

Annual Administrative Report

2023-24



Department of Environment, Science Technology & Climate Change
Government of Himachal Pradesh

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ABOUT DEPARTMENT

The Department of Environment, Science, Technology & Climate Change was established in the state of Himachal Pradesh in April 2007 aiming to enhance the effectiveness of environmental management, safeguard vulnerable ecosystems, and promote sustainable development.



Vision:

To conserve and improve the Environment and Natural Resources of the State.

Mission:

To plan, coordinate, promote and oversee the environment conservation and enhancement programmes through environmentally compatible management practices and technologies.

Mandate of the Department

As per Rules of Business of Govt. of H.P. the mandate of the Department is divided in three parts:

(A) Environment & Pollution Control:

- a) To exercise all the powers vested under all Act and Rules pertaining to protection of environment & control of pollution. Implementation/ enforcement of all environment legislation on behalf of the State Government, which cannot be implemented by State Board, or any other agency:
 1. Water [Prevention and Control of Pollution] Act, 1974.
 2. Water [Prevention and Control of Pollution] Cess Act, 1977.
 3. Air [Prevention and Control of Pollution] Act, 1981.
 4. Environment [Protection] Act, 1986, (Rules listed below);
 5. Bio-medical Waste [Management and Handling] Rules, 1998.

6. Hazardous Waste [Management and Handling] Rules, 1989.
7. Manufacture, Storage and Import of Hazardous Chemical Rules, 1989.
8. Rules for manufacture, use, import and storage of Hazardous Microorganisms, genetically Engineered Micro-organism or Cells, 1989.
9. The Recycled Plastic Manufacture and Usage Rules, 1999.
10. The Ozone Depleting Substances [Regulation and Control] Rules, 2000.
11. The Batteries [Management and Handling] Rules, 2001.
12. The Noise Pollution [Regulation and Control] Rules, 2000.
13. The Municipal Solid Wastes [Management and Handling] Rules, 2000.
14. Nodal agency for environmental clearance.

b) To consider the validity and facts contained in the Environmental Impact Assessment and monitoring of Environment Management Plan prepared by the Project Proponents.

Other functions under environment and pollution control as follows:

1. Collection, preparation and dissemination of "Environmental Inventory" on the State Resources in particular and on the Himalayan Region in general.
2. To deal with all matters pertaining to environmental awareness among the masses, trainings, and research on the environment and pollution control.
3. Monitoring and assessment of impact of development of projects on environment.
4. Dovetailing of the environmental concerns in the development processes through Environmental Planning to ensure environmentally compatible land use and ecosystem specific conservation and sustainable use of all resources.
5. Research and Development on the environment protection and pollution control independently as well as in collaboration with premier institutions in the field of environment.
6. Inventorisation of sources of hazardous chemicals and waste, creation of database on the treatment technologies and providing consultancy for the concerned.
7. To study the likely impacts of agricultural and horticultural activities and study of "Non-Point Sources of Pollution" such as chemical fertilizers, pesticides, insecticides and other chemicals on soil and water resources, flora, fauna and communities in the State and to suggest mitigation measures/alternatives in this regard.
8. To advise the Government on the Environmental issues.
9. To examine the cases of Environment Impact Assessment and recommend the same to the Government of India.
10. Complete control of SEIA & MC, SEIAA & SEAC under EIA mechanism.
11. Monitoring of implementation of Environmental Safeguards as specified by the Government of India at the time of Environment Clearance to the various project Proponents in the State.
12. Monitoring of Pollution Control measures/ devices adopted by the various industries/proponents.
13. All matters pertaining to Natural and man-made disasters and to suggest mitigation/ remedial action plan programmes.
14. To create data bank on disaster management related to potential industrial accidents and mitigation through instruments such as Onsite and Offsite Emergency Plan and Public Liability Insurance cover etc.
15. To make coordination among the various agencies of the State Government, which are involved in environment protection and pollution control such as H.P. State Environment Protection and Pollution Control Board.
16. To deal with all matters relating to Bio-diversity, Biosphere, Mitigation and Management of Natural Disasters, Protection and Conservation of the Wetlands, Grass-lands etc.
17. To deal with all environmental education programmes, awareness programmes and to promote proactive disclosure of environment monitoring and management information by the project proponents and the regulators.
18. To deal with all matters relating to the environmental litigation with respect to aforesaid rules and regulation and Acts.
19. Formulation/ maintenance of environmental standards in respect of various pollutants in the State.
20. Natural Disaster and Climate Change.

(B) Science & Technology:

1. To develop/modify/adapt new technologies in any area relevant to the State of Himachal Pradesh.
2. To disseminate and propagate new technologies for improvement of scientific intervention in developmental needs in the State.
3. To create new databases with the use of modern technologies.
4. To develop appropriate technologies for use in the State of Himachal Pradesh.
5. Propagation of use of Space Technology to develop models for optimum use of resources that promote alternative sustainable mode of development.
6. To enhance scientific and technical capacity and infrastructure in the State.
7. To develop effective liaison with national and international scientific institutions.
8. To evolve Science & Technology Policy for The State.
9. To address issues like:- Organic Pollution, Research and Development, Clean Technologies, Carrying Capacity studies, Life cycles, Sustainable Development, Biotechnology and Genetic Engineering.
10. To direct efforts towards evolving and establishing industrial and technological linkages.
11. Establishing efficient State-wide system of scientific and technological information.
12. To promote the role and importance of science & technology in socio-economic development.
13. Promoting relevance of science towards society and enhancing gender equality in participation of S&T input.
14. Promote conclusion, linkages and networking among S&T institutions including Universities, Industry, Research and Development, NGO and the Government Sector.
15. Undertake capacity building programmes to promote emerging technologies under science popularisation programme.

(C) Biotechnology:

1. Formulation and implementation of Bio-Technology Policy in the State.
2. Strengthening of Human Resource and existing infrastructure in Biotechnology and its continuous improvement for generating skilled manpower in Biotechnology and Technological upgradation of R&D Institutes and Universities within the State.
3. Promotion of Biotechnology and Bioinformatics based activities for entrepreneurship development and employment generation in the State with emphasis on industries based on local bio-resource including forest/animal genetic resource and tissue culture.
4. Generation of resources from Government of India and international donors for promoting emerging technologies in Biotechnology.
5. Establishment of Bio-Technology incubation facilities in private/public/joint sectors.
6. Setting up of Bio-Technology parks and Bio-Technology Industrial Clusters at various locations in the State.
7. Diversification of farming through introduction of superior and disease-free improved genotypes, development of protocols and their refinement for commercial production (including medicinal and aromatic herbs, orchids, and other ornamental plants).
8. To attract small entrepreneurs and other industrial houses for making investments in Bio-Technology bases ventures in the State.
9. Development of marketing network for products based on Biotechnology at national as well as international level.
10. Establishment of Joint Venture Companies (JVCs) with private investors/other organizations with an integrated approach from laboratory to industry and market.
11. Creation of Venture Capital Fund for promotion of Biotechnology based business.
12. Setting up of facility for organic certification in the State.
13. Implementation of Rules for manufacture use, import, export and storage of hazardous micro-organisms genetically engineered organisms' cells or crops.

(D) Climate Change:

1. Support strengthening and implementation of Himachal Pradesh State Action Plan on Climate Change (SAPCC) aligning with National Goals on Climate Change and sustainable development such as Nationally Determined Contributions (NDCs) and Sustainable Development Goals (SDGs).
2. Strengthen the State Centre on Climate Change in the Himachal Council for Science, Technology & Environment and generate strategic knowledge on Climate Change with reference to the Himalayan cryosphere, agri-horti, water, and other allied sectors for informed decision making to ensure sustainable and climate resilient development in consonance with important national missions of Govt. of India on Climate Change.
3. Assess the Climate Change training needs for various departments, educational institutions, research institutions and support in capacity and skill development.
4. Provide guidance on developing various courses and curricula for educational purpose in the context of Climate Change.
5. Undertake public awareness and capacity building programme for media, youth, line departments, civil society etc. on environment and climate change issues by developing and supporting climate change knowledge portal for knowledge management, outreach and visibility.
6. Promote policy issues related to carbon neutrality (reducing emission of greenhouse gases with focus on renewable energy, energy efficiency, development of less carbon intensive urban centres, waste management, sustainable transportation network, and pollution control) with focus on equity and inclusiveness.
7. Support various line departments in development of their Action Plan on Climate Change (both adaptation and mitigation) including low carbon strategies and business models by developing sectoral roadmaps for priority sectors such as forest, water, agriculture, health, energy, power etc. and ensure integration of adaptation and mitigation aspects in sectoral/ flagship schemes and policies.
8. Advance systematic integration of Climate Change concerns into financial decision making and budgetary process in the State and facilitate adaptation planning at state and sub-state levels considering Climate Change implications.
9. Develop proposals for accessing, leveraging and mobilizing finance for climate action from various international and national sources of Climate finance e.g. Green Climate Fund, National Adaptation Fund for Climate Change (NAFCC) etc.
10. Undertake various scientific studies pertaining to research gaps and priority research needs for successful implementation of Climate Change interventions e.g. vulnerability and risk assessment, climate change adaptation and mitigation activity planning, monitoring and evaluation etc.
11. Support in sustained research and actions on Climate Change in the State. Strengthen collaboration and cooperation with international and national research institutions to support research activities in the climate sector and promote an augmentation of scientific knowledge.
12. Co-ordinate with various Central Ministries-Government of India and State line departments for all the issues related to Climate Change.
13. Monitoring and evaluation of implementation of National Action Plan on Climate Change (NAPCC) targets and State Action Plan on Climate Change (SAPCC).
14. Engage with multi-stakeholders such as NGOs, bilateral and multi-lateral agencies private sector etc. for promoting Climate Change adaptation and mitigation responses for building resilience.”.

Administration

The administrative setup of the Department of Environment, Science Technology & Climate Change consists of Minister-in-charge on the top of the hierarchy followed by the Administrative Secretary (EST&CC), Director (DEST&CC), Additional Director (DEST&CC), Chief Scientific Officer & respective heads of the divisions.

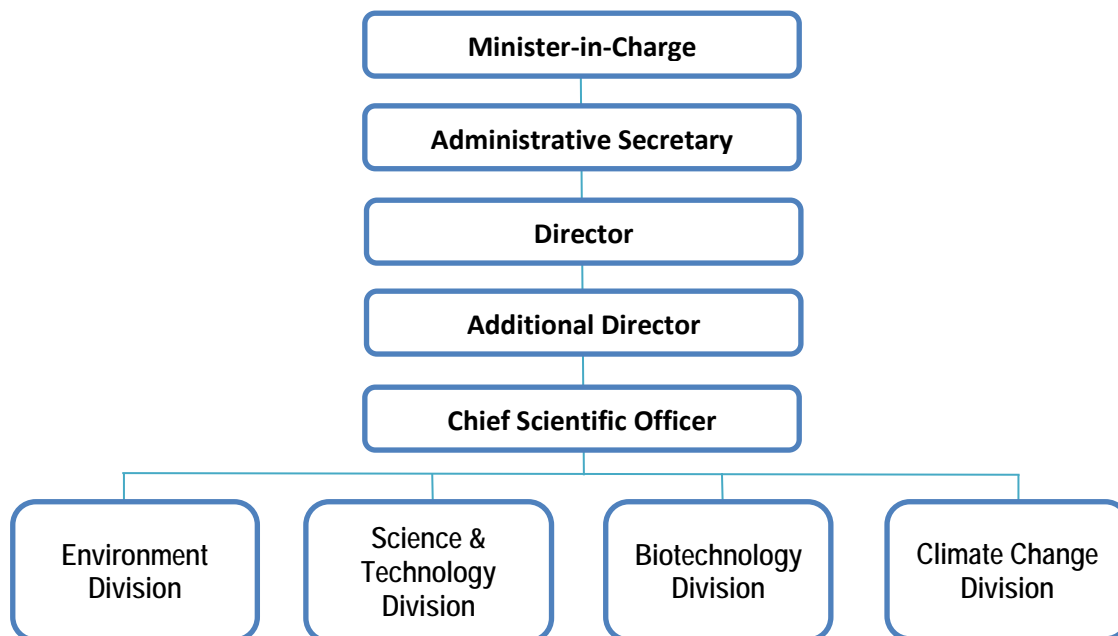


Figure 1 Administrative Setup

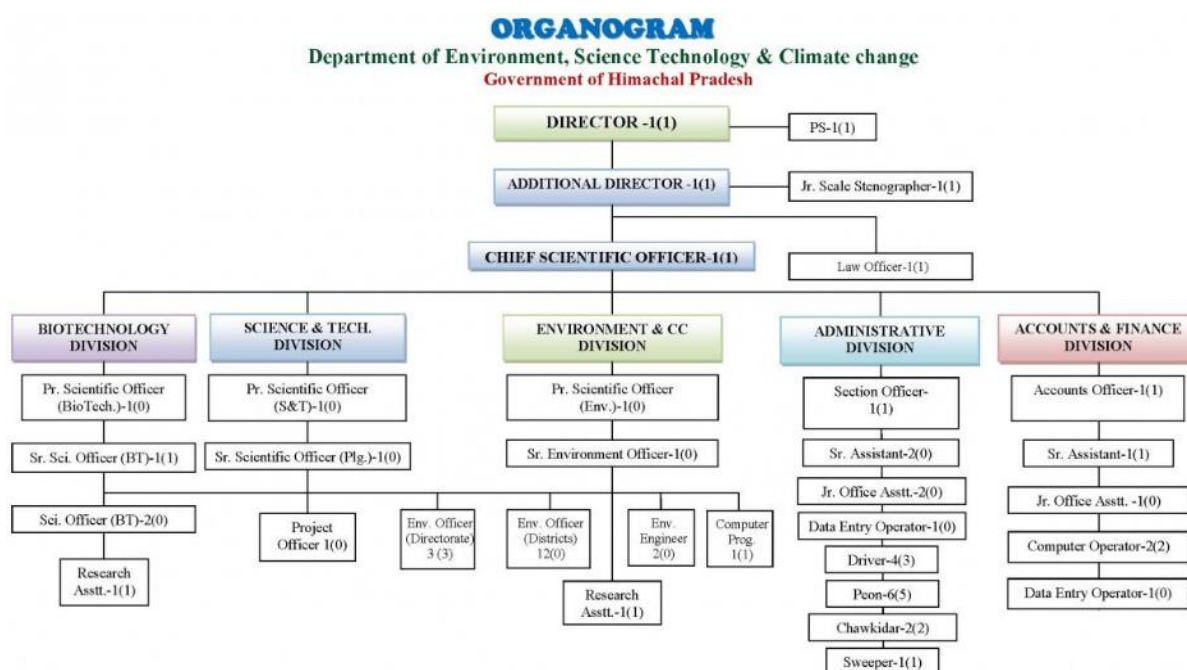


Figure 2 Organogram

Table 1 Sanctioned Posts with vacancy position as on 31.3.2024

#	Name of Posts	Sanctioned Posts	Filled	Vacant
1.	Director	1	1	-
2.	Additional Director	1	1	-
3.	Chief Scientific Officer	1	1	-
4.	Pr. Scientific Officer (BT, Env., & S&T)	3		3
5.	Sr. Environment Officer	1	-	1
6.	Sr. Scientific Officer (Plg.)	1	-	1
7.	Sr. Scientific Officer(BT)	1	-	1
8.	Project Officer	1	-	1
9.	Environment Engineer	2	-	2
10.	Scientific Officer (BT)	2	1	1
11.	Section Officer	1	1	-
12.	Accounts Officer	1	1	-
13.	Environment Officer	15	3	12
14.	Computer Programmer	1	1	-
15.	Law Officer	1	1	-
16.	Personal Assistant / Private Secretary	1	-	1
17.	Sr. Assistant	3	2	1
18.	Research Assistant	2	2	-
19.	Computer Operator	2	1	1
20.	Jr. Scale Stenographer	1	1	-
21.	Jr. Office Assistant (IT)	3	-	3
22.	Data Entry Operator	2	1	1
23.	Driver	4	3	1
24.	Peons	6	5	1
25.	Sweeper	1	1	-
26.	Chowkidar	2	2	-
	Total	60	29	31

Financial Accounts

For the financial year 2023-24, the Department of Environment, Science, Technology & Climate Change has been allocated a budget of ₹3,64,04,000. The detailed allocation of funds under both Non-Plan and Plan Heads is outlined below:

The following Heads of Account under Demand No. 4 and 19 and 32 are being operated by the Department: -

- I. 3425- 60- 001- 02 (P/NP)
- II. 3425- 60-789- 001- 02-03(SC Sub-plan)
- III. 2235-60-800-87 (NP)

The budget provision of Rs. 182.00 lacs under the MH 3425-60-001-02 (Plan), Rs 262.68 lacs under MH 3425-60-001-02 (Non Plan) and Rs. 0.38 lac under MH 2235-60-800-87 (NP) was made under the above-mentioned heads of account for meeting the expenditure on activities of the DEST&CC and Salaries, Wages, Travel Expenses, Office Expenses, Medical Reimbursement, Hospitality, Maintenance, Advt. & Publicity, Motor Vehicles against which expenditure to the tune of Rs. 353.74 lacs have been incurred by the Department during the year 2023-24.

Table 2 Final Excess & Surrender Statement in respect of Budget allocated under Non Plan head during the financial year 2023-24

SOE	Sanctioned Budget	Re-appropriation	Total Budget	Actual expenditure w.e.f. 1.4.23 to 31.3.24	Saving	Excess Expenditure	Reasons for variation
Salary	3,25,96,000	-	3,25,96,000	2,58,15,529	67,80,471	-	Due to non-release of salary for 03/24.
Wages	4,75,000	-	4,75,000	94,511	3,80,489	-	Due to less receipt of bills.
03-Traveling Expenses	9,66,000	(-) 1,00,000	8,66,000	1,53,294	7,12,706	-	Due to less meetings of SEAC & SEAA
0-5 Office Expenses	7,00,000	-	7,00,000	6,15,198	84,802	-	Due to saving in telephone & electricity expenses
06- Medical Reimbursement	5,50,000	(+) 1,00,000	6,50,000	6,49,902	98	-	Due to less receipt of bills.
09- Advt. & Publicity	1,62,000	-	1,62,000	0	1,62,000	-	Due to non-publishing of advertisements.
10- Hospitality and Entertainment	50,000	-	50,000	23,244	26,756	-	Due to less meetings of SEAC & SEAA
21-Maintenance	10,00,000	-	10,00,000	6,37,142	3,62,858	-	Due to less receipt of bills.
27-Motor Vehicle (P)	1,000	-	1,000	0	1,000	-	No new vehicle purchased.
30-Motor Vehicle (POL)	5,00,000	-	5,00,000	4,30,642	69,358	-	Due to less receipt of bills.
31- Machinery & Equipment	5,00,000	-	5,00,000	0	5,00,000	-	Due to non receipt of bills.
Total	3,75,00,000	-	3,75,00,000	2,84,19,462	90,80,538	-	-

Table 3: Final Excess and Surrender Statement in respect of Budget allocated under Plan head during the financial year 2023-24.

SOE	Sanctioned Budget	Addition	Saving	Revised Budget	Actual Expenditure w.e.f. 1.4.23 to 31.3.24	Saving	Reasons for variation
GIA- General (Non-Salary)	3,40,00,000	-	1,89,34,948	1,50,65,052	66,86,988	(-) 83,78,064	Due to availability of expenses under various projects/ programmes being run by the Department under externally aided projects, Gov funded schemes. The 03 bills amounting to rs. 20,15,200/- have not been passed by the Treasury.
TOTAL	3,40,00,000	-	1,89,34,948	1,50,65,052	66,86,988	(-) 83,78,064	-

Table 4 Final Excess and Surrender Statement in respect of Budget allocated under Plan head during the financial year 2023-24.

SOE	Sanctioned Budget	Supplementary Budget	Total Budget	Actual Expenditure w.e.f. 1.4.23 to 31.3.24	Balance	Excess Expenditure	Reasons for Variation
GIA	40,00,000	-	40,00,000	0	40,00,000	-	Bill amounting to r. 39,41,176 /- has not been passed by the treasury.
Minor Works	45,00,000	-	45,00,000	0	45,00,000		Bill amounting to r. 44,33,824 /- has not been passed by the treasury.
Maintenance	15,00,000	-	15,00,000	0	15,00,000		Bill amounting to r. 14,77,941 /- has not been passed by the treasury.
Total	1,00,00,000	-	1,00,00,000	0	1,00,00,000	-	-

Table 5 Final Excess and Surrender Statement in respect of Budget allocated under Non Plan head during the financial year 2023-24.

SOE	Sanctioned Budget	Supplementary Budget	Total Budget	Actual Expenditure w.e.f. 1.4.23 to 31.3.24	Saving	Excess Expenditure	Reasons for Variation
Medical Reimbursement	50,000	1,00,000	1,50,000	1,49,985	(-)15	-	Due to less receipt of bills.
Total	50,000	1,00,000	1,50,000	1,49,985	(-)15	-	-

LOCATION

- Himachal Pradesh is located between latitudes 30°22' to 33°12' N and longitudes 75°45' to 79°04' E.
- Altitude ranges from 350m to 6975m.
- Bordered by Jammu and Kashmir, Tibet, Uttaranchal, Haryana, and Punjab.
- Geographical area: 55,673 km² with three distinct regions: Shiwaliks (up to 1,500m), Middle Himalayan (1,500m to 3,000m), and Himadris (above 3,000m).

