Culture Repository at NBPGR, New Delhi, besides the Tissue Culture Pilot Plants of multiplication of Forest Trees at National Chemical Laboratory (NCL), Pune and The Energy Research Institute (TERI), New Delhi. Besides, under the G-15 initiative of the Gene Banks of Medicinal and Aromatic Plants (GEBMAP), three national gene banks have also been established at Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, NBPGR, New Delhi and Tropical Botanical Garden and Research Institute (TBGRI), Thiruvananthapuram. In addition, plant tissue culture laboratories have also been established by many organizations, like the BSI; ICFRE, Dehradun and Bangalore; GBPIHED; NBRI, Lucknow; CIMAP; TBGRI; State Forest Department of Arunachal Pradesh and several university departments, for rapid mass propagation of selected rare, threatened and economically important plant species.
V) Progress made towards target (please specify indicators used to monitor progress towards the target)
As elaborated under III) and IV) above.
VI) Constraints to achieving progress towards the target
Inadequate financial resources.

Box XXXII.

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.**
I) Has your country established national target corresponding to the above global target?	
a) Yes	X
b) No	
Please specify	
Collection and preservation of the crop genetic resources is being done by the NBPGR, New Delhi. Details given in I) under Target 8. The National Environment Policy, 2006 seeks to encourage cultivation of traditional varieties of crops and horticulture by promotion of organic farming, enabling farmers to realize a price premium. Further, protection of areas of high endemism of genetic resources is also to be strengthened.	
II) Has your country incorporated the above global or national target into relevant plans, programmes and strategies?	
a) Yes	X
b) No	

Please specify
Same as given in II) under Target 8.
III) Current status (please indicate current status related to this target)
Same as given in II) under Target 8.
IV) Measures taken to achieve target (please indicate activities, legislative measures and other steps taken with a view to achieve the target)
Same as given in IV) under Target 8.
V) Progress made towards target (please specify indicators used to monitor progress towards the target)
Same as given in V) under Target 8.
VI) Constraints to achieving progress towards the target
Financial constraints. Better coordination is desirable for optimum utilization of limited funds.

Box XXXIII.

Target 10.	**Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems.**
I) Has your country established national target corresponding to the above global target?	
a) Yes	
b) No	X
Please specify	
Even though there are no management plans available for 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.	
II) Has your country incorporated the above global or national target into relevant plans, programmes and strategies?	
a) Yes	
b) No	X
Please specify	
Lack of sufficient information is a major constraint to developing the national targets on alien species.	

III) Current status (please indicate current status related to this target)
The BSI, under its ongoing programme on survey and documentation of plant resources of the country, also documents alien species and reports from time to time.
IV) Measures taken to achieve target (please indicate activities, legislative measures and other steps taken with a view to achieve the target)
Various measures have been put in place for the management of alien species (see Box XII). However, the problem of alien species is much more dynamic due to natural spread of alien species through seed dispersal mechanisms, etc.
V) Constraints to achieving progress towards the target
The high level of dynamism displayed by biological systems is an important constraint. The measures need to respond according to the changing behaviour of the response and impact of alien species.

Box XXXIV.

Target 11.	**No species of wild flora endangered by international trade.**
I) Has your country established national target corresponding to the above global target?	
a) Yes	X
b) No	
II) Has your country incorporated the above global or national target into relevant plans, programmes and strategies?	
a) Yes	X
b) No	
Please specify	
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/groups of species, is in force since 1 April 1998. India is also a party to the CITES, and has Wildlife Protection Act and National Biodiversity Act in place. Some of the measures put in place may be seen in Box XII.	
III) Current status (please indicate current status related to this target)	
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 Wildlife Protection Act; 13 species/groups (*Podophyllum hexandrum*, *Dioscorea deltoidea*, *Rauvolfia serpentina*, *Aquilaria malaccensis*, *Picrorhiza kurrooa*, *Pterocarpus santalinus*,	

CEE Photo Library

Cucumis callosus. Common in desert zones in the west of Aravalli; the fruits are eaten raw or cooked as vegetable or as sauce (chutney) by the local people.

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.

Sekhar Dattatri

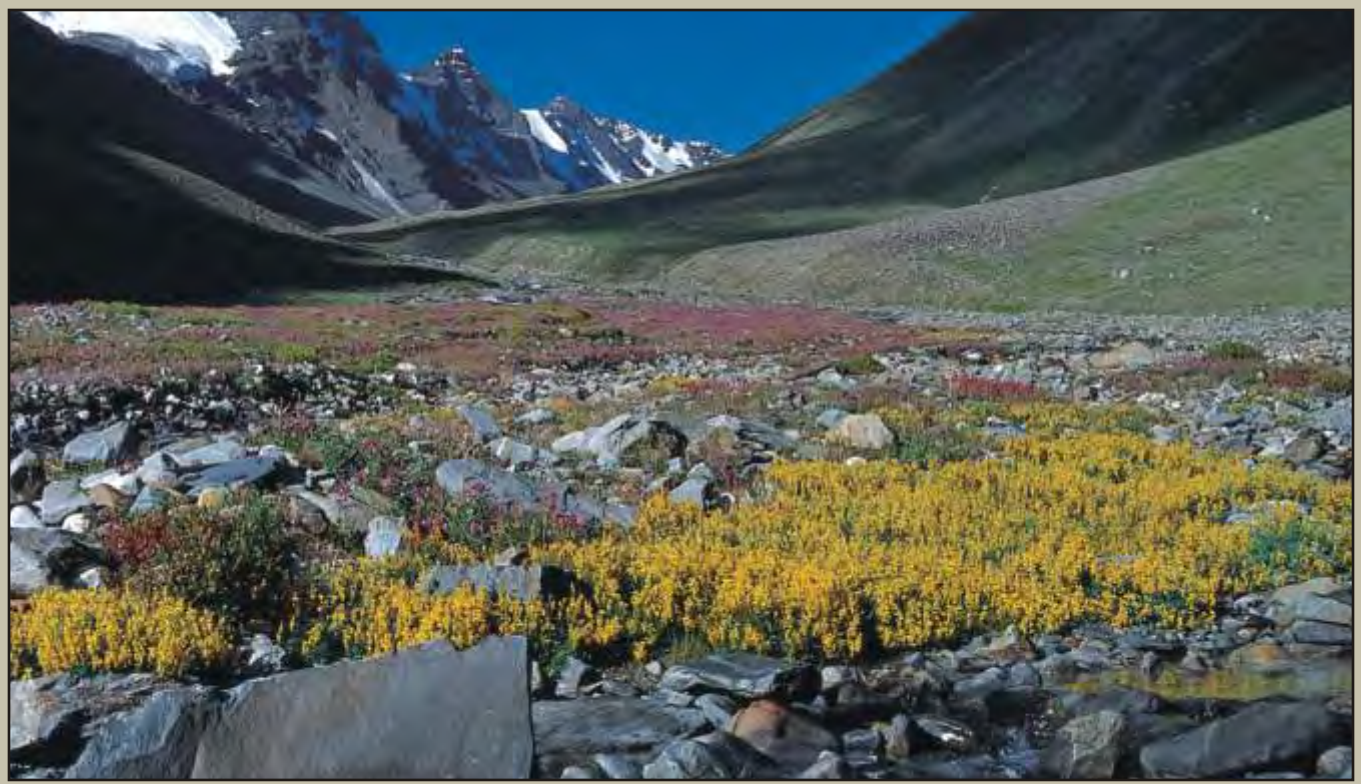
Yellow Orchid. Orchids are the largest and most diverse of the flowering plant (Angiospermae) families, with over 800 described genera and 25,000 species.

Ashok Captain

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

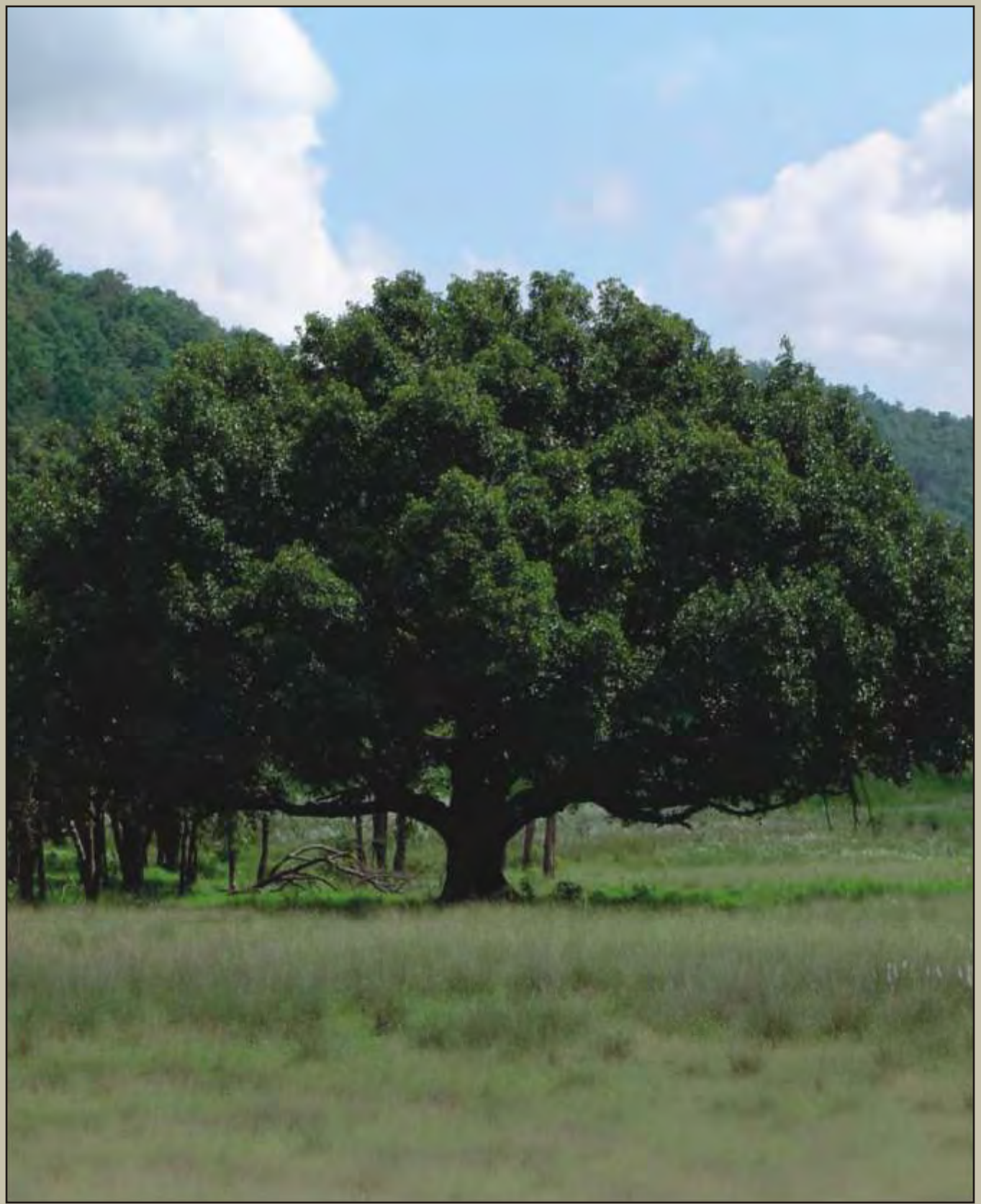
Manoj Dholakia

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.



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.



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.

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 the Negative List of Export.
IV) Measures taken to achieve target (please indicate activities, legislative measures and other steps taken with a view to achieve the target)
BSI has an ongoing programme of assessment of endangered plant species and based on threat perceptions, trade data, etc., it proposes, through the MoEF, its inclusion in different Appendices of CITES or the Negative List of Export. Wildlife Protection Act and Biological Diversity Act also help in achieving these targets.
V) Progress made towards target (please specify indicators used to monitor progress towards the target)
As elaborated under II) and III) above.
VI) Constraints to achieving progress towards the target
Illegal collection of threatened plants is still not a cognizable offence, except those listed in Schedule VI of Wildlife Protection Act, 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, do not help the matter either.

Box XXXV.

Target 12.	**Thirty percent of plant-based products derived from sources that are sustainably managed.**
I) Has your country established national target corresponding to the above global target?	
a) Yes	X
b) No	
Please specify	
Through integrated programmes on ecosystems, such as JFM, sustainable extraction of plant-based products, such as NTFPs, have been undertaken. Development of sustainable extraction techniques, such as tapping of gum karaya, is ongoing.	
II) Has your country incorporated the above global or national target into relevant plans, programmes and strategies?	
a) Yes	X
b) No	

Please specify
There are several efforts addressing sustainable management of plant products. The important legislations related to forests and biological diversity are stringent enough to control unsustainable harvests.
III) Measures taken to achieve target (please indicate activities, legislative measures and other steps taken with a view to achieve the target)
According to the Wildlife Protection Act, 1927, section 36C (1), 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 national park, sanctuary or a conservation reserve, as a community reserve, 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 Biological Diversity Act, 2002 provides for mandatory consultation of the local level BMCs by the NBA and SBBs on all issues relating to conservation and sustainable use of biological resources.
IV) Constraints to achieving progress towards the target
The complexity of socio-cultural situations in the country is an important challenge before establishing newer institutions like BMCs, Community and Conservation Reserves, etc.

Box XXXVI.

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.**
I) Has your country established national target corresponding to the above global target?	
a) Yes	X
b) No	
Please specify	
Same as given in Box XVII.	
II) Has your country incorporated the above global or national target into relevant plans, programmes and strategies?	
a) Yes	X
b) No	

Please specify
Same as given in Box XVII.

Box XXXVII.

Target 14.	**The importance of plant diversity and the need for its conservation incorporated into communication, educational and public-awareness programmes.**
I) Has your country established national target corresponding to the above global target?	
a) Yes	X
b) No	
Please specify	
The National Environment Policy, 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.	
II) Has your country incorporated the above global or national target into relevant plans, programmes and strategies?	
a) Yes	X
b) No	
Please specify	
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.	
III) Current status (please indicate current status related to this target)	
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 publications for creating public education and awareness. The ICFRE organizes forestry extension 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.	

Forest Research Institute (FRI), Indian Institute of Forest Management (IIFM) and Wildlife Institute of India (WII) impart training on environment, forest and wildlife management. Other organizations/NGOs with activities aimed at creating environmental and conservation awareness among all sections of society are Centre of Environment Education (CEE), C. P. R. Environmental Education Centre (CPREEC), National Museum of Natural History (NMNH), ZSI, etc.
IV) Measures taken to achieve target (please indicate activities, legislative measures and other steps taken with a view to achieve the target)
As elaborated under I) and II) above. Target groups for education, training and awareness include students, teachers, functionaries of the government in various sectoral departments and those involved in programmes of conservation, management and utilization of biodiversity, and the public at large.
V) Progress made towards target (please specify indicators used to monitor progress towards the target)
As elaborated under I) and II) above.
VI) Constraints to achieving progress towards the target
A nationwide information system with a uniform format for collection, retrieval and dissemination of data on various aspects of biodiversity is needed.

Box XXXVIII.

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.**
I) Has your country established national target corresponding to the above global target?	
a) Yes	X
b) No	
Please specify	
The National Environment Policy, 2006 seeks to: review the present institutional capacities 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 earmarked 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.	

II) Has your country incorporated the above global or national target into relevant plans, programmes and strategies?	
a) Yes	X
b) No	
Please specify	
Same as given in I).	

Box XXXIX.

Target 16.	**Networks for plant conservation activities established or strengthened at national, regional and international levels.**
I) Has your country established national target corresponding to the above global target?	
a) Yes	X
b) No	
Please specify	
The country has well-established networks of PAs, botanical gardens and institutions for conservation activities effectively supported by legislative and policy framework.	
II) Has your country incorporated the above global or national target into relevant plans, programmes and strategies?	
a) Yes	X
b) No	

Ecosystem approach

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.

Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. At its second meeting, the Conference of the Parties has affirmed that the ecosystem approach is the primary framework for action under the Convention (decision II/8). The Conference of the Parties, at its fifth meeting, endorsed the description of the ecosystem approach and operational guidance and recommended the application of the principles and other guidance on the ecosystem approach. The seventh meeting of the Conference of the Parties agreed that the priority at this time should be facilitating implementation of the ecosystem approach. Please provide relevant information by responding to the following questions.

3. Is your country applying the ecosystem approach, taking into account the principles and guidance contained in the annex to decision V/6? (decision V/6)	
a) No	
b) No, but application is under consideration	
c) Yes, some aspects are being applied	
d) Yes, substantially implemented	X

4. Is your country developing practical expressions of the ecosystem approach for national policies and legislation and for implementation activities, with adaptation to local, national, and regional conditions? (decision V/6)	
a) No	
b) No, but development is under consideration	
c) Yes, practical expressions have been developed for applying someprinciples of the ecosystem approach	X
d) Yes, practical expressions have been developed for applying mostprinciples of the ecosystem approach	

5. Is your country strengthening capacities for the application of the ecosystem approach, andproviding technical and financial support for capacity-building to apply the ecosystem approach? (decision V/6)	
a) No	
b) Yes, within the country	X
c) Yes, including providing support to other Parties	

6. Has your country promoted regional cooperation in applying the ecosystem approach across national borders? (decision V/6)	
a) No	X
b) Yes, informal cooperation	
c) Yes, formal cooperation	

7. Is your country facilitating the exchange of experiences, capacity building, technology transfer and awareness raising to assist with the implementation of the ecosystem approach? (decisions VI/12 and VII/11)	
a) No	
b) No, some programmes are under development	
c) Yes, some programmes are being implemented	X
d) Yes, comprehensive programmes are being implemented	

8. Is your country creating an enabling environment for the implementation of the ecosystem approach, including through development of appropriate institutional frameworks? (decision VII/11)	
a) No	
b) No, but relevant policies and programmes are under development	
c) Yes, some policies and programmes are in place	X
d) Yes, comprehensive policies and programmes are in place	

C. ARTICLES OF THE CONVENTION

Article 5 – Cooperation

9. Is your country actively cooperating with other Parties in respect of areas beyond national jurisdiction for the conservation and sustainable use of biological diversity?	
a) No	
b) Yes, bilateral cooperation (please give details below)	X
c) Yes, multilateral cooperation (please give details below)	X
d) Yes, regional and/or subregional cooperation (please give details below)	X
e) Yes, other forms of cooperation (please give details below)	

Further comments on cooperation with other Parties in respect of areas beyond national jurisdiction for the conservation and sustainable use of biodiversity.

The MoEF, which is the nodal Ministry for the CBD, is also the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Cooperative Environment Programme (SACEP), ICIMOD and IUCN. The MoEF also functions as the nodal agency for participation in international agreements relating to environment, in particular biodiversity, to which India is a party, such as CITES, Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar), Convention on the Conservation of Migratory Species of Wild Animals (CMS), UN Framework Convention on Climate Change (UNFCCC), UNCCD, Commission on Sustainable Development (CSD) and United Nations Forum on Forests (UNFF). MoEF has constituted consultative groups for various conventions to advise the Ministry on the country's position on these international agreements. In addition, there is a consultative group on trade and policy issues, which is jointly chaired by the Secretary, MoEF and the Secretary, Department of Commerce, so as to harmonize policies in trade-related Multilateral Environmental Agreements (MEAs).

The Ministry also handles bilateral cooperation matters relating to regional bodies, such as UNEP, Economic and Social Commission for Asia and the Pacific (ESCAP), South Asian Association for Regional Cooperation (SAARC) and SACEP. In order to complement and supplement work under the various conventions, and to develop synergies, there is close cooperation among the various units within the MoEF dealing with these conventions. This cooperation is ensured *inter alia* through reciprocal representation in the consultative groups of various conventions, exchange of information/documents, seeking inputs on various agenda items before finalizing country positions, implementation of joint work programmes in a decentralized manner, etc.

10. Is your country working with other Parties to develop regional, subregional or bioregional mechanisms and networks to support implementation of the Convention? (decision VI/27 A)	
a) No	
b) No, but consultations are under way	
c) Yes, some mechanisms and networks have been established (please provide details below)	X
d) Yes, existing mechanisms have been strengthened (please provide details below)	

Further comments on development of regional, subregional or bioregional mechanisms and networks to support implementation of the Convention.

India, along with sixteen other mega-diverse countries, which are rich in biological diversity and associated traditional knowledge, has formed a group known as the Like Minded Megadiverse Countries (LMMC). These countries are Bolivia, Brazil, China, Colombia, Costa Rica, Democratic Republic of Congo, Ecuador, Indonesia, Kenya, Madagascar, Malaysia, Mexico, Peru, Philippines, South Africa and Venezuela. The LMMCs hold 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.

In addition, the MoEF also deals with bilateral MoUs/agreements on environment with several countries such as Austria, China, Germany, Iran, Russia, Tajikistan, Turkmenistan, USA and Vietnam. These MoUs/agreements cover a wide array of areas, which pertain to issues of environmental concern.

In addition to formal bilateral agreement, there are cooperative activities with a host of other countries, some of which are as follows:

- European Commission (EC): A meeting of India-EC joint working group on environment facilitated exchange of views on various environmental issues to be raised in multilateral forum (viz. World Summit on Sustainable Development (WSSD), CSD), Biodiversity and Biosafety Protocols, renewable energy, climate change, trade and environment, and common challenges faced by both the countries.
- Brazil: Brazil and India have worked closely in all international forums for dealing with environmental and economical issues. The Indo-Brazil Common Agenda for Environmental issues was signed by both the governments.
- Canada: The ICEF is a joint initiative of the Government of India and the Government of Canada created by the signing of a MoU between the two governments in 1992 for the purpose of undertaking projects related to environment. The primary focus of the ICEF is to enhance the capacity of Indian institutions and organizations to promote and deliver sustainable development programmes addressing the environment.
- Germany: Under the aegis of Indo-German technical collaboration, several projects are being supported by the Government of Germany in the environmental sector.

11. Is your country taking steps to harmonize national policies and programmes, with a view to optimizing policy coherence, synergies and efficiency in the implementation of various multilateral environment agreements (MEAs) and relevant regional initiatives at the national level? (decision VI/20)	
a) No	
b) No, but steps are under consideration	
c) Yes, some steps are being taken (please specify below)	
d) Yes, comprehensive steps are being taken (please specify below)	X

Further comments on the harmonization of policies and programmes at the national level.

MoEF is continuously taking steps to harmonize national policies and programmes in the implementation of various MEAs. Regular wide ranging consultations are held with sectoral ministries and departments of the Government of India, state governments, NGOs, experts, technical institutions and other stakeholders to develop country positions under MEAs and relevant policies, programmes and legislations.

The approach of identifying and actively involving stakeholders in the implementation of various MEAs and relevant regional initiatives has been seen as an effective and essential strategy. MoEF functions with a number of institutions as major partners for developing and implementing national strategies on conservation and sustainable use of biological diversity. These partners include ministries, state government departments, universities and other academic institutions, autonomous institutions, women's organizations and NGOs.

Mechanisms have also been developed within the MoEF to ensure close coordination among different units dealing with various MEAs. MoEF has constituted consultative groups for various conventions to advise the Ministry on issues relating to that convention with reciprocal representation of various members on these groups.

Box XLI.

Please elaborate below on the implementation of this strategy specifically focusing on:

a) outcomes and impacts of actions taken;

b) contribution to the achievement of the goals of the Strategic Plan of the Convention;

c) contribution to progress towards the 2010 target;

d) progress in implementing national biodiversity strategies and action plans;

e) contribution to the achievement of the Millennium Development Goals;

f) constraints encountered in implementation.

Because of the above mentioned strategies, there has been harmonization of recently enacted legislations, namely, Biodiversity Act, 2002, Plant Varieties Protection and Farmers Rights Act and Patent Amendment Act.

National Environment Policy, 2006 has been formulated, which is a statement of India's commitment to clean environment and to making a positive contribution to international efforts.

A large scale exercise has been completed for providing inputs towards a NBSAP. These inputs would be reviewed in terms of the objectives and principles of the National Environment Policy, scientific validity, financial and administrative feasibility, and legal aspects and, thereafter, the NBSAP will be finalized.

Availability of adequate funds is a major constraint in the implementation of various policies and programmes in the country.

Article 6 - General measures for conservation and sustainable use

12. Has your country put in place effective national strategies, plans and programmes to provide a national framework for implementing the three objectives of the Convention? (Goal 3.1 of the Strategic Plan)	
a) No	
b) No, but relevant strategies, plans and programmes are under development	
c) Yes, some strategies, plans and programmes are in place (pleaseprovide details below)	
d) Yes, comprehensive strategies, plans and programmes are in place (please provide details below)	X

Further comments on the strategies, plans and programmes for implementing the three objectives of the Convention.

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 the conservation and sustainable use of biological resources based on local knowledge systems and practices are ingrained in the Indian ethos and way of life. Applications and practices for use of biodiversity in the country have developed over the years in a traditional scientific process.

Environment protection is enshrined in the Constitution of India. Article 48-A and Article 51-A (G) of the Directive Principles of State Policy in the Constitution of India state that 'the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife in the country', and 'to protect and improve the national environment including forests, lakes, rivers and wildlife, and to have compassion for

living creatures'. A focussed articulation of these concerns in programmes and policies began to be seen in the wake of the Stockholm Conference (1972), which got further sharpened after the Rio Summit (1992). Between the Stockholm Conference and the Rio Summit, India has been able to develop a stable organizational structure for environment protection in the country. Legislation, policies and programmes were evolved during this period, which were geared towards this objective. Numerous and wide ranging policies, programmes and projects were initiated which directly or indirectly serve to protect, conserve and sustainably use the country's biological resources.

India's strategies for conservation and sustainable utilization of biodiversity in the past have comprised providing 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; creating *ex situ* conservation facilities such as gene banks, etc.

These programmes and projects are briefly described below.

1. Existing legal and policy regime

Major Central Acts relevant to biodiversity are:

- Indian Forest Act, 1927
- Wildlife (Protection) Act, 1972
- Forest (Conservation) Act, 1980
- Environment (Protection) Act, 1986
- Biological Diversity Act, 2002

These Acts have been amended from time to time and are supported by a number of state laws and statutes concerning forests and other natural resources.

Policies, strategies and action plans directly relevant to biodiversity include:

- National Environment Policy, 2006
- National Forest Policy amended in 1988
- National Conservation Strategy and Policy Statement for Environment and Sustainable Development,1992
- National Agricultural Policy, 2000
- National Land Use Policy
- National Fisheries Policy
- National Policy and Macrolevel Action Strategy on Biodiversity, 1999
- National Wildlife Action Plan
- Environmental Action Plan
- National Forestry Action Programme

The recently approved National Environment Policy, 2006 is a comprehensive policy statement to a common approach to the various sectoral and cross sectoral issues, including fiscal approaches to environment management.

2. Surveys

Survey and inventorization of the floral and faunal resources are carried out by the BSI, established in 1890, and the ZSI, established in 1916. The Forest Survey of India (FSI), established in 1981, assesses the forest cover with a view to developing an accurate database for planning and monitoring purposes. The WII undertakes studies of endangered species of animals and critical ecosystems.

In addition, there are several other organizations involved in survey and inventorization of floral and faunal resources of the country. These include:

- Fisheries Survey of India for commercially exploitable coastal and marine fish species.
- NBPGR for survey and collection of genetic material for wild races and cultivars.
- NBAGR for survey of all the livestock breeds in their respective breeding tracts.
- NBFGR for survey of fish species.
- National Institute of Oceanography (NIO) and Central Marine Fisheries Research Institute (CMFRI) for monitoring of coastal and marine biodiversity.
- Organizations such as the Bombay Natural History Society (BNHS), Salim Ali Centre for Ornithology and Natural History (SACON), FRLHT, universities and other centres for producing information on biodiversity.

3. *In situ* conservation

Approximately 4.74% of the total geographical area of the country has been earmarked for extensive *in situ* conservation of habitats and ecosystems. A PA network of 94 national parks and 501 wildlife sanctuaries has been created. The results of this network have been significant in restoring viable populations of large mammals such as tigers, lions, rhinoceros, crocodiles, elephants, etc.

To conserve representative ecosystems, a biosphere reserve programme is being implemented. Fourteen biodiversity rich areas of the country have been designated as biosphere reserves applying the UNESCO/MAB criteria. These reserves aim at conserving the biological diversity and genetic integrity of plants, animals and microorganisms in their totality as a part of natural ecosystems, so as to ensure their self-perpetuation and unhindered evolution.

Programmes have also been launched for scientific management and wise use of wetlands, mangroves and coral reef ecosystems. 60 wetlands, 35 mangrove areas and four coral reef areas have been identified for intensive conservation and management purposes. The various activities under these programmes include protection, catchment area treatment, pollution control, weed control, wildlife conservation, sustainable fisheries development, environmental education and peoples' participation. National and sub-national level committees oversee and guide these programmes to ensure strong policy and strategic support.

To focus attention on urban wetlands threatened by pollution and other anthropogenic activities, state governments have identified lakes that could be included in the National Lake Conservation Plan (NLCP). The activities of the NLCP include formulation of perspective plans for conservation based on resource survey using remote sensing technology and GIS, studies on biodiversity and related ecological matters, prevention of pollution from point and non-point sources, treatment of catchment areas, desilting and weed control.

Project Tiger, launched in 1973, has succeeded in stabilizing and increasing the tiger population in the country. Project Elephant, launched in 1991-92 aims at ensuring long term survival of viable populations of wild elephants by restoring their lost and degraded habitats, mitigating human-elephant conflicts, and establishing a database on the migration and population dynamics of elephants. It integrates the concerns of improving the quality of life of people living around elephant habitats while maintaining viable populations of elephants. Eleven elephant reserves have been identified for intensive management. Rhinos have been given special attention in selected sanctuaries and national parks in the North East and North West India. All these programmes, though focussed on a single species, have a wider impact as they conserve habitats and a variety of other species in those habitats.

The Tura Range in Garo Hills of Meghalaya is a gene sanctuary for preserving the rich native diversity of wild citrus and musa species. Sanctuaries for rhododendrons and orchids have been established in Sikkim.

The MoEF constituted the NAEB in August 1992. NAEB has evolved specific schemes for promoting afforestation and management strategies, which help the states in developing specific afforestation and management strategies and ecodevelopment packages for augmenting biomass production through a participatory planning process of JFM and microplanning.

4. *Ex situ* conservation

To complement *in situ* conservation, attention has been paid to *ex situ* conservation measures. According to currently available survey, the Central Government and State Governments together run and manage 33 botanical gardens. Universities have their own botanical gardens. There are 275 zoos, deer parks, safari parks, aquaria, etc. A Central Zoo Authority (CZA) was set up to secure better management of zoos. 'Assistance to Botanical Gardens', an MoEF scheme, provides one-time assistance to botanical gardens to strengthen and institute measures for *ex situ* conservation of threatened and endangered species in their respective regions.

5. National Biodiversity Strategy and Action Plan (NBSAP)

India prepared a National Policy and Macrolevel Action Strategy on Biodiversity (1999) through an extensive consultative process. This document is a macro level statement of policies, gaps and further actions needed for conservation and sustainable use of biological diversity. For preparing detailed microlevel action plans at state and regional levels based on this framework document, India had accessed funding from GEF for preparing a NBSAP.

The NBSAP process has been undertaken in India from 2000-2005 by MoEF in a consultative and decentralized manner. The biodiversity strategy and action plans have been prepared for 33 states and union territories, 18 sub-state sites, 10 ecoregions and 13 themes. The final technical report of the NBSAP project has been prepared through an extensive consultative process and the NBSAP is now under preparation and finalization.

