reefs. Aquaculture Authority of India regulates mariculture activities in the country. EIA is applied to mariculture development ensuring conservation of genetic diversity and traditional knowledge.

India is a partner to the Global Coral Reef Monitoring Network. Considering the importance of coral species in the coastal system, their conservation has been given high priority in recent years.

The National Environment Policy, 2006 seeks to disseminate available techniques for regeneration of coral reefs and support activities based on application of such techniques; explicitly consider sea-level rise and vulnerability of coastal areas to climate change and geological events in coastal management plans; as well as infrastructure planning and construction norms; and adopt a comprehensive approach to Integrated Coastal Management by addressing linkages between coastal areas, wetlands and river systems, in relevant policies, regulations and programmes.

Dryland and Sub-humid Land Biodiversity

India has more than three fourth of its geographical area technically classified as dryland and sub-humid land. India has carried out state, sub-state and eco-regional biodiversity assessments to guide conservation programmes. Programmes related to conservation of dryland and sub-humid land biodiversity fall under cross-sectoral mandates of Ministries like Forests, Agriculture, Water Resources and Rural Development, and are subject to multiple legislative frameworks such as Forest (Conservation) Act, 1980; Environment (Protection) Act, 1986; Water (Prevention and

Rohit Vyas

Several of the marine and inland water ecosystems have been brought under the PA network; more efforts are needed to establish and effectively manage the marine PAs and adequately protect inland water ecosystems.

Control of Pollution) Act, 1974, Wildlife Protection Act, 1972; 73rd and 74th Constitutional Amendments; Biological Diversity Act, 2002; National Livestock Policy Perspective, 1996; National Agricultural Policy, 2000; National Land Reforms Policy; Draft Grazing and Livestock Management Policy; Draft National Policy for CPR Lands; Policy on Drought.

The National Action Plan for combating desertification in the context of UNCCD has been prepared in 2001. A large number of social sector and community development programmes have been undertaken in order to combat desertification and include watershed development and credit assistance for rural agro-based activities. Eco-restoration activities for degraded lands have been initiated with use of traditional as well as modern technologies and through community participation.

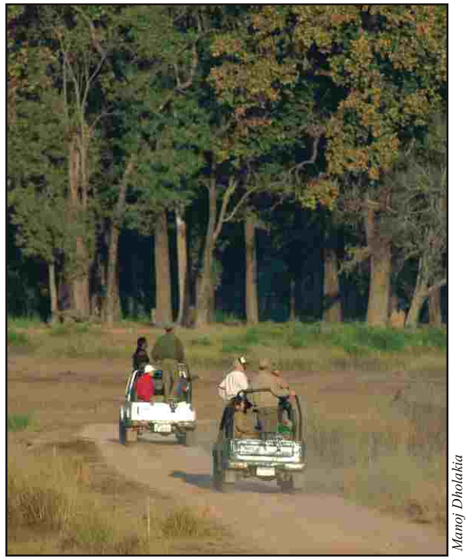
Mountain Biodiversity

India has two major mountain regions, the Himalayas and the Western Ghats. Conservation of mountain biodiversity has been given special importance in various policies, plans and programmes of Government of India.

Specialized institutions are inventorizing biodiversity components and developing technological tools for conservation in these regions. Relatively higher financial resources are allocated towards research in these regions by governmental agencies as well as NGOs. Special networks are active for participatory documentation processes like PBR and community-based conservation.

A large network of PAs including WLSs, NPs and Biosphere Reserves have been established in mountain regions of India covering a representative area well above the national average.

In situ and *ex situ* conservation programmes for critically important species such as bamboo and many medicinal plants along with faunal species ranging from snow leopard to elephants have been gradually directed toward an ecosystem approach. Recognizing the threats to mountain areas, the National Environment



Manoj Dholakia

Tourists enjoying the scenic beauty of forests in Madhya Pradesh. The National Environment Policy, 2006 envisages multi-stakeholder partnerships to derive environmental and ecotourism benefits, and promote sustainable tourism through adoption of best practice norms.

Policy, 2006 calls for adoption of appropriate land use planning and watershed management practices for sustainable development of mountain ecosystems and adopt 'best practices' norms for infrastructure construction in mountain regions to avoid or minimize damage to sensitive ecosystems and despoiling of landscapes. While tourism is a major economic activity in mountain regions, policy and legislative frameworks have been developed to ensure ecologically and socio-economically sound practices are followed. Besides internal priority setting and special provisions under the Finance Commission of the country, India has also developed mechanisms for trans-boundary cooperation in mountain area conservation with countries like Nepal and Bhutan.

PRIORITY SETTING, TARGETS AND CHALLENGES

India accords high priority to effective implementation of all the Articles of the

Convention, provisions in these Articles and relevant programmatic work of the Convention. This high level of priority has helped in creating necessary spaces for relevant legislative and financial actions.

In the context of provisional framework for goals and targets under the Convention, India has developed its own targets for biodiversity conservation under various national policies that mandate actions. For example, the National Forest Policy, 1981 lays down that at least one-third of the country's geographical area should be under forest/tree cover. The planning process accordingly provides administrative and financial support. Such targets have been defined for specific areas like Agriculture, Marine and Coastal areas, Forests and Dry and Sub-humid lands as well as for cross-cutting themes of the Convention such as conservation of species and genetic diversity, promoting sustainable use and consumption, and maintaining socio-cultural diversity of indigenous and local communities.

These targets and corresponding measures to achieve them have met with numerous challenges and obstacles related to socio-economic and political realities, technological limitations and inadequacy of certain enabling mechanisms.

India has done a mapping exercise for various challenges faced by thematic programmes of work falling under different Articles of the Convention with their levels. It is a useful tool for planning and strategizing interventions involving various stakeholders. The juxtaposition of the challenges with programmatic work towards achieving specific national targets gives a comprehensive idea of the status of the country's compliance with the implementation of the Convention. For example habitat degradation, limited allocation of funds, poor infrastructure and technical skills, and poverty are the prime challenges faced, particularly by the Forests thematic programmes. These are sought to be dealt with in programmatic works of afforestation, species conservation, institutional capacity building, participation and cooperation mechanisms and so on.

Unsustainable consumption patterns, lack of economic incentive measures and financial resources, inadequate sectoral and inter-sectoral integration, cooperation, natural disasters and shortage of trained manpower are some of the other prominent challenges. The complexity of socio-cultural aspects in relation to benefit sharing of resources and community participation is among one of critical challenges faced by the country today.

India's Third National Report to the Convention on Biological Diversity provides detailed information on comprehensive efforts taken on social, scientific, technological and legislative fronts towards achieving national targets. This, in turn, leads to the details of India's commitment and contribution to the global quest towards realizing the goals of biodiversity conservation.

Ashok Captain

The Tabebuia, an exotic (not indigenous) tree in India. It looks like a labernum. The tree is leafless when it flowers.

Ashok Captain

Sita's Lizard (*Sitana ponticeriana*). Also called fan-throated lizard, it is a species of agamid lizards found in Nepal, India, Sri Lanka and parts of Pakistan. When disturbed, this lizard sometimes runs with a bipedal gait.

Fritz Bachmayer (Dr. Parvish Pandya's stock photos)

Considering the criticality of coral reefs as coastal habitats, marine protected areas have been established for their conservation.