CLIMATE

- Three regions: Shivalik (up to 915m), Colder Zone (up to 4500m), and the axis (4500m to 5500m).
- Climate varies from semi-tropical to semi-arctic.
- Five physiographic zones based on altitude and moisture: Wet Humid Sub-temperate to dry temperate alpine highlands.

FORESTS

- Recorded forest area: 37,033 km² (66.52% of geographical area).
- Forest types: Reserved (5.13%), Protected (89%), Unclassed (5.41%).
- Forest cover: 14,679 km² (26.37% of geographical area), with very dense (3,224 km²), moderately dense (6,381 km²), and open forest (5,074 km²).
- Protected areas: 2 National Parks and 33 Wildlife Sanctuaries covering 0.76 million ha (13.65% of the state).

RIVERS & LAKES

- Major rivers: Yamuna, Satluj, Beas, Ravi, Chenab.
- Natural lakes: Khajjiar, Ghadasasu Lamba Dal, Manimahesh, Dal, Kareri, Rewalsar, Kumarwah, Prashar, Bhriagu, Dashahr, Chandratal, Surajtal, Chandra Naun, Renuka.
- Manmade lakes: Gobind Sagar, Pong, Pandoh, Chamera.



MINERAL WEALTH

Minerals: limestone, byrytes, clays, mica, iron-pyrites, salt, gypsum, slate, antimony, lead.

Distribution: Limestone in Bilaspur, Sirmaur, Kangra; Salt and Slates in Mandi; Gypsum in Sirmaur, Lahaul & Spiti, Solan; Byryte in Sirmaur; Iron ore in Mandi, Kangra; Uranium in Kullu, Hamirpur.

SOIL

Nine soil groups: alluvial, brown hill, brown earth, brown forest, grey wooded or podzolic, grey brown podzolic, planosolic, humus and iron podzols, alpine humus mountain skeletal.

Soil types by region: Brown, alluvial, grey brown podzolic in Mandi, Kangra, Bilaspur, Una, Solan, Hamirpur, Sirmaur; Grey wooded podzolic in Kullu, Shimla; Humus mountain skeletal in Kinnaur, Lahaul & Spiti, Chamba.

ADMINISTRATIVE STRUCTURE

The state of Himachal Pradesh is divided into 12 districts which are grouped into three divisions, Shimla, Kangra and Mandi. The districts are further divided into 73 subdivisions, 78 blocks and 172 Tehsils. A brief administrative structure of the State is as under:

Divisions	3
Districts	12
Tehsils/ Sub-Tehsils	172
Developmental Blocks	78
Urban Local Bodies	54
Towns	59
Gram Panchayats	3,615
Villages	20,690
Police Stations	130
Lok Sabha seats	4
Rajya Sabha seats	3
Assembly Constituencies	68

DEMOGRAPHIC TRENDS

According to the 2011 Census, the population of Himachal Pradesh is 6,856,509, with an equal distribution between males and females, each accounting for 3,473,892 individuals. Himachal Pradesh contributes 0.57% to India's total population. The state's population is predominantly rural, with 89.96% residing in rural areas and 10.04% in urban areas. The population density stands at 123 persons per square kilometer.

Scheduled tribes make up 4.02% of the population and are primarily concentrated in the districts of Chamba, Lahaul & Spiti, and Kinnaur. The decadal population growth was 907,023 in 1991-2001 and 778,609 in 2001-2011, contributing 0.5% and 0.43% to India's total growth, respectively.

In 2011, the sex ratio was 974 females per 1,000 males, an improvement from 968 females per 1,000 males in 2001. The percentage decadal growth of the population during 2001-2011 was 12.81%, down from 17.54% during 1991-2001. The population density increased from 109 persons per square kilometer in 2001 to 123 in 2011. Himachal Pradesh has the highest percentage of rural population among all Indian states.

Table 6 Population, percentage decadal growth and average annual exponential growth rate

Total Population		Percentage decadal growth		Change in percentage decadal growth	Average annual exponential growth rate	
2001	2011	1991-2001	2001-2011		1991-2001	2001-2011
60,77,900	68,56,509	71.54	12.81	-4.73	1.63	1.21

Table 7 Decadal growth of population and percentage contribution of Himachal Pradesh to total growth of India

Decadal growth of population (Absolute)		Percentage contribution to total growth of India	
1991-2001	2001-2011	1991-2001	2001-2011
9,07,023	7,78,609	0.5	0.43

The livestock population is 5.23 million (Livestock Census 2007).

OCCUPATION

Agriculture is the primary livelihood for 66.71% of the population in Himachal Pradesh. Given the predominantly hilly terrain, terraced farming is the common method of cultivation. Nearly 80% of all agricultural holdings are classified as belonging to small and marginal farmers. Over the past three decades, the state's favorable climate has spurred significant growth in fruit cultivation, horticulture, and both seasonal and off-season vegetable farming.

According to the 1991 Census, 34.41% of the total population are classified as main workers, with 63.25% of these being cultivators. Agricultural laborers constitute 2.66% of the total workforce. Despite some diversification in the agricultural economy, per worker productivity in the primary sector remains relatively low compared to other sectors.

No. of Districts	12		
No. of Towns and cities	57		
Population	60,77,900		
Population Growth rate	17.54%		
Literacy Rate	76.5%		
Total Length of Roads	31,512 km		
Apple Production	592.57 MT	Fruit Production	712.84 MT
Total Forest Area	37,033 km ²	Reserved Forests	1,896 km ²
Area under Tree cover	14,353 km ²	Sub-Alpine & Alpine Forests	2,512 km ²

Dense Forests (Crown density 40%)	8,976 km ²	Himalayan Moist Temperate Forests	4,064 km ²
Unclassed Forests	976 km ²	Mohru Oak	35 km ²
Deodar	811 km ²	Kharsu	246 km ²
Kail	809 km ²	Flowering Plants	3120 species
Chil	1436 km ²	Conifers	13 species
Ban Oak	540 km ²	Orchids	38 species

BIODIVERSITY

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

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

Dense Forests (Crown density 40%)	8,976 km ²	Himalayan Moist Temperate Forests	4,064 km ²
Unclassed Forests	976 km ²	Mohru Oak	35 km ²
Deodar	811 km ²	Kharsu	246 km ²
Kail	809 km ²	Flowering Plants	3120 species
Chil	1436 km ²	Conifers	13 species
Ban Oak	540 km ²	Orchids	38 species

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 formation, 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 percent of the floral and faunal species available in the State are endemic and 5 percent of the other species existing are of exotic nature.

FLORA AND FAUNA

- Himachal Pradesh, part of the Indian Himalayan Region (IHR), is a rich reservoir of biodiversity.
- The IHR faces threats from irrational extraction of wild medicinal herbs, endangering high-value gene stocks.
- A 2002 workshop on 'Endangered Medicinal Plant Species in Himachal Pradesh' addressed these concerns.
- According to the 2003 Forest Survey of India, forests legally cover 66.52% of Himachal Pradesh.
- Vegetation is influenced by elevation and precipitation, with high diversity in medicinal and aromatic plants, especially in the Lahaul-Spiti cold desert region.
- Known as the fruit bowl of the country, Himachal Pradesh has widespread orchards, meadows, and pastures.
- Post-winter, the hillsides and orchards bloom with wildflowers and cultivated flowers like gladiolas, carnations, marigolds, roses, chrysanthemums, tulips, and lilies.
- Himachal Pradesh Horticultural Produce Marketing and Processing Corporation Ltd. (HPMC) markets fresh and processed fruits.
- The state is home to 463 bird species, 77 mammalian species, 44 reptile species, and 80 fish species.
- Key national parks include the Great Himalayan National Park (a UNESCO World Heritage Site) and Pin Valley National Park.
- There are also 30 wildlife sanctuaries and 3 conservation reserves in the state.

Chapter-2

KEY ENVIRONMENTAL CHALLENGES - HIMACHAL PRADESH

Himachal Pradesh is experiencing rapid development, but if these activities are not conducted scientifically, they can lead to significant environmental degradation. The importance of controlling environmental pollution is heightened by the fact that the entire state lies within the Himalayan region—one of the most ecologically and environmentally fragile areas in the world.

The state's fragile mountain ecology and vulnerable hill environment are under increasing threat from various pressures, including population growth, infrastructure development, urbanization, industrialization, mega hydro power projects, mining, tourism, deforestation, and excessive agricultural and horticultural activities.



Himachal Pradesh faces unique environmental challenges due to its sensitive and highly biodiverse ecosystem. It is imperative that the state pursues development without compromising its pristine environment. Climate change and biodiversity loss are two major planetary environmental threats that are closely interlinked. To preserve the state's Himalayan heritage, concerted efforts are needed to address these challenges through sustainable environmental management practices.



Himachal Pradesh is characterized by diverse soils, climates, biodiversity, and ecological regions. As a developing economy, the state relies heavily on its natural resources. However, excessive exploitation of these resources is depleting the very foundation that sustains its growth.

Today, Himachal Pradesh faces critical environmental challenges, particularly the nexus between environmental degradation and economic

growth. These challenges impact the state's environmental resources, including air, land, water, flora, and fauna. Addressing these issues is essential to ensuring a sustainable future for the region.

To a large extent, the environmental degradation is caused by:

- Population growth
- Inappropriate technologies
- Poverty
- Intensive agriculture
- Polluting industries
- Unplanned urbanization

Environmental degradation exacerbates poverty by directly impacting essential resources such as soil fertility, water quality and quantity, air, forests, wildlife, and fisheries. Recognizing this challenge, the country has been divided into agro-climatic, agro-ecological, and agro-meteorological zones. This classification allows for more targeted planning and implementation of programs and measures at the local level, addressing the specific environmental and agricultural needs of each zone.

SECTORAL OVERVIEW

The Government of Himachal Pradesh has prepared & adopted Environment Master Plan to integrate environmental concerns into the state's development planning across various economic sectors over a thirty-year period, using a sectoral approach. The EMP assesses and analyzes all three primary sectors—infrastructure, natural resources management, and services—providing sectoral guidelines for each. These sectors are further divided into subcategories, which include the sub-sectors of infrastructure, natural resources management, and services.

Infrastructure

- ✓ Roads, Highways, rural roads and Transport
- ✓ Hydropower (generation, transmission & distribution)
- ✓ Tourism, Eco-tourism+ Art, Architecture and cultural heritage
- ✓ Industry
- ✓ Mining & Geology
- ✓ Irrigation & Public Health
- ✓ Health
- ✓ Market Infrastructure (including horticulture and agriculture)
- ✓ Rural and Urban Planning

Natural Resources Management (NRM)

- ✓ Agriculture
- ✓ Horticulture
- ✓ Animal Husbandry Livestock
- ✓ Forests, Wildlife and Wetlands
- ✓ Fisheries

Services

- ✓ Education and Vocational Training
- ✓ IT and Telecom
- ✓ Livelihoods
- ✓ Waste Disposal

The vulnerability assessment in Himachal Pradesh has been conducted both sectorally and geographically. Geographical vulnerability is assessed at the tehsil and district levels for the years 2011, 2021, 2031, and 2041. Sectoral vulnerability is evaluated at the tehsil level across various aspects, including water, air, land, natural critical habitats, climate change, hazard susceptibility, areas of spatial conflict, and quality of life indicators such as health and education.

HP'S DEVELOPMENT STRATEGY

In response to concerns about preserving social cohesion and the pristine environmental heritage of Himachal Pradesh, the state is committed to pursuing environmentally and socially sustainable development. To achieve this, Himachal Pradesh is formulating policies for its key revenue-generating sectors—hydropower, tourism, and industry—while also focusing on rural development, as the majority of the population resides in rural areas and relies on natural resources for their livelihoods.

A central aspect of the state's development strategy is the active involvement of its citizens in the change process. Stakeholders have been consulted on a wide range of development issues, ensuring that policies are crafted to promote growth that is both environmentally friendly and aligned with the needs of the people.

Between 2011 and 2014, the World Bank supported Himachal Pradesh in promoting environmentally and socially sustainable development in the hydropower, tourism, and industrial sectors, as well as in watershed development. This collaboration helped the state establish the institutions and policies necessary to ensure that these key sectors

grow and develop with a strong emphasis on environmental considerations, laying the foundation for long-term, sustainable development.

2.1 Sustainable Hydropower

Hydropower is the largest source of revenue for Himachal Pradesh, which holds a quarter of India's total hydropower potential. The state's adoption of environmentally and socially responsible hydropower policies aims to ensure the sustainable development of its hydropower resources well into the future.

Over the years, hydropower development has brought significant benefits to Himachal Pradesh, including electricity, roads, and much-needed development, particularly in remote mountain communities. As a result, all of the state's villages are now fully electrified, making Himachal Pradesh a power surplus state. The sale of electricity has become the state's largest revenue source.

Recognizing the potential environmental impacts of hydropower development on its fragile ecosystem, and considering the needs of communities living near project sites, Himachal Pradesh introduced its Hydro Power Policy in 2006. This policy is designed to ensure that hydropower development is conducted in an environmentally and socially sustainable manner. As part of this approach, the state has implemented pioneering measures to mitigate potential impacts and to ensure that local communities benefit from a share of project revenues.

2.2 Sustainable Tourism

Himachal Pradesh aims to develop its tourism sector in a way that preserves its environmental and cultural heritage while maximizing benefits for local communities and enhancing the overall experience for tourists.

Tourism is a vital source of employment and revenue for the state, thanks to its unique natural and cultural assets. Despite overcrowding in some areas, the growth in tourist arrivals in Himachal Pradesh has outpaced the national average. However, challenges such as unregulated construction, congested roads, and inadequate waste disposal are threatening the very environment that attracts tourists.

To address these issues, the state seeks to balance tourism development with environmental protection, ensuring that both locals and visitors benefit from a sustainable approach to tourism.

2.3 Industry

Himachal Pradesh has introduced incentives for industries to adopt cleaner technologies and has mandated that industrial units publicly disclose their pollution status. This move aims to enhance environmental accountability and promote sustainable industrial practices.

In line with the broader national development model, Himachal Pradesh has sought to attract industries to stimulate economic growth. Since the mid-1990s, both central and state government incentives have resulted in significant industrial growth in the state, particularly in the lower regions where there is better connectivity with the plains of Punjab and Haryana and more accessible, flatter land.

2.4 Green Accounting

Traditionally, the value of forests has been assessed primarily through the revenue generated from timber sales. However, forests provide numerous crucial benefits beyond timber, including stabilizing weather patterns, preventing soil erosion, replenishing springs and rivers, supplying fodder and fuel wood to local communities, and sequestering carbon. Recognizing these broader contributions, Himachal Pradesh committed in 2014 to develop forest accounts to better understand and quantify the value of its forests.

In an innovative move, the state has embarked on a pilot project for green accounting in the Mandi district. This initiative aims to place a monetary value on the diverse services and benefits provided by forests. By creating detailed forest accounts, policymakers will be able to:

Measure Usage: Track how forest resources are utilized, including timber, non-timber products, and ecosystem services.

Assess Beneficiaries: Identify who benefits from these resources, whether it be local communities or other stakeholders.

Monitor Changes: Observe how forest wealth and health change over time due to various factors, including environmental changes and human activities.

The green accounting process will enable more informed, evidence-based decision-making by providing a comprehensive view of forest resources and their economic value. As this initiative is pioneering, it is expected to evolve and improve over time, refining the methods used and expanding the scope of the accounts to include additional data and insights. This evolving framework will help ensure that forest management and conservation efforts are aligned with both environmental sustainability and the socio-economic needs of local communities.

2.5 Watersheds

To enhance the management of land and water resources, Himachal Pradesh is actively involving local communities in developing micro-watershed plans for their respective regions. This approach ensures that resource management strategies are tailored to local needs and conditions, fostering greater community ownership and effectiveness.

With over 90 percent of the state's population living in rural areas and agriculture being the primary occupation, there is a significant dependence on natural resources such as water, soil, and forests. Farming in the state's rugged and hilly terrain presents numerous challenges. The net sown area in Himachal Pradesh is limited to just 15 percent, and most of this land is rain-fed. The thin and fragile soils, combined with steep hill slopes, make the land highly susceptible to erosion.

The promotion of apple cultivation in the 1970s and the subsequent expansion of horticulture and floriculture were significant developments. However, despite these advancements, traditional farming practices in the region remain largely unsustainable. Issues such as overstocking of cattle further exacerbate the degradation of the state's fragile natural resource base, leading to soil erosion, reduced soil fertility, and diminished water resources.

In response to these challenges, the Department of Environment, Science & Technology (DEST) plays a crucial role in promoting sustainable development. The department is dedicated to considering the perspectives of all stakeholders and facilitating interventions at the policy, planning, and program levels. By incorporating stakeholder input and focusing on sustainable practices, DEST aims to ensure that development initiatives are balanced, addressing both environmental conservation and the needs of local communities.

Himachal Pradesh aims to address the complex interplay of environmental degradation and agricultural practices, ensuring that its natural resources are managed sustainably for the benefit of current and future generations.

The Department is responsible for implementing a range of functions to ensure effective environmental management practices. These functions encompass the following key areas:

1. State Environment Plan
2. Environmental Impact Assessment
3. Abatement of Pollution
4. Noise Pollution Control and Management
5. Waste Management
6. H.P. State Environment Fund
7. Eco-Villages Scheme
8. Environmental Leadership

For the year 2023-24, detailed reports on the physical progress made in each of these areas are provided.

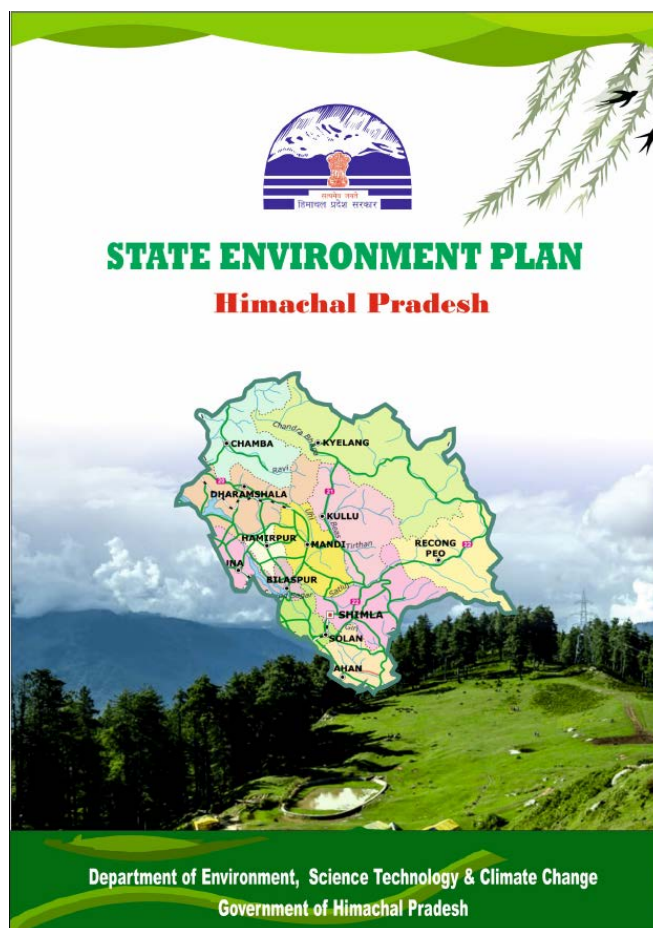
3.1 State Environment Plan

Hon'ble National Green Tribunal (NGT) issued order on dated: 08.02.2022 in the matter OA No. 360/2018 titled as Shree Nath Sharma Vs. Union of India stating the "issue of desirability of District Environment Plans in terms of Article 243 G, 243 W, 243 ZD, read with 11th and 12th Schedules to the Constitution of India, to be operated by the District Planning Committee under Article 243ZD.

It further ordered that based thereon State Environment Plans and also National Environment Plan be prepared to help protection of environment, public health and environmental rule of law in the country."

As per orders following specific thematic areas were identified and indicated by Hon'ble NGT for the preparation of Environment Plans:

- Compliance to Solid Waste Rules including Legacy waste.
- Compliance to Bio-medical Waste Rules.
- Compliance to Construction & demolition Waste.
- Compliance to Hazardous Waste Rules.
- Compliance to E-waste Rules.
- 351 Polluter Stretches in the country.
- 122 Non-attainment cities.
- 100 industrial clusters.
- Status of STPs and re-use of treated water.
- Status of CETPs/ ETPs including performance.
- Ground water extraction/ contamination and re-charge.
- Air pollution including noise pollution.
- Illegal sand mining.
- Rejuvenation of water bodies.



Vide these orders Hon'ble NGT directed the Department of Environment of all the States and Union Territories to collect District Environment Plans of their State and finalize the 'State Environment Plan' covering the specific thematic areas mentioned above including information such as; **Current status, Desirable level of compliance** in terms of statutes, **Gap between current status and desired levels**, Proposal of attending the gap with time lines, and, Names and designation of designated officer for ensuring compliance to provisions under respective statute. In order to prepare the Environment Plans, the following themes and Objectives have been adopted in accordance with the orders:

- To ensure conservation of environment and natural resources at district level.
- Restore ecological balance.
- To achieve Sustainable Development Goals and District Level Targets within prescribed timeline.
- To ensure sustainability at district level following the principles of resource efficiency.
- To ensure decentralized micro level planning, execution and monitoring regarding environment conservation.
- To incorporate all facets of environmental conservation in micro planning.
- To harness active participation of all stakeholders in planned environment conservation actions.
- Assess, mitigate and monitor adverse impacts of various pollution sources at district level.
- Capacity building of stakeholders, departments, agencies, organizations and individuals at district level to understand and implement micro level environmental conservation.
- To harness inter departmental coordination for implementation of action plans.
- To develop local knowledge centres and expertise for developing environmental conservation strategies at district level.
- To develop and implement micro monitoring system at district level.

