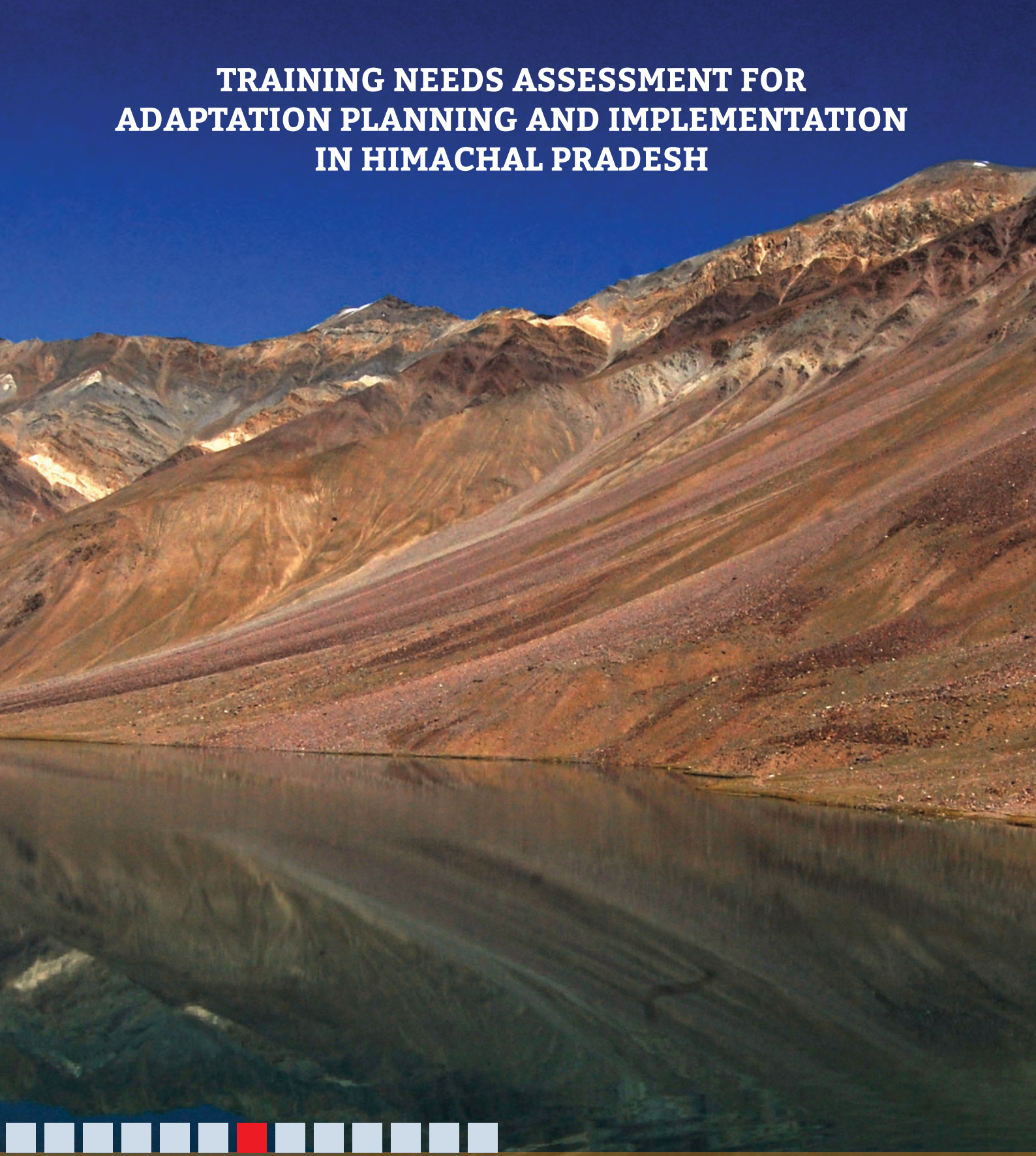
TRAINING NEEDS ASSESSMENT FOR ADAPTATION PLANNING AND IMPLEMENTATION IN HIMACHAL PRADESH



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IHCAP Indian Himalayas Climate Adaptation Programme

हिमाचल प्रदेश सरकार

About **Indian Himalayas Climate Adaptation Programme (IHCAP)**
(Strengthening Capacities on Climate Science and Adaptation in the Indian Himalayas)

IHCAP is a project under the Global Programme Climate Change (GPCC) of the Swiss Agency for Development and Cooperation (SDC), and is being implemented in partnership with the Department of Science and Technology, Government of India. The goal of the project is to strengthen the resilience of vulnerable communities, and to enhance the capacities of research institutions, communities and decision makers.

Objectives

- Strengthening capacities for adaptation planning and implementation in Himachal Pradesh through research, training and capacity building
- Scientific capacity building in the field of Glaciology and related areas
- Facilitating dialogues between Himalayan states and key stakeholders for mainstreaming climate change concerns into development planning

Prepared by Intercooperation Social Development India (ICSD)

Published by Indian Himalayas Climate Adaptation Programme (IHCAP)

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TRAINING NEEDS ASSESSMENT FOR ADAPTATION PLANNING AND IMPLEMENTATION IN HIMACHAL PRADESH

ACKNOWLEDGEMENT

We would like to thank the Indian Himalayas Climate Change Adaptation Programme (IHCAP) for giving us the opportunity to compile this report. Through this report, we learnt a great deal about climate change adaptation and the ongoing efforts in building capacities in Himachal Pradesh.

Dr. S.S. Negi, Director of Department of Environment, Science and Technology, Himachal Pradesh (DEST HP) guided us throughout, and provided invaluable support. Special mention should be made for Dr. Suresh C. Attri, Principal Scientific Officer, Environment, DEST, and Dr. Hemant K. Gupta, Chief Scientific Officer, State Council for Science, Technology and Environment, both of whom provided useful details about the State Action Plan on Climate Change, and various other aspects of climate change adaptation in Himachal Pradesh.

It was the continued support, motivation and guidance of Dr. Shirish Sinha, Deputy Director of Cooperation, Swiss Agency for Development and Cooperation, Embassy of Switzerland in India that made this TNA possible. Mr. Kirtiman Awasthi, Team Leader, IHCAP and Dr. Mustafa Ali Khan, Policy Specialist from IHCAP supported us throughout. Mr. Manoj Kumar, Manager, Admin and Finance, IHCAP provided all administrative and logistical support; and Shimpy Khurana, Communications Officer, IHCAP copy edited and designed the report. Thanks to all of them.

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We would also like to place on record the excellent support provided by all the state, district and panchayat level officers of various departments; training institutes and their faculty members; elected representatives and other functionaries of panchayats, universities and HIPA. Their experiences and suggestions were very helpful.

Finally, it was Ms. Sreelatha and Ms. S. Madhuri of Intercooperation India, who coordinated the activities of TNA, and they rightfully earn our gratitude.

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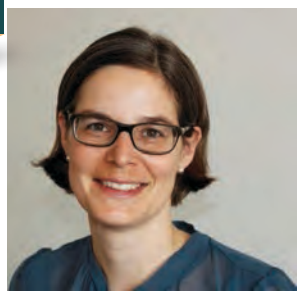

Ms. Janine Kuriger

Director of Cooperation
Swiss Agency for Development and Cooperation
Embassy of Switzerland in India

Mountains are amongst the regions that are highly vulnerable to climate change. As we all know, mountain regions in general, and the Indian Himalayas in particular, are of prime importance, given their role in maintaining weather and water cycles and various ecosystem services. These are now being threatened due to the impacts of climate change.

The Government of India has formulated a dedicated Mission for the Himalayan region as part of its National Action Plan on Climate Change, i.e., the National Mission for Sustaining the Himalayan Ecosystem. At the state level, the government of Himachal Pradesh has taken proactive steps as part of its strategy to adapt to climate change including formulation of its action plan and establishment of a dedicated Center. Recognizing the enormous challenge of climate change, there is an urgent need to build institutional and individual capacities. Capacity building has been identified as one of the key prerequisites for a successful adaptation strategy even at the international level.

The Indian Himalayas Climate Adaptation Programme (IHCAP) of the Swiss Agency for Development and Cooperation (SDC) has been conceived to provide capacity building support to national and state-level efforts in India. Being implemented by SDC, Embassy of Switzerland in India, under the Global Programme Climate Change, and in close cooperation with the Department of Science and Technology, Government of India, IHCAP seeks to strengthen climate change adaptation planning and implementation at the state level in the Indian Himalayan Region.

We are fortunate to have cooperation from the Department of Environment, Science and Technology (DEST), government of Himachal Pradesh in implementing IHCAP activities in the state. It gives me immense pleasure to announce that the Training Needs Assessment (TNA) for Himachal Pradesh, as represented by this report, is a beginning in this direction. We hope that TNA process would lead to institutionalization of climate change adaptation capacity building process in Himachal Pradesh.

My heartiest congratulations to all those who participated in the Training Needs Assessment activities.

(Ms. Janine Kuriger)

> *"We hope that TNA process would lead to institutionalization of climate change adaptation capacity building process in Himachal Pradesh."*

MESSAGE

Dr. S.S. Negi

Director
Department of Environment, Science and Technology
Government of Himachal Pradesh

It gives me immense pleasure to see that the Training Needs Assessment (TNA) report is ready. The exercise was carried out under the Indian Himalayas Climate Adaptation Programme (IHCAP). TNA is a first step in a systematic process of capacity building for adaptation planning and implementation in the state.

The Indian Himalayan Region (IHR) has been described as a fragile ecosystem. The situation becomes even more precarious if one views it in the context of climate change. A recent exercise carried out by the Department of Environment, Science and Technology (DEST) has highlighted the vulnerability of the state due to climate change. It is not just a single department of the state which should or could respond to the challenge posed by climate change. The response needs to be a coordinated one involving various stakeholder departments/organizations.

I hope this will be a coordinated response to climate change, and that this report will lay the foundation for a comprehensive capacity building programme across various levels in the state.

I would like to place on record my thanks to all those who provided inputs for this document. My thanks are also due to the team from Intercooperation Social Development, IHCAP and DEST for developing this document.

(Dr. S.S. Negi)

> *"The TNA is a first step in a systematic process of capacity building for adaptation planning and implementation in the state."*

ABBREVIATIONS

AIBP	Accelerated Irrigation Benefit Programme
ATMA	Agricultural Technology Management Agency
C Credits	Carbon Credits
CDM	Clean Development Mechanism
CEE	Centre for Environmental Education
DOT	Design of Training
DSS	Decision Making Support System
DTS	Direct Training Skills
EOT	Evaluation of Training
EPI	Environment Performance Index
GLOF	Glacial Lake Outburst Flood
HIPA	Himachal Pradesh Institute of Public Administration
HP	Himachal Pradesh
HPNRMS	Himachal Pradesh Natural Resource Management Society
HPSAPCC	Himachal Pradesh State Action Plan on Climate Change
HPSIHFW	HP State Institute of Health and Family Welfare
ICSD	Intercooperation Social Development India
ICTM	Information and Communication Technology Management
IHCAP	Indian Himalayas Climate Adaptation Programme
IWWA	Indian Water Works Associations
KWA	Kerala Water Authority
MHWSDP	Mid-Himalayan Watershed Development Project
MIS	Management Information System
MOT	Management of Training
MVSSP	Multiple Virtual Storage/System Programme
NAPCC	National Action Plan on Climate Change
NEERI	National Environmental Engineering Research Institute
NHB	National Horticulture Board
NRLM	National Rural Livelihoods Mission
NTFP	Non-Timber Forest Produce
NWA	National Water Academy
RIDF	Rural Infrastructure Development Finance
RTI	Right To Information
SAPCC	State Action Plan on Climate Change
SAS	Subordinate Accounts Services
SIRD	State Institute of Rural development
SJVN	Satluj Jal Vidyut Nigam
SREP	Strategic Research and Extension Plan
TNA	Training Needs Assessment
VDP	Village Development Plans
WII	Wildlife Institute of India

LIST OF TABLES AND FIGURES

Photo © Simon Allen/IHCAP

1

INTRODUCTION TO TRAINING AND TRAINING NEEDS ASSESSMENT (TNA)

1. INTRODUCTION TO TRAINING AND TRAINING NEEDS ASSESSMENT (TNA)

1.1 Need for Training

Training is associated with enhancing competence of people to enable them to manage systems more efficiently and in a sustainable manner. It aims at improving performance by enhancing knowledge, skills and attitude. Training is also used as a tool to raise awareness among people, and sensitize them to think and work towards a desired goal.

The following reasons may indicate a need for training in an organization:

- To build staff competence
- To respond to rapid changes induced by different environmental factors
- To bridge the gap between staff turnover and organization expansion
- To motivate people or enhance knowledge/skill of workforce

1.2 Training Needs Assessment (TNA)

Training need arises as a result of a deficiency between 'what needs to be' and 'what has been done so far' in a particular working field. For this reason, training needs assessment is used as a tool to ascertain and bridge the gap between 'what is and what needs to be'. As pointed out by McGehee and Thayer[1], "Many training efforts are begun without any reason, continued with no purpose, and end in no results." In this context, a TNA study should state the reason/s for conducting training, and indicate the final output that would be achieved from such a training. TNA is an ongoing management process of identifying training requirements of the workforce; developing training packages; and conducting training programmes thereon in order to improve the knowledge, skills and abilities of people to think and act in a certain manner.

1.3 Need for Training Needs Assessment for Climate Change

Ensuring sustainability of natural resources and infrastructure in the wake of climate change is becoming increasingly difficult. With increasing frequency of extreme events all across the globe such as floods due to extreme rainfall, erratic rainfall leading to droughts, increasing intensities of cyclones and storm surges, etc. (IPCC, 2007; SREX, 2012), climate change related impacts and ensuing vulnerabilities have emerged as a strategic area of management for every government.

