

# **Green Growth and Biodiversity in Himachal Pradesh**

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# 1 Status of Biodiversity in Himachal Pradesh

Himachal Pradesh is one of the western Himalayan states. This mountainous state covers a broad altitudinal range from 350 meters above sea level (msl) to 6816 msl. The state is one of the biodiversity hotspots, has 8 forest types and 38 sub-types as per Champion and Seth's classification. The climate of Himachal Pradesh varies from semi-tropical to semi-arctic. The varied physiographic and climatic conditions have given rise to diverse natural ecosystems such as forests, grasslands and pastures, rivers, lakes, wetlands and glaciers. Himachal Pradesh is bestowed with 3295 species of plants and 5721 species animals (Kaisth and Sharma undated).

Along with the bio-climatic conditions, the biodiversity of the state is also shaped by the livelihood options followed in the state such as agriculture and livestock mixed farming system, apple orchards and pastoralism. The domesticated biodiversity in form of goats and sheeps form a remarkable feature of the state. The culture and traditional knowledge of biodiversity is demonstrated by large number of sacred forests and groves, sacred wetlands and number of other biodiversity conservation traditions associated with the livelihood practices of the local communities.

## 1.1 Protected Areas, Biodiversity rich sites and Flagship species – Himachal Pradesh

The network of protected areas (PAs) has been the nurtured as the centre of biodiversity. Hence, the status of protected areas in a state serves as an indicator for an understanding about the status of biodiversity conservation, areas of rich biodiversity and the occurrence of flagship species. The PA networks generally take into account the bio-geographic classification of the natural ecosystems. In case of Himachal Pradesh there are four distinct biogeographical zones namely Trans Himalaya (including cold desert of Lahaul and Spiti), the Great Himalayas, High and middle mountains and semi-arid zone. The total 36 PAs are distributed in these four zones where trans-Himalaya (2), Great Himalaya (17), high and middle mountains (13) and semi-arid zone (4). There are in all 5 national parks, 26 wildlife sanctuaries and 3 Conservation reserves covering 8409 sq. km and 15.11% of geographical area of Himachal Pradesh (Kaisth and Sharma undated).

## 1.2 Biodiversity Hotspot

Along with PA network the sites identified as biodiversity hotspots, heritage sites are also important in recognizing the biodiversity richness of the local sites in the states. The cold desert and the western Himalayan agro-biodiversity hotspots also cover the districts of Himachal Pradesh. In all 4 wetlands in Himachal Pradesh are identified for long term conservation planning.

### 1.3 Biodiversity Heritage Sites

Under the Biological Diversity Act, 2002 the areas that are unique ecologically fragile ecosystems - terrestrial, freshwater or marine having rich biodiversity can be declared as Biodiversity Heritage Sites. At national level the National Biodiversity Authority and at state level State Biodiversity Boards can identify and declare such areas. In Himachal Pradesh no such efforts have been made through State Biodiversity Board. But Himachal Pradesh has number of potential areas otherwise documented and studied and can be potentially identified as Biodiversity Heritage Sites. Such areas include sacred forests and forests protected through Rakha system.

### 1.4 Ramsar sites

India has 26 Ramsar Wetland Sites which are recognized for their international importance. The wetlands Chandertal, Pong dam lake and Renuka wetlands in Himachal Pradesh are recognized as Ramsar sites.

### 1.5 Important Bird Areas

An Important Bird Area (IBA) is an area recognized as being globally important habitat for the conservation of bird populations. Currently there are about 10,000 IBAs worldwide. In India there are about 465 IBAs. In Himachal Pradesh there are 24 IBAs. These IBAs harbor several threatened, restricted range, biome and congregatory species of birds in Himachal Pradesh (BNHS 1999).

## 2 Trade, Livelihood and Biodiversity

The importance of biodiversity is not only restricted to the maintenance of local ecology but it is also closely linked with the commercial use of the biological resources. There has been an extremely close association between livelihoods and the biodiversity in Himachal Pradesh. The collection of wild biodiversity such as medicinal plants in Himachal Pradesh demonstrates the direct linkage of the local communities with the biodiversity.

### 2.1 Economic Value from NTFP and Medicinal Plants

In Himachal Pradesh about 165 medicinal plant species are traded every year. The state has 24 species which are amongst the most traded 100 plants in India. The total harvest of medicinal plants is more than 2,500 tonnes. The medicinal plant trade in the state is estimated to be of INR 10 crores where the state earns about INR 40 lakhs from issuance of annual export permits and on an average this trade contributes to about INR 14000 annually to the household economy of the collector. There are about 70 pharmaceutical industries operating in the state but obviously the state also certainly caters to the outside demands (HPMPSP, 2006).

