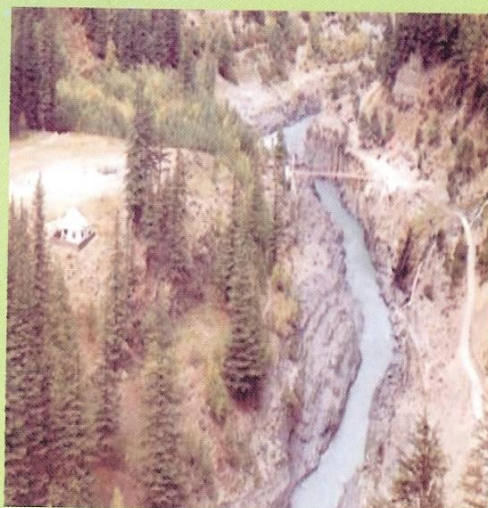


BIODIVERSITY STATUS AND INITIATIVES IN HIMACHAL PRADESH



**HIMACHAL PRADESH STATE BIODIVERSITY BOARD
STATE COUNCIL FOR SCIENCE TECHNOLOGY AND ENVIRONMENT,
HIMACHAL PRADESH, 34-SDA COMPLEX, KASUMPTI, SHIMLA - 171 009**

ABOUT HIMACHAL PRADESH STATE BIODIVERSITY BOARD

Himachal Pradesh State Biodiversity Board has been constituted by Govt. of Himachal Pradesh vide notification no. STE-A (3)-1/2004 dated 14-2-2005 in State Council for Science Technology and Environment under section 22 of the Biological Diversity Act, 2002, for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected herewith and incidental thereto in the state.

FUNCTIONS OF STATE BIODIVERSITY BOARD

1. Advise the State Govt, subject to any guidelines issued by the Ministry of Environment and Forest, GOI, New Delhi on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of the benefits arising out of the utilization of biological resources.
2. Regulate by granting of approvals or otherwise requests for commercial utilization of bio survey and bio-utilization of any biological resources by Indians.
3. Perform such other functions as may be necessary to carry out the provisions of the Biological Diversity Act, 2002 or as may be prescribed by the State Govt.

BIOLOGICAL DIVERSITY ACT, 2002

Ministry of Environment and Forests, Govt. of India, New Delhi has enacted Biological Diversity Act, 2002 and Biological Diversity Rules, 2004 for the conservation and sustainable use of the biological resource on equity and gender basis and regulation and management of biodiversity in the Country. Biological Diversity Act, 2002 envisages the formulation of various bodies for the regulation and management of biodiversity at three levels namely:

- i) National Biodiversity Authority at National Level
- ii) State Biodiversity Board at the State level.
- iii) Biodiversity Management Committees at every local body/Panchayats level in the State.

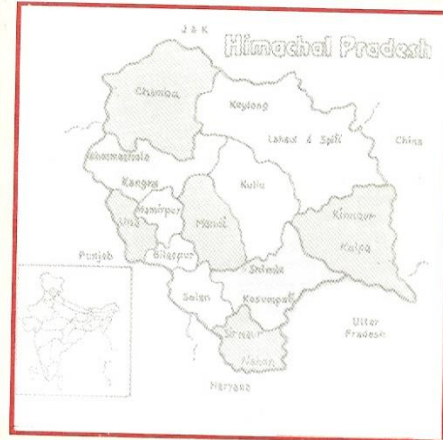
Salient Features of Biological Diversity Act, 2002 are :

- To regulate access to biological resources of the country with the purpose of securing equitable share in benefits arising out of the use of biological resources; and associated knowledge relating to biological resources.
- To conserve and sustainably use biological diversity.
- To respect and protect knowledge of local communities related to biodiversity.
- To secure sharing of benefits with local people as conservers to biological resources and holders of knowledge and information relating to the use of biological resources.
- Conservation and development of areas of importance from the stand point of biological diversity by declaring them as biological diversity heritage sites.
- Protection and rehabilitation of threatened species.
- Involvement of institutions of State Governments in the broad scheme of the implementation of the Biological Diversity Act through constitution of committees.

