National Biodiversity Action Plan

Government of India
Ministry of Environment and Forests

2008

NATIONAL BIODIVERSITY ACTION PLAN

APPROVED BY THE UNION CABINET ON 6TH NOVEMBER, 2008

जहाँ है हरियाली।
वहाँ है खुशहाली।।

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT AND FORESTS

NOVEMBER 2008

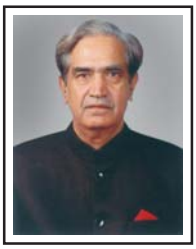
Prepared by:

Dr. Sujata Arora

Dr. J.R. Bhatt

F.No. J-22018/25/29/99-CS (BC)-Vol.(VI)

नमो नारायण मीना
Namo Narain Meena



राज्य मंत्री
पर्यावरण एवं वन
भारत सरकार
नई दिल्ली – 110 003
MINISTER OF STATE
FOR ENVIRONMENT & FORESTS
GOVERNMENT OF INDIA
NEW DELHI - 110 003

December 15, 2008

FOREWORD

Biodiversity, the natural biotic capital of the earth, is fundamental to the fulfillment of human needs and vital for the survival of this planet. Biodiversity thus is life insurance for life itself. However, biodiversity is being increasingly threatened globally on account of various factors. Human activities are also placing severe pressure on biological resources, and increasingly leading to fragmentation and degradation of habitats, and resultant loss of biodiversity. These losses are irreversible and are a threat to our own well-being.

India has a long history of conservation and sustainable use of natural resources. Formal laws, policies and programmes for conservation and sustainable utilization bio-resources date back to several decades. Over the years, India has developed a stable organizational structure and a strong legal and policy framework for protection of environment in the country.

India is also a Party to the Convention on Biological Diversity (CBD), which calls upon all Parties to prepare national biodiversity strategy and action plans for conservation and sustainable use of biological diversity. Accordingly, India had developed a 'National Policy and Macrolevel Action Strategy on Biodiversity' in 1999. The present document on National Biodiversity Action Plan has been prepared through a consultative process by revising and updating the earlier policy, so that it is in consonance with the National Environment Policy, 2006.

This document provides the framework for taking action by the multitude of stakeholders in biodiversity, including the people themselves, for achieving the three objectives of the CBD, namely conservation of biodiversity, sustainable use of its components, and fair and equitable sharing of benefits arising out of their use.

I congratulate all those who were involved in this challenging assignment. I especially wish to put on record the overall guidance and support provided by Shri Bir Singh Parsheera, Special Secretary, and the diligent and whole-hearted efforts put in by Dr. Sujata Arora, Additional Director in this endeavour.

(Namo Narain Meena)

15/12/08

बीर सिंह परशीरा
विशेष सचिव
BIR SINGH PARSHEERA
Special Secretary

पर्यावरण एवं वन मंत्रालय
MINISTRY OF ENVIRONMENT & FORESTS
भारत सरकार
GOVERNMENT OF INDIA
नई दिल्ली – 110003
NEW DELHI - 110003

PREFACE

India is an identified megadiverse country, rich in biodiversity and associated traditional knowledge. The country also has a tradition of conservation and sustainable use of its biodiversity, which has now come under pressure on account of various factors including development imperatives, habitat fragmentation, and introduction of invasive alien species. A global scientific analysis of current trends and plausible future scenarios project that biodiversity loss is likely to continue in the foreseeable time largely because the direct drivers of biodiversity loss are projected to either remain constant or to increase in the near future. This global concern about loss of biodiversity is sought to be addressed in the international Convention on Biological Diversity (CBD), to which India is a Party.

In pursuance to Article 6 of the CBD, India within five years of ratifying the Convention, had developed a National Policy and Macrolevel Action Strategy on Biodiversity in 1999. Thereafter, an externally-aided project on National Biodiversity Strategy and Action Plan (NBSAP) was also implemented in the country during 2000-2004, adopting a highly participatory process involving various stakeholders. Meanwhile, India also enacted the Biological Diversity Act in 2002, Section 36 of which empowers the Central Govt. to develop national biodiversity action plan.