6. Programmes on biodiversity conservation of other concerned ministries

Some activities relevant to biodiversity conservation are also taken up under various programmes of concerned ministries and departments of the Government of India. For example, the DBT supports a number of autonomous and non-government institutions in setting up facilities for micropropagation of endangered plants, especially medicinal plants. The Department of Science and Technology and the CSIR have sponsored research and development projects in the area of biodiversity conservation throughout the country. CSIR laboratories in the country have ongoing programmes on biodiversity including those on conservation of medicinal plants and culture of microorganisms which are useful in soil reclamation and marine biodiversity.

13. Has your country set measurable targets within its national strategies and action plans? (decisions II/7 and III/9)	
a) No	
b) No, measurable targets are still in early stages of development	
c) No, but measurable targets are in advanced stages of development	X
d) Yes, relevant targets are in place (please provide details below)	
e) Yes, reports on implementation of relevant targets available (please provide details below)	
Further comments on targets set within national biodiversity strategies and action plans.	
As mentioned in reply to Question 12, India's National Environment Policy has been formulated and the NBSAP is under finalization.	

14. Has your country identified priority actions in its national biodiversity strategy and action plan? (decision VI/27 A)	
a) No	
b) No, but priority actions are being identified	X
c) Yes, priority actions identified (please provide details below)	
Further comments on priority actions identified in the national biodiversity strategy and action plan.	
As mentioned in reply to Question 12, India's NBSAP is under finalization.	

Section C

15. Has your country integrated the conservation and sustainable use of biodiversity as well as benefit sharing into relevant sectoral or cross-sectoral plans, programmes and policies? (decision VI/27 A)	
a) No	
b) Yes, in some sectors (please provide details below)	
c) Yes, in major sectors (please provide details below)	X
d) Yes, in all sectors (please provide details below)	

Further information on integration of the conservation and sustainable use of biodiversity and benefit-sharing into relevant sectoral or cross-sectoral plans, programmes and policies.

The MoEF is the nodal agency with the responsibility of implementing CBD in the country. MoEF consults all concerned ministries, departments, institutions and NGOs as major partners for developing and implementing national strategies on conservation and sustainable use of biodiversity. Therefore, conservation and sustainable use of biodiversity and benefit sharing have been integrated into many of the relevant sectoral and cross sectoral plans, programmes and policies. Some of the major programmes of MoEF and of other ministries and departments of the Government of India which integrate biodiversity issues are listed below.

Major programmes of MoEF which integrate biodiversity issues

Survey of natural resources	Floral/faunal surveys by BSI/ ZSI, Forest Survey by FSI.
Conservation of	PAs, biosphere reserves, mangroves, wetlands, coral reefs, CZA, Project Tiger, natural resources Project Elephant, botanical gardens.
EIA	Environmental clearances under EIA and CRZ notifications, notifications for ecologically fragile areas.
Control of pollution	Through Central Pollution Control Board/State Pollution Control Boards (CPCBs/SPCBs), monitoring air/water quality, vehicular pollution control, environmental standards, action plans for polluting industries, eco labelling, clean technologies, bio-monitoring of rivers, Common Effluent Treatment Plants (CETPs).
Hazardous substances management	Chemical safety, hazardous waste management, municipal solid waste management, Treatment, Storage and Disposal Facilities (TSDFs).
Conservation of water bodies	NRCP; Sewerage Treatment Plants (STPs); action plans for Ganga, Yamuna, Gomti, and other rivers; NLCP.
Afforestation and ecodevelopment	NAEB programmes, afforestation schemes, eco task force, JFM, conservation of non-wood forest products, development of forest/ pasture seeds, aerial seeds, integrated wasteland development,

	fuelwood/fodder development projects, mapping of wastelands, national fund for afforestation.
Research on natural resources	Ecosystem research programmes, Eastern and Western Ghats research, research under Medicinal and Aromatic Plants (MAP), National Natural Resource Management System (NNRMS), forestry research, research on wood alternative and panel products.
Education and awareness	Formal and non-formal environment education, National Environment Awareness Campaign (NEAC), National Green Corps (eco clubs), NMNH and Regional Museums of Natural History (RMNH), forestry education, training and extension, IIFM, nine centres of excellence in priority areas on environmental science (CEE, CPREEC, CES, CME, SACON, Centre for Environmental Management of Degraded Ecosystems (CEMDE), TBGRI, Madras School of Economics (MSE), FRLHT)

Some programmes on biodiversity conservation dealt with by other Ministries

Ministry/ Departments	Activities
Agriculture	Watershed development programme, agricultural research and education, rainfed agriculture in National Watershed Development Project, Western Ghats Development Project, soil conservation, bio-fertilizers, schemes for women's participation in agriculture, integrated pest management
Water Resources	Command area development programme, National Watershed Management Project, flood control programmes, people's participation in irrigation, R&D in water resources planning
Rural Development	Jawahar Rozgar Yojana, DPAP, Integrated Rural Energy Programme (IREP), Rajiv Gandhi National Drinking Water Mission for rural water supply, waste land development projects of NWDB
Energy/Coal	R&D for energy plantations and agricultural waste utilization, training for environmental management of power projects, R&D for commercialization of waste disposal
Urban Development	Environment improvement of urban slums, urban basic services, integrated development of small and medium towns, NCR for Delhi, low cost sanitation and small towns water supply schemes
Science and Technology	Training/human resource development in bio-technology, national facilities for germ plasm collection, technologies absorption/ adoption scheme, support for research and development, support for information services, support for infrastructure development, support for capacity building

The National Environment Policy, 2006 seeks to institutionalize a holistic and integrated approach to the management of environmental and natural resources explicitly identifying and integrating environmental concerns in relevant sectoral and cross-sectora policies through review and consultation, in line with the National Environment Policy.

Biodiversity and climate change

17. Has your country implemented projects aimed at mitigating and adapting to climate change that incorporate biodiversity conservation and sustainable use? (decision VII/15)	
a) No	
b) No, but some projects or programs are under development	X
c) Yes, some projects have been implemented (please provide details below)	

Further comments on the projects aimed at mitigating and adapting to climate change that incorporate biodiversity conservation and sustainable use.

India's vast population depends on climate sensitive areas like agriculture and forestry for livelihood. Preliminary assessments using BIOME-3 vegetation response model, based on regional climate model projections (HadRM2) for India indicate shifts in forest boundary, changes in species assemblage or forest types, changes in net primary productivity, possible forest die-back in the transient phase, and potential loss or change in biodiversity.

These impacts on forests may have adverse socio-economic implications for forest-dependent communities and the national economy. The impacts of climate change on forest ecosystems are likely to be long term and irreversible. Thus, there is a need for developing and implementing adaptation strategies to minimize possible adverse impacts. Further, there is a need to study and identify the forest policies, programmes and silviculture practice that contribute to vulnerability of forest ecosystems to climate change. Natural ecosystems such as grasslands, mangroves and coral reefs are also likely to be affected by climate change.

The Government of India attaches high priority to the promotion of R&D in multidisciplinary aspects of environment protection, conservation and development including research in climate change. The MoEF is the nodal ministry for the subject of climate change in India. The MoEF, Ministry of Science and Technology (MoST), Ministry of Agriculture (MoA), MHRD, Ministry of Health and Family Welfare (MoHFW) and Indian Space Research Organization (ISRO) are the main ministries of the Government of India which promote and undertake climate and climate change related research in the country.

Preliminary research has been initiated on vulnerability assessment due to climate change on various socio-economic sectors and natural ecosystems in India during the preparation of India's Initial National Communication to the UNFCCC. Many case

studies have also been compiled, such as habitat diversity patterns of rarity in the terrestrial vegetation of northeastern Uttar Pradesh; species diversity in the Central Himalayas, patterns and relationships with ecosystem characters, etc.

The IARI is India's premier national institute for agricultural research, education and extension. The Plant Physiology Division at IARI offers a course on global climate change in the second trimester of its Masters programme, and has been conducting research on the impacts of climate change on crop productivity. Some of the climate-friendly initiatives in the agriculture sector include the standardization of fuel efficient irrigation pump-sets, retrofitting existing pump-sets for higher efficiency, better water and crop management, improved cultivars, more efficient application of synthetic fertilizers, enhanced organic fertilizer use and improved animal feed. Many of these measures would serve to reduce CO_2, CH_4 and N_2O emissions.

India has implemented a large number of progressive policies, programmes and measures to conserve and develop the forests, wildlife, mangroves and coral reefs, such as: the Forest Conservation Act, 1980, the National Forest Policy, 1988, the Wildlife Protection Act, JFM programme, social forestry, the improved cook stove programme, and biogas to conserve fuelwood. Similarly, there are conservation programmes for mangroves, coral reefs and lake ecosystems. All these measures have led to some stabilization of forested areas, a reduction in deforestation and afforestation, significantly contributing to conservation of the forest carbon sink. All these preparations will act as a buffer for the forest dependent communities against the challenges posed by climate change.

India has a separate Ministry for promotion of Non-Conventional Energy Sources (MNES) and a separate financial institution for financing renewable energy projects – Indian Renewable Energy Development Agency (IREDA). India also has a Bureau of Energy Efficiency under Ministry of Power established with support from USAID and GTZ. The aim of these institutions is to promote renewable energy and energy efficiency programmes in the country.

India has established National Clean Development Mechanism Authority (NCDMA) for according host country approval to CDM projects as mandated under UNFCCC. MoEF is the nodal agency for NCDMA. This approval ensures that the project will lead to sustainable development of the country. This approval is given based on the sustainable development criteria developed by MoEF. One of the criteria used is impact on biodiversity by CDM projects. Chapter 3 of the National Communication Report, 2004 submitted to UNFCCC specifically deals with vulnerability assessment and adaptation. This report is prepared with inputs from research and academic institutions, NGOs, experts and policy makers. The report specifically deals with the vulnerability of forests, agriculture natural ecosystems and coastal areas due to climate change.

A regional workshop on mainstreaming biodiversity and climate change was organized between 6 and 11 April 2003 at Dehradun, India with the support of the

IUCN-Regional Biodiversity Programme, Asia, MoEF, UNDP, International Institute of Environment and Development (IIED), Secretariat to the CBD, Secretariat to the UNFCCC, UNEP-Regional Office for Asia and Pacific (invited) and WII. The objectives of this workshop were: to build region and country specific knowledge base that is critical for assessing, facilitating and implementing synergistic action on issues of biodiversity and climate change; to provide opportunities to negotiators, policy makers, and NGOs from Asia on options for integrating biodiversity concerns into National Adaptation Programmes of Action (NAPAs) and climate change concerns into NBSAPs; and to build capacity of the key stakeholders on important policy, legal and management issues including communication, awareness raising components dealing with implementation of synergies at the national level.

Training programme for officers from the Indian Forest Service (IFS) on environmental priorities and sustainable development was conducted by the Centre for Development and Environment Policy (CDEP) during 17-21 February 2003. This training programme for senior in-service IFS officers was sponsored by the Department of Personnel, Government of India and was aimed at exposing the senior forest officers to the emerging global environment priorities of this millennium. Lectures were organized on important issues like forests and the biosphere, water resources, global climate change, land use and land cover change, biodiversity impact assessment, environmental economics, criteria and indicators of sustainable forest management, use of GIS and remote sensing in forestry, etc.

18. Has your country facilitated coordination to ensure that climate change mitigation and adaptation projects are in line with commitments made under the United Nations Framework Convention on Climate Change and the United Nations Convention to Combat Desertification? (decision VII/15)	
a) No	
b) No, but relevant mechanisms are under development	X
c) Yes, relevant mechanisms are in place (please provide details below)	

Further comments on the coordination to ensure that climate change mitigation and adaptation projects are in line with commitments made under the UNFCCC and the UNCCD.

India does not have any commitments for climate change mitigation. However, because of our concern about energy efficiency and use of renewable sources of energy, at the national level India has voluntarily undertaken various measures towards improving energy efficiency and promoting use of renewable sources of energy, *inter alia* through programmes of MNES, Ministry of Petroleum and Natural Gas, Bureau of Energy Efficiency under Ministry of Power, IREDA.

Article 7 - Identification and monitoring

19. On Article 7(a), does your country have an ongoing programme to identify components of biological diversity at the genetic, species, ecosystem level?	
a) No	
b) Yes, selected/partial programmes at the genetic, species and/or ecosystem level only (please specify and provide details below)	
c) Yes, complete programmes at ecosystem level and selected/ partial inventories at the genetic and/or species level (please specify and provide details below)	X

Further comments on ongoing programmes to identify components of biodiversity at the genetic, species and ecosystem level.

The BSI and the ZSI are responsible for the survey and inventorization of flora and fauna of the country. The Survey organizations have 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 level of biodiversity in selected areas have also been brought out. The Surveys have also published Red Data Books on endangered species.

BSI, established in 1890, has its headquarters in Kolkata, and circles and field offices at 10 places in the country. BSI has covered about 70% of the territory of India by field survey. Approximately 23,89,000 specimens collected have been preserved. It has published seven volumes of the flora of India, nine volumes of state flora and 48 volumes of the district flora. Five volumes of the Red Data Book containing identification details of 820 species of endangered plants have been completed.

ZSI, established in 1916, also has its headquarters in Kolkata, and 16 field stations in other places. It has covered about 70% of the territory of India by field survey. 32 volumes of fauna of India and 24 volumes of fauna of various states have been published. A Red Data Book covering identification details of 173 species of mammals and other species of animals under various degrees of threats has been printed.

FSI is engaged in generating information and databases on forest cover and forest resources in the country besides providing services of training, research and extension. FSI prepares a comprehensive State of the Forests Report (SFR), including national forest vegetation maps, once every two years and also prepares thematic maps once in ten years using remote sensing data. The forest cover maps and thematic maps are prepared on a scale of 1:50,000.

WII undertakes studies on endangered species of animals and critical ecosystems.

NBPGR, NBAGR, NBFGR and NBAIM of the MoA are conducting country wide surveys for the identification, monitoring, characterization and conservation of crop plants, livestock breeds, fisheries and agriculturally important microorganisms.

The Fisheries Survey of India is engaged in estimating and monitoring commercially important coastal and marine fish species.

In addition, several national research institutions, universities, organizations and other centres also contribute to biodiversity inventorization.

A. Genetic level: Studies on genetic level are not as yet very widespread and have so far been undertaken only for wild crop relatives and selected domesticated animals through programmes of MoEF, DBT and ICAR. There are several hundred species of wild crop relatives distributed all over the country. A major centre for wild rice is eastern peninsular India and the northeastern hills. The hills of Tamil Nadu are rich in wild relatives of millets, and wheat and barley have been located in the western and north-eastern Himalayas. India's domesticated animals comprise diverse livestock, poultry and other animal breeds. India's eight breeds of buffaloes represent the entire range of the genetic diversity of buffaloes in the world. BSI has carried out cytological studies on selected components of Indian flora. It has also carried out molecular studies on selected taxa in collaboration with NCL, Pune, DBT, Department of Space and Delhi University. ZSI, in collaboration with the Centre for DNA Fingerprinting and Diagnostics (CDFD), and the CCMB located at Hyderabad, is undertaking collaborative training programmes on genetic identification. Training in biosystematics are also being imparted to selected trainees on threatened wildlife.

In the context of microbial biodiversity, major monitoring programmes are in place for specific microorganisms by Government of India through the ICAR and the Indian Council of Medical Research (ICMR) on a long term basis. For example, under the All India Coordinated Project on Nitrogen Fixing Organisms under ICAR, rhizobia are monitored for performance at various agro ecological regions of the country through nodule typing.

The DBT has undertaken an initiative on the inventorization of the existing microbial gene pool in the country which is nearing completion. The MoEF, under its AICOPTAX, has established three centres for the study of bacteria, archaea, fungi and viruses (animal). These centres, each with five sub centres, are involved in strengthening characterization of microbial forms at genetic and species level from various ecosystems.

B. Species Level: BSI has regular ongoing programmes on floral identification and monitoring of various groups of plants from algae to angiosperms. Similarly, ZSI has ongoing regular programmes on faunal identification and monitoring of various groups of animals from protozoa to mammalian. The list of recorded species in different taxonomic groups from the country is given earlier in Box II.