## 2.2 Status of State Biodiversity Board

In Himachal Pradesh in all 106 Biodiversity Management Committees have been established in the state by the State Biodiversity Board.

## 3 Pressures

**Forest cover change:** In case of Himachal Pradesh, there has been degradation of forests as indicated by increase of area under open forests by 4 sq. km (Forest Survey of India 2013).

**Conservation of Shiwaliks Mountains Ranges:** Shiwalik hills form a connecting chain of mountains between Himachal Pradesh and Punjab. It also serves as an important watershed catchment for Punjab. But there have been number of developmental activities taking place in this region. The eco-fragile Shiwalik Hills are being leveled for building roads and for creating urban settlements as well as industrial establishments. There is a need to assess the impacts of this developmental pressure on the forest cover, incidences of land slides, and land degradation in the region.

**Threatened, endangered flora and fauna:** Himachal Pradesh is bestowed with endemic flora and fauna. There have been number of risks to the biodiversity have already been discussed in the chapter. There is a network of protected areas for the conservation of wild for and fauna. But the wild flora and fauna are getting endangered due to loss of habitats and due to destructive harvesting of the species. The overall degradation of habitats is evident from the increase in non-forest area by 26 sq. km and increase in open forests by 4 sq km. There has been increasing pressure on the commercially valuable biological resources such as medicinal plants. The many medicinal plant species are threatened due to over harvesting. About 14 species *Dactylorhiza hatagirea*, *Ephedra gerardiana*, *Nardostachys jatamansi*, *Sassaurea costus*, *Aconitum heterophyllum*, *Angelica galuca*, *Picrorhiza kurroa*, *Podophyllum hexandrum*, *Swertia chirata*, *Atropa acuminata*, *Valeriana jatamansi*, *Cinnamomum tamala*, *Gloriosa superba* and *Rauwolfia serpentina* are recommended for ex-situ conservation due to their high commercial demand from the state (Badola, 2002).

## 4 Biodiversity and Green Growth Roadmap

As a part of Strategic Plan for Biodiversity 2011-2020 of Convention on Biological Diversity, 20 global targets have been agreed upon for the conservation and sustainable use of the biodiversity. These 20 targets are referred as Aichi Biodiversity Targets. These targets are the globally agreed response to curtail the loss of biodiversity and the countries are supposed to design national targets so as to achieve the Aichi Targets 2020. These targets are designed to achieve five strategic goals by 2020. India has subsequently developed 12 National Targets corresponding to 20 Aichi Targets. Thus, achieving the National Biodiversity Targets by India would mean that nationally, India is contributing to achieve the following 5 Strategic Goals.

**Strategic Goal A:** Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

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**Strategic Goal B:** Reduce the direct pressures on biodiversity and promote sustainable use

**Strategic Goal C:** Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

**Strategic Goal D:** Enhance the benefits to all from biodiversity and ecosystem services.

**Strategic Goal E:** Enhance implementation through participatory planning, knowledge management and capacity building

**Table 1:** Contribution of Punjab and Himachal Pradesh to the National Biodiversity Targets

Sr No	Aichi Target	National Target	Contribution of Himachal Pradesh
1	Target 1 By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	Target 1: By 2020, a significant proportion of the country's population, especially the youth, is aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	No. of Biodiversity Management Committees formed - 106
2	Target 2 - By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	Target 2: By 2020, values of biodiversity are integrated in National and State planning processes, development programmes and poverty alleviation strategies.	State PES policy objectives - (i) Provide sustained flow of ecosystem services. (ii) Facilitate an interface mechanism between ecosystem service generators and users. (iii) Incentivize ES generators for ecosystem conservation for incremental and continued flows of ecosystem services. (iv) Enable PES program in the State by identifying the necessary elements. (v) Adopt an ecosystems approach in decision making. (vi) Enable experimentation and pilots that inform and refine ES approaches, Medicinal Plants Policy - Recognition of the medicinal plant resources of the state as very important forest produce. - sizeable rural and urban populations deriving their livelihoods from this sector and significant contribution



Sr No	Aichi Target	National Target	Contribution of Himachal Pradesh
			<p>made by this sector to the State's economy.                      - enabling legislation and institutional mechanisms to develop this sector firmly in place.- the germplasm of medicinal plant diversity of the state conserved in its natural habitat.</p>
3	<p>Target 5 - By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.</p>	<p>Target 3: Strategies for reducing rate of degradation, fragmentation and loss of all natural habitats are finalized and actions put in place by 2020 for environmental amelioration and human well-being.</p>	<p>Forest policy has defined strategies of forest management by classifying forests such as Conservation, Production, Community and Urban forests.</p>
	<p>Target 15 - By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.</p>		<p>Bio-carbon project under AR-CDM project actively working, Plan State Strategy and Action on Climate Change prepared. Forest Policy has identified strategy for afforestation of open forests, wastelands, degraded forest areas marginal and private lands and plantations of seabuckthorn in cold desert areas.</p>