To respond to the effects of climate change on resources and people, India launched its national policy on climate change known as the National Action Plan on Climate Change (NAPCC) in June 2008. NAPCC has eight missions focussing on sustainability of India's water resources, agriculture, forests, the Himalayan ecosystem, human habitats, energy efficiency, increasing renewable energy mix through higher penetration of solar photovoltaics and solar thermal

1 McGehee, W., & Thayer, P. W. (1961). Training in business and industry. New York, John Wiley & Sons.

devices, and establishing a knowledge mission. The national missions are geared towards adaptation to and mitigation of climate change, with generation of knowledge as a key instrument of decision making. To implement these strategies of NAPCC, all states and Union Territories are preparing their State Action Plan on Climate Change (SAPCC), taking into account their circumstances and vulnerability to climate change.

The implementation of strategies identified in the State Action Plans on Climate Change will be undertaken by members of the concerned line departments, and their institutions along with other stakeholders. The Planning Department can also play a key role in the implementation by incorporating climate change actions into their annual and Five-Year Plans, which are undertaken based on the inputs received from line departments. The Finance Department can, in turn, contribute to the process by prioritizing release of funds for the government's short and long-term adaptation and mitigation activities.

In view of the complex nature of the issue, training in climate change, its manifestations and techniques for management of impacts and vulnerabilities becomes imperative for all those instrumental in implementing the programmes and projects of the Government. However, training programmes run by different government departments and their institutions have so far focussed primarily on environmental and disaster management, with only peripheral references to climate change. To bridge this gap, there is an urgent need for an assessment of training needs.

Photo © Simon Allen/IHCAP

2

APPROACH TO IDENTIFYING TRAINING NEEDS

2. APPROACH TO IDENTIFYING TRAINING NEEDS

Training needs for integrating climate change in governance in Himachal Pradesh have been identified through the following steps:

- Reviewed literature to understand the vulnerability of the Himalayan state of Himachal Pradesh as a result of observed climate change and projected climate change. Discussions were held with officials of the Department of Science and Technology and others to identify sectors which require priority action and training. The sectors identified are:
    - *Agriculture*
    - *Horticulture*
    - *Water*
    - *Forests and Biodiversity (Eco-tourism)*
    - *Energy - Hydropower*
    - *Human Habitats*
    - *Human Health*
- Mapped departments that manage these resources at state, district and panchayati raj level
- Reviewed training material of different departments
- Formulated questions and interviewed select personnel representing various levels of governance, and undertook a survey to assess training gaps
- Based on the identified gaps, content for training on climate change issues suggested for various levels of governance

The approach is schematically represented in the following diagram:

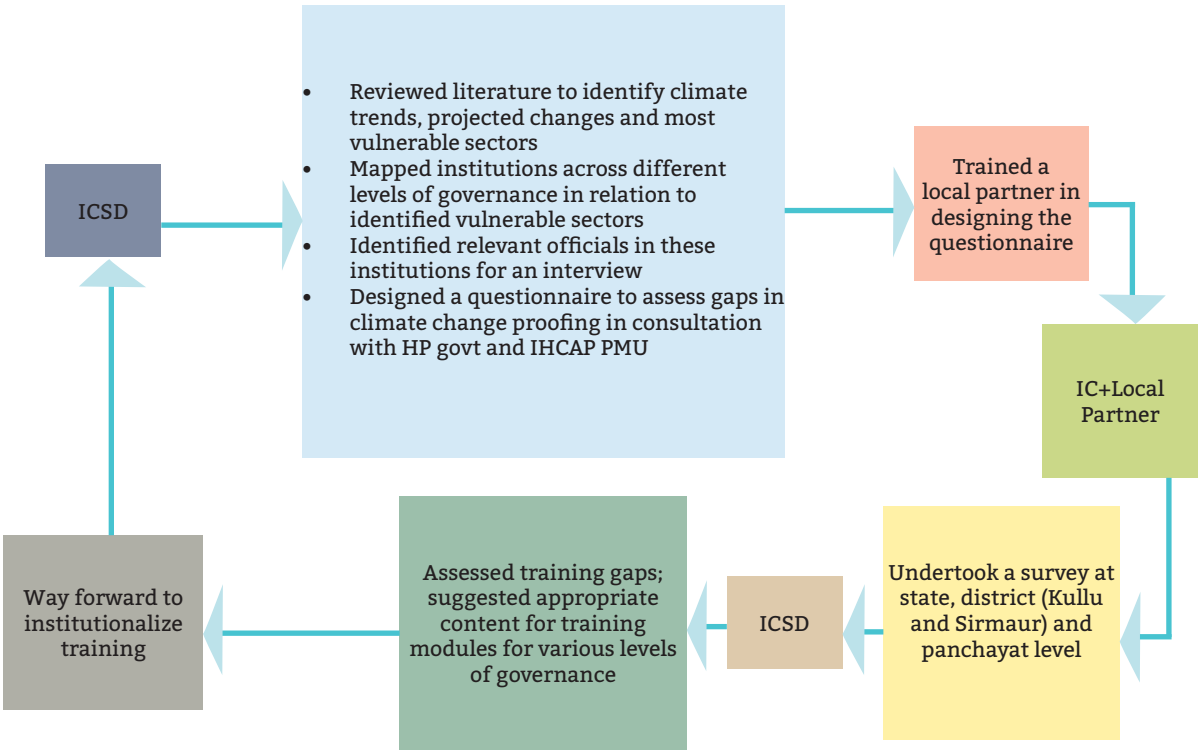

Figure 1: **Schematic Representation of Approach Followed to Assess Training Needs**


BORDER ROADS ORGANISATION
PROJECT ROHTANG TUNNEL
AVALANCHE
PRONE AREA
DRIVE CAREFULLY

Photo © IHCAP

3

CLIMATE CHANGE IN HIMACHAL PRADESH

3. CLIMATE CHANGE IN HIMACHAL PRADESH

The state of Himachal Pradesh lies in western Himalayas, covering an area of 55,673 km^2. It is characterized by diverse climate varying from semi-tropic to semi-arctic, and an altitude ranging from 350 m to 6,975 m. Five north Indian rivers flow through the state, namely, the Ravi, Beas, Chenab, Satluj and Yamuna, and there are about 2,554 glaciers covering 4,160 km^2 area with an ice reserve of 387 km^2. It has three main reservoirs, namely, the Govind Sagar (Bhakra dam), the Pong dam and the Pandoh dam with a total reservoir capacity of 14,218 million m^3.

Precipitation declines from west to east. The annual rainfall varies between a minimum of 522-800 mm in the higher reaches of Chamba and Lahaul Spiti districts to a maximum of about 2,301-3,200 mm in southern parts of Chamba, northern parts of Kangra and southern parts of Sirmaur district. Winter precipitation occurs as snow at elevations over 1,800 m. An average of three metres of snow is experienced between December and March. Areas above 4,500 m remain under perpetual snow cover. The annual mean temperature varies from a minimum of 2.14°C in the north-eastern part of the state to a maximum of 31.92°C in its south-western areas (ADB, 2010).

Observations in climate between 1901 and 2002 indicate that there has been a significant increase in air temperature- by about 1.6°C in the north-western Himalayan region. Further, the rate of increase in maximum temperature is found to be higher at higher altitudes compared to lower altitudes (Bhutani et al, 2007). The analysis of annual rainfall data (Ranbir, 2010) of last 25 years in different districts reveals an increase in rainfall in districts lying at higher altitudes, and decrease in rainfall in districts situated at lower latitudes. Temperature projections for the state indicate a further rise in temperature by 1.6 to 2.8°C by 2050s, and an overall increase in precipitation with high spatial variability (HPSAPCC, 2013).

According to the 2011 census, the total population of Himachal Pradesh is over 6.8 million, with a density of 123 persons/km^2. About 68 percent of the population residing in rural areas is dependent on climate-sensitive activities such as agriculture, horticulture, livestock rearing and sale of forest produce.

Himachal Pradesh is vulnerable to 25 out of 33 types of hazards identified by the high-powered committee of the Government of India. Apart from this, fragility of mountains and burgeoning human settlements has made the state more susceptible to landslides, flash flooding and cloud bursts. The other hydro-meteorological hazards that occur in the state include droughts, forest fires, hailstorms, windstorms, lightening and snow avalanches. As seen above, the sustainability of the state's resources is driven entirely by the sustenance of the Himalayan ecosystem, which in turn, is highly climate sensitive. In view of this, a National Mission for Sustaining the Himalayan Ecosystem (NMSHE) was launched under the aegis of the National Action Plan on Climate Change (NAPCC) by the Government of India.

KEY CLIMATE-SENSITIVE SECTORS IN HIMACHAL PRADESH

Agriculture and Horticulture: Agriculture contributes nearly 45 percent to the net state domestic product. It is the main source of income and employment in the state. Almost every family owns a land, and is engaged in agriculture or horticulture for its day-to-day requirements. The state also regularly supplies exotic non-season vegetables to the plains, and is also the second-largest producer of apples in the country after Jammu and Kashmir. Its unique climate also enables it to diversify into production of other fruits and vegetables such as strawberries and mushrooms.

The average land holding in the state is very small, less than one hectare per family. With many fields situated on steep lands, mechanization is also limited. Most agriculture is of subsistence type, and depends on suitable climate for good yields. Water scarcity in the state due to climate changes is also threatening to affect food security. Therefore, steps to protect crops from the vagaries of climate are essential. For example, use of poly houses to protect horticulture crops, and construction of small water reservoirs that store rain water for sprinkler and drip irrigation can lead to an increase in horticulture produce.

Livestock rearing: Almost every family raises livestock for its day-to-day requirements. Owing to very small land holdings, families rely heavily on natural fodder resources such as forests to feed their livestock. Livestock kept by tribal communities undertake seasonal movements to new areas to access pastures. Climate change may prove to be a boon for these communities as grasslands at higher heights may open up, and become available for grazing with increase in temperature. However, increase in temperature may also result in livestock's increased exposure to heat at higher altitudes, and emergence of new diseases.

Fisheries: The commonly found varieties of fish in the state include Mahaseer, Trout and Carp. Although fish are found in abundance in the state, habitat changes due to changes in climate is also likely to influence the fish population.

Forest and biodiversity: The total forest cover in Himachal Pradesh, as per the 2011 State of the Forest Report, is 14,679 km^2, which is 26 percent of the total gross area of the state. Between 2009 and 2011, the state has gained 11 km^2 of forest area. However, the area under dense forest cover has not increased. The medium dense forest cover has reduced by two km^2, and the open forest area has increased by 13 km^2. Furthermore, state revenue from forest produce has increased from Rs. 14 crores to Rs. 72 crores between 1990-91 and 2010-11 (Himachal Forest Statistics, 2010) due to sustainable forest management practices. Some of the species such as *Lilium polyphyclum, Sorbus, Lanata, Swertia, Androsco, Aconitum heterophyllum* that were found in the state in 1902, no longer exist. Similarly, *Pinus Loifolia* that existed at 1,800 m altitude is now found at 2,200 m altitude. About 27 species of wildlife in the state are either endangered or vulnerable.

An analysis, carried out by Chaturvedi et al (2010) using IBIS model with climate inputs from PRECIS, a regional climate model, indicates that the forests in the state are likely to undergo changes in about 55 percent of the forest grids that fall within the state boundary ascribed by the Forest Survey of India.

Water resources: The glaciers in Himachal Pradesh with seasonal snow cover serve as perennial sources of rivers, and are used as renewable sources of water for irrigation, drinking, energy and industrial use in the state as well as in the states of Punjab, Haryana and Uttar Pradesh. However, evidence suggests rise in temperatures is causing these glaciers to recede. Although the state has five rivers flowing through it, it still faces paucity of water (HPSAPCC, 2013). This scarcity is attributed to frequent erratic rainfall patterns, cloud bursts, floods and frequent droughts leading to high runoff along the state's mountainous rugged terrain. Most of the excess water is lost through runoff, and provisions of recovery are not enough. Further, loss of ice and snow due to warming of the atmosphere is forcing glaciers to retreat, which can further lead to long-term impact on availability of water downstream. In addition, glacial lakes formed from melting of glaciers stored in moraines, often burst. This can lead to catastrophic effects downstream, as had been observed in Uttarakhand in 2013.

Tourism: Himachal Pradesh is one of the key mountain tourist destinations in India. However, changes in climate are disturbing the fragile ecosystem of the state. Frequent landslides, floods and depleted forest cover can affect tourism in the state in the future.

Hydropower: The electricity generation through hydropower is 23,000 MW in the state, of which during the 11th Plan, 8,368 MW of hydropower was produced in the state[2]. Receding glaciers due to warming is one of the major concerns for hydropower generation in the state along with the increasing frequency of erratic and heavy rainfall.

Habitats: Frequent and intense precipitation leading to landslides is common in the state. This puts the settlements along the mountains at risk. Infrastructure such as roads and buildings are also vulnerable. Preparedness for emerging diseases including heat stress in a warming scenario is the need of the hour. Further, the issue of excessive heat during summers, which has been escalating over the years, is necessitating the use of fans/air conditioners in the settlements below 4,500 m. In this context, sustainable transport systems that make use of walking zones and non-motorized vehicles can go a long way in reducing stress on the environment.

Impacts due to hydro-meteorological disasters: Hydro-meteorological disasters such as glacial lake outburst floods, arising due to melting of glaciers, is a threat to infrastructure and habitats downstream. Similarly, increasing intensity of rainfall and hailstorms is leading to landslides, floods and loss of crop production as well as human lives. To avert such crisis, systematic planning is required.