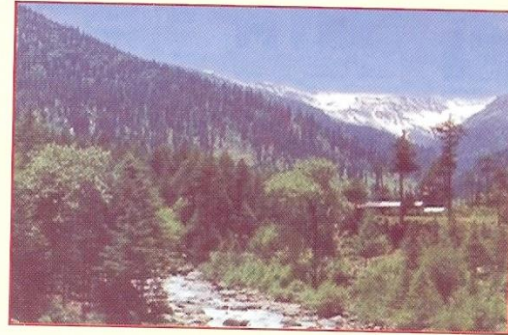
The Biological Diversity Act, 2002 lay provisions for penalties along with imprisonment for any cognizable offence committed under the Act which is as follows:

- Whoever contravenes or attempts to contravene or abets the contravention of the provisions of section 3 or section 4 or section 6 shall be punishable with imprisonment for a term which may extend to five years, or with fine which may extend to ten Lakh rupees and where the damage caused exceeds ten Lakh rupees such fine may commensurate with the damage caused, or with both.
- Whoever contravenes or attempts to contravene or abets the contravention of the provisions of section 7 or any order made under subsection (2) of section 24 shall be punishable with imprisonment for a term which may extend to three years, or with fine which may extend to five Lakh rupees, or with both.
- If any person contravenes any direction given or order made by the Central Government, the State Government, the National Biodiversity Authority or the State Biodiversity Board for which no punishment has been separately provided under this Act, he shall be punished with a fine which may extend to one Lakh rupees and in case of a second or subsequent offence, with fine which may extend to two Lakh rupees and in the case of continuous contravention with additional fine which may extend to two Lakh rupees everyday during which the default continues.

Himachal Pradesh is situated in the lap of north-western Himalaya having beautiful landscapes, lush green forests, bubbling streams, emerald meadows, enchanting lakes, eternal snows, ethnic communities and colourful people. It is bounded by Tibet in the east, Jammu and Kashmir in the north, Uttaranchal in Southeast. Haryana in the south and Punjab in the west. It is located between $30^{\circ} 22' 40''$ to $33^{\circ} 12' 40''$ North Latitude and $75^{\circ} 47' 55''$ to $79^{\circ} 04' 20''$ East Longitudes having geographical area 55,673 km² which is 1.7% of the country's area and 10.54% of the Himalayan landmass. Himachal Pradesh is a hilly state and harbours one of the richest diversity of mountain landscapes with altitude ranging from 350 msl at boundary along Punjab plains to 6816 msl at Reo-Purgial in the Zaskar range in Kinnaur.



The altitude increases from west to east and south to north. The general landscape presents an intricate mosaic of mountain ranges, hills and valleys. Important mountain ranges in the State include the Shiwaliks, Dhauladhar, Pirpanjal, Great Himalaya and the Zaskar. Separated by valleys, glens and hills, there are distinct physiographic zones which run almost parallel throughout the length of the State from west to east. The state can be divided into three main topographic regions i.e. (i) the Shiwaliks, (ii) the Lesser Himalaya and (iii) the Greater Himalaya. The climate of Himachal Pradesh varies from semi-tropical to semi-arctic from place to place depending upon the altitude of the region. Varied physiographic and climatic factors have given rise to diverse natural ecosystems, namely, forests, grasslands and pastures, rivers, lakes and wetlands, glaciers etc. which are the store house of the rich biodiversity.



WHAT IS BIODIVERSITY ?

Biodiversity or biological diversity is the variability within and between all micro-organisms plants and animals both wild and domesticated and the ecological systems which they co-exist and inhabit. It is one of the greater wealth of the planet. It starts with genes and manifests itself as organisms, species, populations and communities which lead to the formation of ecosystems, landscape and ultimately biosphere. Biodiversity manifests at three levels :

- Species Diversity - diversity among species in an ecosystem.
- Genetic Diversity - diversity of genes within a species. There is genetic variability among the populations and the individuals of the same species.
- Ecosystem diversity - diversity at higher level of organization, the ecosystem.

IMPORTANCE OF BIODIVERSITY

Biodiversity has direct consumptive value in food, agriculture, medicine and industry. Approximately 80,000 plants have been used at one time and the another in the human history of which only 150 have been cultivated on a large scale. Today 10 to 20 species provide 80-90% of food requirements of the world. At one time, nearly all medicines were derived from the biological resources. Even today, 67-70% of modern medicines are derived from natural products. In addition to food and medicines,

biodiversity provide us with many other products without which life would be difficult. Wood, fuel, fodder, clothing and shelter, material for industries are some of the examples.

Biodiversity also has aesthetic and recreational values. Biodiversity maintains ecological balance and continues evolutionary process. The indirect ecosystem services provided through biodiversity are photosynthesis, pollination, transpiration, chemical cycling, nutrient cycling, soil maintenance, climate regulation, air, water system management, waste treatment and pest control. Conservation and sustainable use of biodiversity are therefore, fundamental to ecological sustainable development. In fact, the very survival of mankind is dependent on biological diversity i.e. plants, animals and microbes.