Sr No	Aichi Target	National Target	Contribution of Himachal Pradesh
4	Target 9 - By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	Target 4: By 2020, invasive alien species and pathways are identified and strategies to manage them developed so that populations of prioritized invasive alien species are managed.	Forest Policy - Eradication of invasive weeds with the help of appropriate technologies will be implemented and monitored in the phased manner, Networking and collaborations with research institutions, NGOs for project development and Preparation of vermi-compost from weeds
5	<p>Target 6 - By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.</p> <p>Target 7 - By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.</p> <p>Target 8 - By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.</p>	Target 5: By 2020, measures are adopted for sustainable management of agriculture, forestry and fisheries.	1) Setting up National Mahseer Fish Farm to meet the long standing demand of mahseer seed transplantation in open waters. 2) The tree species exempted from Land Preservation Act and Trade and Transit Rules will be reviewed periodically to encourage agro-forestry and farm forestry on private lands. 3) Organic farming policy to provide sustainable livelihoods to the farming community through organic farming approaches.

Sr No	Aichi Target	National Target	Contribution of Himachal Pradesh
6	<p>Target 10 - By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.</p> <p>Target 11 - By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.</p> <p>Target 12 - By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.</p>	<p>Target 6: Ecologically representative areas on land and in inland waters, as well as coastal and marine zones, especially those of particular importance for species, biodiversity and ecosystem services, are conserved effectively and equitably, on the basis of PA designation and management and other area-based conservation measures and are integrated into the wider landscapes and seascapes covering over 20% of the geographic area of the country, by 2020</p>	<p>Ramsar sites, Other important wetlands, PA number, CCAs, IBAs, Wetland Conservation and Management Rules of 2010</p>
7	<p>Target 13 - By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.</p>	<p>Target 7: By 2020, genetic diversity of cultivated plants, farm livestock and their wild relatives, including other socioeconomically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.</p>	<p>Indian Himalayan Region - Agro-biodiversity hotspot. State Organic Farming Policy formulated for conservation of agricultural practices and livelihood and food security.</p>

Sr No	Aichi Target	National Target	Contribution of Himachal Pradesh
8	Target 14 - By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	Target 8: By 2020, ecosystem services, especially those relating to water, human health, livelihoods and wellbeing, are enumerated and measures to safeguard them are identified, taking into account the needs of women and local communities, particularly the poor and vulnerable sections.	State PES policy objectives - (i) Provide sustained flow of ecosystem services. (ii) Facilitate an interface mechanism between ecosystem service generators and users. (iii) Incentivize ES generators for ecosystem conservation for incremental and continued flows of ecosystem services. (iv) Enable PES program in the State by identifying the necessary elements. (v) Adopt an ecosystems approach in decision making. (vi) Enable experimentation and pilots that inform and refine ES approaches. Use of externally aided projects (Mid Himalaya) to focus on women, indigenous and local communities, poor and vulnerable people.
9	Target 16 - By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	Target 9: By 2015, Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization as per the Nagoya Protocol are operational, consistent with national legislation.	Establishment of SBB and BMCs to execute Access and Benefit sharing of the commercially used biological resources as per National Guidelines.
10	Target 3 - By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic	Target 10: By 2020, an effective, participatory and updated national biodiversity action plan is made operational at different levels of governance.	By contributing to the National Biodiversity Action Plan

Sr No	Aichi Target	National Target	Contribution of Himachal Pradesh
	conditions.		
	Target 4 - By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.		
	Target 17 - By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.		By contributing to the National Biodiversity Action Plan
11	Target 18 - By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	Target 11: By 2020, national initiatives using communities' traditional knowledge relating to biodiversity are strengthened, with a view to protecting this knowledge in accordance with national legislations and international obligations.	Preparation of People's Biodiversity Registers is yet to begin.
12	Target 19 - By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	Target 12: By 2020, opportunities to increase the availability of financial, human and technical resources to facilitate effective implementation of the Strategic Plan for Biodiversity 2011–2020 and the national targets are identified and the	By contributing to the National Biodiversity Action Plan

Sr No	Aichi Target	National Target	Contribution of Himachal Pradesh
		Strategy for Resource Mobilization is adopted.	
	Target 20 - By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	???	???