2 HP Annual Plan 2013-14 and five-year plan 2012-17, http://hpplanning.nic.in/Plans.htm

Photo © Simon Allen/IHCAP

4

MAPPING OF DEPARTMENTS AND IDENTIFICATION OF CLIMATE CHANGE CONCERNS

4. MAPPING OF DEPARTMENTS AND IDENTIFICATION OF CLIMATE CHANGE CONCERNS THAT EACH DEPARTMENT NEEDS TO ADDRESS

It is to be noted that in Himachal Pradesh, like in other states of India, managing a particular resource or activity involves multiple departments. Table 1 gives the list of departments handling climate sensitive sectors in Himachal Pradesh. In addition to these departments, the Departments of Planning and Finance were also surveyed because the two departments are the final decision-making bodies in terms of resource management for each annual and Five-Year Plan.

Table 1: Mapping of departments by sectors

Sector	Department	State Level	K u l l u District	Sirmaur District
Water	Department of Rural Development	Y	Y	Y
	Department of Irrigation and Public Health	Y	Y	Y
	Department of Forests	Y	Y	Y
Agriculture/ Horticulture	Department of Agriculture	Y	Y	Y
	Department of Horticulture	Y	Y	Y
Forestry/ Biodiversity/ Eco-Tourism	Department of Forests	Y	Y	Y
	Biodiversity Board	N	N	N
Urban Development	Public Works	Y	Y	Y
	Department of Town and Country Planning	Y	Y	Y
Health	Department of Health and Family Welfare - State Institute of Health and Family Welfare	Y	Y	Y
Hydropower	Directorate of Energy	Y		
	Him Urja/SJVN	Y		
Disaster Management	State Disaster Management Authority	Y	-	-
	District Disaster Management Authority – Kullu	-	Y	-
	District Disaster Management Authority- Sirmaur	-	-	NA

Table 1: Mapping of departments by sectors				
Sector	Department	State Level	Kullu District	Sirmaur District
Planning and Finance	Department of Planning	Y	NA	NA
	Department of Finance	Y	NA	NA
Knowledge Management	Himachal Pradesh Institute of Public Administration (HIPA)	Y	NA	NA
	State Institute of Rural Development	Y	NA	NA
	Department of Science and Technology	Y	NA	NA
Panchayati Raj	Kullu	Y	Y	Y
	Sirmaur	Y	Y	Y

Note: **Y: Yes visited, N: Not visited, NA: Not applicable**

The survey revealed that every department has a training programme at all levels of governance. The training programmes are usually conducted at service entry point. For ongoing service capacity enhancement, courses, as may be required for career growth and exposure to current issues and knowledge, are undertaken regularly. The training is either imparted within the training cells of the department, or by faculty of specialized training institutions working on the subject within the state or at national or regional level.

Table 2 summarizes the content of training conducted by different departments. It is to be noted that in most departments, technical content remains the same across senior and mid-levels of governance. For field-level workers, training content is more action oriented.

It can be concluded from the survey of training programmes of various departments involved in natural resource management that:

- All departments are imparting training to the staff to enable better understanding of the basics of their focus area, needs of the ongoing programmes, and existing, new and emerging techniques, tools and technologies of resource management

- Though climate change is impacting all resources, except for the Department of Environment, Science and Technology, Department of Horticulture, and the State Disaster Management Authority, no other department has introduced climate change as a strategic subject, or traced its impacts and resultant vulnerabilities to design adaptation strategies and actions, which are over and above the existing developmental actions

- The Department of Forests and the Mid-Himalayan Programme for Watershed Management being implemented by the Department of Rural Development cover CDM and C credits. However, this too is only one of the elements of climate change action towards mitigation and adaptation

- Satluj Jal Vidyut Nigam Limited (SJVN) provides an outline of carbon credits within its environment management training programme module. However, this too, has no linkages with the overall climate change issue that is likely to impact Satluj water systems and hydropower generated from the same

- Although climate change has been introduced as a subject in many of these departments, it is still being treated as a stand-alone subject, without any linkages with the focus area of the department. For example, the State Disaster Management Authority needs to institute a training programme that gauges the extent of severity, and the potential impacts of hydro-meteorological hazards. Similarly, the Horticulture Department needs to incorporate a module that reviews the extent of likely impacts of climate change on horticulture produce in Himachal Pradesh, the opportunities and vulnerabilities associated with it, and the need to have adaptation strategies

Table 2: Mapping of departments by sectors and training content

Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
Water	Department of Rural Development	Trainings conducted under the World Bank Mid-Himalayan Watershed Development Project (MHWSDP): The aim of this project is to reverse the process of degradation of natural resources, improve their productive potential, sequester C and improve livelihoods and incomes of rural households residing in selected watersheds using socially-inclusive and environmentally-sustainable approaches. Through this programme, training is given to villagers in development of gram panchayat plans, micro planning, development of skills, livelihoods, marketing, etc. Self-help groups, common interest groups, user groups and community-based organizations are trained in community empowerment, vermin composting, backyard poultry, etc.	MHWSDP training being imparted by the Himachal Pradesh Natural Resource Management Society (HPNRMS)	No
	Department of Irrigation and Public Health	Senior level and mid-level (chief engineer, superintendent engineer, executive engineers): Governance of urban water supply, irrigation and sanitation systems, recent water treatment technologies, water quality management, maintenance and management of water supply, irrigation and sewerage systems, decentralized planning, development and governance in rural water supply as per the guidelines of the Government of India in the National Rural Drinking Water Programme, decision-making, decision support system and management information system, project monitoring and management, quality assurance and e-procurement, disaster management, project monitoring and management, construction and contract management and safety in construction. Junior level (junior engineers and office support staff): RTI Act, water supply and distribution management, quality in construction, disaster management, construction management and safety in construction, rules and Acts pertaining to the department, inventory management, office procedure/ service matters, conduct rules, contracts, stores acquisition and maintenance, cash and cash accounts, reports and returns, working in e-iph modules, RTI, stress management, gender equalities, Consumer Protection Act, human rights/citizen charter, etc. Field-level staff: Training in supervision of execution of pump house, sump wells, storage tanks and other structures. Maintenance of cement consumption registers and record keeping of all the material, maintenance of history card of hand pumps, training in procedures of warabandi agreed by the KVSs of the schemes, and training in assembly, fittings, installation, maintenance and repair of plumbing pipe fixtures, fittings for water supply and sanitary, drainage systems	Training imparted in the following institutions for senior, mid and field-level staff: •PHE training cells in Himachal Pradesh for refresher courses •Central Public Health and Environment Engineering Organization •National Environmental Engineering Research Institute (NEERI) •Indian Water Works Associations (IWWA) •National Water Academy (NWA) •Kerala Water Authority (KWA)	No

Table 2: Mapping of departments by sectors and training content

Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
Agriculture/ Horticulture	Department of Agriculture	Topics for senior-level officers at the directorate and district level: Knowledge of improved agricultural techniques, integrated pest and disease management, efficient water management practices, commercial crops for improving crop productivity and generating employment, course on organic farming quality and quantity produce of agriculture, course on financial and administrative rules, course on computer application, internet, e-mail, course on state and central sector schemes, course on contingent plans, course on RTI Acts Topics for mid-level officers: Operationalization of SREP (Strategic Research Extension Plan) through ATMAs (Agriculture Technical Management Agencies), market-led extension, organic farming and balance use of fertilizers. Sustainable agriculture development, IPM (Integrated Pest Management Programme) and bio-control, INM (Integrated Nutrient Management programme), soil and water conservation, weed management, IWSM (Integrated Watershed Management), drought management strategies, safe and judicious use of pesticides, quality control of seeds and fertilizers, application of remote sensing and GIS in agri-development, principle and practices management of cereals, effective application of insecticides. Agriculture extension workers: Latest techniques in improving crop production and vegetable cultivation, organic farm management practices, weed control in vegetable crops, integrated nutrient management and balance use of fertilizers, IPM bio control and pest management, safe and judicious use of pesticides, soil and water management, soil sampling, testing and soil health cards	Senior and mid-level officers: •State Agriculture Management Extension Training Institute, Mashobra, Shimla •University of Horticulture and Forestry, Nauni •HPKVV (Himachal Pradesh Krishi Vishwa Vidyalaya), Palampur •KVK (Krishi Vigyan Kendra) station Agriculture extension: FTC (Forest Training Centre) Sundernagar Office administration, procedures, rules, gender sensitization and disaster management: HIPA (Himachal Pradesh Institute of Public Administration)	No

Table 2: Mapping of departments by sectors and training content

Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
	Department of Horticulture	Orientation programme on the department's, projects, weather-based crop insurance, pest management, agri and horticulture produce marketing, disaster management of fruit crops Horticulture: Advances in nursery production techniques- Invitro propagation for disease free plant material, nursery raising of all fruit crops of economic importance, orchard management- canopy management, layout, soil and water management including micro irrigation techniques, integrated nutrient and pest management, new promising varieties of fruit crops and training in productivity improvement, establishing budwood banks and their role in productivity improvement, advances in integrated nutrient and pest management and organic farming, precision farming of horticulture crops, organic certification, IPR (Intellectual Property Rights), patent laws, high-tech cultivation of flowers, advances in apiculture, problems and techniques, advances in post harvest management of horticulture, cultivation of medicinal and aromatic plants, post harvest processing techniques, climate change and its impact on horticulture Floriculture: Greenhouse culture for various agro-climatic conditions, greenhouse cultivation for commercial cultivation of rose, carnations, lilliums, chrysanthemums, alstroemeria, marigold, aster, Antirrhinum, gerbera, bulbous plants; training in growing substrates for commercial floriculture; advances in producing quality plantation stock; training in quality seed production; nutrient management and pest and disease management; efficient irrigation technologies; post harvest handling of cut flowers; and marketing Bee keeping: Fundamentals of bee lifecycle and its different types; hive and other modern bee equipment; bee keeping as an industry; economics of bee keeping; stationary and migratory bee keeping; bee as pollinator and its role in enhancing crop productivity; Bumble bee as alternate/backup pollinator crops; conservation of insect pollinators for maintaining biodiversity; importance of queen in honey production and pollination; factors affecting honey production; management practices for increasing hive production; breeding practices for avoiding mice menace; feeding bees; detecting bee diseases; preparation of colonies for pollination; maintaining quality of honey production; protecting bees from pesticides; harvesting honey, storage and marketing	Orientation Programme •SAMETI (State Agricultural Management and Extension Traning Institute), Mashobra, Shimla Horticulture and Floriculture •YS Parmar University of Horticulture and Forestry and its regional research stations Mushroom •Directorate of Mushroom Research (ICAR) •Himachal Pradesh Institute of Public Administration- office procedures, financial administration •State Agriculture Management Extension Training Institute- Induction General office administration: •HIPA	Yes

Table 2: Mapping of departments by sectors and training content

Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
Forestry/ Biodiver-sity/ Eco-Tourism	Department of Forests	Basic forestry and forest, wildlife management and fire management: Training is being provided in forest laws, forest offence cases and procedures, nursery and plantation techniques, nursery techniques, basic forestry principals and fundamentals for forest workers, forest accounting and procedures, seed nursery and technology; joint forest management, management of wildlife sanctuaries, procedures for private sales; range management information systems; zoo management; gender sensitization; micro planning; orientation course for range officers; wildlife census; forest fire prevention and awareness; management and conservation of NTFP/ medicinal herbs; participatory management/ techniques; formation and management of self-help groups; eco-tourism; nature awareness training camps; orientation course for forest guards Watershed management: watershed concepts and components, delineation and demarcation of watershed on ground and on maps, need for integrated watershed management, traditional and modern approaches to watershed management, people's participation, constitution and functioning of watershed development committees, gender issues, data collection through PRA (Participatory Rural Appraisal) and development of work plans, pasture improvement, simulation of PRA tools, analysis and interpretation of data, monitoring and evaluation, sustainability of watersheds Eco-Tourism: Special training programmes for communities on eco-tourism conducted by the State Forest Department. The training programmes are for eco-track level societies and for service providers (cooks, guides etc.). Local craftspersons are trained to produce and exhibit their articles for eco-tourism purposes. To promote eco-tourism, training in nature awareness through training camps is also provided	Basic forestry and watershed management training is being carried out at: Forestry Training Institute at Chail; Forestry Training Institute at Sundernagar; ICFRE (Indian Council of Forest Research and Education), Dehradun; FRI (Forest Research Institute), Bhopal Training in eco-tourism being carried out by: •Wildlife Institute of India (WII) •Centre for Environmental Education (CEE) •National Museum of Natural History •HP Gyan Vigyan Samiti •Forest and training schools of SFD (State Forest Department)	No
	Biodiversity Board	The Board is under the Department of Environment, Science and Technology. It is envisaged that training in biodiversity conservation will be carried out by the department for its scientific and technical staff. No further detail on the module is given	May be carried out at WWF	
Urban De-velopment	Public works	Not found, but training exists in quality control for achieving quality parameters of works in the state. Material testing laboratories at state level and zonal laboratories are under its control. For assuring quality control, training is given in standardization of designs and drawings for buildings, bridges and assurance of common technical instructions, training in placing order, codes and specifications, schedule of rates, etc.	Public Works Department	No

