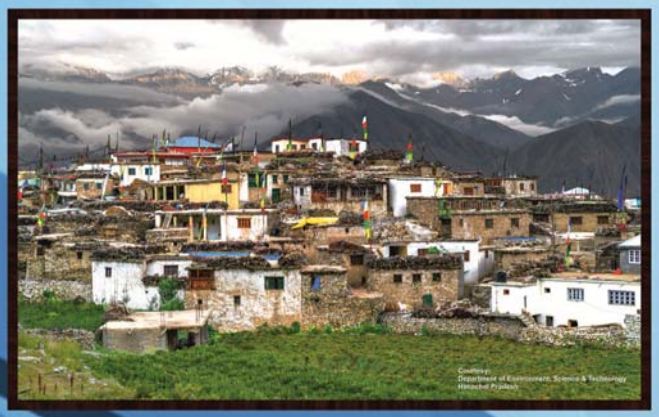
Annual Administrative Report 2020-21



सत्यमेव जयते
हिमाचल प्रदेश सरकार

Department of Environment, Science & Technology
Government of Himachal Pradesh

Annual Administrative Report 2020-2021

TABLE OF CONTENTS

CONTENTS

ABOUT DEPARTMENT

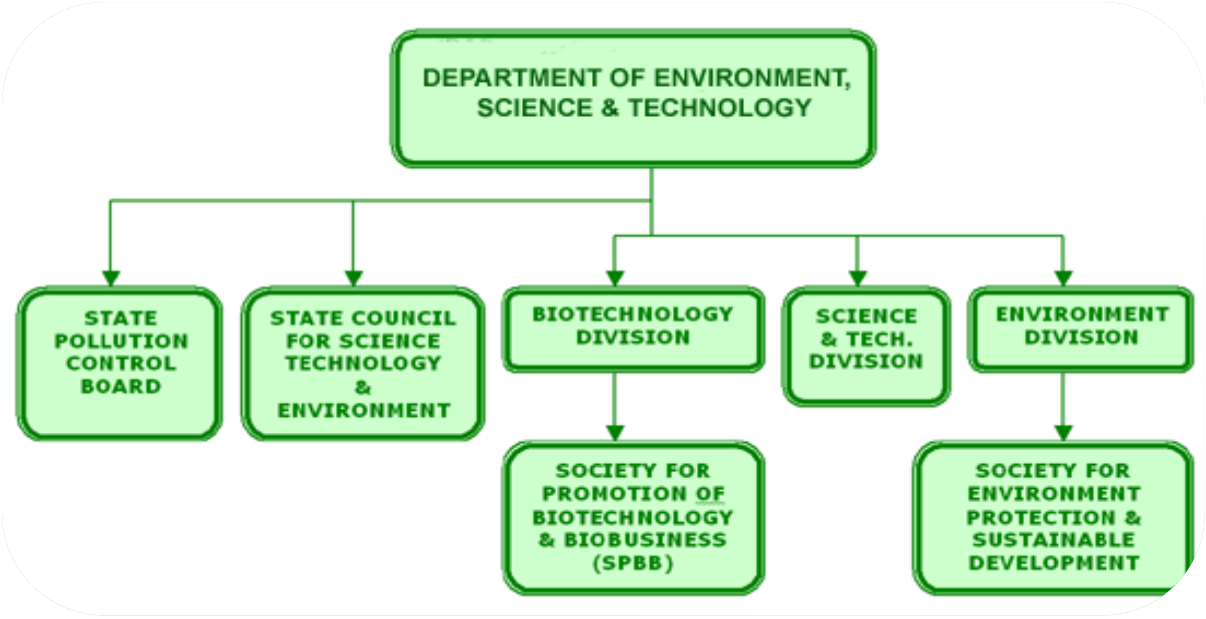
The Department of Environment, Science & Technology was set up in the State of H.P. in April, 2007 with an objective to improve the effectiveness of environmental management, protect vulnerable ecosystems and enhance sustainability of development.

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 of Environment, S & T 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 under:

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 suggests 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 pro-active 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) Bio-Technology:

1. Formulation and implementation of Bio-Technology Policy in the State.
2. Strengthening of Human Resource and existing infrastructure in Bio-Technology and its continuous improvement for generating skilled manpower in Bio-Technology and Technological upgradation of R&D Institutes and Universities within the State.
3. Promotion of Bio-Technology and Bio-informatics 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 Bio-Technology.
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 Bio-Technology 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 Bio-Technology 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.

Administration

The administrative setup of the Department of Environment, Science & Technology consists of Minister-in-charge on the top of the hierarchy followed by Additional Chief Secretary (Env., S&T)/ Principal Secretary (Env., S&T), Director (DEST), Additional Director/Joint Director (DEST), Principal Scientific Officer (Environment), Principal Scientific Officer(Bio-Technology).

Administrative Setup

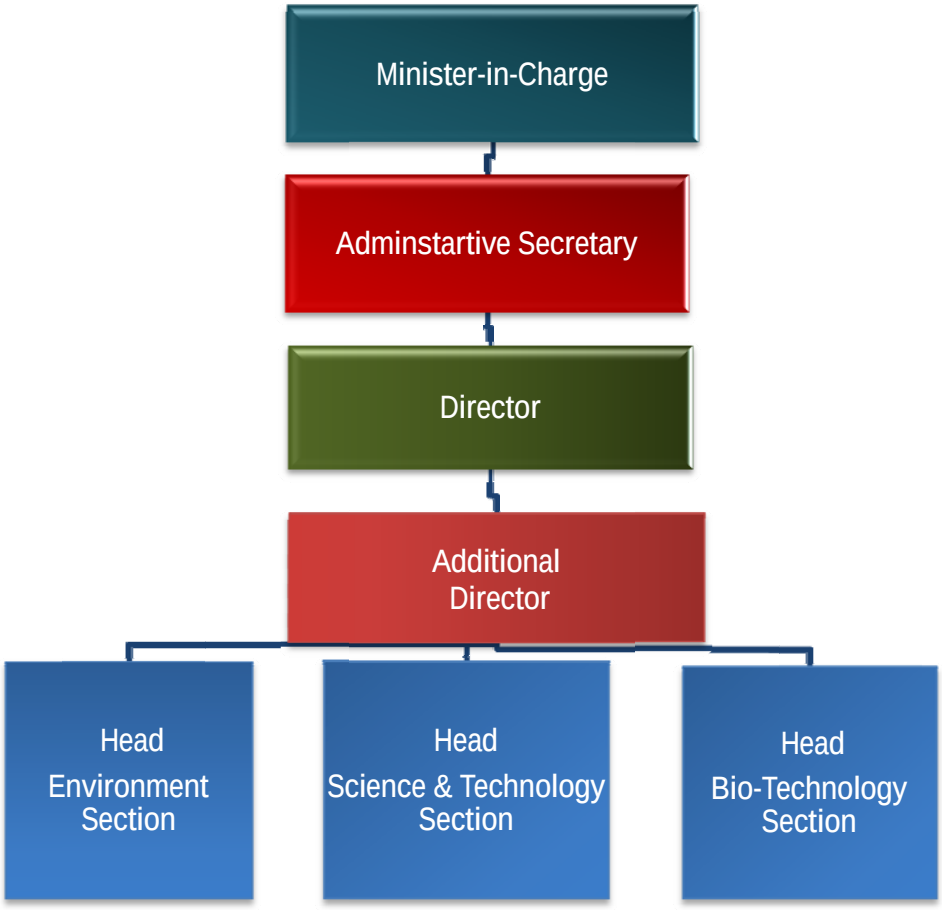


Figure 1: Administrative Setup

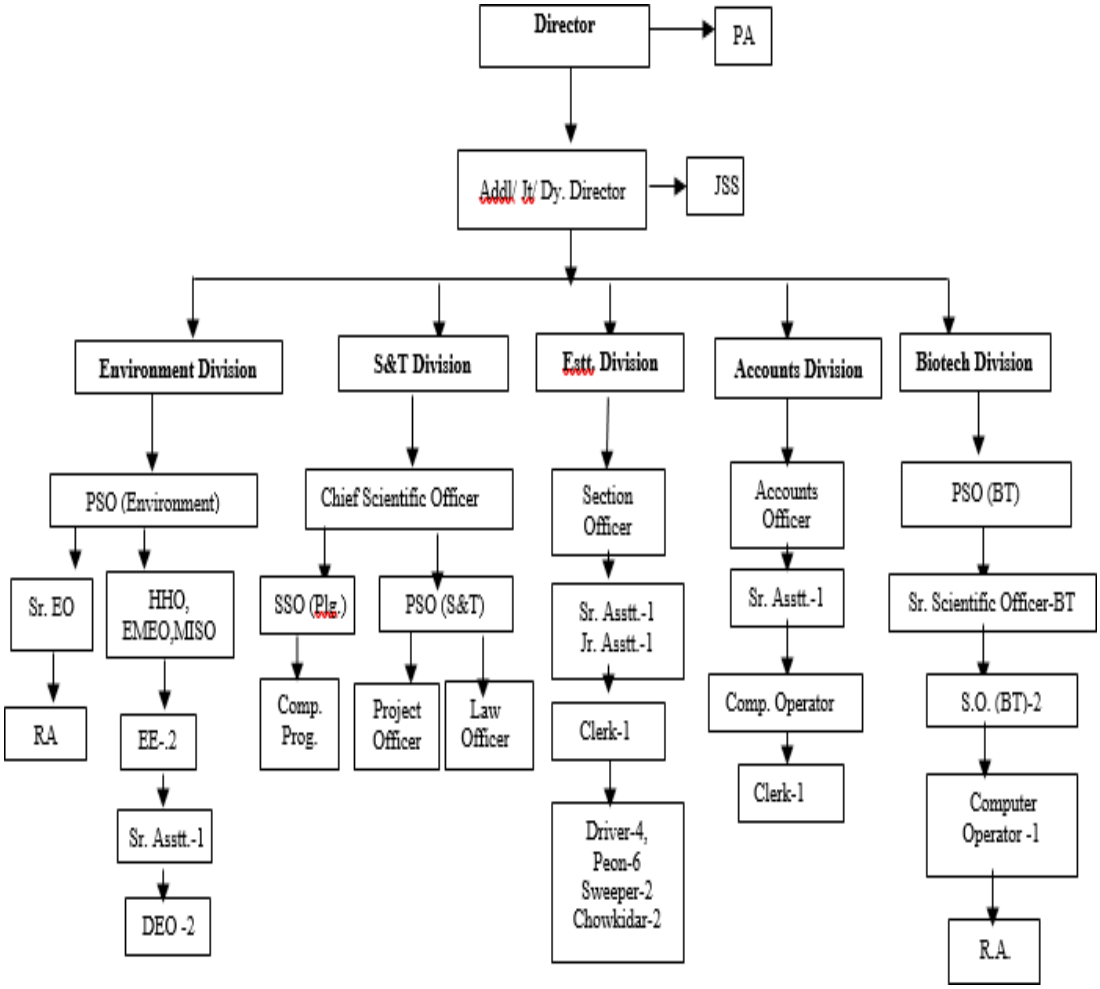


Figure 2: Organisational Structure of
Department of Environment, Science & Technology, Paryavaran Bhawan, H.P.

Table 1. Sanctioned Posts with vacancy position as on 31.3.2021

S. No	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	1	2 (S&T)
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	-	2
11	Section Officer	1	1	-
12	Accounts Officer	1	1	-

S. No	Name of Posts	Sanctioned Posts	Filled	Vacant
13	Human Habitat Officer	1	1	-
14	Environment Monitoring & Evaluation Officer	1	1	-
15	MIS Officer	1	1	-
16	Computer Programmer	1	1	-
17	Law Officer	1	1	-
18	Personal Assistant	1	1	-
19	Sr. Assistant	3	2	1
20	Research Assistant	2	2	-
21	Computer Operator	2	1	1
22	Jr. Scale Stenographer	1	1	-
23	Jr. Assistant/ Clerk	3	-	3
24	Data Entry Operator	2	1	1
25	Driver	4	3	1
26	Peons	6	5	1
27	Sweeper	1	1	-
28	Chowkidar	2	2	-
	Total	48	31	17

Accounts

During the financial year 2020-21 Department of Environment, Science and Technology was allocated/ Sanctioned an outlay of Rs. 3,64,04,000/-.The detailed statement in respect of Budget allocated under Non Plan and Plan Heads is given below.

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

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 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 was incurred by the Department during the year 2020-21.

Table 2 : Final Excess & Surrender Statement in respect of Budget allocated under Non Plan head during the financial year 2020-21.

S.No.	SOE	Sanctioned Budget	Supplementary Budget	Total Budget	Actual expenditure w.e.f. 1.4.20 to 31.3.21	Saving	Excess Expenditure	Reasons for variation
1	Salary	3,08,72,000	-	3,08,72,000	2,00,27,634	1,08,44,366	-	Due to non-release of salary for 03/21.
2	Wages	3,35,000	(+)82000	4,17,000	4,15,404	1,596	-	Due to less receipt of bills.
3	Traveling Expenses	8,94,000	(-)82000	8,12,000	3,04,475	5,07,525	-	Due to less meetings of SEAC & SEAA
4	Office Expenses	5,90,000	-	5,90,000	4,73,803	1,16,197	-	Due to saving in telephone & electricity expenses
5	Medical Reimbursement	5,50,000	-	5,50,000	2,84,640	2,65,360	-	Due to less receipt of bills.
6	Advt. & Publicity	1,62,000	-	1,62,000	0	1,62,000	-	Due to non-publishing of advertisements.
7	Hospitality and Entertainment	50,000	-	50,000	13,906	36,094	-	Due to less meetings of SEAC & SEAA
8	Motor Vehicle (P)	1,000	-	1,000	0	1,000	-	No new vehicle purchased.
9	Motor Vehicle (POL)	4,28,000	-	4,28 ,000	2,63,130.00	1,64,870.00	-	Due to less receipt of bills.
	Total	3,38,82,000	-	3,38,82,000	2,17,82,992	1,20,99,008	-	-

Table 3 :Final Excess and Surrender Statement in respect of Budget allocated under Plan head during the financial year 2020-21.

Sr.No	SOE	Sanctioned Budget	Add Supple-mentary Budget	Total Budget	Actual Expenditure w.e.f. 1.4.20 to 31.3.21	Saving	Reasons for variation
1.	GIA-General (Non-Salary)	3,95,00,000	-	3,95,00,000	96,57,859	(-)2,98,42,141	Due to availability of expenses under various projects/ programmes being run by the Department under externally aided projects, GoI funded schemes.
	TOTAL	3,95,00,000	-	3,95,00,000	96,57,859	(-)2,98,42,141	-

Table 4 : Final Excess and Surrender Statement in respect of Budget allocated under Non Plan head during the financial year 2020-21.

Sr. No.	SOE	Sanctioned Budget	Supplementary Budget	Total Budget	Actual Expenditure w.e.f. 1.4.20 to 31.3.21	Saving	Excess Expenditure	Reasons for Variation
1.	Medical Reimbursement (Retirees)	48,000	1,00,000	1,48,000	1,47,757	(-)243	-	Due to less receipt of bills.
	Total	48,000	1,00,000	1,48,000	1,47,757	(-)243	-	-

CHAPTER-1

STATE OF ENVIRONMENT

Location

Himachal Pradesh is located between latitude $30^0$22' to $33^0$12' N and longitude $75^0$45' to $79^0$04' E. The altitudes in the Pradesh, a wholly mountainous region in the lap of Himalayas, range from 350 metres to 6975 metres above mean sea level. It is surrounded by Jammu and Kashmir in the north, Tibet on north/north east, Uttaranchal in the east/south east; Haryana in south and Punjab in south west/west.

Himachal Pradesh, predominantly a mountainous state in the Western Himalayas, has a geographical area of 55,673 km^2. The altitude of the state varies from 350 m to 6,975 m above the mean sea level.

The state has three distinct regions, viz. the Shiwaliks with altitudes upto 1,500 m, Middle Himalayan region between 1,500 m to 3,000 m and the Himadris higher than 3,000 m. About one third of the state is permanently under snow, glaciers and cold deserts which do not support tree growth. The average annual rainfall is about 1,800 mm. The temperature varies from sub-zero to 35^0.

Climate

Himachal Pradesh can be divided into three regions:- (i) The Shivalik ranges (the height from plain upto 915 metres); (ii) Colder Zone (the height is about 4500 metres); and (iii) the axis and crystalline core of the whole system (the height above 4500 metres but below 5500 metres). The climatic conditions, therefore, vary from the semi-tropical to semi-artic. Physiographically, the State can be divided into five zones based on altitudes and moisture regime conditions. These vary from Wet Humid Sub-temperate situation to dry temperate alpine high lands.

Forests

a. Recorded Forest Area

The recorded forest area of the state is 37,033 km^2 which is 66.52% of its geographical area. Reserved Forests constitute 5.13%, Protected Forests 89%, Unclassed Forests 5.41% of the recorded 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 tee growth, being under permanent snow, glaciers and cold deserts.

b. Protected Areas

Himachal Pradesh has two National Parks and 33 Wildlife Sanctuaries covering 0.76 million ha which constitutes 13.65% of the state's geographical area. The Great Himalayan national Park is famous for snow leopard.

c. Forest Cover

The forest cover in the state, based on interpretation of satellite data of October-December 2008, is 14,679 km^2 which is 26.37% of the state's geographical area. In terms of forest canopy density classes, the state has 3,224 km^2 area under very dense forest, 6,381 km^2 area under moderately dense forest and 5,074 km^2 area under open forest.