The national targets set by India in tune with the Aichi Biodiversity Targets are aiming at aligning number of forward looking policies so as to fulfill the strategic goals at national level. For most of the targets India has a very comprehensive policy regime backed by institutional support on ground. The indicators for monitoring the progress have also been developed and are assigned to the respective organisations for follow up. But at the operational level for implementing the respective targets dealing with the complexity of governance structure, policy regime along with complexity of bio-physical conditions in the country becomes a big challenge to understand the outcome.

The case study of Himachal Pradesh becomes illustrative to understand the progress and number of issues which still require attention for implementation. Based on the analysis of Table 2, several reforms could be suggested for not only achieving the National Biodiversity Targets but also to have a sustained process of biodiversity conservation, sustainable and equitable utilization of the biological resources.

## 5 Suggested reforms to achieve contribution of HP towards national targets

### 5.1 Staff and capacities

Himachal Pradesh has responded proactively to the situation concerning its biodiversity by formulating desired policies and setting targets to achieve the objectives but there is a need to visualize and percolate the policy provisions at the implementation level. For example in case of medicinal plants, there has been a separate policy developed. This subject at state level needs to be addressed by State Medicinal Plants Board, State Biodiversity Board and State Forest Department with various objectives of the several policy provisions. Presently, there are difficulties in having a coordinated approach by these three entities to arrive at

larger objectives to be addressed by the state on medicinal plant conservation, sustainable harvesting, cultivation and developing equitable benefit sharing associated with the commercialization. Thus, there is a need of assessing the requirement of staff on the field so as to fulfill the objectives and also assess the capacities of the staff to undertake the desired activities. There are departments such as State Biodiversity Board which are poorly staffed but mandated with number of objectives as per the policy provisions. Thus, strengthening the required staff and the necessary capacities remain an important agenda for both the states.

## 5.2 New legal provisions

For implementation of policies there is a need for formulating rules and a road map for implementation. This is applicable to many newly formed policies in Himachal Pradesh such as State PES Policy, Medicinal Plant Policy, etc. Thus, there is a need of developing road map for implementation of these policies. Similarly, even mainstreaming the provisions of State Forest Policy of Himachal Pradesh would require clear road map. The Aichi targets and National targets thus become an opportunity to evolve such road maps.

## 5.3 Research gaps

The state of Himachal Pradesh has the potential to evolve research programmes to tackle the gaps in information for implementation of number of policies provisions. There could be three major areas where the states can immediately develop a collaborative research programmes with national and international agencies by involving the state and national research organisations as follows:

**a) Valuation of ecosystem services:** Himachal Pradesh has 'Payment for Ecosystem Services' policy. But there is a need to generate the necessary knowledge as defined by the policy such as Identification of Ecosystem Services (ES) and Quantification of their flows, Identification of stakeholders and their institutions, process of engagement and Institutional arrangements, Determination of types and levels of payments, Regulatory and Legal Framework, Financial Arrangements, etc.

**b) Threatened flora and fauna:** With the help of State Biodiversity Board and State Forest Departments, Himachal Pradesh can develop a mechanism to assess the conservation status of the existing flora and fauna in a participatory way. It will involve process prioritization of species for monitoring, developing baseline and developing a monitoring mechanism. The information so generated can be fed for decision making process. The prioritization of species can be revisited periodically. The instruments such as People's Biodiversity Register would be important for this recording the presence of species.

**c) Sustainable and equitable utilization of biodiversity:** The trade of biological resources such as medicinal plants is of concern to the state. There are pharmaceutical units which are dependent upon the medicinal plant sourced from the wild. But lack of data on quantities from various locations in wild along with status of availability in the wild pose a major challenge for identifying sustainable limits of harvesting. Especially in the Himachal Pradesh there is an urgent need to address these gaps. At national level, India has guidelines

for Access and Benefit sharing arising from the commercial utilization of biodiversity. Both the states need to understand how to make best use of policy regime for equitable sharing of benefits from the commercial use of biodiversity. In Himachal Pradesh there has been an established evidence of contribution of income from medicinal plant trade to the household economy. In this regard it is an important aspect for livelihoods of the local communities.

**4) Fiscal gaps:** The implementation of new programmes cannot be possible unless adequate budgetary provisions are not made. In this regard, there is a need to first assess how much extra financial resources are needed for operationalizing institutions such as State Biodiversity Board, State Medicinal Plant Board, Forest Departments so as to undertake the suitable reforms in their ongoing activities. In case of Himachal Pradesh there is no such exercise available at the state level which would analyse the budget needed for mainstreaming the biodiversity aspects in the process of Green Growth.

## 5.4 Timelines

The international and national targets have a time line of 2020. It means there is a time of six years which can be efficiently used by the states to contribute to the national targets. But more important aspect of adhering to the national policy frameworks along with the national biodiversity targets is that the impacts of the interventions evolved till 2020 will sustain its impact beyond 2020.



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