After approval of the National Environment Policy (NEP) in 2006, preparation of National Biodiversity Action Plan (NBAP) was taken up by revising and updating the document prepared in 1999, and by using the final technical report of NBSAP project. The NBAP draws upon the main principal in the NEP that human beings are at the centre of concerns of sustainable development and they are entitled to a healthy and productive life in harmony with nature.

The NBAP which has been developed in consultation with various stakeholders, attempts to identify threats and constraints in biodiversity conservation. Taking cognizance of the existing legislations, implementation mechanisms, strategies, plans and programmes, action points have been designed, so as to integrate biodiversity concerns into various others sectors. The attempt has been to make the NBAP consistent with the ecological, social, cultural and economic mosaic of the country, and provide a focus and impetus to the current efforts towards biodiversity conservation.

Since the consequences of biodiversity loss are often the harshest for the subsistence of the rural poor who depend most directly and immediately upon services provided by biodiversity for their livelihoods, and who are often the least able to access or afford substitutes when these services become degraded, there is an urgent need to recognize and factor-in the contribution made by biodiversity services to poverty alleviation efforts specifically, and to national economic growth more generally. The NBAP is an important tool for translating these concerns, as well as the policies and programmes provided by the CBD, into actions. Development and implementation of the NBAP is thus central to achieving the objectives of the CBD at the national level. The intrinsic nature of biodiversity and the multiple nature of its stakeholders underline the need for securing substantial inter-sectoral coordination and for providing flexibility in timelines for implementation of the action points.

I express my appreciation for the sincere and dedicated efforts put in by Dr. Sujata Arora, Additional Director in preparation of the NBAP. I also wish to thank Dr. J.R. Bhatt, Director for his assistance and Shri A.K. Goyal, Joint Secretary for his supervision of this assignment.

Dated : 15th Dec 2008
Place : New Delhi

(Bir Singh Parsheera)

CONTENTS

CHAPTER 1

PREAMBLE

India is known for its rich heritage of biological diversity, having already documented over 91,000 species of animals and 45,500 species of plants in its ten bio-geographic regions. Nearly 6,500 native plants are still used prominently in indigenous healthcare systems. Thousands of locally-adapted crop varieties, grown traditionally since ancient times, and nearly 140 native breeds of farm livestock, continue to thrive in its diversified farming systems. The country is recognized as one of the eight Vavilovian Centres of Origin and Diversity of Crop Plants, having more than 300 wild ancestors and close relatives of cultivated plants still growing and evolving under natural conditions.

Biodiversity (comprising all the diversity observed among species, their populations and also the vast ecosystems) that we see around us today, is the outcome of over 3.5 billion years of evolutionary development, shaped by natural processes and increasingly by human influence. It sustains the web of life and we fully depend upon it to meet our food, healthcare and other needs. Conserving biodiversity is basic to our survival and well-being and using it sustainably forms part of the Indian culture and lifestyle. Biodiversity and ecosystem services provided by it contribute to poverty eradication and national development.

Biodiversity is not distributed evenly across the globe. Certain countries, lying mostly in the tropics, are characterized by high species richness and more number of endemic species. Called megadiverse countries, 17 of them formed the group of Like Minded Megadiverse Countries (LMMCs) and India was invited in 2004 to chair this group for two years. During this period, India coordinated the development of common position of LMMCs, especially for negotiations of an international regime on access and benefit sharing.

India has participated actively in all the major international events related to environment protection and biodiversity conservation over the past decades and has ratified all the major biodiversity and environment related global conventions **(Table 1)**. It played an important role in developing the agreed text for the Convention on Biological Diversity (CBD) and became a Party to it in February 1994. The three objectives of the CBD are conservation of biodiversity, sustainable use of its components, and fair and equitable sharing of benefits arising out of the use of these resources. Article 6 of the Convention calls upon the Parties to develop national biodiversity strategies and action plans. Recognising the sovereign rights of States over their natural resources, the Convention provides that access to genetic resources rests with the national governments and it is subject to national legislation (Article 15).

The Union Ministry of Environment and Forests (MoEF), the nodal agency for implementing provisions of CBD in India, developed a strategy for biodiversity conservation at macro-level in 1999 and enacted the Biological Diversity Act in 2002 followed by the Rules thereunder in 2004. There is a need now to develop and implement a suitable national action

plan for promoting biodiversity conservation, sustainable use of its components and equitable sharing of benefits arising from such use. The National Environment Policy, 2006, seeks to achieve balance and harmony between conservation of natural resources and development processes and also forms the basic framework for the National Biodiversity Action Plan.