Rivers & Lakes

Himachal Pradesh has the privilege of snowfed perennial rivers and rivulets flowing in almost all parts of the Pradesh. Yamuna, with its important tributaries of Tons, Pabbar and Giri in the east and Satluj, Beas, Ravi and Chenab in the west flow through various parts of the Pradesh. Some of the important natural lakes worth mentioning are Khajjiar, Ghadasasu Lamba Dal, Manimahesh, Mahakali in Chamba Distt.; Dal, Kareri in Kangra Distt.; Rewalsar, Kumarwah, Prashar in Mandi district; Bhrigu and Dashahr in Kullu Distt.; Chandratal and Surajtal in Lahaul & Spiti Distt.; Chandra Naun in Shimla district; and Renuka in Sirmaur Distt. The man made lakes include Gobind Sagar in Bilaspur district; Pong lake in Kangra district; Pandoh lake in Mandi district; and Chamera lake in Chamba district.

Mineral Wealth

Himachal Pradesh is blessed with mineral wealth. As per investigation of Geological Survey of India, the minerals available in Himachal Pradesh includes lime stone, byrytes, clays, mica, iron-pyrites, salt, gypsum, slate, antimony and lead. The distribution of these minerals is scattered all over the State and includes lime stone in Bilaspur, Sirmaur and Kangra districts; Salt and Slates in Mandi District; Gypsum in Rajban Bharli Sirmour distt.; Lahaul & Spiti and Sapatu in Solan distt.; Byryte in Sirmour, Iron ore in Mandi and Kangra; and uranium in Kullu and Hamirpur.

Soil

The soils of the State can broadly be divided into nine groups on the basis of their development and physico-chemical properties. These are : (i) alluvial soils, (ii) brown hill soils, (iii) brown earth, (iv) brown forests soils, (v) grey wooded or podzolic soils, (vi) grey brown podzolic soils, (vii) planosolic soils, (viii) humus and iron podzols,(ix) alpine humus mountain speletal soils. The soil found in the districts of Mandi, Kangra, Bilaspur, Una, Solan, Hamirpur and Sirmaur is generally brown, alluvial and grey brown podzolic, Kullu and Shimla have grey-wooded podzolic soils,while Kinnaur, Lahaul and Spiti and some parts of Chamba district have humus mountain peletal soils.

Administrative structure

Since 1st September, 1972, there had been no changes in the administrative structure of Himachal Pradesh except carving out of new sub-divisions, sub- tehsils, raising of sub tehsils to the level of tehsils. Presently, there are 12 districts, 52 sub-divisions, 109 tehsils and sub-tehsils in Himachal Pradesh. From development point of view, the Pradesh is divided into 75 development blocks. The smallest unit for development-cum-administration is Panchayat and their number is 3037.

Demographic Trends

As per 2011 Census, population of Himachal Pradesh is 68,56,509 of which males are 34,73,892 and females are 34,73,892. The percentage share of HImachal Pradesh to India's population is 0.57. Rural population is 89.96% and urban population is 10.04%. The population density is 123 persons per km^2. The scheduled tribes constituting 4.02% of the population are mainly distributed in three districts i.e. Chamba, Lahaul & Spiti and Kinnaur. Decadal growth of population of Himachal Pradesh in 1991-2001 is 9,07,023 and 7,78,609 in 2001-2011 with a percentage contribution to total growth of India being 0.5 and 0.43 respectively.

There are 974 females per 1000 males recorded in 2011 as against 968 per 1000 males in 2001. The percentage decadal growth during 2001-2011 is 12.81 as against 17.54 during 1991-2011. The density of population rose from 109 per sq km in 2001 to 123 per sq km in 2011. Himachal Pradesh has the highest percentage of rural population among all the States of the country.

Population, percentage decadal growth and average annual exponential growth rates (1991-2001 and 2001-2011) is given in Table

Population, percentage decadal growth and average annual exponential growth rates

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

Decadal growth of population and percentage contribution to total growth of India (1991-2001 and 2001-2011) is given in Table.

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

The mainstay of the people of Himachal Pradesh is agriculture on which 66.71% population depends for their livelihood. The topography being mostly hilly, the type of cultivation is terraced. Close to 80 percent of all holdings fall in the category of small and marginal farmers. Due to ideal climate, fruits cultivation, horticulture and vegetable growing (seasonal as well as off-season) has developed rapidly during the past three decades.

Percentage of main workers to total population is 34.41 and the percentage of cultivators to total main workers is 63.25. The percentage of agricultural labourers to total workers is 2.66 as per 1991 census. Despite diversification of farm economy the per worker productivity in primary sector of economy continues to be low as 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

Bio-Diversity

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.

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 is one of the states that lies in the Indian Himalayan Region (IHR), one of the richest reservoirs of biological diversity in the world. The IHR is currently undergoing large scale irrational extraction of wild, medicinal herbs, thus endangering, many of its high-value gene stock. To address this, a workshop on 'Endangered Medicinal Plant Species in Himachal Pradesh' was held in 2002 and the conference was attended by forty experts from diverse disciplines. (Himachal Pradesh, n.d.)

According to 2003 Forest Survey of India report, legally defined forest areas constitute 66.52% of the area of Himachal Pradesh. Vegetation in the state is dictated by elevation and precipitation. The state endows with a high diversity of medicinal and aromatic plants. Lahaul-Spiti region of the state, being a cold desert, supports unique plants of medicinal value including *Ferulajaes*.

Himachal is also said to be the fruit bowl of the country, with orchards being widespread. Meadows and pastures are also seen clinging to steep slopes. After the winter season, the hillsides and orchards bloom with wild flowers, while gladiolas, carnations, marigolds, roses, chrysanthemums, tulips and lilies are carefully cultivated. Himachal Pradesh Horticultural Produce Marketing and Processing Corporation Ltd. (HPMC) is a state body that markets fresh and processed fruits.(Himachal Pradesh, n.d.)

Himachal Pradesh has around 463 bird 77 mammalian, 44 reptile and 80 fish species. Great Himalayan National Park, a UNESCO World Heritage Site and Pin Valley National Park are the national Parks located in the state. The state also has 30 wildlife sanctuaries and 3 conservation reserves.(Himachal Pradesh, n.d.)

CHAPTER-2

KEY ENVIRONMENTAL CHALLENGES - HIMACHAL PRADESH

The State of Himachal Pradesh is developing by leaps and bounds. The development activities,if not undertaken in a scientific manner, invariably results into environmental degradation.

The control of environmental pollution has assumed a great significance. It is more relevant as the entire State of Himachal Pradesh falls within the Himalayan Region, which is ecologically and environmentally one of the most fragile regions of the world.

In the advent of increased pressure from the various facets of developmental, population explosion, infrastructure, urbanization, industrialization, establishment of mega hydro power projects, industrial projects, mining, tourism, encroachment of forest land, deforestation, excessive agricultural and horticultural activities etc. the fragile mountain ecology and vulnerable hill environment is under threat of degradation.

Himachal Pradesh, which has its own peculiar environmental problems, needs to tread the developmental path without compromising with its pristine environment. Climate change and biological diversity loss are the two major planetary environmental threats facing mankind today and they are closely interlinked. Himachal Pradesh has a sensitive and highly bio-diverse ecosystem. To conserve our Himalayan heritage, we must jointly strengthen our endeavours to tackle climate change and curb the loss of biological diversity through adoption of sustainable environmental management practices.

State is characterized by the variety of soils, climate, biodiversity and ecological regions it is endowed with. As a developing economy, the country depends heavily on its natural wealth; however, excessive use of natural resources is depleting the very resource base that sustains it. The State today faces key environmental challenges, especially because of the nexus of environmental degradation and economic growth. These challenges pertain to the State of environmental resources, such as air, land, water, flora and fauna.

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

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

Environmental degradation also perpetuates poverty, since it directly affects soil fertility, quantity and quality of water, air, forests, wildlife and fisheries.

Recognizing the problem, the country has now been classified into agro-climatic, agro-ecological and agro-meteorological Zones. The classification facilities planning and implementation of various programmes and measures at the local level.

Sectoral Overview

In 2013, DEST developed an Environmental Master Plan (EMP) that established baseline data for the state's natural and physical resources. The plan identifies ecologically sensitive zones and the critical issues that impact them, while outlining corrective measures as well as the manpower and regulations needed to implement them.

The Government of H.P. has adopted the Environment Master Plan (EMP) to mainstream environmental concerns into the State's development planning in sectors of economy for thirty years by applying sectoral approach.

All three sectors namely Infrastructure, Natural Resources Management and Services have been assessed and analysed for preparing he sectoral guidelines.

The sectors are further divided into sub categories i.e. sub sectors of Infrastructure, Natural Resources Management and Services sectors.

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

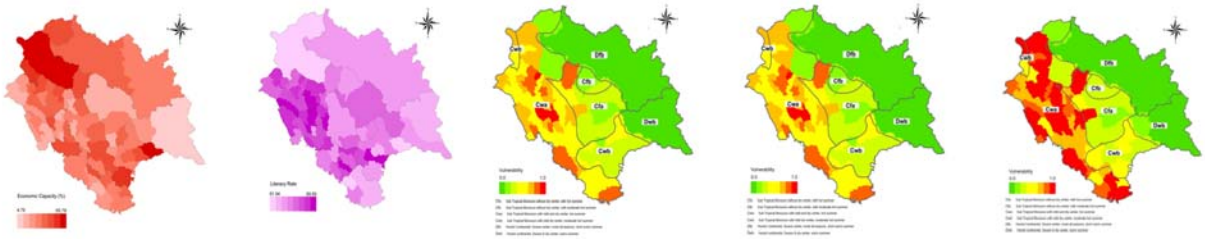
Natural Resources Management (NRM)

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

Services

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

The Vulnerability assessment was done both sectorally and geographically. The unit for assessment of geographical vulnerability is tehsil and district for year 2011, 2021, 2031 and 2041. Sectoral vulnerability is assessed at tehsil level with respect to water, air, land, natural critical habitats, climate change, hazard susceptibility, spatial areas of conflict, quality of life (health) and quality of life (education).



HP's Development Strategy

Responding to people's concerns about preserving their unique social cohesion and pristine environmental heritage, HP is seeking to develop in an environmentally and socially sustainable manner. Towards this end, it is devising suitable policies for its key revenue earning sectors - hydropower, tourism, and industry- as well as for rural development, as the vast majority of the state's people live in rural areas and depend on natural resources for their livelihoods. A key feature of HP's development strategy is that citizens are being made an integral part of the change process. Inputs from stakeholders have been sought on a broad range of development issues, and policies are now being tailored to ensure that future growth is both environment-friendly and responsive to people's needs.

Between 2011 and 2014 – the World Bank helped the State to promote environmentally and socially sustainable development in hydropower, tourism, and industry, as well as in the development of watersheds. The state establish the institutions and policies needed to bring long-lasting change in the manner in which these key sectors grow and develop with environmental considerations.

2.1 Sustainable Hydropower

Hydropower is Himachal Pradesh's largest source of revenue and the state holds a quarter of India's total potential. The adoption of environmentally and socially responsible hydropower policies will help the state develop its hydropower resources in a sustainable manner well into the future.

Over the years, the development of hydropower has brought power, roads and much-needed development to Himachal Pradesh, especially to remote mountain communities. Today, with all its villages fully electrified, HP has become a power surplus state and the sale of electricity has become its largest source of revenue. Aware of the possible impacts of hydropower development on its fragile environment, and keeping in mind the needs of communities living in project vicinities, the state's 2006 Hydro power Policy has sought to ensure that it develops its hydropower resources in an environmentally and socially sustainable
manner. Accordingly, a number of pioneering measures have been adopted to mitigate possible impacts and ensure that local people receive a share of project revenues.

2.2 Sustainable Tourism

Himachal Pradesh seeks to develop its tourism potential in a manner that protects its environmental and cultural heritage, ensures that a larger number of local people benefit from tourist arrivals, and tourists too have a better overall experience.

Given HP's unique natural and cultural assets, tourism is a key source of jobs and revenues in the state. Despite overcrowding in many areas, tourist arrivals in HP have grown faster than the national average. But while the state is a getaway for people seeking to flee the searing heat of the plains, unregulated construction, overcrowded roads, and poor waste disposal are degrading the very environment that is often the primary attraction for tourists to the state.

2.3 Industry

Himachal Pradesh now provides incentives to industries to adopt cleaner technologies. Importantly, industrial units have been mandated to publicly disclose their pollution status.

Following the development model of the rest of the country, the hill states too have attempted to attract industry to fuel economic growth. Since the mid-nineties, incentives provided by the central and state government have led to the exponential growth of industries in HP, mostly in the lower reaches, where there is good connectivity with the plains of Punjab and Haryana and flatter land is available.

2.4 Green Accounting

Usually, the value of forests is determined by the revenue they generate through the sale of timber. However, since forests make a vital contribution to the larger wellbeing of the people and the planet – such as stabilizing weather patterns, binding precious topsoil, giving rise to springs and rivers, providing fodder and fuel wood to local communities, and sequestering carbon – HP made a commitment in 2014 to draw up forest accounts to better understand their vital contribution. The state is now seeking to

place a monetary value on its forests and is piloting green accounting in Mandi district. These accounts will enable policy makers to measure how forest goods are being used, who is benefitting from them, how the forest wealth is changing and so on, enabling planners to take more evidence-based decisions. Given the pioneering nature of this exercise, it is bound to be a work-In progress that will undoubtedly evolve over time.

2.5 Watersheds

To better manage land and water resources, communities are being directly involved in drawing up micro-watershed plans for their regions. More than 90 percent of the state's people live in rural areas with agriculture as their single largest occupation. This makes them heavily dependent on natural resources – water, soil, forests, etc. However, farming in the state's rugged and hilly terrain is not easy. Land for cultivation is scarce and the state's net sown area is just 15 percent. Most cultivable land is rain-fed, soils are thin and fragile, and steep hill slopes are extremely prone to erosion. Although apple cultivation was rapidly promoted in the 1970s, followed by the expansion of horticulture and floriculture, the people's farming practices continue to be largely unsustainable. This, together with the overstocking of cattle is leading to the degradation of the state's fragile natural resource base.

The Department of Environment, Science & Technology is performing its functions by taking into consideration all stakeholders and facilitating the policy, plan and programme level interventions to ensure all round sustainable development.

CHAPTER – 3

ENVIRONMENTAL MANAGEMENT

The Department is mandated to perform various functions for effective Environmental Management practices, the functions include following facets.

- Environmental Impact Assessment
- Abatement of Pollution -Air Quality Water Quality
- Noise Pollution Control and Management
- Waste Management
- H.P. State Environment Fund
- Eco-Villages Scheme
- Environmental Leadership

During the year 2020-21, the physical progress on above is detailed up as under:

3.1 Environment Impact Assessment

Under the Environment Impact Assessment Notification, 2006 & Amendments by Ministry of Environment, Forests and Climate Change, Govt. of India, issued and published in the Gazette of India, Extraordinary, Part-II, under Section 3, Sub-section (ii) Ministry of Environment and Forests the grant of environmental clearance was mandated to States by empowering State Level Environment Impact Assessment Authorities. The Department of Environment, Science & Technology, Paryavaran Bhawan, H.P. is the nodal Department for the Environment Impact Assessment.

3.1.1. State Level Environment Impact Assessment Authority (SEIAA)

Government of India under sub-section (3) of section 3 of the Environment (Protection) Act, 1986 has constituted a State Level Environment Impact Assessment Authority (SEIAA) comprising of three Members including a Chairman and a Member – Secretary nominated by the State Government or the Union territory Administration concerned.

Table 3.1. Details of SEIAA Meetings 2021

Sr. No.	No. of meeting	Date	Total no. of cases listed	Housing Cat 8 (a) & (b)	Mining Cat 1 (a)	Metallurgical Cat 3 (a)	Malt Spirit Plant under Category 5(g)	River Valley	Cases for transfer of	Renewal of EC	Corrigendum	Representations received/issue	7 (da)	5(f)	Remarks
1	47th	22.05.2020	12	1	6	-	-	-	-	5	-	-	-	-	EC Granted:07 TOR issued: NIL
2	48th	19.06.2020	12	-	10	-	-	-	2	-	-	-	-	-	EC Granted:08 TOR issued:02

3	49th	26.09.2019	27	1	23	-	-	-	3	-	-	-	-	-	EC Granted:20 TOR issued:04
4	50th	22.12.2020	24	2	13	1	-	1	2	3	-	1	1	-	EC Granted:13 TOR issued:03
5	51st	25.03.2021	29				-				-		-	1	EC Granted:16 TOR issued:0 2
Total			104												EC Granted:64 TOR issued: 11

During the year 2020-21, a total of 74 Mining Projects, 2 Building and Construction Projects have been appraised and considered for grant of Environmental Clearances. The details of applications appraised, considered by SEIAA and tabulated and given in table 3.1,3.2 for reference.

3.1.2. 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). So far 200 cases have been resolved under SEAC meetings of 2020-21. Following is the detail of the no. of meetings organised by the DEST. The details of applications appraised, considered by SEAC and tabulated and given in table 3.3 for reference.