Table 2: Mapping of departments by sectors and training content

Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
	Department of Town and Country Planning	Senior level officials: Training is provided in spatial planning and allied disciplines including environmental planning, heritage conservation, land-space architecture, urban design, transport planning, rural planning, GIS and remote sensing and geo-informatics Mid-level officials: Principles and techniques of urban planning and development laws, disaster management, RTI Act-2005, H.P. Public Service Guarantee Act, 2011 and H.P. Apartment and Property Regulation Act, 2005, gender budgeting, e-governance, office procedure and financial management, socio-economic research, GIS and remote sensing and heritage conservation and re-generation Junior level officials: Disaster mitigation and management, basic computer training in MS Word/MS Excel/internet, technical procedure, i.e. in revenue matters, drafting, estimation, valuation, field surveys and mapping, Acts, rules, regulations and standing orders Field surveyors: Basic computer training in MS Word/MS Excel/internet, field surveys and studies, research methodology and operational research, Acts, rules, regulations and standing orders For elected representatives of ULBs: Solar passive design regulations, rain water harvesting regulations, barrier free environment regulations, heritage conservation, guidelines, documentation/ information system, H.P. Apartment and Property Regulation Act, 2005 and Competition Act, 2002 (No. 12 of 2003)	Training provided by: universities/Central/ state government; departments and professional bodies HIPA (Himachal Pradesh Institute of Public Administration) HIPA (Himachal Pradesh Institute of Public Administration) TCP (Town and Country Planning) Department TCP Department TCP Department	No
Health	Department of Health and Family Welfare	Training is conducted in: Administrative and financial management and hospital management for deputy directors, chief medical officers/principal STCs and senior medical superintendents. Hospital management, administration and financial management and refresher course on national health programmes such as NRHM, RNTCP, JSY, NPCDCS, NVBDCP, NPCB, NMHP, NPCTC, etc. conducted for block medical officer and senior medical officer, civil hospitals and regional hospitals. Induction training and refresher course on clinical subjects, training in advance techniques in all areas of medicine and other health-related subjects conducted for medical officers at PHC or CH or RH or ZH level	Training carried out by: HP State Institute of Health and Family Welfare (HPSIHFW)	
Hydropower	Directorate of Energy	NA	NA	NA
	Him Urja	NA	NA	NA

Table 2: Mapping of departments by sectors and training content				
Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
	Satluj Jal Vidyut Nigam (SJVN)	Relevant trainings are in: Water resource development: GPS - Field survey, repair, water harvesting for drought management, integrated and conjunctive use of surface; MIS for monitoring and evaluation of projects, lift irrigation schemes; drip and sprinkler irrigation systems; watershed development and management; hydrological and structural safety of dams. Environment management: Water and wastewater management, underground sewerage systems - design, CDM (Clean Development Mechanism) projects - conceptualization to corporate environmental management and carbon markets, bio medical waste management – handling and safe disposal options, environmental issues in mining sector - legal and statutory requirements (as per the MoEF guidelines), corporate social responsibility - a triple bottom line framework (social, economical and environmental concerns), environmental management technology in chemical industries, municipal reforms in environment services, latest trends in EIA (Environment Impact Assessment)- process and procedures as per MoEF guidelines, wastewater treatment, environment, health and safety management, maintenance of air pollution control equipment, safety in storage, handling and transportation of hazardous materials, sewage treatment plants - reuse and recycle options, occupational health and safety management, environment management in process, municipal solid waste management - collection, handling, disposal and recovery options, environmental management through cleaner production, underground sewerage systems - design, operation and maintenance occupational health and safety, environmental compliance management in distilleries and sugar industries, environmental management systems for cement industries	Hydel Training Institute, Jhakri	No

Table 2: Mapping of departments by sectors and training content

Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
Disaster Management	State Disaster Management Authority	HPSDMA through HIPA and other training institutions has conducted training for district level officers, Forest Department, elected members of PRIs, Education department, Agriculture, Horticulture, Urban local bodies, Public Works Department, Transporters, Housing Boards/Town and Country Planning, Health, Revenue Department, Irrigation and Public Health, Police, all corporations and boards, NGOs, elected members of ULBs, Social Welfare Department, mock drill for HIPA staff and Rural Development. Training is conducted to generate awareness about the provisions of the Disaster Management Act, 2005; orientation and awareness on disaster management and its various aspects; preparation of DMPs (Disaster Management Plans); preparation of response plans; training to perform the ESF (Emergency Support Functions) assigned to the departments; training in integration of DRR (Disaster Risk Reduction) into development plans and policies; training in mitigation measures and plans; community awareness and IEC; damage and needs assessment; conducting mock drills; training of all the new entrants into government services, training in urban risk reduction, safe construction practices, school safety, post disaster needs assessment, ToT (Training of Trainers) on DRR for NGOs and master trainers- on drought mitigation, flash floods risk mitigation and management, landslide mitigation by geosynthetic, management of water supply after disaster, emergency handling during disasters, DM training for elected representatives of panchayati raj, urban local bodies, etc. Further, specialized training modules are being formulated for policy planners, construction sector, district administration (management and coordination centres), search and rescue sector, social and community sector, health sector, livelihoods, IEC and media sector, voluntary and service sectors, public representatives, forest sector, tourism and education sector	Training conducted by HPSDMA through: Disaster management Centre, HIPA, National Institute of Disaster Management, PTC Daroh, medical colleges, B.Ed institutions, Revenue Training Institute, Patwar schools and all departmental training institutes, etc.	
Planning and Finance	Department of Planning	None	NA	NA
	Department of Finance	An introduction to planning process in the government; preparation of budget and nominal rolls; preparation of excess and surrender statements; reconciliation of accounts with the Accountant-General and diversion of funds; procedure for effecting purchases of stock, store and stationery articles and issues thereof; annual physical verification of stores; how to declare store as unserviceable and procedure for condemnation; handling of cash and writing of cash books; audit and inspections - CAG reports, PAC matters and submission of replies thereof. Three-fourth retention/destruction of record pertaining to accounts	HIPA	No

Table 2: Mapping of departments by sectors and training content

Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
Knowledge Manage-ment	HIPA	Regular training: Institutional training for IAS probationers; foundation course for HAS and other gazetted officers; professional course for HAS officers; subordinate accounts services (SAS) training; SIRD progammes for district/block level officers; office procedure and financial administration; training in Income Tax; Sevottam Service Delivery/Citizens Charter; good governance; communication and presentation skills; court procedure; course on Ministering Tax Administration; course on data management in government offices; Right to Information Act, 2005; disaster management; e-governance and information technology related trainings. Special training (2012-2013): Management of training; training needs analysis; direct training skills; design of training; evaluation of training; Information and Communication technology management, etc.	HIPA	Yes
	Rural Development	Training programme on basic concepts of lab to land: Community mobilization; formulation of village development plans and training in government programmes Training programmes on structural aspects and convergence: concepts of MGNREGA including people's initiative; identification of new shelf of projects; options on convergence and execution through line departments; structural aspects of major rural development projects under MGNREGA Training programmes on social audit; MIS and convergence: concepts of MGNREGA including social audit, MIS and convergence with departmental schemes Training programmes on latest guidelines and labour budget under MGNREGA: concepts of MGNREGA including latest guidelines, instructions and fund flow management and labour budget Watershed training programme (IWMP): concepts, guidelines and implementation of watershed programmes with reference to new common guidelines, training in preparation of DPR (Detailed Project Report), structural aspects of major rural development projects, options of convergence and linkages of IWMP with income generation Training programme on total sanitation campaign: training in concepts of multiple virtual storage system programme, solid and liquid waste management and sustainability; structural aspects of toilet design, IEC and options of convergence Training programme on NRLM (National Rural Livelihood Mission): concepts of NRLM, guidelines, procedures, experiences of its implementation, activity identification and linkages with financial institutions, skill development and marketing Refresher training course on all schemes/ programmes: concepts of rural development and panchyati raj programmes/schemes and office procedures, financial administration and functioning of the departments	State Institute of Rural Development, Mashobra, Shimla	No

Table 2: Mapping of departments by sectors and training content

Sector	Department	Training Content	Training Imparted by	Orientation towards addressing climate change issues
	Panchayati Raj	Basic training programme for gram panchayat representatives and panchayat secretaries/sahayks: Training in basic knowledge and understanding of the administrative functioning of GPs and GS; basic issues relating to maintenance of finance and accounts, judicial functioning and civil works management; key provisions of select developmental schemes of the government; development of community leadership, public dealing and effective communication; critical social issues in HP; key provisions of RTI and social audit Training module for the elected representatives of the panchayat samiti, zilla parishad: introduction to panchayati raj, Acts and rules, different committees of panchayati samiti/ zila parishad, district plan formulation, convergence issues, devolution of power, flagship and rural development schemes, RTI Training module regarding financial management for elected representatives of PRIs: Revenue earning mechanisms of gram panchayat; taxation mechanisms, preparing budgets and others	Training carried out by: Panchayati Raj Department	No
	Department of Science and Technology	Proposed training: Senior technical staff: Climate change, mitigation and adaptation; climate change modelling, vulnerability assessment; wetland management; biodiversity conservation; disaster management; remote sensing and GIS; recent advances in agriculture and industrial biotechnology; e-governance management; awareness of Right to Information Act, 2005 Special training: Rainwater harvesting; structures for masons/contractor; solar passive design and techniques for architects and planners; environment audit of buildings for schoolchildren; disaster management for schoolchildren and professionals; remote sensing for scientists/professionals; edusat for schoolchildren; building of scientific temper through Children Science Congress. Climate change and environmental planning and administration: Climate change modelling; clean development mechanism, greenhouse gas inventory, vulnerability assessment, environment impact assessment; project management (skills; environmental laws; basic GIS course; courses enhancing scientific temper; environment monitoring; soil and land pollution management; disaster management Other training: Medicinal and aromatic plants; biotechnology, technologies on value addition and processing of medicinal and aromatic plants; agronomical practices of MAP for endemic HP species; applied biotechnology in agriculture/horticulture; biotechnological approaches for rural development; administrative skills for effective administration including financial rules (two weeks); designing of training and social mobilization skills; himalayan ecosystem conservation techniques including wetland management, glacier protection; rainwater harvesting, solar passive structure on green buildings	Training to be carried out by staff from: TERI; ASCI Hyderabad, National Disaster Management Authority; IIRS, ISRO; RFLHD; NIRD; HIPA; IITs, IIMs, IRMA etc.	Yes

Table 3: Responses of departments/stakeholders on training needs for inclusion of climate change adaptation*

Sector	Department	State Level	Kullu District	Sirmaur District
Water	Department of Rural Development	Climate change is a reality. We need to include it in our training programmes, especially for integrated watershed management, thereby, implicating the fact that we have to look at the projected changes in rainfall pattern, glacier movement, water resources in totality, and other issues such as crop management, livestock management, etc.	There is a need to build capacity and train district administration in climate change in order to conduct climate sensitive adaptive activities at the district level. However, currently watershed development activities are conducted. With such conservation of water resources, this acts as a buffer to safeguard communities vulnerable to varied rainfall at risk from water scarcity.	Trainings in watershed conducted at the district level. State level trainings conducted at the University of Agriculture/ Horticulture and HIPA. Exposure visits are conducted at other locations. Training needs to be more systematized and mainstreamed into the annual agenda as trainings are conducted on ad-hoc basis.
	Department of Irrigation and Public Health	Impact of climate change on water availability is a key concern with more intense rainfall, but happening with lower frequency. Therefore, this resource has to be managed innovatively.	At the district level, water harvesting and conservation practices are being undertaken which reduce vulnerabilities during water scarce months.	Trainings currently focus on water, disaster and other technical trainings from HIPA and Mandi. Trainings are conducted for JEs, AEs and actions.
	Department of Forests	Protecting watersheds within the forests is likely to be difficult with changes in forest types projected, especially in upper catchment areas.	Hydropower projects and runoff from rivers and dams are a major source of concern for the Forest Department. To preserve soil from the impacts of high intensity rainfall, soil conservation measures are undertaken. Therefore, training component needs to include a general projection of climate change on water resources including rainfall, snow melt and runoff and location specific measures for adaptation.	Consider climate change as a factor to sustainable forestry, however, no direct trainings in establishing linkages between climate change and forestry. Climate change is taught as a general module in officers' trainings.
Agriculture/ Horticulture	Department of Agriculture	Both increase in temperature and decrease in water availability will impact agricultural produce in the state. Innovative means for sustainable agriculture such as thermal resistant and water stress resistant cultivars need to be introduced and efficient water, soil management practices need to be followed to prevent nutrient loss due to frequent landslides, etc. Systematic training in climate change impacts and state-of-the-art adaptation technologies for efficient water use, soil protection, crop sustainability, etc. need to be introduced at various altitudes.	The snowfall over the years has reduced in Kullu impacting water availability for agriculture. Accordingly, agricultural practices have to evolve and measures including switching to organic farming, use of water efficient practices (polyhouse sprinkling), and where required, borewell and lift irrigation for smallholder farmers need to be undertaken. In this respect, projections of water availability in different areas and adaptation techniques need to be the focus of training at all levels including for farmers.	No awareness on impacts of climate change exists at the district or at the field level. However, district level agricultural activities are carried based on the direction given by the state such as advisory on crop type to be sown, date of sowing, water management practices, soil management practices.
	Department of Horticulture	Though provisions are being made to create water resources for minor irrigation, sheds for plants to protect them from hail, warmer weather, etc. and heat tolerant varieties at higher altitudes where temperatures have gone up, there is still no awareness about the extent of impacts and new innovations	Climate change impacts are being felt in the form of lower temperatures and lower availability of water. Kullu has introduced low chilling varieties of apples. Trainings provided to farmers and staff in Bijore.	At the district level, trainings include aspects of climate change, however, not much information is available (and therefore shared) on it specifically. Increase the capacity and sensitize the staff at the district and block level on the effects of climate change.