Table 1: Major multilateral environment agreements (MEAs) ratified by India

MEAs	Year	Entry into force	Date of ratification by India	Issues covered
Convention on Wetlands of International Importance	1971	21.12.1975	11.02.1982	Conservation and wise use of wetlands, primarily as habitat for the water-birds
Convention for the Protection of World Cultural and Natural Heritage	1972	17.12.1975	04.11.1977	Protection and conservation of cultural and natural heritage
Convention on International Trade in Endangered Species	1973	01.07.1975	20.07.1976	International trade in endangered species of wild fauna and flora
Bonn Convention on Migratory Species of Wild Animals	1979	01.11.1983	01.11.1983	Conservation, management and wise use of migratory species of wild animals and their habitats
Vienna Convention for Protection of the Ozone Layer	1985	22.09.1988	18.03.1991	Protection of atmospheric ozone layer above the planetary boundary layer
Montreal Protocol on Substances that Deplete the Ozone Layer	1987	01.01.1989	19.06.1992	Protection of atmospheric ozone layer above the planetary boundary layer
Basel Convention on Transboundary Movements of Hazardous Wastes and their Disposal	1989	05.05.1992	24.06.1992	Regulation of transboundary movements of hazardous wastes and their disposal
United Nations Framework Convention on Climate Change (UNFCCC)	1992	21.03.1994	01.11.1993	Changes in the earth's climate system due to anthropogenic interference
Kyoto Protocol to the UNFCCC	1997	16.02.2005	26.08.2002	Quantified emission limitation and reduction commitments for Annex I Parties
Convention on Biological Diversity (CBD)	1992	29.12.1993	18.02.1994	Biological diversity and biological resources
Cartagena Protocol on Biosafety to the CBD	2000	11.09.2003	11.09.2003	Regulation of transboundary movement, transit, handling and use of living modified organisms (LMOs)
United Nations Convention to Combat Desertification	1994	26.12.1996	17.12.1996	Combating desertification and mitigate the effects of drought, particularly in Africa
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	1998	24.02.2004	24.05.2005	Promote shared responsibility and cooperative efforts among the Parties in the international trade of certain hazardous chemicals, in order to protect human health and the environment from potential harm and to contribute to their environmentally sound use
Stockholm Convention on Persistent Organic Pollutants	2001	17.05.2004	13.01.2006	Protect human health and the environment from persistent organic pollutants

CHAPTER 2

INTRODUCTION

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

Notwithstanding the fact that current knowledge of the number of species inhabiting the earth is still incomplete, estimates vary from 8 to 14 million species. To date, about 1.7 million species have been described while many more await discovery. India, a megadiversity country with only 2.4% of the land area, accounts for 7-8% of the recorded species of the world spread over 45,500 species of plants and 91,000 species of animals that have been documented so far **(Tables 2 & 3)**.

At the global level, 2,78,900 species of microorganisms have been described so far out of the estimated 3.75 million extant species. In India, 5,650 microbial species have been described.

A wide variety in physical features and climatic situations has resulted in a diversity of habitats and ecosystems such as forests, grasslands, mountains, wetlands, coastal and marine (mangroves and coral reefs) and deserts. India is also one of the eight primary centres of origin of cultivated plants and is an acknowledged centre of crop diversity, including about 375 closely related wild species mainly of rice, and several important pulses, millets, vegetables, fruits and fibre plants **(Table 4)**. In addition, nearly 140 breeds of domesticated animals (such as cattle, sheep, goat, camel, horse and poultry) are also found here **(Table 5)**.