The NIO, Goa has developed several databases on marine biodiversity at species level including:

1. Crabs of India (http://www.indian-ocean.org): A CDROM on "Marine Prawns of India" was released on January 17, 1998. The second CDROM collates taxonomy, systematics, biogeography, life cycle and morphology related information on 75 crab species that are found in the marine and estuarine waters of this country. This package also lists the specialists on marine crabs in India and their important publications.
2. Prawns of India (http://www.indian-ocean.org): This CDROM gives information related to identification, systematics, life cycle, biogeography, diseases and morphology

of prawns in India. Kerala is well known for brackish water prawn and fish farming known as 'Pokkali' culture

3. Corals of India (http://www.indian-ocean.org)
4. Lignicolous fungi (http://www.indian-ocean.org): About 200 species of marine wood-degrading fungi are known in the world and the present CD furnishes information on 80 species which are collected from mangrove ecosystems.

Sporadic data is also available with respect to fungi, algae, bacteria and viruses in India. The inventory programme of DBT will, when complete, have a list of microbial species indigenous to the country. Partial lists through DNA sequencing tools are being added under the AICOPTAX programme and a majority of this gene pool has been deposited at the MTCC, Chandigarh. Individual researchers are adding to this list.

In the context of organized microbial inventorization, surveys and systematics, support programmes are relatively new and database creation is therefore behind that of plants and animals. Also, at least in the case of bacteria, the species concept itself is under debate. Further complications arise from the forms that are known only through gene sequences (non-culturables) and have no living representative in global culture collections. Thus, estimates of bacterial species globally range anywhere from 10^7-10^9 with serious discussions on the validity of data.

C. Ecosystem Level: BSI is undertaking 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. Some details of the same are given below:

Ecosystem	Area	Percentage	Floral diversity
Forest ecosystem	6,39,600 sq km	19.46	± 80% of total flora Mountain Flat terrain
Grassland ecosystem	12 million ha.	4	1,300 sp. (370 endemics)
Wetland ecosystem	4.1 million ha.	1.22	267 sp. (excluding algae)
Natural	1.5 million ha.		
Man made	2.6 million ha.		
Coastal and mangrove ecosystem	0.6 million ha. 7,516.6 km coastal line	0.2	1,200 sp.
Marine ecosystem	——	——	857 algal sp. 15 sea grasses
Desert ecosystem			
Hot	2,85,680 sq km	8.69	870 sp.
Cold	98,660 sq km	3	1,205 sp.

ZSI is undertaking inventorization programmes for faunal components at ecosystem level for Himalayan ecosystem, freshwater ecosystem, estuarine ecosystem, marine ecosystem, tropical rainforest ecosystem, terrestrial ecosystem, desert ecosystem, and island ecosystem.

Microbiologists have studied various ecosystems often through ad hoc research projects, student theses research and by undertaking forays for laboratory. This rather unorganized activity has however touched upon various natural and man-made environments, such as Marine coastal areas, Rhizosphere of crop plants, Eriophid mites, Fish microorganisms, Forest plants and litter, Tree bark, Aquatic sediments, Rumen of domesticated animals, Grasslands, Food products, Oligotrophic and eutrophic lakes, Root nodule bacteria, Effluents from industries and hospital, Salt pans and playas, Thermal springs, Mangrove plants and sediments, Anaerobic digesters, and Endophytes.

During the last few years, a major concerted effort has been made to analyze the microbial diversity in marine environment through a programme supported by the DOD. Additional organized support for the study of sites, such as Sambhar Lake in Rajasthan and Lonar Lake in Maharashtra, has been made available on a long term basis through the AICOPTAX. To search for agriculturally useful microorganisms for sustainable development, ICAR is in the process of finalizing a major initiative on the subject. CSIR has an in-house multi institutional project on the microbial wealth of India.

The latest assessment, ninth in the series of SFRs, i.e. SFR-2003, has been completed. Steady improvements have been made in the forest cover assessment for preparation of each report by employing latest data with higher resolution and scale, with more intensive coverage, on the ground verification and by using superior techniques of interpretation.

Special points in SFR-2003 are: introduction of an additional class of forest cover by splitting dense forest cover (canopy density above 40%) into two classes, namely very dense forest (canopy density more than 70%) and moderately dense forest (canopy density between 40-70%) while open forest cover having density 10-40% remains the same. The same criteria have been applied in the case of mangroves also.

Special projects of "Forest Type Mapping of India's Forests" and "Monitoring of Changes in Forest Cover in Tiger Reserves of India" have also been initiated.

FSI has been conducting field inventory 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 including some areas more than once and about 140 reports have been published. During 2002-2007, FSI is also conducting field inventory of forest resources inside and outside forests, including vegetation survey and estimation of soil carbon in forests.

A methodology has been developed for the comprehensive assessment of forest resources inside and outside forest areas at the national level by stratifying the country into physiographic zones and taking a sample of 10 per cent districts for detailed inventory during a cycle of two years. The information thus generated will form a part of the biennial SFR. These estimates will be further improved in the subsequent reports as another set of 10 percent districts are sampled and surveyed, and so on. Together with forest

inventory, assessment of herbs and shrubs (vegetation survey) is being carried out. In addition, assessment of regeneration status, biodiversity indices and soil carbon in forest areas are also being carried out.

FSI is conducting national forest/tree inventory along with vegetation survey. As per the revised methodology, a National Forest Inventory Database System (NFIDS) based on database software (MS Access) using Visual Basic at the front and has been prepared. The data base system has the following modules:

- National Forest Inventory/Trees Outside Forests(TOF) Data Entry Module
- National Forest Inventory/TOF Data Processing Module
- National Forest Inventory/TOF Reporting Module
- National Forest Inventory/TOF Result Database Module
- GIS Interface with forest cover

Work on the first two modules has already been completed and successfully installed in all the zonal offices. The activities for the remaining modules are being taken up.

Mapping of forest ecosystems and biodiversity is one of the thrust areas of remote sensing applications. State-of-the-art technology has been developed for mapping of forest ecosystems including their density and vigour. For mapping of biodiversity, methodologies have been developed at the landscape level. The technology has been widely disseminated and transferred to many user agencies. Remote sensing techniques are being used routinely for monitoring of natural resources in the country. In addition, remote sensing and GIS data are also being used for change detection, delineating forest fires, habitat management, mapping of wetlands, mangroves and coral reefs.

Nio, Goa has developed a database on mangrove ecosystems of India (http://www.mangroveindia.org).

20. On Article 7(b), which components of biological diversity identified in accordance with Annex I of the Convention, have ongoing, systematic monitoring programmes?	
a) at ecosystem level (please provide percentage based on area covered)	X
b) at species level (please provide number of species per taxonomic group and percentage of total known number of species in each group)	X
c) at genetic level (please indicate number and focus of monitoring programmes)	X

Further comments on ongoing monitoring programmes at the genetic, species and ecosystem level.

Various survey organizations such as BSI, ZSI, FSI, Bureaus of Genetic Resources, etc., have regular ongoing programmes of work for the inventorization of biological resources. The details have been explained as part of Question 19.

21. On Article 7(c), does your country have ongoing, systematic monitoring programmes on any of the following key threats to biodiversity?	
a) No	
b) Yes, invasive alien species (please provide details below)	X
c) Yes, climate change (please provide details below)	X
d) Yes, pollution/eutrophication (please provide details below)	X
e) Yes, land use change/land degradation (please provide details below)	X
f) Yes, overexploitation or unsustainable use (please provide detailsbelow)	X

Further comments on monitoring programmes on key threats to biodiversity.

For monitoring key threats to biodiversity, ZSI, BSI, NAEB, NBPGR, NBAGR and NBAIM have undertaken programmes for assisting various scientific organizations, universities and government departments for monitoring changes in ecosystem and key threats to biodiversity by providing identification and advisory services. BSI and ZSI have regular ongoing programmes of assisting scientific organizations, universities and government departments responsible for monitoring the changes in the ecosystem and key threats to biodiversity by providing them identification and advisory services related to faunal elements.

NAEB, in the MoEF, has the mandate of promoting afforestation, tree planting, ecological restoration and eco-development activities in the country. Special attention is being given to the 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, Western Ghats, etc.

Functions of NAEB also include:

a. Evolving mechanisms for ecological restoration of degraded forest areas and adjoining lands through systematic planning and implementation, in a cost effective manner;
b. Restoring, through natural regeneration or appropriate intervention, the forest cover in the country for ecological security and to meet the fuelwood, fodder and other needs of the rural communities;
c. Restoring fuelwood, fodder, timber and other forest produce in degraded forests and adjoining lands in order to meet the demand for these items;
d. Sponsoring research and extension of research findings to disseminate new and proper technologies for the regeneration and development of degraded forest areas and adjoining lands;
e. Creating general awareness and help foster a people's movement for promoting afforestation and eco-development with the assistance of voluntary agencies, NGOs, Panchayati Raj institutions and others, and promote participatory and sustainable management of degraded forest areas and adjoining lands;

f. Coordinating and monitoring the action plans for tree planting, ecological restoration and eco-development; and

g. Undertaking all other measures necessary for promoting afforestation, tree planting, ecological restoration and eco-development activities in the country.

National Afforestation Programme is the flagship scheme of the NAEB to provide support, both in physical and capacity building terms, to the Forest Development Agencies (FDAs), which in turn are the main organs to implement JFM. 561 FDAs have been operationalized so far to treat a total area of 7.61 lakh hectares. Bamboo plantation, medicinal plants and jatropha have been given adequate focus under the National Afforestation Programme. Rehabilitation of jhum lands (shifting cultivation) has been given specific focus under this programme, and so far 14 jhum projects has been sanctioned in the northeastern states.

Ecological Task Forces of Ex-servicemen are employed in remote and difficult areas to undertake restoration of degraded ecosystems through afforestation, soil conservation and water resource management techniques.

A JFM Cell has been established to monitor the JFM programme and generate policy responses. 28 States have adopted JFM with involvement of 8.4 million families. 84,632 JFM committees are managing around 17.33 million hectares of forest land.

Monitoring of specific microorganisms, particularly pathogens, is being undertaken selectively. Some of the surveillance studies include *Mycobacterium tuberculosis* by Central JALMA Institute for Leprosy (Agra) in collaboration with CDFD, Hyderabad; enteric pathogens with particular reference to *Vibrio cholerae* O139 by National Institute of Cholera and Enteric Diseases (NICED) at Kolkata; *Yersinia pestis* by National Institute of Communicable Diseases (NICD), Delhi with the help of regional stations of the institute situated across the country; *Leptospira* by Regional Medical Centre (RMC) at Port Blair; and Human Immunodeficiency Virus (HIV) by National AIDS Research Institute (NARI), Pune and National AIDS Control Organization (NACO), New Delhi.

A number of investigators supported by financial assistance from various government agencies have contributed to the study of prevalence of several other pathogens in our country.

NBPGR and NBAIM are mandated to check and monitor entry of any invasive species.

CPCB and National Environmental Engineering Research Institute (NEERI) have inbuilt mechanisms for monitoring of pollution/eutrophication wherein microbial forms are also used as indicators.

ICAR monitors land use change/land degradation through coordinated programmes in the context of agriculturally useful programmes, especially rhizobia, phosphorus solubilisers and other growth promoting forms such as arbuscular mycorrhizal fungi. ICAR has in place guidelines for effective use of microbial inoculants especially biofertilizers and biopesticides to check unsustainable use in agro-ecosystems so that environmental

balance is maintained. Conservation centres in the country have collections of important microorganisms. A few ecosystem based monitoring programmes have been initiated, such as pathogenic bacteria of river Narmada, endophytes of tree species and crop plants, petroleum hydrocarbon degrading microbes, autotrophs and heterotrophs of Sambhar Lake, thiobacilli from mining sites, heterotrophs and actinomycetes of Lonar Lake, root nodulating bacteria of tree legumes of Western Ghats and Nanda Devi Biosphere Reserve, metagenomic approach to natural ecosystem for non-culturables, marine microbial diversity, etc.

22. On Article 7 (d), does your country have a mechanism to maintain and organize data derived from inventories and monitoring programmes and coordinate information collection and management at the national level?	
a) No	
b) No, but some mechanisms or systems are being considered	
c) Yes, some mechanisms or systems are being established	
d) Yes, some mechanisms or systems are in place (please provide details below)	X
e) Yes, a relatively complete system is in place (please provide details below)	

Further information on the coordination of data and information collection and management.

As far as the maintenance of data related to animal resources are concerned, the ZSI maintains proper records of all species collected, which form the National Zoological Collections. The organization coordinates and monitors the information, collection and management at the national level. The preparation of a faunal database of nearly 20,00,000 specimens is underway.

As far as the maintenance of data related to plant resources are concerned, the BSI maintains primary data on all species collected in the form of over 30,00,000 herbarium specimens in well planned and maintained herbaria, and secondary data in the form of label data on the herbarium sheets. The preparation of digital database of these specimens is underway.

Several collection centres are maintaining a record of microorganisms wherein both indigenous and global gene pools are maintained. Major facilities include the MTCC, Chandigarh; NBAIM; Mau Rhizobial Collection Centre, IARI; Marine Cyanobacteria, Bhartidasam University; private collection centre at Nicholas Piramal; anaerobes and metallogens at Agharkar Research Institute; smaller collections at various universities. Digitization of the existing major gene pool is nearing completion through a DBT programme.

23. Does your country use indicators for national-level monitoring of biodiversity? (decision III/10)	
a) No	
b) No, but identification of potential indicators is under way (please describe)	
c) Yes, some indicators identified and in use (please describe and, if available, provide website address, where data are summarized and presented)	X
d) Yes, a relatively complete set of indicators identified and in use (please describe and, if available, provide website address, where data are summarized and presented	

Further comments on the indicators identified and in use.

Studies are underway for using indicators for national level monitoring of biodiversity. Some species of animals, particularly macro-invertebrates in aquatic ecosystems and soil fauna in forest ecosystems, are being studied in order to establish their ability to monitor the degradation of environmental quality. The assessment is based on their distribution and abundance in affected zones. Similarly, the changes in the population of selected threatened animal species are also being monitored. Validation of the threatened species is also being undertaken.

Biodiversity characterization at landscape level is monitored, using satellite remote sensing (RS) and GIS in biodiversity rich areas, like Western Himalayas, Eastern Himalayas, Western Ghats and the Andaman and Nicobar Islands. These studies use porosity, patchiness, etc. as indicators for national level monitoring of biodiversity at ecosystem and landscape level.

Decisions on taxonomy

24. Has your country developed a plan to implement the suggested actions as annexed to decision IV/1? (decision IV/1)	
a) No	
b) No, but a plan is under development	X
c) Yes, a plan is in place (please provide details below)	X
d) Yes, reports on implementation available (please provide details below)	

Further information on a plan to implement the suggested actions as annexed to decision IV/1.

India has committed itself to capacity building in taxonomy. MoEF organized a "National Workshop in Capacity Building in Taxonomy" in Jaipur in 1997 which identified gap areas in taxonomy and recommended taking up an AICOPTAX. The project was launched in 1999-2000.

Under this project, Centres for Research, each with 4-5 coordinating units, have been set up in identified priority gap areas (e.g., virus, bacteria, microlepidoptera, etc.) in the field of taxonomy. As of now, there are 82 such units. In addition, fellowships, scholarships, chairs, career awards, etc., have been initiated. Strengthening of BSI and ZSI as the coordinating units has been taken up. Organized specialist groups drawn from universities, BSI and ZSI have been set up to take up taxonomic work on animal viruses, bacteria, archaea, algae, fungi, lichens, bryophytes, pteriodophytes, gymnosperms, palms, grasses and bamboos, orchids, helminthes, nematodes, microlepidoptera and mollusca. Training in plant and animal biosystematics has also been recognized as an important component.

For each centre, an experienced taxonomic expert has been identified as the coordinator, who in turn has identified 4-5 collaborators across the country. The coordinators of the centres, together with the collaborators, are undertaking the following activities through training of two research scholars each:

- survey, collection, identification and preservation
- maintaining collections and taxonomic databanks
- developing identification manuals
- training college teachers, students and local communities in parataxonomy

Financial assistance is provided to each of these centres for undertaking these activities. Thus, each research centre is engaged in training 10 to 12 research scholars. In addition, the training centres are imparting training in biosystematics through the use of latest technologies. A high level steering committee headed by a taxonomist has been constituted to oversee the implementation of the project.