*List of people interviewed is in Annexure 1

Table 3: Responses of departments/stakeholders on training needs for inclusion of climate change adaptation*

Sector	Department	State Level	Kullu District	Sirmaur District
Forestry/ Biodiversity/ Eco-Tourism	Department of Forests	The Forest Department is in the process of implementing the Green India Mission, and has already become the first state to sell carbon credits through its CDM mechanism. However, it might be worthwhile to include climate change and its impacts on forests species, forest produce, etc. in the climate change training module. Establish linkages of climate and soil with suitability of forest species that can be planted at different heights. The merit of long-term observation plots that can act as markers for establishing climate change impacts on forest species and help develop adaptation plans to conserve and regenerate depleted forests.	Major challenges are deforestation from hydro-electric projects and consequent degradation of local biodiversity, which is exacerbated due to climate change. Trainings in soil conservation, afforestation, forest fire management, etc. among others, are undertaken. Linkages with climate change not established.	Climate change is considered as a key factor for sustainable forestry, however, no direct trainings in establishing linkages between climate change and forestry is undertaken. Climate change is taught as a general module in officers' trainings.
Urban Development	Public works	We have so far not included any training that relates climate change impacts to the activities of public works. However, we would like to introduce it as a subject area and try and understand how the likely impacts can be ameliorated through additional action from our end, especially when we do retrofitting to abate landslides, flash flood impacts, etc.	Undergo regular trainings for all officers at various institutes across the country according to their specialization, but no training or exposure exists on how to integrate climate change concerns in urban planning and infrastructure development.	No focused activities or linkages in climate change established. Environment trainings attended by selected executive engineers and assistant engineers. No climate change component in the trainings. Only environmental components, that too, not linked with climate change.
	Department of Town and Country Planning	Though detailed training in town and country planning is being carried out, training programme that evaluates the impacts of climate change on habitats in HP have not been included in the training modules. The module also needs to integrate vulnerability of the systems and likely adaptation strategies, costs and other management aspects.	While carrying out all the planning, budget for extreme events including climate change induced events or other natural happenings. No specific training in climate change aspects and its integration into departmental activities. Additionally, no such plan to include climate change in current trainings.	-
Health	Department of Health and Family Welfare - State Institute of Health and Family Welfare	No linkages with climate change and disease prevalence in Himachal is part of our training programmes. Though vector climate sensitive diseases such as malaria is not heard of, but in a changing climate scenario, our preparedness needs to be in place, and therefore, such a module needs to be part of the overall training programme.	-	-

*List of people interviewed is in Annexure 1

Table 3: Responses of departments/stakeholders on training needs for inclusion of climate change adaptation*

Sector	Department	State Level	Kullu District	Sirmaur District
Hydropower	Directorate of Energy	We are aware of the likely impact of climate change on hydropower generation in the state due to potential retreat of glaciers. Our designs do take into account excess water and depleted water levels for hydel power generation, however, in case of extreme scenario, strategies still need to be laid out to deal with the extremes of climate to ensure energy security in the state as well as to protect related infrastructure, and ensure efficient generation (low C) and distribution.	-	-
	Him Urja		-	-
	SJVN		-	-
Disaster Management	State Disaster Management Authority	SDMA has instituted programmes on climate change and through HIPA is developing modules that evaluate the impacts of climate change on various sectors. However, disaster frequency, intensity issues and consequent adaptation strategies have not been taken into account.	We are more prepared in handling as disaster occurs. Therefore, training in climate change and disasters would be useful for us to enable us to prepare for disasters (District Disaster Management Authority – Kullu)	Same sentiments expressed by the District Disaster Management Authority- Sirmaur
Planning and Finance	Department of Planning	We have no official training in integrating climate change into planning	-	The Planning Department works on small projects at the district level such as construction work, roads and infrastructure. They do not consider climate change as a factor in planning/execution/training (other than basic environment considerations).
	Department of Finance	We have no official guidance on prioritizing and ensuring funds for climate change related actions in the state.	-	--
Knowledge Management	Himachal Pradesh Institute of Public Administration (HIPA)	HIPA has a climate change module and will continuously upgrade it as per the requirement of the departments.		
	State Institute of Rural Development	No module on climate change		
	Department of Science and Technology	The department is introducing a module on climate change. However, our areas of governance such as biodiversity conservation, pollution control also need to be linked with climate change concerns to develop adaptation strategies.		

*List of people interviewed is in Annexure 1

Table 3: Responses of departments/stakeholders on training needs for inclusion of climate change adaptation*

Sector	Department	State Level	Kullu District	Sirmaur District
Panchayati Raj		No module on climate change. However, it is required as all the programmes that we implement are climate sensitive.	Same sentiments expressed in Kullu	District Panchayati Raj Department has developed a training schedule proposal for the whole year. Training modules and study material to be submitted to the state for approval. Currently, the trainings do not have any climate change specific modules. However, the department can increase sensitivity of ToTs to climate change, so it needs master trainers.

*List of people interviewed is in Annexure 1

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IDENTIFICATION OF GAPS IN TRAINING NEEDS

5. IDENTIFICATION OF GAPS IN TRAINING NEEDS

Based on the responses, it can be concluded that there is certainly a need for training that incorporates climate change concerns into planning processes of the government as well as into implementation of the State Action Plan on Climate Change (SAPCC), which is already in place in Himachal Pradesh with specific strategies towards amelioration of climate change impacts and towards mitigation of the drivers of change. However, to implement SAPCC, the state needs to include climate change as a strategic area of training in all departments of the government because:

- Although officials are aware of climate change, departments are not yet prepared to handle its effects on the resources they manage, and the vulnerabilities of the systems and population associated with those resources

- Training programmes of the departments have not yet taken into account the likely impacts of climate change. As a result, departments are ill-equipped to devise strategies for adaptation and mitigation

- Disaster management trainings are still reactive in nature as they do not take into account the projected impacts of climate change (especially the hydro-meteorological events)

- Recent training needs assessment conducted for SDMA and DDMA suggests actions for recovery rather than preparedness to combat hydro-meteorological hazards in a changing climate scenario

- The Department of Horticulture, HIPA, SIRD, DEST and SJVN have started introducing climate change as a subject area in their trainings, however, it is not yet part of all the trainings. In addition, trainings are not designed to address key climate change concerns in different sectors

- Cash crops are highly sought after, but they are sensitive to climate change. In view of this, planning of cropping pattern in agriculture and horticulture needs to follow the agro-climatic zone approach. This is important to optimize farm inputs, maximize productivity and ensure food security. In addition, knowledge about indigenous climate hardy crops; new climate change resilient cultivars; traditional and new techniques of soil and water management; methods of seed protection, etc. must be given to the farmers

- Frequent and more intense hail, excess rainfall and resultant landslides, flash floods due to cloud bursts, etc. are a matter of concern for the state. Therefore, Public Works and Irrigation and Flood Control Departments need to constantly be on a disaster recovery mode

- Although some training programmes of DEST cover issues such as heat stress and buildings, these have not yet been included in the training programme of the Urban

Development Department

- The Planning and the Finance Departments have not yet taken cognizance of the Environment Performance Index (EPI) developed by the Planning Commission (Chandrasekharan et al., 2013). The EPI includes climate change as one of the criteria. Recognizing the influence of climate change on natural resources, the Planning Commission has suggested that it may be taken as an indicator for allocation of central assistance to state plans in the future

- Climate proofing actions must be considered as one of the criteria to access central funds. The Planning and Finance Departments must also prioritize the same in their plans and allocations

- There are no systematic awareness generation programmes on climate change for legislators, or for senior bureaucrats in the state

- Children must be made aware of the effects of climate change, and how they can be tackled

- At the village level, the capacity of the village panchayats should be enhanced to enable it to integrate climate change concerns into their development activities

Table 4 below summarizes specific climate change concerns that each of the departments need to address relating to various programme implementation activities.

Table 4: Specific climate change concerns of various departments managing climate sensitive resources and assets

Department	Specific climate change concerns to be addressed by the Department
Department of Rural Development	The Rural Development Department is engaged in creation of durable and directly productive economic assets like water conservation works that ensure availability of adequate water for the villagers, soil conservation, irrigation schemes, horticulture, plantation in villages, rural housing, sanitation through solid and liquid waste management, developing wasteland and degraded land and enhancing rural livelihoods, etc. These are being implemented through various state and central government programmes such as MGNREGA, Indira Awaas Yojana, etc. However, the convergence possibilities of these schemes also need to be explored to maximise benefits. All activities done through various programmes are highly climate sensitive, and therefore, need enablers for long-term sustenance of the assets created through these programmes in a changing climate scenario. For example: Water conservation activities would require an estimate of how much water is required, how this can be met, and in the event of extreme events such as high rainfall, floods and droughts, how the water storage structure can be protected or evapotranspiration rates can be reduced. Horticulture activities would require understanding of what type of crops are suitable for a warming climate in the area of focus, and what on-farm amendments would be required to compensate for the stresses of climate change.
Department of Irrigation and Flood Control	This department is implementing activities to enhance accessibility to irrigation and controlling floods occurring along the five rivers flowing through this state. The development of major and minor irrigation development projects are supported by programmes such as Accelerated Irrigation Benefit Programme (AIBP), the ACA programme, etc. and the flood control is being supported by RIDF (Rural Infrastructure Development Finance) programme of NABARD, etc. Developing major irrigation assets would require knowledge of climate trends of the area, projected climate change scenarios of temperature, rainfall, probability and intensity of droughts, extreme rainfall, rate of glacial melt, current and projected evapotranspiration rates, etc. These are some of the criteria that may have to be integrated as the design criteria for the irrigation projects, and hence for the infrastructure to be developed for the projects. Similarly, for flood control works to be sustainable, extent of flooding, likely areas to be flooded or GLOFs need to be understood.
Department of Forests and Wildlife	The Department of Forests and Wildlife is involved in afforestation activities through nursery raising, assisted natural regeneration and artificial regeneration. It also undertakes soil and water conservation activities along the slopes of the mountains in and around the forest areas. Further, it has an extensive programme on eradication of exotic weeds spread over 18,500 ha of forestland in the Shivaliks. It also undertakes forest fire management. Further, new and innovative technologies are being introduced for forest management, bio-engineering measures to protect the fragile ecology, and harvesting NTFP such as medicinal plants native to the ecosystem of the Himalayas within Himachal Pradesh. In view of the above, and the need for protection of plant and animal biodiversity, and for maximizing the value of forest ecosystem services, it is imperative that the Forest Department officials are aware of (i) the extent of likely impacts of climate change on forest vegetation, biodiversity and forest produce (ii) the options for adaptation, e.g., identification of vegetation appropriate for warmer temperatures, enabling projects to help shift/preserve biodiversity to conducive climate (biodiversity corridors) (iii) extent of likely intensity of extreme events to plan for protection of watersheds within forests, etc.

Table 4: Specific climate change concerns of various departments managing climate sensitive resources and assets

Department	Specific climate change concerns to be addressed by the Department
Department of Agriculture	Agriculture dominates the economy of the state though only a little over 10 percent of the total land area is cultivated. About 18.5 percent of the cultivated area is under irrigation and remaining is rainfed. The cultivation is carried out right from 240 m to 4,250 m above sea level. Agro-climatically, the region is more suitable for growing off-season vegetables and temperate fruits. One of the key objectives of the Agriculture Department is to support sustainable agriculture through management of natural resources and soil health, organic and risk mitigation. The government through its various projects promotes potato, vegetables, ginger and tea development, which are high value cash crops. It provides assistance on fertilizers, development of vermi-composting units, soil testing, plant protection from pests and diseases. Programmes that are operational in the state are Rashtriya Krishi Vikas Yojana, Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM), RIDF towards improving water use efficiency, etc. The state has a fragile landscape. Therefore, protecting agriculture from extreme climate events is one of the main concerns of the state to ensure food security and livelihoods. In view of this, the Department of Agriculture may need to focus on: •Assessing the likely impacts of climate change on all types of crops grown in the state •Assessing the impact of climate change on soil nutrient capacity and productivity •Identifying crops suitable in a changing climate scenario •Identifying enabling steps for growing appropriate cultivars •Protecting and preserving indigenous biodiversity that is resistant
Department of Horticulture	The diverse agro-climatic conditions prevailing in the state offer great opportunities for diversification in horticulture. Besides this, ancillary activities like mushroom cultivation, floriculture, harvesting of medicinal plants and bee keeping have further complemented the growth of horticulture in the state. Horticulture mission is one of the key central programmes that is helping the state to realize its horticulture production capacity. For maximising the capacity of the state to grow horticulture crops in a changing climate, the state officials planning horticulture production need to understand: •The implications of climate change on horticulture produce such as on key commercial fruits, bee keeping and flower cultivation •Best ways of adaptation and maximizing crop production
Biodiversity Board	The Biodiversity Board in the state is operating under the aegis of the Department of Science and Technology and Environment. One of the key activities of the Board is to help maintain biodiversity registers at the village level. Considering that the state is endowed with diversity, and that some of it is resilient to changes in climate, the Biodiversity Board can help in identification of indigenous plant biodiversity that can adjust to changing climate, and ensuring food security, and maintaining ecosystem services such as soil health, watershed protection, etc.
Public Works Department	Motorable rural roads and state highways have played a pivotal role in the development of the state. Other associated activities include cross-drainage, construction of need bridges, metalling and tarring of roads, etc. In a climate change scenario, extreme precipitation events, GLOFs are likely to increase causing damage to ill-constructed roads directly or through landslides. In this scenario, protecting the infrastructure is imperative. Therefore, officials of the Public Works Department need to be aware of: •The frequency and intensity of projected extreme events •The corresponding requirement of strengthening the existing infrastructure •Climate-friendly design norms for building new planned infrastructure
Department of Town and Country Planning	The department ensures planned, systematic and sustainable rural and urban development in accordance with environmental and heritage imperatives. All housing development in the state takes place mostly along the slopes of the hills. In a changing climate context, the department needs to develop its capacities towards: •Identifying vulnerable areas that are susceptible to hydro-meteorological disasters •Understanding the likely impacts of climate change on such regions, and hence, on urban and rural habitats •Designing its building regulation norms, and aligning them with the imperatives of the likely climate change impacts such as intense heat, frequent and intense rainfall, landslides, floods, etc.
Department of Health and Family Welfare	Disease prevalence pattern is likely to change with changing climate in the state. Warming of the atmosphere may lead to occurrence of vector-borne diseases, which at the moment, are not reported from the state. The state may need to take stock of the likely impacts of climate change on disease profile of the state in the future, and design strategies in advance to combat the same. Additionally, the infrastructure accessibility to transfer patients in times of hydro-meteorological disasters is another area which the department needs to work on with other departments including Public Works and the State Department of Disaster Management.

