7 CONSERVTION AND MAINTENANCE OF FLORA AND FAUNA

Indian region has contributed Significantly to the global biodiversity. India (is a homeland of 167 cultivates spccies and 320 wild relatives of crop plants. It is the ccnire of diversity of animal species (Zebu. Mithun. Chicken. water, buffalo, camel): crop plants (rice, sugarcane banana, tea. millet): fruit plants and vegetables (mango, jackfruit. cucurbits), edible diascoreas, alocasia, and colocasia; spices and condiments (cardamom, black pepper, ginger, turmeric); and bamboos, brassicas and tree cotton. India also represents a secondary'centre of domestication for some animals (horse, goat, sheep cattle, yak and donkey) and plants (tobacco, potato and maize).

The in situ conservation of biodiversity is being carried out through Biosphere Reserves. National Parks. Wildlife Sanctuaries and other protected areas by the Ministry of Environment and Forests. The joint forest management systems involve forest departments and local community. This enables the tribal people and local communities to have access to non-wood forest products, and at the same time protect the forest resources.

The National Bureau of Plant. Animal and Fish Genetic Resources has a number of programmes to collect and conserve the gennplasm of plants and animals in seed gene banks, and field gene banks for in re-conservation. Botanical and Zoological gardens have large collections of plant and animal species in different climatic regions of India.

The Union Ministry of Environment and Forests (MoEF). India, passed the Biological Diversity Act. 2002, with an objective to regulate access to genctic resources and associated knowledge by foreign individuals and institutions and ensure equitable sharing of benefits arising out of resources and knowledge available in the country. The Act is aimed to protect and regulate access to plant and animal genetic resources and traditional knowledge (TK). A three-tiered system of regulation is envisaged under the Biological Diversity Act. which consists of the National Biodiversity Authority (NBA) at the head, followed by State Biodiversity Boards (SBB) and local-level Biodiversity Management Committees (BMC). Every state of India, thus, has a responsibility for the formation of the State Biodiv ersity Board that would be linked with the Biodiversity Management Committee.

FORMATION OF LMMC GROUP

India and sixteen other countries rich in biological diversity and associated tradition knowledge have formed a group known as the Like-Minded Meeadiversc Countries (LMMC). These seventeen countries are Bolivia, Brazil, Chin, Colobia, Costa Rica, Democratic Republic of Congo, Ecuador, India, Indonesia Kenya Madagascar, Malaysia, Mexico, Peru, Philippines, South Africa and Venezuela.

The group of LMMC has been created to act as a mechanism for consultation and

WILDLIFE CONSERVATION THROUGH CULTURE AND HISTORY

- Tradition of non-violence
- Animals revered in Indian culture
- Elephants- Lord Ganesha
- Lion/Tiger- associated with Goddess Durga
- Snake- associated with Lord Shiva
- Conservation values inscribed in Ashoka pillar edicts
- Gandhian policy of " Ahimsa"
- Bishnoi Community.

cooperation to promote their interests and priorities related to the preservation and sustinable use of biological diversity with a view to ensure fair and equitable sharming of benefits arising out of the use of their biological resources and associated tradition konowledge as envisaged under the convention on Biological Diversity.

SOME IMPORTANT NATIONAL INSTITUTIONS FOR CONSERVATION OF FLORA AND FAUNA

Zoological Survey of India (ZSI)

The Zoological Survey of India, the only taxo-nomic organization in the country involved in the study of all kinds of animals from Protozoa to Mammalia, occurring in all possible habitats from deepest depth of the ocean to the peaks of Himalaya, was established on 1st July, 1916 to promote survey, exploration and research leading to the advancement in our knowledge of the various aspects of the exceptionally rich animal life.

- Responsible for carrying out stirvey to list all endangered species.
- It has its headquarters at Kolkata and also has sixteen other regional stations.
- Four status smvey's one for Tibetan Wild Ass as earlier surveys. Ecological shidies including status survey of endangered animals were also continued.
- The National Zoological Collection was further enriched by the addition of 9532 Identified specimens belonging to 487 species.
- Several faunal exploration and surveys including various eco-systems, Biosphere Reserves, National Parks and Wildlife Sanctuaries, Tiger Reserves, were undertaken by the ZST and its various Regional Stations.
- Research work regarding Identification of new taxa, and fauna from various States were also continued during the year.
- Several studies on Butterflies and Moths of Madhya Pradesh, Amphibions of North-East India, Mammals of Kerala, etc., were under-taken by the ZSI and its various Regional Stations.
- The ZSI published several records, occasional papers, bibliographies of Indian Zoology and other special publications during the year. Participation in Antarctica Expedition: ZSI is providing monthly e-News since Januar 2009, highlighting new discoveries, new records, published paper articles on its role in environ-mental protection, visit of the dignitaries, pub-lication of checklists etc.

Faunal Exploration and Surveys: Ecosystems: A total of thirty eight extensive surveys were undertaken during 2009-10 viz. Mountain (nineteen), Forests (two), Marine (two), Estuarine (nine), Desert (four), Manmade ecosystems (two).

Geological Survey of India (GSI)

GSI is a premier earth science organisation, meets the geosciences information requirement in diverse fields;

- Established in 1851 with the main aim of locating coal resources.
- Has strength of about 2,900 scientists and technical professionals.
- Its functions are to encompass wide spectrum of earth science activities e.g, geological, geo-physical and geo-chemical surveys, marine surveys, geoenvironmental studied and various laboratory studies. •
- It has opened full-fledged seism-otectonic divisions at Lucknow, Jaipur, Shillong, Calcutta, Nagpur and Hyderabad.
- Has also opened technical consultancy divisions at many of its regional centres to collabo-rate and cooperate with the potential investors in mineral fuel and other developmental sectors.
- New activities initiated during Ninth Plan period are development of village economy by Mineral Resource

Appraisal Programme and Gedchemical Mapping.

Forest Survey of India (FSI)

- Established in 1981.
- Has its headquarters at Dehradun and four regional offices at (1) Bangalore, (2) Kolkata, (3) Nagpur and (4) Shimla.
- It was a successor to "Pre-investment Survey of Fqrest Resources" (PISFR), a project initiated in 1965 by Government of India and sponsored by FAO and UNDP.
- It prepares thematic maps on 1:50,000-scale and forest vegetation map of the country.
- Vegetation maps are prepared after *every* two years.
- The activities of FSI include: (i) Forest Coves Mapping; (ii) Inventory Data Processing; (iii) Training; (iv) Creation of National Basic Forest Inventory System (NBFIS); (v) Special Studies; and (vi) Consultancy.
- A part from the above, the FSI is also in the process of carrying out assessment of Trees out side forest (TOF), both rural and urban for which necessary statistical techniques have been evolved by FSI.

  Forest Survey of India (FSI) assesses forest cover of the country ever)' two years by digitally interpretation of remote sensing satellite data and publishes the results in a biennial re-port called 'State of Forest Report' (SFR).

WILDLIFE CONSERVATION -PRESENT POSITION

- Wild Life (Protection) Act, 1972
- Provides for creation of Protected Areas
- Prohibits all forms of hunting (including Game hunting)
- Six Schedules- according high status of protection
- Provides for constitution of highest advisory Board- National Board for Wildlife under the Chairmanship of the Prime Minister
- Provisions for stringent punishments

- Beginning in 1987, nine SFRs have been brought out so far, and the 10th SFR is under publication. In the current 10th cycle (i.e. for Himalayan Monal Pheasant (Lopophorus impejanus) (Kiang) in Ladakh, one for Himalayan Marmot in Ladakh, one for Snow Trout in Himachal Pradesh and another for Himalayan Salamander in West Bengal were cfarrkd out.
- Several short duration intensive surveys for ecological studies were also undertaken and detailed taxonomic studies were carried out on the material collected during these as well.
- The FSI celebrated the year 2006 as its Silver Jubilee Year on September 28-29, 2006. Work-shops, film shows were organized and a number of publications were also brought out by the FSI on this occasion.

BOTANICAL SURVEY OF INDIA

The Botanical Survey of India (BSI) is the apex research organization under the MOEF for carrying out taxonomic and floristic studies on wild plant resources of the country. BSI was established on 13th February, 1890 with the basic objective to explore the plant resources of the country and to identify the plants species with economic virtues. Sir George King, the then Superintendent of the 'Royal Botanic Garden' Calcutta was appointed as First ex-officio Honorary Director of the BSI. After independence, the department was reorganized in 1954 by Government of India as a part of scientific development of the country. Its functional base was further expanded to include various new areas. Units of BSI Indian Botanic Garden was established in 1787 by Lieutenant Colonel Robert Kyd. Its 273 acres unique landscape design was initiated by Sir George King in 1872. It is considered to be one of the best in the botanic gardens of the world with undulated land surfaces, artificial lakes and moats interconnected with underground pipes receiving water from the river Hooghly. It was known as East India Company's Garden or the 'Company Bagan' or Calcutta Garden and later as the Royal Botanic Garden which after independence was renamed as the 'INDIAN BOTANIC GARDEN' in 1950. It came under the

management of the Botanical Survey of India on January 1, 1963. Great Banyan Tree The 260 years old Great Banyan Tree (Ficus bengalensis L.) is located in the Indian Botanic Garden, Howraw. It has 2800 prop roots and spread in 1.5 hectares. Central National Herbarium, Howrah CNH is one of the oldest and one of the largest herbaria in the world, was established in 1795 by Dr. William Roxburgh. Dr. N. Wallich (1815–1846), the successor of William Roxburgh developed this herbarium to a great extent. Central National Herbarium possesses about 2.5 million of herbarium sheets belonging to nearly 350 families of plants, which are arranged according to Bentham and Hooker's system of classification. The area under the jurisdiction of Central National Herbarium is confined to the states of West Bengal, Bihar and Jharkhand.

SOME SPECIAL PROJECT FOR ENDANGERD SPECIES

An endangered species is a species of organisms that will likely become extinct. The phrase 'endangered species' colloquially refers to any species that fits this description whereas conservation biologists typically use it to refer to species that are designated Endangered in the IUCN Red List, wherein "endangered" is the second most severe conservation status for wild populations, following Critically Endangered. 3079 animals and 2655 plants are Endangered worldwide, compared with 1998 levels of 1102 and 1197, respectively.[1] The amount, population trend, and conservation status of each species can be found in the Lists of organisms by population.

NATIONAL ENVIRONMENT POLICY 2006

No comments National Environment Policy 2006 is a response to our national commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (g), (DPSP) strengthened by judicial interpretation of Article 21.

It is recognized that the maintenance of the Healthy environment is not the responsibility of the state alone. It is the responsibility of every Citizen and thus a spirit of partnership is to be realized through the environment Management of the country. Here is the summary of the National Environment Policy 2006: Challenges:

WILDLIFE CONSERVATION -PRESENT POSITION

- Legislations
- Wild Life (Protection) Act, 1972
- Biological Diversity Act, 2002
- Indian Forest Act, 1927
- Forest (Conservation) Act, 1980
- Environment (Protection) Act, 1986
- Foreign Trade Regulation Act, 1992
- Policies and Plans
- National Environment Policy-2006
- National Biodiversity Action Plan
- National Wildlife Action Plan (2002-2016)
- National Forestry Action Plan
- EXIM Policy

The key environmental challenges that India faces are related to the nexus of environmental degradation with poverty in its many dimensions, and economic growth. Challenges are intrinsically connected with the state of environmental resources, such as land, water, air, and their flora and fauna. Drivers of Degradation Proximate drivers of environmental degradation are population growth, inappropriate technology and consumption choices, and poverty, leading to changes in relations between people and ecosystems, and development activities such as intensive agriculture, polluting industry, and unplanned urbanization. Other drivers of degradation are the lack of clarity or enforcement of rights of access and use of environmental resources, policies which provide disincentives for environmental conservation (and which may have origins in the fiscal regime), market failures (which may be linked to shortcomings in the regulatory regimes), and governance constraints. Impact on Health Poor environmental quality has adversely affected human health. Environmental factors are estimated as being responsible in some cases for nearly 20 percent of the burden of disease in India, and a number of environment-health factors are closely linked with dimensions of

SOME IMPORTANT INFORMATION

i. National Forest Policy revised in -1988

ii. Biodiversity act of India was passed by the Parliament in the year 2002

iii. Forest Act 1927

iv. Biosphere Reserve Scheme 1986

Wild life protection act 1972 (Revised in 1991):

Objectives:

1. Restriction and prohibition on hunting of animals
2. Protection of specified plants -
3. Setting up and managing Sanctuaries and national Parks
4. Empowering zoo authority
5. Control of trade and commerce of wildlife

Chipko Movement was bom in March 1973 at Gopeshwar in Chamoli district. The movement had two leaders. Sunderlal Bahuguna of Silyara in Tehri and Chandi Prasad Bhatt of Gopeshwar.