Table 3.2 Details of SEAC Meetings 2021

Sr. No.	No. of meeting	Date	No. of applications
1	73rd	10.06.2020	36
2	74th	01.09.2020	23
3	75th	22.09.2020	22
4	76th	03.12.2020	25
5	77th	02.03.2021	30
Total			136

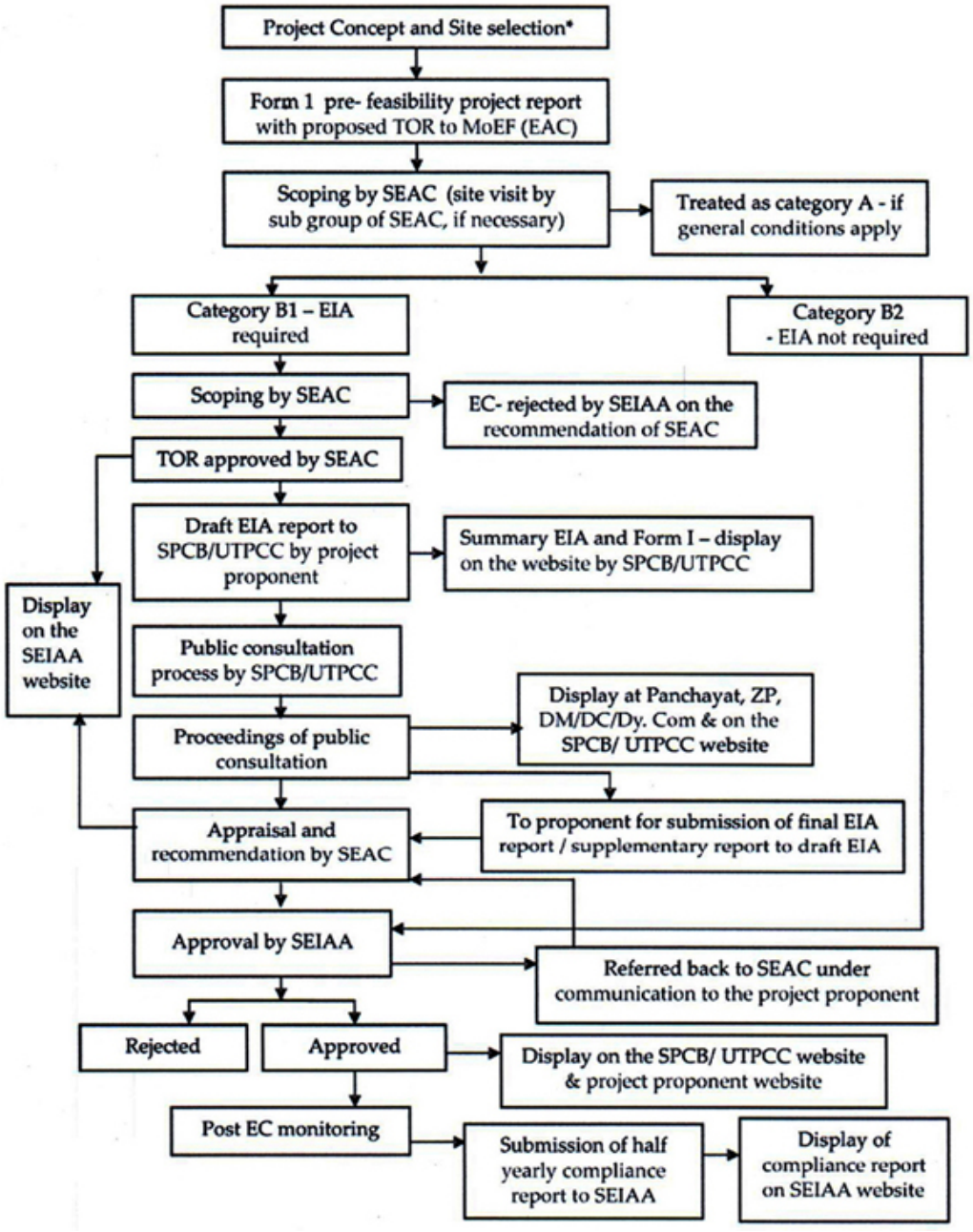


Figure 3.1: Procedure followed by the Department of Environment, Science & Technology, H.P. for issuing the Environmental Clearance Certificates.

3.2. 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.

3.3 Waste Management

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

HP Non biodegradable Garbage (Control) Act was enacted in the State way back in 1995 and perhaps the State of Himachal Pradesh was the first to adopt regulation for management of garbage in the State. The Act aims to prevent throwing or depositing non-biodegradable garbage in public drains, roads and places open to public view and to regulate the use of non-biodegradable material in the State of Himachal Pradesh and for matters connected therewith or incidental thereto.

The Objective of the act is to prevent throwing or depositing non-biodegradable garbage in public drains, roads and places open to public view and to regulate the use of non-biodegradable material in the State of 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 is 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.

d. Notification dated: 4th June, 2004

- ✓ Ban on use of polythene carry bags having thickness less than 70 Micron and size less than 12″× 18″ in the State
- ✓ Ban effective from 14th June, 2004 in the State.

e. Notification dated: 7th July, 2009

- ✓ Complete ban on use of polythene carry bags (irrespective of their size and thickness) and plastic items having one time use such as disposable plastic cups, glasses and plates which are made up of non-biodegradable material.
- ✓ Eleven officers are authorized for entry and inspection and to compound any offence under the Act.
- ✓ Provision of fine up to Rs. 25,000/- on use and stock of polythene carry bags.
- ✓ Provision of fine up to Rs. 5,000/- on littering of plastic waste by institution/ commercial establishment.
- ✓ Provision of fine up to Rs. 1,000/- on littering of plastic waste by individuals in the premises of any private or commercial establishments.

f. Notification dated: 20th August, 2010

- ✓ Thirteen more officers/ officials are authorized for effective implementation of entry and inspection under Section 7(A) and to compound any offence under the H.P. Non-biodegradable Garbage (Control) Act, 1995.

g. Notification dated: 4th November, 2010

- ✓ Head Constable is authorized entry and inspection under Section 7(A) and to compound any offence under the H.P. Non-biodegradable Garbage (Control) Act, 1995.

h. Notification dated: 15th March, 2011

- ✓ Assistant Commissioner, Parwanoo is authorized for entry and inspection under Section 7(A) and to compound any offence under the H.P. Non-biodegradable Garbage (Control) Act, 1995.

i. Notification dated: 19th March, 2011

- ✓ Ban on use of plastic items such as disposable plastic cups, plates and glasses which are made up of non-biodegradable material by any person or institution/ commercial establishment including shopkeepers, vendors, wholesalers, retailers, hawkers, rehriwala etc.
- ✓ Provision of fine up to Rs. 25,000/- on use and stock of polythene carry bags.
- ✓ Provision of fine up to Rs. 5,000/- on littering of plastic waste by institution/ commercial establishment.
- ✓ Provision of fine up to Rs. 1,000/- on littering of plastic waste by individuals in the premises of any private or commercial establishments.

Table 3.3 : No of challan and cases compounded during 2020-21

Sr.No	Name of Month	No of Challans	Compounded Fee(Rs)
1	April, 2020	50	31000 /-
2	May, 2020	9	35,500 /-
3	June, 2020	31	75,200 /-
4	July, 2020	37	72,330 /-
5	August, 2020	107	62000 /-
6	September, 2020	87	71,500 /-
7	October 2020	65	72500 /-
8	November 2020	41	43,000 /-
9	December 2020	17	70,500 /-
10	January, 2021	48	30,000 /-
11	February, 2021	38	31,000 /-
12	March, 2021	37	71,000 /-
	Total	567	6,65,530 /-

Month	Bilaspur		Chamba		Hamirpur		Kullu		Kinnaur		L&S			
	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)	Case	Fine (Rs.)
Apr. 20	2	1000	-	-	45	27000	2	1000	Nil	Nil	-	-	-	-
May20	Nil	Nil	Nil	Nil	Nil	Nil	7	9000	Nil	Nil	-	-	-	-
Jun. 20	Nil	Nil	2	6000	8	13000	7	26000	1	200	-	-	-	-
July 20	Nil	Nil	4	47000	Nil	Nil	10	5000	Nil	Nil	-	-	-	-
Aug 20	Nil	Nil	3	1500	49	28500	20	11500	Nil	Nil	Nil	Nil	-	-
Sep 20	1	500	6	3000	2	700	12	13500	1	300	Nil	Nil	-	-
Oct 20	Nil	Nil	Nil	Nil	Nil	Nil	29	28000	1	1000	-	-	-	-

Nov 20	Nil	Nil	6	6000	Nil	Nil	11	24000	Nil	Nil	-	-	-	-
Dec 20	-	-	-	-	1	3000	4	6000	Nil	Nil	Nil	Nil	-	-
Jan 21	Nil	Nil	20	10000	Nil	Nil	15	8500	Nil	Nil	-	-	-	-
Feb 21	Nil	Nil	Nil	Nil	Nil	Nil	26	13000	Nil	Nil	-	-	Nil	Nil
Mar 21	Nil	Nil	7	5500	Nil	Nil	14	15000	Nil	Nil	Nil	Nil	-	-
Total	3	1500	48	79000	105	72200	157	160500	3	1500	Nil	Nil	Nil	Nil

Shimla		Mandi		Solan		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	1	3000	-	-	-	-	50	31000
Nil	Nil	Nil	Nil	1	1500	-	-	1	25000	9	35500
Nil	Nil	1	3000	9	20500	1	1000	2	5500	31	75200
5	5830	14	7000	Nil	Nil	1	500	3	7000	37	72330
1	2000	20	10000	1	1000	Nil	Nil	13	7500	107	62000
1	5000	52	28500	5	16500	Nil	Nil	7	3500	87	71500
Nil	Nil	9	4500	22	19000	Nil	Nil	4	20000	65	72500
Nil	Nil	20	10000	4	3000	-	-	Nil	Nil	41	43000
1	5000	3	1500	4	53000	-	-	4	2000	17	70500
Nil	Nil	1	500	1	3000	Nil	Nil	11	8000	48	30000
Nil	Nil	1	500	6	5000	-	-	5	12500	38	31000
Nil	Nil	1	500	6	3000	9	47000	Nil	Nil	37	71000
8	17830	122	66000	60	128500	11	48500	50	91000	567	665530

3.4 H.P. State Environment Fund

In order to create sense of self responsibility and build financial mechanism through volunteer contributions the Government of H.P. notified 'Environment Fund' in State of Himachal Pradesh. This Fund was created in November 2008 with an objective of environment protection through voluntary efforts. Following are the major component of the Environment Fund;

The Himachal Pradesh Environment Fund comprises of:

- 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.

1. 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., is 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.

2. Apportionment of the Collections:

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

i. 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.

ii. 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.

iii. 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.

iv. 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.

v. An amount up to 5% of the total collections out of the Himachal Pradesh Environment Fund is kept as contingency for administering of Himachal Pradesh Environment Fund including expenses for maintenance of accounts, logistics , organizing of meetings etc.

Note: As an interim arrangement, the grants would be based on quarterly contribution/ donations.

3. 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*

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

i) 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.

ii) 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.

5. Receipt of Funds:

(i) 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.

(ii) 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.

6. Monitoring of State Environment Fund:

1. The Grant so provided from/ out of the Himachal Pradesh Environment Fund for environment protection etc. is monitored by the Member Secretary of the Himachal Pradesh Environment Fund Administering Committee i.e. Director (Environment, Sci. & Tech.).
2. 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 was provided.
3. 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.

7. Custody of the Account:

The money received /lying in the Himachal Pradesh Environment Fund is 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 is 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 3.4: Details of H.P. Environment Fund as on 31.03.21

Received	Rs. 588500/-
Expenditure	Rs. 35.40/-
Total Balance as on 31.03.21	Rs. 588535.4/-

3.5 Eco-Village Scheme

Eco-Village Scheme aims to devise ways to build a resilient village community and developing their skills and competencies to deal with resource depletion, changing climate and related environment challenges. Village communities need to be made aware of the pressures on their available resources, the impact of their decisions on the environment as well as choices available to them for following a sustainable development pathway. The endeavour will be to promote transformative action and achieve sustainable development through environmentally responsible and responsive practices in the area of water management, waste management, energy conservation, management of natural resources, climate change action and sustainable livelihoods. This approach will not only help those stakeholders who are working to implement sustainable community development programmes but also will set benchmarks for others to adopt and bring a radical change in thinking process of the communities at large in the State, especially in inculcating environmentally responsible behaviour.

Eco village is an emerging concept still in the process of being developed. Through the Eco village Concept, Department of Environment, Science & Technology, Government of Himachal Pradesh intends to demonstrate a model of environmentally sustainable development in active collaboration with village people that reflect their concern and respect for the environment.

Environmentally sustainable and ecologically oriented eco villages is focused towards developing low impact lifestyles that reduce the "ecological footprint" by as much as 50% of the base assessment from launch of the scheme. Himachal Pradesh is a small Himalayan state having a population of 67 lakhs (Census 2011). Nearly 90% of the population of Himachal Pradesh lives in rural areas and the agrarian economy is largely sustained by the Himalayan ecosystem and its natural resources. Various socio-economic and environmental changes are threatening these resources and posing new challenges for the people of the state. The major components of the scheme are as under:

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:

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

d) Functional Components of a 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 though 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.

e) Eligibility criteria for selection of village under the scheme:

Villages to be developed as Model Eco Village should fulfil the following general criteria:

- ✓ Minimum population of 250 individuals / 50-75 households
- ✓ Good connectivity; i.e. not remote and inaccessible
- ✓ Sufficient scope for demonstrating environment responsive action in all/ any of the components of the scheme; i.e. forests, pastures, natural water sources and springs, agriculture- horticulture practices, adoption of non-conventional energy sources, waste management

Additionally, proactive willingness of the people/ panchayat to participate in the scheme, including any self-initiated action on environment issues, presence of functional community-level organisations (Self-help groups, Common interest groups, forest committees etc.) would be desirable.

f) Procedure for Selection of villages:

The Department of Environment, Science &Technology will shortlist/ select/ adopt the Villages/ Panchayats that fulfil the criteria listed above. Subject to the availability of resources/ funds, only one village/ panchayat from a district would be selected for implementation under the scheme, on the recommendation of the concerned Deputy Commissioner to the Nodal Department i.e. Department of Environment, Science & Technology.

g) Preparation of Eco-Village Development Plan (EVDP) and Implementation:

For each selected village an Eco-Village Development Plan (EVDP) will be prepared by DEST, through an Expert Agency, integrating all the components and existing programs/schemes in operation in the block*. The Plan shall initially be drawn up for implementation in five years. The village level plan shall include a Situational analysis, Baselines, Resource Mapping. All prescriptions is based on gap assessment & analysis taking into account the base line status of various environmental aspects pertaining to the actionable components as listed at S.No.6 above and shall have a Annual component wise break-up of the activities. The development of the EVDP would be a consultative and participative process, this would be different from conventional planning.

*(*The BDO concerned , at the time of forwarding the application of a village under this scheme, shall indicate budget provisions under various Central Govt./ State Govt. Programs/ schemes such as MGNREGA, Swachh Bharat Mission, Himachal Pradesh State Rural Livelihoods Mission, JNSSM, MNRE schemes etc. that are ongoing or likely to come up in the selected village; forconvergence and synergy with the current Eco-Village Scheme.)*

h) Formation of a Village Level Management Committee

Department of Environment science and Technology (DEST), GoHP is the Nodal Department and will be over-all responsible for the implementation of the Plan. For each village, selected for development as an Eco-village under this Scheme, DEST will notify a Village Level Management Committee (VMC) to coordinate and guide the implementation of the plan at the village level. The constitution of this committee is as under:

- ✓ President of Panchayat concerned
- ✓ Representative of DEST, Shimla
- ✓ Elected member of village/ concerned ward
- ✓ Forest Beat Guard
- ✓ Panchayat Secretary

BDO concerned shall provide all necessary facilitation, support and coordination for smooth execution of works and programs under the scheme.

i) Financial Outlay:

Each EVDP shall have an approximate outlay of rupees 50 lakhs to be utilised over a period of 5 years as per the annual plan of action. Of this total outlay DEST provides a grant of Rs. 20.00 Lakhs per selected village to meet expenditure on execution of the recommended preparatory actions and funding of critical gaps. The balance funds as may be required over Rs. 20 Lakhs for activities is garnered through convergence and utilising budgets from concerned line departments, district administration, etc. under various relevant ongoing Government schemes.

The Department of Environment, Science & Technology provides grant of Rs.20 lakhs per village in four instalments and administered as under:

- ✓ 20% amount of the total grant is allocated as the first instalment and next instalment is allocated after expenditure and furnishing of utilization certificate of first instalment by the concerned BDO with physical achievements as per approved frame work.
- ✓ This grant is used for sanctioned works, actions and programmes of the scheme and for funding of critical gaps in accordance of the approved plan. The actions, programmes, works is sanctioned by the Department of Environment, Science & Technology.
- ✓ The implementation plan with budget is finalized by the Department of Environment, Science &Technology, Shimla, Himachal Pradesh.
- ✓ The budget is routed through concerned Block Development Officers of the selected village.
- ✓ The budget is spent in accordance with approved outlay, implementation framework, with specified timelines duly approved by the State Level Steering Committee.

DEST earmarks separate budget for the purpose of Gap analysis/ Assessment of ongoing activities, preparation of GIS base maps, preparation of base line data, reporting etc. as well as preparation of the Eco village plan. The expenses as may be required towards institutional charges for evaluation, monitoring and reporting etc. are also be borne by the DEST.

j) Involvement of Private – Non Governmental Organizations in implementation of scheme

Under this scheme the role of private/nongovernmental organization is very important, especially for creating awareness, IEC and trainings. Collaboration with NGOs and Private sector are encouraged in implementation of the scheme and the Nodal department (Department of Environment, Science & Technology) shall examine and process such requests for dove-tailing them with the EVDP.

k) Monitoring and Impact Assessment- Reporting

Each Eco-village under the scheme is monitored by the DEST periodically. Monitoring and evaluation of impacts over baseline status is carried out for each component under the implementation plan. The monitoring can be community led, departmental or through an independent agency.