It has been clearly stipulated and specified under above mentioned orders that the Environment Plans prepared by different agencies needs to be revised periodically and updated every year and executed in respect of all concerned thematic areas. Apart from the thematic areas already specified viz; Solid Waste Management, Plastic Waste Management, C&D Waste Management, Biomedical Waste Management, hazardous Waste Management, E-Waste Management, Air Quality Management, Water Quality Management, Industrial Wastewater Management, Mining Activity Management Plan, Noise Pollution Management Plan, Plantation Management Plan and any other thematic area relating to the goals of environmentally sustainable development can also be added.

On the basis of above background, the state of Himachal Pradesh adopted following objectives while formulating in the State Environment Plan:

- To ensure conservation of environment and natural resources at State level and restoring the ecological balance of the State.
- To achieve Sustainable Development Goals and State Level Targets.
- To incorporate all facets of environmental conservation at State level planning.
- To harness active participation of all concerned stakeholder departments in planned environment conservation actions.
- Capacity building of stakeholders, departments, agencies, organizations and individuals at state level to understand and implement state level environmental conservation.
- Identifying the gaps in the implementation of environmental components in the District Environment Plans and recommending filling these gaps.

The following thematic areas have been prioritized and identified for preparation of State Environment Plan:

- a) Solid Waste
- b) Bio Medical Waste
- c) Construction & Demolition Waste
- d) TSDF-Hazardous waste
- e) E-waste
- f) Polluted river stretches in HP
- g) Non Attainment cities in HP
- h) Industrial Clusters

- i) STP Recycling of Treated Water
- j) Common Effluent Treatment Plants in HP
- k) Ground water Extraction and Recharge
- l) Air Pollution - SPM, SOx, NOx and Noise Pollution
- m) Minerals & Mining (Lime stone, sand, stone)
- n) Water Bodies- (Lakes, Ponds etc.) Extended Producer Responsibility

Based upon the above thematic area State Environment Plan of Himachal Pradesh has been developed and published during financial year 2023-24.

3.2 Environment Impact Assessment

Under the Environment Impact Assessment (EIA) Notification of 2006 and subsequent amendments issued by the Ministry of Environment, Forests, and Climate Change, Government of India, it has been mandated that states are responsible for granting environmental clearances. This process is overseen by State Level Environment Impact Assessment Authorities, which have been empowered to ensure that development projects comply with environmental regulations.

In Himachal Pradesh, the Department of Environment, Science Technology & Climate Change, at Paryavaran Bhawan, serves as the nodal department for the Environmental Impact Assessment process. This department is responsible for coordinating and facilitating the EIA process within the state, ensuring that all projects undergo a thorough environmental review before receiving clearance. The department's role is crucial in balancing development needs with environmental protection, thereby safeguarding the state's ecological integrity.

3.2.1. State Level Environment Impact Assessment Authority (SEIAA)

Under sub-section (3) of section 3 of the Environment (Protection) Act, 1986, the Government of India has established the State Level Environment Impact Assessment Authority (SEIAA) for each state. The SEIAA comprises three members, including a Chairman and a Member-Secretary, both of whom are nominated by the respective State Government or Union Territory Administration.

In the fiscal year 2023-24, the SEIAA in Himachal Pradesh appraised and considered a total of 69 Mining Projects and 4 Building and Construction Projects for the grant of Environmental Clearances.

Table 8 Details of SEIAA Meetings 2023-24-(i)

Sr. No.	Meeting No.	Date	Category Wise Details			
			Mining	Hydro	Const.	MSW Site
1	61	21-04-2023	32	-	-	-
2	62	04-05-2023	-	-	1	-
3	63	13-06-2023	14	-	1	-
4	64	05-09-2023	11	-	-	-
5	65	07-10-2023	4	-	2	-
6	66	17-11-2023	-	-	-	-
7	67	28-12-2023	2	-	-	-
8	68	17-02-2024	6	-	-	-
Total Case			69	0	4	0

3.2.2. State Expert Appraisal Committee (SEAC)

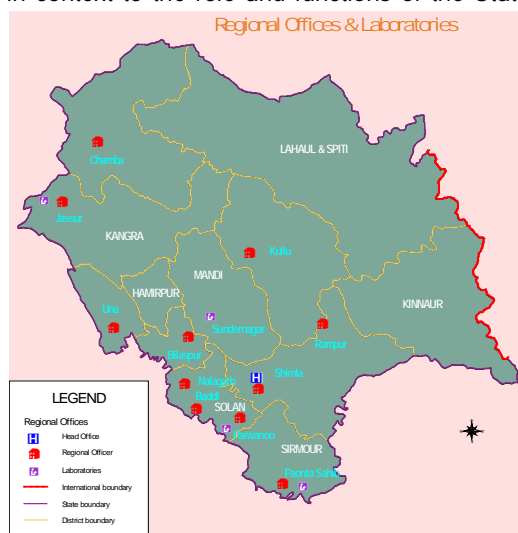
Central Government, in consultation with the State Government constitutes the State Expert Appraisal Committee (SEAC) for the purpose of assisting State Level Environment Impact Assessment Authority (SEIAA). Total 153 cases have been appraised by the SEAC during 2023-24. Following is the detail of the no. of meetings organised by the DEST&CC.

Meetings of SEAC 2023-24 – Appraisal			
Sr. No.	Meeting Number	Date	No. of Applications
1	91	04-04-2023	12
2	92	29-04-2023	01
3	93	07-06-2023	25
4	94	07-08-2023	44
5	95	66-09-2023	10
6	96	29-11-2023	15
7	97	07-12-2023	14
8	98	06-01-2024	21
9	99	07-02-2024	11
Total Cases			153

3.3. Abatement of Pollution

The Environment (Protection) Act, 1986 is the umbrella act which encompasses almost all type of regulations for environmental pollution control and management aspects. In fact this act was enacted to provide the prevailing legislation for control of water and air pollution more effectively and to remove the deficiency of these legislation. The prime objective of the legislation was to plug the existing statutory gaps whereby tremendous responsibilities. The following prominent rules and notifications are significant in context to the role and functions of the State Government and H.P. State Pollution Control Board:

1. Manufacture, Storage and Import of Hazardous Chemical Rules, 1989.
2. The Hazardous Waste (Management & Handling) Rules, 1989/2000
3. Rules for Manufacture, Use, Import, Export and Storage of Hazardous Microorganism, Genetically Engineered Organisms or Cells, 1989.
4. Noise Pollution (Control and Regulation) Rules, 1999.
5. Bio - medical Wastes (Management & Handling) Rules, 1998.
6. Recycled Plastics Manufacture and Usage Rules, 1999/2003.
7. Municipal Solid Wastes (Management & Handling) Rules, 2000.
8. Ozone Depleting Substances (Regulation & Control) Rules, 2000.
9. Batteries (Management & Handling) Rules, 2000.



Under these Rules regulatory powers have been delegated to State Pollution Control Board by way of functions that have been entrusted to the Board in addition to the Air (Prevention and Control of Pollution) Act and Water (Prevention and Control of Pollution) Acts.

State Pollution Control Board

The H.P. State Pollution Control Board serves as the central agency within the state's administrative framework for planning, promoting, coordinating, and overseeing the implementation of environmental programs. For nearly three decades, the Board has played a pivotal role in shaping the state's direction on environmental protection. The foundation of this effort was laid at the national level, with the establishment of a legislative framework aimed at safeguarding the environment from the adverse impacts of rapid industrial expansion. Over time, both legislative and technological frameworks have significantly evolved to address the growing complexity and scale of environmental challenges, which have often outpaced the capabilities to manage them. This expansion was driven by the need to tackle the compounded environmental issues arising from accelerated development, ensuring that environmental protection keeps pace with economic growth.

The principal activities undertaken by H.P. State Pollution Control Board consist of prevention & control of pollution, protection of environment, in the framework of following legislations.

- Water (Prevention & Control of Pollution) Act, 1974: The Parliament in the 25th year of the Republic promulgated this legislation in pursuance to Clause - 1 of Article 252 of the Constitution of India, with the objective of prevention and control of water pollution and maintenance and restoration of wholesomeness of water. The H.P. State Pollution Control Board was constituted in 1974 under the provisions of this Act.
- Water (Prevention & Control of Pollution) Cess Act, 1977: This Act provides for levy of cess on the water consumed for specific purposes with a view to dissuade wasteful and indiscreet use of water.
- Air (Prevention & Control of Pollution) Act, 1981: On the analogy of the Water (Prevention & Control of Pollution) Act, 1974 the Union Government promulgated another identical legislation which was exclusively meant to deal with the problems of air quality and preservation and maintenance thereof.

Major Roles and responsibilities of HPSPCB:

Type of Pollution	Concerned Agency for Infrastructure Development & Control of Pollution	Action by the Board
Water Pollution	- Irrigation-cum-Public Health - Urban Local Bodies - Industrial units and Industries Department	To regulate STPs, ETPs MSW, Sewage, slaughter houses and through it enforce control and management of pollution.
Air Pollution	- Transport - Industrial units - HEPs	To regulate APCDs/ Monitor Vehicles and HEPs
Noise Pollution	- District Administration - Police Department - Department of S&T and the State Board.	To regulate through Monitoring
Municipal Solid Waste	- Department of Urban Development - District Administration and - Municipal Authorities	Monitoring, reporting and to regulate through Authorization.
Biomedical Wastes	- Health Department and concerned government/private institutions and hospitals.	To regulate through Authorization
Hazardous Waste	- Industrial units & Industries Department	To regulate through Authorization
Mining	- Department of Industries (Geological Wing) and individual mine owners.	To regulate under the Air & water Acts.
Land use	- Department of Town & Country Planning	Advise location of industries

PRIMARY WATER QUALITY CRITERIA		
Designated Base Use	Class of Water	Criteria
Drinking water source without conventional treatment but after disinfection.	A	1. TC MPN/100ml. shall be 50 or less. 2. pH between 6.5 and 8.5. 3. DO 6 mg/l or more. 4. BOD 5 days 20°C 2 mg/l or less.
Outdoor bathing (Organized)	B	1. TC MPN/100ml. shall be 500 or less. 2. pH between 6.5 and 8.5. 3. DO 5 mg/l or more. 4. BOD 5 days 20°C 3 mg/l or less.
Drinking Water Sources after conventional treatment	C	1. TC MPN/100ml. shall be 5000 or less. 2. pH between 6 and 9. 3. DO 4 mg/l or more. 4. BOD 5 days 20°C 3 mg/l or less.
Propagation of Wild Life Fisheries.	D	1. pH between 6.5 and 9.5. 2. DO 4 mg/l or less. 3. Free Ammonia (as N) 1.2 mg/l or less

Irrigation, Industrial Cooling Controlled Waste.	E	<ol style="list-style-type: none"> 1. pH between 6.5 and 9.5. 2. Electrical Conductivity at 25 mg/cm max. 2250. 3. Sodium absorption ratio Max. 26. 4. Boron Max 2 mg/l.
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Assessment of the status of water quality of the natural water bodies is one of the most important aspect of environment monitoring. Water quality data not only help to ascertain the nature and extent of the requirement for pollution control measures but also indicates its impact on water quality of rivers in the State.

The monitoring is being done on regularly on quarterly basis. In all about 200 locations are monitored on major rivers Satluj, Beas, Ravi, Yamuna, Parvati, Sirsa, Markanda&Sukhna including their tributaries.

About 22 parameters are being analyzed for water quality analysis which includes both the physico-chemical and bacteriological contents. Besides this, about eighteen 18 locations are monitored in major industrial towns for the ground water quality of hand pumps and wells.



It has been observed that quality of ground water monitored in the State confirms the prescribed standards. The water quality monitoring is being carried out under National and State Water Quality Monitoring Programs: The water quality monitoring network is across all the river basins.

Management of Air Pollution:In the State SPCB has very effective air Quality Monitoring Network the air quality is being monitored at about

7 locations; viz; Shimla, Parwanoo, Poanta, Damtal, Barmana, Baddi& Kala Amb.

3.4 Noise Pollution Control & Management

A mobile app "शोर नहीं" has been developed & made functional for the convenience of the Citizen of Himachal Pradesh to report any noise pollution occurrence to the authorities for corrective measures in association with National Informatics Centre, Himachal Pradesh with the following key features:

- Public can Report Noise Pollution.
- User's Geo Coordinates / location communicated.
- User can also send the Photograph.
- Reported instances made available to authorities.
- Also sends Noise level and small audio clip.
- Minimum, Maximum and Average value of sound are also communicated.
- User within Himachal Pradesh, only can Submit Complaint.
- OTP Based User Authentication to avoid False Complaints.
- Public and Officer Roles.
- Also Lists Ill Effects of Noise



3.5 Waste Management

a. Himachal Pradesh Non-Biodegradable Garbage (Control) Act;

The HP Non-Biodegradable Garbage (Control) Act was enacted in 1995, making Himachal Pradesh one of the first states in India to implement legislation for managing non-biodegradable waste. The Act is designed to prevent the disposal of non-biodegradable garbage in public spaces, such as drains, roads, and areas visible to the public. It also seeks to regulate the use of non-biodegradable materials within the state. The primary objective of the Act is

to protect the environment by controlling the improper disposal of non-biodegradable waste, thereby maintaining cleanliness and reducing environmental pollution in Himachal Pradesh.

Major Highlights:

- ✓ Prohibition to throw any non-biodegradable garbage or any biodegradable garbage in a non-biodegradable bag or container in public drains and sewage.
- ✓ Bio-degradable material specified in the Act are; Polythene, Nylon, Poly-Vinyl-Carbohydrates (PVC), Poly-Propylene, Poly-Styrene.
- ✓ Provision for placement of receptacles and places for deposit of non-biodegradable garbage by local authorities in the State.
- ✓ It shall be the duty of owners and occupiers of all lands and buildings to collect and deposit non-biodegradable garbage in separate receptacles/ dustbins other than those kept and maintained for deposit of biodegradable garbage and keep them in good condition and repair.
- ✓ Power to local authority or competent authority for removal of non-biodegradable garbage or material and take necessary steps to dispose of the said garbage or material at the cost of such person in the manner as provided in this Act.

b. Himachal Pradesh Non-Biodegradable Garbage (Control) Rules, 1996 Major Highlights:

- ✓ Constitution of Garbage Management Zone by local authority.
- ✓ Constitution of Garbage/ Waste Management Committee by local authority.
- ✓ Colour coding of the receptacles/ dustbins.
- ✓ Prohibition to throw non-biodegradable garbage and mixing of bio-medical/ clinical waste with other non-biodegradable waste/ garbage.
- ✓ Local authority responsible for collection and removal of garbage/ waste.

c. Non-Biodegradable Waste Management- Polythene Eradication

In order to avoid the degradation of the Environment, the Department of Environment, Science & Technology took a lead in saving Environment from the ill effects of the plastic menace/ pollution, the State Government under the HP Non biodegradable Act, 1995 issued the necessary notification to ban the use of colored recycled plastic carry bags. Himachal Pradesh was the first State in the country to ban plastic and polythene carry bags in 2004 and thereafter in 2009 and thereafter issued various notifications in order to implement the provisions of the above Act.

Efforts of the Department towards plastic waste management- timeline

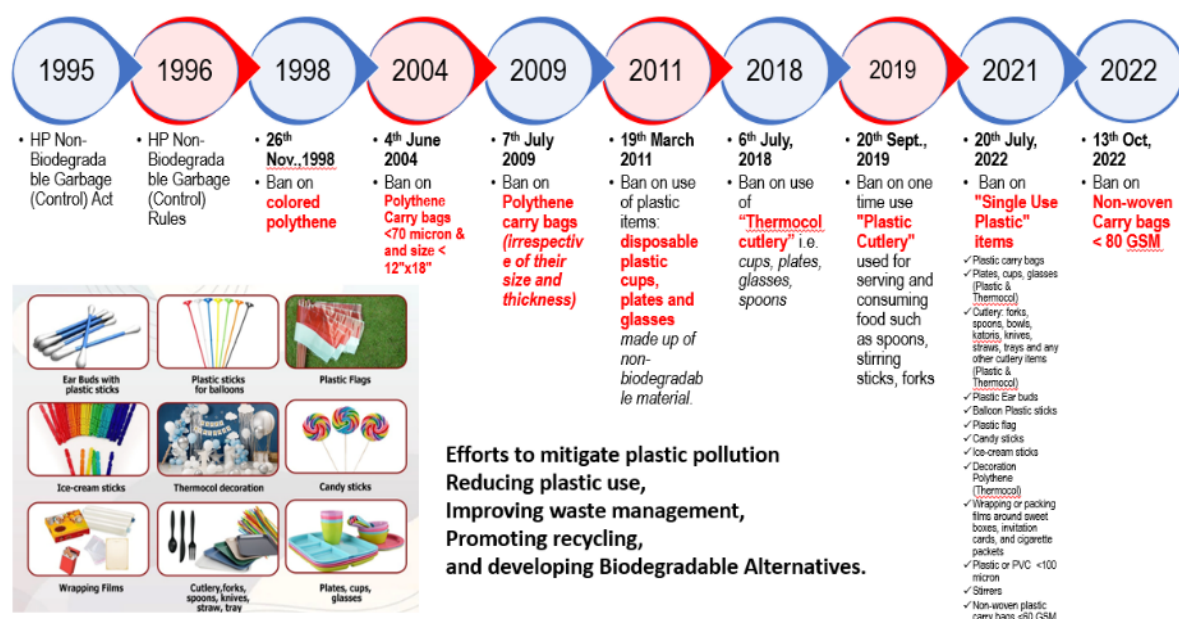


Table 11 No of challan and cases compounded during 2023-24

Sr.No	Name of Month	No of Challans	Compounded Fee(Rs)
1	April, 2023	126	82,500 /-
2	May, 2023	341	2,81,500 /-
3	June, 2023	74	61,000 /-
4	July, 2023	35	53000 /-
5	August, 2023	48	35000 /-
6	September 2023	169	1,86,800 /-
7	October 2023	58	71,500 /-
8	November 2023	79	85,000 /-
9	December 2023	59	81,500 /-
10	January, 2024	49	38,100 /-
11	February, 2024	93	78,600 /-
12	March, 2024	56	33,000 /-
Total		1377	14,89,500 /-

Table 12 & 13 No of challan and cases compounded during 2023-24

Month	Bilaspur		Chamba		Hamirpur		Kangra		Kullu		Kinnaur		L&S	
	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)	Case		Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)
Apr. 23	Nil	Nil	2	1000	74	42500	4	16000	11	5500	Nil	Nil	-	-
May23	3	1500	6	3000	135	70000	93	135000	75	51000	Nil	Nil	-	-
Jun. 23	Nil	Nil	8	14500	4	8000	1	4000	10	5000	Nil	Nil	-	-
July 23	2	4500	1	500	Nil	Nil	4	4500	2	1000	Nil	Nil	-	-
Aug 23	Nil	Nil	18	16000	5	2500	3	4500	1	500	Nil	Nil	-	-
Sep 23	Nil	Nil	27	32500	20	10000	8	5000	Nil	Nil	Nil	Nil	4	1800
Oct 23	6	25500	6	8000	5	6500	8	3500	Nil	Nil	Nil	Nil	-	-
Nov 23	8	19000	1	25000	1	500	27	19500	Nil	Nil	Nil	Nil	-	-
Dec 23	3	6500	2	30000	16	8000	Nil	Nil	Nil	Nil	Nil	Nil	-	-
Jan 24	-	-	2	6000	18	9000	Nil	Nil	5	5000	Nil	Nil	-	-
Feb 24	Nil	Nil	32	16600	33	16500	3	1500	3	2000	Nil	Nil	-	-
March 24	Nil	Nil	Nil	Nil	28	14000	3	1500	Nil	Nil	Nil	Nil	-	-
Total	22	57000	105	153100	339	187500	154	195000	107	70000	Nil	Nil	4	1800

Case	Shimla		Mandi		Solani		Sirmour		Una		Total	
	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)
Nil	Nil	Nil	Nil	23	11500	-	-	12	6000	126	82500	
Nil	Nil	7	3500	19	10500	2	5500	1	1500	341	281500	
4	2000	Nil	Nil	33	20500	-	-	14	7000	74	61000	
Nil	Nil	1	1500	25	41000	-	-	-	-	35	53000	
-	-	7	3500	14	8000	-	-	Nil	Nil	48	35000	
29	14500	11	5500	40	79000	19	30000	11	8500	169	186800	
Nil	Nil	Nil	Nil	17	14500	-	-	16	13500	58	71500	
Nil	Nil	10	5000	23	11500	9	4500	-	-	79	85000	
Nil	Nil	22	23500	9	10000	7	3500	Nil	Nil	59	81500	
Nil	Nil	6	4000	15	12600	1	500	2	1000	49	38100	
Nil	Nil	Nil	Nil	18	39000	3	2500	1	500	93	78600	
Nil	Nil	1	500	10	10000	6	3000	8	4000	56	33000	
33	16500	65	47000	246	358100	47	49500	65	42000	1187	1087500	

3.6 HP State Environment Fund

To encourage a sense of self-responsibility and establish a financial mechanism through voluntary contributions, the Government of Himachal Pradesh established the 'Environment Fund' in November 2008. This fund is aimed at supporting environmental protection efforts through voluntary initiatives. The Himachal Pradesh Environment Fund consists of the following major components:

- Direct contribution, donations, from the individuals/ industrialists/NGOs/industries associations/ hotel associations/ Departments, Corporate bodies, Societies etc.,
- Any other source of donation which the State Government may deem fit.

i. Drive for Collections of the Fund:

Government employees can associate themselves for the Himachal Pradesh Environment Fund. Collections will not be made by the Government employees in the discharge of their official duties or with reference to the official functions like issue of licenses, registration of documents etc. Collection can however be made/ raised by the Govt. Employees by organizing fairs, cultural programmes, through advts. in magazine/ souvenir publication etc.