Appiko Movement - Similar type movement Appiko movement was under taken by **Pandurang Hegde** in south in 1983.

SPECIAL WILDLIFE PROJECTS IN INDIA

- **Project Tiger** - Running Since 1 April 1973 - Central Government
- **The Gir Lion Sanctuary Project** - Running Since 1972 - Central Govt. And Gujrat Govt.
- **Himalayan Musk I)eer Project** - U.P. Govt. IUCN and Central Govt.
- **The Manipur Brow Antlered Deer Project** - Running Since 1977
- **Project Hangul** - Since 1970 - **J&K** Govt., IUCN, WWF
- **Crocodile Breeding Project** - Since 1975 UNDP, Central Govt.
- **Project Elephant** - Recently Started.

ABOUT WILDLIFE

Red Data Book: This book contains a record of **animals** & **plants** which are known to be in danger. This Book is maintained by the **IUCN** (International Union of Conservation of nature and natural Resources).

- **Green Data Book:** A book containing a list of **rare plants** in protected areas like Botanical gardens.
- **Silent Valley:** it is tropical evergreen forest in Kerala (Palghat) declared as national Reserve Forest. It is called silent valley because there is no noise in the forest during night, even that of cicadas, as they are not found there. **It is related to conservation of forest.**
- **Butterfly Park:** India's first and only butterfly park was established in 1992 near Gangtok **(Sikkim)**

poverty (e.g. malnutrition, lack of access to clean energy and water). Interventions such as reducing indoor air pollution, protecting sources of safe drinking water, protecting soil from contamination, improved sanitation measures, and better public health governance, offer tremendous opportunities in reducing the incidence of a number of critical health problems. Objectives of the Policy Conservation of Critical Environmental Resources Intra-generational Equity: Livelihood Security for the Poor Inter-generational Equity Integration of

Environmental Concerns in Economic and Social Development: Efficiency in Environmental Resource Use Environmental Governance Enhancement of Resources for Environmental Conservation Principles of National Environment Policy 2006: The Policy evolved from the recognition that only such development is sustainable, which respects ecological constraints, and the imperatives of justice. The Objectives stated above are to be realized through various strategic interventions by different public authorities at Central, State, and Local Government levels. They would also be the basis of diverse partnerships. The principles followed in the policy are: Human Beings are at the Centre of Sustainable Development Concerns: Right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations. In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. Where there are credible threats of serious or irreversible damage to key environmental resources, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. In various public actions for environmental conservation, economic efficiency would be sought to be realized "Polluter Pays" principle: Impacts of acts of production and consumption of one party may be visited on third parties who do not have a direct economic nexus with the original act. Such impacts are termed "externalities". The National Environment Policy promotes the internalization of environmental costs, including through the use of incentives based policy instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest, and without distorting international trade and investment. Legal Liabilities in the Policy The environmental redressal mechanism based on doctrines of criminal liability, have not proved sufficiently effective, and need to be supplemented. The policy adopts the civil liability for environmental damage that would deter environmentally harmful actions, and compensate the victims of environmental damage. The alternatives to Civil Liability may also apply viz. Fault Based liability and Strict Liability. In Fault Based Liability a party is held liable if it breaches a preexisting legal duty, for example, an environmental standard. Strict liability imposes an obligation to compensate the victim for harm resulting from actions or failure to take action, which may not necessarily constitute a breach of any law or duty of care. The Doctrine of Public Trust As per this doctrine, the State is not an absolute owner, but a trustee of all natural resources, which are by nature meant for public use and enjoyment, subject to reasonable conditions, necessary to protect the legitimate interest of a large number of people, or for matters of strategic national interest. Legislative Reforms A judicious mix of civil and criminal processes and sanctions will be employed in the legal regime for enforcement, through a review of the existing legislation. The policy calls for identification of the emerging areas for new legislation, due to better scientific understanding, economic and social development, and development of multilateral environmental regimes, in line with the National Environment Policy. It also calls for review the body of existing legislation in order to develop synergies among relevant statutes and regulations. Environment Impact Assessment: The policy focuses on encouraging the regulatory authorities, Central and State, to

WILDLIFE CONSERVATION -PRESENT POSITION

- National Biodiversity Action Plan
- Based on principles that human beings are at centre of sustainable development concerns
- Envisages planned manner for implementing provisions of Convention on Biodiversity
- Strengthening and integration of in-situ and ex-situ conservation of natural resource base and its sustainable utilization

BIODIVERSITY RELATED LEGAL FRAMEWORKS IN INDIA

Sl. No.	Legal Acts
1.	Fisheries Act, 1897
2.	Destructive Insects and Pests Act, 1914
3.	The Indian Forest Act, 1927
4.	Agricultural Produce (Grading and Marketing) Act, 1937
5.	Indian Coffee Act, 1942
6.	Import and Export (Control) Act, 1947
7.	Rubber (Production and Marketing) Act, 1947
8.	Tea Act, 1953
9.	Mining and Mineral Development (Regulation) Act 1957
10.	Prevention of Cruelty to Animal Act, 1960
11.	Customs Act, 1962
12.	Spices Board Act, 1986
13.	Seeds Act, 1966
14.	The Patents Act, 1970
15.	Wildlife (Protection) Act, 1972
16.	Marine Products Export Development Authority Act 1972
17.	Water (Prevention and Control of Pollution) Act, 1974
18.	Tobacco Board Act, 1975
19.	Territorial Water, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976
20.	Water (Prevention and Control of Pollution) Cess Act, 1977
21.	Maritime zones of India (Regulation and fishing by Foreign Vessels) Act 1980
22.	Forest (Conservation) Act, 1980
23.	Air (Prevention and control of Pollution) Act 1981
24.	Agricultural and Processed Food Products Export Development Authority Act 1985/ 1986
25.	Environment (Protection) Act, 1986
26.	Species Act, 1986
27.	National Diary Development Board, 1987
28.	Rules for the manufacture, use/import/export and'storage of hazardous microorganism/ genetically engineered organisms or cells, 1989
29.	Foreign Trade (Development and Regulation) Act, 1992
30.	Protection of Plant varieties and Farmer's Rights (PPVFR) Act, 2001
31.	Biological Diversity Act, 2002
32.	Plant Quaratine (Regulation of Import into India) order 2003
33.	Biological Diversity Rules, 2004 -
34.	The Food Safety and Standards Act, 2006
35.	Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
36.	National Green Tribunal Act 2010

institutionalize regional and cumulative environmental impact assessments (R/CEIAs) to ensure that environmental concerns are identified and addressed at the planning stage itself. CRZ The policy aims to revisit the Coastal Regulation Zone (CRZ) notifications to make the approach to coastal environmental regulation more holistic, and thereby ensure protection to coastal ecological systems, coastal waters, and the vulnerability of some coastal areas to extreme natural events and potential sea level rise. In pursuance with the Policy CRZ Notification 2011 was released recently. The Problem of LMOs LMO refers to the Living Modified Organisms. Living modified organisms (known as LMOs) result from modern biotechnology is broadly equivalent to genetically modified organisms. The difference between an LMO and a GMO is that a Living Modified Organism is capable of growing, and typically refers to agricultural crops. Genetically Modified Organisms include both LMOs and organisms which are not capable of growing, i.e. are dead. The National Environment Policy says that Genetically Modified Organisms require evaluation of their potential benefits and risks as part of relevant regulatory processes. The subset of LMOs, may, however, owing to their potential for replication, involve environmental concerns in addition. LMOs may pose significant risks to ecological resources, and perhaps, human and animal health. In order to ensure that development of biotechnology does not lead to unforeseen adverse impacts, the policy aims to review the regulatory processes for LMOs so that all relevant scientific knowledge is taken into account, and ecological, health, and economic concerns are adequately addressed. ESZs: The Environmentally Sensitive Zones are the areas with identified environmental resources having "Incomparable Values" which require special attention for their conservation. In order to conserve and enhance these resources, without impeding legitimate socio-economic development of these areas, the National Environment policy aims to identify and give legal status to Environmentally Sensitive Zones in the country having environmental entities with "Incomparable values" requiring special conservation efforts. The policy also envisages formulating area development plans for these zones on a scientific basis, with adequate participation by the local communities. Desert Habitats The arid and semi-arid region of India covers 127.3 mha (38.8%) of India's geographical area and spreads over 10 states. The Indian desert fauna is extremely rich in species diversity of mammals and winter migratory birds. However the pressures of a rapidly increasing population on the natural resource base necessitate adoption of innovative and integrated measures for conservation of desert ecosystems. The policy aims at measures such as Intensive water and moisture conservation through practices based on traditional and science based knowledge, and relying on traditional infrastructure. Panchayats & Women Participation The policy aims at working towards giving the legal recognition of the traditional entitlements of forest dependent communities taking into consideration the provisions of the (PESA). This would remedy a serious historical injustice, secure their livelihoods, reduce possibilities of conflict with the Forest Departments, and provide long-termincentives to these communities to conserve the forests. Wild life The policy aims to expand the Protected Area (PA) network of the country, including Conservation and Community Reserves, to give fair representation to all bio-geographic zones of the country. In doing so, develop norms for delineation of PAs in terms of the Objectives and Principles of the National Environment Policy, in particular, participation of local communities, concerned public agencies, and other stakeholders, who have a direct and tangible stake in protection and conservation of wildlife, to harmonize ecological and physical features with needs of socio-economic

WILDLIFE CONSERVATION-PRESENT POSITION

- National Wildlife Action Plan (2002-16)
- Ecological Security and in situ Conservation
- Peoples' Support for Wildlife
- Effective Management of Protected Areas

development. Wetlands The Ramsar Convention defines wetlands as, 'areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters', thereby giving a wide scope to the term. Wetlands are under threat from drainage and conversion for agriculture and human settlements, besides pollution. The policy aims at setting up a legally enforceable regulatory mechanism for identified valuable wetlands, to prevent their degradation and enhance their conservation. Develop a national inventory of such wetlands.

WILDLIFE PROTECTION ACT, 1972

The Wildlife Protection Act, 1972 is an Indian legislation enacted by the Parliament of India for protection of plants and animal species. Before 1972, India only had five designated national parks. Among other reforms, the Act established schedules of protected plant and animal species; hunting or harvesting these species was largely outlawed.

The Act provides for the protection of wild animals, birds and plants; and for matters connected therewith or ancillary or incidental thereto. It extends to the whole of India, except the State of Jammu and Kashmir which has its own wildlife act. It has six schedules which give varying degrees of protection. Schedule I and part II of Schedule II provide absolute protection - offences under these are prescribed the highest penalties. Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower. Schedule V includes the animals which may be hunted. The plants in Schedule VI are prohibited from cultivation and planting. The hunting to the Enforcement authorities have the power to compound offences under this Schedule (i.e. they impose fines on the offenders). Up to April 2010 there have been 16 convictions under this act relating to the death of tigers.