Director, Department of Environment, Science & Technology is responsible for implementation of the guidelines and is authorized to add/ delete any of above terms &conditions in the guidelines in future, if deemed necessary.

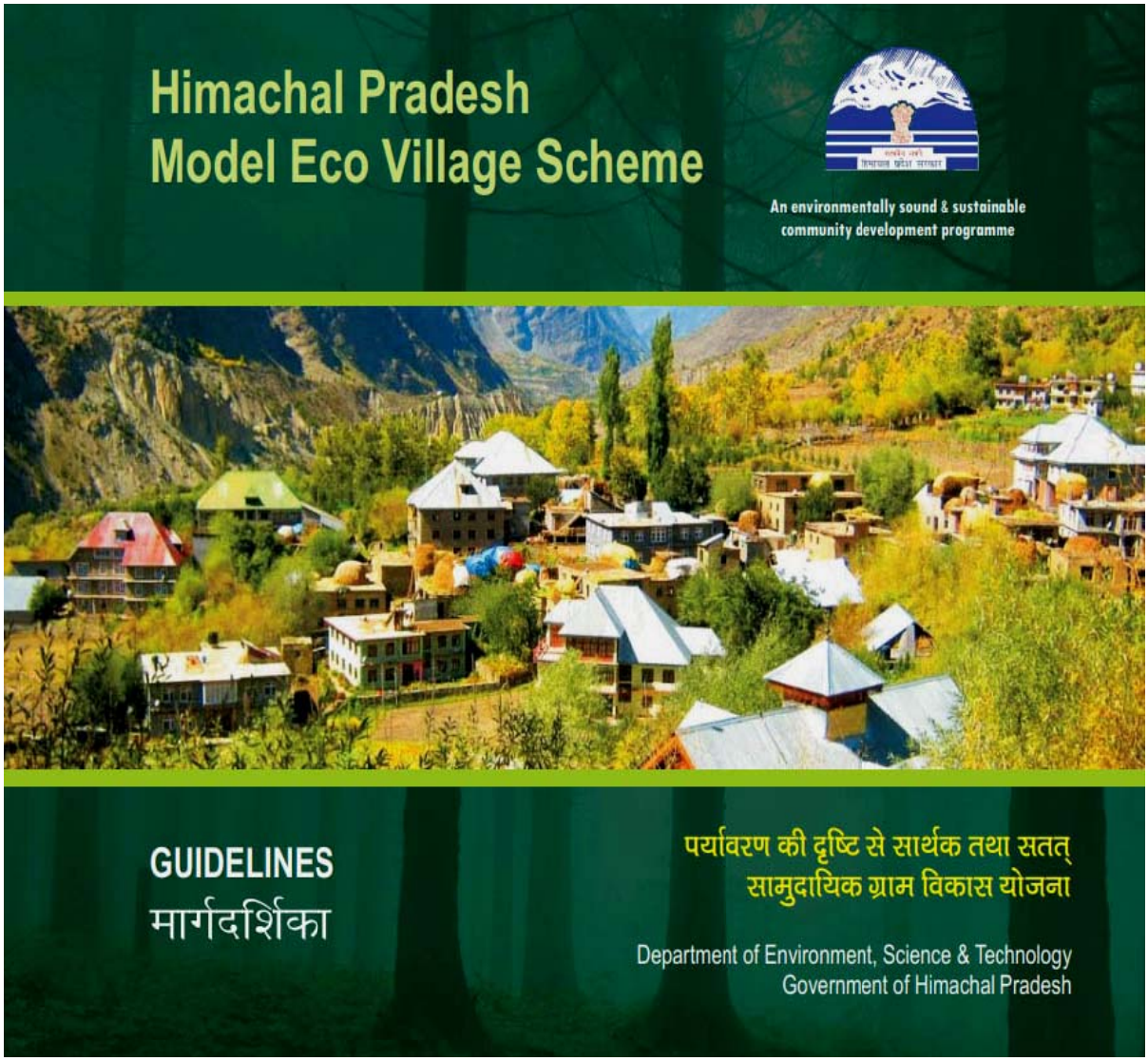
As per mandate for implementation of the scheme during the year necessary actions have been initiated for development of eco villages. The preliminary surveys of each village have been made for initiating the process to prepare EVDPs. Eco village development committees have been constituted as per guidelines. The convergence of different schemes with eco village scheme have been made. The meeting of different stakeholders have been convened to bring awareness about the eco system and conservation practices etc.

Upto this financial year Model Eco Village Scheme is being implemented in following villages:

District	#	Eco Village Details	Start (F.Y.)
Mandi	1.	VillageBaila, GP Janjehali, Block Seraj	2018
	2.	Village Leh, GP Lambathach, Block Seraj	2020
Kullu	3.	Village Shaleen, GP Shaleen, Block Naggar	2019
Sirmaur	4.	Village Deothal, Block Shilai	2018
Shimla	5.	Village Baghalli, GP Dhamoon, BlockTutu (Earlier Block Mashobra)	2018
	6.	Village Charau, Block Tutu (Earlier Block Mashobra)	2020
Kinnaur	7.	Village Kamru, Block Kalpa	2018
Bilaspur	8.	Village Tepra, GP Ghayal, Block Sadar	2018
	9.	Village Kandraur, Block Sadar	2019
Hamirpur	10.	Village Lag, GP Manvi, Block Bhoranj	2020
Solan	11.	Village Mahog, Block Kandaghat	2019
Kangra	12.	Village Keori (Bir-Billing), GP Bir Billing, Block Baijnath	2019
	13.	Village Beed, Block Baijnath	2020
Una	14.	Village Changar Handola, Block Bangana.	2019
Chamba	15.	Village Bhanjraru, Block Tissa	2019

As per mandate for implementation of the scheme during the year necessary actions have been initiated for development of eco villages. The preliminary surveys of each village have been made for initiating the process to prepare EVDPs. Eco village development committees have been constituted as per guidelines. The convergence of different schemes with eco village scheme have been made. The

meeting of different stakeholders have been convened to bring awareness about the eco system and conservation practices, etc.



3.6. financial Achievements:

District	#	Eco Village Details	Start (F.Y.)	Funds Released In Lakhs
Mandi	1.	VillageBaila, GP Janjehali, Block Seraj	2018	16.00
	2.	Village Leh, GP Lambathach, Block Seraj	2020	8.00
Kullu	3.	Village Shaleen, GP Shaleen, Block Naggar	2019	8.00
Sirmaur	4.	Village Deothal, Block Shilai	2018	16.00
Shimla	5.	Village Baghalli, GP Dhamoon, BlockTutu (Earlier Block Mashobra)	2018	12.00
	6.	Village Charau, Block Tutu (Earlier Block Mashobra)	2020	8.00
Kinnaur	7.	Village Kamru, Block Kalpa	2018	16.00
Bilaspur	8.	Village Tepra, GP Ghayal, Block Sadar	2018	16.00
	9.	Village Kandraur, Block Sadar	2019	12.00
Hamirpur	10.	Village Lag, GP Manvi, Block Bhoranj	2020	8.00
Solan	11.	Village Mahog, Block Kandaghat	2019	12.00
Kangra	12.	Village Keori (Bir-Billing), GP Bir Billing, Block Baijnath	2019	12.00

	13.	Village Beed, Block Baijnath	2020	8.00
Una	14.	Village Changar Handola, Block Bangana.	2019	12.00
Chamba	15.	Village Bhanjraru, Block Tissa	2019	12.00
Total				176.00

3.7. Environment Leadership Awards 2020-21

In order to recognize various innovative actions, initiatives by individuals, institutions, organizations active in the State in different fields of economy, Government of Himachal Pradesh has decided to institute 'Himachal Pradesh Environment Leadership Awards' which is conferred annually.

Government of Himachal Pradesh is committed to pursue a development strategy that takes into account the vulnerability of the Himalayan region and the need for environment protection. The endeavour is to support a transformational shift towards an environmentally sustainable and carbon smart economic growth model with the help of individuals/ organizations and demonstrate best practices towards environment protection.

The Awards is given every year for twelve categories on their outstanding/ remarkable sustainable practices adopted, viz; Urban Local Bodies, Hospitals, Hotels & Resorts, Academic Institutions, Schools, Office Premises, Industries, Panchayats, Residences/ Resident Welfare Societies, Restaurants, Bus Stands, Railways Stations, Airports etc. that further the course of environment stewardship.

The award consists of a trophy, a citation and a cash prize viz; Rs. 50,000/- as First Prize and Rs. 25,000/- as Second Prize, under each of twelve categories.

During the year 2020-21 for the first time in Himachal Pradesh these awards were given. After following prescribed procedure the applications were invited from all stakeholders. The category wise details of the winners of the Environment Leadership Awards 2020-21 is as follows:

Table Category I (Office Premises)

Awards/ Prize	Name of Awardees	Remarks of specific initiatives
1st Prize	– SJVN Corporate Office Complex, Shakti Sadan, Shanan, Shimla-171006, H.P	• Regulatory compliances taken. • ISO 9001, 14001, OHSAS 18001 to SJVN Projects nd corporate office was conferred ISO 9001:2015. • Energy conservation by installation of 100 kw solar plant at SJVN office, 40 Kw solar water heating system, using natural lighting with provisions of sky light glasses, energy audit. • Installation of STP, bio-composting machine for solid organic waste management, waste paper for making office stationary. • Rain water harvesting system, fire alarm system, automatic leak detection system, escalators, lift etc. • Implementation of Enterprise Resource Planning (ERP) solution in SJVN. • Awareness campaign, swachhata campaigns, plantation at office complex and observation of various environmental days. • Received various awards.
2nd Prize	– None Found Suitable	-

Consolation Prize/ Certificate of Appreciation	– M/s Nathpa Jhakri Hydro Power Station, SJVN Ltd., VPO Jhakri, Rampur Bushahr, Distt. Shimla-172201	• Regulatory compliances taken. • Energy efficiency by installation of 310 KW grid-connected solar power plant, at surge shaft area, 42 KW roof top solar panels at different office premises and guest houses, solar water heaters occupancy sensors, LED lights etc. • Use of recycled materials in office, manure for green areas, pretreatment of bio-medical waste before disposal, hazardous waste disposal through authorized agencies. • Electric vehicle charger installed at office complex. • Various cleaning drives and awareness campaigns, ISO 9001, 14001, OHSAS 18001 to NJHP Station, swachhata campaigns etc. • Green belt development, emergency preparedness plan etc. STP installed, incinerator plant at NJHP, bio-gas plant, vermicomposting pit etc. • Received various awards.

Table Category II (Schools)

Awards/ Prize	Name of Awardees	Remarks of specific initiatives
1st Prize	– Govt. Sr. Sec. School Shamror, District Solan, H.P.	• Vermicompost pits and manure used in flower beds, herbal garden and kitchen garden. • Waste management, use of polythene banned in school, eco bricks are made out of plastic waste, sanitary incinerator in school. • Rain water harvesting tank, disaster management plan for school. • Plantation drives, awareness campaigns, various environmental committees are formed in school for monitoring. • Received various awards.
2nd Prize	– DAV SS Public School, Phase-II Sector-4, New Shimla, Shimla-9, H.P.	• Activities such as vermicomposting, energy, air & water audits, rain water harvesting, waste management, waste minimization by using paper less work. • Energy efficiency by the use of CFL and solar cell panels, solar cookers and e-boards. • Planation work, various cleanliness campaigns and observation of various environmental days. • Received various awards.
2nd Prize	– GSSS, Himgiri, Tehsil Churah, Distt. Chamba, H.P.- 176321,	• Establishment of herbal garden at school, kitchen garden, extensive plantation work by school, awareness activities etc. • Waste management, recycling of plastic waste and reuse of waste plastic bottles in gardens. • Received awards.
Consolation Prize/ Certificate of Appreciation	– None Found Suitable	

Table Category III (NGO/Institution)

Awards/ Prize	Name of Awardees	Remarks of specific initiatives
1st Prize	– Healing Himalayas Foundation, B-24, Anarkali Garden, Jagatpuri, Delhi, 110051 (NGO	• Work in the field of solid waste management. Two villages have been engaged viz; Kalga and Tosh withwaste segregation at source and have segregated

	operating in Village Kalga, Tosh, Pulga, Barshainin, Nakthan in Kullu, Summer Hill in Shimla and Parashar Rishi Lake in Mandi)	6 lakhs Kg of garbage from the time of inception of their foundation. • Working through awareness and clean up drives in 5 villages of Kullu, Summer Hill in Shimla and Prashar Rishi Lake in Mandi. Collected 2.5 lakh garbage from Kheerganga alone and approx. 6 lakh garbage from Himalayan region. Work on plastic removal which is then transported to energy plants and also working on recycling of pet bottles back to companies. • Received awards for contribution in environment awareness
2nd Prize	– The Voice NGO, Sawant Niwas, Near Bus Stand Jhanjhiri, Khalini, Shimla-171009.	• Cleanliness drives, blood donation camps, tree plantation in various areas of Himachal, started cloth bank to help poor people, awareness campaigns during election, drugs awareness program, wall paintings and sports events. • Plantation drives, planted more than 700 trees and other social and environmental campaigns.
2nd Prize	– Chandan Kranti Samiti, Head Office Churag, Tehsil Karsog, Distt. Mandi, H.P.	• Initiative in the field of growing Chandan Trees in Himachal. • Chandan tree farming in Nahan, Karsog, Teban Sarahan, Sunni, Renuka ji. Samiti has planted till date one lakh chandan trees in Himachal and successful growth in four years.
Consolation Prize/ Certificate of Appreciation	– YATN NGO, House No. 224, Ward No. 11, Bhardwaj Niwas, Gandhi Nagar, Kullu, H.P. 175101 H.P.	• Cleanliness campaigns. NGO replaced plastic plates used in langars with pattals made up of green leaves, installed garbage boxes at various spots in route to Bijli Mahadev. Cleanliness campaigns and awareness drives in Mani Mahesh, Chambs, Himachal Pradesh University. Collected 260 Kg. glass and 162 Kg plastic at Bijli Mahadev and submitted at MRF site • Organized various national level workshops and seminars related to environmental awareness • Plantation drives, almost 200 Devdar trees are planted on way to Bijli Mahadev. • Also organized a free photography workshop tour and rallies for awareness. • A grievances cell was started in which people can submit complaints which further submitted to administration.

Table Category IV Academic Institutions (Other than Schools)

Awards/ Prize	Name of Awardees	Remarks of specific initiatives
1st Prize	Swami Vivekanand Government College Ghumarwin, Distt. Bilaspur, H.P. 174021	• College has declared its campus as Plastic Free Zone. Separate dustbins for wet and dry garbage are placed. • Disposal pit for preparing manure and vermicompost pit. Non biodegradable waste through MC is sent to ACC Barmana. Incinerator in women's washroom was installed. • Solar Panels have been installed in the campus which has resulted in significant decrease in electricity Bill. • Rain water harvesting tank was constructed and water is used in gardening and in toilets. • Botanical garden in the campus. • Plantation drive in and around campus which have planted nearly 700 plants in collaboration with Forest Deptt.

		• Various environmental and social awareness campaigns through Rovers & Rangers unit and NSS Unit of college. • Fire extinguishers located in appropriate and proper places throughout the campus.
2nd Prize	– None Found Suitable	
Consolation Prize/ Certificate of Appreciation	– None Found Suitable	

Table Category V Hospitals

Awards/ Prize	Name of Awardees	Remarks of specific initiatives
1st Prize	– None Found Suitable	–
2nd Prize	– Deen Dayal Upadhayay Zonal Hospital (Ripon) Shimla, Distt. Shimla, H.P.- 171001	• Adherence to Bio-medical Waste (Management and Handling) Rules, 2016. • Herbal garden maintained at hospital premises etc. • Installation of solar panels, LED lighting, gas heaters, air conditioner in hospital. • Plastic waste segregation & collection for disposal, aerobic, anaerobic composting of biodegradable kitchen waste. • Rain water harvesting for toilets & maintenance of permeable area by plantation to prevent soil erosion
Consolation Prize/ Certificate of Appreciation	–None Found Suitable	

Table Category VI Panchayats

Awards/ Prize	Name of Awardees	Remarks of specific initiatives
1st Prize	– None Found Suitable	–
2nd Prize	– Gram Panchayat Kamroo, Tehsil Sangla.	• Work in the field of water conservation, maintenance of natural water resources. • Energy conservation by using solar street lights in the GP Kamroo. • Organic farming is being practiced. • Preservation of natural heritage of the culture. • Awareness and cleanliness campaigns by local Mahila Mandals. • GP Kamroo is selected for development of eco-village under the scheme “Model Eco-Village Scheme” of H.P.
Consolation Prize/ Certificate of Appreciation	– None Found Suitable	–

3.8. H.P Notification during 2004 on Noise Pollution Control vide (No. EDN [S&T]- A(3) 1/2000 Dated: 31-10-2003).

The increasing ambient noise pollution levels in public places from various sources, inter-alia use of loudspeakers, fire crackers especially with the use of public address system (Microphones), music systems, pressure horns and other mechanical devices affects the human health and the psychological well-being of the society adversely. Keeping in view this the State Government has notified various norms to control such pollution in the State.

A. Standards for the Use of Microphone and Instrument Sound/ Noise:

(i) No public Address system (microphone) hall operate after 10-00 p.m. before 6-00 a.m. and all the loudspeakers should be fitted with "Sound Limiter."

(ii) The Microphone used in sound amplification in the public address system shall not be pointed outward. It should be pointed inward to the gathering concerned.