Table 4: Specific climate change concerns of various departments managing climate sensitive resources and assets

Department	Specific climate change concerns to be addressed by the Department
Directorate of Energy	The Directorate is responsible for providing a conducive policy framework and directions to promote, develop and harness the hydro potential of the state. It is also responsible for coordinating/facilitating the programmes/policies which lead to development of other renewable energy and conservation of energy and its efficient use. The state has about 23,000 MW of hydroelectric power generation potential. Hydropower in the state is fed by water from the rivers, which are rainfed and receive water from glacial melt. Therefore, it is essential to maintain adequate water levels in the future, and ensure that dams are strong to sustain sudden onslaught of flood water due to cloud bursts or GLOFs.
State Disaster Management Authority and the District Disaster Management Authorities	In view of the state's susceptibility to hydro-meteorological disasters, it is imperative to build a plan for disaster management that is anticipatory in nature. This can be done by integrating climate change into development plans to avoid destruction due to natural disasters in the future. Therefore, institutional arrangement that links knowledge of climate change with the causes of disasters needs to be upgraded. Similarly, capacity building requirements and disaster response preparedness need to be reviewed.
Department of Environment, Science and Technology	The Department of Environment, Science and Technology has the mandate to implement environmental regulations, and is the focal point for climate change in Himachal Pradesh government. The mandate of the State Climate Change Centre is to help the state achieve sustainable growth by providing scientific knowledge towards informed decision making through observation of glaciers, climate research to understand climate change in various sectors, enhancing C sink capacities in forests, ensuring sustenance of biodiversity in the state, strengthening capacity building in disaster management, etc.
Department of Planning	At the national level, the Planning Commission has formulated national plans keeping in view the vulnerability of the nation, its people and resources to climate change. The Planning Commission will also look at climate-resilient aspects in the Plan Documents of the states. Accordingly, the Planning Board in the state needs to advise the departments to submit plans and budget that address climate concerns of the state.
Department of Finance	The Department of Finance can help prioritize actions that will be required for climate proofing in each sector, and accordingly, ensure fund availability for the same.
Himachal Pradesh Institute of Public Administration (HIPA)	The institution can help anchor training programmes on climate change in the state.

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SUGGESTED TRAINING MODULES

6. SUGGESTED TRAINING MODULES

Based on the identified gaps, a combination of training programmes is proposed:

- Two orientation programmes for legislators and top state bureaucrats
- Three training programmes for officials and master trainers

If implemented, it will be the first step towards integrating action towards climate proofing, and in turn, integrating climate change in development activities in Himachal Pradesh.

The proposed training programmes will not only cover climate change issues relevant to the state, but will also enable officials of the state at various levels of governance to plan strategies geared towards addressing climate change in a holistic manner, including aspects of gender. The target audience for the trainings will include the following:

Legislators (Orientation Programme)

A legislators forum is suggested for half a day. The objective of this forum is to enable legislators to internalize climate change concerns of the state, and hence, facilitate formulation and adoption of policies to address the same.

Very senior bureaucrats (Orientation Programme)

A roundtable on climate change is suggested. It will help planners learn about the latest global developments on climate change, India's response, and the state's concerns.

The roundtable will also include a discussion on identification of priority actions that the departments must take to address climate change concerns, and how implementation of actions can be facilitated.

Senior technical officials in the departments within the state and districts

A set of modules focussing on climate change issues is suggested for these officials. These will enable them to develop monitoring and evaluation mechanism to track adaptation action, and to identify capacity building requirements to address climate change impacts and vulnerabilities.

Mid-level officials in the state and district departments

A set of modules will be offered for training to these officials. It is envisaged that through this programme, mid-level officials will get hands-on experience in identifying vulnerability of the sectors they manage relating to climate change. The training will also enable them to devise adaptation actions at field level; formulate monitoring and evaluation frameworks for tracking adaptation; and evaluate their own capacity building needs.

Training of master trainers

Master trainers will be trained from a pool of field officials nominated from various departments including extension officers, panchayati raj officials, BDOs, officials of gram panchayats, universities, other institutions of repute and NGOs.

The objective of the training is to enable integration of climate change concerns, and hence, adaptation planning in village, district and state planning. A refresher course will be held in the second year for master trainers.

Refresher course for master trainers

A refresher course will be conducted in the second year for master trainers. The training content will be designed to get feedback from trainers on the training they have conducted for various groups of stakeholders based on the training received in the previous year. This will enable strengthening of the existing modules perceived from the field. The refresher course will contain latest on climate and impact modelling approaches, data needs, data availability, designing of risk assessment frameworks for assessing vulnerabilities, latest on development of adaptation strategies, and monitoring and evaluation requirements, among others.

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SUGGESTED TRAINING CONTENT

7. SUGGESTED TRAINING CONTENT

The following modules will cover various levels of training:

7.1 Module 1: An introduction to climate change and need for adaptation action with a special focus on Himachal Pradesh

Objective:

To develop a common understanding of climate change science, its impacts, vulnerability and adaptation needs in the national, Himalayan, and specifically, in Himachal context.

Outcome:

The participants in the training programme will have:

- A basic understanding of climate change, and of the connection with global action and regional and local effects
- A background information on India's response to climate change
- Impacts of climate change on different sectors and biophysical systems, especially in the Himalayan region including in Himachal Pradesh
- An understanding of exposure, sensitivity, vulnerability and adaptation needs in mountainous regions including Himachal Pradesh
- Extreme events and planning for climate-smart disaster risk mitigation
- An understanding of adaptation planning needs and financing including consideration of inclusion of climate change as a criterion in planning for ensuring funding of programmes from various agencies/sources

Resource Material:

IPCC 2007a. Summary for Policy Makers- Working Group I. http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

IPCC 2007b. Summary of Policy makers- working Group II. http://www.ipcc-wg2.gov/AR4/rev_archive/spm.pdf

IPCC SREX, 2010. Managing The Risks Of Extreme Events And Disasters To Advance Climate Change Adaptation Summary For Policymakers, Summary Report. http://ipcc-wg2.gov/SREX/images/uploads/SREX-SPMbrochure_FINAL.pdf

The National Action Plan on Climate Change, Govt. of India

Himachal Pradesh State Action Plan on Climate Change

INCCA 2010. 4x4 regional report. Ministry of Environment and Forests, Govt. of India

NATCOM, 2012. India;s National Communication to Climate Change

ICIMOD publications. http://lib.icimod.org/collection/ICIMOD%20Publications

ICIMOD 2013. Adaptation Learning Highways : Working with Communities to Adapt to Climate Change

Ranbir Singh Ranaa, R.M. Bhagata, Vaibhav Kaliaa and Harbans Lal, ISPRS Archives XXXVIII-8/W3 Workshop Proceedings: Impact of Climate Change on Agriculture

131. Impact Of Climate Change On Shift Of Apple Belt In Himachal Pradesh

http://www.isprs.org/proceedings/XXXVIII/8-W3/b2/10-B10-179_ISRO F.pdf

ADB, 2010. Climate Change Adaptation in Himachal Pradesh- Sustainable Strategies for Water Resources. http://www.indiawaterportal.org/articles/climate-change-adaptation-himachal-pradesh-sustainable-strategies-water-resources-report

Indrani Chandrasekharan, R. Sendhil Kumar, Seena Raghunathan and Shweta Chandrasekaran, 2013. Construction of environmental performance index and ranking of states, Current Science, Vol. 104, No. 4, pp 435-439.

CEDRIG- Climate, Environment and Disaster Risk Reduction Integration Guidance http://www.sdc-climateandenvironment.net/en/Home/Tools_Training/media/CEDRIG/CEDRIG-Part i AimConceptandSupportMaterial.pdf

OECD Policy Guidance - Integrating Climate Change Adaptation into Development Cooperation, Part II: Integrating Climate Change Adaptation at National, Sectoral and Project Levels.

OECD DAC SEA and Climate Change Adaptation Advisory Note: http://content.undp.org/go/cms-service/download/asset/?asset_id=2081168

UKCIP Adaptation Wizard (an online tool that goes through a 5-step process to assess vulnerability to current climate and future climate change, identify options to address key climate risks, and develop an adaptation strategy): http://www.ukcip.org.uk/wizard

Adaptation Learning Mechanism (case studies, publications, country profiles): http://www.adaptationlearning.net

Sector risk assessments in UNFCCC National Communications (under national reports, non Annex I): www.unfccc.int

National Adaptation Programmes of Action (NAPAs) for LDCs (under national reports, non Annex I): www.unfccc.int

GEF-funded climate change adaptation project appraisals (search SCCF, LDCF): http://www.gefonline.org/

World Bank climate change data portal: http://sdwebx.worldbank.org/climateportal/home.cfm?page=globlemap

7.2 Module 2: Interpreting climate data and impacts of climate change

Objective:

To have enhanced awareness about observed climate trends, projected climate change and projected impacts on various resources.

Outcome:

The participants will have:

- An understanding of the importance of observed climate trends including climate variability, and how they can be used to understand the severity of extreme events that can happen in the future
- An awareness about different climate models and the scenarios driving them
- Information about what is likely to happen, where, when and how sure one can be about the projected changes in the context of Himachal Pradesh, relating to its glaciers, agriculture, horticulture, fisheries, livestock, forests, biodiversity, human habitats and human health
- An understanding of uncertainties of climate change projections, and tools of managing uncertainties associated with climate change
- Resources for availability of climate data required for assessments of this nature

Resource material:

IPCC, 2007a. Science of Climate Change. IPCC Working Group Report I

IPCC 2007 b. Impacts of Climate Change. IPCC Working Group Report II

NATCOM 2012. India's Second National Communication to the UNFCCC. MoEF, GoI

Rupa Kumar, K; Sahai, A.K; Krishna Kumar, K; Patwardhan, S.K; Mishra, P.K; Revadekar, J.V; Kamala, K; Pant, G.B; High-resolution climate changes scenarios for India for the 21st century. Current Science, 90, 2006, 334-345

Rupa Kumar, K; Krishna Kumar, K; Patwardhan, S.K; Deshpande, N.R; Sharma, C; Mitra, A.P; Future climate scenarios for the South Asian Region as simulated by the Regional Climate Model HadRM2.Science and Culture, 71, 2005, 214-224

K. Rupa Kumar, A. K. Sahai, K. Krishna Kumar, S. K. Patwardhan, P. K. Mishra, J. V. Revadekar, K. Kamala and G. B. Pant : High Resolution Climate Change Scenarios for India, Current Science, vol.90, No. 3, 2006, 334-345

Climate Mapper: http://worldwindcentral.com/wiki/Add-on:Climate_Mapper

Climate Wizard (The Nature Conservancy): http://www.climatewizard.org

IPCC Data portal: http://www.ipcc-data.org/

National Communications and NAPAs: www.unfccc.int

Oxford University and UNDP climate change profiles (available for 52 countries): http://country-profiles.geog.ox.ac.uk/index.html

PRECIS from the UK Meteorological Office (RCM, dynamic downscaling): http://precis.metoffice.com/new_user.html

RegCM3 from the International Centre of Theoretical Physics (RCM, dynamic downscaling): http://users.ictp.it/~pubregcm/RegCM3/faq.htm

Statistical Downscaling Model (SDSM): https://co-public.lboro.ac.uk/cocwd/SDSM/SDSMManual.pdf

WikiAdapt (statistical downscaling): http://wikiadapt.org/index.php?title=The_Climate_Change_Explorer_Tool

World Bank climate change data portal: http://sdwebx.worldbank.org/climateportal/home.cfm?page=globlemap

DFID: Adaptation to climate change: the right information can help the poor to cope (2004): http://www.dfid.gov.uk/Documents/publications/climatechange/7information.pdf

GTZ: Climate Change Information for Effective Adaptation (2009): http://www2.gtz.de/dokumente/bib/gtz2009-0175en-climate-change-information.pdf

Ramamasy S.; Baas, S.: Climate variability and change: adaptation to drought in Bangladesh. Module 4: Climate risk assessment at community level in the agricultural sector. (2007): ftp://ftp.fao.org/docrep/fao/010/a1247e/a1247e00.pdf

Randall et al: Climate Models and Their Evaluation. (IPCC report 2007): http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter8.pdf

Regional Climate Scenarios for Application in Climate Change Vulnerability and Adaptation Assessments (National Communication Support Programme): http://ncsp.va-network.org/

UserFiles/File/PDFs/Resource%20Center/Climate%20Scenarios/NCSP_climate_scenarios_guidance.pdf

Shohme, S.; Marx, S. (2009): The Psychology of Climate Change Communication: http://blogs.ei.columbia.edu/climate/2009/11/13/tips-for-communicating-climate-change/

Ziervogel, G. et al. (2008): Climate change and adaptation in African agriculture. Stockholm Environmental Institute: http://www.wikiadapt.org/filestore/Final_Rockefeller_Report4April08.pdf

7.3 Module 3: Assessing vulnerability to climate change to undertake adaptation planning

Objective:

The module will enable assessment of vulnerability of different development plans/programmes of the state. This will be the basis for integration of adaptation strategies into development plans that are over and above the current adaptation actions.