PROJECT TIGER

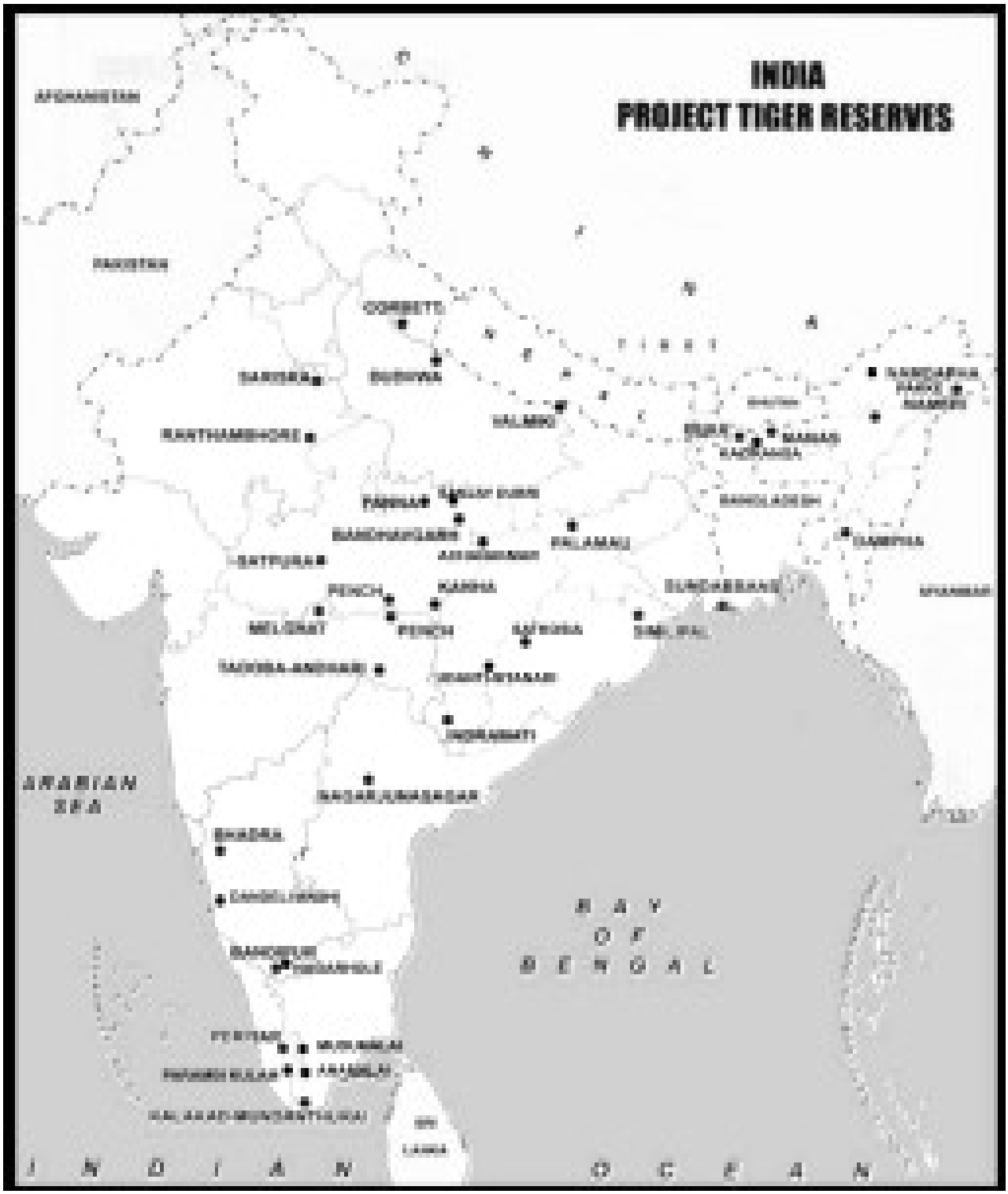
Tiger sightings have become quite rare these days in India, reason being the Tiger killings because of its multitude of medicinal or magical properties that is why tiger trade is very profitable. Genuinely the tiger skin is not fashionable but the smuggling of Tiger fur coats and rugs are not difficult for the impoverished hunters. Tiger in IndiaEven after the bans made by the government warning not to gather even wood from the former hunting grounds, poaching of tigers continue.

Still efforts are continuously made to preserve these magnificent predators from extinction.

Project Tiger is the most famous wildlife conservation project of India, which was lunched in 1972 to protect the diminishing population of Indian tigers. As recently as 1970, the hunting of tigers was legal in India and this majestic animal was hunted by the erstwhile royals and elites for pleasure and its beautiful skin. According to various estimates, during the 1950s and early 1960s, over 3,000 tigers lost their lives to trophy hunters. In the beginning of the 1970s, the tiger population in India was estimated to be around 1,800, shocking and jolting the concerned authorities to formulate an immediate plan to save Indian tigers and the result was the launch of Project Tiger in 1972.

India is home to the largest number of wild tigers in the world and shelters approximately 60% of the world's wild tiger population. Initially 9 Tiger reserves covering an area of 16,339 sq km were chosen for Project Tiger. Corbett National Park was the first national park of India to be covered under Project Tiger on April 1st, 1973. Now as many as 27 Tiger Reserves, covering an area of37,761 sq km, are included in Project Tiger.

The main aim of Project Tiger was to create a safe haven and ideal environmental conditions for the survival and growth of tigers and its prey to ensure maintenance of a viable population of this wonderful animal in the country. From its inception in 1972, Project



Tiger was aimed at saving the tiger and to identify and eliminate the factors responsible for the decline of tiger population in the country. The factors recognized by Project Tiger included habitat destruction, forestry disturbance, loss of prey, poaching and competition with local villagers and domestic animals.

The Project tiger was launched in India in 1972 as conservation programme for saving the Indian Tiger Population. Some of the best

List of Tiger Reserves in India

S. No.	State	Tiger Reserve	Year Estd.	Est. No. of Tigers	Total Area (km^2)	Management status	
1	Assam	Kaziranga Tiger Reserve	2006	42	859	very good	Good tiger density
2	Assam	Manas Tiger Reserve	1973-74	35	2840	good	Poor tiger density, Recovering from prolonged disturbance due to Bodo unrest
3	Assam	Nameri Tiger Reserve	1999–2000	37	344	satisfactory	Encroachment and tree cutting by locals
4	Arunachal Pradesh	Namdapha Tiger Reserve	1982-83	37	1985	satisfactory	Low tiger density, Extremism, encroachment by Lisus
5	Arunachal P.	Pakhui Tiger Reserve	1999–2000	36	862	good	Good tiger density
6	Andhra P.	Nagarjunsagar-Srisailam Tiger Reserve	1982-83	29	3568	poor	Low tiger density Left wing extremism (Naxalite)
7	Bihar	Valmiki Tiger Reserve	1989-90	42	840	satisfactory	Low tiger density extremism
8	Chhattisgarh	Indravati Tiger Reserve	1982-83	39	2799	poor	Severely affected by Naxalites, Out of bounds
9	Chhattisgarh	Guru Ghasidas Tiger Reserve	2010 (pro)	71	2899	satisfactory	Separated from Sanjay National Park in Madhya Pradesh
10	Jharkhand	Palamau Tiger Reserve	1973-74	19	1026	Poor	Low tiger density, Left wing extremism
11	Karnataka	Bandipur Tiger Reserve	1973-74	89	866	very good	Good tiger density
12	Karnataka	Nagarhole (extension) Tiger Reserve	1999–2000	47	643	good	Good tiger density
13	Karnataka	Bhadra Tiger Reserve	1998-99	36	492	very good	Low tiger density
14	Kerala	Periyar Tiger Reserve	1978-79	77	925	very good	There are an estimated 53 tigers (2010) in the reserve
15	Tamil Nadu/ Kerala	Annamalai Tiger Reserve	2008-09	49	1019	very good	Moderate tiger density
16	Madhya P.	Bandhavgarh Tiger Reserve	1993-94	79	1162	very good	Good tiger density
17	Madhya P.	Bori-Satpura Tiger Reserve	1999–2000	44	1486	very good	Poor tiger density
18	Madhya P.	Kanha Tiger Reserve	1973-74	87	1945	very good	Good tiger density
19	Madhya P.	Panna Tiger Reserve	1994-95	18	542	poor	Recovering from local extinction of tiger due to poaching. Dacoit infestation.
20	Madhya P.	Pench Tiger Reserve	1992-93	64	758	very good	Good tiger density
21	Maharashtra	Melghat Tiger Reserve	1973-74	45	1677	good	Low tiger density
22	Maharashtra	Pench Tiger Reserve	1998-99	35	257	good	Moderate tiger density
23	Maharashtra	Tadoba-Andhari Tiger Reserve	1993-94	100 [8]	620	good	Very Good tiger density, High rate of man tiger conflicts
24	Maharashtra	Sahyadri Tiger Reserve	2008	46	569	satisfactory	9 tigers (2007)
25	Mizoram	Dampa Tiger Reserve	1994-95	48	5 00	good	Low tiger density due to ecological reasons

26	Odisha	Simlipal Tiger Reserve	1973-74	64	2750	good	must visit this place,in core area good tiger density, green around
27	Rajasthan	Ranthambhore Tiger Reserve	1973-74	68	1334	good	Good tiger density
28	Rajasthan	Sariska Tiger Reserve	1978-79	5	866	poor	Recovering from local extinction of tiger due to poaching
29	Tamil Nadu	Kalakad-Mundathurai Tiger Reserve	1988-89	93	800	very good	Low tiger density due to ecological reasons
30	Tamil Nadu	Mudumalai National Park	2007	64	321	very good	Moderate tiger density
31	Kerala	Parambikulam Tiger Reserve	2010	58	391	very good	Moderate tiger density
32	Uttar Pradesh	Dudhwa Tiger Reserve	1987-88	141	811	good	Good tiger density, Poaching along borders
33	Uttarakhand	Jim Corbett Tiger Reserve	1973-74	146	1316	good	Good tiger density
34	West Bengal	Buxa Tiger Reserve	1982-83	29	759	good	Low tiger density offences by jobless tea plantation workers
35	West Bengal	Sunderbans Tiger Reserve	1973-74	89	2585	very good	Good tiger density
36	Chhattisgarh	Udanti & Sitanadi Tiger Reserve	2008-09	54	1580	poor	Low tiger density
37	Odisha	Satkosia Tiger Reserve	2007	31	988	poor	Low tiger density
38	Chhattisgarh	Achanakmar Tiger Reserve	2008	42	963	satisfactory	Low tiger density
39	Karnataka	Anshi Dandeli Tiger Reserve	2007	41	875	satisfactory	Low tiger density
40	Madhya P.	Sanjay Dubri Tiger Reserve	2008	56	831	poor	Very low tiger density
41	Karnataka	Bannerghatta tiger and lion reserve	1978		116	zoo	not a Project Tiger reserve
42	Tamil Nadu	Sathyamangalam Tiger Reserve	2013	47	524		61 tigers (2012)
43	Karnataka	Biligiri Rangaswamy Temple Wildlife Sanctuary	2010	40	540		26 tigers (2011)
44	Karnataka	Kudremukh Tiger Reserve	2011	62	360		28 tigers (2013)
45	Andhra P.	Kawal Tiger Reserve	2011-6-15	42	893		38 tigers (2012)
46	Maharashtra	Nagzira-Navegaon Tiger Reserve	28 Nov, 2013 (Nov, 2013)	20	700	Good	would be home to surplus tigers from Tadoba Tiger Reserve
47	Maharashtra	Bor Tiger Reserve	2011 pro)	15			
48	Uttar Pradesh	Pilibhit Tiger Reserve	2010 In-principle approval	43	1089		
49	Odisha	Sunabeda Tiger Reserve	2010 In-principle approval	44	856		
50	Madhya P.	Ratapani Tiger Reserve	2010 In-principle approval	45	674		
59	Goa	Mhadei Tiger Reserve	2011 (pro)	52			[17]
52	Uttar Pradesh	Suhelwa Tiger Reserve	2010 (pro)	50			
53	Rajasthan	Mukundara Hills Tiger Reserve	2011 In-principle approval				

examples of this programmes success can be seen in the national parks situated in the high Himalayan region, to the mangrove swamps of the Sundarbans and the thorny scrubs of Rajasthan. But more wildlife conservation laws and awareness among people is still required to make Indian sanctuaries a safe haven for tigers.

Objective

The main objective of Project Tiger is to ensure a viable population of tiger in India for scientific , economic , aesthetic , cultural and ecological values and to preserve for all time, areas of biological importance as a natural heritage for the benefit, education and enjoyment of the people. Main objectives under the scheme include wildlife management, protection measures and site specific ecodevelopment to reduce the dependency of local communities on tiger reserve resources.

Initially, the Project started with 9 tiger reserves, covering an area of 16,339 sq.km., with a population of 268 tigers. At present there are 27 tiger reserves covering an area of 37761 sq.km., with a population of 1498 tigers. This amounts to almost 1.14% of the total geographical area of the country. The selection of reserves was guided by representation of ecotypical wilderness areas across the biogeographic range of tiger distribution in the country. Project Tiger is undisputedly a custodian of major gene pool. It is also a repository of some of the most valuable ecosystem and habitats for wildlife.

Tiger Reserves are constituted on a 'core-buffer' strategy. The core area is kept free of biotic disturbances and forestry operations, where collection of minor forest produce, grazing, human disturbances are not allowed within. However, the buffer zone is managed as a 'multiple use area' with twin objectives of providing habitat supplement to the spill over population of wild animals from the core conservation unit, and to provide site specific ecodevelopmental inputs to surrounding villages for relieving their impact on the core. Except for the National Parks portion if contained within, normally no relocation of villages is visualised in the buffer area, and forestry operations, NTFP collection and other rights and concessions to the local people are permitted in a regulated manner to complement the initiatives in the core unit.

Project Tiger has put the tiger on an assured course of recovery from the brink of extinction, and has resurrected the floral and faunal genetic diversity in some of our unique and endangered wilderness ecosystem. The population of tigers in the country has increased significantly to about 4000 from less than 2000 at the time of launch of the project.