(iii) No public address system shall operate anytime in the Silence Zones, i.e. 100 meters around the premises of Hospitals, Nursing Homes, Educational Institutions and Courts and these restrictions of use of microphones is operative during the working hours of the Schools, Colleges and Library offices.

(iv) No loudspeaker(s) is allowed to be used without the prior permission of the local Police Authority/Sub-Divisional Magistrate/ District Magistrate in their respective jurisdiction.

(v) For the use of loudspeakers, the "Authority" as prescribed under Rule 2 (c) of the Noise Pollution [Regulation and Control] Rules, 2000 [herein after called as said Rules] shall ensure following sound levels in the concerned Area/Zones as describes under rule 3 of the said Rules:

(vi) During the time of any function in the Street or any other public place passage is kept open for the passers-by.

(vii) The concerned "Authority" while granting permission to any loudspeaker to be used in the open place shall ensure that "Sound Limiters" are fitted to these sound levels remain under control as per the prescribed limits contained above in para A(v).

(viii) Between 6-00 a.m. to 10-00 p.m. the loudspeakers to be used in cultural/religious places or any other function shall maintain the ambient air quality standard as prescribed above in para A (v). After 10-00 p.m. cultural function is arranged within a temporarily covered area with sound absorbing materials, provided:

a) All operators shall also maintain the ambient noise/sound levels outside the covered area as prescribed under Act and Rules ibid.

b) No Microphone or Loudspeakers is allowed to be fitted or operated outside such covered area and that too only box-type loudspeakers are allowed to be used inside the covered area.

c) For the use of Public Address System or Microphone in any cultural/religious functions permission thereof is obtained from the local police Authority/Sub-Divisional Magistrate/ District Magistrate of the area.

Table; Noise standards

	Area	Day Time*	Night Time**
A	Industrial Area	75dB/Leq	70dB/Leq
B	Commercial Area	65dB/Leq	55dB/Leq
C	Residential Area	55dB/Leq	45dB/Leq

*) Day time is reckoned in between 6-00 a.m. to 10-00 p.m.
**) Night time is reckoned in between 10-00 p.m. to 6-00 a.m.

(ix) The "Sound Limiters" applied for the control of sound/noise by the operator as described above, shall keep the sound/noise levels within the prescribed limits.

(x) The loudspeakers (Microphones) used in cultural/religious places shall maintain the ambient air standards as per the prescribed norms.

(xi) No permission(s) is allowed for open function three days before starting of important examination such as Schools/Colleges, entrance tests of State Levels such as Pre-Medical/Pe-Engineering Tests and/ or any other competitive examinations to be conducted by the H.P. State Public Service Commission/ Union Public Service Commission/ Board at the State/ National Level, where large number of students are involved, till such examinations/ tests are over.

B. Noise Standards for fire Crackers

i). The manufacture, sale or use of firecrackers generating noise levels exceeding 125 dB(AI) or 145 dB(C) pk at 4 meters distance from the point of bursting is prohibited.

ii). For individual fire-cracker constituting the services (joined fire-cracker), the above mentioned limit be reduced by 5 log 10 (N) dB, where N= number of crackers joined together.

iii). The use of fire-works or fire-crackers shall not be permitted except 6-00 p.m. to 10-00 p.m. No fireworks or fire-crackers is used between 10-00 p.m. and 6-00 a.m. throughout the State.

iv). No fireworks or fire-crackers is allowed at any time in the Silence Zone as defined in the Rules ibid.

C. Standards for Vehicular Horns:

i) The use of pressure horns is stopped completely.

ii) No Horns will be used in Silence Zone at any time.

iii). No Horns is used after 10-00 p.m. to 6-00 a.m.

CHAPTER- 4

CLIMATE CHANGE

Climate Change is long term average weather (e.g. temperature, rain and snowfall, wind) on any given day tends to be most controlled by the cycle of the seasons from spring through summer, autumn and winter. Other factors, with longer time scales, can cause systematic changes to the climate.

Climate Change undoubtedly has emerged as an issue of concern presently for all living organisms. Climate Change has potential to completely and adversely affect the way of human life. The term "Global Warming" and "Climate Change" are often used interchangeably, but there is a difference. "Global Warming" is the gradual increase of the Earth's average surface temperature due to greenhouse gases in the atmosphere, whereas the 'Climate Change' a broader term. It refers to the long term changes in the climate including changes in average temperature and rainfall due to global warming. Climate Change phenomenon which is much more complex is the result of activities that alters the composition of atmosphere, due to undesirable and unwanted over exploitation of our natural resources.

Climate Change refers to a statistically significant variation in either the mean state of the climate in its variability, which is attributed directly or indirectly to anthropogenic activities that alter the composition of global atmosphere and which are in addition to natural climatic variability observed over comparable time periods. Protecting our environment requires changing how our essential resources are managed and how our energy needs are met. In Himachal Pradesh Department of Environment, Science & Technology is the nodal Department to deal the subject climate change in the State.

4.1. State Action Plan on Climate Change

As a part of a regional Commitment, H.P. State Action Plan on Climate Change was initiated in the State to decentralise action on the National Action Plan on Climate Change (NAPCC). The State Strategy & Action Plan on Climate Change (SAPCC) was prepared in State with a focus to target the local issues and to address with State's strategy to mitigate or cop up with the impacts of changing climate.

4.2. H.P. Knowledge Cell on Climate Change

HP State Knowledge Cell on Climate Change (HPKCCC) under National Mission for Sustaining the Himalayan Ecosystem (NMSHE) was setup in the Department of Environment, Science & Technology, Govt. of Himachal Pradesh by the Nodal Ministry of Science & Technology, Govt. of India for NMSHE. Witha total budget outlay of ~ Rs.2.74 Crores.

Through this Knowledge Cell the GoHP intends to place a sound coordination mechanism for ensuring cooperative and cohesive actions on climate change under active coordination with Department of Science Technology (DST), Government of India. The National Mission for NMSHE Climate Change knowledge cell would be an activity based setup which will function with following approach:

- Data Generation, information, Policy directive formulation, Vulnerability Assessments, participatory resource management strategies and development of livelihood options.
- Deploying Technologies for hazard mitigation & disaster management, development of ideal human habitats, and agriculture and forest sector innovations.
- Awareness, Capacity Building, developing human resource, emphasis on skill development, enable communities become sufficiently empowered with know-how and mountain specific required skills, necessary for adaptation to climate change.
- Active Community Participation for enhancing ecological sustainability by involving community in investigating causes and consequences of disturbance regimes, promoting conservation of native and endemic elements, and understanding glacier and river system dynamics.

Through this cell the data base on climate change is generated and the knowledge gaps is filled up. The setting up of a knowledge centre shall build a vibrant and dynamic knowledge system in line with the objectives of National Missions with primary focus to collection, collation and dissemination of climate change knowledge in the State through building human and knowledge capacities, institutional capacities, evidence based policy implementation capacities, continuous learning and pro-active designing of development strategies capacities, regional network of knowledge institutions engaged in research on Himalayan Ecosystem. The Department of Environment aims to develop a coherent database on the geological, hydrological, biological and social cultural dimensions including traditional knowledge system on preservation and conservation of the ecosystem and also to generate a strong database through monitoring and analysis, to eventually create a knowledge base for policy interventions on climate change.

4.2.1 Objectives:

- ✓ Formation of knowledge networks among the existing knowledge institutions engaged in research and development relating to climate science and facilitate data generations, sharing and exchange through a suitable policy framework and institutional support.
- ✓ Establishment of National and International technology watch groups with institutional capacities to carry out research on risk minimized technology selection for developmental choices.
- ✓ Support for development of national capacity for modeling the regional impact of climate change on different ecological zones within the country for different seasons and living standards.
- ✓ Establishing research networks and encouraging research in the areas of climate change impacts on important socio-economic sectors like agriculture, health, natural ecosystem, bio-diversity etc.
- ✓ Generation and development of the conceptual and knowledge basis for defining sustainability of development pathways in the light of responsible climate change related actions.
- ✓ Providing an improved understanding and awareness of the key climate processes and the resultant climate risks and associated consequences.
- ✓ Complementing the efforts under the other national missions, strengthen indigenous capacity for the development of appropriate technologies for responding to climate change

through adaptation and mitigation and promote their utilization by the Government and societies for sustainable growth of economies.

- ✓ Creating institutional capacity for research infrastructure including access to relevant data sets, computing and communication facilities and awareness to improve the quality and sector specific scenarios of climate change over the Indian subcontinent.
- ✓ Ensuring the flow and generation of human resources through a variety of measures including incentives to attract young scientists to climate science.
- ✓ Building alliances and partnerships through global collaboration in research & technology development on climate change under International and bilateral S&T cooperation arrangements.
- ✓ Building capacities of communities, ULBs, PRIs, CBCs to deal with climate change Risks and hazards.

4.2.2 Projects on Climate Change under HPKCCC

Through the NMSHE Knowledge Cell the GoHP is to institute effective mechanism of network among NGOs, Research Institutions, and Universities & Stakeholder Departments/ Organizations. Structural arrangements this mechanism is shown as under:

1. Under HPKCCC the Department 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 - lambathach Panchayt, Tehsil Thunag & Development Block seraj of Mandi district in Himachal Pradesh,India. aprroved 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 Lambathach panchayat of district Mandi. was implemented a pilot study was conducted in Lambathch Panchayat of District Mandi.

The Expected outcomes of project are:

- 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.

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

CAFRI is a continuation of commitment from GIZ India for the state under the project CCA RAI (Climate Change Adaptation in Rural Areas of India) which also supplemented various activities related to capacity development and planning, implementing, financing, monitoring adaptation initiatives at different level of governance. The Mission team visited the state in 24-25 February 2020 and discussed on further strategies for implementation of the project activities as part of Indo-German Technical Cooperation.

CAFRI project supports the implementation of Himachal Pradesh. SDG Vision 2030 targets and State Action Plan on Climate Change with special attention to vulnerable target groups such as women's self-help groups and women Farmer Producer Organizations (FPO) and their associations. Furthermore, the project pursues that local needs and formats for participation of target groups are included in the guidelines of various funding schemes as an important criterion for the approval of project proposals in order to ensure the quality and ownership of the adaptation actions.

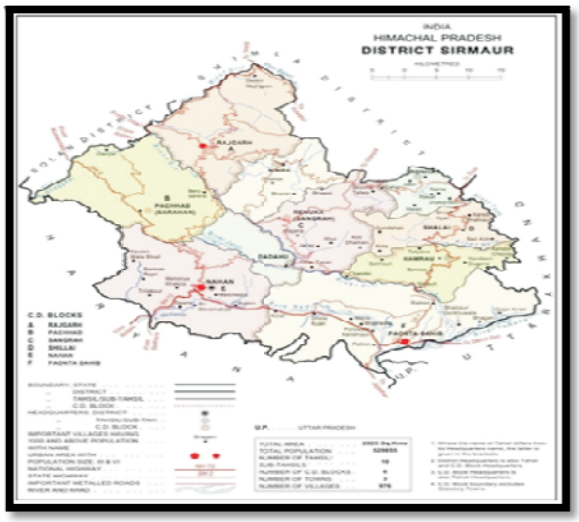
3. Projects under National Adaptation Fund on Climate Change

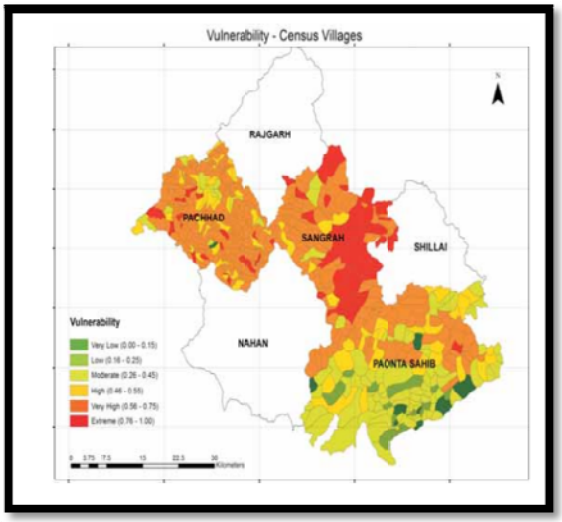
A Project under National Adaptation Fund for Climate Change titled **"Sustainable Livelihood of Agriculture Dependent Rural Communities in Drought Prone District of Himachal Pradesh through Climate Smart Solutions"** was funded by the Ministry of Environment, Forests & Climate Change (MoEF&CC), Govt.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

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

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.





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.

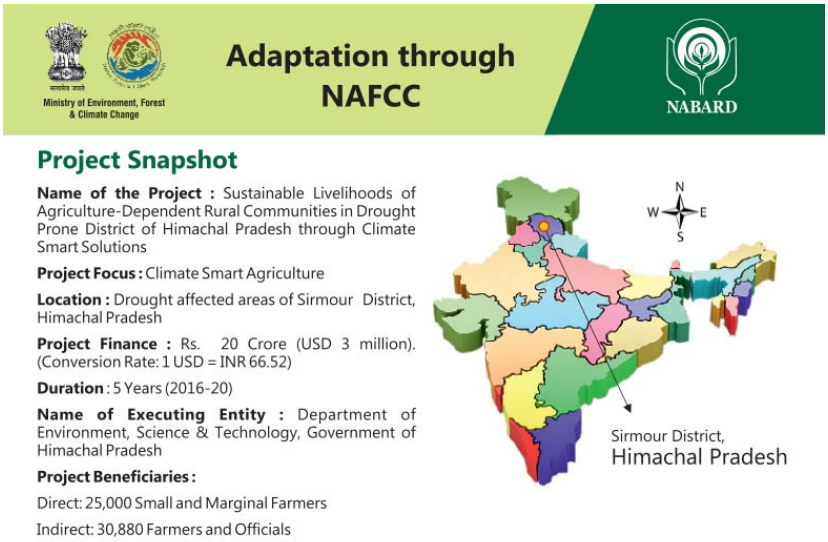


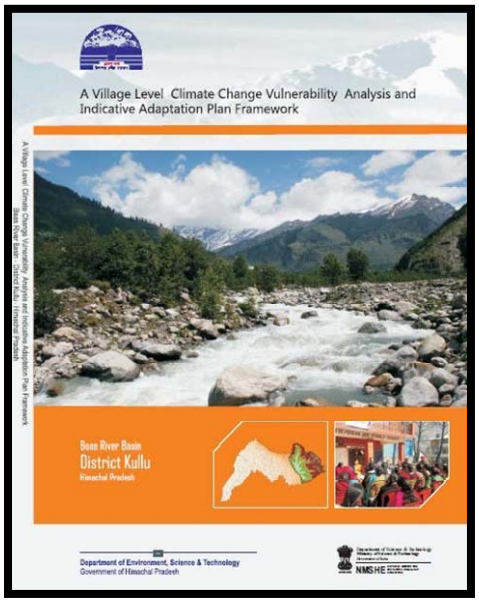
Figure Source: https://www.nabard.org/auth/writereaddata/File/HP-nafcc.pdf

4. Capacity Building and Training on Climate Change Adaptation and Environmental Protection and Environment Manangement:

During this financial year 2020-21,no training programmes on climate change adaptation and environment protection and environment management were conducted by the HPKCCC in the State.

5. Climate Change Vulnerability Assessment Studies

The Government of H.P has completed Village Level Climate Change Vulnerability Assessment for Beas River Basin covering 1650 No. of Panchayats, 9258 No. of villages in four Districts of the State, Kullu, Mandi, Hamirpur & Kangra undertaking CCVA through Hydrological Modelling for Micro-Watershed Assessments. Various capacity building programme on climate change adaptations have been organized. Village level Climate Change Vulnerability Assessment & Adaptation Plans for Kinnaur & Lahaul-Spiti districts falling under Satluj river basin was completed and plans for Shimla, Kullu & Mandi district are being prepared.



Based on the vulnerability assessment report the awareness material has also been prepared and distributed to all stakeholders and community at large.

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.

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) was 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
➢ 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.	➢ 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 km^2, which is 26.35% of the State's geographical area. in terms of forest canopy density classes, the State has 3,224 km^2 very dense forest, 6,381 km^2 moderately dense forest, and 5,074 km^2 open forest. As per data there was a decrease of 2 km^2 in the moderately dense forest and an increase of 13 km^2 in open forest. It is noticed from the analysis that there was 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 $m^3$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 timer 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 was estimated for the financial year 2020-21.

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 2019-20 an area of 7,969.23 hectares has been achieved. 35 lakh medical plants are to be planted in the Financial year 2020-21.

