

Ongoing projects:

- National Wetland Inventory and Assessment (NWIA) Phase-II (under SARITA programme)
- Cryosphere Application Programme (CAP), ISRO-SAC, Ahmadabad
- Understanding the nature of alpine timberlines of Himalaya: Integrating ecological and scenario studies for assessing the impact of climate change.
- Understanding influence of climate Change on small hydro-power projects in Himachal Pradesh, India
- Status of Geo-resources and Impact Assessment of Exogenic Geological Processes in NW Himalayan Ecosystem” under NMSHE programme of DST
- Pilot Study on Snow and Ice harvesting at village Pooh, district Kinnaur.
- Formulation of Himachal Pradesh Science, Technology and Innovation Policy (STIP) 2020.

Completed projects

- Integrated Studies of Himalayan Cryosphere using Space Based inputs (ISHC).
- Vulnerability and Risk analysis of Geo-hazards in Himalayan region.
- Snow and Glaciers study project (ISRO) DOS GOI Phase-II.
- Snout monitoring, mapping mass and energy balance and assessment of bio-physical environment of Nardu Glacier, Baspa basin, district Kinnaur Himachal Pradesh.
- Monitoring and Estimation of Mass Balance of Glaciers with different aspects in Baspa Basin using space data and their validation with in-situ observations on Nardu glacier.
- Seasonal Snow cover in Baspa, Beas, Jiwa, Parbati, Pin, Spiti River Sub-Basins in Himachal Pradesh.

Reports/Documentations

- 101 years data (Seasonal, Monthly and Annual) Rainfall Trends in Himachal Pradesh during 1901-2002 has been documented.
- Document on “Evaluation of physico – chemical parameters of major tributaries flowing into the Pong Dam, & general floral diversity around Pong Dam Wildlife Sanctuary - A Case Study”.
- Hazard Risk Vulnerability Assessment (HRVA) in Kullu district.
- A technical report on the findings of the study carried out under Snow Glacier Phase-II program.
- A technical report on the findings of the study Snout Monitoring, Mapping, Mass and Energy Balance and Assessment of Biophysical Environment of Nardu Glacier, Baspa Basin, District Kinnaur, Himachal Pradesh.
- A technical report on the Moraine dammed lakes in Satluj catchment using space data for 2015.
- Assessment of general floral diversity around Pong Dam Wildlife Sanctuary.
- Development of Geo-informatics techniques using SAR Data for identification of glacial zones in Chotta Sigri glacier”.
- Documentation of Daily Meteorological Data.
- Flood Hazard Zonation and Vulnerability Assessment of Soan River, Una District HP
- Interactive Geo-Portal of Himachal Pradesh has been created covering parameters Lithology, Drainage, Geo-morphology, watershed, soil etc. upto Tehsil level.
- Status report created in the form of Database for Medicinal Herbs in Six districts of Himachal Pradesh for the year 1990-2007.

- Documentation on Animal Diseases influenced by Climate Variation in Himachal Pradesh.
- Changing trends in monsoon in Himachal Pradesh reported for 112 years from 1901-2012.
- Generated Ramsar Information Sheets for three major Wetlands of Himachal Pradesh (**Renuka, Pong and Chandertal**) of Himachal Pradesh.

Books

- Coffee Table book on “Traditional food grain crops of Himachal Pradesh”.
- Coffee Table book on “Wild edible fruits of Himachal Pradesh”.



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Introduction

In pursuance to the National Action Plan on Climate Change (NAPCC), Government of Himachal Pradesh took several actions which includes Himalayan Chief Minister's Conclave on 'Indian Himalaya: Glaciers, Climate Change & Livelihoods' held at Shimla on October, 29-30, 2009 and the joint programme evolved therein called 'Shimla Declaration on Climate Change and Himalayan Development'. A State Centre on Climate Change was established under the aegis of the State Council for Science, Technology & Environment, Department of Environment, Science & Technology on 29th March 2010, Himachal Pradesh so that State's initiatives could be detailed with the Centre's initiatives.

- To enhance the monitoring of glaciers, their state of health, present and past retreating trends, impacts of change in glacial mass on the river flows and snow cover patterns, Updation of glacial inventories etc.
- To evolve awareness modules at the different platforms for the mitigation of natural disaster threat in Himachal Pradesh.
- To create and generate awareness amongst various stakeholders for taking appropriate measures in combating the impacts of climate change.
- To coordinate with different universities, research institutions, Govt. departments, NGOs etc. to pursue theme based specific research on climate change and its impacts in the state.
- To formulate policies and input to the state government in the field of disaster management and climate change.

Main sectors under HPCCC



Snow & Glaciers

Himalayas possess one of the largest resources of snow and ice outside the Polar Regions. Geological history of Earth indicates that glacial dimensions are constantly changing with changing climate. During Pleistocene the earth's surface has experienced repeated glaciations over a large land mass. During the interglacial period, climate was warmer and deglaciation occurred on large scale. This suggests that glaciers are constantly changing with time and these changes can affect the discharge of most of the Himalayan Rivers. Therefore it is important to carry out the investigation for snow and glaciers for the proper management of resources and disasters. State Centre on Climate Change has been carrying snow & glaciers studies, which includes:

- Monitoring of Glacial lakes in Chandra, Bhaga, Chenab, Satluj, Beas, Ravi, Jiwa and Parwati Sub-basins.
- Monitoring of Glaciers in Himachal Pradesh using LISS III & LISS IV satellite data.
- Monitoring of Panchhuk lake for early disaster preparedness.
- Mapping of seasonal snow cover in Himachal Pradesh.
- Monitoring of Glacial Lakes in Satluj River Basin.
- Snout Monitoring, Mapping, Mass and Energy Balance and Assessment of Biophysical Environment of Nardu Glacier, Baspa Basin, HP.