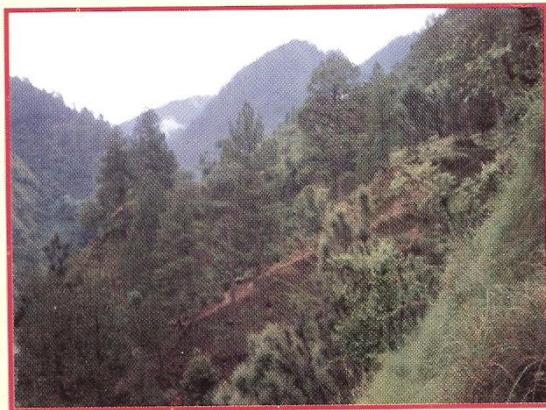
STATUS OF BIODIVERSITY IN HIMACHAL PRADESH

Himachal Pradesh is bestowed with distinctive floral and faunal biodiversity having aesthetic, cultural, commercial and genetic values. It is a mountainous state and have vast repository of flora and fauna having profuse variation in intra and inter-species levels. Variable treasures of the biological resources are because of its varied topography, geological formations, altitudinal ranges and climatic conditions. The range of biodiversity elements represented in the state varies from sub-tropical region to that of temperate, dry temperate and alpine region. 95% of the floral and faunal species available in the state are endemic and 5% of the other species existing are of exotic nature.



FLORAL DIVERSITY

Floral biodiversity in the State is described under forest vegetation, medicinal and aromatic plants, diversity in agricultural crops including unexploited and lesser known cereal crops, wild fruits and wild ornamental plants. Out of the total 47,000 plant species found in the country as many as 3295 species are reported from Himachal Pradesh. Floral wealth of the state consists of higher plants, ferns, mosses, fungi and Lichens. There are 3120 species of angiosperms, 13 species of gymnosperms and 124 pteridophytes and 38 species of orchids.



The vegetation is a blend of Ban Oak Forest, Moist Temperature Deciduous Forest, Himalayan Alpine Pastures and Rhododendron Scrub Forest. The lower ranges have the growth of blue pine while the higher altitudes have firs and spruce. Coniferous forest dominate the mid and high hills with Oaks in

depressions. In the foothills, forests are dry deciduous with Sal as the predominant species. In dry localities Chir pine occur as the dominant species.

The state is rich in medicinal herbal plant wealth and people in the villages in some pockets are dependent on the medicinal herbal plant wealth for their livelihood. By the regular extraction of the plants of medicinal and aromatic utility from the forests and alpine pastures nearly 60 species of

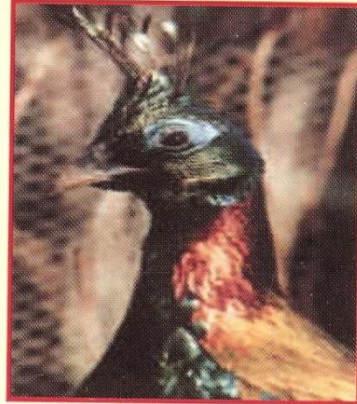
medicinal plants fall under the category of endangered species presently as per the IUCN criteria in the state.

FAUNAL DIVERSITY

The state harbours a large faunal diversity. The fauna of Himachal Pradesh is very diverse and unique. Out of 89,451 species of animals in India, the state harbors 5,721 species of the Indian fauna which shows richness of biological resources of the state considering its small geographical area, which is only 1.7% of the country. This faunal diversity includes 649 Chordates (77 Mammals, 447 Birds, 44 Amphibians and 83 Fishes), 4543 Arthropods (2 Bryozoa, 4362 Insects, 195 Arachnids, 11 Myriopods and 73 Crustaceans) and 412 others (60 Annelids, 73 Molluscs, 2 Acanthocephala, 132 Nematodes, 16 Rotifers, 90 Platyhelminthes, 2 Cnidaria, 3 Porifera and 34 Protozoans). Among



the pheasants, with increasing altitude are Kalij in the foothills, Koklas and Monal in the temperate and mid-level forests, and the Snow cock in the alpine



areas. The Western Tragopan, a rare and endangered specie, is confined only to the western Himalayas. Himachal Pradesh also has probably the largest population of Chir pheasants in the world. mammals include the Himalayan and long tailed marmots, Himalayan squirrels and voles. Among herbivores are the Ibex,

Serow, Blue sheep, Tahr, Musk deer, Ghoral and the Barking deer. A large variety of carnivores, which are either rare or of intermediate status such as Black Bear, Brown Bear, Himalayan Weasel, Yellow Throated Martin, Stone Martin and Wolf are also found here. The Common Leopard and Snow Leopard is representative of the larger cats.