Direct contribution, donations, from the individuals/ industrialists/ NGOs/ industries associations/ hotel associations/ Departments, Corporate bodies, Societies etc., shall be accepted at any time in the Himachal Pradesh Environment Fund though there will not ordinarily be a specific drive for collection of environment fund at any level from the Government side.

ii. Apportionment of the Collections:

Out of the total collection from the Himachal Pradesh Environment Fund computed at the end of financial year:-

- a) An amount up to the 50% of the total collections out of the Himachal Pradesh Environment Fund could be contributed towards environmental protection, conservation, restoration and mitigation works etc. including efforts to reduce carbon footprints.
- b) An amount up to the 25% of the total collections out of the Himachal Pradesh Environment Fund could be given to the development of environmental infrastructure in the State.
- c) An amount up to the 10% of the total collections out of the Himachal Pradesh Environment Fund could be contributed for environmental educational activities, awareness programmes etc.
- d) An amount up to the 10% of the total collections out of the Himachal Pradesh Environment Fund could be given for any environmental proposes at the direction of Chairman of the Environment Fund Administering Committee.
- e) An amount up to 5% of the total collections out of the Himachal Pradesh Environment Fund shall be kept as contingency for administering of Himachal Pradesh Environment Fund including expenses for maintenance of accounts, logistics , organizing of meetings etc.
 - a. Note: As an interim arrangement, the grants would be based on quarterly contribution/ donations.

iii. Governance Committee to Administer the Himachal Pradesh Environment Fund :

The Himachal Pradesh Environment Fund will be administered by a committee named as "Environment Fund Administering Committee" consisting of the following which would ordinarily meet once in three months:

1.	Hon'ble Chief Minister, Himachal Pradesh	Chairman
2.	Minister (Environment, Sci.& Tech)	Member
3.	Chief Secretary , Govt. of H.P	Member
4.	Pr. Secretary (Env., S&T), Govt. of H.P.	Member
5.	Representative of Pr. Secretary (Finance)	Member
6.	Two Non-official Members to be nominated by the Govt.	Member
7.	Director (Env., S&T)	Member Secretary

iv. Incurring of Expenditure Out of the Himachal Pradesh Environment Fund:

- a) Expenditure from the Himachal Pradesh Environment Fund shall only be incurred after approval by the Environment Fund Administering Committee for the purposes defined in para 4 above except for 10% of total collection earmarked for expenditure at the discretion of Chairman of Environment Fund Administering Committee.
- b) While examining grant proposals for the Himachal Pradesh Environment Fund the Environment Fund Administering Committee Shall ensure that the proposals cover one or more of the following aspects:-
 - Proposal for environmental protection, conservation, restoration and mitigation works etc. including efforts to reduce carbon footprints in the environmentally vulnerable areas.
 - The proposal for development of environment infrastructure for environment protection, eco restoration, mitigation etc.
 - Awards to individuals, organizations, institutions etc. of proven track record that have rendered/ rendering valuable services to the Nation/ State in protection of environment for recognition of their contribution for the cause of environment protection.
 - Relief for environment protection in exceptional cases for the following categories:
 - a). Environmental losses sustained as a result of natural calamities.
 - b). Grants to villages proactive for environment protection and reducing carbon footprints.
 - c). Grant to schools, institutions, organizations showing proactive role in environmental protection and conservation.
 - Environmental educational activities, awareness programmes.
 - Any other case not covered by any of the above categories and where the Environment Fund Administering Committee is satisfied with regard to the genuineness of the demand of grant for environmental protection, conservation, mitigation and restoration.

v. Receipt of Funds:

- a) The following are designated authorities for the receipt of funds under the Himachal Pradesh Environment Fund :

At State Headquarter: (a) Office of Chief Minister, H.P.
(b) Office of Director (Env., S&T)

At District Level: Office of Deputy Commissioners in H.P.
- b) Mode of payment:- The donations/ contributions shall have to be made in the form of demand draft or cross A/c payees cheques payable at Himachal Pradesh Environment Fund ,H.P.

vi. Monitoring of State Environment Fund:

- a. The Grant so provided from/ out of the Himachal Pradesh Environment Fund for environment protection etc. shall be monitored by the Member Secretary of the Himachal Pradesh Environment Fund Administering Committee i.e. Director (Environment, Sci. & Tech.).
- b. The Member Secretary of the Himachal Pradesh Environment Fund Administering Committee i.e. Director (Environment, Sci. & Tech.) shall ensure that the grant so provided out of the Himachal Pradesh Environment Fund is utilized for the purpose for which it has been provided.
- c. The Member Secretary of the Himachal Pradesh Environment Fund Administering Committee i.e. Director (Environment, Sci. & Tech.) shall ensure that the Utilization Certificates are given by the recipients of grant.

vii. Custody of the Account:

The money received /lying in the Himachal Pradesh Environment Fund shall be credited to Saving Fund Account in the Nationalized / Co-operative Bank at Shimla by the Member Secretary, Environment Fund Administering Committee.

The account in respect of Himachal Pradesh Environment Fund shall be operated by the Director (Environment, Science & Technology).

The account of the Himachal Pradesh Environment Fund is audited by the Examiner, Local Fund Accounts Himachal Pradesh.

Table 2 Details of H.P. Environment Fund as on 31.03.24

Received	Rs. 10,10,700/-
Expenditure	Rs. 13,85,299/-
Total Balance as on 31.03.24	Rs. 23,95,999/-

Funds collected from the violators under HP Non-Biodegradable Garbage (Control) Act, 1995 is also being deposited in the State Environment Fund notified vide Notification No. STE-F(4)-3/2008, dated 4/11/2008 for volunteer contributions towards environment management protection, conservation, restoration and mitigation etc.

After approval of the Chairman of HP Environment Fund Administrative Committee i.e. Hon'ble Chief Minister, the best three performing organization were incentivized @ 10%, 8% & 5% of total contributed funds under HP Non Biodegradable Garbage (Control) Act, 1995.

The year wise details of incentivization of first three departments are as under:

#	Name of the Department	Incentivized Amount (2021)	Incentivized Amount (2022)	Incentivized Amount (2023)
1	SPCB, HP	Rs. 20,300	Rs. 93,400	Rs. 25,320
2	HP Police Department	Rs. 13,000	Rs. 27,200	Rs. 12,890
3	HP Food and Civil Supplies Corporation	Rs. 6,650	Rs. 10,100	Rs. 36,950
		Rs. 39,950	Rs. 1,30,700	Rs. 75,160

The fund is being utilized in a) Organization of Himachal Pradesh Environment Leadership Awards function b) Organization of World Environment Day function and c) Organization of awareness campaigns & workshops etc.

3.7 Eco-Village Scheme

The Eco-Village Scheme is designed to build resilient village communities by enhancing their skills and capacities to address resource depletion, climate change, and other environmental challenges. The scheme aims to raise awareness among village communities about the pressures on their natural resources, the environmental impact of their decisions, and the sustainable development options available to them. The goal is to foster transformative actions and promote sustainable development through environmentally responsible practices in areas such as water management, waste management, energy conservation, natural resource management, climate change adaptation, and sustainable livelihoods.

This approach not only supports stakeholders engaged in sustainable community development programs but also sets benchmarks for others to follow, driving a shift towards environmentally responsible behavior across communities in Himachal Pradesh.

The Eco-Village concept, still evolving, aims to demonstrate a model of environmentally sustainable development in collaboration with village residents, reflecting their commitment to environmental stewardship. These eco-villages will focus on developing low-impact lifestyles that aim to reduce the "ecological footprint" by up to 50% from the initial assessment at the scheme's launch.

Himachal Pradesh, a small Himalayan state with a population of 6.7 million (Census 2011), is predominantly rural, with nearly 90% of its people living in villages. The state's agrarian economy is deeply connected to the Himalayan ecosystem and its natural resources. However, various socio-economic and environmental changes are threatening these resources, presenting new challenges for the state's population. The Eco-Village Scheme addresses these challenges through the following key components:

a) Vision of the scheme:

To demonstrate villages as models of sustainable development based on environmentally responsible individual and collective action for reducing human ecological foot-print and through judicious use of natural resources.

b) Objective of the scheme:

To ensure sustainable development in an organized and integrated manner. The programme endeavours to sustain prosperity in villages, that is built around sustainable use of the key natural resources of a village, through the adoption of low-impact practices that result in water security, food security and livelihood security for the village communities.

c) Key elements of a Model Village:

- Environment sustainability through responsible Natural Resource Management practices
- Community participation
- Use of Modern and Clean technology & practices
- Convergence of resources available for development.

d) Functional Components of an Eco-Village.

Major components* of proposed Model Eco Village-an Environmentally Sound Sustainable Community Development are as under:

➤ **Protection and conservation of Natural Water Sources/ springs:**

- Prioritize critical springs based on their vulnerability to carry out rejuvenation through a landscape approach.
- Develop a detailed climate resilient spring shed development plan for the vulnerable springs.
- Develop village water security plan in the identified spring-sheds.

➤ **Adoption of Sustainable Agriculture Horticulture Practices.**

- Crop diversification and Traditional Crops.
- Organic Farming
- Farm Produce Management Practices.

➤ **Water management and irrigation.**

- Rain water harvesting from roof tops.
- Revival and Creation of water ponds./ maintenance of water bodies.
- Collection of treated waste water for farming.
- Minimize water use through strict conservation practices- supply in sustainable manner.

3.7 Physical Achievements

3.7.1. Eco Friendly Field Activities





3.7.2. Water Management



3.7.3. Energy Conservation



3.7.4. Waste Management



3.6.5. Tree Plantation



Funds utilization status under Model Eco Village Scheme is as follows:

#	District	#	Eco Village Details	Total Rs Lakhs
1.	Mandi	1.	Village Baila, GP Janjehali, Block Seraj	20.00
		2.	Village Leh, GP Lambathach, Block Seraj	20.00
2.	Kullu	3.	Village Shaleen, GP Shaleen, Block Naggar	20.00
3.	Sirmaur	4.	Village Deothal, Block Shilai	20.00
4.	Shimla	5.	Village Baghalli, GP Dhamoon, Block Tutu (Earlier Block Mashobra)	20.00
		6.	Village Charau, Block Tutu (Earlier Block Mashobra)	20.00
		7.	Village Khagna, GP Khagna, Block Chopal	8.00
		8.	Village Sidhroti, GP Lowerkoti, Block Rohru	8.00
5.	Kinnaur	9.	Village Kamru, Block Kalpa	20.00
6.	Bilaspur	10.	Village Tepra, GP Ghayal, Block Sadar	20.00
		11.	Village Kandraur, Block Sadar	20.00
7.	Hamirpur	12.	Village Lag, GP Manvi, Block Bhoranj	20.00
		13.	Village Baleta Kalan, GP Neri, Block Hamirpur	8.00
8.	Solan	14.	Village Mahog, Block Kandaghat	20.00
9.	Kangra	15.	Village Keori (Bir-Billing), GP Bir Billing, Block Baijnath	20.00
		16.	Village Beed, Block Baijnath	20.00
10.	Una	17.	Village Changar Handola, Block Bangana.	20.00
		18.	Village & GP Takarla, Block Amb	8.00
11.	Chamba	19.	Village Bhanjraru, Block Tissa	20.00
Total				332.00

3.8. Environment Leadership Awards

To acknowledge and encourage innovative actions and initiatives in various sectors of the economy, the Government of Himachal Pradesh has established the 'Himachal Pradesh Environment Leadership Awards.' These awards are conferred annually to recognize individuals, institutions, and organizations in the state that have made significant contributions to environmental stewardship.

The Government of Himachal Pradesh is committed to a development strategy that prioritizes the unique vulnerabilities of the Himalayan region and the imperative of environmental protection. The goal is to support a transformative shift towards an environmentally sustainable and carbon-smart economic growth model. This initiative aims to showcase and promote best practices in environmental protection, driven by the efforts of individuals and organizations across the state.

The awards are presented each year in twelve categories, honoring outstanding and sustainable practices in areas such as Urban Local Bodies, Hospitals, Hotels & Resorts, Academic Institutions, Schools, Office Premises, Industries, Panchayats, Residences/Resident Welfare Societies, Restaurants, Bus Stands, Railway Stations, and Airports. Each category recognizes contributions that advance environmental stewardship.

The awards include a trophy, a citation, and a cash prize—Rs. 50,000 for the First Prize and Rs. 25,000 for the Second Prize in each of the twelve categories. In 2023-24, the awards were presented for the first time in Himachal Pradesh. Applications were invited from all stakeholders following the prescribed procedure, leading to the selection and recognition of exemplary contributions to environmental protection. The category wise details of the winners of the Environment Leadership Awards 2023-24 is as follows:

Table 15 Category I (Industry)

Awards/ Prize	Name of Awardees/Address	Remarks of specific initiatives
1 st Prize (Industry)	– M/s Cipla Limited, Baddi, H.P. Village Malpur, PO Bhud, Tehsil Baddi, District Solan, H.P	<ul style="list-style-type: none"> For energy conservation Cipla Ltd Baddi has installed Grid connected rooftop solar plant installed on both units in H.P. LED lights are installed. LPG is used for boiler fuel for steam generation which is a low carbon emission fuel. Biodiesel is used, Biomass briquettes are used. For water conservation measures rain water harvesting structures are installed. Water harvesting by roof, pond, dug well & check

		<p>dams in plant vicinity. RO-EDI unit-2 use in cooling tower which also conserve water usage.</p> <ul style="list-style-type: none"> • Cipla Ltd. Baddi has done plantation within and outside the vicinity of their plants at Baddi. Sequestering carbon 5 Tons per year.
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Table 16 Category II (Schools)

Awards/ Prize	Name of Awardees/Address	Remarks of specific initiatives
2 nd Prize (Schools)	<ul style="list-style-type: none"> – Govt. Senior Secondary School, Manpura, H.P. Tehsil Baddi, Distt. Solan, H.P 	<ul style="list-style-type: none"> – School has adopted for water conservation measures. Rain water harvesting and by way of constructing 40000 ltr. Tank in the school for storage of rain water and is used for gardens and kitchen in the school. A water bank has been made by the school with local public for storing rain water and use during scarcity of water. – School has taken initiative for energy conservation by installing 7.5 Kw roof-top solar power plant in school which led to reduced electricity bill of the school. – School is actively participating in tree plantation campaigns and planted various trees in school. One herbal garden has also been maintained in the school. – School has provided dustbins in school for keeping the dry and wet waste separate and are also spreading awareness

Table 17 Category III (NGO/Institution)

Awards/ Prize	Name of Awardees/Address	Remarks of specific initiatives
2 nd Prize (NGO/Institution)	<ul style="list-style-type: none"> – Recity Network Private Limited, Ward No. 3, Palampur Khas, Kesar Bag Colony, Palampur, Distt. Kangra, H.P. 176061. – [A-703, Golden Chariot, Old Lokhandwala, Andheri (West), Mumbai, Maharashtra-400053] – (Working Location at Dalhousie, Distt. Chamba, H.P.) 	<ul style="list-style-type: none"> – Recity Network NGO engages with all stakeholders in the plastic waste chain, from sourcing to recycling and collected 53000 MT of plastic waste. Recity Network has installed recycled plastic waste benches, interlocking tiles and dustbins in various parks. – Also imparts training to sanitary waste workers and doing good work in awareness by installing banners for solid waste management. – Recity Networks has made QR scan code for monitoring the 100% door to door collection of waste in Dalhousie town.

Table 18 Category IV (Office Premises)

Awards/ Prize	Name of Awardees/Address	Remarks of specific initiatives
1 st Prize (Office Premises)	<ul style="list-style-type: none"> – Directorate of Treasuries, Accounts and Lotteries, H.P. Block No. 23, SDA Complex, Kasumpti, Shimla 	<ul style="list-style-type: none"> – Sustainability design features have been incorporated in construction of treasury buildings in H.P. and three office buildings have been certified with Green Certification. – Energy efficient appliances and solar panels and solar water heaters and RWH are used in in the buildings of Treasury Deptt. in the State.

Awards/ Prize	Name of Awardees/Address	Remarks of specific initiatives
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<p>2nd Prize (Office Preises)</p>	<ul style="list-style-type: none"> - Regional Laboratory Shimla, HP State Pollution Control Board, BCS, Phase-III, New Shimla-9, H.P. 	<ul style="list-style-type: none"> - Regional laboratory Shimla of HPPCB regularly monitor the greenhouse gas Ozone (O3) along with concentration of other CO, NH3 and SO2 gases. - Solar panels are installed on the roof of the building. - For water conservation, self-made filtration assembly for liquid waste is installed in the regional laboratory. - Recycling of material is done by using the chemical isopropyl alcohol used for one test for cleaning of laminar air flow. Packaging material is recycled through local vendors. - Regional laboratory emission to air is under permissible limits. - Only laboratory of State Board having NABL accreditation in Waste water and Surface water.
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Table 19 Category V (Hospital)

Awards/ Prize	Name of Awardees/Address	Remarks of specific initiatives
<p>1st Prize (Office Premises)</p>	<ul style="list-style-type: none"> - Zonal Hospital, Dharamshala, Distt. Kangra, H.P. 	<ul style="list-style-type: none"> - Zonal Hospital Dharamshala is doing good work in biomedical waste management All the Biomedical waste is sent to Common Biomedical waste treatment facility and maintains cleanliness in hospital. - Practices such as Reuse Recycle and Refuse (RRR) is used. - For making paperless working in hospital e-office is in use. - For energy conservation solar panels have been installed. Energy audit and cost benefit analysis is regularly done.
<p>2nd Prize (Office Premises)</p>	<ul style="list-style-type: none"> - City Hospital (A unit of Para Multispecialty Hospital Pvt. Ltd.) Matour, City Hospital (A unit of Para Multispecialty Hospital Pvt. Ltd.) Matour, Teh. Kangra, Distt. Kangra, H.P 	<ul style="list-style-type: none"> - City Hospital Matour is doing good work in biomedical waste management All the Biomedical waste is sent to Common Biomedical waste treatment facility and log book is also maintains in hospital. - Hospital has its own STP and ETP which is functioning well. - Cleanliness campaigns are organized regularly. Also collect plastic waste and hand over to MC.

Climate change refers to long-term changes in average weather patterns, including temperature, precipitation, and wind, which are typically influenced by the natural cycle of seasons—spring, summer, autumn, and winter. However, factors with longer time scales, such as human activities, can lead to systematic changes in the climate.

Today, climate change is recognized as a critical global challenge. The consequences of rising temperatures, extreme weather events, and melting ice caps are increasingly evident, driven largely by human activities like fossil fuel combustion. The scientific consensus is unequivocal: human actions are the primary drivers of global warming. To address this, there is an urgent need to transition to clean energy sources, reduce greenhouse gas emissions, and adopt sustainable practices.

Climate change impacts every sector, from agriculture and food security to public health and economic stability. Key solutions include harnessing renewable energy sources such as solar and wind, constructing energy-efficient buildings, and promoting sustainable transportation options like electric vehicles. Additionally, individual efforts—such as reducing waste and conserving water—play a crucial role in mitigating the effects of climate change.

In Himachal Pradesh, the Department of Environment, Science, Technology & Climate Change (DEST&CC) leads efforts to enhance environmental management, protect ecosystems, and promote sustainable development. As the state's nodal authority on climate change, DEST&CC collaborates closely with the Ministry of Environment, Forest & Climate Change (MoEFCC) under the Government of India to implement climate action strategies and ensure the state's development is aligned with environmental sustainability goals.

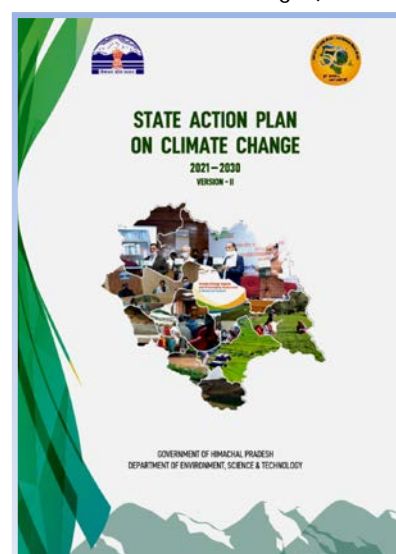
4.1. State Action Plan on Climate Change

As part of its regional commitment, Himachal Pradesh initiated the State Action Plan on Climate Change (SAPCC) to align with and decentralize the National Action Plan on Climate Change (NAPCC). The SAPCC has been tailored to address local challenges and incorporate the state's unique strategies for mitigating and adapting to the impacts of climate change.

Recognizing that the SAPCC is a dynamic document, the 'State Strategy and Action Plan on Climate Change 2021-30' has been revised to emphasize state-specific priorities, drawing on the latest knowledge and understanding. This comprehensive framework will guide the state's efforts in relevant fields and sectors to adapt to and mitigate the impacts of climate change. Additionally, it will assist in prioritizing and implementing various mitigation measures, ensuring that the state's development path remains resilient and sustainable in the face of climate change.