The effective protection and concerted conservation measures inside the reserves have brought about considerable intangible achievements also, viz. arresting erosion, enrichment of water regime thereby improving the water table and overall habitat resurrection. Labour intensive activities in tiger reserves have helped in poverty alleviation amongst the most backward sections, and their dependence on forests has also reduced. The project has been instrumental in mustering local support for conservation programme in general.

Approach

- Elimination of all forms of human exploitation and disturbance from the core and rationalisation of such activities in the buffer.
- Limitation of the habitat management to repair damage done by man.
- Researching facts about habitat and wild animals and carefully monitoring changes in flora and fauna.

PROJECT ELEPHANT

Elephant (Elephas maximus) is the largest terrestrial mammal of India . Elephant being wide ranging animal requires large areas . As per our mythology , elephant took birth from celestial waters and thus are closely associated with rains / water because of the belief. The requirement of food and water for elephants are very high and therefore their population can be supported only by forests that are under optimal conditions. The status of elephant can be the best indicator of the status of the forests. Asian elephants were believed to be widely distributed – from Tigris –

Euphrates in West Asia eastward through Persia into the Indian sub-continent, South and Southeast Asia including Sri Lanka, Java, Sumatra, Borneo and up to North China. However currently they are confined to Indian Subcontinent, South East Asia and some Asian Islands - Sri Lanka, Indonesia and Malaysia. About half of the Asian elephant population is in India. Old literatures indicate that even during the Moghul period, elephants were found all over India including many part of Central India like Marwar, Chanderi, Satwas, Bijagarh and Panna. However current distribution of wild elephant in India is confined to South India ; North East including North West Bengal; Central Indian states of Orissa , South WB and Jharkhand; and North West India in Uttarakahnd and UP.

Project Elephant (PE) was launched by the Government of India in the year 1992 as a Centrally Sponsored Scheme with following objectives:

- To protect elephants, their habitat & corridors
- To address issues of man-animal conflict
- Welfare of domesticated elephants

Financial and Technical support are being provided to major elephant bearing States in the country. The Project is being mainly implemented in 13 States / UTs , viz. Andhra pradesh , Arunachal Pradesh , Assam , Jharkhand , Karnataka , Kerala , Meghalaya , Nagaland , Orissa , Tamil Nadu , Uttranchal , Uttar Pradesh and West Bengal. Small support is also being given to Maharashtra and Chattisgarh . Main activities under the Project are as follows:

- Ecological restoration of existing natural habitats and migratory routes of elephants;
- Development of scientific and planned management for conservation of elephant habitats and viable population of Wild Asiatic elephants in India;
- Promotion of measures for mitigation of man elephant conflict in crucial habitats and moderating pressures of human and domestic stock activities in crucial elephant habitats;

- Strengthening of measures for protection of Wild elephants form poachers and unnatural causes of death;
- Research on Elephant management related issues;
- Public education and awareness programmes;
- Eco-develoment
- Veterinary care

Outlay /Expenditure During 5 Year Plans (In Rs Crores)

Estimation of wild elephant population in the year 2007 -08.

The all India enumeration of wild population of elephants in the country is carried out at every five year interval. The comparative figures as below for the states shows that the estimated population of wild elephants in the country has increased by more than one thousand compared to the 2002.

Estimated Population of Wild Elephants - 2007-08.

Elephent Reserves

Till now 26 Elephant Reserves (ERs) extending over about 60,000 sq kmt have been formally notified by various State Governments . Consent for establishment 6 more ERs - Baitarini ER & South Orissa ER in Orissa , Lemru & Badalkhod in Chattisgarh and Ganga-Jamuna (Shiwalik) ER in U.P , Khasi ER in Meghalaya has been accorded by MOEF. The concerned State Governments are yet to notify these ERs.

List of Elephant Reserves with area and population as per 2005 census are as follows. In year 2005 for the first time enumeration were

done in ERs. Next estimation in ERs will be in the year 2010.

- Elephant Reserves With Estimated Population In India.
- State Wise Funds Released Under Project Elephant From 2002-03 To 2008-2009.
- Fund Released For Ex-Gratia Under Project Elephant.
- Monitoring of Illegal Killing of Elephants (MIKE) Programme.

Mandated by COP resolution of CITES , MIKE program started in South Asia in the year 2003 with following purpose:

To provide information needed for elephant range States to make appropriate management and enforcement decisions, and to build institutional capacity within the range States for the long-term management of their elephant populations.

The main objectives of the MIKE are:

- To measure levels and trends in the illegal hunting of elephants;
- To determine changes in these trends over time; and
- To determine the factors causing or associated with such changes, and to try and assess in particular to what extent observed trends are a result of any decisions taken by the Conference of the Parties to CITES.

HUNTING AND POACHING

- Major impediment in wildlife Conservation
- Animals poached include:
- Tiger- skin, bones, etc
- Leopard- Skin, bones, etc
- Elephant- Ivory
- Rhino- Horn
- Musk deer- Musk
- Bear- Bile
- Snakes/Lizards- skin
- Turtle- meat
- Pangolin- meat

Under the programme data are being collected from all sites on monthly basis in specified MIKE patrol form and submited to Sub Regional Support Office for South Asia Programme located in Delhi who are assisting Ministry in the implementation of the progremme.

Mike Sites in India:

- Chirang Ripu (Assam)
- Dhang Patki (Assam)
- Eastern Dooars (WB)
- Deomali (Arun Pradesh)
- Garo Hills (Meghalaya)
- Mayurbhanj (Orissa)
- Mysore (Karnataka)
- Nilgiri (TN)
- Shivalik (Uttarakhand)
- Wayanad (Kerala)

CROCODILE BREEDING PROJECT

Crocodilians were threatened in India due to indiscriminate killing for commercial purpose and severe habitat loss until enactment of the Wildlife (Protection) Act.1972. All three species of crocodiles (Gharial, Gavialis gangeticus; Mugger crocodile,Crocodylus palustris and Saltwater crocodile, Crocodylus porosus in the river systems of Odisha were on the verge of extinction by the seventies. Crocodiles were very few because of ever increasing human activity in the rivers and their other traditional habitats, and consequent reduction in the extent of habitable stretches. Also, the survival rate of the crocodile hatchlings in nature is low because of predation. Piecemeal efforts were being made from the sixties onwards to save the crocodile. FAO Expert, Dr. H.R.Bustard engaged by UNDP/FAO and Government of India studied the prospects of crocodile rehabilitation, and based on his report and guidance a Crocodile Conservation Project was launched in 1975 in different States. The Gharial and Saltwater crocodile conservation programme was first implemented in Odisha in early 1975 and subsequently the Mugger conservation programme was initiated, since Odisha is having distinction for existence of all

the three species of Indian crocodilians. The funds and technical support for the project came from UNDP/ FAO through the Government of India

Management Objectives

The broad strategy adopted for rehabilitation of crocodiles was to protect them in their natural habitats, to rebuild the population quickly through captive breeding (rear and release), and to build up trained personnel for the job. The broad objectives of activities under crocodile project were the following.

(a) To protect the remaining population of crocodilians in their natural habitat by creating sanctuaries.

(b) To rebuild natural population quickly through 'grow and release' or 'rear and release' technique involving the following phases of operation.

- Collection of eggs from natural nests as soon as these were laid,
- Incubation of these eggs under ideal temperature and humidity maintained in artificial hatcheries,
- Hatching and rearing the young crocodilians in ideal captive-husbandry conditions,
- Marking and releasing young crocodiles in protected areas, and
- Assessing the result of release along with protection of the released crocodiles.

(c) To promote captive breeding.

(d) To take-up research to improve management. Some of the major research activities have been in the following directions.

- Interpretation of the various types of data collected during survey and census.
- Determination of parameters for maximum success in egg collection, egg incubation, hatching, rearing and release, including husbandry aspects on feeding, food conversion and growth.
- Study of habitat features and population structure.
- Study of behavioural biology including reproduction, thermo-regulation, feeding, water-orientation, locomotion etc.

(e) To build up a level of trained personnel for better continuity of the project through trainings imparted at the project-sites and through the erstwhile Central Crocodile Breeding and Management Training Institute, Hyderabad.

(f) To involve the local people intimately through the following:

- The development of a strong level of acceptance of the project by the people, by locating the projects in rural areas where people could both see and participate in the entire programme.
- Protect the immediate and long-term interests of fishermen who reside within the sanctuaries, and whose livelihood depends on fishing, by, if necessary, providing an alternative source of income that was not detrimental to the conservation aims.
- Extend the conservation programme to village-level, commercial crocodile farming, so that people could earn an income from conserving crocodiles and their habitats.

Project Sites in Odisha

During 1976, survey of (i) salt-water crocodiles and (ii) Gharial crocodiles was conducted in the river system of Bhitarkanika area and in the Mahanadi, respectively. The number of salt-water crocodiles in Bhitarkanika area was estimated to be 95, including 34 adults. The number of Gharials in Mahanadi was estimated to be 8, including 4 adults. No detailed survey was, however, conducted for Mugger crocodiles at that time, although the species occurred at several places in the State. The one breeding population of Mugger known at that time was in the Balimela Dam in Koraput district.

The Crocodile Project started with the objective of building the population to a stage when incidence of sighting could be 5 to 6 crocodiles per KM length of water. The Project sought to make up the natural losses by death and predation through rear and release operation. This involved collection of eggs from the nests as soon as these were laid, incubation and hatching of these eggs in hatcheries under regulated conditions of temperature and humidity, rearing the young juveniles, marking and release of the young crocodiles into Nature in protected areas, and assessment of the degree of success in restocking any protected area with crocodiles released from the hatcheries. To accomplish these tasks, 3 separate research units were established at Tikarpara, Dangmal and Ramatirtha for the Gharial, Salt Water Crocodile and the Mugger, respectively. At the Nandankanan Biological Park, captive breeding plans for all three species were pursued.

'BAULA' PROJECT AT DANGAMAL

'Baula' is the Oriya term for Saltwater Crocodile. At Dangmal in Bhitarkanika sanctuary, salt-water crocodile eggs have been collected locally; and young crocodiles have been released in the creeks and the estuaries; and more than 2200 crocodiles have been released in phases since 1977.

This operation has been reasonably successful and the crocodile population in the Bhitarkanika river system has gradually been built up. Above 50 released female Saltwater Crocodiles have bread successfully and are laying eggs in the wild.

The annual census conducted in the river systems of Bhitarkanika wildlife sanctuary in Jan.2004 indicated that there were 1308 Saltwater crocodiles and the crocodile population is on increasing trend.

MUGGER PROJECT AT RAMATIRTHA

The Ramatirtha center, meant for Mugger crocodiles, initially started with eggs and juveniles of Mugger procured from Tamilnadu. Since 1984 breeding of Muggers and the release of young ones into the nature in Similipal have been carried out, and so far more than 600 crocodiles have been released in Similipal.

Census was conducted to ascertain the population status of Mugger crocodiles in the prominent rivers/waterbodies inside the Similipal. The river wise census results have been indicated below.

The census results indicate the followings:

- In West Deo river, two stretches namely UBK-Patbil and Kandadhenu-Lower Barhakamuda hold 27 out of 42 (64.28%) of total muggers in about 15 km of the river.

STATUS AND TREND OF BUSHMEAT HARVEST

- Bush meat harvesting is illegal in India
- Occasional cases of illegal hunting cannot be ruled out
- No categorical survey has been carried out so far
- Studies conducted so far indicate hunting of:
- Galliformes
- Porcupine
- Wild Boar
- Amphibians and Reptiles
- Deer
- Hares
- Turtles
- Pangolins

- In river Khairi, the stretches between Jenabil and Ransa, about 15 km long,hold 13 (65%) out of 20 Muggers.

This is the situation/trend continuing since late 1980s during which regular monitoring of the crocodiles has been carried out.

River and size / length wise distribution of Crocodiles-2004.

GHARIAL PROJECT AT TIKARPADA

At Tikarpara, Gharial eggs were obtained at different points of time from Narayani and Kali rivers in Nepal and Chambal sanctuary in Madhya Pradesh, Rajasthan and Uttar Pradesh. The eggs collected from Mahanadi were infertile. Some hatchlings of Gharial were obtained from eggs incubated in Royal Chitwan National Park of Nepal and Katarniyaghat sanctuary in Uttar Pradesh. All Gharials reared at Tikarpara and those produced from captive breeding at Nandankanan zoo, numbering more than 700, were released in the river Mahanadi between Boudh and Katrang.