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

a. Water: The fresh water supply is emerging a big challenge in present time. At present there is 100% urban and rural population having access to drinking water but only 10.30% population is getting 135 LPD (Litre Per Day) of water supply and 65.30% @ 55 LPD in urban and rural areas respectively. There is huge gap in demand and supply against the standard rate of demand. There are pressure from changing climate and increasing population levels. Only [51.83% of urban population using sanitation] The STP's (Sewage Treatment Plant) have been provided but there are gaps in technical implementation.

b. Forests: Over the period the forest cover of Himachal Pradesh has observed a pressure due to decrease in rain fall and increase in population. The Forests of Himachal Pradesh, known for their grandeur and majesty are like a green pearl in the Himalayan crown. The forests in Himachal Pradesh which host 7.32% of flora and 7.4% fauna of the Country are presently under great stress due to impact of modern civilization, economic development and growth in human and cattle population. The Forest cover in the State, based on interpretation of satellite data of October- December 2008, is 14,679 sq Kms. which is

26.37% of the State's geographical area. The state has 38 Forest Types which belong to 8 Forest Type Groups, viz. Tropical Moist Deciduous Forest, Tropical Dry Deciduous Forest, Subtropical Pine Forest, Himalayan Moist Temperate Forest, Himalayan Dry Temperate Forest, Sub Alpine Forests , Moist Alpine Scrub and Dry Alpine Scrub.

c. Soil: The overall production of the Agriculture sector and Horticulture sector for the year 2015-16 is 2847000 metric tons and 819000 metric tons respectively. If we analyse the rate of growth in the area with production it is not comparative, the manner in which the overall production should have been achieved could not be achieved. There are many factors including the soil quality. The maintaining soil quality to improve health of Agriculture/ Horticulture is an important factor. There is need to control degradation of soil quality through effective water resource management, solid waste management, to ensure qualitative and quantitative outputs.

d. Renewable Energy: The state has an estimated hydropower potential of 37,436 MW out of which only 10,400 MW was harnessed so far. The domestic demand is about 84% of total requirement. At present only 0.6% energy is generated from solar, 2% from nuclear and 6.4% from thermal. There is need to enhance the share of solar optimally. The electrical energy intensity is increasing day by day and the transmission and distribution losses are also posing threats on demand and supply chain.

Table 5.1: Natural Resource Management Challenges and Actions

Sector	Sub Sector	Challenges	Action
Natural Resource Management	Water	– Changing Climate (Precipitation, Rainfall & Temperature) – Increasing Water Demand – Non rain water harvesting – Ground water depletion	– Adaptation actions in water sector. – Improve efficiency in Water distribution – Enhance Rain Water Harvesting – Ground Water Recharge – Improve Water Quality
	Forests	– Forest density decreasing – Forest Cover decreasing – Forest fire increasing – Loss of biodiversity	– Protect & Conserve Forests – Afforestation programme – Creation of infrastructure to control forest fire – Increase use of cleaner fuels LPG.
	Soil	– Agriculture & Horticulture Production – Uncontrolled unscientific Solid Waste Management – Depleting Forests.	– Improve soil quality – Soil moisture, nutrient level checks and improvements. – Effective Sanitation System, – Control Industrial Pollution
	Renewable Energy	– Lacking in Infrastructure Development – Transmission & Distribution Losses – Depletion of glacier cover – Silt management.	– Transmission & Evacuation of power. – Construction costs rationalization as greener energy. – Enhance solar energy usage. – Enhance wind energy use.

	Air Quality	– Air pollution due to cement industries – Increasing network of road. – Increasing vehicles. – Increasing industries	– 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 better manage renewable sources of energy, reduce waste generation through prevention, reduction, recycling and re-use and to sustainably manage the use of natural resources the following three fold strategies have been adopted:

- ✓ Strategies towards protecting natural resources
- ✓ Strategies towards better waste management
- ✓ Strategies towards sustainable consumption and production

In order 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 the Government of Himachal Pradesh sets following targets to be achieved by 2030:

- ✓ Increase the Solar – wind Renewable Energy Production and Consumption by 10%.
- ✓ Collect, Treat, Process 50%, ~ 250 tons of municipal wastes through waste to energy facilities in the State.
- ✓ Increase the area under organic farming under horticulture from 17,000 hectares to 30,000 hectares and under agriculture increase vermi composting units from 1000 to 1930 and increase production of organic manure from 0.85 lakhs MT to 0.164 lakhs MT benefiting 20,000 farmers.
- ✓ Reduce the total pesticides used in agriculture by 20% of present use.
- ✓ Area to be brought under Bio Control from 100 hectares to 175 hectares and Release of bio agents from 150 lakhs to 270 lakhs benefiting 6932 families.
- ✓ Increase hydro power - renewable energy capacity by 30%.
- ✓ Construct covered storage for food grains at the micro level.
- ✓ Set up cold chains at basin levels.
- ✓ Promote & Setup Horti-Agri produce processing and preservation units at small scale level.

Table 5.2: Strategies & Targets for success

SDG	Targets	Indicators	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 countries taking action, with developed countries taking the lead, taking into account the	12.1.1.Material Footprint and material footprint per capita.	Foot print on industrial production is 5570.88 (000'tones) G grams CO_2 eq. 15.86 lakhs LPG (Liquid Petroleum	Reduction in CO_2 emission by 10% of 2012 levels Increase by 10% of 2012 levels.	Reduction in CO_2 emission by 20% of 2012 levels Increase use of LPG by 30% of 2012 levels.	All Stakeholder Departments Food & Civil Supplies, Indian Oil Corporation

	development and capabilities of developing countries.		Gas) users			
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 was 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 Organiztion)setup	78 FPOs (Farmer Produce Organiztion) 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 are 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. Tentative 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 is situated in the western Himalayas. Covering an area of 55,673 kilometers (34,594 miles), Himachal Pradesh is a mountainous state with elevation ranging from about 350meters (1,148 ft.) to 6,000 meters (19,685 ft.) above the Mean Sea Level. Area-wise, Hamirpur is the smallest district of the Pradesh which covers an area of 1,118 sq. kilometers (2.01%)and Lahaul & Spiti has the largest area of 13,835 sq. kilometres (24.85%).The population of Himachal Pradesh is 68,56,509 as per the Census of India, 2011. In terms of population it accounts for only 0.57% of total country's population. The population of the State increased by 17.53% between the years 1991–2001 and further decreased by 12.81 % in 2011.

In the context of understanding the climate trends in Himachal Pradesh, both precipitation (Rainfall& Snowfall) and temperature are considered significant indicators. Based on comprehensive studies carried over NW (North West) Himalayas on long term trends in maximum, minimum and mean annual air temperate by Bhutiyani, et. al. 2007, included observation from Shimla, HP for a period 1901-2002,

at95 % confidence level indicates that there is a significant increase in air temperature in the NW0 Himalayan region by about 1.6 C with winter warming at a faster pace.

Himachal Pradesh is highly vulnerable State to a large number of natural as well as man-made disasters. Earthquake has jolted this hilly State many times and caused great losses to the State. Flood, drought, landslide and cloud burst are other common natural calamities of the State that are very frequent. In the context of human vulnerability to disasters, economically weaker sections are the ones that are worst affected. The children of this section of society are studying in Government schools.

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

S.No	NatureofDisaster	Frequency	Intensity
1.	Flood	Regular feature	High
2.	Drought	Every3–5years	Moderate
3.	Cloudburst	Regular feature	High
4.	Earthquake	Regular feature	ModeratetoVeryHigh
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	Regularfeature	High

5.2.5. Gaps between targets and current achievements in Himachal Pradesh

Based on the available data and its assessment clearly indicates that that there is a considerable gap in our knowledge about the natural resources and their vulnerability to climate change of the entire Himalaya in general and State in particular. There is no systematic monitoring, documentation, or research to have an update on the status of biodiversity in the region. Despite various projections and observed changes, the region lacks adequate scientific evidences to understand the impact of climate change on various aspects of human wellbeing. Across the entire region, most of the limited research that is available focuses on the adverse impacts of climate change and overlooks the adaptation mechanisms that local people have developed themselves, and have evolved the potential new opportunities. There is also a lack of trained human resource and institutional set up and policy imperatives to tackle climate change issues. The present analysis and assessment experienced shortcomings mainly as a result of lack of reliability in observed trends and model projections in later

parts resulting from the lack of consistent sector wise data in relation to climate change. Three broad areas stand out as knowledge and data gaps that need to be addressed:

- ✓ First, there is much to learn about the potential magnitude and rate of climate change at the regional and local levels, and subsequent impacts on the full range of biodiversity endpoints and ecosystems.
- ✓ Second, there is need to develop a consolidated biodiversity conservation techniques (both traditional and natural), or climate adaptation techniques, targeted on Himachal Pradesh or Himalayan region.
- ✓ Third, detailed analysis needed at the moment to be developed for each of the priority vulnerable sector specifically to agriculture and horticulture, ecosystems and to biodiversity and other natural resources.

Based on available data base and the current/prevalent conditions, analysis have been carried out for Himachal Pradesh to demonstrate that how the State is vulnerable w.r.t. climate change risks and what are the indicators/scenarios. An attempt was made to undertake the district level mapping of adaptive capacity in the State as a composite of bio, social and technological indicators. But certainly inadequate data base and the knowledge gaps indicate towards strengthening of capacity of State on account of this.

So far as climate change induced disasters are concerned the State is lacking in the basic knowledge of safety (KAP Report, 2012). Educational institutions of the State are highly vulnerable especially to earthquake. Hence there is a need to prepare a standard and uniform disaster operation procedure for the department to deal with various situations. Human resources of the department need training on management and mitigation of different type of disasters including relief, rescue and rehabilitation. Department also needs to establish a monitoring mechanism at district level to check the district level Disaster management plans. For this a pool of resource persons is needed in each district to help in the preparation of safety plans. It will also be helpful in the auditing of these plans at grass root level to ensure the implementation of the concerns of risk reduction. Adequate financial powers need to be vested with the district, college and school level to manage the crisis.

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

The economy of the State is dependent on sectors like the hydel power generation, horticulture, agriculture, forestry and tourism etc. and these sectors are assumed to be under threat in the present scenario of changing climate. Any change in these sectors due to climate change, in every likelihood, will not only going to affect the livelihood prospects in the agrarian economies of mountain regions, but also everyone living below in the plains. The major issues of concern due to the emerging threat of climate change in Himachal Pradesh are:

- ✓ Agrarian economy of 90% rural population and their livelihood.
- ✓ Dependence on rains for agrarian activities.
- ✓ Sustainability of hydro economy as dependency on snow and glaciers.
- ✓ Water sources for drinking and irrigation.
- ✓ Rural livelihood dependency on forest for fuel wood, fodder and non-wood products etc.
- ✓ The role of medicinal herbs in economy.
- ✓ Climate induced and other natural hazards threat in the state.

Indicators of Climate Change in Himachal Pradesh are:

- ✓ Rise in temperature in the NW Himalayan Region by about 1.6°C in the last century.
- ✓ Warming rate of Shimla was higher during the period 1991-2002 as compared to earlier decades.
- ✓ About 17% decrease in rainfall in Shimla was observed from 1996 onwards.
- ✓ The decreasing trend in seasonal snowfall in Shimla is very conspicuous since 1990 and it was lowest in 2009.
- ✓ Monsoon discharge in Beas River has shown a significant decrease.
- ✓ Winter discharge in River Chenab has shown a significant increase.
- ✓ Satluj showing an increasing trend in winter and spring discharge.
- ✓ Quality of apple was affected and the apple line has shifted upwards.
- ✓ Area under apple is being diverted to vegetable due to rising temperature.
- ✓ Incidence of pest and disease are more severe.
- ✓ Pine forest invading heights.
- ✓ Kikar, Tali (Shisham), Deodar, Ban trees are on decline.

Based on the available data and its assessment clearly indicates that that there is a considerable gap in our knowledge about the natural resources and their vulnerability to climate change of the entire Himalaya in general and State in particular.

There is also a lack of trained human resource and institutional set up and policy imperatives to tackle climate change issues. The present analysis and assessment experienced shortcomings mainly as a result of lack of reliability in observed trends and model projections in later parts resulting from the lack of consistent sector wise data in relation to climate change.

- ✓ No significant infrastructure available for early warning system for disasters and natural calamities.
- ✓ There is a need to undertake the district level mapping of adaptive capacity in the State as a composite of bio, social and technological indicators.
- ✓ Inadequate data base and the knowledge gaps indicate towards strengthening of capacity of State on account of this.

The water crisis, droughts and floods, agriculture-horticulture security issues, agriculture, land fertility, health impacts especially vector borne diseases, vulnerable forests, deforestation and loss of biodiversity, pollution of air, water and soil will have the most impact on the State and so on the poor and vulnerable groups and sections of the society. There is a need for further analysis, capacity enhancement to cope up with the likely climate change impacts in Himachal Pradesh and need for adaptation and mitigation measures.

From the analysis it was concluded/ observed that impact on agriculture-horticulture production will be visible in the form of change in cropping pattern and the crop productivity can be projected to decrease even at 1- 2^{o}C rise in temperature. Whereas Himachal Pradesh is likely to experience 1.7°C to 2.2°C warming:

- ✓ Northern parts of the State at higher altitudes can witness most shifts.
- ✓ Agriculture may benefit from the increase length of growing period initially but would get adversely affected later on.
- ✓ Apple production may be affected with shift in the long term.
- ✓ Some regions may experience large reduction in yields (up to 50% by 2020).

Impact of climate change on water resources will definitely be manifested in the State, further; water stress will increase with changes in rainfall patterns and the fast melting of Himalayan glaciers.

- ✓ The rainfall is projected to increase during June to September.
- ✓ Increased occurrence of floods and increased flow in rivers and dams, increased instances of soil erosion and silt load.
- ✓ Increase in water stress for rain-fed crops due to warming (1.7°C to 2.2°C)
- ✓ Glaciers retreat may affect the discharge dependability of all rivers.

Impacts of Climate Change on the forests of State are highly uneven due to climate variance:

- ✓ The forests of the State are highly vulnerable especially the high altitude dense forests.
- ✓ Forest types shifts may occur in >80% of forested grids (2080 scenarios).
- ✓ The occurrence of forest fire may increase.
- ✓ The forest productivity may increase initially but there would certainly be long term adverse impacts.

About 26% of the State's geographical area is the repository of 3,295 species out of which 95% are endemic to the state and 5% (150) species are exotic, most of the people in rural areas in the State depend directly or indirectly on forests for their livelihood.

Table 5.5 :Indicator Statements for Monitoring the Progress

SDG	Targets	Indicators	Current Status	Target by 2022	Target by 2030	Data Source
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 framers 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 was 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 was 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 climate change mitigation, adaptation, impact reduction and early warning.	13.3.1. Block level capacity building & awareness programme organizing 200 awareness camps.	-	100 Awareness camps on climate adaptation Prepare report Model R&D facilities in 10 villages	200 awareness camps on climate adaptation Publishing of reports and papers R&D facility to demonstrate climate smart practices set up in 50 villages	Administration, RD, ULBs, Agriculture, Horticulture, RLBs etc.
		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 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.			Three proposals to Green Climate Fund prepared and submitted	At least 10 Green Climate Fund proposals prepared	DEST
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

Department of Environment, Science & Technology being Nodal Department for environment protection and climate change is also partner in implementing various bilateral and multilateral programmes of Government of India.

Climate Change Adaptation in Rural Areas of India (CCA – RAI) with the Ministry of Environment, Forests and Climate Change, Government of India is implementing various actions. As a part of such agreements, bilateral agreement DEST worked with Government of Germany (GIZ).

Under Multilateral cooperation DEST worked with the World Bank and Global Green Growth Institute (GGGI) South Korea on environmental management practices with a focus on municipal solid waste management.

During the year 2020-21, the DEST was involved in implementation of bilateral programme Indian Himalayan Climate Adaptation Programme (IHCAP)- of Department of Science and Technology (DEST), Govt. of India, initiatives for undertaking research on climate change and conducting capacity building programmes to strengthen the existing staff of the nodal/ line state and districts department, research institutions, NGOs, women SHGs etc. For this programme the DEST worked with SDC-Government of Switzerland.

The brief background of these programms and actions taken under these programmes during the year 2020-2021 are elaborated as follows:

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

Context :

India's Nationally Determined Contributions (NDCs) emphasiseson better adaptation to climate change by enhancing investmentsin sectors vulnerable to climate change. CAFRI project as anintegral part of the BMZ programme "Climate and Environmentin Rural India" is guided by the NDCs and supports partners inreducing climate change risks of vulnerable groups, sectors andalso build capacities of actors (at different levels) in the planning,implementation and financing of climate adaptation initiatives at state level.

Project name Commisioned by	Climate Adaptation and Finance in Rural India (CAFRI) German Federal Ministry for Economic Cooperation and Development (BMZ)
Project region	Himachal Pradesh
Lead executing agency Partner Agency	Ministry of Environment, Forest and Climate Change (MoEFCC) Department of Environment, Science & Technology, GoHP
Duration	01.01.2020 – 31.12.2022

The technical support under project comprise of:

1. Policy, Planning & Impact Monitoring for Adaptation envisages supporting adaptation policy architecture at state level for integration of change instruments/factors into policies, plans and programmes.

- Technical support for revision of State Action Plan on Climate Change (SAPCC).
- Downscaling SAPCC priority activities at district and village level and identification of vulnerable groups, sectors and regions.
- Support gender responsive participatory adaptation planning and implementation at local level.
- Develop mechanism for SAPCC & adaptation activity and impact monitoring linked to SDG indicators.
- Technical support on state specific project proposal on climate change adaptation catering to the local needs.
- Developing sector specific guidelines for climate change adaptation and disaster risk reduction (DRR) in priority sector like crop value chains.

2. Capacity Development envisages strengthening capacities of local multiplicators to spread awareness and knowledge on adaptation along with training of government officials at multiple levels for integrating climate change adaptation into planning processes.
   - Strengthening capacities of public authorities in planning
   - and implementation of the adaptation measures.
   - Panchayat/village level capacity development programmes on local adaptation needs including women self-help groups, Panchayati raj institutions, Farmer Producers Organizations (FPOs).
   - Technical support for institutionalising state level capacity development program.

3. Knowledge Management & Networking for exchange of information and knowledge related to adaptation.
   - Development of roadmap and operationalisation of state level knowledge network & platform on climate change adaptation and disaster risk reduction.
   - Planning a joint coordinated process for implementation of adaptation relevant measures at state level.
   - Knowledge sharing and exchange with focus on state level priorities.