Table 2: Recorded plant species

Taxonomic group	Number of species		% of world flora
	World	India	
Angiosperms	250000	17500	7.0
Gymnosperms	650	48	7.4
Pteridophytes	10000	1200	12.0
Bryophytes	14500	2850	19.7
Lichens	13500	2075	15.0
Fungi	70000	14500	20.7
Algae	40000	6500	16.3
Virus/Bacteria	8050	850	10.6
Total	**406700**	**45523**	**11.8**

Source: India's Third National Report to CBD, 2006

Table 3: Recorded animal species

Taxonomic group	Number of species		% in India
	World	India	
PROTISTA (Protozoa)	**31250**	**2577**	**8.24**
ANIMALIA			
Mesozoa	71	10	14.08
Porifera	4562	500	10.70
Cnidaria	9916	842	8.49
Ctenophora	100	12	12.00
Platyhelminthes	17500	1622	9.22
Nemertinea	600	-	-
Rotifera	2500	330	13.20
Gastrotricha	3000	100	3.33
Kinorhyncha	100	10	10.00
Nematoda	30000	2850	9.50
Nematomorpha	250	-	-
Acanthocephala	800	229	28.62
Sipuncula	145	35	24.14
Mollusca	66535	5072	7.62
Echiura	127	43	33.86
Annelida	12700	840	6.61
Onychophora	100	1	1.00
Arthropoda	**970670**	**69903**	**7.20**
Crustacea	35534	2934	8.26
Insecta	861696	61151	7.10
Arachnida	73440	5818	7.90
Pycnogonida	600	16	2.67
Pauropoda	360	-	-
Chilopoda	3000	100	3.33
Diplopoda	7500	162	2.16
Symphyla	120	4	3.33
Merostomata	4	2	50.00
Phoronida	11	3	27.27
Bryozoa (Ectoprocta)	4000	200	5.00
Entoprocta	60	10	16.66
Brachiopoda	300	3	1.00
Pogonophora	80	-	-
Priapulida	8	-	-
Pentastomida	70	-	-

Table 3: Recorded animal species (contd.)

Taxonomic group	Number of species		% in India
	World	India	
Chaetognatha	111	30	27.02
Tardigrada	514	30	5.83
Echinodermata	6223	765	12.29
Hemichordata	120	12	10.00
Chordata	**48451**	**4994**	**10.40**
Protochordata	2106	119	5.65
Pisces	21723	2546	11.72
Amphibia	5150	240	4.66
Reptilia	5817	460	7.91
Aves	9026	1232	13.66
Mammalia	4629	397	8.58
Total (Animalia)	1191208	88730	7.45
Grand Total (Protista+ Animalia)	**1222458**	**91307***	**7.46**

* Updated upto January 2007

Source: Faunal Resources of India, 2007. Zoological Survey of India

Table 4: Wild relatives of crop plants in India

Crop	Number of wild relatives
Cereals & Millets	46
Pulses	81
Fruits	91
Spices and Condiments	28
Vegetables	76
Fibre crops	15
Oilseeds	14
Miscellaneous plants	28
Total	**379**

Table 5: Indian native breeds of domesticated animals

Group	Number
Cattle	30
Buffalo	10
Sheep	42
Goat	20
Camel	9
Horse	6
Donkey	2
Poultry	18
Total	**137**

Environment protection is enshrined in the Constitution of India. Article 48-A and Article 51-A(g) of the Directive Principles of State Policy in the Constitution of India state that "the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife in the country", and it is a duty of every citizen "to protect and improve the national environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures". Under the system of democratic decentralization of responsibilities enshrined in Constitution amendment No. 73 of 1993, local bodies consisting of elected representatives, one third of whom are women, have been entrusted with the responsibility of safeguarding the local environmental capital stocks.

At the Central Government level, MoEF is the focal point for biodiversity conservation, as well as the nodal Ministry for all environment and forest related matters. Biodiversity being a multi-disciplinary subject, several other Ministries/Departments and affiliated agencies at the central and state levels are also undertaking biodiversity related programmes. At the Central level, the Ministries/Departments of Agriculture, Health, Water Resources, Rural Development, Power, Industry, New and Renewable Energy, Urban Development, Science and Technology, and others have important programmes relating to biodiversity.