SOCIAL / CULTURAL LINKAGES WITH BIODIVERSITY

Biodiversity has contributed in many ways to the development of Human culture, and, in turn, human communities have played a major role in shaping the diversity of nature at genetic, species and ecological levels. Man's relation with biodiversity is as old as the evolution of man itself. He has been dependent upon the biodiversity for fulfillment of his entire livelihood needs. The people of Himachal Pradesh, a predominantly rural and agrarian State, have very strong linkages with biodiversity. The cereals, millets, pulses, the vegetables and the fruits are all plant based. The natural forests in the area provide wood for building of houses, furniture, bridges, agricultural implements, stakes for agricultural crops in addition to providing much needed fuel wood. Fibre is also extracted from many plants. Many wild relatives of domesticated plants find home in the State and this wild



germplasm is highly sought after for development of high yielding and disease resistant domesticated crops. People are also dependent upon the native land races of livestock for agricultural purposes and their daily needs of milk, meat, wool and hide. A large proportion of this livestock feeds on the grasses and leaves of trees obtained from both wild and domesticated habitats. The leaf litter collected from the forests is used as bedding for the cattle and then applied to the agricultural fields as manure.

Many people of the state draw raw material from wild plant resources to make baskets, ropes, mats, leaf plates, artifacts, etc. to generate income. Collection and sale of medicinal plants from the wild forms another source of income to the rural people. Wild mushrooms and Guchhii (*Morchella* spp) are the sources of alternate income of the rural people which are collected from the local forest during the fruiting seasons of the fungal wealth of the state.

No religious ceremony in the State is complete without use of plants. Many plants including 'dhoop' and 'juniper' are used as incense in religious ceremonies and many others like 'bael', 'tulsi' etc. are used as offerings to the deities. Whereas 'bargad' forms the tree of choice in religious groves in the lower belts, it is 'deodar' that forms the main species in sacred groves in the higher hills. Gates bedecked with fresh leaves of local keystone species are put up to welcome guests. Such is the relevance of biodiversity to the people of the State that 'Deodar' has been adopted as the state tree, 'Rhododendron' as the state flower, 'Musk Deer' as the state animal and 'Monal' as the state bird.

NEED FOR CONSERVATION OF BIODIVERSITY

Biodiversity of Himachal Pradesh is becoming threatened due to biotic and abiotic factors in the absence of perspective strategic action plans for conservation of the biological resources. Many species have critically a low population which is further being affected by catastrophies or overexploitation leading to the elimination of species. Due to developmental activities many species of flora and fauna have been estimated to be threatened. The percentage of threatened species in the fragile mountainous region has been observed comparatively much higher in the state because of the dependence of the local people on biological resources for livelihood in the state. Survival of many valuable species of animals and birds, medicinal herbs, aquatic and domesticated floral and faunal species is at risk because of the continuous and unscientific extraction and hunting etc from their natural habitats. The situation is fast deteriorating due to continuous and indiscriminate use of chemicals as fertilizers and spray of highly toxic insecticides/ fungicides/ pesticides/ weedicides etc. in agriculture and horticulture fields, which is spoiling the soil strata as well as microbial biodiversity of the soil in the state. Introduction of exotic species are threatening the survival of local species of terrestrial and aquatic ecosystems in the state. Incidences of forest fires are causing irreparable loss to biodiversity. Some of the floral and faunal species facing threat to their existence are listed as follows :



THREATENED/ ENDANGERED FAUNA:

- Butterflies :** Freak, Scarce Siren; Golden Emperor, Broad banded Sailor, Banded Apollo, Ladakh Banded Apollo, Pale Jezebel
- Reptiles :** Common Indian Monitor, Yellow Monitor, Indian Rock Python

Birds	:	Cheer Pheasant, Monal Pheasants, Mountain Quail, Snow Cock, Tragopan, Himalayan Bearded Vulture, Himalayan Golden Eagle, Laggar Falcon
Animals	:	Himalayan Brown Bear, Snow Leopard, Himalayan Lynx, Kashmir stag, Himalayan Ibex, Himalayan Tahr etc.