Outcome:

The participants will:

- Identify the sensitivity to climate variability of different resources including vulnerability of human habitats, human health and access to energy, especially in Himachal Pradesh
- Identify the vulnerability of different resources based on perceptions of stakeholders that are managing, implementing, and benefitting from the programmes and plans of the state
- Identify the current adaptation tools available to them, and how they can be augmented and strengthened
- Identify climate change signals that will impact the resources, the potential bio-physical and socio-economic impacts
- Rate and prioritize vulnerabilities of the resources they manage or benefit from

Resource material:

Mountains and Climate Change- From Understanding to Action

http://www.cde.unibe.ch/userfiles/Fullversion_low_Mountains_and ClimateChange.pdf

High mountain glaciers and climate change - Challenges to human livelihoods and adaptation. http://www.grida.no/publications/high-mountain-glaciers/

ICIMOD publications. http://lib.icimod.org/collection/ICIMOD%20Publications

ICIMOD 2013. Adaptation Learning Highways : Working with Communities to Adapt to Climate Change

Ranbir Singh Ranaa, , R.M. Bhagata, Vaibhav Kaliaa and Harbans Lal, ISPRS Archives XXXVIII-8/W3 Workshop Proceedings: Impact of Climate Change on Agriculture

131. Impact Of Climate Change On Shift Of Apple Belt In Himachal Pradesh

http://www.isprs.org/proceedings/XXXVIII/8-W3/b2/10-B10-179_ISRO F.pdf

ADB, 2010. Climate Change Adaptation in Himachal Pradesh- Sustainable Strategies for Water Resources. http://www.indiawaterportal.org/articles/climate-change-adaptation-himachal-pradesh-sustainable-strategies-water-resources-report

CRiSTAL Tool for community scale vulnerability assessment and adaptation planning: http://www.cristaltool.org/content/download.aspx

GTZ (2010): Climate Proofing for Development: Adapting to Climate Change, Reducing Risk: http://www.gtz.de/en/686.htm

CEDRIG- Climate, Environment and Disaster Risk Reduction Integration Guidance http://www.sdc-climateandenvironment.net/en/Home/Tools_Training/media/CEDRIG/CEDRIG-Part i AimConceptandSupportMaterial.pdf

National Communications Support Programme (NCSP) V&A Network Resource Centre: http://ncsp.va-network.org/section/resources

OECD Policy Guidance - Integrating Climate Change Adaptation into Development Cooperation, Chapter 5: Operationalising Adaptation: From Theory to Action, and Part II: Integrating Climate Change Adaptation at National, Sectoral and Project Levels

UNDP (2010): Screening Tools and Guidelines to Support the Mainstreaming of Climate Change Adaptation into Development Assistance – A Stocktaking Report: http://www.undp.org/climatechange/library.shtml

UNDP-GEF (2005): Adaptation Policy Frameworks (planning methodologies for adaptation), Technical Papers 3: Assessing Vulnerability for Climate Adaptation, 4: Assessing Current Climate Risks, and 5: Assessing Future Climate Risks: http://www.undp.org/climatechange/adapt/apf.html

USAID (2007): Vulnerability and Adaptation Manual for Development Planning: http://www.usaid.gov/our_work/environment/climate/pub_outreach/index.htm

World Bank (2009): Guidance notes on Mainstreaming Adaptation to Climate Change in Agriculture and Natural Resources Management Projects: http://beta.worldbank.org/climatechange/content/mainstreaming-adaptation-climate-change-agriculture-and-natural-resources-management-project

7.4 Module 4: Identification of adaptation options and selection of measures

Objective:

Brainstorm to identify adaptation options for vulnerabilities discussed in Module 2, and select the most appropriate option.

Outcome:

This will enable participants to:

- Identify all possible adaptation strategies (technology, capacity building-institutional or individual, policy options, etc.) to address vulnerabilities at state and local level (in this case local level can be district level or village level) including the need for further studies, if required
- Identify activities that can be rolled out to implement adaptation strategies at different timescales
- Identify different stakeholders that will be involved in the implementation of adaptation strategies
- Assess the most appropriate adaptation measure that can be implemented by evaluating a set of criteria for prioritization such as effectiveness, cost, feasibility, no regrets options, etc.

Resource material:

P S Ramakrishnan, 2008. Redeveloping Mountain Landscapes as Cultural Cradles of Biodiversity in Mountainous Regions: Laboratories for Adaptation, IHDP Update, Issue 2, October 2008

ICIMOD, 2010. Himalayan Climate Change Adaptation Programme (HICAP). http://lib.icimod.org/record/27760/files/HICAP%20Project%20Flyer.pdf

OECD Policy Guidance - Integrating Climate Change Adaptation into Development Cooperation, Chapter 5: Operationalising Adaptation: From Theory to Action, and Part II: Integrating Climate Change Adaptation at National, Sectoral and Project Levels

GTZ (2010): Climate Proofing for Development: Adapting to Climate Change, Reducing Risk: http://www.gtz.de/en/686.htm

UNDP-GEF (2005): Adaptation Policy Frameworks (planning methodologies for adaptation) Technical Paper 7: Assessing and Enhancing Adaptive Capacity: http://www.undp.org/climatechange/adapt/apf.html

USAID (2009): Adapting to Coastal Climate Change: A Guidebook for Development Planners: http://www.usaid.gov/our_work/cross-cutting_programs/water/docs/coastal_adaptation/adapting_to_coastal_climate_change.pdf

USAID (2007): Vulnerability and Adaptation Manual for Development Planning: http://www.usaid.gov/our_work/environment/climate/puboutreach/index.html

World Bank (2009): Guidance notes on Mainstreaming Adaptation to Climate Change in Agriculture and Natural Resources Management Projects: http://beta.worldbank.org/climatechange/content/mainstreaming-adaptation-climate-change-agriculture-and-natural-resources-management-project

7.5 Module 5: Developing monitoring and evaluation (M&E) framework

Objective:

The objective of the development of an M&E framework is to ensure that the adaptation strategies being implemented are adequately addressing the identified vulnerabilities.

Outcome:

The participants will have the capacity to:

- Set milestones as markers of progress for implementation of the identified adaptation strategies
- Design evaluation criteria for progress that may include a combination of scientific data analysis, community-level observations and third party verification
- Deliver effectively

Suggested Reading Material:

CEDRIG- Climate, Environment and Disaster Risk Reduction Integration Guidance http://www.sdc-climateandenvironment.net/en/Home/Tools_Training/media/CEDRIG/CEDRIG-Part i AimConceptandSupportMaterial.pdf

OECD Policy Guidance - Integrating Climate Change Adaptation into Development Cooperation, Part II: Integrating Climate Change Adaptation at National, Sectoral and Project Levels

GIZ (in preparation): Monitoring and evaluation for effective adaptation - A practitioner's manual. (Working title; available from April 2011 at www.giz.de)

GTZ (2008): Results-based Monitoring. Guidelines for Technical Cooperation: http://www.csr-weltweit.de/uploads/tx_jpdownloads/wirkungsorientiertes-monitoring-leitfaden-en_01.pdf

IDS (2008): Evaluation of Adaptation to Climate Change from a Development Perspective: http://www.esdevaluation.org/images/IDS_Report_on_Evaluating_Adaptation_for_GE_publication_version.pdf

J Frankel-Reed (2008): Considerations for Developing Monitoring and Evaluation Approaches for

Climate Change Adaptation: http://www.nautilus.org:8080/GC/gci/adaptnet/reports/2008/monitor-evaluate

National Communications Support Programme (NCSP): Developing Socioeconomic Scenarios: For Use in Vulnerability and Adaptation Assessments http://ncsp.va-network.org/UserFiles/File/PDFs/Resource%20Center/Socio economic%20Scenarios/Socio-economicScenarios_guidance.pdf

UNDP-GEF (2005) Technical Paper 9: Continuing the Adaptation Process: http://www.undp.org/climatechange/adapt/apf.html

USAID (2007): Vulnerability and Adaptation Manual for Development Planning: http://www.usaid.gov/our_work/environment/climate/puboutreach/index.html

World Bank Series on Development (2009): Evaluating Climate Change and Development: http://www.amazon.com/Evaluating-Climate-Change-Development-World/dp/1412814030/ref=sr_1_1?ie=UTF8&s=books&qid=1263169776&sr=1-1

World Bank (2009): Mainstreaming Adaptation to Climate Change in Agriculture and NRM: http://beta.worldbank.org/climatechange/content/mainstreaming-adaptation-climate-change-agriculture-and-natural-resources-management-project

7.6 Module 6: Building capacity for adaptation to climate change

Objective:

Develop a comprehensive approach for augmenting capacities needed for action on adaptation.

Outcome:

The participants will be able to evaluate:

- Individual and organizational capacities that need to be built to implement adaptation actions to address climate change
- Capacity building needs for knowledge/information management
- Areas of cooperation between departments
- Policies needed over and above the existing policies for managing various resources

Suggested Resource Material:

Macchi, M (2011) Framework for community-based climate vulnerability and capacity assessment in mountain areas. Kathmandu: ICIMOD. http://www.climateadapt.asia/upload/events/files/4df5851ac678bicimod-framework_for_community-based_climate_vulnerability_and_capacity_assessment_in_mountain_areas.pdf

Africa Climate Change Resilience Alliance: The ACCRA adaptive capacity framework (consultation status): http://www.preventionweb.net/english/professional/publications/v.php?id=15886

Gupta, J et al. (2010): The Adaptive Capacity Wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. Environmental Science and Policy 13

ODI (2010): Responding to a changing climate. Exploring how disaster risk reduction, social protection and livelihoods approaches promote features of adaptive capacity: http://www.odi.org.uk/resources/details.asp?id=4790&title=climate-change-disaster-risk-reduction-adaptive-capacity-social-protection

UNCIP (2010): Attributes of Well-Adapting Organizations: http://downloads.theccc.org.uk.s3.amazonaws.com/ASC/UKCIP_Well_adapting_organisations.pdf

WRI (2009): The National Adaptive Capacity Framework: Key Institutional Functions for a Changing Climate: http://www.wri.org/project/vulnerability-and-adaptation/nac-framework

7.7 Module 7- Module at local level

Objective:

Understanding climate stresses, vulnerability and adaptation planning of the existing programmes and projects of various departments at local level such as in districts, blocks and villages for various sectors.

Module 7.1: Understanding key climate stresses and their impacts on activities related to water resource management, agriculture, forests, biodiversity, eco-tourism, human habitats, human health and energy needs

Module 7.2: Identification of gaps in action taken as part of the various programmes, and projects that are unable to address these stresses

Module 7.3: Identification of local knowledge available on existing coping strategies, and identification of new and additional strategies for adaptation

Module 7.4: Integrating adaptation needs in district/village planning. This may include technical knowledge through diversification of livelihoods including insurance and capacity building for managing adaptation action

Outcome:

Climate change concerns will be integrated from bottom up - from village level planning to district and state-level planning

Suggested resource material:

HP State action Plan on Climate change

Highnoon project outputs on glaciers

Bhutan National Adaptation Programme of Action – Bhutan NAPA, http://www.adaptationlearning.net/sites/default/files/NAPA%20Final%20Report%20Bhutan.pdf

Nepal National Adaptation Programme of Action- Nepal NAPA, 2010. http://www.napanepal.gov.np/pdf_reports/NAPA_Report.pdf

ICIMOD 2013. Adaptation Learning Highways : Working with Communities to Adapt to Climate Change

Ranbir Singh Ranaa, , R.M. Bhagata, Vaibhav Kaliaa and Harbans Lal, ISPRS Archives XXXVIII-8/W3 Workshop Proceedings: Impact of Climate Change on Agriculture

131. Impact Of Climate Change On Shift Of Apple Belt In Himachal Pradesh

http://www.isprs.org/proceedings/XXXVIII/8-W3/b2/10-B10-179_ISRO F.pdf

ADB, 2010. Climate Change Adaptation in Himachal Pradesh- Sustainable Strategies for Water Resources. http://www.indiawaterportal.org/articles/climate-change-adaptation-himachal-pradesh-sustainable-strategies-water-resources-report

CEDRIG- Climate, Environment and Disaster Risk Reduction Integration Guidance http://www.sdc-climateandenvironment.net/en/Home/Tools_Training/media/CEDRIG/CEDRIG-Part i AimConceptandSupportMaterial.pdf

OECD Policy Guidance - Integrating Climate Change Adaptation into Development Cooperation, Part III: Integrating Climate Change Adaptation at the Local Level

CARE (2009): Climate Vulnerability and Capacity Analysis Handbook: http://www.careclimatechange.org/cvca/CARE_CVCAHandbook.pdf

CRiSTAL Tool for community scale vulnerability assessment and adaptation planning: http://www.cristaltool.org/content/download.aspx

GTZ (2009): Manuel d'utilisation. Climate Proofing dans les projets et programmes de Gestion Durable de Terres au Mali: http://www2.gtz.de/dokumente/bib/gtz2010-0306fr-manuel-climate-proofing-mali.pdf

IIED (2009): Community-based adaptation to climate change. Participatory Learning and Action 60: http://pubs.iied.org/14573IIED.html

IUCN: A Framework for Social Adaptation: Sustaining Tropical Coastal Communities and Industries (2010): http://data.iucn.org/dbtw-wpd/edocs/2010-022.pdf

UNDP (2010): Community Water Initiative: Fostering Water Security and Climate Change Adaptation and Mitigation: http://sgp.undp.org/downloads/CWI%20-%20Local%20Adaptation%20to%20Climate%20Change%20Knutson%2015%20April%202010.pd

7.8 Module 8- Refresher course

Objective:

The module will be used in the second year of this programme, when the first batch of master trainers have imparted a few trainings themselves, and have understood the exact requirements of the training. Therefore, this module will contain the following:

- A feedback from trained officials on gaps in the course, methodology of training, or duration of training

- An update on latest developments in the area of climate modelling, impact and vulnerability assessment, developing adaptation strategies, government programmes and funds available, etc.