One of the assessments of the rear and release operation in respect of Gharials was made during December, 1987 - January, 1988, when only 25 Gharials were found to be surviving in the entire stretch of the river Mahanadi and down stream of Hirakud Reservoir over a length of 400 Kms. In January, 2003 census, one male and two female Gharials were sighted / counted in and outside of the sanctuary, respectively. A study was carried out to assess the reasons for poor survival of the Gharial in Mahanadi. For increasing the Gharial population to more viable levels it is absolutely essential to minimize fishing and navigation at least on certain stretches of the river. It has been under consideration to rehabilitate Gharials in Mahanadi up-stream of Hirakud reservoir, and some stretches of the river Brahmani.

The census conducted in winter-2004 in the river system of Mahanadi within the limits of Satkosia Gorge Sanctuary indicated survival only one male Gharial (3-3.5m length). This Gharial was located between Binikei and Majhipada of the river Mahanadi / SatkosiaGorge.

PROJECT RHINO

Among the grave threats faced by the greater one-horned rhinoceros today is the uneven population distribution along its home range. Kaziranga National Park in the northeast Indian state of Assam is home to more than 1800 individuals, about three quarters of the world's greater one-horned rhinoceros population distributed in India and Nepal. Chitwan National Park in Nepal has the second-largest population of about 400 individuals, which is less than one-fourth of the Kaziranga population.

Conservationists are wary of this situation and liken it to the "all eggs in one basket" syndrome, since the survival of the species is more or less pegged on the wellbeing of the Kaziranga rhino population.

For long-term conservation of the species, the need to expand its distribution is the unanimous assertion. New population of rhinos have been established in Bardia National Park and Suklaphanta Wildlife Reserve in Nepal and in Dudhwa National Park in India. Manas National Park in western part of Assam along the Indo-Bhutan border also offers an ideal location for this conservation venture. Once home to about 100 rhinos, Manas lost its entire population to poachers by 2000, but still retains habitat suitable for rhino survival.

Rhino Rehabilitation Project

In February 2006, for the first time in India, the Assam Forest Department and Wildlife Trust of India-International Fund for Animal Welfare (WTI-IFAW) translocated a hand-raised rhino calf to Manas.

THREATENED ANIMALS OF INDIA

T = Threatened; R = Rare; E = Endangered; V = Vulnerable

MAMMALS		
1	Macaca silenus (L) — Lion - Tailed Macaque	E
2	Loris tardigradus (L)- Slender Loris	T
3	Hylobates hoolock (Harlan) - Hoolock Gibbon	E
4	Panthera tigris (L) - Tiger	T
5	Panthera leo persica (Meyer) Asiatic Lion	T
6	Panthera Pardus (L) Leopard or Panther	T
7	Felis bengalensis Kerr Leopard Cat	V
8	Felis temmincki: V and Horsfield Golden Cat	E
9	Felis manual Pallas Palla's Cat	R
10	Felis silverstris ornate Gravy Indian Desert Cat	R,E
11	Canis lupus (L) Wolf	E
12	Vulpes bengalensis (Shaw) Indian Fox	T
13	Ailurus fulgei)s F Cuvier Red Panda	E
14	Manis crassicaudata Gray The Indian Pangolin	T
15	Elephas maximum (L) Asian Elephant	E
16	Rhinoceros unicornis (L) The great one-horned Rhinoceros	E
17	Asinus hemionus khur (Lesson) Asiatic wild ass	E
18	Bos mutus (Przewalski) Wild Yak	R
19	Bubalus bubal is (L) Wild Buffalo	E
20	Cervus elaphus hanglu Wagner Hangul or Kasmir Stag	E
21	Antelope cervicarpa (L) Black buck .	V
22	Moschus moschiferus L Musk Deer	E
23	Gazella docras (L) Chinkara	V
BIRDS		
1	Choriotis nigriceps (Vigors) Great Indian Bustard	E
2	Grus leucogeranus Pallas Siberian Crane	T
3	Grus nigricollis Przeyalski Blacknecked Crane	E
REPTILES		
1	Chelonia mydas (L) Green Sea Turtle	T
2	Gavialis gangeticus (Gmelin) Gharial	R,T
3	Crocodylus porosus Schneider Estuarine Crocodile	T
4	Crocodylus palustris (lesson) Mugger Crocodile	T
5	Varanus bengalensis (Daudin) Common Indian Monitor	E
6	Varanus griseus (Dudin) Indian Desert Monitor	T
7	Python molurus (L) Indian Rock Python	E
8	Python reticulates (Schneider) Reticulated Python	E
AMPHIBIANS		
1	Tylototriton verrucosus Anderson Himalayan Newt	R

This marked the beginning of an ambitious project to reintroduce rhinos to Manas, where the species was driven to local extinction by poaching. WTI-IFAW's Rhino Rehabilitation Project aims to gradually repopulate rhinos in Manas, by relocating and rehabilitating orphaned or displaced hand-raised rhinos from Kaziranga National Park. This effort to repopulate rhinos in Manas is supported by the Bodoland Territorial Council and the Assam Forest Department.

Kaziranga National Park largely falls within the Brahmaputra River flood plains and gets inundated annually in the rainy season. The floods take a heavy toll on wildlife including rhinos. In addition to death by drowning and displacement on being washed away, increased rhino poaching has also been associated with these floods as the escaping animals are highly vulnerable when they move out of the park in search of higher ground.

The Centre for Wildlife Rehabilitation and Conservation (CWRC), situated near Kaziranga National Park has been rescuing displaced rhino calves since its inception in 2002. The project is a joint venture between the Assam Forest Department and WTI-IFAW.

A resident veterinarian and animal keepers look after the rescued rhino calves and other animals at CWRC. Initially housed in the stabilisation chamber for varying periods depending on the age, the rhino calves are later transferred to a spacious outdoor enclosure within the centre.

Once the captive calves stable and old enough, they are readied for their relocation to the release site in Manas for a 'soft-release'. The rhinos are screened for diseases to prevent transmission into the wild and are radio-collared to facilitate post-release monitoring. They are then transported to Manas in trucks, usually mildly sedated to prevent panic.

In Manas, a spacious boma (a temporary enclosure) spanning about 33 acres has been created at Bansbari Range. The rhinos, relocated from CWRC, are released into the boma where they are confined till they attain sexual maturity. The boma ensures protection to the calves from predators, while allowing them to acclimatise to the local environment. The rhinos in the boma have no interactions with humans except during periodical medical assessments.

After about two or three years of acclimatisation, the calves are released into the wild and are remotely monitored round-the-clock with the help of radio-transmitters.

PROJECT SNOW LEOPARD

The snow leopard, and indeed the entire Himalayan landscape and wildlife, forms part of India's unique natural heritage. Our country is gifted with a vast high altitude landscape that is endowed with tremendous biodiversity values and resident people, who have respected, understood and coexisted with wildlife here for millennia. People inhabiting this region, which mostly occurs above the cultivable zone, are primarily pastoral with limited alternatives for survival in a rather austere landscape. The coexistence of people and wildlife in these regions is now threatened due to pressures of the burgeoning human and livestock populations. Since wildlife of the region is spread across the entire landscape (but at low densities), in areas traditionally used by people also, it is important to adapt our conservation approach to suit the needs of this specific region. I am happy to note that my ministry has undertaken this effort to prepare a project after prolonged consultations with most of the important stakeholders of the region that should generate better conservation models not only for the snow leopard range, but for the country

SOCIO ECONOMIC IMPORTANCE OF BUSHMEAT

- In India meat of domesticated animals preferred over hunting of wild animals
- Large scale hunting for food subsistence uncommon in India though certain pockets indulge in such hunting
- Rare cases of socio economic dependence on meat of wild animals
- Indigenous tribes of Andaman & Nicobar Islands exercise legal hunting rights under Wild Life (Protection) Act, 1972

in general. The Project Snow Leopard initiative strives to ensure conservation in the region is based on sound science and participatory planning and implementation of programmes that balances the needs of local people and conservation.

The project proposes to put important guidelines in place, build capacity of local people and forest department staff and set up or strengthen institutions at the village, landscape, state and central levels for project design and implementation, and provide funding for implementation and subsequent monitoring. The first four years will be crucial in understanding all aspects of the project based on one site in each of the five states and the programme will then be expanded to cover the entire range.

CHIRU CONSERVATION

The Chiru or Tibetan antelope is found high up in the plains of the Tibetan Plateau extending from Lhasa in Tibet to Ladakh in India. There are estimated to be around 100,000 of these antelope left in the wild, although the animal remains the target of heavy poaching. The Chiru‚Äôs extremely fine under fleece is spun into wool known as shahtoosh and used for scarves and other high fashion accessories which can sell for prices in excess of US$50,000. Experts estimate that as many as 20,000 antelope a year are now being slaughtered. From China, they are smuggled into India and from there onto the world market. Despite the Chiru's protection under CITES and its listing as a Class I protected animal by the 1989 Chinese national law on Wild Animal Protection, the organized trade in shahtoosh continues to threaten this species with extinction.

The Tibetan antelope was listed as an Appendix II species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1975; it was moved to Appendix I in 1979, making all international trade in chiru parts and derivatives illegal. The species is currently listed as "Vulnerable" in the 1996 International Union for the Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Animals.

The Tibetan antelope is designated a Class I protected species in China, and a Schedule I species both in India and Nepal – hunting and/ or trade are prohibited in all of these countries.

In India, the chiru is listed under Schedule II of the Jammu and Kashmir Wild Life (Protection) Act; trade in Tibetan antelope products is permitted within the state. J&K is the only region in India that has an independent wildlife law and the only location in the world where shahtoosh possession and manufacture are officially legalized. Since processing of raw shahtoosh and weaving of shahtoosh products take place in J&K, the state has become a safe haven for the illegal trade.

WETLANDS AND THEIR CONSERVATION

The wetlands encompass diverse and heterogeneous assemblage of habitats ranging from lakes, estuaries, river flood plains, mangroves, coral reef and other related ecosystems. Abundance of water at least for a part of the year is the single dominant factor.

Ramsar definition

Ramsar is a city in Iran where the first World Convention on Wetlands was held on 2 February 1971. The Ramsar Convention defines wetlands as given below:

> 'Wetlands are area of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres.'

This definition talks about the maximum water depth in case of marine areas, for these to

qualify as wetlands. However, it does not indicate the same for other aquatic bodies. Therefore, it becomes difficult to classify other aquatic bodies into wetland group.

In order to prepare a status of wetlands in USA, the US Department of Interior Fish and Wildlife Service Authority adopted the following definition of Cowrdin in 1979:

> 'Wetlands are lands, transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by the shallow water.'

For the purpose of this classification, wetlands must have one or more of the following attributes.

- At least periodically the land supports predomi-nantly hydrophytes.
- The substrate is predomi-nantly undrained hydric soil.
- The substrate is non-soil and is saturated with water or covered by shallow water sometime during the growing season of each year.

This definition emphasizes three key attributes of wetlands: (1) hydrology which is a degree of flooding of soil saturation, (2) wetland vegetation (hydrophytes), and (3) hydric soils. This definition has been broadly followed as it specifies various attributes of wetlands. This definition does not contradict Ramsar's definition but only specifies the parameters to be used for identification.

Broadly speaking, wetlands are shallow water bodies in which water keeps up for most part of the year and recedes below the surface level during the dry season. The biotic community undergoes time changes from aquatic/marshy to mesophytic types. These are complex hydrological and biogeochemical systems and have been recognized as distinctly separate ecosystems between the terrestrial and aquatic ones.

Distribution

Wetlands in India are distributed in different geographical regions ranging from Himalayas to Deccan plateau. The variability in climatic conditions and changing topography is responsible for significant diversity. They are classified into different types based on their origin, vegetation, nutrient status, thermal characteristics, like

- Glaciatic Wetlands (e.g., Tsomoriri in Jammu and Kashmir, Chandertal in Himachal Pradesh),
- Tectonic Wetlands (e.g., Nilnag in Jammu and Kashmir, Khajjiar in Himachal Pradesh, and Nainital and Bhimtal in Uttaranchal),
- Oxbow Wetlands (e.g., Dal Lake, Wular Lake in Jammu and Kashmir and Loktak Lake in Manipur and some of the wetlands in the river plains of Brahmaputra and Indo-Gangetic region. Deepor Beel in Assam, Kabar in Bihar, Surahtal in Uttar Pradesh)
- Lagoons (e.g., Chilika in Orissa)
- Crater Wetlands (Lonar lake in Maharashtra)
- Salt water Wetlands (e.g., Pangong Tso in Jammu and Kashmir and Sambhar in Rajasthan)
- Urban Wetlands (e.g., Dal Lake in Jammu and Kashmir, Nainital in Uttaranchal and Bhoj in Madhya Pradesh)
- Ponds/Tanks, man-made Wetlands (e.g., Harike in Punjab and Pong Dam in Himachal Pradesh)
- Reservoirs (e.g., Idukki, Hirakud dam, Bhakra-Nangal dam)
- Mangroves (e.g., Bhitarkanika in Orissa)
- Coral reefs (e.g., Lakshadweep)
- Creeks (Thane Creek in Maharashtra), seagrasses, estuaries, thermal springs are some kinds of wetlands in the country.