Modalities are presently being explored for developing a cadre of reasonably skilled taxonomists who could help in the characterization of biodiversity and associated traditional knowledge, as provided for in the Biological Diversity Act, 2002.

25. Is your country investing on a long-term basis in the development of appropriate infrastructure for your national taxonomic collections? (decision IV/1)	
a) No	
b) Yes (please provide details below)	X

Further information on investment on a long-term basis in the development of appropriate infrastructure for your national taxonomic collections.

The two national survey organizations, viz., BSI and ZSI, responsible for the collection, preservation, taxonomic identification and maintenance of national collections of flora and fauna up to species level are fully funded by the Government of India. The BSI and ZSI have well established systems for identification and preservation of specimens collected and are now in the process of building electronic databases. Besides, there are programmes

such as the AICOPTAX, under which funds are provided by MoEF to various institutes/ universities of the country for the development of both infrastructure and expertise.

Some of the other initiatives include establishment of a Marine Microbial Reference Centre at Kochi, MTCC, Chandigarh, NCAIM, Mau and some other smaller collections which are helping to conserve the microbial gene pool.

26. Does your country provide training programmes in taxonomy and work to increase its capacity of taxonomic research? (decision IV/1)	
a) No	
b) Yes (please provide details below)	X

Further information on training programmes in taxonomy and efforts to increase the capacity of taxonomic research.

BSI and ZSI periodically conduct several courses to impart training for the collection, preservation and identification of plant and zoological specimens. Each year, training programmes are being conducted at HQ, Kolkata and selected regional stations. These training programmes are mainly for teachers, research workers in universities, NGOs and law enforcement officials such as forest officials, as also departmental candidates. Besides, the AICOPTAX programme is also aimed towards the development of expertise in taxonomy. Training programmes on wildlife DNA extraction and fingerprinting are also being conducted in collaboration with CDFD, Hyderabad. MTCC and NBAIM carry out short-term training modules especially for young faculty and researchers. Similar training modules on rhizobia and other biofertilizers have been held on a regular basic during the last years under the National Agricultural Technology Project (NATP) of ICAR at IARI and Tamil Nadu Agriculture University. The DBT supported Marine Cyanobacterial Centre also holds regular training modules. Training booklets and manuals on several groups have been prepared through the above programmes.

27. Has your country taken steps to ensure that institutions responsible for biological diversity inventories and taxonomic activities are financially and administratively stable? (decision IV/1)	
a) No	
b) No, but steps are being considered	
c) Yes, for some institutions	X
d) Yes, for all major institutions	X

The Government of India has taken appropriate measures for the financial and administrative stability of the two major organizations, BSI and ZSI, responsible for

biological diversity inventorization and monitoring. MTCC, Chandigarh is jointly supported on a long terms basis by DBT and CSIR whereas NBAIM is a full-fledged institute of ICAR. Long term support to Centre for Marine Cyanobacteria has been provided by DBT. The AICOPTAX initiative of MoEF is likely to receive continued support for some years since this is the only major taxonomy initiative in the country that cuts across all major groups microorganisms, plants and animals. Metagenomic and functional approaches need to be established and/or strengthened to meet global standards.

28. Is your country collaborating with the existing regional, subregional and global initiatives, partnerships and institutions in carrying out the programme of work, including assessing regional taxonomic needs and identifying regional-level priorities? (decision VI/8)	
a) No	
b) No, but collaborative programmes are under development	
c) Yes, some collaborative programmes are being implemented (please provide details about collaborative programmes, including results of regional needs assessments)	X
d) Yes, comprehensive collaborative programmes are being implemented (please provide details about collaborative programmes, including results of regional needs assessment and priority identification)	

Further information on the collaboration your country is carrying out to implement the programme of work for the GTI, including regional needs assessment and priority identification.

Collaborative programmes are being implemented at the regional and global levels through SACEP; Indo-Australia Training and Capacity Building in Marine Protected Areas; Indian Subcontinent Plant Specialist Group (ISPSG); Indian Subcontinent Regional Orchid Specialist Group (ISROSG); Census of Marine Life (CoML) and Ocean Biogeographic Information System (OBIS); and Budapest Treaty for Microorganism, affiliated to World Federation of Culture Collection (WFCC).

29. Has your country made an assessment of taxonomic needs and capacities at the national level for the implementation of the Convention? (annex to decision VI/8)	
a) No	
b) Yes, basic assessment made (please provide below a list of needs and capacities identified)	X
c) Yes, thorough assessment made (please provide below a list of needs and capacities identified)	

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

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.

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.

Manoj Dholakia

Great Indian One-horned Rhinoceros. Once found throughout India in the grassy flood plains of the Indus, Ganga and Brahmaputra rivers, it is now restricted to the banks of the Brahmaputra. The world's largest population of the one-horned rhino can be found in Kaziranga National Park, Assam.

CEE Photo Library

Six-spotted Tiger Beetle (*Anthia sexguttata*)

Ashok Captain

A Bug Nymph. When disturbed, it squirts a green oily liquid which burns if it touches the skin. The liquid smells a bit like cinnamon oil or methyl salicylate.

Manoj Dholakia

Asian Elephant. To ensure long term survival of identified viable elephant populations in their natural habitats, India launched Project Elephant in 1992 to assist states having free-ranging populations of wild elephants.

International Snow Leopard Trust, USA

Snow Leopard. The richness and uniqueness of biodiversity elements and wide-ranging indigenous knowledge systems, coupled with increasing degradation of bioresources, have resulted in at least two mountain areas in the country (the Himalayas and the Western Ghats) emerging as a global conservation priority.

Manoj Dholakia

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

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.

Further comments on national assessment of taxonomic needs and capacities.
Currently, some lacunae exist in the taxonomic expertize in the country because of death/retirement of old taxonomists on one hand and non interest in taxonomic studies by students in the universities on the other hand. With the result, there are a large number of animal and plant groups belonging to lower phyla where no taxonomic expertize exists at any level. In order to develop interest in taxonomic studies, encouragement need to given and funds provided for upcoming students of taxonomy under AICOPTAX. Similarly, capacity building needs have been identified in lower group of plants, animals and microbes, and certain other specialized groups, like orchids, grasses, palms, etc. In the area of microbial diversity, India had very fine fungal taxonomists at one time and has therefore contributed extensively to new Indian taxa in the past. This work force is now highly depleted and only a handful of experts in various groups are available. Bacterial identification involves not only phenotypic tests of a large variety but molecular tools of various kinds including DNA sequencing. Description of a species furthers requires G+C analysis and DNA: DNA hybridization, which requires not only authentic cultures from either experts or culture collections, but also tedious procedures. Many Indian researchers have to seek international cooperation to reach this end, although IMTECH, Chandigarh and CCMB, Hyderabad are equipped for such lengthy exercises. CCMB in particular has described over 20 new bacterial species from cold environments, particularly Antarctica. However, for others it has been difficult to get beyond DNA sequencing. Thus, a major thrust is required to develop taxonomic experts for bacteria and archaea where expertize is indeed limited. This would mean strengthening some of the established groups and raising others to centres of excellence with necessary resources. In addition, further thrust is needed in the use of housekeeping genes, multilocus enzyme electrophoresis (MLEE) and other tools for characterization of bacteria. Also, considering the large non-culturable diversity of especially bacteria and archaea, it is essential to apply the metagenomics approach to diversity search and biopotentiality. Only limited efforts are currently operative on this front in the country but some younger groups are bracing up to the challenge. In the context of environmental dynamics, it would also be prudent to select a few representative chemical environments for assessment of total functional communities utilizing microarrays that are now being used in molecular microbial ecology to understand gene function without the need of cultivation. With the present assessments, it is proposed to draw a roadmap to strengthen the microbial taxonomy, functionality and genetic component through training of appropriate workforce, inter-institutional linkages and bilateral cooperations.

30. Is your country working on regional or global capacity building to support access to, and generation of, taxonomic information in collaboration with other Parties? (annex to decision VI/8)	
a) No	
b) Yes, relevant programmes are under development	

c) Yes, some activities are being undertaken for this purpose (please provide details below)	X
d) Yes, many activities are being undertaken for this purpose (please provide details below)	

Further comments on regional or global capacitybuilding to support access to, and generation of, taxonomic information in collaboration with other Parties.

Some activities in SAARC countries under SACEP and Species Survival Commission of IUCN have been initiated. In the area of microbial diversity, while individual groups often have cooperating partners from across the globe, MTCC is part of the WFCC, a global body. NBAIM has working linkages with CABI and other similar networks. Both these institutions have held short term training programmes for young researchers but considering the new dimensions that are being added to diversity searches and functionality, greater collaboration with other parties is definitely required.

31. Has your country developed taxonomic support for the implementation of the programmes of work under the Convention as called upon in decision VI/8? (annex to decision VI/8)

a) No	
b) Yes, for forest biodiversity (please provide details below)	X
c) Yes, for marine and coastal biodiversity (please provide details below)	X
d) Yes, for dry and sub-humid lands (please provide details below)	X
e) Yes, for inland waters biodiversity (please provide details below)	X
f) Yes, for mountain biodiversity (please provide details below)	X
g) Yes, for protected areas (please provide details below)	X
h) Yes, for agricultural biodiversity (please provide details below)	X
i) Yes, for island biodiversity (please provide details below)	X

Further comments on the development of taxonomic support for the implementation of the programmes of work under the Convention

The basic taxonomic support (inventorisation of faunal resources) has been built up in ZSI for the implementation of the programme of work related to tropical rainforest, coral reefs and mangroves, desert fauna, lakes and rivers, high altitude ecosystem, national parks, biosphere reserves, tigers reserves, wildlife sanctuaries, and island ecosystems.

The basic taxonomic support in terms of preparing inventories of plant species, their taxonomic characterization, occurrence, etc., in different ecosystems as mentioned above

is being provided by the BSI, ICFRE, WII, laboratories under CSIR (like NBRI, CIMAP, Regional Research Laboratory (RRL), Institute of Himalayan Bioresource Technology (IHBT), ICAR (NBPGR) and some academic institutions. As indicated under item 20 (a), assessment of microbial diversity in various ecosystems has been undertaken on an ad-hoc basis.

32. Has your country developed taxonomic support for the implementation of the cross-cutting issues under the Convention as called upon in decision VI/8?	
a) No	
b) Yes, for access and benefit-sharing (please provide details below)	X
c) Yes, for Article 8(j) (please provide details below)	X
d) Yes, for the ecosystem approach (please provide details below)	X
e) Yes, for impact assessment, monitoring and indicators (please provide details below)	X
f) Yes, for invasive alien species (please provide details below)	X
g) Yes, for others (please provide details below)	

Further comments on the development of taxonomic support for the implementation of the cross-cutting issues under the Convention.

Cross-cutting issues such as sustainable development, resource management, bioprospecting, biopiracy are dealt by survey organizations through identification, distribution and monitoring at species level. To provide taxonomic support on the above cross-cutting issues, the two national organizations, BSI and ZSI, along with some other national laboratories, academic institutions and NGOs, provide information on identity, occurrence and utilization of components of biodiversity, both plants and animals.

Besides the establishment of a centre for research on bacteria and archaea, fungi and animal viruses under AICOPTAX, ICAR has in place strong quarantine measures for agricultural and food products to check entry of any invasive form including Genetically Modified Organisms (GMOs) that have to undergo approvals through other bodies. Establishment of the NBA has helped monitor ABS in the use of natural biodiversity at national and international forums. Several ecosystems are being studied sporadically through AICOPTAX programme, academic research in universities and at institutes. A programme on marine microbial diversity is operating on a long term basis through the DOS, Government of India.

For purposes of taxonomic support to individual microbiologists, MTCC, Chandigarh provides paid services for identification, conservation and supply of microbial cultures. It also extends a facility for maintenance of patented cultures with restricted supply based on the depositor's terms and conditions. ICAR is initiating a major programme on the

diversity of growth promoting microorganisms keeping sustainable production in mind. DBT, similarly, has been supporting a biodiversity based bioprospecting initiative now for several years, keeping sustainable production, herbals and biopesticides in mind. This runs in concert with the molecular taxonomy initiative of DBT on plant species of importance. CSIR has begun a network programme entitled "Exploration and exploitation of microbial wealth of India for novel compounds and biotransformation process" wherein 10 institutes are participating.

Article 8 - *In situ* conservation
[excluding paragraphs (a) to (e), (h) and (j)]

33. On Article 8(i), has your country endeavored to provide the conditions needed for compatibility between present uses and the conservation of biological diversity and sustainable use of its components?

a) No	
b) No, but potential measures are being identified	
c) Yes, some measures undertaken (please provide details below)	X
d) Yes, comprehensive measures undertaken (please provide detailsbelow)	

Further comments on the measures taken to provide the conditions needed for compatibility between present uses and the conservation of biological diversity and sustainable use of its components.

India has endeavoured to not only create awareness, but also provide the conditions needed for compatibility between present uses and the conservation of biological diversity and sustainable use of its components by helping foster all stakeholders' involvement at various levels including voluntary agencies, NGOs, Panchayati Raj institutions and others. Some of the examples are given below:

- **Joint Forest Management (JFM)Programme:** JFM programme has emerged as a powerful tool of sustainable forestry in India. A JFM cell was established in 1998 to monitor the JFM programme and generate policy responses. A network for consultation with stakeholders has also been developed. FDAs have been set up at the forest division level to undertake holistic development in the forestry sector with people's participation. 561 FDAs have so far been operationalized. This decentralized two tier institutional structure (FDA and JFM cell) allows greater participation of the community, both in planning and implementation, to improve forests and livelihood 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. To create further awareness, Forest Protection Committees (FPC) and Eco-Development Committees have been formed at village/Panchayat levels in several states.

- **India Eco-Development Project:** Improved PA management systems have been evolved to improve the capacity of PA management to conserve biodiversity and gain support of the local people for conservation by increasing opportunities for local participation in PA management. Village level eco-development programmes have been undertaken in order to reduce negative impacts of the local people on biodiversity. Education and awareness activities and monitoring and research activities for conservation in identified tiger reserves and national parks have been promoted. The project has been implemented in seven sites in seven different states, i.e., Palamau in Jharkhand, Buxa in West Bengal, Nagarhole in Karnataka, Periyar in Kerala, Pench in Madhya Pradesh, Gir in Gujarat and Ranthambore in Rajasthan.
- India is implementing a comprehensive programme since 1987 for the conservation and management of wetlands in the country. The activities include preparation and implementation of management action plans for 20 identified wetlands of the country emphasizing participation of people living around these areas. Initiatives have been taken for conservation of biodiversity within wetland areas. For example, in Chilika Lagoon, a community-based approach has been taken for habitat improvement of Nalabana Sanctuary, and in Lokat Lake, a management action plan with specific measures for *in situ* conservation of Keibul Karjao National Park, which is a habitat of the endangered ungulate species, *Cervus eldield*.
- The National Mangrove and Coral Reef Committee has the responsibility of promoting management action plans for all mangrove and coral reef regions of the country.
- Special region development programmes have been initiated, such as Hill Area Development Programme, Western Ghats Development Programme, Deccan Development Programme.
- In Madhya Pradesh, Jharkhand, West Bengal and Orissa, field projects have been established to understand the NTFP-based species conservation and value addition by local communities at IIFM under International Centre for Community Forestry.
- Conservation of medicinal plants in Betul district of Madhya Pradesh through local participation under the *in situ* conservation project by the IIFM.
- Project on criteria and indicators for sustainable forest management at IIFM.
- MPCAs have been developed by FRLHT in three states – Tamil Nadu, Karnataka and Kerala on *in situ* medicinal plant conservation.
- Indian Institute of Science has initiated preparation of PBRs in Western Ghats area though JFM communities to assist in conservation of biological diversity.
- In the northeastern states, efforts are being made towards biodiversity conservation through people's participation, sacred grove approach, identification of orchids and other local flora by groups working in the North Eastern Hill University (NEHU), Shillong.
- Some other relevant programmes include Project Elephant, special conservation projects for Kashmir stag, brow-antlered deer, crocodiles, musk deer and snow leopard, special habitats of conservation importance under the jurisdiction of state governments, marine protected areas, sanctuaries for rhododendron, orchids, citrus, pitcher plant, etc.