In order to monitor the implementation of SAPCC a State Level Climate Change Governing Council has been setup for taking all the strategic decisions on climate change. The Council is headed by Chief Minister, Himachal Pradesh. The operating arm of the Climate Change Governing Council is Executive Council chaired by the Chief Secretary to the Govt. of Himachal Pradesh. The Department of Environment, Science Technology is the nodal agency for overseeing the implementation of SAPCC.

The State Government is continuously working to implement mission wise targets through stakeholder department as per the following details for the improvement of livelihood & upliftment of the rural communities of the State of Himachal Pradesh:



1. State Mission for Green India

Code	Activity	Implementing Agency
F-EB/1	Identification of key impacts, vulnerabilities and research priorities – Support research priorities to fill gap in climate change and forestry research needs.	Forest Department
F-EB/2	Developing strategies in collaboration with hydro power industry.	Forest Department, Energy Department, Private sector
F-EB/3	Developing communication strategies targeted at schools, public and private sector for afforestation progress.	Forest Department, Media, Private sector, PSUs, Education Department
F-EB/4	Strengthening of State Wetland Authority and preparation and implementation of Action Plans at micro level for conservation and restoration of wetlands.	DEST, Forest State Wetland Authority, Fisheries, Tourism, District Administration
F-EB/5	Enhancement of livelihood options of state through community Agro forestry/farm forestry.	Department of Forest
F-EB/6	Biodiversity Conservation through habitat management and strengthening of Biodiversity management committees.	Biodiversity Board
F-EB/7	Eco Tourism landscape Expansion.	Department of Forest

2. State Mission on Sustainable Agriculture

Code	Activity	Implementing Agency
AG/N/1	Sustainable land use management.	Department of Agriculture (Himachal Pradesh Agriculture Development Society)
AG/N/2	Adequate research for development of high value crops including fruits and off season vegetables which are suitable for the seasonal variations to promote a viable solution for farmers facing the impacts of climate change on cereal based agriculture.	Universities, Research Institutions
AG/N/3	Analysis of the impact of climate change on crop yield change, demand and supply	Universities, Research Institutions.
AG/N/4	Introduce community centric watershed development and soil conservation.	Department of Agriculture, Department of Soil conservation, Horticulture
AG/N/5	Revision and implementation of Contingency plans .	Department of Agriculture
AG/N/6	Use of information and communication technologies including mobile apps for dissemination of weather related information.	Department of Agriculture, Horticulture, IMD Board
AG/N/7	Foster and promote the efficient use of water in agriculture and improvement of livelihood resilience.	Department of Agriculture, Department of Irrigation and Public Health
AG/N/8	To promote development of eco village/ bio village in order to improve livelihood resilience amongst villages in high-altitude regions.	Department of Agriculture, Horticulture
AG/N/9	To promote crop diversification through protected cultivation and promotion of solar fencing in state.	Department of Agriculture, Horticulture
AG/N/10	To promote balanced use of pesticides and fertilizers in state strengthen FPOS market linkages for agro-horticulture and herbiculture produce.	Department of Agriculture, Horticulture
AG/N/11	Development of micro cold chain circuits.	Department of Agriculture,

		Horticulture
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3. State Mission on Water

Code	Activity	Implementing Agency
WR/N/1	Reduce water demand in the state by controlling leaks, implementing water-saving programs, cascading and reusing water.	Department of Jal Shakti
WR/N/2	Integrated water resources management should be promoted. Expansion and maintenance of STPs in the State to promote recycling of water leading to reduced groundwater extraction.	Department of Jal Shakti
WR/N/3	Promotion of Spring-Shed Management leading to increase in irrigation efficiency.	Department of Jal Shakti / Department of Agriculture
WR/N/4	Development of contingency plans in water sector / Improve defence during hazards.	Department of Jal Shakti
WR/N/5	Management of Irrigation through Water User Agencies.	Department of Jal Shakti

4. State Mission on Health

Code	Activity	Implementing Agency
HS/1	Monitoring systems and emergency plans by including risk management practices, any climate change related health impacts.	Department of Health
HS/2	Improve monitoring of environmental health indicators.	Department of Health
HS/N/1	Strengthening health care in Himachal Pradesh to reduce deaths of new-borns and children under 5 years of age.	Department of Health
HS/N/2	Strengthen the prevention and treatment of Vector-borne diseases such as malaria and dengue.	Department of Health
HS/N/3	Training and awareness programmes for identifying early signs of extreme climatic events on the population and their remedy.	Department of Health, NHM
HS/N/4	To understand the impact for the operational research for climate change in all districts of state.	Medical Colleges (Medical University H.P.), Universities

5. State Mission for Climate Change Strategic Knowledge and Information

Code	Activity	Implementing Agency
SK/1	Design of Instruments to Promote the Development, Transfer and Adoption of Technologies for Climate Change Mitigation and Adaptation.	DEST Knowledge Cell on Climate Change, Agriculture, Horticulture, Water, Health sectors.
SK/2	Strengthening the Institutional Framework in Himachal Pradesh for Addressing Climate Change and strengthening of HPKCCC.	DEST Knowledge Cell on Climate Change
SK/N/3	Mapping of the knowledge base and data resources relevant to climate change for the mobilization of state specific strategic knowledge networks.	DEST Knowledge Cell on Climate Change
SK/N/4	Study the climate data and project the climate changes for vulnerability assessment at the regional and local level.	DEST Knowledge Cell on Climate Change
SK/N/5	Identification of research gap in each sector with review of existing sectoral policies and strategies.	DEST Knowledge Cell on Climate Change
SK/N/6	Vulnerability Assessment with latest technology, at micro level with river basin approach. .	DEST Knowledge Cell on Climate Change

6. State Mission for Enhanced Energy Efficiency and Conservation

Code	Activity	Implementing Agency
EN/N/1	Undertake feasibility assessment study to reduce the cost of major financing components impacting the tariff of HEP with the view to make it financially viable.	Directorate of Energy
EN/N/2	Facilitate development of identified solar power projects/ other reserved energy projects.	HIMURJA, DOE
EN/N/3	Improve energy intensity through adoption of energy conservation and DSM measures.	HIMURJA, MNRE, DOE
EN/N/4	Reduction in energy-use intensities in income generating activities through structural adjustments of activity typology and ensuring linkages along value addition chain and optimal use of resource endowment.	HIMURJA, MNRE, DOE
EN/N/5	Feasibility study to analyse, assess hydro power development in phased manner. Identify the future prospects in view of connect power scenario, balance energy mix requirement. Assess social and environmental obligations of HED.	Directorate of Energy
EN/N/6	Capacity Building of the Technical manpower of Power Sector to upgrade with the latest state of art technologies, internationally in practice these days which are more environment friendly, adaptable to Climate Change, economical and at the same time efficient also.	Directorate of Energy
EN/N/7	Comprehensive Study of Glacial deposits and impacts of Climate Change, Global Warming on Glacial deposit in Himachal Pradesh and its impact on Hydro Power development in the state.	Directorate of Energy
EN/N/8	Implementation of Communication Strategy with respect to hydro Power development in the state of Himachal Pradesh for having better coordination amongst all relevant stakeholders.	Directorate of Energy
EN/N/9	Comprehensive Study for proper Dam regulations, Reservoir management and Silt management and disposal due the future anticipated impact of Climate Change.	Directorate of Energy
EN/N/10	Promotion and awareness of Solar Roof Top programme through awareness activities/exhibitions.	HIMURJA
EN/N/11	Development of Safety and quality of hydro projects up to 5 MW capacity.	HIMURJA, MNRE
EN/N/12	Reduction in energy use intensity by using solar system viz solar water heater, solar lantern, solar light, solar coolers (box and dish type).	HIMURJA
EN/N/13	Repair and maintenance of reserved energy systems.	HIMURJA
EN/N/14	Assess stress on Hydro Power plants on account of CC and financial aspects.	DOE
EN/N/15	Implementation of commutative Environment Impact Assessment Studies	DOE
EN/N/16	Assessment of minimum water discharge requirement on the face of CC	DOE

7. State Mission on Urban Planning and Sustainable Habitat

Code	Activity	Implementing Agency
USH/1	Strengthen Waste management practices.	Department of Urban

		Development
USH/2	Adoption of rain water harvesting as part of building by-laws.	Department of Urban Development
USH/N/1	Recycling and reuse of treated waste water.	Department of Urban Development
USH/N/2	Green highway in all ULBs (Plantation and Maintenance) - tree line alongside of National Highways.	Department of Urban Development
USH/N/3	Adoption of electrical vehicles for mass transportation in urban local bodies.	Department of Urban Development
USH/N/4	Consideration of tax on diesel run vehicles at the time of registration imposing optimum Fuel efficiency program.	Department of Transport
USH/N/5	Alteration of Conventional fuel and adopt blending of bio-fuel in automobile.	Department of Transport
USH/N/6	Adoption of rope ways transportation in urban local bodies.	Department of Transport, UDD

4.2. H.P. Knowledge Cell on Climate Change under NMSHE- Phase-II

The Department is implementing the activities approved under HPKCCC Phase-II by DST, GoI vide order No. DST/CCP/SCCC-IHR/HP/200/2020 (C) with the total budget amounting to Rs. 1,12,81,695/- as per following details:

#	Head	I Yr	II Yr	III Yr	IV Yr	V Yr	Total
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Up-gradation of workstations with input and output & other devices (UPS, GPS devices, Printer, Projector, Xerox Machine, MAP Scanner etc.)	7,81,695	-	-	-	-	7,81,695
2	Up-gradation of Office Automation Software (OS, MS Visual Studio, SQL/Oracle Server, GIS Server), data (meteorological, census etc. etc.) & maps (satellite images etc.)	15,00,000	-	-	-	-	15,00,000
3	Equipments for demonstrating demo solar energy plant, bio-gas plant, micro hydro-plant (Gharat), installation of structures for revival of springs.	90,00,000	-	-	-	-	90,00,000
	Non-Recurring Total (A)	1,12,81,695	-	-	-	-	1,12,81,695

Activities being undertaken under the project is as under:

S.No.	Objective	Start month	End month	Quantified deliverables for Monitoring
1	Vulnerability and risk assessment Proposed Activities (i) Micro-watershed level climate change vulnerability assessment of two river basins and panchayat/ village climate change adaptation plans of districts falling in river basins.	Jan., 2021	Dec., 2023	- Climate Change Adaptation plan for around 1200 panchayats/PRI based upon the vulnerability assessment. - Roadmap for state level knowledge network prepared.
2	Institutional Capacity building Proposed Activities (i) Strengthening of R&D activities on Climate Change. (ii) Policy review of primary sectors: water, forest, agriculture, biodiversity & energy.	Jan, 2021	Dec, 2025	- Capacity building package developed for target group. - R&D activities started at state level. - Water, Forest, Agriculture, Biodiversity Energy policy revised.

	(iii) Develop capacity building package on climate change adaptation for selected target groups.			
3	Training programmes for stakeholders Proposed Activities (i) 12 district level workshops. (ii) 4 institutional level workshops (iii) 4 gender specific workshops (iv) Training for Agri-horti, Water, Energy & forest sectors.	Jan, 2021	Dec, 2025	Training programmes for all proposed sectors conducted. 12 district level, 4 institute level, 4 gender specific workshops conducted.
4	Public awareness for community Proposed Activities as above. (i) Publication of IEC material (reports, posters, pamphlets etc.) on climate change adaptation.	Jan, 2021	Dec, 2025	12 Number of awareness programmes conducted for each district. 20 Number of reports, posters, pamphlets published.
5	Others (i) Strengthening climate change adaptation & mitigation through low-carbon energy pathway by setting up demo composite micro-hydro unit, promoting solar energy & bio-gas plants. (ii) Demo project on revival and recharge of springs. (iii) Demonstration of diversified rural livelihood for women marginal farmer in the rural area of the state. (iv) Develop a capacity development package on climate change adaptation for selected target groups in the State. (v) Develop roadmap for State level Knowledge Network and Conceptualizing Climate Change Resource/ Reference hub in the State.	Jan, 2021	Dec, 2025	Setting up of 3 low carbon energy demo projects on hydro, solar and biogas. Recharging and revival of 10 water springs. Demonstration of diversified rural livelihood for women marginal farmer in 10 rural villages.

4.3 Climate Adaptation and Finance in Rural India (CAFRI) - Himachal Pradesh (HP)

Name: Climate Adaptation, Resilience and Climate Finance in Rural India Phase-II (CAFRI-II)

Objective: The planning, implementation, financing, and monitoring of gender-responsive, transformative, and climate risk-informed interventions to enhance climate resilience in rural India in selected states and at the national level is strengthened.

Partner States: Himachal Pradesh, Uttar Pradesh, Tamil Nadu, Haryana, Uttarakhand

Nodal Partners in Himachal Pradesh: Department of Environment Science Technology and Climate Change (DEST&CC), GoHP.

Duration: 1.7.2023-30.6.2026

Operational Plan

Activity	Key Deliverables	Partner	Area / Region / City	Budget
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<p>i) Development and implementation of risk informed gender-transformative development strategy/guidelines for implementation of SAPCC for Agriculture and Water Missions at state level.</p> <p>ii) 12 District Level Contingency Plans/Guidelines to be developed for Agriculture and Water Missions for HP (based on four agro-climatic zones-strategic guidelines prepared)</p>	<ul style="list-style-type: none"> • 12 District level plans/guidelines prepared in line with SAPCC, covering four agro-climatic zones. • 12 Distt level plan implementation framework developed in line with SDGs and NDCs targets. District level plan of three target districts implementation process started 20 % targets achieved by the end of CAFRI-II. Technology Need Assessment (Agri-Horti-Biodiversity) (Crop diversification, moisture management, value addition, harvesting, preprocessing technology etc.). Gender-sensitive development strategy for implementation of SAPCC for Agriculture and Water Missions at state level prepared. 	DoCC, DoA, DoH, Jal Shakti, DoRD	HP	GIZ
M & E digital dashboard & MIS (mission wise) for implementation and reporting on the impact HP SAPCC 2021-30	<ul style="list-style-type: none"> • MIS and Digital Dashboard Based on the Monitoring & Evaluation Framework Developed and ready to use by the government departments 	DoCC and relevant line departments	HP	GIZ
Development/Revision of Software for CCRC at DoCC, Govt of HP	<ul style="list-style-type: none"> • Software/application development Launch of CCRC 	DoCC	HP	GIZ

3. Project under National Adaptation Fund on Climate Change

A Project under National Adaptation Fund for Climate Change titled "Sustainable Livelihood of Agriculture Dependent Rural Communities in Drought Prone District of Himachal Pradesh through Climate Smart Solutions" has been funded by the Ministry of Environment, Forests & Climate Change (MoEF&CC), Govt. of India with a total budget outlay of 20 Crores.

The choice of location is driven by the high climate vulnerability of the district as depicted in the State Action Plan on climate change. The following figures shows the high exposure and high level of climate variability in Sirmour both in the current and future scenario.

The analysis of results reveals that the low lying areas of Himachal Pradesh are highly exposed to climate change. The areas falling in Hamirpur, Sirmour, Solan and Una districts are highly exposed whereas, Kangra, Chamba and Mandi districts are also exposed but comparatively less than the above districts. Likewise areas falling in and Shimla and Kullu districts are also moderately exposed to climate change. High exposure to variable precipitation and high temperature is the urgency that requires smart approach for adaptation. This approach will be tied up with short term adaptive capacity enhancement and long term infrastructure planning. This project will also be tied to a transformational project the state is planning in the water sector with high environmental eco-system co-benefit for the region.

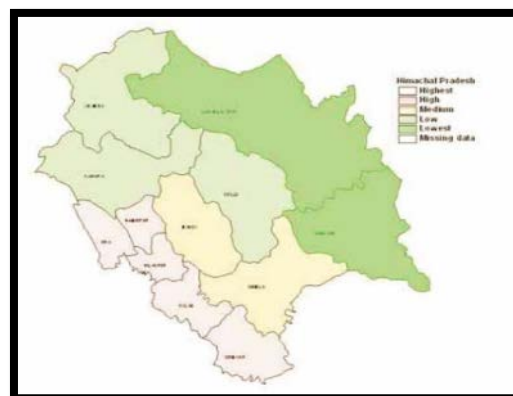
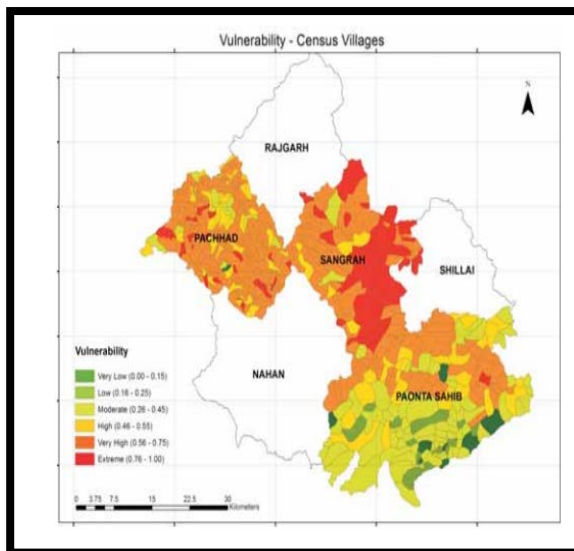
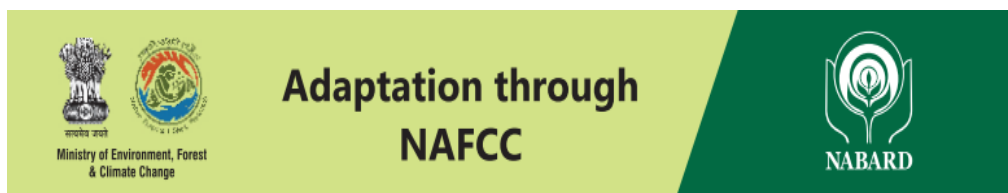


Figure 3 Figure Shows high vulnerability of the District (SAPCC, H.P.)



The Sirmour district of Himachal Pradesh which has second highest level of rural population growth in the decade is experiencing moisture stress and with negative livelihood consequence for the agriculture and horticulture based livelihood. The recent drought history of the district indicates that most of the tehsils of this district were drought affected in 2002 and 2009. The following climatic, socio-economic and cultural pattern have pushed the people (the small and marginal land holders) of the district to margin: (a) deficit and erratic rainfall (b) high dependence on monsoon and least diversification of crops and livelihood options (c) lack of rain water harvesting culture (d) lack of reservoirs/check dams for conservation of water, high poverty, traditional practices (compatible for earlier climatic scenario and now not relevant). The proposed project tries to build the adaptive capacity of small and marginal farmers to adapt to drought and related impacts and enhance resilience through a climate smart approach. This will enable mainstream climate change agenda in the district agricultural planning process. The proposed solutions will also take in to account the climate vulnerability and adaptive capacity that is not usually considered in the regular planning context.