Ninety-four wetlands have been identified for conservation and management under the National Programme for Conservation and Management of Wetlands. These wetlands are eligible for financial assistance on 100% grant basis to the concerned State Governments for undertaking activities like survey and

demarcation, weed control, catchment area treatment, desiltation, conservation of biodiversity, pollution abatement, livelihood support, creation of minor infrastructure, educational awareness, capacity building of various stakeholders, and community development. So far 24 States have been covered; the remaining States are expected to the covered in the Eleventh Five-Year Plan.

Benefits of Wetlands

Wetlands offer several substantive benefits. Unfortunately, they are often not fully understood. Some of the most obvious advantages are listed below.

- Life support systems.
- Winter resorts for a variety of birds for shelter and feeding.
- Suitable habitats for fish and other flora and fauna.
- Effective in flood control, waste water treatment, reducing sediment loads and recharging of aquifers.
- Valuable for their educational and scientific interest (especially their high diversity or species richness).
- Recreational benefits (swimming, diving, tourism).

Threats

Threats to wetland ecosystems comprise the increasing biotic and abiotic pressures and perils.

Biotic

- Uncontrolled siltation and weed infestation
- Uncontrolled discharge of waste water, industrial effluents, surface run-off, etc. resulting in proliferation of aquatic weeds, which adversely affect the flora and fauna
- Tree felling for fuel wood and wood products causes soil loss affecting rainfall pattern, loss of various aquatic species due to water-level fluctuation
- Habitat destruction leading to loss of fish and decrease in number of migratory birds.

Abiotic

- Encroachment resulting in shrinkage of area.
- Anthropogenic pressures resulting in habitat destruction and loss of biodiversity.
- Uncontrolled dredging resulting in successional changes.
- Hydrological intervention resulting in loss of aquifers.
- Pollution from point and non-point sources resulting in deterioration of water quality.
- Ill-effects of fertilizers and insecticides used in adjoining agricultural fields.

IMPACTS OF POPULATION AND SPECIES

- So far no distinct studies conducted to ascertain the impact of use of bush meat on the species
- Poaching/hunting more for illegal trade in parts and products than for consumption of meat .

Cardinal Constituents of Comprehensive Strategy for Wetland Conservation

The conservation and management of wetlands calls for a comprehensive strategy, ranging from legal framework and policy support to inventorization, institutional mechanism, capacity building, and community participation. The position with regard to these aspects is as follows:

Legal framework

Though there is no separate provision for specific legal instrument for wetland conservation, the legal framework for conservation and management is provided by the following legal instruments:

- Several legislations have been enacted which have relevance to wetland conservation. These include Forest Act, 1927, Forest (Conservation) Act, 1980, the Wildlife (Protection) Act, 1972, the Air (Prevention and Control of Pollution) Act, 1974, the Water Cess

Act, 1977 and the umbrella provision of Environment (Protection) Act, 1986.

- India has set up 505 Wildlife Sanctuaries and 100 National Parks, 14 Biosphere Reserves, 6 Heritage Sites, Projects on Tiger conservation and Elephant conservation and Marine Turtles conservation with the objective of effective conservation of wetlands, and floral and faunal wealth in forest areas.
- Notification declaring the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters, which are influenced by tidal action (in the landward side) up to 500 metres from the high tide line, and the land between the low tide line and the high tide line as the Coastal Regulation Zone Notification, 1991 under the provision of Environment (Protection) Act, 1986. This proposes graded restriction on setting up and expansion of industries, including pressures from human activities.
- Portions of the listed sites have been declared as Wildlife Sanctuaries and National Parks.
- Guidelines for sustainable development and management of brackish water aquaculture have been drawn up. State Governments like Andhra Pradesh and Tamil Nadu have aquaculture guidelines also at the local level.
- The Biodiversity Act, 2002, and the Biodiversity Rules, 2004, are aimed at safeguarding the floral and faunal biodiversity, and regulating their flow from the country to other countries for research and commercial use. Thus, their provisions also contribute towards conserving, maintaining, and augmenting the floral, faunal and avifaunal biodiversity of the country's aquatic bodies.

Policy Support: National Environment Policy (NEP), 2006

Our National Environment Policy (NEP), approved by the Cabinet on 19 May 2006, recognizes the numerous ecological services rendered by wetlands. The NEP states:

> 'Wetlands are under threat from drainage and conversion for agriculture and human settlements, besides pollution. This happens because public authorities or individuals having jurisdiction over wetlands derive little revenues from them, while the alternative use may result in windfall financial gains to them. However, in many cases, the economic values of wetlands' environmental services may significantly exceed the value from alternative use. On the other hand, the reduction in economic value of their environmental services due to pollution, as well as the health costs of the pollution itself, are not taken into account while using them as a waste dump. There also does not yet exist a formal system of wetland regulation outside the international commitments made in respect of Ramsar sites. A holistic view of wetlands is necessary, which looks at each identified wetland in terms of its causal linkages with other natural entities, human needs, and its own attributes.'

The Environmental Policy identifies the following six-fold Action Plan:

1. Set up a legally enforceable regulatory mechanism for identified valuable wetlands to prevent their degradation and enhance their conservation. Develop a national inventory of such wetlands.
2. Formulate conservation and prudent use strategies for each significant catalogued wetland, with participation of local communities, and other relevant stakeholders.
3. Formulate and implement eco-tourism strategies for identified wetlands through multi-stakeholder partnerships involving public agencies, local communities and investors.
4. Take explicit amount of impacts on wetlands of significant development projects during the environmental appraisal of such projects; in

particular, the reduction in eco-nomic value of wetland environmental services should be explicitly factored into cost-benefit analysis.

5. Consider particular unique wetlands as entities with 'Incomparable Values', in developing strategies for their protection.
6. Integrate wetland conservation, including conservation of village ponds and tanks, into sectoral development plans for poverty alleviation and livelihood improvement, and the link efforts for conservation and sustainable use of wetlands with the ongoing rural infrastructure development and employment generation programmes. Promote traditional techniques and practices for conserving village ponds.

MANGROOVES IN INDIA AND THEIR CONSERVATION

Mangroves are various types of trees up to medium height and shrubs that grow in saline coastal sediment habitats in the tropics and subtropics – mainly between latitudes 25° N and 25° S. The remaining mangrove forest areas of the world in 2000 was 53,190 square miles (137,760 km²) spanning 118 countries and territories. The word is used in at least three senses:(1) most broadly to refer to the habitat and entire plant assemblage or mangal, [page needed] for which the terms mangrove forest biome, mangrove swamp and mangrove forest are also used, (2) to refer to all trees and large shrubs in the mangrove swamp, and (3) narrowly to refer to the mangrove family of plants, the Rhizophoraceae, or even more specifically just to mangrove trees of the genus Rhizophora. The term "mangrove" comes to English from Spanish (perhaps by way of Portuguese), and is likely to originate from Guarani. It was earlier "mangrow" (from Portuguese mangue or Spanish mangle), but this word was corrupted via folk etymology influence of the word "grove".

The mangrove biome, or mangal, is a distinct saline woodland or shrubland habitat characterized by depositional coastal environments, where fine sediments (often with high organic content) collect in areas protected from high-energy wave action. Mangroves dominate three-quarters of tropical coastlines. The saline conditions tolerated by various mangrove species range from brackish water, through pure seawater (30 to 40 ppt (parts per thousand)), to water concentrated by evaporation to over twice the salinity of ocean seawater (up to 90 ppt).

In India, mangroves occur on the West Coast, on the East Coast and on Andaman and Nicobar Islands (see Map and Table), but in many places they are highly degraded. According to the Government of India (1987), India lost 40 percent of its mangrove area in the last century. The National Remote Sensing Agency (NRSA) recorded a decline of 7 000 ha of mangroves in India within the six-year period from 1975 to 1981. In Andaman and Nicobar Islands about 22 400 ha of mangroves were lost between 1987 and 1997.

Growing awareness of the protective, productive and social functions of tropical mangrove ecosystems has highlighted the need to conserve and manage them sustainably (FAO, 1994). This article discusses the various measures taken by the Government of India for the conservation and management of mangroves, the problems that persist in spite of these measures and some solutions to overcome them.

The article is based in part on the field experiences of the author since 1992 in the State of Goa and the Middle Andaman Islands.

NEED FOR MANGROVE CONSERVATION AND MANAGEMENT

Increasing human population in coastal areas is resulting in increased pressure on mangrove ecosystems in many countries, with the growing demand for timber, fuelwood, fodder and other non-wood forest products (NWFPs) (Saenger, Hegerl and Davie, 1983). To ensure the conservation of mangroves for environmental benefits, together with a sustainable supply of various forest and other products to meet the day-to-day requirements of local people, appropriate management of mangrove ecosystems is needed. Management can also

open new avenues for self-employment such as ecotourism, fishing, beekeeping and cottage industries based on mangrove forest products, helping to improve the socio-economic conditions of the local communities.

MANAGEMENT OF MANGROVES IN INDIA

India has a long tradition of mangrove forest management. The Sundarbans mangroves, located in the Bay of Bengal (partly in India and partly in Bangladesh), were the first mangroves in the world to be put under scientific management. The area's first management plan was implemented in 1892 (Chaudhuri and Choudhury, 1994).

More recently, the concern of the Government of India for the conservation of forests and wildlife was clearly demonstrated by a 1976 amendment to the Indian Constitution, which states that it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife.

Recognizing the importance of mangroves, the Government of India set up the National Mangrove Committee in the Ministry of Environment and Forests in 1976 to advise the government about mangrove conservation and development. In its first meeting, the panel, which consists of scientists, research scholars and experts on the mangrove ecosystem, emphasized the need to conduct a survey of the extent of existing mangrove areas within the country. The government subsequently introduced a scheme for mangrove conservation and protection, consisting of:

- identification of selected mangrove areas for conservation;
- preparation of a management plan;
- promotion of research;
- adoption of a multidisciplinary approach involving state governments, universities, research institutions and local organizations.

In 1979, the National Mangrove Committee recommended areas for research and development and for management of the mangroves, which included the following:

- nationwide mapping of the mangrove areas, preferably by remote sensing techniques coupled with land surveys, and time series to assess the rate of degradation of the ecosystems;
- quantitative surveys of area, climatic regime, rate of growth of forest trees and seasonal variations of environmental parameters;
- assessment of suitable sites for reserve forests;
- conservation programmes;
- afforestation of degraded mangrove areas;
- study of management methods, the ecology of mangroves, their flora and fauna, their microbiology and the biochemistry of organic matter and sediments.

On the basis of the National Mangrove Committee's recommendation, 15 mangrove areas were identified for conservation. The Government of India has provided guidance and financial assistance to states and Union territories for the preparation and implementation of Management Action Plans for the conservation and development of these mangrove ecosystems. Most of these plans are now being implemented. The plans broadly cover survey and demarcation, natural regeneration in selected areas, afforestation, protection measures, fencing and awareness programmes.

The government also supports research by academic institutions for development of mangrove ecosystems on a sound ecological basis. The National Forest Policy, 1988 lists effective conservation and management of natural forest ecosystems (including the mangrove ecosystem) as a priority area for forestry research.

Legislative framework

In India, a legislative framework for the conservation and management of mangroves is already in place. The Indian Forest Act, 1927 and the Wildlife (Protection) Act, 1972 provide protection to flora and fauna. Although they do

not specifically mention mangroves, these acts can also apply to the conservation of the flora and fauna of mangrove ecosystems. Since 1927, the Indian Forest Act has been applied to the mangrove forests of the Sundarbans, which have been declared as a reserved area (Naskar and Mandal, 1999).