34. On Article 8(k), has your country developed or maintained the necessary legislation and/or other regulatory provisions for the protection of threatened species and populations?	
a) No	
b) No, but legislation is being developed	
c) Yes, legislation or other measures are in place (please provide details below)	X

Further information on the legislation and/or regulations for the protection of threatened species and populations.

Wildlife Protection Act (WLPA), 1972 provides for setting up of sanctuaries, national parks and enclosed areas, and the constitution of a CZA. It has provisions relating to prohibition of trade or commerce in wild animals, animal articles and trophies. The WLPA prohibits the hunting of the wild animals specified in Schedules I-IV of the WLPA and also states the special circumstances under which wild animals may be hunted. It also provides for protection of plants specified in Section VI (six species identified at present) in any forest land and any area specified by notification by the central government. In 2002, Wildlife Protection Amendment Act was promulgated with provisions to strengthen conservation and move towards greater participation.

India is a party to the CITES which prohibits trade in endangered species.

India has enacted Biological Diversity Act, 2002 which regulates access to biological resources of the country and calls for the protection and rehabilitation of threatened species.

Programmes are in place for the rehabilitation of threatened species in the country through botanical gardens, sanctuaries, zoos, etc.

Specific programmes for species conservation have been initiated for rhino, river dolphins, etc.

Captive breeding programmes are ongoing, e.g., for crocodile.

Red Data Books listing threatened species of plants and animals have been published by BSI and ZSI.

Environmental (Protection) Act, 1986 and Forest Conservation Act, 1980 also address issues related to protection of threatened species and populations.

35. On Article 8(l), does your country regulate or manage processes and categories of activities identified under Article 7 as having significant adverse effects on biological diversity?	
a) No	
b) No, but relevant processes and categories of activities being identified	

c) Yes, to a limited extent (please provide details below)	X
d) Yes, to a significant extent (please provide details below)	

Further comments on the regulation or management of the processes and categories of activities identified by Article 7 as having significant adverse effects on biodiversity.

The legal measures, undertaken to regulate processes and categories of activities having significant adverse effects on biological diversity include:

- The CRZ Notification 1991 laid out a detailed set of restrictions on development activities along the coast of the country. To monitor and implement its provisions, MoEF has constituted 13 State Coastal Zone Management Authorities for each of the coastal states and Union Territories, and one National Coastal Zone Authority.
- EIA has been made mandatory by giving it a legislative status since 1994 for incorporating environmental concerns in development processes. Expert committees under the provision of EIA Notifications have been constituted for appraisal of projects received for environment clearance for different sectors such as industry, thermal power, river valley and hydro electric power, mining, infrastructure, nuclear power, and new construction projects and industrial estates.

Programme of work on protected areas (Article 8 (a) to (e))

36. Has your country established suitable time bound and measurable national-level protected areas targets and indicators? (decision VII/28)	
a) No (please specify reasons)	
b) No, but relevant work is under way	
c) Yes, some targets and indicators established (please provide details below)	X
d) Yes, comprehensive targets and indicators established (please provide details below)	

Further comments on targets and indicators for protected areas.

Suitable and measurable national level PA targets have been established in India. In 1988, India had 54 national parks and 372 wildlife sanctuaries. By 2005, this network has grown to 94 national parks and 501 wildlife sanctuaries covering 4.74% of the total geographical area of the country. The goal is to establish 163 national parks and 707 wildlife sanctuaries covering 5.74% of the total geographic area of the country. This would ensure appropriate representation of the range of biological values spread across the ten biogeographic zones and twenty-six biogeographic provinces in the country. The monitoring committee of the National Wildlife Action Plan (2002-2016) periodically monitors the status of establishment and management of PAs in the country.

The National Environment Policy, 2006 envisages expansion of PA network to give fair representation to all biogeographical zones. The Wildlife Action Plan (2002-2006) also calls for expansion of the PA network.

37. Has your country taken action to establish or expand protected areas in any large or relatively unfragmented natural area or areas under high threat, including securing threatened species? (decision VII/28)	
a) No	
b) No, but relevant programmes are under development	
c) Yes, limited actions taken (please provide details below)	
d) Yes, significant actions taken (please provide details below)	X
Further comments on actions taken to establish or expand protected areas.	
Detailed recommendations for establishing new PAs and for rationalizing the boundaries of existing PAs have been made in the report 'Planning a Protected Area Network in India'. Several unfragmented natural areas and habitats of threatened/ endangered species have been brought within the PA network.	

38. Has your country taken any action to address the under representation of marine and inland water ecosystems in the existing national or regional systems of protected areas? (decision VII/28)	
a) No	
b) Not applicable	
c) No, but relevant actions are being considered	
d) Yes, limited actions taken (please provide details below)	
e) Yes, significant actions taken (please provide details below)	X
Further comments on actions taken to address the under representation of marine and inland water ecosystems in the existing national or regional systems of protected areas.	
Although 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 protected areas and to adequately protect inland water ecosystems. Presently, there are 31 marine protected areas and over 100 PAs, which include both terrestrial and freshwater ecosystems. There is a need to comprehensively review the establishment and management of marine protected areas.	

39. Has your country identified and implemented practical steps for improving the integration of protected areas into broader land and seascapes, including policy, planning and other measures? (decision VII/28)	
a) No	
b) No, but some programmes are under development	

c) Yes, some steps identified and implemented (please provide detailsbelow)	X
d) Yes, many steps identified and implemented (please provide detailsbelow)	

Further comments on practical steps for improving integration of protected areas into broader land and seascapes, including policy, planning and other measures.

Efforts are currently underway to integrate PAs into broader landscapes by bringing about appropriate changes in policy, planning and management of PAs. WII has identified significant landscapes in the country and the Project Tiger, Government of India is initiating a project 'Biodiversity Conservation and Livelihood Support' in important PAs with linkages with the broader landscapes.

40. Is your country applying environmental impact assessment guidelines to projects or plans for evaluating effects on protected areas? (decision VII/28)

a) No	
b) No, but relevant EIA guidelines are under development	
c) Yes, EIA guidelines are applied to some projects or plans (pleaseprovide details below)	X
d) Yes, EIA guidelines are applied to all relevant projects or plans (please provide details below)	

Further comments on application of environmental impact assessment guidelines to projects or plans for evaluating effects on protected areas.

India has sector-specific EIA guidelines and enabling legislation. Any development proposed or planned in and around the PAs is subjected to the EIA process. The incorporation of biodiversity concerns in the EIA process is underway, along with the development of guidelines for strategic environment assessment (SEA). These would enable the country to integrate conservation concerns in developmental planning in a meaningful way.

41. Has your country identified legislative and institutional gaps and barriers that impede effective establishment and management of protected areas? (decision VII/28)

a) No	
b) No, but relevant work is under way	
c) Yes, some gaps and barriers identified (please provide details below))	X
d) Yes, many gaps and barriers identified (please provide details below)	

Further comments on identification of legislative and institutional gaps and barriers that impede effective establishment and management of protected areas.
Yes, the country has identified major legislative and institutional barriers that impede effective establishment and management of PAs. The country's key wildlife legislation *viz.*, Wildlife Protection Act, 1972 prescribes elaborate provisions for establishment of PAs which include rehabilitation of habitations inside the national park. Unfortunately, the process of rehabilitation has not been completed fully due to a variety of social, economic, political, administrative and financial reasons, and thus several PAs have not been legally gazetted to date. Further, the absence of management plans and monitoring processes also affects management effectiveness of PAs. Low investment (manpower and financial) in PAs and inadequate inter-agency coordination also adversely affect PA management.

42. Has your country undertaken national protected-area capacity needs assessments and established capacity building programmes? (decision VII/28)	
a) No	
b) No, but assessments are under way	X
c) Yes, a basic assessment undertaken and some programmes established (please provide details below)	
d) Yes, a thorough assessment undertaken and comprehensive programmes established (please provide details below)	
Further comments on protected-area capacity needs assessment and establishment of capacity building programmes.	
The national PA management capacity has been assessed. The WII is the premier agency of the MoEF for planning and implementing capacity building programmes in the field of wildlife and PA management. There is a need to build capacity at the state level, especially to train the frontline staff, who are presently inadequately trained and under-equipped to meet their job responsibilities.	

43. Is your country implementing country-level sustainable financing plans that support national systems of protected areas? (decision VII/28)	
a) No	
b) No, but relevant plan is under development	
c) Yes, relevant plan is in place (please provide details below)	
d) Yes, relevant plan is being implemented (please provide details below)	X

Further comments on implementation of country-level sustainable financing plans that support national systems of protected areas.
At the national level, the central government provides technical and financial support to strengthen the conservation, protection and other measures that are necessary for natural resources through the MoEF. The Ministry plans, promotes and coordinates all forestry and wildlife programmes. Some of the important centrally sponsored schemes include development of national parks and sanctuaries, eco-development in and around PAs, Project Tiger, Project Elephant, wetland conservation programme, conservation and management of coral reefs, biosphere reserves, etc. The country, presently, has no sustainable financing plans that support national systems of PAs. However, the need is being felt to develop these plans and to develop public-private partnerships for effective PA management.

44. Is your country implementing appropriate methods, standards, criteria and indicators for evaluating the effectiveness of protected areas management and governance? (decision VII/28)	
a) No	
b) No, but relevant methods, standards, criteria and indicators are under development	
c) Yes, some national methods, standards, criteria and indicators developed and in use (please provide details below)	X
d) Yes, some national methods, standards, criteria and indicators developed and in use and some international methods, standards, criteria and indicators in use (please provide details below)	

Further comments on methods, standards, criteria and indicators for evaluating the effectiveness of protected areas management and governance.
Globally, the concept of PA Management Effectiveness Evaluation (MEE) is of recent origin. The World Commission on Protected Areas (WCPA's) MEE framework has been applied by a few countries. In India, under the UNESCO/IUCN Project 'Enhancing Our Heritage: Management and Monitoring for Success in World Natural Heritage Sites' operational in two world heritage sites, viz., Kaziranga National Park, Assam and Keoladeo National, Rajasthan, evaluation of management effectiveness using WCPA-MEE framework is being done. Recently, the MoEF and the Office of the Comptroller and Auditor General (CAG), Government of India have initiated the process of conducting independent audits of all national parks and sanctuaries in the country and present the results to the Indian Parliament. Technical assistance and financial resources are needed to establish the MEE process in all 595 PAs and to periodically conduct this exercise.

Article 8(h) - Alien species

45. Has your country identified alien species introduced into its territory and established a system for tracking the introduction of alien species?	
a) No	
b) Yes, some alien species identified but a tracking system not yet established	
c) Yes, some alien species identified and tracking system in place	X
d) Yes, alien species of major concern identified and tracking system in place	

Invasive alien species pose a serious threat to biodiversity, which is considered second only to habitat loss. About 40% of species in Indian flora are alien, of which 25% are invasive. However, not much information is available on invasive fauna and microbes. Some alien species have been identified by various bureaus but tracking systems are under consideration. For example, NBFGR has prepared a list of exotic/alien species under aquaculture/fisheries and aquarium trade, and their invasive impact has also been evaluated. A strategic plan and guidelines for quarantine and exotic fish introductions has been prepared and published.

More relevant information is given in Box XII.

46. Has your country assessed the risks posed to ecosystems, habitats or species by the introduction of these alien species?	
a) No	
b) Yes, but only for some alien species of concern (please provide details below)	X
c) Yes, for most alien species (please provide details below)	

Further information on the assessment of the risks posed to ecosystems, habitats or species by the introduction of these alien species.

Numerous invasive alien species, particularly the natives of tropical South America and Mexico, have severely invaded Indian forest ecosystems, waterways, fisheries, farmlands, fallows and roadsides/pathways. *Parthenium hysterophorus L.*, which is an exotic species from tropical America, has naturalized in most of India because of its strong invasive potential. Numerous pests like coffee berry borer, peanut stripe virus, banana bunchy top virus, potato wart and golden nematode have invaded India and are serious pests.

A national workshop sponsored by the MoEF and Forests was organized in the Department of Botany, Banaras Hindu University during 18-20 August 2004 to discuss various aspects relating to alien invasive species and biodiversity in India. The workshop focused on themes related to the ecology of invasive species, reasons behind invasiveness, their impact and the need for development of a reporting system on alien species.

As of now, assessment of damage has been done mostly at the local level revealing extensive adverse effects on major ecosystems and also showing alarming environmental degradation. Some states, like West Bengal, Tamil Nadu and Kerala, have adopted legislative and administrative measures for eradicating/preventing further invasion of the most noxious weed species and exotic fish carnivores (including the big head carp) or their replacing native species.

47. Has your country undertaken measures to prevent the introduction of, control or eradicate, those alien species which threaten ecosystems, habitats or species?	
a) No	
b) No, but potential measures are under consideration	
c) Yes, some measures are in place (please provide details below)	X
d) Yes, comprehensive measures are in place (please provide details below)	

Further information on the measures to prevent the introduction of, control or eradicate those alien species that threaten ecosystems, habitats or species.

Same as given in Box XII.

MoEF is implementing the APFISN Project of FAO, and is in the process of preparing a country report of invasive alien species.

48. In dealing with the issue of invasive species, has your country developed, or involved itself in, mechanisms for international cooperation, including the exchange of best practices? (decision V/8)	
a) No	
b) Yes, bilateral cooperation	
c) Yes, regional and/or subregional cooperation	X
d) Yes, multilateral cooperation	

49. Is your country using the ecosystem approach and precautionary and bio-geographical approaches as appropriate in its work on alien invasive species? (decision V/8)	
a) No	
b) Yes (please provide details below)	X

Further comments on the use of the ecosystem approach and precautionary and bio-geographical approaches in work on alien invasive species.
Based on past experience where some exotic species (introduced for ornamental purpose) turned out to be highly invasive, a precautionary approach has been adopted. Restoration of degraded forest ecosystems has been taken up with priority on regeneration of native and locally adapted species groups. Freshwater ecosystems have been given priority attention for clearing operations. Biogeographical approach has promoted sharing of relevant information among neighbouring states.

50. Has your country identified national needs and priorities for the implementation of the Guiding Principles? (decision VI/23)	
a) No	
b) No, but needs and priorities are being identified	X
c) Yes, national needs and priorities have been identified (please provide below a list of needs and priorities identified)	
Further comments on the identification of national needs and priorities for the implementation of the Guiding Principles.	
Identification of national needs and priorities is being undertaken as part of the NBSAP which is under finalization.	

51. Has your country created mechanisms to coordinate national programmes for applying the Guiding Principles? (decision VI/23)	
a) No	
b) No, but mechanisms are under development	X
c) Yes, mechanisms are in place (please provide details below)	
Further comments on the mechanisms created to coordinate national programmes for implementing the Guiding Principles.	
Preventing accidental entry of invasive alien species is the shared responsibility of the authorized government departments that issue import permits and conduct quarantine checks. MoEF supports and coordinates programmes for eradication/control measures/ utilization of invasive species,and also restoration of degraded ecosystems, whereas the MoA has the infrastructure and expertise.	

52. Has your country reviewed relevant policies, legislation and institutions in the light of the Guiding Principles, and adjusted or developed policies, legislation and institutions? (decision VI/23)	
a) No	
b) No, but review under way	
c) Yes, review completed and adjustment proposed (please provide details below)	X
d) Yes, adjustment and development ongoing	
e) Yes, some adjustments and development completed (please provide details below)	
Further information on the review, adjustment or development of policies, legislation and institutions in light of the Guiding Principles.	
A comprehensive review of the national system has pointed out the need for setting up a National Invasive Species Advisory Committee and also a Unified Command for Plant and Animal Quarantine at the national level.	