Project Snapshot

Name of the Project : Sustainable Livelihoods of Agriculture-Dependent Rural Communities in Drought Prone District of Himachal Pradesh through Climate Smart Solutions

Project Focus : Climate Smart Agriculture

Location : Drought affected areas of Sirmour District, Himachal Pradesh

Project Finance : Rs. 20 Crore (USD 3 million). (Conversion Rate: 1 USD = INR 66.52)

Duration : 5 Years (2016-20)

Name of Executing Entity : Department of Environment, Science & Technology, Government of Himachal Pradesh

Project Beneficiaries :

Direct: 25,000 Small and Marginal Farmers

Indirect: 30,880 Farmers and Officials

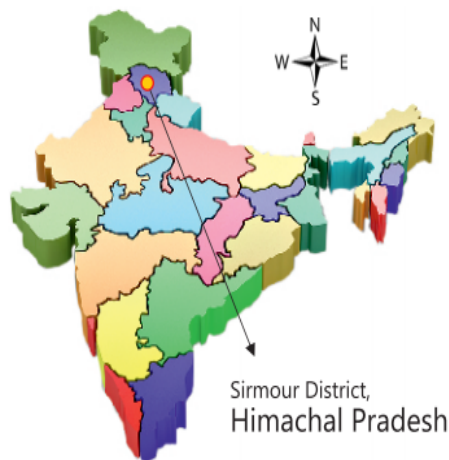


Figure Source: <https://www.nabard.org/auth/writereaddata/File/HP-nafcc.pdf>

4. NMHS : My Waste My Wealth- a Project for setting up 8 Pilot Micro Demonstration Solid Waste Management Plan with financial and social sustainability on multidimensional, coordinated approach

The Department of Environment, Science & Technology, GoHP is implementing a project on "My Waste My Wealth- Project for setting up 8 Pilot Micro Demonstration Solid Waste Management Plan with financial and social sustainability on multidimensional, coordinated approach" under National Mission on Himalayan Studies (NMHS) sanctioned by the Ministry of Environment, Forest & Climate Change, Govt. of India. The objective of the proposed project is to improve public health and quality of life by developing environmentally and financially sustainable systems for solid waste management in Himachal Pradesh include the following:

1. Develop new environmentally safe and socially acceptable pilot demonstration micro SWM facilities at eight selected locations;
2. Develop legal and regulatory frameworks at the local level;
3. Improve municipal financial management and cost recovery systems so as to guarantee the sustainability of urban SWM;
4. Ensure the positive social impact of the new SWM system on the waste pickers;
5. Establish local and municipal mechanisms for minimization and recycling;


The following 8 locations are being developed under the NMHS project:

1. Municipal Council Theog (Municipal Solid Waste =1.8 tons per day)
2. Nagar Panchayat Narkanda (Municipal Solid Waste = 0.80 tons per day)
3. Nagar Panchayat Kasol (Municipal Solid Waste=0.50 to 1 tons per day)
4. Gram Panchayat, Dharampur, Solan (Municipal Solid Waste=0.50 to 5 tons per day)
5. Municipal Council Sarkaghat, Mandi, (Municipal Solid Waste 1.5-2 tons per day)
6. Temple committee at Chintpurni Temple (Kitchen waste 50 to 200 kg/day)
7. Temple committee at Naina Devi Temple (Kitchen waste 50 to 200 kg/day)
8. Temple Maa Bala Sundari, Trilokpur, Nahan Temple (Kitchen waste 50 to 200 kg/day)

In addition to above, 2 more locations have been selected for Municipal Solid Waste Management plants as per budget announcement of the State Government:

1. Municipal Council Joginder Nagar, (Municipal Solid Waste =2-2.5 tons/day)
2. Nagar Panchayat Baijnath-Paprola, (Municipal Solid Waste =3-4 tons/day)

Project Location



#	Project Location	Funding	Geo Coordinates
1	Municipal Council Theog, Shimla	NMHS	31° 7'25.89"N 77°21'19.30"E
2	Nagar Panchayat Narkanda, Shimla	NMHS	31°15'21.92"N 77°27'35.48"E
3	Municipal Council Sarkaghat, Mandi	NMHS	31°42'5.48"N 76°44'10.85"E
4	Nagar Panchayat Kasol, Kullu	NMHS	32° 0'33.49"N 77°18'58.59"E
5	Gram Panchayat, Dharampur, Solan	NMHS	30°53'59.13"N 77° 1'26.34"E
6	Chintpurni Temple, Una	NMHS	31°48'30.76"N 76° 6'10.36"E
7	Naina Devi Temple, Bilaspur	NMHS	31°18'22.29"N 76°32'10.81"E
8	Temple Maa BalaSundari, Trilokpur, Nahan, Sirmour	NMHS	30°32'25.40"N 77°12'29.95"E
9	Municipal Council Joginder Nagar, Mandi	State Fund	31°59'28.46"N 76°47'23.69"E
10	Nagar Panchayat Baijnath-Paprola, Kangra	State Fund	32° 3'6.86"N 76°38'56.52"E

5. Capacity building of marginal farmers in rural areas of Himachal Pradesh on biotechnological interventions for Climate Change Adaptation to ensure sustainable livelihood

The Department of Environment, Science & Technology is implementing a project on "Capacity building of marginal farmers in rural areas of Himachal Pradesh on biotechnological interventions for Climate Change Adaptation to ensure sustainable livelihood - Lamba Thach Panchayat, Tehsil Thunag & Development Block Seraj of Mandi district in Himachal Pradesh, India" approved by the Department of Technology, Ministry of Science & Technology, Govt. of India.

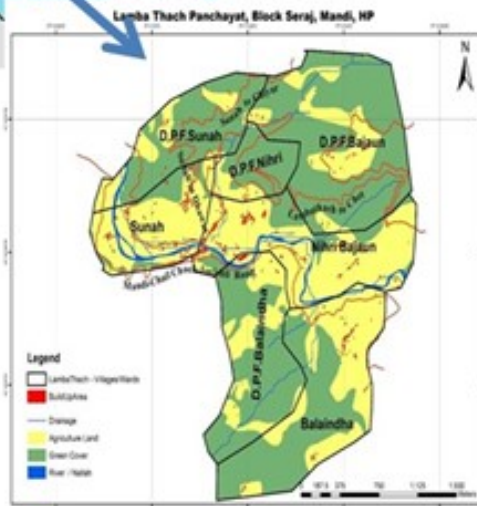
The primary objective of the project is to built capacities of the farmers, create enabling training centre/ pilot in the domain of climate change adaptation with application of biotechnological intervention in Lamba Thach Panchayat of district Mandi. The expected outcomes of the project will be:

- Development of unit/cluster for demonstration of farm-base bio-technology interventions in selected villages of Lamba Thach Panchayat of District Mandi.
- Integrated Bio-technology inputs better cultivation through variators, organc- soil & water management. Value addition & market linkages of local farm produce.
- Training & capacity building of farmers through demonstration unit/ cluster.

Project Location:



Demography					
Revenue village	Geographic areas in (ha.)	House-holds	Populations	Male	Female
SUNAH	171	219	674	340	334
NIHARI BIJAJUN	258	173	579	288	291
BALAINDDHA	99	107	384	176	208
TOTAL	528	499	1637	804	833



Land use	
Type	Area in Hectares
Cultivated land	118
Barren/Non – Cultivated land	478
Forest land	299
Non-irrigated land	118
Grazing land	143
Net Sown area	116
TOTAL	1272

Engagement of Farmers for formation and joining of Himachal Farmers Producers Cooperative Society Ltd. Janjehali



Marginal farmers of the registered Farmer Producer Organization (FPO) identified & selected under the project



Figure 4 Training and Capacity Building of farmers at CSIR IHBT

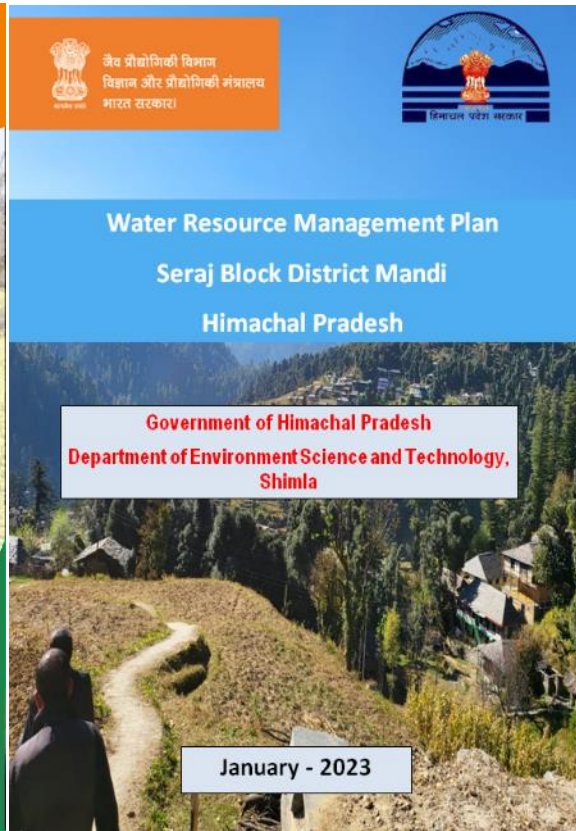
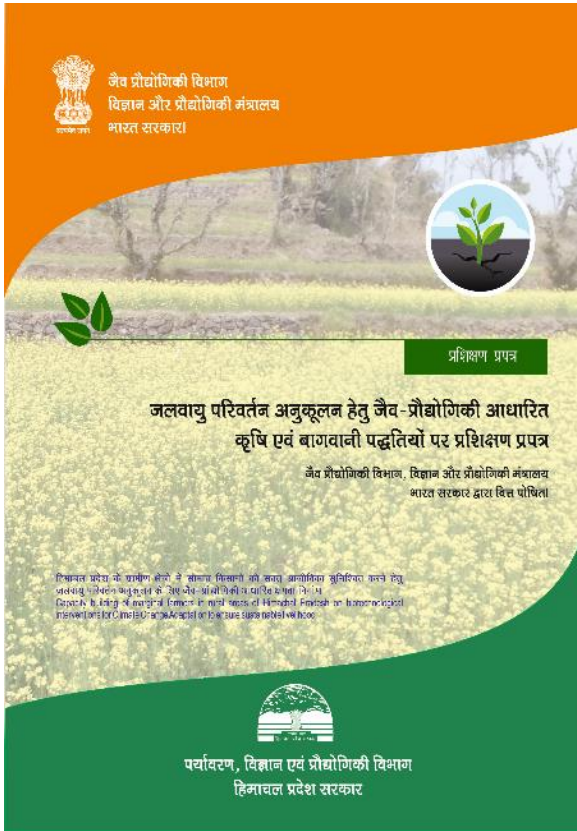


Figure 5 Publications

Chapter-5

SUSTAINABLE DEVELOPMENT GOALS

The Department of Environment, Science & Technology is nodal office for coordinating preparation and implementation of Sustainable Development Goals (SDG) 12 & 13. Overall in H.P. the State Planning Department is the Nodal Department to coordinate the SDG's.

The GoHP has embarked upon the State specific action plan to achieve the SDG's. The SDG's are a set of 17 goals for the world's future, through 2030 backed up by a set of 169 detailed Targets, negotiated over a two-year period at the United Nations and agreed to by nearly all the world's nations, on 25 Sept 2015.

The State is at 2nd rank to achieve Sustainable Development Goals:

States	SD G7	SD G6	SDG 12	SDG 16	SDG 11	SD G3	SDG 10	SD G1	SDG 15	SD G8	SD G4	SD G2	SDG 13	SD G5	SD G9	Compo site SDG
Kerala	100	89	65	80	75	72	69	83	77	62	80	80	69	63	60	75
Himachal Pradesh	100	85	77	73	79	78	78	80	68	78	74	52	62	62	61	74
Tamil Nadu	100	87	78	71	79	81	74	86	63	71	69	66	61	59	71	74
Andhra Pradesh	100	92	84	77	78	77	74	81	69	67	50	52	63	58	52	72
Goa	100	100	47	63	89	72	75	83	59	76	71	78	44	55	68	72
Karnataka	100	85	89	76	78	78	67	68	67	66	64	53	62	57	64	72
Uttarakhand	100	85	82	86	76	77	77	74	64	63	70	61	60	46	56	72
Sikkim	100	89	76	72	85	62	61	80	73	71	58	69	65	58	52	71
Maharashtra	100	90	82	69	87	83	71	66	52	62	64	44	58	51	66	70
Gujarat	94	93	50	82	87	86	64	66	61	64	52	46	67	49	72	69
Telangana	100	96	73	71	76	67	67	68	81	73	63	50	43	41	59	69
Mizoram	100	85	87	81	61	79	64	80	48	51	60	72	66	54	32	68
Punjab	100	66	71	76	91	77	68	69	48	57	60	73	51	45	69	68
Haryana	100	80	77	71	81	72	68	69	48	59	64	58	51	43	66	67
Tripura	83	82	99	80	67	67	85	82	69	57	42	52	41	39	35	65
Manipur	96	87	89	69	65	68	70	60	60	36	63	64	57	41	35	64
Madhya Pradesh	86	88	78	66	81	62	51	44	84	60	45	43	49	55	37	62
West Bengal	98	81	79	81	45	76	71	59	53	57	54	46	39	41	53	62
Chhattisgarh	78	89	64	71	78	60	72	49	65	64	55	37	38	64	36	61
Nagaland	69	87	91	79	48	61	46	73	63	48	39	64	69	48	30	61
Odisha	80	86	73	59	70	67	66	41	83	48	45	42	70	46	46	61
Arunachal Pradesh	85	67	77	64	39	64	69	54	93	50	41	66	58	37	31	60
Meghalaya	50	75	73	72	51	70	88	77	64	63	48	37	62	51	25	60
Rajasthan	100	54	74	73	81	70	45	63	43	57	60	53	49	39	45	60
Uttar Pradesh	100	83	79	79	77	60	41	44	61	53	51	41	39	50	42	60
Assam	98	64	66	62	55	59	65	51	78	50	43	41	53	25	39	57
Jharkhand	77	83	55	70	71	74	65	36	71	54	45	19	25	51	37	56
Bihar	78	91	59	73	67	66	48	32	62	50	29	31	16	48	24	52
UNION TERRITORIES	SD G7	SD G6	SDG 12	SDG 16	SDG 11	SD G3	SDG 10	SD G1	SDG 15	SD G8	SD G4	SD G2	SDG 13	SD G5	SD G9	Compo site SDG
Chandigarh	100	99	78	73	98	74	100	75	85	70	79	97	61	58	45	79
Delhi	100	61	50	62	65	90	72	81	81	65	75	63	55	33	66	68
Lakshadweep	83	100	63	77	56	78	75	61	67	62	62	74	68	58	40	68
Puducherry	98	91	66	86	76	70	62	75	50	68	70	59	23	66	59	68
Andaman and Nicobar Islands	100	87	73	46	85	68	67	71	72	59	57	45	77	68	23	67
Jammu and Kashmir	100	88	95	74	57	70	65	69	52	47	49	71	63	46	42	66

Kashmir																
Ladakh	100	84	95	74	57	70	65	79	27	59	49	71	66	46	48	66
Dadra and Nagar Haveli & Daman and Diu	71	95	62	75	89	80	66	65	62	57	56	27	18	53	47	62
India	92	83	74	74	79	74	67	60	66	61	57	47	54	48	55	66
Target	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

5.1 Sustainable Development Goal No. 12: 'Ensure Sustainable Consumption and Production Patterns'

5.1.1. Targets:

Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries:

1. By 2030, achieve the sustainable management and efficient use of natural resources
2. By 2030, halve per capita food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.
3. By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.
4. By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.
5. Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.
6. Promote public procurement practices that are sustainable, in accordance with national policies and priorities.
7. By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.
8. Support to strengthen scientific and technological capacity to move towards more sustainable patterns of consumption and production.
9. Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.

5.1.2. Tentative Indicator

1. Material footprint and material footprint per capita.
2. Global food loss index.
3. Number of parties to international multilateral environmental agreements on hazardous and other chemicals and waste that meet their commitments and obligations in transmitting information as required by each relevant agreement.
4. Treatment of waste, generation of hazardous waste, hazardous waste management, by type of treatment.
5. National recycling rate, tons of material recycled.
6. Number of companies publishing sustainability reports.
7. Number of departments implementing sustainable public procurement policies and action plans.
8. Percentage of educational institutions with formal and informal education curricula on sustainable development and lifestyle topics.
9. Number of qualified green patent applications over total.
10. Residual flows generated as a result of tourism; direct GDP.

5.1.3. Vision

Sustainable Consumption and Production (SCP) has been defined as "The use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations" United Nations Environment Programme (UNEP).

Consumption and Production SCP is also a possibility to “leapfrog” to more resource efficient, environmentally sound and competitive technologies, bypassing inefficient, polluting, and ultimately costly phases of development. This could improve the competitiveness and the access of local products to the national, regional and international markets, increasing the possibilities of national revenues and economic growth, which in turn, if distribution policies and activities are in place, can contribute to poverty eradication United Nations Environment Programme (UNEP).

The Government of Himachal Pradesh will strive to sustainably harness the renewable sources of energy, reduce waste generation through prevention, reduction, recycling and re-use and to sustainably manage the use of natural resources.

Himachal Pradesh Today	Focus for Tomorrow
<ul style="list-style-type: none"> ➤ 26.40%, 14, 679 ha. area under Forest Cover (37037 ha. Forest Area). ➤ 80% area under rain fed agriculture. ➤ 450 tons of municipal solid wastes and 60 tons of hazardous wastes are generated per day in State. 	<ul style="list-style-type: none"> ➤ Sustainable practices to harness renewable energy. ➤ Enhance forest density and cover. ➤ Integrated watershed development. ➤ Efficient use of natural resources. ➤ Efficient management of waste through prevention recycling, re-use, etc. ➤ Sustainable patterns of consumption and production.

5.1.4. Gaps between targets and current achievements in Himachal Pradesh

Reserved Forests constitute 5.13%, Protected Forests 89.27% and Un classed Forests 5.60% of the total forest area. About two third of the State's geographical area is under recorded forests. But a substantial part of this is not conducive for tree growth, being under permanent snow, glaciers and cold deserts. The forest cover in the State, based on interpretation of satellite data, is 14,679 km², which is 26.35% of the State's geographical area. in terms of forest canopy density classes, the State has 3,224 km² very dense forest, 6,381 km² moderately dense forest, and 5,074 km² open forest. As per data there has been a decrease of 2 km² in the moderately dense forest and an increase of 13 km² in open forest. It is noticed from the analysis that there has been an improvement in area of forests.

Primary sector, which includes Agriculture, Forestry, Fishing, Mining and Quarrying, during 2015-16, witnessed growth rate of 0.7 percent. During the year, 145984 m³ of timber, 10 ton of firewood, 2 ton of Charcoal and 7285 mg of Khair were extracted from the State Forests.

Forests are exposed to dangers of fire, illicit felling and encroachment. It is therefore, felt necessary that check posts are established at suitable places to curb illicit timber trade, installation of fire fighting equipments and new techniques are introduced in all the forest divisions where fire is a major destructive element. Communication network is also required for good management and protection. Keeping these factors in view Intensification of Forest Management Scheme is being implemented with Central Assistance. An outlay of Rs. 402.00 lakh has been estimated for the financial year 2022-23.

Forest plantation is being carried out under Productive Forestry Scheme and Soil Conservation Schemes. These schemes include Improvement of Tree Cover, Raising Nurseries for Departmental Plantation and Public Distribution, Development of Pasture & Grazing Land and Protective Afforestation, Soil Conservation and Afforestation. For the financial year 2016-17 an area of 7,969.23 hectares has been achieved. 35 lakh medical plants are to be planted in the Financial year 2022-23.

5.1.5. Gap analysis:

- ✓ Focus is on productivity, outputs and yields not balanced with an equal emphasis on conservation and rejuvenation of environmental and natural resources.
- ✓ Implications of future trends - increasing population pressure, the imperatives of development and climate change - are inadequately understood and addressed though all these are putting additional pressure on the quantity and quality of natural resources.
- ✓ Training courses follow a sectoral approach and not an eco-system approach. Forest department conducts some excellent training courses but needs to strengthen them through an eco-system approach.
- ✓ Training does not take into account women's traditional knowledge on agriculture and allied activities (crop varieties, animal species, seed selection & storage, bio-pesticides, etc), nor adds value to it.

- ✓ Legislators are not trained in adaptation measures – neither on local measures based on traditional knowledge and practice that can be scaled up successfully, nor on new measures.
- ✓ Training on participatory social audit needed for larger impacts and effective monitoring & evaluation.
- ✓ Designated officers for environment too few – usually just one – and located only at the headquarters, not in field/implementation areas.
- ✓ No focus on resource constraints and rejuvenation of environmental and natural resources as integral to operational plans.
- ✓ Inadequate incorporation of environmental issues in trainings of regulation bodies though these bodies are key to maintaining health of environmental resources
- ✓ Trainings are sectoral and project-focused, not taking a macro or a 'programmatic' view for e.g. need to take the entire river basin as a parameter for each hydro-power unit.
- ✓ Trainings do not include backward and forward linkages which are necessary for environmental considerations for e.g. mining plans, construction of roads with adequate drainage.
- ✓ Elected representatives are not exposed to some of the best practices in eco-friendly urban development and management that are available in India and particularly in Latin American countries.
- ✓ Inadequate attention to use of state-of-the-art technology like GIS (Geographic Information System) for planning and monitoring.
- ✓ Inadequate knowledge about cross-sectoral linkages, understanding of convergences.
- ✓ Attitudinal change required for more pro-environment decision making and management practices.

5.1.6. Challenges: Natural Resource Management

Water: Fresh water supply is a major challenge with only 10.30% of the population receiving 135 LPD and 65.30% receiving 55 LPD, leading to a significant gap in demand and supply.

Forests: Himachal Pradesh's forests, covering 26.37% of its area, are under stress from decreased rainfall, population growth, and development pressures, impacting its rich biodiversity.

Soil: Agricultural and horticultural production has not met potential due to soil quality issues, necessitating better soil management and water resource strategies.

Renewable Energy: Despite having 37,436 MW of hydropower potential, only 10,400 MW has been harnessed. Solar energy usage is minimal, and increasing energy demand along with transmission losses threaten supply stability.

Table 5.1: Natural Resource Management Challenges and Actions

Sector	Sub Sector	Challenges	Action
Natural Resource Management	Water	<ul style="list-style-type: none"> – Changing Climate (Precipitation, Rainfall & Temperature) – Increasing Water Demand – Non rain water harvesting – Ground water depletion 	<ul style="list-style-type: none"> – Adaptation actions in water sector. – Improve efficiency in Water distribution – Enhance Rain Water Harvesting – Ground Water Recharge – Improve Water Quality
	Forests	<ul style="list-style-type: none"> – Forest density decreasing – Forest Cover decreasing – Forest fire increasing – Loss of biodiversity 	<ul style="list-style-type: none"> – Protect & Conserve Forests – Afforestation programme – Creation of infrastructure to control forest fire – Increase use of cleaner fuels LPG.
	Soil	<ul style="list-style-type: none"> – Agriculture & Horticulture Production – Uncontrolled unscientific Solid Waste Management – Depleting Forests. 	<ul style="list-style-type: none"> – Improve soil quality – Soil moisture, nutrient level checks and improvements. – Effective Sanitation System, – Control Industrial Pollution
	Renewable Energy	<ul style="list-style-type: none"> – Lacking in Infrastructure Development – Transmission & Distribution Losses 	<ul style="list-style-type: none"> – Transmission & Evacuation of power. – Construction costs rationalization as greener energy. – Enhance solar energy usage.

		<ul style="list-style-type: none"> - Depletion of glacier cover - Silt management. 	<ul style="list-style-type: none"> - Enhance wind energy use.
	Air Quality	<ul style="list-style-type: none"> - Air pollution due to cement industries - Increasing network of road. - Increasing vehicles. - Increasing industries 	<ul style="list-style-type: none"> - Implementation & Monitoring of integrated CAT (Catchment Area Treatment) plans. - Green roads & Road side plantations. - Strengthening of automatic air quality monitoring station. - Maximize use of clean fuels. - Mass transportation. - Parking facilities.