India's strategy for conservation and sustainable utilization of biodiversity focuses on according special status and protection to biodiversity rich areas by declaring them as national parks, wildlife sanctuaries, biosphere reserves, and ecologically fragile and sensitive areas; diverting pressure on reserve forests by supporting alternative measures for meeting fuel wood and fodder needs of people; afforestation of degraded areas and wastelands; and creation of *ex situ* conservation facilities such as gene banks, within the overall ambit of a stable institutional framework. Conservation programmes for species such as tiger and elephant, and species-specific sanctuaries for wild and domesticated biodiversity have been established so as to strengthen conservation efforts. Setting up of zoos, botanical gardens, and captive breeding centres, and also promoting genetic mapping, gene banking and research activities on *ex situ* / *in situ* conservation, are other initiatives. Protected areas are the cornerstones of biodiversity conservation in India, and approximately 4.74% of the total geographical area of the country is already under in situ conservation of habitats and ecosystems.

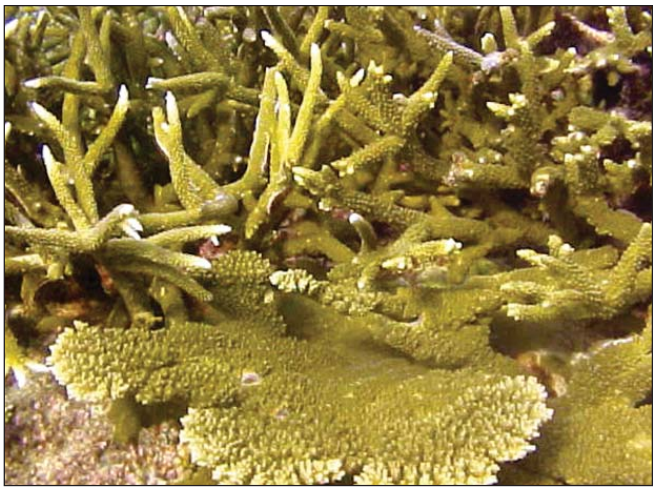
India has participated in all major international events on environment issues, since the Stockholm Conference on Human Environment and Development in 1972. The country has contributed to and ratified several key multilateral agreements on environment issues, including the Convention on Biological Diversity (CBD). Pursuant to the CBD, following a widespread consultative process, a 'National Policy and Macrolevel Action Strategy on Biodiversity' was developed in 1999 to consolidate and augment existing strategies and programmes relating to biodiversity. India has also enacted the Biological Diversity Act, 2002, which was developed through an extensive and intensive consultation process initiated in 1994. India is one of the few countries to have enacted such a legislation. This Act primarily aims at giving effect to the provisions of the Convention, including regulating access to biological resources and associated traditional knowledge so as to ensure equitable sharing of benefits arising out of their use, in accordance with the provisions of Article 15 of the CBD. The Government has also promulgated the Biological Diversity Rules in 2004.

The National Environment Policy (NEP) 2006 seeks to achieve balance and harmony between conservation and development. The policy is intended to mainstream environmental concerns in all

development activities. The dominant theme of this policy is that while conservation of environmental resources is necessary to secure livelihoods and well-being of all, the most secure basis for conservation is to ensure that people dependent on particular resources obtain better livelihoods from the fact of conservation, than from degradation of the resources. The NEP prescribes that human beings are at the centre of concerns for sustainable development and they are entitled to a healthy and productive life in harmony with nature.

The principal aim of the National Forest Policy, 1988 is to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which are vital for sustenance of all life forms, human, animal and plant. The derivation of direct economic benefit must be sub-ordinated to this principal aim. The national goal should be to have a minimum of one-third of the total land area of the country under forest or tree cover. In the hills and in mountainous regions, the aim should be to maintain two-third of the area under such cover in order to prevent erosion and land degradation and to ensure the stability of the fragile ecosystem.

India, over the past sixty years, is witness to transition from a predominantly rural based agrarian society into a diversified economy. India's planned approach to socio-economic development and poverty



eradication has underlined sustainability of natural resources. Conservation and resource management is integral to development plans. A sound environmental policy and legal framework is also in place. Recent economic liberalization policies have seen new strides in technology upgradation, cleaner fuels, efficiencies in production and environmentally sound practices. At the same time, Indian society's traditional respect for the ecology, rivers and nature continues to remain as strongly rooted as ever. The planning process also seeks to diversify the economy further into the industrial and service sectors, while accelerating the growth rate. Development has to be long-standing and inclusive, involving both the private and public sectors as partners. The national planning process emphasizes promotion of people's participatory institutions and social mobilization, particularly through women-empowerment, for ensuring the environmental sustainability of the development process. Socio-economic development consists of increase in the production, distribution, sale and consumption of food, goods and services. Planning in India seeks to increase wealth, and thereby, human welfare, and provide a safety net for the environment.