THREATENED/ ENDANGERED FLORA

Atis, Chora, Singli-Mingli, Somlata, Kaur, Karu, Banhaldi, Patrala, Dhoop, Bankakri, Chukhri, Kuth, Talispatra, Mushakbala, Pushkarmool, Ratanjot, Salampanja, Jeevak, Rishbhak, Mahameda, Ravandchini, Chiraita, Rasna, Rakhal

ISSUES OF CONCERN

- * There is lack of information and awareness among the stakeholders about importance of biodiversity both wild and domesticated (existing vegetation and cultivated crops including pseudo-cereals) medicinal/aromatic herbs/plants and traditional knowledge about plant uses.
- * Unscientific methods of harvesting medicinal and aromatic plants and poor control on contractors for medicinal plants collection resulting into loss of biodiversity.
- * Lack of knowledge about the importance of sustainable minor forest produce (NTFP) development and related research.
- * Lack of adequate funds, facilities, trained manpower, long term research plans and appropriate extension facilities.
- * Poor co-ordination amongst development plan executing bodies, local communities, and research and academic institutions which is adversely affecting biodiversity conservation initiatives.
- * Transformation from joint families to a nuclear family system leading towards erosion of traditional knowledge base.
- * Human-Wildlife conflict resolution existing.
- * Use of subsidized chemicals in the form of fertilizers, pesticides, fungicides, insecticides etc. in agriculture landscapes is causing harm to soil strata and threat to micro-diversity.
- * Inadequate efforts to biodiversity enterprise based enhancement for improvement of quality of life of local communities.
- * Due to extreme and prolonged winter, heavy demand for fuel wood takes toll of existing vegetation, shrubs and perennial species along with their roots.
- * High rate of soil erosion due to wind and water in cold deserts, flash floods in rivers in Kinnaur and Lahaul leads to biodiversity loss in the area.
- * Transformation from diversified animal-crop system to a system of monocultures of Apple/Pea/Potatoes & keeping just jersey cows as compared to a variety of traditional livestock assemblage leading towards unrecoverable erosion of local genetic breed and cultural diversity.
- * Excessive grazing by domesticated and migratory animals during spring and summers also cause a great loss to biodiversity in the area.
- * Hunting is still prevalent in the state inspite of ban imposed by the Govt.
- * Traditional animal husbandry and traditional crops cultivation decreasing in the area.
- * Destruction of habitat due to the construction of large hydroelectric dams, roads and buildings, industries leading to excessive landslides causing a great threat to biodiversity.
- * Lack of understanding of traditional farming practices leading to erosion of agro-biodiversity in all agro-climatic zones.

- * Lack of policies for compensation for loss of agro-diversity due to development activities viz. roads, dams, industries etc.
- * Exotic weeds, namely Lantana camera, Ageratum, Eupatorium and Parthenium spreading rapidly in both agriculture and Govt. lands.
- * Danger to aquatic biodiversity due to developmental activities, introduction of numerous exotic fishing practices and use of chemicals.
- * Inadequate documentation of indigenous knowledge and local traditions related to conservation and use of biodiversity.
- * Inadequate information on microbial diversity and limited knowledge of beneficial microbes.
- * Loss of local animal genetic resources due to low productivity of the local breeds leading to replacement of local strains.
- * Inadequate information, co-ordination and adoption of appropriate technologies for propagation and conservation of health related bioresources.

BIODIVERSITY INITIATIVES:

- * Biodiversity Strategy and Action Plan formulated for conservation of Biodiversity of the State and Sub-State Site (Lahaul & Spiti and Kinnaur Districts).
- * Himachal Pradesh State Biodiversity Board has been constituted for conservation and regulation of biological resources in the State.
- * Draft Rules framed for the State Biodiversity Board.
- * Prepared Bibliography of Biodiversity of North-Western Himalayas with focus on Himachal Pradesh.
- * Prepared literature for awareness on biodiversity for the stakeholders.
- * Draft of Policy guidelines for conservation of Biodiversity in the State prepared.
- * People Biodiversity Registers in five Panchayats are to be prepared on pilot basis in the State.
- * Information on various facets of biodiversity being collected and collated for formulation of a database on biodiversity.
- * Conversion of Pine needles biomass into briquettes and its use as fuel in the rural areas viz a viz income generation in the state through organization of awareness cum demonstration trainings to the farmers/farmwomen, NGOs, PRIs, Self Help Groups, Mahila Manadals and IRDP families.
- * Awareness for the implementation of Biological Diversity Act, 2002 amongst the stakeholders of biodiversity is being carried out.
- * Environment friendly farm practices being popularized through demonstration trainings in the State.

For Further Information Contact :

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Compiled By : Kamraja Kaisth & Priyanka Sharma

Printed By : HP State Co-operative Development Federation Printing Press, Shimla. Ph.: 0177-2803323