Consultancy Provided

- State Centre on Climate Change provides consultancy for monitoring all the Glacial Lakes in the Satluj Catchment as part of disaster preparedness plan.
- Provided consultancy to HPPCL for Shongtong-Karchham Hydro Electric Project "Vegetation Map based on the satellite data analysis".
- Provided consultancy to HPTDC Kasauli, for Groundwater Potential Map around Kasauli.

Agri-horticulture

Agri-horticulture sector plays a vital role in global economic, nutritional and food security. At the same time, it is one of the most vulnerable sectors to the impacts of climate change, due to its sensitivity to extreme and sudden variations in temperature, humidity and precipitation. To this effect, a status study was conducted with a view to ascertain the impact of climate change on Agri-Horticulture activities in Himachal Pradesh. The status reports were designed to know the statistical impact of climate change on productivity of Agri-horticultural crops in Himachal Pradesh with a study focused on District Kullu, Shimla, Kangra, Mandi and Kinnaur. This study qualified the results of statistical trend of climatic variables vis-à-vis crop productivity (Rabi and kharif) juxtaposed with a perception-based assessment. Various crops under study were Rice, Maize, Potato, and Wheat, millets, ragi, total pulses, total vegetables showed significantly changing yields during 1966- 2009 time periods for all the districts under study. The results revealed a strong relationship between climate variability and productivity of crops during the kharif and rabi season. The effects of variability in maximum temperature, diurnal temperature, and rainfall, a significant and positive trend in all the districts under study.

- Changes in acreage and production of major agricultural/horticultural crops.
- Comparative analysis of climatic changes and its impact on Apple productivity of Kullu (Manali) and Shimla districts of Himachal Pradesh.
- Impact of Climate change on Agri-Horticulture sector in districts Kangra, Shimla, Mandi, Kullu and Kinnaur.
- Impact of Rainfall on Agriculture in Himachal Pradesh.
- Impact of Climate Variation on Plant Diseases.

Forestry

Forests are the storehouse of the rich biodiversity and are critical for ecological balance of an area. They constitute the essential life support system besides being a source of timber, fuel, fodder and medicines etc. They ought to be recognized as water reservoirs, natural source of soil nutrition, soil creators and soil binders. The unique and socio-economically important floral diversity makes Himachal Pradesh as one of the most fascinating hill State of the country.

To study the status of forests in Himachal Pradesh, HPCCC started a study on "Temporal change in tree species in forest of Himachal Pradesh" based on Forest Working Plans and Compartment History Files. Under this study tree communities (pure and mixed communities) were constituted and density (Ind/ha) were calculated for each dominant tree species. The dominant tree species as per analysis are *Pinus roxburghii*, *Pinus wallichiana*, *Cedrus deodara*, *Abies pindrow*, *Picea smithiana*, *Quercus floribunda*, *Quercus leucotrichophora*, *Quercus semecarpifolia* and Broad-leaved. The total area under the selected forests was 57447.45 ha which was used as a sample area in the study. Status of thirteen Forest Divisions (Shimla, Theog, Chopal, Rohru, Kullu, Banjar/Seraj, Parwati Forest Division, Karsog Forest Division, Chamba, Dalhousie, Solan, Palampur and Kinnaur Forest Division) were documented.

- An analysis of the temporal changes in the forests cover of Himachal Pradesh (1991-2015) based on FSI reports.
- To study the temporal change in tree species composition in forests of Himachal Pradesh- a working plan based study.

Workshops/Seminars

- Three awareness cum demonstration workshops for the Junior Engineers and Masons of Mandi, Shimla and Kangra Divisions in 2010-2011.
- Fourth Group Monitoring workshop and Fifth Meeting of the Programme Advisory committee- -Earth & Atmospheric Sciences (PAC-EAS) of Science & Engineering Research Board (SERB) GoI.
- One Day Workshop on "Understanding Climate Change" 15th November 2013 at Gaity Theatre, The Mall, Shimla.
- Brain Storming Workshop on "Snow & Glaciers and the Himalayan River Systems", 29-30 May 2013 at HHH, Shimla.
- "National Conference on Himalayan Glaciology" was organized on 30th - 31st October, 2014 at Peterhoff, Shimla.
- Awareness Program on Landslide Risk Mitigation Shimla, Himachal Pradesh, 11th January, 2016.
- Earthquake Awareness workshops in collaboration with CBRI Roorkee at Palampur 29-30 July 2016 and Reckong Peo 20-21 February 2017
- State Science & Technology Conclave-2018 at Shimla on 7-8 June 2018.
- Organized 8th meeting of SERB -National Post Doctoral Fellowship (N-PDF) for young scientist at Shimla on 5-6 August 2018.
- Conclave of Himalayan States on "Well-Being of the Next Generation of Himalayan People" at Peterhoff Shimla on 5 October 2018.
- Workshops for the Master Trainers on Earthquake Resistant constructions in Himachal Pradesh.
- Challenges of Disaster Risk Reduction in Hill Towns of North-Western Himalayas (Himachal Pradesh, Uttarakhand, Jammu & Kashmir, Ladakh) at HHH, Shimla on 22-23 October 2019.