The current phase of graduated economic liberalization in India which began in 1991, proceeds hand in hand with a sustained process of political decentralization which aims at devolving works and responsibilities on culturally diverse populations to implement local development plans. Project and

programme designs for biodiversity conservation need to be predicated on socio-cultural convergence and user harmony.

A major concern now is to formulate and implement a National Biodiversity Action Plan (NBAP) taking in view the prevailing threats to biodiversity as well as challenges to the ongoing conservation efforts. The NBAP needs to be consistent with the ecological, social, cultural and economic mosaic of the country. India's cultural diversity which is closely linked with its biogeographic features, itself offers a major challenge to prepare and implement a biodiversity action plan. Preparation of NBAP is also in pursuance of Article 6a of the CBD, as well as Sections 36(1) and (3) of the Biological Diversity Act, 2002.

The process of preparing the NBAP for India was carried out by the Ministry of Environment and Forests involving wide consultations and planning with various stakeholders across the country, including an externally aided project on 'National Biodiversity Strategy and Action Plan' (NBSAP). Under the NBSAP project, 33 state level, 10 ecoregion level, 18 local level, and 13 thematic action plans were prepared. On the basis of these action plans, a final technical report of NBSAP was prepared under the project. This NBAP document is broadly based on the evaluation of existing legislations, regulatory systems, implementation mechanisms, existing strategies, plans and programmes, using the report of NBSAP project as one of the inputs. It proposes to design actions based on the assessment of current and future needs of conservation and sustainable utilization, and of physical and fiscal instruments, with particular reference to implications and impact of such instruments on short and long term basis. Considering the multidisciplinary nature of biodiversity, the actions identified in the NBAP are aimed towards integration of the three objectives of the CBD into relevant sectoral or cross-sectoral plans, programmes and policies. The NBAP takes into account ecosystem approach, where appropriate, and promotes mainstreaming of gender considerations. The challenge before India is not only to sustain the efforts of the past, but also to further consolidate the endeavour in accordance with a rational need assessment.

Chapter 3 of this NBAP document describes the major threats and constraints facing biodiversity conservation. For the purpose of addressing these threats, objectives of NBAP have been outlined in Chapter 4, followed by corresponding action points emanating from the objectives in Chapter 5. A tabulated matrix for implementation of the key activities of NBAP indicating the implementing agencies and timeframe is given in Chapter 6.

CHAPTER 3

BIODIVERSITY CONSERVATION: THREATS AND CONSTRAINTS

In the backdrop of varying socio-cultural milieu and often conflicting demands of various stakeholders, there is an urgent need for augmenting and accelerating the efforts for the conservation and sustainable use of biological diversity, and for fair and equitable sharing of benefits arising from the utilization of genetic resources. Threat to biodiversity stems mainly from habitat fragmentation; degradation and loss; shrinking genetic diversity; invasive alien species; declining forest resource base; climate change and desertification; overexploitation of resources; impact of development projects; and impact of pollution. The constraints and challenges to biodiversity conservation which flow inter alia from these threats relate to biodiversity information base; implementation of Biological Diversity Act and safeguarding traditional knowledge; new and emerging biotechnologies; economic valuation and natural resource accounting; policy, legal and administrative measures; and institutional support.

3.1 Habitat fragmentation, degradation and loss, and shrinking of genetic diversity

Habitat destruction is identified as the main threat to biodiversity. Under diverse natural conditions, over a billion people in rural and urban areas live in harmony under a democratic system in India. Their pressing needs for food, fibre, shelter, fuel and fodder combined with compelling need for economic development exert enormous pressure on natural resources. With half the total land under agriculture, and approximately 23 per cent under forests, the protection of diverse habitats poses a formidable challenge.