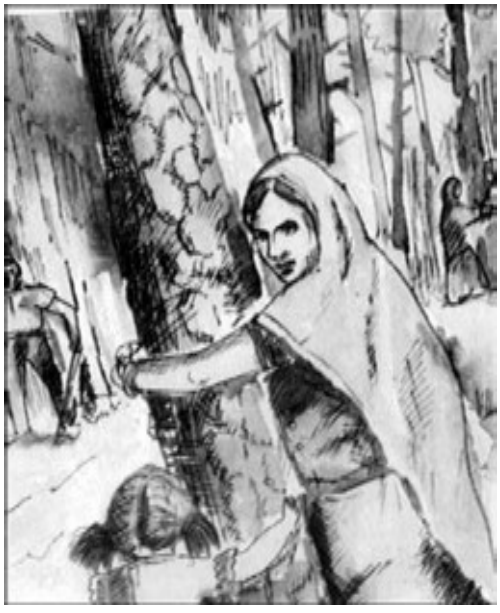
The Forest Conservation Act, 1980 states that no forest area shall be diverted for any non-forestry purpose without prior approval of the Government of India. This act has proved very effective in preventing diversion of mangrove forest areas for non-forestry purposes.

The Environment (Protection) Act, 1986 has had a crucial role in the conservation and management of mangrove ecosystems. It declares a Coastal Regulation Zone in which industrial and other activities such as discharge of untreated water and effluents, dumping of waste, land reclamation and bunding are restricted in order to protect the coastal environment. Coastal stretches are classified into four categories, and mangroves are included in the most ecologically sensitive category.

Enforcement of the legislative mandates is a prime need (Untawale, 1992).

CHIPKO MOVEMENT

The Chipko movement or Chipko Andolan is a movement that practiced the Gandhian methods of satyagraha and non-violent resistance, through the act of hugging trees to protect them from being felled. The modern Chipko movement started in the early 1970s in the Garhwal Himalayas of Uttarakhand, then in Uttar Pradesh with growing awareness of rapid deforestation. The landmark event in this struggle took place on March 26, 1974, when a group of peasant women in Reni village, Hemwalghati, in Chamoli district, Uttarakhand, India, acted to prevent the cutting of trees and reclaim their traditional forest rights, which were threatened by the contractors assigned by the state Forest Department. Their actions inspired hundreds of such actions at the grassroots level throughout the region. By the 1980s the movement had spread throughout India and led to the formulation of people-sensitive forest policies, which put a stop to the open felling of trees in regions as far as the Vindhyas and the Western Ghats. Today, it is seen as an inspiration and a precursor for Chipko movement of Garhwal.[2][3] Its leader was Sunderlal Bahuguna.



SILENT VALLEY – A PEOPLE'S MOVEMENT THAT SAVED A FOREST

Long before the Internet era, a remarkable people's movement saved a pristine moist evergreen forest in Kerala's Palakkad District from being destroyed by a hydroelectric project. The battle for the now famous Silent Valley raged for over ten years and involved thousands of people who did not even live in the vicinity of the area that was to be destroyed. Although the campaign did not have any centralized planning, it was highly effective. The sustained pressure exerted on the government by citizens using every possible means available at the time – letters to the editors of newspapers, seminars, widespread awareness programmes, and finally petitions and appeals in court and other high offices – proved ultimately successful. In 1986 Silent Valley was declared a National Park, a striking testimony to the power of peoples' action. The lessons from this inspiring and hard-fought campaign are still relevant today. Here is a gist drawn from an article by the poet Sugatha Kumari in 'Silent Valley – Whispers of Reason'.

BISHNOI MOVEMENT

In the year 1471 A.D., there was a severe drought in a village called Pipasar of Rajasthan. The drought lasted for three years. Every bit of grass and plants were chopped to feed the animals. Children starved, cattle were dying and there was not a drop of water. People left their homes to search for water. At that time, there was a man called 'Jambeshwar' who was acutely pained at the tragedy but wisely learnt a lesson. He noticed that, unlike in the past, the land was not able to withstand the destruction from the drought as a large number of trees had been felled. If life was to survive, people must understand the value of environment. He preached that the way in which we lived should be in harmony with nature and not against it. He came to be known as Guru Maharaj Jambaji. Jambaji put down his thoughts into 29 principles which are followed by his disciples who are known as Bishnois (20+9) or twentyniners. According to the religion preached by Jambaji, there was strict ban on:

- Killing of any animals or bird;
- Felling of a green tree.

The unique religion of conservation was taken up by a large number of people in Rajasthan and the number of Bishnois increased to the entire village communities. This helped to make villages greener and restore the natural ecosystems. Vegetation naturally helped to recharge the ground water.

About 300 years after this religion was founded, the soldiers of king of Jodhpur tried to cut trees in a Bishnoi village of Khejadali so that a new place may be built for the king. The Bishnois tried to reason with them and stop them but in vain. But true of their religion, the Bishnois hugged the trees to protect them. The soldiers attacked them to overcome the protest and 363 Bishnois were killed. When the king heard of this massacre and the unique religion, he was overcome by people's devotion. He ordered his men to withdraw, gave the religion state sanction and ensured that the wishes of Bishnois were respected in future.

Even today, after many generations, Bishnois continue to protect the trees and animals. One can spot a Bishnoi village easily as being more green and abundant in wildlife. The population of Black Buck, which is in the list of endangered species, is found to be in greater number in Bishnoi villages than outside.

In today's environment, when many places are facing acute shortage of water and pollution of air, land and water, we need to take a lesson from Bishnois. Conservation is a religion every human being should adopt.

NARMADA BACHAO ANDOLAN

Narmada Bachao Andolan is the most powerful mass movement, started in 1985, against the construction of huge dam on the Narmada river. Narmada is the India's largest west flowing river, which supports a large variety of people with distinguished culture and tradition ranging from the indigenous (tribal) people inhabited in the jungles here to the large number of rural population. The proposed Sardar Sarovar Dam and Narmada Sagar will displace more than 250,000 people. The big fight is over the resettlement or the rehabilitation of these people. The two proposals are already under construction, supported by US$550 million loan by the world bank. There are plans to build over 3000 big and small dams along the river.

It is a multi crore project that will generate a big revenue for the government. The Narmada Valley Development plan is the the most promised and most challenging plan in the history of India. The proponents are of the view that it will produce 1450 MW of electricity and pure drinking water to 40 million people covering thousand of villages and towns. Some of the dams have been already been completed such as Tawa and Bargi Dams. But the opponents says that this hydro project will devastate human lives and bio diversity by destroying thousand of acres of forests and agricultural land. On the other hand it will overall deprive thousands of people of their livelihood. They believe that the water and energy could be provided to the people through alternative technological means, that would be ecologically beneficial.

Led by one of the prominent leader Medha Patkar, it has now been turned into the

International protest, gaining support from NGO'S all around the globe. Protestors are agitating the issue through the mass media, hunger strikes, massive marches, rallies and the through the on screen of several documentary films. Although they have been protesting peacefully, but they been harassed, arrested and beaten up by the police several times. The Narmada Bachao Andolan has been pressurizing the world bank to withdraw its loan from the project through media.

The strong protests through out the country not only made impact on the local people but has also influenced the several famous celebrities like film star Aamir Khan , who has made open efforts to support Narmada Bachao Andolan. He said he only want that those who have been rendered homeless should be given a roof. He pleaded to the common people to take part in the moment and come up with the best possible solutions.

A NEW DAM PROPOSAL

In 2001 a new Hydro project was proposed and the "Man vs. Monkey debate" was revived. The proposed site of the dam (64.5 m high and 275 m long) is just 3.5 km downstream of the old dam site at Sairandhiri, 500 m outside the National Park boundary. The 84 km² catchment of the project area included 79 km² of the Silent Valley National Park.

The Kerala Minister for Electricity called The Pathrakkadavu dam (PHEP) an "eco-friendly alternative" to the old Silent Valley project. The PHEP was designed as a run-off-the-river project with an installed capacity of 70 MW in the first phase (105 MW eventually) and an energy generation of 214 million units (Mu) with a minimal gross storage of 0.872 million cubic metres. The claim was that the submergence area of the PHEP would be a negligible .041 km² compared to 8.30 km² submergence of the 1970s (SVHEP). However, The spectacular waterfall between the Neelikkal and Pathrakkadavu hills bordering the Silent Valley will disappear if the proposed Pathrakkadavu hydro-electric project is implemented.

During January to May 2003 a rapid Environmental Impact Assessment (EIA) was carried out during by the Thiruvananthapuram-based Environmental Resources Research Centre and its report was released in December, stating that forest lost due to the project would be just .2216 km², not including the 7.4 km approach road and land to be acquired for the powerhouse in Karapadam.

BALIYAPAL MOVEMENT

The Government of India decided to setup a missile testing range at Baliyapal in Orissa. Baliyapal become a centre of controversy because the area to be taken for the testing range area a very fertile area with thick population. The Government could not implement its decision because of the strong resistance of the people.

THE PLCHIMADA STRUGGLE

"It is a new experience for us that water becomes a market commodity. It is alien to ourhabits. To sell bottled water is unjust and anti-nature."

Veloor Swaminathan states the rationale of the struggle in these simple statements. Thestruggle against the multi-national Coca-Cola factory at Plachimada of Perumatty Panchayat in Chittoor Taluk of Palakkad district, Kerala has shown unique consistency and perseverance for the last two years. It has attracted considerable amount of international media attention and thus being projected as a symbolic model of resistance against multi-national colonization. As a result, similar struggles against Coca-Cola and the exploitation of scarce groundwater resources for its sake, is gaining momentum in Sivaganga in Tamilnadu and in Orissa. All these struggles have to be viewed in a perspective that would unveil the ruthless exploitative face of globalization and its agents, the multi-national giants. Rugmini (46), a resident of Plachimada colony, says that she does not experience any water scarcity before the company started functioning.

"We live here for the last 20 years. Before two years we need not have to go out to fetch water. But today we walk a distance of two and a half kilometers to collect two pots of water. The

Panchayath who is supposed to serve the people dose not take any action to resolve this problem".

They for more than one and a half years are agitating against the human rights violation of the factory. People representing the five most affected colonies adjacent to the factory, who belong to Eravala, Malasar tribal communities and other scheduled cast communities have been holding demonstrations and sit-in strike in front the factory for the last one and a half years. On April 22nd 2002,around2000 men, women and children dwelling around the Hindustan Coca-Cola Beverages Pvt. Ltd at Plachimada, picketed the factory and gave an ultimatum to the authorities to quit immediately. The Adivasi Gotrasabha leader Ms. C.K.Janu inaugurated the overwhelming function. The police arrested all the people participated in the function. Blockades, Dharna and Picketing were all resorted to during this continuous protest against the wrongs of the mighty by the poor and the weak.

The police accusing them of raising slogans against the multinational company, blocking the workers from entering the factory and indulging in anti-social activities, registered several cases against these poor people and their leaders. The company filed a case (OP No.11598) in the High Court demanding police protection from these 'anti- social elements'. The accused were Vilayodi Venugopal (Chairman,Adivasi Protection Council),Veloor Swaminathan (Convenor, Action Council) Subrahmanyan, Murukesan, Kochikkadu Mani,and Pazhaniswmi. But the High Court accepted a counter petition in file submitted by the Action Council explaining that they were waging a very just protest and it was their legitimate right to demonstrate in a peaceful and democratic manner. The MNC was clever enough to influence the media not to give coverage to the struggle. Obviously the news papers except a few cannot go against the interests of the MNCs like the HCC. Political parties, irrespective of their ideologies for or against globalization and WTO, have wooed their best to protect the interests of the factory depriving the basic rights and physical existence of those who elected them to power. As the days went by the national media just cannot but to give due coverage as the struggle was gaining momentum and international media attention Cases were registered one after another but it didn't affect the morale or political will of the people whatever be the financial burden it rendered.The giant factory that can literally dictate terms to political rulers, law enforcement agencies, civil servants etc., used its money power and muscle power to silence the people and it has been partly successful so much so that the police department, despite the fact that the petition by the factory for Police protection was dismissed by the high court of Kerala, has mis-informed the people that the factory has been granted police protection by the high court. There is heavy deployment of police at the gate of the factory threatening the poor people of dire consequences if any attempt is made against the smooth functioning of the factor.

SOCIAL FORESTRY IN INDIA

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Social forestry means the management and protection of forests and afforestation on barren lands with the purpose of helping in the environmental, social and rural development.

The term, social forestry, was first used in India in 1976 by The National Commission on Agriculture, Government of India. It was then that India embarked upon a social forestry project with the aim of taking the pressure off currently existing forests by planting trees on all unused and fallow land.

Social Forestry programme

Government forest areas that are close to human settlement and have been degraded over the years due to human activities needed to be afforested. Trees were to be planted in and around agricultural fields. Plantation of trees along railway lines and roadsides, and river and canal banks were carried out. They were planted in village common land, government wasteland, and Panchayat land.

Involvement of Common People

Social forestry also aims at raising plantations by the common man so as to meet

the growing demand for timber, fuel wood, fodder, etc., thereby reducing the pressure on the traditional forest area. This concept of village forests to meet the needs of the rural people is not new. It has existed through the centuries all over the country but it was now given a new character.