5.1.7. Strategies & Targets for success

To effectively manage renewable energy sources, minimize waste generation through prevention, reduction, recycling, and reuse, and ensure the sustainable use of natural resources, the Government of Himachal Pradesh has adopted a three-pronged strategy:

- Strategies for Protecting Natural Resources
- Strategies for Improved Waste Management
- Strategies for Sustainable Consumption and Production

In line with these strategies, the following targets have been set to be achieved by 2030:

- Increase Renewable Energy Production and Consumption: Enhance solar and wind energy production and consumption by 10%.
- Municipal Waste Management: Collect, treat, and process 50% of municipal waste (~250 tons) through waste-to-energy facilities within the state.

Expand Organic Farming:

- Increase the area under organic horticulture from 17,000 to 30,000 hectares.
- Expand vermi composting units in agriculture from 1,000 to 1,930.
- Boost organic manure production from 0.85 lakh MT to 1.64 lakh MT, benefiting 20,000 farmers.
- Reduce Pesticide Usage: Decrease the use of pesticides in agriculture by 20% from current levels.

Promote Biological Control:

- Expand the area under biocontrol from 100 to 175 hectares.
- Increase the release of bioagents from 150 lakhs to 270 lakhs, benefiting 6,932 families.
- Increase Hydropower Capacity: Expand hydropower capacity by 30%.

Enhance Food Storage and Preservation:

- Construct covered storage facilities for food grains at the micro level.
- Establish cold chains at basin levels.
- Promote and set up small-scale processing and preservation units for horticultural and agricultural produce.

Table 5.2: Strategies & Targets for success

SDG	Targets	Indicator	Current Status	Target by 2022	Target by 2030	Data Source
12.1	Implement the 10-year framework of programmes on sustainable consumption and production, all	12.1.1. Material Footprint and material footprint per capita.	Foot print on industrial production is 5570.88 (000'tones) G	Reduction in CO ₂ emission by 10% of 2012 levels	Reduction in CO ₂ emission by 20% of 2012 levels	All Stakeholder Departments

	countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.		grams CO ₂ eq. 15.86 lakhs LPG (Liquid Petroleum Gas) users	Increase by 10% of 2012 levels.	Increase use of LPG by 30% of 2012 levels.	Food & Civil Supplies, Indian Oil Corporation
12.2	By 2030, achieve the sustainable management and efficient use of natural resources	12.2.2.Solar – wind Renewable Energy Production and Consumption increased by 10%	At present only 0.6% share of solar energy.	Achieve 10% of solar-wind renewable energy production.	Achieve 60% of solar-wind renewable energy production.	Deptt. of Energy.
		12.2.3.Increase hydro power - renewable energy capacity.	At present only 10 GW (Gigawatt) hydro-power has been harnessed	10% Increase	30% increase	Deptt. of Energy
12.3	By 2030, halve per capita food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.	12.3.1.Increase the area under organic farming under Horticulture & Agriculture	17,000 Ha. in Agriculture Sector Adoption of organic farming policy	20,000 Ha. in Agriculture Sector 15,000 families benefitted Soil testing labs at district level setup	30,000 Ha. in Agriculture Sector. 30,000 families benefitted. Soil testing facility at block level setup	Agriculture & Horticulture Deptt.
		12.3.2.Reduce the total pesticides used in agriculture/ horticulture	238 MT use of pesticides	10% Reduction	30% Reduction	Agriculture & Horticulture Deptt.
		12.3.3. Construct covered storage for food grains at the micro level.		10% increase.	40% increase	Agriculture & Horticulture Deptt.
		12.3.4. Set up cold chains at basin levels.	-	2 River basins	5 river basins	Agriculture & Horticulture Deptt.
		12.3.4.Promote & Setup horti-Agri produce processing and preservation units at small scale level	-	30 FPOs (Farmer Produce Organization)setup	78 FPOs (Farmer Produce Organization) setup	Agriculture & Horticulture Deptt., Distt. Administration
12.4	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	12.4.1.Collect, Treat, Process 50%, ~ 250 tons of municipal wastes through waste to energy facilities in the State.	-	Produced ~5 MW of energy from Municipal waste. Common Municipal Solid Waste in all block setup Common Effluent Waste Water Treatment plant in all major industrial areas PFR prepare STP (Sewage Treatment Plant) setup in local bodies	Produced ~20 MW of energy from Municipal waste. Common Municipal Solid Waste in all Tehsils Head Quarter setup CETP (Common Effluent Treatment Plant) setup in all major areas STP made function in all towns	ULBs', Distt. Admn. Energy Deptt. Pollution Control Board (PCB), Department of Environment, Science & Technology (DEST) PCB, DEST PCB, DEST

12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	12.5.1. Collect, Treat, Process 50%, ~ 250 tons of municipal wastes through waste to energy facilities in the State.	-	Produced ~5 MW of energy from Municipal waste.	Produced ~20 MW of energy from Municipal waste.	ULBs', Distt. Admn. Energy Deptt.
12.6	Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	12.6.1 Policy framework for adopting sustainable practices and to integrate sustainability information into their reporting cycle	- At present 1% waste water recycled	50% 10% waste water recycling increase in industrial areas of 1012 levels	100% 50% increase in waste water recycling in industrial area of 2012 levels.	Industries Department
12.7	Promote public procurement practices that are sustainable, in accordance with national policies and priorities.	12.7.1. Implementation/ development of State Specific procurement policies in accordance with nation policies	-	Policy developed/ implemented e-procurement system adopted	100% implementation Of public procurement policy.	All stakeholder departments
12.8	By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	12.8.1 Dissemination of information about sustainable development and lifestyles in harmony with nature by incorporating it in existing education system.	-	Education curriculum updated. Develop 30 eco villages Organization of 1000 mass awareness camps	100% implementation Develop 80 eco villages Organization of 10000 mass awareness camps	Education Department DEST DEST
12.a	Support to strengthen scientific and technological capacity to move towards more sustainable patterns of consumption and production	-	-	Develop R&D modelling facility for awareness on environmental practices at state level	Develop R&D model facility on environmental protection at district level	DEST
12.b	Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.	-	-	Build model green roads of 10 kms. Length Promote green industries Develop training modules for green jobs Traditional knowledge	Build model green roads in all districts Promote green industries Conduct 1000 training for green jobs and traditional knowledge	DEST, PWD Tourism, Forest Deptt. of Industries DEST

5.2. Sustainable Development Goal No. 13: 'Take Urgent Action to Combat Climate Change and its Impacts'

5.2.1. Targets

1. Strengthen Resilience and Adaptive Capacity to climate related hazards and natural disasters in all countries.
2. Integrate climate change measures into national policies, strategies and planning.
3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
4. Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible.
5. Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries, including focusing on women,

5.2.2. Indicator

1. Number of Deaths, Missing people, Injured Relocated or Evacuated due to disasters per 100000 people.
2. Number of departments that have formally communicated the establishment of integrated low-carbon, climate-resilient, disaster risk reduction development strategies (e.g. a state adaptation plan process, national policies and measures to promote the transition
3. to environmentally friendly substances and technologies).
4. Number of institutions that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula.

5.2.3. Vision

In consonance with the State Action Plan on Climate Change (SAPCC), the Government of Himachal Pradesh will strive to increase resilience, spread climate change knowledge & awareness, improve adaptive capacity of the people towards changing climate, especially extremely vulnerable areas of the State.

Table :5.3

Himachal Pradesh Today	Focus for Tomorrow
➤ Himachal Pradesh is likely to experience 1.7°C to 2.2°C warming.	➤ Climate Change Vulnerability Assessment at Village level.
➤ The mean annual rainfall likely to vary between 1268±225.2 and 1604±175.2 mm in the State.	➤ Promote sustainable development through climate change related adaptation and mitigation actions.
➤ Himachal Pradesh emits only ~0.67% GHGs (Green House Gases) of National Emission.	➤ Raise awareness and education on mitigation, adaptation and resilience in all communities, especially in vulnerable areas.

5.2.4. Himachal Pradesh Today

Himachal Pradesh, located in the western Himalayas, covers 55,673 square kilometers (34,594 miles) with elevations ranging from 350 meters (1,148 ft) to 6,000 meters (19,685 ft) above mean sea level. Hamirpur is the smallest district, covering 1,118 sq. km (2.01%), while Lahaul & Spiti is the largest, with 13,835 sq. km (24.85%). The state's population, as per the 2011 Census, is 6,856,509, accounting for 0.57% of India's total population. The population increased by 17.53% from 1991 to 2001 and then decreased by 12.81% by 2011.

Climate trends in Himachal Pradesh, particularly precipitation (rainfall and snowfall) and temperature, are crucial indicators. A study by Bhutiyani et al. (2007) on long-term climate trends in the Northwest Himalayas, including

Shimla, HP, from 1901-2002, found a significant increase in air temperature by about 1.6°C, with faster winter warming.

Himachal Pradesh is highly vulnerable to both natural and man-made disasters, including earthquakes, floods, droughts, landslides, and cloudbursts. The economically weaker sections, particularly children in government schools, are the most affected by these disasters.

Table 5.4: Frequency and Intensity of Disasters in H.P.

S.No	NatureofDisaster	Frequency	Intensity
1.	Flood	Regular feature	High
2.	Drought	Every 3–5years	Moderate
3.	Cloudburst	Regular feature	High
4.	Earthquake	Regular feature	Moderate to Very High
5.	Landslide	Regular feature	High
6.	Avalanche	Regular feature	Low
7.	Lightening	Rare	low
8.	Disease Epidemic	Rare	High
9.	Industrial toxicity	Rare	Low
10.	Accidents	Regular feature	High
11.	Fire	Regular feature	High

5.2.5. Gaps between targets and current achievements in Himachal Pradesh

The available data and its assessment reveal significant gaps in our understanding of natural resources and their vulnerability to climate change in the Himalayas, particularly in Himachal Pradesh. There is a lack of systematic monitoring, documentation, and research on the region's biodiversity and the impacts of climate change on human well-being. Current research focuses primarily on the adverse effects of climate change, often overlooking local adaptation mechanisms and potential new opportunities. Additionally, there is a shortage of trained personnel, institutional frameworks, and policy directives to address climate change challenges.

Three key knowledge and data gaps need attention:

1. Understanding the magnitude and rate of climate change at regional and local levels and its impact on biodiversity and ecosystems.
2. Developing consolidated biodiversity conservation and climate adaptation techniques specific to Himachal Pradesh and the Himalayan region.
3. Conducting detailed analyses for vulnerable sectors, particularly agriculture, horticulture, ecosystems, and biodiversity.

An analysis of Himachal Pradesh has highlighted the state's vulnerability to climate change, but inadequate data and knowledge gaps underscore the need to strengthen the state's capacity. The district-level mapping of adaptive capacity, considering biological, social, and technological indicators, remains incomplete due to these gaps.

Regarding climate change-induced disasters, the state lacks basic safety knowledge (KAP Report, 2012). Educational institutions are particularly vulnerable to earthquakes, necessitating a standardized disaster operation procedure. Training is needed for department personnel in disaster management, including relief, rescue, and rehabilitation. Establishing district-level monitoring mechanisms and creating a pool of resource persons for disaster planning and auditing at the grassroots level are essential. Additionally, financial authority should be granted at the district, college, and school levels to manage crises effectively.

- 13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful**

mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible.

Project proposals on 1. Community based Water Harvesting and Natural Water Resource Management project by IPH (Irrigation & Public Health) Department and 2. Himachal Pradesh Climate Resilient Forest Management by Department of Forest through Nodal Department i.e. Department of Environment, Science Technology submitted to Green Climate Fund Board through NABARD.

13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries, including focusing on women

Himachal Pradesh's economy heavily relies on sectors such as hydropower generation, horticulture, agriculture, forestry, and tourism, all of which are under threat from climate change. Changes in these sectors could significantly impact the livelihoods of mountain communities and those living in the plains.

Major climate change concerns in Himachal Pradesh include:

- The agrarian economy affecting 90% of the rural population.
- Dependence on rainfall for agriculture.
- Sustainability of hydropower, reliant on snow and glaciers.
- Water sources for drinking and irrigation.
- Rural livelihoods dependent on forests for fuelwood, fodder, and non-wood products.
- The economic role of medicinal herbs.
- Climate-induced natural hazards.

Indicators of Climate Change in Himachal Pradesh:

- A rise in temperature by about 1.6°C in the last century in the NW Himalayan Region.
- An increased warming rate in Shimla during 1991-2002.
- A 17% decrease in rainfall in Shimla since 1996.
- A noticeable decrease in seasonal snowfall in Shimla since 1990, with the lowest recorded in 2009.
- Decreased monsoon discharge in the Beas River.
- Increased winter discharge in the Chenab River.
- Shifts in apple cultivation due to rising temperatures, with areas converting to vegetable farming.
- Increased pest and disease severity.
- Shifts in forest types, with pine forests invading higher altitudes and declines in native trees like Kikar, Tali, Deodar, and Ban.

Knowledge and Data Gaps:

- Limited understanding of the magnitude and rate of climate change at regional and local levels.
- Lack of consolidated biodiversity conservation and climate adaptation techniques for Himachal Pradesh.
- Insufficient district-level adaptive capacity mapping due to inadequate data.
- Absence of significant infrastructure for early warning systems and disaster management.

Impacts of Climate Change:

- Water crises, droughts, floods, and impacts on agriculture, land fertility, health (especially vector-borne diseases), forests, deforestation, biodiversity loss, and pollution.
- A projected temperature increase of 1.7°C to 2.2°C could lead to significant shifts in agriculture and horticulture, affecting cropping patterns and productivity. Some regions may see yield reductions of up to 50% by 2020.
- Water resources will be stressed, with increased rainfall during June to September, leading to more floods, soil erosion, and glacier retreat affecting river discharge.
- Forests, especially high-altitude dense forests, are highly vulnerable, with potential shifts in forest types and an increased risk of forest fires.
- About 26% of Himachal Pradesh's area contains 3,295 species, 95% of which are endemic. Rural communities rely heavily on forests for their livelihoods.

Table 5.5: Indicator Statements for Monitoring the Progress

SDG	Targets	Indicators	Current Status	Target by 2022	Target by 2030	Data Source
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13.1	Strengthen Resilience and Adaptive Capacity to climate related hazards and natural disasters in all countries.	13.1.1. A village level Climate Change Vulnerability Assessment (CCVA) for all districts covering all 20690 villages of 3226 panchayats in all 78 developmental blocks.	Village level Climate Change Vulnerability Assessment of three blocks of District Sirmaur completed.	CCVA of all villages of Sirmaur, Kullu, Bilaspur, Una, Hamirpur & Kangra Districts with Hydrological modelling.	CCVA of all villages of the State of all districts. Vulnerability Assessment of all Agro-climatic zones.	Census, Meteorology, all concerned stakeholder departments.
		13.1.2. Establish at least one climate smart eco-village in all 78 developmental block of the State.	Climate smart eco-villages guidelines prepared and process of identifying eco-villages initiated.	Implementation of climate smart eco-villages guidelines in 5 villages of the state	Implementation of climate smart eco-villages guidelines in one village of 78 blocks.	Panchayati Raj, District Administration, BDOs etc.
		13.1.3. Building resilience through increased water availability and efficient water use in rural areas by constructing 3226 water harvesting structures.	To improve adaptive capacity of the rural community climate change adaptive measures initiated in Sirmaur district under NAFCC (National Adaptation Funds on Climate Change).	1000 water harvesting structures made functional. Restoration of 500 natural springs	3226 water harvesting structures to be made functional. Revive 3000 natural springs.	Agriculture, Horticulture, RD, Panchayati Raj, District Administration, IPH
		13.1.4. Adoption of climate smart agriculture technologies and farm diversification options for climate resilient livelihoods.	Climate smart agriculture technologies and farm diversification options for climate resilient livelihoods initiated in district Sirmaur under NAFCC.	Target beneficiaries 1.00 Lakhs farmers under climate smart technologies.	Target beneficiaries 5.00 Lakh farmers under climate smart technologies.	Agriculture, Horticulture, RD, Panchayati Raj, District Administration, IPH.
		13.1.5 Number of villages covered by early warning system for floods	Presently study on early warning systems for floods have been carried out for district Kullu of HP under which setting up of early warning system in villages around Parvati River has been proposed.	Flood prone villages of Kullu district situated around Beas & Parvati River will be equipped with early warning systems.	Flood prone villages situated around all river basin of the state will be equipped with early warning system.	Disaster Management Authority, District Administration
13.2	Integrate climate change measures into national policies, strategies and planning.	13.2.1 Implementation of actions of State Strategy & Action Plan on Climate Change integrated with Nation Action Plan on Climate Change.	State Action Plan has been prepared with sectoral guidelines and recommendations and actions are being implemented with sectoral departments/ agencies.	Integration of recommendations of SAPCC (State Action Plan for Climate Change) in all upcoming developmental schemes of State and Centre.	Implementation of recommendations of SAPCC in all developmental schemes.	All sectoral departments of the State.
13.3	Improve education, awareness-raising and human and institutional capacity on	13.3.1. Block level capacity building & awareness programme organizing 200 awareness camps.	-	100 Awareness camps on climate adaptation Prepare report	200 awareness camps on climate adaptation Publishing of reports and papers	Administration, RD, ULBs, Agriculture, Horticulture, RLBs etc.

	climate change mitigation, adaptation, impact reduction and early warning.			Model R&D facilities in 10 villages	R&D facility to demonstrate climate smart practices set up in 50 villages	
		13.3.2. Improved community mobilization to collectively plan and undertake climate change adaptation.	-	5 cluster/ FPO (Farmer Produce Organization) setup	FPO in 10 cluster setup in 10 blocks	Administration, RD, ULBs, Agriculture, Horticulture, RLBs etc.
		13.3.3.Improved potential of livestock resources as an option for livelihood stabilization in rural areas.	-	20 sensitization camps for shepherds conducted	50 camps organized	Animal Husbandry, RLBs etc.
		13.3.4. Establish district level knowledge network of climate change among education institutions establishing 12 district level knowledge groups.	Process of establishment of knowledge network of climate change initiated.	Institutions of 6 districts brought under networking. Establishment of Research Groups.	Institutions of all districts in the State Establishment of Research Groups	Education Department
		13.3.5. Knowledge generation for extremely/highly vulnerable village assessed as per climate change vulnerability analysis to enhance awareness of rural communities and stakeholders as well as for better policy inputs.	Process of capacity building programme for Legislators & policy makers initiated	Conduct 50 Awareness camps	Conduct 500 Awareness Camps	HP Vidhan Sabha, Admn. Secretaries, District Administration, RD, ULBs, RLBs etc.
13.a	Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing			Three proposals to Green Climate Fund prepared and submitted	At least 10 Green Climate Fund proposals prepared	DEST

	countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible.					
13.b	Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries, including focusing on women,			Gender focused adaptation graining programs in each block in 78 camps	Gender focused Adaptation training programs in each panchayats of HP conducted	DEST

Chapter-6

ENVIRONMENT MANAGEMENT & CLIMATE CHANGE – INTERNATIONAL COOPERATION

The Department of Environment, Science, Technology & Climate Change (DEST&CC), as the nodal department for environmental protection and climate change, collaborates on various bilateral and multilateral programs with the Government of India.

Bilateral Cooperation:

- DEST&CC partnered with the German Development Cooperation (GIZ) under the Indo-German Technical Cooperation Project, CAFRI (Climate Adaptation, Resilience, and Finance in Rural India, Phase-II) in collaboration with the Ministry of Environment, Forest and Climate Change (MoEFCC), GoI. CAFRI-II focuses on localizing climate adaptation efforts in Himachal Pradesh, developing gender-transformative strategies for implementing the State Action Plan on Climate Change (SAPCC) for Agriculture and Water Missions at the district level across the state's four agro-climatic zones.

Multilateral Cooperation:

- DEST&CC collaborated with the World Bank and Global Green Growth Institute (GGGI), South Korea, on environmental management practices, particularly municipal solid waste management.
- In 2023-2024, DEST&CC participated in the Indian Himalayan Climate Adaptation Programme (IHCAP) of the Department of Science and Technology (DST), GoI. This program, in partnership with the Swiss Agency for Development and Cooperation (SDC), focused on research and capacity building on climate change. Efforts included training for staff from nodal and district departments, research institutions, NGOs, and women's self-help groups.

This section provides a brief overview of these programs and the actions undertaken during the year 2023-2024.





Glimpses of World Environment Day and Exhibition jointed hosted by DEST&CC, GIZ and SDMA, GoHP.

1.1. Climate Adaptation and Finance in Rural India (CAFRI) - GIZ

Context :

India's Nationally Determined Contributions (NDCs) emphasize improving climate change adaptation by increasing investments in vulnerable sectors. The CAFRI project, part of the BMZ program "Climate and Environment in Rural India," aligns with the NDCs by helping reduce climate risks for vulnerable groups and sectors. It also focuses on building the capacities of stakeholders at various levels in planning, implementing, and financing state-level climate adaptation initiatives.

Project name	Climate Adaptation, Resilience and Climate Finance in Rural India (CAFRI II)
Commissioned by	German Federal Ministry for Economic Cooperation and Development (BMZ)
Project region	Haryana, Himachal Pradesh, Tamil Nadu, Uttar Pradesh, Uttarakhand (MoEFCC); PAN India (NABARD)
Lead executing agency	Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India, and the National Bank for Agriculture and Rural Development (NABARD)
Duration	2023 - 2026

Targeted Beneficiaries:



Expected Outcomes:

Relevant public institutions have integrated gender- responsive climate risk analyses based on climate scenarios or approaches into policy planning documents, procedures, guidelines, or funding programmes.