4. Expected Achievements (Impacts)
   - Enhanced capacities for implementation of adaptation measures at state level based on climate information and local priorities and gender considerations at large.
   - Nodal agencies and state departments track adaptation impacts in relevant projects and programmes under the SAPCC through gender-sensitive impact assessment.
   - Improved coordination and flow of expertise and information among stakeholders at state level (nodal agencies, line departments, research institutions, CSOs, private sector).

Pictures of World Environment Day and the APR workshop on 05-06-2020

6.2. Development Policy Loan- World Bank

Over a seven-year period, the World Bank has assisted Himachal Pradesh move forward on its green and inclusive development agenda. The journey started in 2009, with the World Bank's first Development Policy Loan (DPL) provided the state with $200 million in budgetary support to implement much-needed fiscal reforms. In the wake of this, HP embarked on a path of green and inclusive development that is the most sustainable way forward for a state with unique environmental and cultural assets. The two subsequent Green Growth DPLs that followed – for $ 100 million each, between 2011 and 2014 - helped the State to promote environmentally and socially sustainable development in hydropower, tourism, and industry, as well as in the development of watersheds. This is the first time that the World Bank has provided support of this nature to a state in India. It is also the first time that India has accessed a loan from the Clean Technology Fund - a global fund that finances clean technologies to reduce greenhouse gas emissions. The two loans have helped the state establish the institutions and bring reforms in policies needed to bring long-lasting change in the manner in which these key sectors grow and develop. Nevertheless, going forward, it will require strong political will and a committed bureaucracy to implement the state's bold new vision on the ground.

In 2009, the World Bank's first Development Policy Loan (DPL) helped Himachal Pradesh establish the Department of Environment, Science & Technology (DEST). DEST has now become a strong advocate of environmental issues and coordinates the efforts of various government departments, enabling them to plan their development activities in an integrated and environment-friendly manner.

In 2013, DEST developed an Environmental Master Plan (EMP) that established baseline data for the State's natural and physical resources. The plan identifies ecologically sensitive zones and the critical issues that impact them, while outlining corrective measures as well as the manpower and regulations needed to implement them. An important step was the establishment of the Aryabhatta Geo-informatics and Space Application Centre (AGiSAC) in 2011, the centre is a technical hub that serves as a repository for all data on the State's environment, as well as its natural and man-made resources. It assists government departments to make evidence-based development decisions and to monitor results.

Under multilateral cooperation the DEST during the year worked with the World Bank and Global Green Growth Institute (GGGI) South Korea on environmental management practices with a focus on municipal solid waste management. During this period a Team of Experts from World Bank GGGI, South Korea also visited the State and consulted all important stakeholders.

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

The Himalayan Region is one of the most vulnerable regions in the country facing enormous challenges related to climate change and its impacts on ecosystems and livelihoods. There is an urgent need to identify mechanisms for facilitating adaptation in the Himalayan region with the aim of building preparedness towards climate change impacts. While there may be several options required for adaptation, all adaptation options might not be possible to implement at one go. Thus, apart from understanding local conditions, vulnerabilities, and adaptation measures, there is also a need to know the adaptation priorities of different stakeholders.

The NMSHE mission document recognizes the need for adaptation in the Himalayan region. It clearly highlights identification of desirable adaptation policies to improve regional sustainability as one of the proposed actions to address overall objectives and goals of the Mission. It states that 'there is a need to integrate scientific information on impacts, vulnerability, and adaptation in decision making processes, risk management, and sustainable development initiatives.

Recognizing the vulnerability of Himachal Pradesh, the Department of Environment, Science & Technology (DEST), Government of Himachal Pradesh was collaborating with the Indian Himalayas Climate Adaptation Programme (IHCAP) of Swiss Agency for Development and Cooperation (SDC).

As part of IHCAP Phase I (2012-15), a collaborative pilot study in Kullu district of Himachal Pradesh was conducted by a consortium of Swiss and Indian universities and research institutions in coordination with DEST to provide an integrated assessment of climate vulnerability, hazards and risk. The assessments were conducted following an integrated framework for assessing vulnerability, hazards and risk and provide information on baseline conditions in Kullu district. Based on the research conducted a set of adaptation actions have been proposed and are available as part of the Synthesis Report on Kullu studies.

Phase II of IHCAP (year 2016-19) program is designed to take forward the initiative of the first phase through demonstration of science based adaptation planning and its implementation. Based on the consultation held with line departments and stocktaking of the initiative taken up by the Government of Himachal Pradesh towards enhancing the resilience of the ecosystem and livelihood, nine concrete adaptation measures were identified from amongst the measures proposed under IHCAP Phase I

study. Further detailed concept notes have been developed with stakeholder agencies after intensive deliberation for district Kullu.

Consultation meetings were organized, which were attended by representatives of district administration, officials of the line department, NGO/ CBOs, academics, defence research agency and international institutes, who in turn participated in prioritization of adaptation measures. Detailed Project Reports (DPRs) were developed for the selected adaptation concepts after due consultation with the line departments, Project Implementing Entity (PIE) and other nodal departments. The details of the project activity were also validated in course of the consultation meeting held with the state nodal agency for climate change and officials of the line department on 5th of August 2016.

The concrete adaptation measures selected for securing financial assistance in following :

- Reducing GLOF Risk in Parvati Valley of Kullu district, Himachal Pradesh
- Promoting Climate Resilient Agri-Horticulture in Banjar, Kullu district, Himachal Pradesh
- Ecosystem Based Adaptation in the Great Himalayan National Park, Kullu district, Himachal Pradesh

The brief outline of these project reports finalized during the year 2020-21 are as under:

(i) Reducing GLOF Risk in Parvati Valley of Kullu district, Himachal Pradesh

Study conducted by IHCAP programme revealed an increase in the formation of supra-glacial lakes from 12 (1989) to 77 (2014) in Parvati valley catchment. This increase was associated with retreat of glaciers, and these lakes can pose threat to the downstream inhabited areas, road infrastructure, agricultural land and hydroelectric projects. The project is conceptualised to strengthen the resilience of the vulnerable community and reducing the GLOF hazards risk through establishment of modern and sustainable catchment scale early warning system in Parvati valley and mainstream it to District Disaster Management system of Kullu district.

The project is prepared for a budgetary requirement of INR 20 crore comprising of the following adaptation measures:

1. GLOF hazard zonation and vulnerability mapping in the Parvati valleys area
2. Establishment of early warning system with last mile linkage to community
3. Capacity Building of vulnerable communities through demonstration of community based GLOF related risk management system in Parvati Valley.

(ii) Promoting Climate Resilient Agri-Horticulture in Banjar, Kullu district, Himachal Pradesh

Horticulture and agriculture provides direct employment to 71% of the total states population. 30% of the total state domestic product was seriously impacted by climate variability in recent past. Production of apple, which was a predominant crop of the district, has declined between 1982 and 2005 with increase in maximum temperature (decline of more than

9.1 units per year in last 23 years has taken place). The project aims to improve the adaptive capacity of rural small and marginal farmers including rural women in the Banjar area through introduction of alternate horticultural practice along with required social engineering and capacity building processes.

The project is prepared for a budgetary requirement of INR 20 crore comprising of the following adaptation measures:

1. Promote high density spur variety- low chilling variety of apple production and pomegranate, cultivation promotion through farmers training.
2. Dissemination of anti-hail nets in Kullu district for reduction of damage of fruits.
3. Creation of water source e.g. poly lined tanks for supporting micro irrigation system in the high density orchard.
4. Establishment of Controlled atmosphere storage unit and Grading Lines.

(iii) Ecosystem Based Adaptation in the Great Himalayan National Park, Kullu district, Himachal Pradesh

The project is conceptualized to propagate medicinal species plantation and its conservation in the GHNP eco-region. Increased biodiversity reserve will enhance the climate resilience and ensure the continuity of the ecosystem function. The project will also enhance the adaptive capacity of the community to address current challenge and future uncertainties with focus on gender, social inclusion and environmental rehabilitation. Most of the forest communities of the national park are poor and marginalized and are heavily dependent on the natural resources base for their livelihood due to limited options. Climate variability coupled with anthropogenic pressure has severely impacted the livelihood of the people depending upon agriculture and horticulture in the national park region. At the same time the dependency of the community on the medicinal plant produce as an alternate means livelihood are also and impacted due to altitudinal shift of certain medicinal plant species including extinction of certain spices. The project is intended to secure the livelihood of the community through promotion and mainstreaming of the medicinal plant cultivation, developing it value chain and market.

The project is prepared for a budgetary requirement of INR 17.34 crore comprising of the following adaptation measures:

1. Environment scanning including biodiversity and vulnerability assessment along with mapping of community ecosystem linkage
2. Assessment and establishment of market linkage for medicinal plant produce
3. Establishment of infrastructure for promotion of medicinal plant in GHNP including nursery, drying and processing units
4. Development of Herbal Garden as an endangered species conservation measures
5. Support establishment of private nurseries involving local people
6. Promotion of organic medicinal plant cultivation

CHAPTER-7

RESEARCH & DEVELOPMENT PROGRAMME- IN ENVIRONMENT & SCIENCE & TECHNOLOGY

The research ecosystem in India presents a significant opportunity for multinational- national- regional corporations across the world due to its intellectual capital available in the country. Consequently, several MNCs have shifted or are shifting their research and development (R&D) base to India. These R&D bases either develop products to serve the local market or help the organizations, institutions deliver new innovative generation of products faster to the markets across.

Himachal Pradesh is also witnessing strong growth in its agriculture, horticulture, hydropower and other allied sectors including waste management and as the government is investing large sums to set up dedicated research centres for R & D in these sectors. There are at present about 20 universities, IIT, IIM, NIT, Medical Institutions working in the State. The Department of Environment Science & Technology being nodal department for Environment Management, Science & Technology aims to develop Himachal Pradesh into innovation on the back of effective government measures taken to provide an enabling environment for growing research and development in Himalayan Region.

Go HP also aims to enhance the bilateral cooperation for technical support in environment protection and science and Technology in the State to support new research and development (R&D) projects in the areas of Climate Change, Environmental Management, Science & Technology.

During the year 2021-22 the Department of Environment, Science & Technology invited the R&D project proposals from various scientists and technical experts in the State who were working in the Academic institutions, National laboratories and other recognized R&D Institutions in Himachal Pradesh in different fields under a scheme with a budgetary sealing of upto Rs. 10.00 Lacs to be completed in a period of two years to strengthen the research and development in various fields of Environment, Natural Resource Management and, Biotechnology for achieving the objective of environment conservation and sustainable development in the State.

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 2020-21.

In the Financial year 2020-21 a total of 5 project proposals were shortlisted/ sanctioned with the following titles in the area of Environment, Climate Change and Biotechnology:

Environment, Climate Change

1. Application of Biochar Technology to procure drinking water from ETP water.
2. Designing and Development of a Microalgae Based Prototype for the Improvement of Air Quality in the Industrial Areas of H.P.
3. Extraction of keratin from poultry waste biomass of and its application in the production of value-added product.
4. Bioconversion of waste chicken feathers into N- rich organic fertilizer by keratinolytic bacteria for effective waste management in Himachal Pradesh.
5. Value Addition of Sand Pear: Waste to Worth Approach for Sustainable Livelihood of Rural Population.

Biotechnology

6. Biotechnological interventions to develop basal rot resistant germplasm of garlic for cultivation in hilly regions.

7.2. Abstracts

7.2.1. " Application of Biochar Technology to procure drinking water from ETP water".

No.Env.S&T(F)/R&Dproject/2017/4657

Table 7.1: Details of PI and Co PI's -(i)

Beneficiary	Chitkara University, Barotiwala, Distt. Solan, H.P.
Principal Investigator	Dr. Arun Lal Srivastav
Co-Investigator	Dr Varinder S Kanwar
Project duration:	24 months
Total Budget	Rs. 9,95,000 /-/-(Nine lakh Ninty five thousands only)

Abstract: CETPs are frequently used to treat wastewater; they can also be used for irrigation and other domestic purposes, but not for drinking because the wastewater may also be chemically and biologically contaminated. Toxic metals, organics, and microbes are possible major pollutants in ETP treated water. Due to significant industrial discharge, the Nalagarh-Baddi-Barotiwala (BBN) industrial sector in Himachal Pradesh's Solan district is dealing with a serious problem of air, water, and soil contamination. The best method currently used to remove pollutants from water is adsorption. A cheap, sustainable, and renewable adsorptive material made from agricultural waste is called biochar. This proposal's objective is to look into an alternate drinking water source in case there isn't enough groundwater accessible. Water samples (CETP treated water) were obtained at the CETP, Baddi, Himachal Pradesh, for the purpose of characterising the water's initial composition and determining its level of toxicity. At Chitkara University in Himachal Pradesh, biochar adsorbents were created in the lab utilising a variety of biomasses, including wheat straw and rice husk. Biological oxygen demand (BOD),

iron, and colour were determined to be high (over standard) in the water sample based on the CETP treated water testing results. Iron levels were 0.96 mg/L, the BOD was 9.3 mg/L, and the colour was 320 Hazen units. However, significant amount of the iron in CETP water may be removed by using rice husk biochar. For the iron removal adsorption studies, the adsorbent dosage and contact duration were 0.5 mg/L and 2 hours, respectively. The initial pH, however, was 8.7 prior to adsorption and 9.0 following adsorption. The greatest colour removal from CETP water, or 97%, was achieved with wheat straw biochar and finally adsorbents.

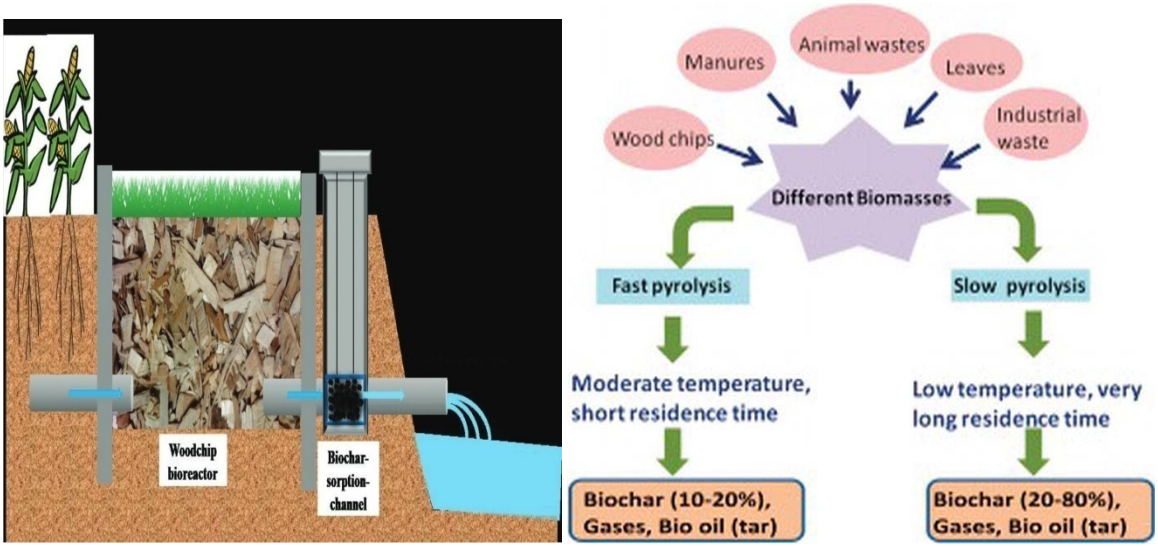


Figure 7.1

7.2.2. " Designing and Development of a Microalgae Based Prototype for the Improvement of Air Quality in the Industrial Areas of H.P.".

Table 7.2: Details of PI and Co PI's -(ii)

Beneficiary	Department of Biotechnology,Shoolini University, Solan (H.P.)
Principal Investigator	Dr.Pradeep Kumar
Co-Investigator	Mr. Sankhjit Pramanik
Project duration:	24 months
Total Budget	Rs. 4,20,000 /-(four lakh twenty thousands only)

Abstract: Air pollution is one of the most serious problems in the world and is posing a major risk to our health and food security. Himachal Pradesh is famous for its pleasant weather, natural beauty, and clean, fresh mountain air. For last few years, rapid industrialization, transportation, or hazardous solid/liquid waste disposal issues, and even agriculture have been releasing significant amounts of pollutants into the atmosphere, including NO_2, SO_2, CO_2, O_3, VOC's, PM 2.5, and PM10, reducing air quality and increasing health problems among people living in the state. The declining AQI of the industrial belt, particularly in Baddi-Nalagarh and other Himachal Pradesh cities, was a source of concern because they fail to fulfill the National Ambient Air Quality Standards under Section 16 of the Air Prevention and Control of Pollution Act, 1981. Hence, there is a threat to the quality of life as well as

the natural beauty that can sink the root for the state's economically viable and environmentally secure future. Various traditional air quality monitoring devices are currently available; however, the main vanishing points of these technologies are cost and efficacy. Microalgae are sunlight-driven cell factories that convert carbon dioxide and other toxic compounds to potential biofuels, foods, feeds and high-value bioactive compounds and releasing approximately 71% of the earth's oxygen in the process of photosynthesis. Hence, potential applications of microalgae make them to play an important role in air quality monitoring and bio-energy production in future. Aim of the project is to use microalgae as an alternative method in air pollution control and determine its efficiency and also to make the process economically viable and cheap. Thus, the toxic pollutants from air will be treated in an effective and cheapest way by using standardized hyperactive and stable microalgae-based method to get the goal of having clean environment in the state. Moreover, microalgae-based prototype thus developed will be used for improving the air quality at household level especially in the industrial areas of Himachal Pradesh.