With the introduction of this scheme the government formally recognised the local communities' rights to forest resources, and is now encouraging rural participation in the management of natural resources. Through the social forestry scheme, the government has involved community participation, as part of a drive towards afforestation, and rehabilitating the degraded forest and common lands.

Need of Social Forestry

This need for a social forestry scheme was felt as India has a dominant rural population that still depends largely on fuelwood and other biomass for their cooking and heating. This demand for fuel wood will not come down but the area under forest will reduce further due to the growing population and increasing human activities. Yet the government managed the projects for five years then gave them over to the village panchayats (village council) to manage for themselves and generate products or revenue as they saw fit.

Types

Social forestry scheme can be categorized into groups; farm forestry, community forestry, extension forestry and agroforestry.

Farm Forestry

At present in almost all the countries where social forestry programmes have been taken up, both commercial and non commercial farm forestry is being promoted in one form or the other. Individual farmers are being encouraged to plant trees on their own farmland to meet the domestic needs of the family. In many areas this tradition of growing trees on the farmland already exists. Non-commercial farm forestry is the main thrust of most of the social forestry projects in the country today. It is not always necessary that the farmer grows trees for fuelwood, but very often they are interested in growing trees without any economic motive. They may want it to provide shade for the agricultural crops; as wind shelters; soil conservation or to use wasteland. Farm Forestry is another name for Agroforestry; a part of Social Forestry.

Community Forestry

Another scheme taken up under the social forestry programme, is the raising of trees on community land and not on private land as in farm forestry. All these programmes aim to provide for the entire community and not for any individual. The government has the responsibility of providing seedlings, fertilizer but the community has to take responsibility of protecting the trees. Some communities manage the plantations sensibly and in a sustainable manner so that the village continues to benefit. Some others took advantage and sold the timber for a short-term individual profit. Common land being everyone's land is very easy to exploit. Over the last 20 years, large-scale planting of Eucalyptus, as a fast growing exotic, has occurred in India, making it a part of the drive to reforest the subcontinent, and create an adequate supply of timber for rural communities upon the augur of 'social forestry'.

Extension Forestry

Planting of trees on the sides of roads, canals and railways, along with planting on wastelands is known as 'extension' forestry, increasing the boundaries of forests. Under this project there has been creation of wood lots in the village common lands, government wastelands and Panchayat lands.

Schemes for afforesting the degraded government forests that are close to villages are being carried out all over the country.

Agroforestry

In agroforestry, silvicultural practices are combined with agricultural crops like leguminous crop, along with orchard farming and live stock ranching on the same piece of land. In lay man language agroforestry could be understood as growing of forest tree along with agriculture crop on the same piece of land.

In a more scientific way agroforestry may be defined as a sustainable land use system that maintains or increases the total yield by combing food crop together with forest tree and live stock ranching on the same unit of land, using management practices that takes care of the social and culture characteristic of the local people and the economic and ecological condition of the local area.

Objectives of Social Forestry and Environment Wing

Social forestry, schemes that have been started all over the country have made a considerable difference in overall forest cover in a short time. Afforestation outside the conventional forest area for the benefit of rural and urban communities. The main objective is to :

- Improve the environment for protecting agriculture from adverse climatic factors,
- Increase the supply of wood fuel for domestic use, small timber for rural housing, fodder for livestock, and minor forest produce for local industries,
- Increase the natural beauty of the landscape; create recreational forests for the benefit of rural and urban population,
- Provide jobs for unskilled workers and
- Land rehabilitation
- Finally, its object is to raise the standard of living and quality of life of the rural and the urban people.

Mission

- To carry out a need based and time bound programme of afforestation with special emphasis on fuel wood and fodder development on all degraded and denuded lands/forests.
- Afforestation of abandoned jhum lands and mined areas.
- Linear strip plantation of fast growing species on sides of public roads, rivers, streams and irrigation canals.
- Afforestation on unutilized lands under State/Corporate, institutional or private ownership.
- Green belts in urban/industrial areas.
- Shelter belt (generally more extensive than the wind breaks) for the purpose of shelter from wind and sun covering areas larger than a single farm on a planned pattern.
- Farm forestry in the form of raising rows of trees on bund or boundaries of fields and individual trees in private agricultural land as well as creation of wind breaks round a farm or orchard by raising one or two lines of trees.
- Raise flowering trees and shrubs mainly to serve as recreation forests for the urban and rural population.
- Elicit people's participation involving women and young people in conservation of forests, wildlife and environment.
- Environmental awareness generation and celebration of vanamahotsava, environment day, wildlife week etc.

APPIKO MOVEMENT

The Appiko movement was a revolutionary movement based on environmental conservation in India. The Chipko movement (Hug the Trees Movement) in Uttarakhand in the Himalayas inspired the villagers of the Uttara Kannada district of Karnataka State in southern India to launch a similar movement to save their forests. In September 1983, led by Panduranga Hegde, men, women and children of Salkani "hugged the trees" in Kalase forest. (The local term for "hugging" in Kannada is appiko.) Appiko movement gave birth to a new awareness all over southern India.It is organised by Pandu Ram Hegde of Karnatka.

In 1950, forest covered more than 81 percent of Uthara Kanara district. The government, declaring this forest district a "backward" area, then initiated the process of "development". Their major industries - a pulp and paper mill, a plywood factory and a chain of hydroelectric dams constructed to harness the rivers - sprouted in the area. These industries have overexploited the forest resource, and the dams have submerged huge-forest and agricultural areas. The forest had shrunk to

nearly 25 percent of the district's area by 1980. The local population, especially the poorest groups, were displaced by the dams. The conversion of the natural mixed forests into teak and eucalyptus plantations dried up the water sources, directly affecting forest dwellers. In a nutshell, the three major p's - paper, plywood and power-which were intended for the development of the people, have resulted in a fourth p: poverty.

ADOPT-AN-ANIMAL PROGRAMME

To help involve the general public in animal conservation and raise money, the Nandankanan zoo (Orissa) started the Adopt-an-Animal programme in 2008 for all of its animals. Adopters receive a customized adoption certificate and one free entry ticket for each animal adopted. In addition, the adopter's name is displayed on a special board and a special mention made in the annual report of the zoo. Adopters can pay from Rs. 500 for a small bird to Rs. 100,000 for a tiger for a year. The zoo authorities have made available two of the most attractive sites for adoption which are the Lion Safari and Tiger Safari for which the adoption cost is Rs. 1,000,000 and Rs. 500,000 respectively. Although other zoos also have adoption programs, Nandankanan was the first zoo to get a tax exemption under section 80G of the Income Tax Act. Funds received under the program are used to support the zoo's care and services for all its inhabitants by providing quality food to meet their nutritional requirements, medical care, equipment, enclosure upgrades, and biodiversity enrichment. The parents of two students Sristi and Prakriti from Cuttack were the first to adopt, paying Rs. 4,000 to adopt a blue and yellow macaw. The State Bank of India donated Rs. 500,000 to adopt six endangered animals including a one-horned rhinoceros, white Bengal tiger, chimpanzee, and an orangutan. The Confidence Factory, near Bhubaneswar, adopted a Royal Bengal Tigress Rebati in 2012.

SOME INTERNATIONAL ORGANISATION FOR WILDLIFE CONSERVATION

International Union for Conservation of Nature

The International Union for Conservation of Nature (IUCN, Union internationale pour la conservation de la nature [UICN], in French) is an international organization dedicated to finding "pragmatic solutions to our most pressing environment and development challenges". The organization publishes the IUCN Red List of Threatened Species, which assesses the conservation status of species.

IUCN supports scientific research, manages field projects globally and brings governments, non-government organizations, United Nations agencies, companies and local communities together to develop and implement policy. IUCN is the world's oldest and largest global environmental network—a democratic membership union with more than 1,000 government and NGO member organizations, and almost 11,000 volunteer scientists in more than 160 countries. IUCN's work is supported by more than 1,000 professional staff in 60 offices and hundreds of partners in public, NGO and private sectors around the world. The Union's headquarters are located in Gland, Switzerland, near Geneva.

IUCN's stated vision is "a just world that values and conserves nature". Its mission is to "influence, encourage and assist societies throughout the world to conserve nature and to ensure that any use of natural resources is equitable and ecologically sustainable".

WORLD WIDE FUND FOR NATURE (WWF)

The World Wide Fund for Nature (WWF) is an international non-governmental organization working on issues regarding the conservation, research and restoration of the environment, formerly named the World Wildlife Fund, which remains its official name in Canada and the United States. It is the world's largest independent conservation organization with over 5 million supporters worldwide, working in more than 100 countries, supporting around 1,300 conservation and environmental projects. WWF is a foundation, in 2010 deriving 57% of funding from individuals and bequests, 17% from government sources (such as the World Bank, DFID, USAID) and 11% from corporations.

The group says its mission is "to stop the degradation of the planet's natural environment

and to build a future in which humans live in harmony with nature."[6] Currently, much of its work focuses on the conservation of three biomes that contain most of the world's biodiversity: oceans and coasts, forests, and freshwater ecosystems. Among other issues, it is also concerned with endangered species, pollution and climate change.

UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)

The United Nations Environment Programme (UNEP) is an agency of the United Nations that coordinates its environmental activities, assisting developing countries in implementing environmentally sound policies and practices. It was founded as a result of the United Nations Conference on the Human Environment in June 1972 and has its headquarters in the Gigiri neighborhood of Nairobi, Kenya. UNEP also has six regional offices and various country offices.

Its activities cover a wide range of issues regarding the atmosphere, marine and terrestrial ecosystems, environmental governance and green economy. It has played a significant role in developing international environmental conventions, promoting environmental science and information and illustrating the way those can be implemented in conjunction with policy, working on the development and implementation of policy with national governments, regional institutions in conjunction with environmental non-governmental organizations (NGOs). UNEP has also been active in funding and implementing environment related development projects.

UNEP has aided in the formulation of guidelines and treaties on issues such as the international trade in potentially harmful chemicals, transboundary air pollution, and contamination of international waterways.

The World Meteorological Organization and UNEP established the Intergovernmental Panel on Climate Change (IPCC) in 1988. UNEP is also one of several Implementing Agencies for the Global Environment Facility (GEF) and the Multilateral Fund for the Implementation of the Montreal Protocol, and it is also a member of the United Nations Development Group. The International Cyanide Management Code, a program of best practice for the chemical's use at gold mining operations, was developed under UNEP's aegis.

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES (CITES)

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

Widespread information nowadays about the endangered status of many prominent species, such as the tiger and elephants, might make the need for such a convention seem obvious. But at the time when the ideas for CITES were first formed, in the 1960s, international discussion of the regulation of wildlife trade for conservation purposes was something relatively new. With hindsight, the need for CITES is clear. Annually, international wildlife trade is estimated to be worth billions of dollars and to include hundreds of millions of plant and animal specimens. The trade is diverse, ranging from live animals and plants to a vast array of wildlife products derived from them, including food products, exotic leather goods, wooden musical instruments, timber, tourist curios and

medicines. Levels of exploitation of some animal and plant species are high and the trade in them, together with other factors, such as habitat loss, is capable of heavily depleting their populations and even bringing some species close to extinction. Many wildlife species in trade are not endangered, but the existence of an agreement to ensure the sustainability of the trade is important in order to safeguard these resources for the future.

Because the trade in wild animals and plants crosses borders between countries, the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation. CITES was conceived in the spirit of such cooperation. Today, it accords varying degrees of protection to more than 35,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs.

GREENPEACE

Greenpeace is a non-governmental environmental organization with offices in over forty countries and with an international coordinating body in Amsterdam, the Netherlands. Greenpeace states its goal is to "ensure the ability of the Earth to nurture life in all its diversity" and focuses its campaigning on world wide issues such as global warming, deforestation, overfishing, commercial whaling, genetic engineering, and anti-nuclear issues. Greenpeace uses direct action, lobbying and research to achieve its goals. The global organization does not accept funding from governments, corporations or political parties, relying on 2.9 million individual supporters and

foundation grants. Greenpeace has a general consultative status with the United Nations Economic and Social Council and is a founding member of the INGO Accountability Charter; an international non-governmental organization that intends to foster accountability and transparency of non-governmental organizations.

Greenpeace is known for its direct actions and has been described as the most visible environmental organization in the world. Greenpeace has raised environmental issues to public knowledge, and influenced both the private and the public sector. Greenpeace has also been a source of controversy; its motives and methods have received criticism and the organization's direct actions have sparked legal actions against Greenpeace activists, such as fines and suspended sentences for destroying a test plot of GMO wheat.