Female professionals and managers from public institutions, the private sector, and civil society, alongside agricultural consultation services, producer organizations, and/or federations of women's self-help groups, actively engage in capacity development activities. Furthermore, they demonstrate concrete examples by integrating climate risk and vulnerability assessments into their professional decision- making processes, thereby mitigating maladaptation risks.

Gender-responsive and risk-informed climate change adaptation project proposals are submitted by relevant public and private institutions to potential public or private stakeholders for funding.

Financing mechanisms to finance adaptation technologies and solutions are approved by the financing mechanism provider.

Contribution to the 2030 Agenda



1.1.1.1.1.1

Climate Change Reference Centre (CCRC):

Climate Change Reference Centre (CCRC):

CCRC has been set up in the Department of Environment Science Technology & Climate Change (DEST&CC) in Himachal Pradesh, and aims to strengthen information exchange on climate change, and coordination among relevant stakeholders at state level. The CCRC shall be a one-stop platform for learning and to gain knowledge about climate change adaptation and mitigation, its approaches through interactive web-based learnings etc. acting as a digital repository for climate change knowledge and references at regional, national, and international level.



Figure 24 Climate Change Reference Centre



Figure 25 Capacity Development Programme launch event at State Agriculture management & Extension Training Institute (SAMETH) and launch of Mission Life Poster on World Environment Day 2023 jointly developed by DEST&CC and GIZ.

6.2. Development Policy Loan- World Bank

Over seven years, the World Bank has supported Himachal Pradesh in advancing its green and inclusive development agenda. Starting in 2009, the first Development Policy Loan (DPL) provided \$200 million for fiscal

reforms, leading the state toward sustainable development. Two subsequent Green Growth DPLs, totaling \$200 million between 2011 and 2014, furthered this agenda by promoting environmentally and socially sustainable development in hydropower, tourism, industry, and watershed management. These loans also marked the first time India accessed the Clean Technology Fund for reducing greenhouse gas emissions. The support helped Himachal Pradesh establish institutions and reform policies for lasting change, though continued political commitment is essential for implementing this vision.

The World Bank's 2009 DPL facilitated the creation of the Department of Environment, Science, Technology & Climate Change (DEST&CC), which now advocates for environmental issues and coordinates integrated, eco-friendly development efforts across government departments. In 2013, DEST developed an Environmental Master Plan (EMP) that established baseline data for the state's resources, identified ecologically sensitive zones, and outlined corrective measures. The Aryabhata Geo-informatics and Space Application Centre (AGISAC), established in 2011, serves as a data repository and assists government departments in making evidence-based decisions.

DEST&CC collaborated with the World Bank and Global Green Growth Institute (GGGI), South Korea, on environmental management, focusing on municipal solid waste management. A team of experts from these organizations visited the state to consult key stakeholders.

6.3. Indian Himalayas Climate Adaptation Programme- (IHCAP)- SDC

The Himalayan region faces significant challenges due to climate change, impacting ecosystems and livelihoods. To address these challenges, there is an urgent need to identify and prioritize adaptation mechanisms. While multiple adaptation options exist, not all can be implemented simultaneously. Understanding local conditions, vulnerabilities, and the priorities of different stakeholders is crucial. The NMSHE mission document highlights the need for adaptation in the Himalayas, emphasizing the integration of scientific information on impacts, vulnerability, and adaptation into decision-making, risk management, and sustainable development initiatives.

Recognizing the vulnerability of Himachal Pradesh, the Department of Environment, Science Technology & Climate Change (DEST&CC) has collaborated with the Indian Himalayas Climate Adaptation Programme (IHCAP) of the Swiss Agency for Development and Cooperation (SDC). During IHCAP Phase I (2012-15), a pilot study in Kullu district assessed climate vulnerability, hazards, and risks, leading to proposed adaptation actions. Phase II (2016-19) built on this by demonstrating science-based adaptation planning. Nine adaptation measures were identified and detailed through consultation with stakeholders, resulting in the development of Detailed Project Reports (DPRs) for implementation in Kullu district. These efforts were validated through meetings with state nodal agencies and line departments. The status of projects prepared under in technical association with SDC are as under:

#	Project Title	Proposed budget	Current Status
1.	Reducing Glacial Outburst and Flood Risk in Parvati Valley of Kullu district, Himachal Pradesh	Rs. 20.49 Cr. Under NAFCC	Approved in principle by MoEF&CC, Gol on 23/12/2019. Technically revised EWS proposal also submitted to SDMA for funding.
2.	Promoting Climate Resilient Agri-Horticulture in Banjar, Kullu district, Himachal Pradesh	Rs. 19.92 Cr. Under NAFCC	Under consideration at MoEF&CC, Gol level.
3.	Promotion of resilient ecosystem through reduced pressure on forest through propagation of Medicinal plants in Great Himalayan National Park	Rs. 17.34 Cr. Under NAFCC	Under consideration at MoEF&CC, Gol level

Chapter-7

RESEARCH & DEVELOPMENT PROGRAMME IN ENVIRONMENT & SCIENCE & TECHNOLOGY

Country's rich intellectual capital has made it an attractive destination for multinational corporations (MNCs) to establish research and development (R&D) bases. These R&D centers not only cater to the local market but also accelerate the global delivery of innovative products. Himachal Pradesh, with its growing sectors like agriculture, horticulture, hydropower, and waste management, is seeing increased investment in dedicated research centers. The government has allocated up to Rs. 10.00 Lacs per project for two years to strengthen R&D in areas such as environment, natural resource management, and biotechnology. Currently, around 20 universities and institutions, including IIT, IIM, and NIT, operate in the state.

The Department of Environment Science Technology & Climate Change, as the nodal body for environment management and science, is committed to fostering innovation in Himachal Pradesh by creating a conducive environment for R&D in the Himalayan region. The state also aims to enhance bilateral cooperation for technical support in environmental protection and science. In 2023-2024, the department invited R&D project proposals from scientists and experts in academic institutions and national laboratories to further the goals of environmental conservation and sustainable development in Himachal Pradesh.

Proposals are invited on following thematic areas: -

1. Impact of Hydro-Power Projects on Environment in H.P. specifying minimum ecological flow of river streams.
2. Application of Science and Technology for the upliftment of rural population with special emphasis of rural women farmers/ population in H.P.
3. Solid Waste Management with special emphasis on disposal of polythene/ non-biodegradable waste management in H.P.
4. Impact of Environmental Pollution viz; Water, Air, Soil on Human Health and remedial measures.
5. Climate Change Adaptation in Agriculture, Horticulture, Water sector in Himachal Pradesh.
6. Climate Change and Health Impacts with special emphasis on adaptive measures in H.P.
7. Problems of Environmental Pollution in industrial areas of H.P.- remedial measures.
8. Livelihood promotion through biotechnology based enterprise in Rural Areas.
9. Development of crop varieties for disease resistance in Himachal Pradesh using biotechnology.
10. Strengthening of Institutional laboratories of academic institutions through calibration of equipments for accuracy in research.

7.1. Number of Projects approved/ sanctioned in the year 2023-24

Project Title	Synthesis and analysis of green deep eutectic solvent systems for energy storage applications
Beneficiary	Himachal Pradesh University, Summer Hill Shimla-171005
Principal Investigator	Dr. Ramesh Chand Thakur, Associate Professor, Department of Chemistry,
Co-Investigator	Dr. Sunil Kumar, Associate Professor, Department of Chemistry
Project duration:	24 months
Total Budget	Rs. 7,00,000 /-(Seven lakh only)

Project Abstract

Electrochemical energy storage being a cleaner approach with a strong focus on health and environmental considerations has attracted significant attention from researchers. Electrolytes are the key ingredients in these electrochemical energy storage devices. Deep eutectic solvents have the potential to serve as an alternative for currently used organic electrolytes in commercial batteries as the organic electrolytes being toxic to the environment raise a major safety concern. Also, we know that to encourage an environmentally friendly transportation system and turn Himachal Pradesh into a hub for electric vehicles, the state government of Himachal

Pradesh has approved the electric vehicle policy. However, there are some significant limitations with electric vehicles that prevent them from going mainstream. Most of the issues related to the battery like Battery cost, battery overall performance, battery safety, battery recyclability and the performance of an EV battery can also be significantly impacted by temperature, making them unsuitable for extremely cold (Himachal Pradesh) or too hot regions. So, keeping all these issues in mind, we will study various parameters of electrolytes to develop environment-friendly electrolytes. In this study, different combinations of novel DESs will be formulated and their different physicochemical properties, electrochemical stability, and safety parameters will be determined. Further to understand molecular interactions spectrochemical techniques will be used. Keeping in view the environmental benignity of bio-additives and water, the possibility of using bio-additives and water as an additive in these DESs for electrolytic applications will be explored. So, the findings of this project will be useful in promoting vehicles policy in Himachal Pradesh.

Major outcomes expected from the project:

- Synthesis of novel DESs solution systems.
- Determination of the physicochemical properties like measurements of density, viscosity, conductivity, thermo physical and acoustic parameters of system selected for energy storage applications.
- To calculate the electrochemical parameters like electrochemical window, thermal stability, and capacity of electrolytic systems taken.
- Molecular level interpretation of such systems using spectroscopic techniques to infer the observation in terms of their molecular interaction behavior.

Deliverables:

- Publications of work in reputed international journals.
- Filing of Patent.
- Recommendations to State Government and Battery manufacturers.

Project Title	Endocrine disrupters (plasticizers) causing childhood obesity and thyroid disorder in Pediatric population in the State of Himachal Pradesh
Beneficiary	Dr. RPG Medical College Tanda, Distt. Kangra, H.P.-176001
Principal Investigator	Dr. Atul Gupta, Assistant Professor, Deptt. of Pediatrics, Room No. 22, Pediatric OPD Block 11, Ground Floor.
Co-Investigator	Dr. Jyoti Sharma, Assistant Professor, Deptt. of Pediatrics, Ground Floor,
Project duration:	24 months
Total Budget	Rs. 8,04,500 /-(Eight lakh Four Thousand five hundred only)

Project Abstract

Endocrine disrupting chemicals (EDC) may be natural or man made molecules variably distributed in environment. On entering human population they affect the endocrine system, the most widespread EDC are industrial chemicals and pesticides. Consumer products containers have EDC in plastic bottles, toys, household chemicals, cosmetics, fabrics and packed food stuffs. ED influence Hypothalamus-Pituitary- Thyroid axis (HPT axis) which is essential for the neuronal, metabolism and physical development in Pediatric age group. ED affecting the hypothalamus-pituitary axis are PCB, PBDE, phthalates, perchlorates which decrease the T4 levels causing decreased action on tissues. They cause changes in agonist receptors leading to adipocyte differentiation and obesity. Dyslipidemia and obesity are currently known complications of ED and more evidence is accumulating regarding their role in these disorders. Thyroid disorders and obesity in pediatric age group are increasing worldwide. Its effects are evident as number of children in Himachal Pradesh are attending hospitals and getting treated for these disorders. These effects cannot be directly attributed to life style changes as both these disorders are multifactorial in origin. Primary objective-To determine association between Endocrine disrupter chemicals and endocrine disorders (Thyroid disorders and obesity) in paediatric age group (1 yr -18 yrs).Secondary objective-To determine the effects on anthropometry and neurodevelopment in paediatric age group.

Methodology: All patients (1 yrs to 18 yrs) presenting to paediatric OPD and enrolled in Paediatric Endocrine clinic in Dr RPGMC Kangra and suffering with these disorders during the study period will be enrolled in study. All details of the patients will be documented and samples to be taken for identifications of group of EDC.GCMS on

urine samples and TMS on serum samples if needed will be performed to identify the EDC. . DQ/IQ (Intelligence quotient) will be determined besides neurodevelopmental profile of the patient.

Project Title	An Intelligent air quality index prediction approach using explainable AI with vehicular emission data
Beneficiary	Thapar Institute of Engineering, Patiala, Punjab- 147004
Principal Investigator	Dr. Anju Bala, Associate Professor, CSED.
Co-Investigator	Prof. Pawan Garga, Dean Faculty of Env. Development and Sustainability
Project duration:	24 months
Total Budget	Rs10,00,000/-(Ten lakh only)

Project Abstract

Air pollution has been increased nowadays due to many of the factors like transport, industries, deforestation and others etc. 45% air pollution is due to the transport. It has been prevailing in HP major Air pollution from tourism activities and increased so much especially during summer and winter vacations due to the maximum number of vehicles and type of vehicles like diesel and petrol used by people. So, there is a need to predict and interpret future AQI (Air Quality Index) with intelligent techniques. In this work, an intelligent air quality prediction approach using deep learning/machine learning would be proposed. An Explainable AI (XA1) would also be utilized to make the processes and outputs of the prediction model more interpretable and understandable to humans. The proposed technique can be validated on statistical data collected from HP Air Pollution control board or Municipal Corporation and current data. Finally, Web app/Android app along with prediction model would be delivered as a product.

Objectives of Research Project

- Identification and Assessment of various vehicles playing in the main roads of urban Shimla
- Assessment of Emission inventory of vehicles in the study area
- To Propose an Intelligent Air quality Predictor based on Vehicular Emissions, which would help in the planning of mitigation measures

Methodology:

Objective 1: An Identification and Assessment of Vehicle plying in study area

- Data Collection from HP Air Pollution Control Board/Municipal Corporation.
- Process and store the data to Cloud to find Average no. of vehicles entered in the city.

Objective 2: To Find Emission Inventory of Vehicles

- Retrieve data from Cloud to find the emissions.
- Emission inventory will be assessed by taking into account the emission factors as per GoI norms.
- Clean and Pre-process the data to apply for Air Quality Prediction based on vehicular emissions.

Objective 3: To Propose an Air Quality Predictor using Deep Learning/XAI technique

- Propose an intelligent Air Quality Predictor Approach using Deep Learning/XAI.
- Implement and Test it on real and historical data set
- Design an Android/Web App to map air quality
- Validate it on the Quality of Service Parameters like RMSE (Root mean Square Error), MSE (Mean Absolute Error), Accuracy etc.
- Mitigation measures would be suggested based on prediction results.

SCIENCE & TECHNOLOGY SECTION

Under the Science & Technology division, the department is dedicated to advancing technical knowledge and education to foster scientific thinking and maintain high standards in scientific education. One of its major goals is to popularize science within society, aiming to inspire curiosity and interest in scientific pursuits among young minds. By building a science-oriented culture, the department supports the overall development of Himachal Pradesh and contributes to national progress.

The department also prioritizes fostering research across all scientific disciplines and actively supports state scientists in gaining both national and international exposure. Promoting the development of science and technology is seen as crucial for the state's progress and prosperity.

Key responsibilities of the division include:

- Formulating policies related to science and technology.
- Coordinating with other departments on science and technology-related subjects.
- Conducting scientific surveys and research.
- Providing grants for research and design activities.
- Supporting and coordinating applied research programs in universities and other institutions.
- Developing science and technology plans addressing the state's specific needs.

The division's activities are executed through the HP State Council for Science & Technology.

8.1 Himachal Pradesh Council for Science & Technology

The Himachal Pradesh Council for Science, Technology & Environment (HPCSTE) serves as the primary agency for advancing Science & Technology in the state. Established by the Government of Himachal Pradesh on January 3, 1986, the Council was created under a nationwide initiative by the Department of Science & Technology, Government of India, to foster the development of Science & Technology across the state. The HPCSTE focuses on the following areas:

- ✓ To advise State Govt. on Science, Technology & Environment related issues & interventions.
- ✓ To develop, demonstrate & transfer appropriate technologies for the State.
- ✓ To pool and exchange scientific knowledge from National & International scientific Institutions/organisations for the development of the State.
- ✓ To promote, popularise and disseminate Scientific & Technological Innovations.
- ✓ To create and strengthen science & technology facilities in the state.
- ✓ To promote research & development studies relevant to state needs.
- ✓ To establish linkages with Universities and R & D Institutions.
- ✓ To provide consultancy services in successfully demonstrated/ developed technologies.

The Himachal Pradesh Council for Science, Technology & Environment (HPCSTE) is governed by its General Body, which serves as the highest decision-making authority. The General Body is chaired by the Hon'ble Chief Minister, with the Hon'ble Minister for Science & Technology serving as the Vice Chairman. The Administrative Secretary for Environment, Science & Technology is the Member Secretary. The General Body includes members from both government and non-government scientific organizations at the central and state levels.

The Executive Committee (EC) manages the Council's administration and oversees its executive functions. The Secretary for Science & Technology is the Chairman of the Executive Committee. The Member Secretary of the HPCSTE, also known as HIMCOSTE, acts as the executive head of the organization.

The HIMCOSTE is performing the functions for science and technology with the help of various sub-agencies and programmes, the different programmes are as under:

- Environment Education & Outreach- National Green Corps, Eco Clubs
- H.P. State Wetlands Authority- Wetland management planning and implementation.
- ENVIS- Awareness portal.
- Science Popularization- Children science congress.
- Research & Development Projects in Science & Technology.
- Capacity Building and training in Science & Technology
- Technology Dissemination- Appropriate Technology dissemination.
- Patent Information Centre.
- H.P. State Biodiversity Board
- Remote sensing - AGISAC- GIS database creation and analysis.

BIOTECHNOLOGY SECTION

The State Government of Himachal Pradesh has notified its Biotechnology Policy under Notification No. STE-A(1)-2/2008 dated December 20, 2014. This policy aims to establish Himachal Pradesh as a leading Himalayan Bio-Business hub by promoting biotechnology across various sectors such as agriculture, horticulture, animal husbandry, health, and bio-resource utilization.

The Biotechnology Division's primary objective is the effective implementation of this policy. The specific objectives for implementing the State Biotechnology Policy include:

- Supporting R&D: Enhance research and development in key biotechnology areas, including agriculture, horticulture, animal husbandry, human health, environment, and industry.
- Upgrading Infrastructure: Improve the infrastructure of R&D and educational institutions to foster the development of a highly skilled workforce in biotechnology.
- Global Competitiveness: Position Himachal Pradesh as a preferred and globally competitive destination for the development of biotechnology products, processes, and services.
- Bio-resource Conservation: Sustainably conserve the State's commercially valuable bio-resources for long-term development.

The Department has initiated the process to establish Biotechnology Park in the State. In order to setup Bio-Tech Park Project Management Unit (PMU) has been notified on dated 7/2/2024. Land has been identified at Dhabota, Nalagarh for the purpose of establishment of BT Park. Meeting of PMU has also been convened.

PUBLICATIONS

S.No.	Title & Hyperlink
1.	State Action Plan on Climate Change http://dest.hp.gov.in/sites/default/files/PDF/SAPCC%202021-30-web.pdf
2.	CAFRI Project http://dest.hp.gov.in/?q=climate-adaptation-and-finance-rural-india-cafri-himachal-pradesh-hp
3.	Research and Development http://dest.hp.gov.in/?q=research-and-development
4.	Booklet on Polythene Hatao Paryavaran Bachao https://desthp.nic.in/publications/PolytheneHataoParyavaranBachao.pdf
5.	Plastic Waste Management- Rules & Regulations https://desthp.nic.in/publications/Compilation_Rules_Notifications.pdf
6.	Bio-Technology- Status Report 2017 https://desthp.nic.in/publications/BiotechnologyInHP.pdf
7.	Carbon Intensity of H.P. in association with NMSHE https://desthp.nic.in/publications/Folders/Folder-CarbonIntensity.pdf
8.	Booklet on "Forests or Carbon Sinks" https://desthp.nic.in/publications/Folders/Folder-Forests.pdf
9.	Green House Gas Emissions in Himachal Pradesh https://desthp.nic.in/publications/ghg2014_A1b.pdf
10.	Executive Summary EMP https://desthp.nic.in/publications/EMP_ES_A1b.pdf
11.	State Strategy & Action Plan on Climate Change https://desthp.nic.in/publications/HPSCCAP_A1b.pdf
12.	Green House Gas Emission Inventory of H.P. based on reports of 2008-2009 https://desthp.nic.in/publications/ghg2012_A1b.pdf
13.	A Village Level Climate Change Vulnerability Analysis and Indicative Adaptation Plan Framework Beas River Basin – District Kullu Himachal Pradesh https://desthp.nic.in/HPKCCC/PDF/Climate_Change_Vulnerability_Kullu_HP.pdf
14.	Enabling Adaptation in Himachal Himalayas https://desthp.nic.in/HPKCCC/PDF/Dhamun_Report_Final_Web.pdf
15.	https://desthp.nic.in/HPKCCC/reports/Folder_Hindi_Agriculture.pdf
16.	Strengthening Crop Management Practices in Drought Prone Areas of District Sirmour of Himachal Pradesh, India- <i>Booklet</i> https://desthp.nic.in/HPKCCC/reports/Folder_A3_SLADRC_HPKCCC.pdf
17.	Climate Modelling of Himachal Pradesh https://desthp.nic.in/HPKCCC/reports/Report%20on%20Climate%20Modelling-HP.pdf
18.	https://desthp.nic.in/HPKCCC/PDF/Poster-Glaciers-Hindi.pdf
19.	Model Eco-Village Scheme http://dest.hp.gov.in/?q=model-eco-village-scheme
20.	My Waste My Health http://dest.hp.gov.in/?q=my-waste-my-wealth-project-setting-8-msw-demo-sites-hp-under-nmhs

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