53. Is your country enhancing cooperation between various sectors in order to improve prevention, early detection, eradication and/or control of invasive alien species? (decision VI/23)	
a) No	
b) No, but potential coordination mechanisms are under consideration	X
c) Yes, mechanisms are in place (please provide details below)	
Further comments on cooperation between various sectors.	
Active cooperation among the concerned central and state government departments like agriculture, livestock, fisheries, forests, water resources, tourism, commerce, shipping, environment and rural development, while involving lead institutions and NGOs, are being developed on a case-to-case basis.	

54. Is your country collaborating with trading partners and neighboring countries to address threats of invasive alien species to biodiversity in ecosystems that cross international boundaries? (decision VI/23)	
a) No	
b) Yes, relevant collaborative programmes are under development	X
c) Yes, relevant programmes are in place (please specify below the measures taken for this purpose)	

Further comments on collaboration with trading partners and neighboring countries.
Consultations/discussions are underway among neighbouring countries.

55. Is your country developing capacity to use risk assessment to address threats of invasive alien species to biodiversity and incorporate such methodologies in environmental impact assessment (EIA) and strategic environmental assessment (SEA)? (decision VI/23)	
a) No	
b) No, but programmes for this purpose are under development	
c) Yes, some activities for developing capacity in this field are being undertaken (please provide details below)	X
d) Yes, comprehensive activities are being undertaken (please provide details below)	
Further information on capacity development to address threats of invasive alien species.	
Various research projects have been initiated to develop capacity to address the threats of invasive alien species. Workshops on relevant topics are being regularly organized with active participation of major stakeholders and key players.	

56. Has your country developed financial measures and other policies and tools to promote activities to reduce the threats of invasive species? (decision VI/23)	
a) No	
b) No, but relevant measures and policies are under development	
c) Yes, some measures, policies and tools are in place (please provide details below)	X
d) Yes, comprehensive measures and tools are in place (please provide details below)	
Further comments on the development of financial measures and other policies and tools for the promotion of activities to reduce the threats of invasive species.	
Funding and technical support is provided to a limited extent for projects undertaken by various institutions by central government ministries and departments.	

Box XLVI.

Please elaborate below on the implementation of this article and associated decisions specifically focusing on: a) outcomes and impacts of actions taken; b) contribution to the achievement of the goals of the Strategic Plan of the Convention; c) contribution to progress towards the 2010 target; d) progress in implementing national biodiversity strategies and action plans; e) contribution to the achievement of the Millennium Development Goals; f) constraints encountered in implementation.
There has been improved coordination, stronger databases and widened networking in recent years on invasive alien species, and recommendations have been developed for actions to be taken at the national, state and grassroot levels. However, much more funding and policy support is required to address this important issue.

Article 8(j) - Traditional knowledge and related provisions

GURTS

57. Has your country created and developed capacity-building programmes to involve and enable smallholder farmers, indigenous and local communities, and other relevant stakeholders to effectively participate in decision-making processes related to genetic use restriction technologies?	
a) No	
b) No, but some programmes are under development	X
c) Yes, some programmes are in place (please provide details below)	
d) Yes, comprehensive programmes are in place (please provide details below)	

Further comments on capacity-building programmes to involve and enable smallholder farmers, indigenous and local communities and other relevant stakeholders to effectively participate in decision-making processes related to GURTs.
The use of Gene Use Restriction Technologies (GURTS) or terminator technology is prohibited as per the provisions of the Protection of Plant Varieties and Farmers' Rights Act, which was passed by the Government in 2001. Import of GURTS products has been banned in India, and state-of-the-art containment facilities and diagnostic tools have been developed. Regular consultations are held among nodal agencies, major stakeholders and key players on these issues.

Status and trends

58. Has your country supported indigenous and local communities in undertaking field studies to determine the status, trends and threats related to the knowledge, innovations and practices of indigenous and local communities? (decision VII/16)	
a) No	
b) No, but support to relevant studies is being considered	X
c) Yes (please provide information on the studies undertaken)	

Further information on the studies undertaken to determine the status, trends and threats related to the knowledge, innovations and practices of indigenous and local communities, and priority actions identified.

India is rich in ITK 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.

Constitutional amendment no. 73 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 safeguarding local environmental capital stocks.

As envisaged in this amendment, the Biological Diversity Act, 2002 provides for setting up of BMCs for conservation, sustainable use and documentation of biodiversity and chronicling traditional knowledge.

Mandatory consultation of BMCs of NBA and SBBs ensures involvement of local community in decision making relating to ABS.

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.

Involvement of local communities and support to them for studies on KIP is being encouraged through the preparation of PBRs under the Biological Diversity Act, 2002. In addition, a database on sacred groves is under development. 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.

India is not only supporting initiatives for the protection of traditional knowledge and access benefit sharing, but has also been engaged in the "promotion" and "teaching" of traditional knowledge since 1950. For example, in the health sector, India has established more than 300 graduate and post-graduate colleges of traditional medicine and has given traditional systems of medicine a legal status in its national health programmes. In the National Health Policy, 2002, the Government of India has identified revitalization of

local (village based) health traditions as a major thrust area. Community traditional health knowledge registers have been prepared in a participatory way with the help of knowledgeable households and local healers. These registers are kept by local healer associations and are used for passing on useful knowledge to future generations as well as protecting traditional knowledge from bioprocessing. Some organizations, such as FRLHT, have developed software for documentation of local health traditions and the register is also available in a digitized form.

Akwé: Kon guidelines

59. Has your country initiated a legal and institutional review of matters related to cultural, environmental and social impact assessment, with a view to incorporating the Akwé:Kon Guidelines into national legislation, policies, and procedures?	
a) No	
b) No, but review is under way	
c) Yes, a review undertaken (please provide details on the review)	X

Further information on the review.

Biological Diversity Act, 2002 is in place after an extensive consultation process involving various stakeholders, and takes into account the sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources.

60. Has your country used the Akwé:Kon Guidelines in any project proposed to take place on sacred sites and/or land and waters traditionally occupied by indigenous and local communities? (decision VII/16)	
a) No	
b) No, but a review of the Akwé: Kon guidelines is under way	
c) Yes, to some extent (please provide details below)	
d) Yes, to a significant extent (please provide details below)	X

Further information on the projects where the Akwé:Kon Guidelines are applied.

MoEF assisted by other organizations is undertaking maintenance of a large number of sacred groves across the country. Comprehensive status reports have been prepared and follow up actions are being taken while providing technical support and funding where required.

Extensive documentation has been done and is available in the form of academic publications on sacred groves. There are about 19,000 sacred groves which are

documented from several states in 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, Bhopal.

A project on conservation and sustainable management of dryland biodiversity aims to promote the conservation of vulnerable, endangered and endemic wild animals, medicinal plants and wild varieties of important crops in two sanctuaries. The project features several innovative approaches to biodiversity conservation, including promoting indigenous knowledge and grassroots solutions for developing alternative livelihoods, and identifying and promoting native conservation ethics (sacred groves, knowledge forests, etc.) as the foundation for conservation awareness efforts.

The Sacred Grove Information System (SGIS) developed by NCL, Pune, includes type and nature of information, information sources, validity and authenticity of information. Information is being collected through published literature and through personal communication. 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. Web-based data acquisition and dissemination approach eliminates time gap required for collection and publishing of the data, making it a transparent information based model. Information is also being acquired in multimedia form such as sketches, line drawings, photographs, as well as audio and video clips.

Capacity building and participation of indigenous and local communities

61. Has your country undertaken any measures to enhance and strengthen the capacity of indigenous and local communities to be effectively involved in decision-making related to the use of their traditional knowledge, innovations and practices relevant to the conservation and sustainable use of biodiversity? (decision V/16)	
a) No	
b) No, but some programmes being developed	
c) Yes, some measures taken (please provide details below)	
d) Yes, comprehensive measures taken (please provide details below)	X

Further information on the measures to enhance and strengthen the capacity of indigenous and local communities.

As mentioned in response to Question 58, the Biological Diversity Act, 2002 provides for mandatory consultation of concerned BMCs by the NBA and SBBs on all issues relating to access to biological resources and associated TK, thereby ensuring involvement of local communities in the decision making process. Some other measures taken

to enhance and strengthen the capacity of indigenous and local communities include the following:

- Establishing medicinal plants parks: an opportunity for biodiversity conservation: This project aims to collect and document the ITK related to medicinal plants, and to establish a medicinal plants' park to serve as a model farm to raise awareness among local people of the need to conserve medicinal plants.
- Save and regenerate the environment: Promoting Sloping Agriculture Land Technology (SALT) and community plantation programmes as an alternative to shifting cultivation in order to protect and preserve the environment.
- Conservation of hoolock gibbons and rainforest biodiversity through community participation: Educating local people about the importance of the rainforest in maintaining ecological balance. Establishing networks among villagers, forest workers and NGO members to save rainforest habitats and to protect hoolock gibbons.
- Community conservation of indigenous animal breeds in Tamil Nadu: Provision of support to breeders associations, herders' groups and women's groups; documentation of local breeds; raising awareness among target groups.
- Collection and preservation of indigenous and medicinal fruit trees of Assam: Conservation of biodiversity of medicinal plants through collection and preservation of germplasm, and raising awareness among the community through training programmes.
- An environmental awareness generation and eco-restoration programme on the Palni Hills (Western Ghats): The project intends to create awareness about natural processes among villagers, students and decision-makers, and to implement eco-restoration activities in some 75 centres across south India.
- The wild orchids of the Karnataka part of the Western Ghats in Dandeli Wildlife Sanctuary: Project aims at *in situ* and *ex situ* conservation of wild orchids through sustainable collection and harvesting of orchids involving local communities. The project helps to conserve the wild orchids by involving the Karnataka Forest Department.
- Land and water management leading towards biodiversity conservation: The project intends to encourage appropriate local environmental practices through restoration of deteriorated traditional water bodies, revitalization of degraded lands and protection of endangered species of trees.
- Strengthening traditional livelihood systems of desert communities through agro-forestry and horticulture practices: The project emphasis is on incorporating the components of horticulture and agro-forestry to make agricultural operations more lucrative and more resistant to drought, and to popularize the practice of agro-forestry and horticulture among marginalized farmers.
- Confluence of organic farming with self-help groups (SHGs) in the Sivaganga and Gunjwani valleys of Pune district: The project aims to connect organizational strength of SHGs with organic farming practices to promote sustainable agriculture, women's empowerment and improved agriculture technology through Integrated Pest Management (IPM).

- Community seed banks for conservation of indigenous genetic resources: empowerment, capacity-building and training: The Project will attempt to create an indigenous seed supply system through capacity building, *in situ* conservation and creation of community seed banks.
- Tribal communities of the Jeypore tract of Orissa: In a powerful demonstration of the successes achievable through community-based conservation efforts, tribal groups in the state of Orissa have applied bottom-up efforts to conserve local agro-biodiversity by linking the livelihood security of villagers with the wider ecological security of the region. In the Jeypore tract, Orissa, introduction of outside crop varieties and forest degradation have led to a decline in the number of native rice varieties. For instance, native rice varieties have fallen in number from 1,750 to 150 and are increasingly under threat from commercial varieties. To counter this threat to local biodiversity and to ensure the security of their food supply, tribal communities in the area initiated a programme in 1997 that promotes agro-biodiversity conservation through wide ranging efforts to support community gene management, protect the natural environment and promote sustainable livelihoods. Supported by the M.S. Swaminathan Research Foundation (MSSRF), the project recognizes the important role played by farmers in the conservation and enhancement of agro-biodiversity and provides encouragement for these activities by providing recognition and monetary rewards for their on-farm conservation efforts. Local farmers are now involved in participatory plant breeding and the compilation of community biodiversity registers, which have been combined with the development of community seed and grain banks. Through these initiatives, remaining varieties of rice are now being conserved and overexploited medicinal plants are being cultivated in community medicinal plant gardens instead of being harvested from the fragile forests of the region. Critically, market linkages have been created based on the promotion of traditional varieties of rice and medicinal plants that allow communities to benefit financially from their conservation activities. By lessening dependence on commercial seeds and purchased food, and by developing new production systems and markets for traditional rice varieties, medicinal plants, and other forest products, local people are enjoying new opportunities for economic advancement while ensuring the long term survival of the plant varieties that have supported them for millennia.
- TKDL is a value added digital database developed by the Government of India for (i) preservation of traditional knowledge; (ii) 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 (iii) 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. For creation of TKDL, Traditional Knowledge Resource Classification (TKRC) has been evolved for approximately 6,000 subgroups in Ayurveda, 3,500 sub-groups in Unani and 1,000 sub-groups in Siddha systems of medicine. The structure of TKRC is similar to that commonly used for classifying

modern innovations, which enables an easy linkage with the International Patent Classification (IPC). Transcriptions of several thousands of formulations have already been done. The areas of diversification include traditional foods, traditional architecture and tribal knowledge.

- Components of Biodiversity Digital Library: CSIR and BSI have initiated a collaborative venture to set up a Biodiversity Digital Library with an objective of digitization of plant resources (Kingdom: Plantae) including genetic resources of India, establish source of origin on a scientific basis of this resource, and establish the provider country of this resource and/or knowledge pertaining to the resource. The database will include an inventory of 22,000 species of plant resources and a virtual herbarium of 3.5 million specimens.
- A comprehensive, computerized database on Indian Medicinal Plants has been developed at FRLHT over the last decade, linking scientific names of plant entities with vernacular names. This comprehensive nomenclature database incorporates exhaustive enlistment of plants recorded in medicinal use in India and currently incorporates 7,577 botanical names correlated to 146,384 vernacular names in 17 languages. This comprehensive database has been prepared through detailed referencing of more than 200 published sources ranging from scholarly commentaries on classical texts relating to codified systems as well as published ethno-medico botanical studies. Each botanical name is correlated to a vernacular names and each and every such correlation is linked to a published reference. However, in its present status, it represents less than 10% of the vernacular names of medicinal plants in important Indian languages and further work is going on. This database is unique as it provides a link between the traditional, cultural knowledge and the precise scientific names of the plant entities.
- A methodology for Documentation and Rapid Assessment of Local Health Traditions (DALHT) has been evolved for supporting the local knowledge about native plant names and their use for promoting primary health care of local communities. This documentation work has involved grassroot level NGOs. Data collection has taken place at different sites, covering households and folk healers of different villages in the 4 states of Karnataka, Kerala, Tamil Nadu and Maharashtra.
- Building of the country's first bio-geo cultural repository of natural resources has been initiated for use by Indian systems of medicine. The herbarium database incorporates reliable cross-linkages between local and traditional names used in medical literature and botanical names so that it could be accessed not only by plant taxonomists but also by the non-botanists including physicians of Indian systems of medicine. The herbarium acts as an information source for Indian medicinal plants, particularly on botanical identity, distribution, habit, habitat preferences, ethno-botany, use and method of usage, available variations, threat status, related conservation studies, etc. It currently houses 35,000 voucher specimens comprising 2,096 species spread across 150 families. These have been collected from Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Maharashtra, Orissa, Himachal Pradesh, Uttaranchal, Jammu and Kashmir, Arunachal Pradesh, Meghalaya, Assam, Mizoram and Nagaland.

62. Has your country developed appropriate mechanisms, guidelines, legislation or other initiatives to foster and promote the effective participation of indigenous and local communities in decision making, policy planning and development and implementation of the conservation and sustainable use of biodiversity at international, regional, subregional, national and local levels? (decision V/16)	
a) No	
b) No, but relevant mechanisms, guidelines and legislation are under development	
c) Yes, some mechanisms, guidelines and legislation are in place (please provide details below)	X

Further information on the mechanisms, guidelines and legislation developed.

As mentioned in the response to Questions. 58 and 61, India has enacted the Biological Diversity Act, 2002, which provides for effective participation of local communities in decision making, *inter alia* through mandatory consultation of local level BMCs by NBA and SBBs; and preparation of PBRs. In addition, several measures/ mechanisms/programmes are in place that promote effective participation of local communities. Some of these are listed in response to Question 61.