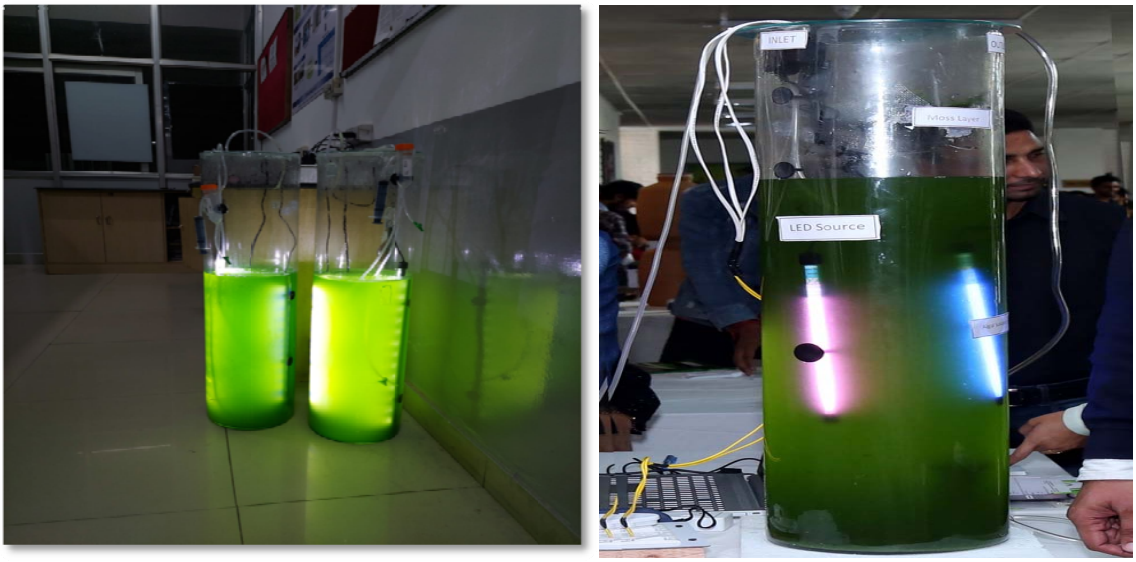


Figure 7.2

7.2.3. " Extraction of keratin from poultry waste biomass of and its application in the production of value-added product".

Table 7.3: Details of PI and Co PI's -(iii)

Beneficiary	Jaypee University of Information Technology, Waknaghat, Distt. Solan- 173234, H.P
Principal Investigator	Dr. Ritika Singh , Asst. Prof.,School of Agriculture,Abhilashi University
Co-Investigator	Mrs. Shivani Kaundal
Project duration:	24 months
Total Budget	Rs.7,60,000 /-(Seven lakh Sixty Thousand only)

Abstract: In this project the extraction of keratin from poultry waste biomass and its application in the production of value-added products is carried out. Poultry biomass was collected fromModern Slaughterhouse, M.C Abattoir, Shimla (H.P).After that, the blood stains, fats, and grease are removed from the chicken feathers by pre-treating themby soaking them in detergent and petroleum ether.Then dried in direct sunlight and packed in plastic seal bags for further examination.After that optimization is done on the various temperatures, pHs, and concentrationof the hydrolyzing agents (Sodium hydroxide and Sodium sulfite), the bestoutcomes are observed at 0.5 M concentration with a keratin yield of 64%. Then, pretreated chicken feathers are dissolved in 0.5 M NaOH solution and left in the incubator shaker for 5 hours at (500 rmp at 50°C), to extract keratin under optimal conditions. After that hydrolysate was filtered to remove the undissolvedresidues. Then, the precipitation was done with 2N HCL solution by maintaining the pH up to the isoelectric point (5 pH) of keratin after that solution was centrifuged to obtain keratin pellets and then washed multiple times with distilled water to remove the NaOH and HCLcontent, freezedryat -55 °C for 24 hours using the lyophilizer to obtain the keratin powderand then it was stored at 4 °C for further analysis.Characterization of keratin powder is done by using Bradford protein assay and SDS-page. Further extracted keratin is used in makingkeratin-basedbiofilm as an alternative to synthetic plastic, after conducting several experiments with various concentrations, temperatures, and plasticizers, biofilm is produced by dissolving glycerol solution, dialyzed keratin, and gelatin with the aid of the stirring method at the optimal concentration.Dried on optimized temperature to obtain keratin-gelatine blended bioplastic film. This bioplastic film can be used as a food packaging (dry)material. The film completely breaks down in water and soil.

Keratin has a high market value it also aids in the formation of hair, nails, and skin's outer layer (Epidermis)and helps to support skin, heal wounds, and keep nails and hair healthy.So, by using extracted keratin a hair treatment cream, shampoo, and moisturizing cream is formulated to prevent damaged hairs and skin. A number of formulations were tried and the best formulation was chosen onthe basis of homogenous emulsions. The basic formulations included in this product are emulsifier, thickener, base of cream, gelling agent, stabilizer, surfactants, moisturizer, oils, water, and preservatives. The HLB value of oil phase ingredients are calculated to ensure the concentration of the emulsifier in the formulation. This cosmetic formulation typically consists of three phases: water phase, oil phase, and cool down phase. The cosmetic formulation is based on the proportion or weight-based list of components required to formulate the product, and it also includes the production process and methods. Several testing parameters are performed to analysed the cream for safe use, like physical and chemical analysis of raw material and active ingredients (keratin) used in the formulation, stability testing, and self-life determination, homogeneity test was analysed by visual inspection for the appearance and existence of any clog, organoleptic properties of thecream is observed for color, odour, and appearance,pH,viscosity is determined by viscometerusing spindle no S – 64 at 20 rpm at a temperature of 25 °C.The spread-ability, work of shear, firmness, and stickiness of cosmetic products arealso analysed, and for irritancy, testcream is applied on the dorsal left-hand surfaceand checked continuously for 30 days.The cream was observed for a period of 30 days.After 24 hours, there was no phase separationis observed. The cream looks thick and white in color.The formulation had constant pH,and a homogeneous, non-greasy texture. The cream is found to be stable at room temperature.There was no color change after storage of 30 days. There was no irritation, no grittiness found after applying on the skin, the cream gives a smooth texture and moisturizing properties.The cream contained keratin which has hair regeneration power. The components used in this formulation can strengthen the hair.Further plans are to formulate other cosmetics products and to work on other applications of extracted keratin, for example,removing dye and trace metals from the wastewater.

Schematic representation of the extraction of keratin and synthesis of bioplastic and cosmetics products

Figure 7.3

7.2.4. Bioconversion of waste chicken feathers into N- rich organic fertilizer by keratinolytic bacteria for effective waste management in Himachal Pradesh.

Table 7.4: Details of PI and Co PI's -(iv)

Beneficiary	Dr. YS Parmar University of Horticulture and Forestry, Nauni, Solan, H.P.
Principal Investigator	Dr Sunita Devi,
Co-Investigator	Dr. Rohit Bishist
Project duration:	24 months
Total Budget	Rs. 6,16,000 /- (Rs. Six lakh sixteen thousand only.)

Abstract: The aim of the study was to convert chicken feathers waste into N- rich organic fertilizer using potent keratinolytic bacterial strains *viz., Bacillus halotolerans* L2EN1, *B. cereus* N27, *B. cereus* N14, *B. megaterium* N35 and *B. halotolerans* DPE11. For the preparation of organic fertilizer, chicken feathers (CF) and cow dung (CD) were used as substrates. Two experimental setups *i.e.,* Set-I, consisted of bacterial consortium and Set-II, without consortium, were laid out in a Completely Randomized Block design with five treatment combinations (T_1 - CF only; T_2 – 3CF:1CD; T_3 - 1CF:1CD; T_4 - 1CF:3CD and T_5 - CD only), both in plastic pots and composting pits for a period of six months. Samples from each treatment combination of each set were drawn at monthly intervals for their microbiological and physico-chemical analysis. Results revealed that highest population density (Log CFU/g) of bacteria (12.45 in Set-I and 12.41 in Set-II) was observed on 60 days. Among treatments, their population attained maxima (9.85 in Set-I and 9.70 in Set-II) in treatment T_2. Initially, the fungal

population maintained a low density in both the sets till 90 days and 120 days in Set-I and Set-II, respectively. As the composting period progressed, their population increased significantly in both the sets and achieved maxima (3.49 in Set-I and 3.15 in Set-II) in treatment T_4. The actinomycetes were not detected upto 90 days in all the treatments except in treatment T_4 (2.43) of Set-I. The maximum density of diazotrophic bacteria (9.20 in Set-I and 8.00 in Set-II) was observed at 90 days in both the sets. The population density of spore formers (SFs) and proteolytic bacteria (PB) was statistically at par at 60 (6.55 SFs: 9.69 PB) and 90 (6.60 SFs: 9.70 PB) days in Set-I, implying the early and prolonged attainment of thermophilic phase. As the proportion of CF increased over CD, the population density of SFs and PB declined significantly in both the sets. Physico-chemical analysis revealed a statistical significant increase in the pH towards alkaline range in both the sets. In Set-I, temperature recorded at 60 (46.17) and 90 (46.32) days was statistically at par, implying the achievement of early and prolonged thermophilic phase. Maximum moisture loss was observed at thermophilic phase (at 60 and 90 days in Set-I and at 90 days in Set-II) of the composting process. Overall, significant increase and decrease in the non-volatile and volatile solids, respectively was observed as the composting period progressed. As the proportion of CF decreased over CD, a significant decrease and increase in the non-volatile and volatile solids, respectively was observed. A statistical significant increase was observed in organic carbon as the proportion of CD increased over CF in both the sets with maxima (46.99 in Set-I and 47.94 in Set-II) in treatment T_5. The loss in total nitrogen increased significantly with increase in the proportion of CD over CF and progressive days of composting. In Set-I, the C:N ratio observed at 180 days was in the order: T_5 (31.84) > T_4 (15.70) > T_3 (7.45) > T_2 (5.13) > T_1 (4.10) while, in Set-II, C:N ratio varied in the order: T_5 (31.64) > T_4 (16.00) T_3 (6.42) > T_2 (4.93) > T_1 (3.65). To conclude, among sets and treatments, treatment T_4 of Set-I was best in terms of its microbiological (bacteria: 9.40; fungi: 4.20; actinomycetes: 3.49; enteric: 7.62; SFs: 4.96; diazotrophs: 6.38; PB: 7.98) and physico-chemical (pH: 7.53; temperature: 34.79; EC: 0.87; moisture: 45.10; non-volatiles: 21.25; volatiles: 78.75; organic carbon: 45.68; N: 7.02; P: 0.68; K: 2.06; C:N ratio: 15.70) characteristics, (%) in the pot mixture (T_1 – 5; T_2 – 10; T_3 – 15; T_4 – 20) along with control (without CFC).

CHAPTER-8

SCIENCE & TECHNOLOGY SECTION

Under the Science & Technology division the department aims to spread and improve technical knowledge, education to improve scientific temperament as well as sustained focus on quality of scientific education. Popularizing Science in society is the other major objective of this Department.

At the same time, spreading Science as an outlook as well as for igniting young, curious minds remains a high priority. Building a society that encourages science augurs well for development of Himachal Pradesh and the nation. The Department also fosters research in all areas of Science & Technology. And it also actively encourages scientists of the state to gain exposure within and outside the country. Development of Science & Technology certainly holds a key to progress and prosperity.

Development of Science and Technology and policy decision of all the subject concerned are the prime responsibility of this section. Interdepartmental coordination in the subjects related to Science & Technology, conducting scientific surveys, research and design in subject related to Science & Technology, providing grants to the persons and institutions involved in survey, research and design activities relating to Science and Technology, supporting and co-ordinating applied research programmes in universities and other institutions, formulation of Science & Technology plans relevant to the following identified needs of the State are also among the important functions.

The entire work of this section is being carried out through H P State Council for Science & Technology as such the section is not made functional.

8.1 Himachal Pradesh Council for Science & Technology

The Himachal Pradesh Council for Science, Technology & Environment, is currently the nodal agency for the promotion of Science & Technology. The Council was established at Shimla by Govt. of Himachal Pradesh on January 3, 1986 under the country wide programme of the Department of Science & Technology, Govt. of India to promote Science & Technology in the State. The council is working in 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.

General body of the State Council is the Highest decision making body of the Himachal Pradesh Council for Science, Technology and Environment. Hon'ble Chief Minister is the Chairman and Hon'ble Minister for Science & Technology is the Vice Chairman of the General Body of the Council. The

Administrative Secretary, Environment, Science & Technology to the Govt. of HP is Member Secretary of the General Body and members from Govt. Non-Govt. & scientific organisations both central and state are the members of the General body. The Executive Committee [EC] of State Council looks after the administration of the Council and is responsible for the executive function of the Himachal Pradesh Council for Science, Technology and Environment. The Secretary [S&T], to the Govt. of HP is the Chairman of the Executive Committee of the State Council. The Member Secretary, Himachal Pradesh Council for Science, Technology and Environment (HIMCOSTE) is the executive head of the organisation.

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.

CHAPTER-9

BIO-TECHNOLOGY SECTION

7.2 Biotechnology Division:

The State Government has notified Biotechnology Policy vide Notification No. STE-A(1)-2/2008 dated 20.12.2014. As per the State Biotechnology policy, the Government is poised to make Himachal Pradesh into a prosperous Himalayan Bio-Business hub through the promotion of Biotechnology in the areas of Agriculture, Horticulture, Animal Husbandry, Health and Bio-resource Utilization for the development of State.

In the view of above Implementation of State Biotechnology Policy is the main target of Biotechnology Division.

Following objectives are framed for the implementation of State Biotechnology policy.

- To support R&D in potential areas of Biotechnology, including, Agriculture, Horticulture, Animal Husbandry, Human Health, Environment and Industry.
- To upgrade infrastructural support to R&D and Educational Institutions to generate highly skilled human resource in Biotechnology.
- To make Himachal a preferred and globally competitive destination for the development of BT product, processes and services.
- To conserve the commercially exploit bio-resources of the State for sustainable development.

a. Details of Project proposals Under Applied Biotechnology funded in 2020-21.

7.2.5 " Biotechnological interventions to develop basal rot resistant germplasm of garlic for cultivation in hilly regions.".

Table 7.5: Details of PI and Co PI's -(i)

Beneficiary	Dr. YS Parmar University of Horticulture & Forestry, Nauni, Solan, H.P.
Principal Investigator	Dr Anupama Singh
Co-Investigator	Dr Bhupesh Kumar Gupta
Project duration:	24 months
Total Budget	Rs. 5,87,000 /-(Five lakh eighty seven thousand only)

Abstract: Garlic is an important cash crop grown in Himachal Pradesh. Being a cash crop garlic fetches remunerative prices to the farmers. It is particularly suitable for farmers with small and holdings. It is affected by various diseases, out of which basal rot caused by *Fusarium oxysporum* is predominant. Breeding for disease resistance is nearly impossible in garlic as it is sexually sterile. Long-term clonal propagation has led to lesser variability in garlic germplasm. Therefore, biotechnological approaches

like in vitro selection of somaclonal variants in presence of pathotoxin can contribute to generation of resistant germplasm. In the present project, garlic callus will be induced from various explants like root tips and basal plates. This callus will be allowed to grow and regenerate in the presence of fusarium oxysporum pathotoxin at different concentrations. The regenerated pants will be hardened and evaluated for *Fusarium* basal rot resistance. Development of resistant lines will help in boosting garlic production in Himachal.

Figure 7.4

PUBLICATIONS

S.No.	Title & Hyperlink
1.	Booklet on Polythene Hatao Paryavaran Bachao https://desthp.nic.in/publications/PolytheneHataoParyavaranBachao.pdf
2.	Plastic Waste Management- Rules & Regulations https://desthp.nic.in/publications/Compilation_Rules_Notifications.pdf
3.	Bio-Technology- Status Report 2017 https://desthp.nic.in/publications/BiotechnologyInHP.pdf
4.	Carbon Intensity of H.P. in association with NMSHE https://desthp.nic.in/publications/Folders/Folder-CarbonIntensity.pdf
5.	Booklet on "Forests or Carbon Sinks" https://desthp.nic.in/publications/Folders/Folder-Forests.pdf
6.	Green House Gas Emissions in Himachal Pradesh https://desthp.nic.in/publications/ghg2014_A1b.pdf
7.	Executive Summary EMP https://desthp.nic.in/publications/EMP_ES_A1b.pdf
8.	State Strategy & Action Plan on Climate Change https://desthp.nic.in/publications/HPSCCAP_A1b.pdf
9.	Green House Gas Emission Inventory of H.P. based on reports of 2008-2009 https://desthp.nic.in/publications/ghg2012_A1b.pdf
10.	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
11.	Enabling Adaptation in Himachal Himlayas https://desthp.nic.in/HPKCCC/PDF/Dhamun_Report_Final_Web.pdf
12.	कृषि एवं बागवानी के विभिन्न पहलुओं पर बढ़ता जलवायु परिवर्तन का प्रभाव https://desthp.nic.in/HPKCCC/reports/Folder_Hindi_Agriculture.pdf
13.	Strengthening Crop Management Practices in Drought Prone Areas of District Sirmour of Himachal Pradesh, India- *Booklet* https://desthp.nic.in/HPKCCC/reports/Folder_A3_SLADRC_HPKCCC.pdf
14.	Climate Modelling of Himachal Pradesh https://desthp.nic.in/HPKCCC/reports/Report%20on%20Climate%20Modelling-HP.pdf
15.	Biotechnology in Himachal Pradesh http://dest.hp.gov.in/sites/default/files/BiotechnologyInHP.pdf

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