The loss and fragmentation of natural habitats affect all animal and plant species. We need to not only stop any further habitat loss immediately but also restore a substantial fraction of the wilderness that has been depleted in the past. Various species of plants and animals are on the decline due to habitat fragmentation and over-exploitation, e.g. habitats of Great Indian Bustard in Madhya Pradesh, Gujarat and Rajasthan, and of the Lion-tailed Macaque in Western Ghats.

The major impact of developmental activities involves diversion of forest land. Since the enactment of Forest (Conservation) Act in 1980, 11.40 lakh hectares of forest area, for about 14,997 development projects, has been approved for diversion. Against this diversion, compensatory afforestation has been stipulated for over 12.10 lakh hectares of land.

Habitat fragmentation and loss is also one of the primary reasons leading to cases of man-animal conflict. Common property resources like pastures and village forests, which served as buffer between wildlife habitat and agriculture, have been gradually encroached upon and converted into agricultural fields and habitation. Due to this, the villagers are brought into a direct conflict with wild animals. The usual cases regarding man-animal conflicts relate to leopards, elephants, tigers, monkeys, blue-bulls, wild boars and certain birds. Section 11 of the Wildlife (Protection)

Act, 1972 authorizes the Chief Wildlife Warden of a State/UT to permit the translocation/capturing/killing of a wild animal in the following circumstances:

- Schedule-I animals (elephant, tiger, leopard, etc.) only when they pose threat to human life or have become so disabled or diseased beyond recovery; and
- Other wild animals (blue bull, wild boar, monkey, etc.) when they pose threat to human life, crops and other properties or have become so disabled or diseased beyond recovery.

Sacred groves, initiatives of communities for conserving biodiversity due to their religious beliefs (India has over 19,000 sacred groves) are also getting degraded or converted to plantations. Because there are several medicinal plants and wild relatives of crop plants occurring naturally in these areas, the sacred groves need to be conserved. Traditional norms and practices for conservation of neighbourhood forests and common land are also diminishing, although certain rural and tribal communities continue to safeguard their biological resource base even at the cost of their livelihood and sustenance **(Box 1)**.

Box 1: Bishnois – Committed to Conservation

The Bishnoi tribe of Western Rajasthan has, over the centuries, protected the trees and wild animals in and around their villages. Bishnois do not cut trees for fuel and timber; they remove only the dead trunks and twigs. Spotted deer, black buck and blue bull can be seen foraging fearlessly in their fields. Even if the crop is consumed by herds of deer, the Bishnois do not chase away the animals.

In 1730 A.D. Maharaja Abhaya Singh of Jodhpur ordered cutting of trees in large numbers to provide timber for building a fortress. He sent soldiers to Bishnoi villages to cut down khejari trees growing in the area. When soldiers applied the axe, the Bishnoi villagers pleaded to spare the trees., When the soldiers did not relent, they hugged the trees and as many as 363 of them laid down their lives to save the trees.

The Bishnois worship nature in all its manifestations, conserve trees and medicinal plants, provide food and water to animals, and are vegetarians in their diet, as advocated by their Guru Jambaji.

Loss of habitats and over- exploitation have led to depletion of genetic diversity of several wild animals and cultivated plants. Shrinking genetic diversity leads to more vulnerability to diseases and pests and lesser adaptability to environmental changes. This lesson has emerged from the world-wide experience of drastically curtailed genetic diversity in agricultural biodiversity following the so-called Green and White Revolutions in agriculture-based economies, including India.

Conserving the flagship large animal species (such as the lion, tiger, rhino and elephant) has also highlighted the concern that these projects should aim at broadening the genetic base (gene pool) in breeding populations besides focusing on habitat protection. The decisive factor in saving critically endangered species is maintaining the minimum size and genetic base of inter-mating individuals rather than their total number which may include the non-breeding individuals also.

An assessment of plant genetic resources for food and agriculture illustrates this point. These resources contribute to people's livelihoods while providing food, medicine, feed for domestic animals, fibre, clothing, shelter, energy and a multiple of other products and services. India is remarkably rich in agriculturally important genetic resources. However, both the number of crops grown on commercial scale and the number of their varieties grown under different agro-ecosystems, have severely declined in recent decades reducing thereby the agricultural biodiversity maintained in diverse farming systems.

About 150 crops feed most of the human population at present, but just 12 of them provide 80% of food energy (with wheat, rice, maize and