63. Has your country developed mechanisms for promoting the full and effective participation of indigenous and local communities with specific provisions for the full, active and effective participation of women in all elements of the programme of work? (decision V/16, annex)	
a) No	
b) No, but relevant mechanisms are being developed	X
c) Yes, mechanisms are in place (please provide details below)	

Further comments on the mechanisms for promoting the full and effective participation of women of indigenous and local communities in all elements of the programme of work.

The mechanisms developed for promoting participation of local communities do have specific provisions for participation of women. For example, the Biological Diversity Rules, 2004 provide that not less than one third of the members of the local level BMCs should be women. Similarly, there are several other such mechanisms/programmes which explicitly and specifically provide for effective participation of women.

Support to implementation

64. Has your country established national, subregional and/or regional indigenous and local community biodiversity advisory committees?	
a) No	
b) No, but relevant work is under way	
c) Yes	X

65. Has your country assisted indigenous and local community organizations to hold regional meetings to discuss the outcomes of the decisions of the Conference of the Parties and to prepare for meetings under the Convention?	
a) No	
b) Yes (please provide details about the outcome of meetings)	X

Further information on the outcome of regional meetings.

Local community organizations represented through NGOs are involved in preparing for meetings under CBD.

66. Has your country supported, financially and otherwise, indigenous and local communities in formulating their own community development and biodiversity conservation plans that will enable such communities to adopt a culturally appropriate strategic, integrated and phased approach to their development needs in line with community goals and objectives?	
a) No	
b) Yes, to some extent (please provide details below)	
c) Yes, to a significant extent (please provide details below)	X

Further information on the support provided.

The MoEF has funded and supported the preparation of PBRs by the Indian Institute of Science. PBRs were prepared 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. The PBRs can be used to promote the sustainable management of natural resources and support claims of communities and individuals to knowledge about biodiversity resources and their use. In addition, local communities have been actively involved in the GEF-funded NBSAP project, implemented by the MoEF.

Article 9 - *Ex situ* conservation

67. On Article 9(a) and (b), has your country adopted measures for the *ex-situ* conservation of components of biological diversity native to your country and originating outside your country?	
a) No	
b) No, but potential measures are under review	
c) Yes, some measures are in place (please provide details below)	
d) Yes, comprehensive measures are in place (please provide details below)	X

Further information on the measures adopted for the *ex situ* conservation of components of biodiversity native to your country and originating outside your country.

Ex situ conservation of biodiversity in India has been institutionalised 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. The Government of India has also initiated establishment of a national botanical garden in NOIDA in Uttar Pradesh.

The first zoo in India dates back to 1854, being the private zoo of a royalty. The first public zoo in India was established in Chennai by the municipality. Current statistics place the number of zoos, animal parks, aquaria, etc., at 300. Species-oriented captive breeding programmes have been initiated in many of these zoos throughout the country. Exclusive crocodile and turtle breeding parks were established in the 1970s.

CZA has been set up under MoEF to provide guidelines to all zoos and monitor their activities. It also oversees the functioning of zoos which can 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 (CBSG) exist for a wide range of organisms.

The Government of India has finalized a National Zoo Policy for strengthening scientific and technical capacity for the management of zoos.

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 the National Bureau of Plant Genetic Resources (NBPGR), the

National Bureau of Animal Genetic Resources (NBAGR), the National Bureau of Fish Genetic Resources (NBFGR) and the National Bureau of Agriculturally Important Microorganisms (NBAIM). Brief details of the these bureaus are given below:

NBPGR: The Indian National Plant Genetic Resources System (IN-PGRS) spearheaded by the NBPGR is among the most dynamic and prominent systems in the world. The NBPGR has been entrusted with the national responsibility to plan, conduct, promote, co-ordinate and take the lead in activities concerning collection, introduction, exchange, evaluation, documentation, conservation and sustainable management of diverse germplasm of crop plants and their wild relatives, with a view to ensure their availability for use over time to breeders and other researchers. It includes NBPGR network of 10 regional stations/base centres/quarantine centres over different phyto-geographic zones of the country and active collaboration and linkages with over 30 National Active Germplasm Sites (NAGS). NBPGR is conserving genetic resources of crop plants, including their wild relatives. The National Gene Bank located at NBPGR has the facility to conserve seed propagated species having 'orthodox seed behavior', i.e. the seeds of such species can be dried to a low moisture content (2-7%), without loosing the viability, and stored at low temperatures (4 to -20^0C). Seeds can be stored for up to 100 years under such conditions. The Bank currently holds more than 250,000 accessions for various crop plants and wild species including some duplicated collections. NBPGR has assisted several collaborating institutes/centres in establishing medium-term seed storage computer and data documentation facilities. In addition, it also imparts need based, on-the-job training to scientists and technicians.

In addition to seed conservation, other *ex situ* conservation methods, such as '*in vitro* storage' and '*cryo* storage', are being employed to conserve species having recalcitrant seeds (seeds which cannot be dried below a critical moisture content and are sensitive to low temperature storage), and vegetatively propagated species. NBPGR has conserved about 1,500 accessions under *in vitro* gene bank and about 5,800 accessions have been conserved in the *cryo* gene bank. For vegetatively propagated species, mainly horticultural crop plants, a network of 'field gene banks' are maintaining about 40,000 germplasm accessions.

NBAGR: The establishment of the NBAGR at Karnal in 1984 marked the beginning of India's formal efforts to conserve the livestock genetic resources in the country. The large infrastructure for research and conservation of indigenous germplasm of livestock includes state and central animal husbandry departments, species-specific institutes of the ICAR, and state agricultural universities. Many livestock farms maintain indigenous breeds which can form the nuclear herds for *in situ* conservation. Various bull mother farms and frozen semen banks are interlinked for *ex situ* conservation of semen of indigenous breeds for posterity.

To increase effectiveness of its conservation programmes, a comprehensive plan for 25 years has been prepared by the NBAGR.

1. The country has a vast network of livestock farms under central and state governments as well as NGOs where indigenous animal genetic resources are managed.

2. *Ex situ* conservation at institutional or State Agricultural Universities (SAU) herds as well as sizeable number of breeds of Indigenous animals that were imported from other countries in the past.
3. *Ex situ* conservation in the form of frozen semen of indigenous breeds and breeds imported from other countries is done at several places in the country.
4. *Ex situ* conservation of different breeds.

The identification, monitoring and conservation of domestic animal biodiversity programme is going on at NBAGR. The number of breeds studied/documented include: cattle (30), buffalo (10), sheep (42), goat (22), poultry (20), yak (2), mithun (2), camel (6) and horse (8). NBAGR also prepared a Country Report on Status of Domestic Animal Diversity.

NBFGR: India abounds in fish genetic resources that inhabit its river systems, wetlands, coastal areas and marine zones. Out of nearly 20,000 documented fish species of the world, 2,200 fin fish species have been recorded in India from cold fresh waters of upper stretches of the Indus, the Ganges and the Brahamaputra (73 species), warm waters of 14 major river systems draining the plains (544 species), brackish waters of estuarine areas (143 species) and marine waters of the three surrounding seas (1,440 species). Twenty seven species are considered to be rare/endangered/vulnerable.

The NBFGR, located at Lucknow and administered by the ICAR, is devoted to the conservation and sustainable utilization of fish diversity in India. NBFGR has developed a few *ex situ* conservation methodologies for fish genetic resources of the country. It has a sperm bank for 23 fish species including endanffered ones. It is also maintaining a DNA bank for fish diversity. The Institute has also developed a LIVE gene banking programme at Lucknow and other regional centres.

1. NBFGR has made an ecosystem wise (cold water, warm water, brackish water and marine) database on the first fish germplasm resource in the country.
2. 79 threatened fish species have been recorded as per IUCN.
3. 32 species of freshwater are evaluated under Conservation Assessment Management. Programme (CAMP).
4. Different categories of threats to fish genetic resources have been assessed.
5. Information on exotic fish germplasm and their invasion in aquaculture and fisheries.

In addition, recognizing the need for sophisticated facilities for research and development and providing services, the following germplasm facilities have also been set up:

i) The National Facility for MTCC at IMTECH, Chandigarh, with over 1,600 cultures in its stock.

ii) The National Facility on Blue Green Algal Collection at the IARI, with over 500 strains and several pure cultures as well as soil-based cultures, which have been supplied to farmers for production of biofertilisers.

iii) The National Facility for Marine Cyanobacteria at the Bharatidasan University, Tiruchirapalli, which is co-ordinating extensive surveys on the southern coast.

iv) The National Facility for Plant Tissue Culture Repository at NBPGR, New Delhi, which has undertaken *in vitro* conservation of germplasm (seed and pollen *in vitro* culture) over the medium and long term, particularly for those species for which conventional methods are inadequate. It has 650 accessions of crop species and employs molecular methods of characterization and classification.

v) The National Facility for Laboratory Animals at the Central Drug Research Institute, Lucknow and the National Institute of Nutrition, Hyderabad have made available quality animals for biomedical research and industry in the country.

vi) The National Facility for Animal Tissue and Cell Culture, Pune, an autonomous institution under the DBT has 1,127 stock cultures comprising 594 different cell strains. The facility has supplied 401 culture consignments to 84 institutions throughout the country. It also has 50 vectors, plasmids and genomic libraries.

vii) Three National Gene Banks for MAPs at CIMAP, Lucknow and the NBPGR, New Delhi, both for the northern region; and TBGRI, Trivandrum, for peninsular India have been established. These banks will conserve important species of proven medicinal value, which are categorized as endangered, threatened or rare, and which are used extensively in traditional systems of medicine, are difficult to propagate, have significance for R&D for the future, and are of commercial value. India is the regional co-ordinator for Asia and also the overall co-ordinator for the establishment of gene banks of MAPs among G-15 countries.

viii) CCMB has been undertaking the development and maintenance of DNA profiles.

Himalayan Forest Research Institute (an ICFRE institution) is also involved in *ex situ* conservation of medicinal plants of higher altitude and cold desert areas. University of Horticulture and Forestry (UHF), Solan and Ayurveda Centre in Himachal Pradesh are also involved in this activity. State Forest Department, J&K is also taking up *ex situ* conservation of medicinal plants.

BNHS has initiated *an ex situ* conservation programme for Indian vultures. The captive regime centre has been set up at Narayana. The vulture population has declined by about 95%-97% due to the pain killer diclofenac used in the treatment of livestock, which are consumed by vultures. India has decided to phase out this drug within the next six months.

68. On Article 9(c), has your country adopted measures for the reintroduction of threatened species into their natural habitats under appropriate conditions?	
a) No	
b) No, but potential measures are under review	
c) Yes, some measures are in place (please provide details below)	X
d) Yes, comprehensive measures are in place (please provide details below)	

Further comments on the measures for the reintroduction of threatened species into their natural habitats under appropriate conditions.
Various projects have been initiated for the reintroduction of threatened species into their natural habitats under appropriate conditions. For example, threatened species, like the pitcher plant, are being mass-propagated and re-introduced in their natural habitats. Asiatic Lions are being re-located in Madhya Pradesh. Threatened mangrove species have been mass propagated and introduced into their natural habitats. Sea reaching of threatened species, viz. sea turtles and sea horses, has been taken up. NBFGR has developed captive breeding programmes for seed production of threatened/endangered fish species for future ranching programmes for conservation.

69. On Article 9(d), has your country 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?	
a) No	
b) No, but potential measures are under review	
c) Yes, some measures are in place (please provide details below)	X
d) Yes, comprehensive measures are in place (please provide detailsbelow)	

Further information on the 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.
Collection of biological materials from their natural habitats is being regulated under the provisions of the Wildlife Protection Act and the Biological Diversity Act. NBPGR has also circulated guidelines for collection of crop plant species and wild species that stipulate collection of only a minimal sample in case of rare or endangered plant species. These guidelines are passed on to collectors before all exploration collection missions. (Ref: NBPGR-NATP, Tech Bull No. I, NBPGR 1999). Comprehensive guidelines have been prepared for the use and exchange of germplasm for research by the ICAR including that of animal genetic resources. NBFGR is campaigning intensively by organizing mass awareness programmes and encouraging people's participation in saving degrading natural habitats as well as eroding fish germplasm of different aquatic ecosystems in different parts of the country.

Box XLVIII.

Please elaborate below on the implementation of this article and associated decisions specifically focusing on: a) outcomes and impacts of actions taken; b) contribution to the achievement of the goals of the Strategic Plan of the Convention; c) contribution to progress towards the 2010 target; d) progress in implementing national biodiversity strategies and action plans; e) contribution to the achievement of the Millennium Development Goals; f) constraints encountered in implementation.
Strong national systems of *ex situ* conservation supported by a network of botanical gardens and zoological parks have been developed. There is increasing coherence of policies and programmes on conservation and sustainable use of bio-resources but more fund mobilization and infrastructure development is required.

Article 10 - Sustainable use of components of biological diversity

70. On Article 10(a), has your country integrated consideration of the conservation and sustainable use of biological resources into national decision-making?	
a) No	
b) No, but steps are being taken	
c) Yes, in some relevant sectors (please provide details below)	X
d) Yes, in most relevant sectors (please provide details below)	

Further information on integrating consideration of conservation and sustainable use of biological resources into national decision-making.
Conservation and sustainable use of biodiversity has been integrated into national decision making through: i. Policy statements (e.g. National Forest Policy, National Conservation Strategy, National Wildlife Action Plan, National Environment Policy etc.) ii. Legislative measures (e.g. Environment (Protection) Act, Wildlife (Protection) Act, Biological Diversity Act, EIA Notification, CRZ Notification, Notifications on ecologically fragile areas etc.) iii. Programmes (JFM and other programmes of NAEB, mission mode project on household food and nutritional security)

71. On Article 10(b), has your country adopted measures relating to the use of biological resources that avoid or minimize adverse impacts on biological diversity?	
a) No	
b) No, but potential measures are under review	
c) Yes, some measures are in place (please provide details below)	X
d) Yes, comprehensive measures are in place (please provide details below)	

Further information on the measures adopted relating to the use of biological resources that avoid or minimize adverse impacts on biological diversity.

Sustainable use of biological diversity is emphasized in 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 local situations, pressure from biodiversity-rich areas and resources is to be diverted by bringing additional areas under green cover to satisfy local demands, 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 coastal zone through Coastal Zone Regulation Rules, 1991 under Environment (Protection) Act.

To adopt economically effective and socially viable incentives for conservation and sustainable use of biological diversity, 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 National Conservation Strategy and Policy Statement on Environment and Sustainable Development, 1992 provides for the basis for the integration and internalization of environmental considerations in the policies and programmes of different sectors. It also emphasizes sustainable lifestyles and the proper management and conservation of resources.

Beginning in the 1980s as scattered initiatives by some forest officials, and since 1990 transformed into a national programme, JFM is an ambitious government attempt

at regenerating and sustainably using forests. It was launched by MoEF's cir cular of June 1, 1990 to all states and union territories providing guidelines for *the 'Involvement of Village Communities and Voluntary Agencies in the* Regeneration of Degraded Forests' (GoI, 1990). Almost all the JFM orders in various states allow a 100% share for members of the FPCs in the flow of usufructs (NTFP and fuelwood and small timber except reserved items) from the protected forest areas. NTFP flow thus provides a significant incentive to communities for the protection of their respective forest areas. Though the initial thrust of JFM was towards timber production, both communities and forest officials are realizing that NTFP use is far more sustainable and beneficial.

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. There were six different programmes, one each on life support crops, horticulture and vegetable gardening, animal husbandry, fisheries, value addition, and impact assessment.

All India Coordinated Research Project on Under Utilized and Under Exploited 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 under-utilized crops. Presently, the project is functioning at 20 centres with new crops such as jatropha, adzuki bean, faba bean, etc. The technical programme encompasses 19 plant species comprising 12 food crops and 7 plant species of feed and fodder, industrial or soil reclamation value.

72. On Article 10(c), has your country put in place measures that protect and encourage customary use of biological resources that is compatible with conservation or sustainable use requirements?	
a) No	
b) No, but potential measures are under review	
c) Yes, some measures are in place (please provide details below)	X
d) Yes, comprehensive measures are in place (please provide details below)	

Further information on the measures that protect and encourage customary use of biological resources that is compatible with conservation or sustainable use requirements.

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/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