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TRAINING PROGRAMME OBJECTIVES AND IMPLEMENTATION ARRANGEMENT

8. TRAINING PROGRAMME OBJECTIVES AND IMPLEMENTATION ARRANGEMENT

8.1 Long-term objectives of the training programme

- To bring about qualitative changes in addressing developmental issues encompassing climate change
- To introduce new knowledge, techniques, technologies, management to meet new challenges of climate change

8.2 Short-term objectives

- To develop capacities of department personnel, understand vulnerabilities associated with climate change in their respective areas of resource management
- To enable officials to plan and implement climate proof projects
- To enable officials to develop annual plans that integrate climate change adaptation budgets and extend to Five-Year Plans
- To update skills and knowledge of in-service officials from time to time, keep pace with the evolving knowledge on climate change, changing technologies, latest government policies and priorities
- To build capacity of stakeholders to design, operate, monitor and manage climate proofing of projects

8.3 Training framework

The focus of the training is to address impacts and vulnerabilities due to climate change on all aspects of natural resource management, and assets managed by different departments to achieve sustainable development in the state. Therefore, the training will be on the following sectors:

- Water Resources
- Agriculture
- Forests
- Biodiversity
- Hydropower
- Habitats

- Disaster management

In addition to legislators and top bureaucrats of the state, the level of trainees includes:

- Senior-level officials
- Mid-ranking officials
- Field-level officials

8.4 Ensuring participation

No training programme can be successful if it does not evolve adequate response from the department to nominate participants. Generally, it is seen that trainings are postponed, or even cancelled due to inadequate number of participants, resulting in loss of energy, time and resources. Thus, the person nominated should get dedicated time for training by the supervisor, and he/she should not back out without valid reasons.

8.5 Training material and knowledge portal

The training background material will be provided during the training. In addition, HPCCC as part of its mandate, will host a resource/knowledge portal where training and capacity building modules and other material will be uploaded.

The training will include interactions among participants, therefore, appropriate training material is proposed to be provided to the participants. This includes chart papers for writing notes, pins, boards, flip charts, etc. Further, practical training will be imparted through field visits.

8.6 Training implementation arrangement

In order to execute the training, it is proposed that the entire training process will be anchored by the Himachal Pradesh State Climate Change Centre (HPCCC). All the training guidance will be provided by HPCCC in consultation with various stakeholders.

It is proposed that to institutionalize the training and capacity building programme, HIPA in Shimla shall function as the host institution. HIPA has also proposed to set up a dedicated Centre on climate change for implementation of the training and capacity building programme.

Initially, all trainings will be provided by a combination of national and international experts, as well as experts drawn from different institutes, departments and universities in Himachal Pradesh, or other mountain states. Master trainers, together with subject experts, can continue to provide training beyond the duration of IHCAP project. For this, it is proposed that a pool of master trainers is maintained by HPCCC, and made available to HIPA for continuation of future programmes.

Subsequently, master trainers will carry out training of senior technical officers in the state, and of

mid-level and field-level officials.

8.7 Training coverage

The suggested content for each programme, number of people to be trained, duration of the programme, etc. are detailed in Table 5.

The implementation arrangement for imparting training on integrating climate change in Himachal Pradesh is shown in Figure 2.

Table 5: Summary of Implementation of the Training Programme							
Level of Training	Target Group	Module	No. of Participants per batch	Number of days of training	Method of Training	Number of programmes 2014-15	No. of people trained
Orientation programme 1	Legislators	Abridged Module 1: An introduction to climate change and the need for adaptation action with a special focus on Himachal Pradesh	30	½ Day	Classroom interactive training	2 (one each in 2014 and 2015)	70
Orientation programme 2	Senior Bureaucrats	Module 1: An introduction to climate change and the need for adaptation action with a special focus on Himachal Pradesh (more detailed)	30	1 Day	Classroom interactive training	2 (one each in 2014 and 2015)	60
Level 1 training	Directors/ Chief Engineers in state and districts	Module 1-6 Included but abridged Module 1: An introduction to climate change and the need for adaptation action with a special focus on Himachal Pradesh Module 2: Interpreting climate data and impacts of climate change Module 3: Assessing vulnerability to climate change to undertake adaptation planning Module 4: Identification of adaptation options and selection of measures Module 5: Developing M&E framework Module 6: Building capacity for adaptation to climate change	30	3 Days + 1 day exposure visit ½ Day ½ day ½ day ½ day ½ day ½ day	Classroom interactive training+ exposure visits	4 (Two each in 2014 and 2015)	120

Table 5: Summary of Implementation of the Training Programme

Level of Training	Target Group	Module	No. of Participants per batch	Number of days of training	Method of Training	Number of programmes 2014-15	No. of people trained
Level 2	Mid Level officials+ nominees for trainers from different universities/institutions from HP	Modules 1-6 included. Module 1: An introduction to climate change and the need for adaptation action with a special focus on Himachal Pradesh Module 2: Interpreting climate data and impacts of climate change Module 3: Assessing vulnerability to climate change to undertake adaptation planning Module 4: Identification of adaptation options and selection of measures Module 5: Developing M&E framework Module 6: Building capacity for adaptation to climate change Sectoral module: Understanding climate stresses, vulnerability and adaptation planning relating to existing programmes and projects of various departments at local level such as district, block and village level	30	Total 5 days including field visit ¼ Day ¼ Day ½ Day ½ Day ½ Day ½ Day 2 and ½ days	Through Harvard Case Study methods*	5 Programmes (Three in 2014 and two in 2015) 1 refresher course for selected trainers	150 50

Table 5: Summary of Implementation of the Training Programme							
Level of Training	Target Group	Module	No. of Participants per batch	Number of days of training	Method of Training	Number of programmes 2014-15	No. of people trained
Level 3: Master trainers	Nominees from departments, universities, NGOs, and other institutions of repute	Modules 1-7+field visit Module 1: Understanding key climate stresses and their impacts on activities relating to water resource management, agriculture, forests, biodiversity, eco-tourism, human habitats, human health and energy needs Module 2: Identification of gaps in action taken as part of various programmes and projects that are unable to address these stresses Module 3: Identification of local knowledge available on existing coping strategies and identification of new and additional strategies for adaptation Module 4: Integrating adaptation needs in district/ village planning. This may include technical knowledge through diversification of livelihoods including insurance and capacity building for managing adaptation action Module 5: Developing M&E framework Module 6: Building capacity for adaptation to climate change Module 7: Understanding climate stresses, vulnerability and adaptation planning relating to the existing programmes and projects of various departments at local level such as at district, block and village level	30 1/2 day 1/2 day 1 day 1 day ½ day ½ day 2 days	7 days including field visit	Through the Harvard Case Study Method*	4	120

Level 3 Master trainers- refresher course	Trained master trainers	The content of refresher course will include: -Feedback on trainings conducted by master trainers relating to the content of the training as part of this programme -A refresher course on climate change modelling, impact and vulnerability assessments, developing risk assessment framework for identifying risks, developing appropriate adaptation strategies and actions	30	5	A combination of interactive and classroom	4 refresher courses. To be carried out in 2015	120

*The training can be conducted using the Harvard Case Study method, which conveys teaching messages mainly through interactive practical work by trainees. The training will deal with Himachal Pradesh with situation based on real life conditions and challenges.

All modules will follow the same sequence:

- A training package will be developed which will contain:
  - * Handouts outlining objectives, expected outcomes and a summary of learning points and references for each module
  - * A training manual detailing the tasks for different case works
  - * A trainers' handbook comprising basic participatory training methodologies, and hands-on guidance on training
  - * A library of PowerPoint slides which can be used by the trainers
- Introduction will provide the necessary theoretical background, and introduce participants to the case work
- The case work will enable participants to work through different aspects of climate change adaptation in a systematic manner

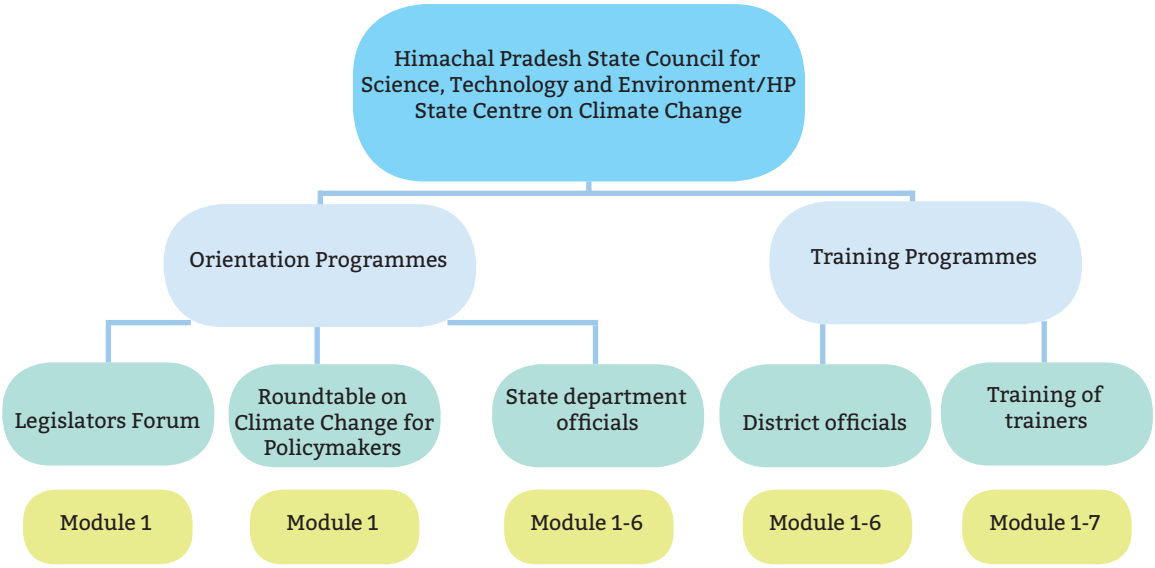

Figure 2: **Structure of Capacity Building Programme in Himachal Pradesh**

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ANNEXURE 1

9. Annexure 1

List of people interviewed

Sector	Department	State Level	Kullu District	Sirmaur District
Water	Deptt of Rural Development	Jitender Sajta Project Director , IWMP Directorate of Rural Development Sh. Robin George Project Director, NRLM & NBA Sh. D.S. Chandel Training Coordinator SLNA Shimla	Sharbh Negi DC Kullu Sh. Kamal Saroch ADM Kullu Sh. Bhanu Gupta BDO Kullu	Name: Sh. Ravinder Rana Designation: Project Officer Department: DRDA Name: Sh. Krishan Dutt Designation: BDO Department: Development Block, Nahan
	Deptt of Irrigation and Public Health	Sh. K.K.Gupta Ex. Engineer IPH Shimla	Name: Sh. Vinay Hazari Designation: Ex- En Department: IPH Kullu	Name: Sh. Layak Ram Designation: Training In charge Department: IPH Nahan
	Deptt of Forests	Sh. H.S. Rana DFO Forest Training Institute Chail Solan	NA	NA
Agriculture/ Horticulture	Deptt of Agriculture	Dr J.C. Rana Director Directororate of Agriculture	Dr. Bihari Lal Sharma Dy. Director District Agricuture Office	Name: Sh. Jagdish Designation: Dy. Director. Department: District Agriculture Department, Sirmour at Nahan Name: Sh. Kulbhushan Designation: Subject Matter Specialist (SMS) Department: Block Level Agriculture office
	Deptt of Horticulture	Gurdev Singh Director Directorate of Horticultutre Sh. M.M. Sharma & S.S. Verma Training Coordinator Directorate of Horticulture	Sh. B.C. Rana Dy. Director District Horticulture Officer Dr Vinay Bharadwaj Block Development Officer Deptt of Horticulture	Dr. Shusheel Kumar Deputy Director Dr. Amit Bakshi Horticulture Development Officer(HDO) Block level Agriculture office
Forestry/ Biodiversity/ Eco Tourism	Deptt of Forests	N	Sh. Kirti Singh Thakur Assistant Conservator of Forests, Kullu Deptt of Forest Conservation Kullu	Sh. Pradeep Sharma, HPFS District Forest Officer Sh. S.R. Rana District Forest Development officer Forest Circle Nahan
	Biodiversity Board	N	N	N
	Tourism	Additional Director HP Deptt of Tourism, Shimla	Dr Meenu Dhiman Deputy Director Tourism, Kullu Sh. Arvind District Tourism Officer Deptt of Tourism, Kullu	N
Note: NA- not applicable, N- Not interviewed				

Sector	Department	State Level	Kullu District	Sirmaur District
Urban Development	Public works	Chief Enigineer, Public Works Deptt, Shimla Sh. Ramesh Chand Senior Research Officer PWD, HP Gov, Shimla	Mr D R Shanin Executive Engineer Public Works Deptt, Kullu Ms. Dinesh Lata Guleria Town Planner Deptt of Country and Town Planning, Kullu	Sh. Ajay Verma Executive Engineer PWD Nahan Sh. Kulbhashan Singh Designation: JE Department: PWD Nahan
	Urban Development	Sh. R.S. Chauhan Training Incharge UD Shimla	Sh. T.S. Thakur SDO MC Kullu	Sh. S. S. Negi Executive Officer MC Nahan
	Deptt of Town and Country Planning	Sh. A.N. Gautam State Town & Country Planner Deptt of Town and Country Planning, Shimla Ms. Anjali Sharma TCPO (HQ) TCP Shimla		
Health	Department of Health and Family Welfare/State Institute of Health and Family Welfare	Principal State Institute of Health and Family Welfare	Sh. Subhash Chader CMO Health department Kullu	N
Hydropower	Directorate of Energy/Power	Sh. S. S. Chauhan AGM, Personnel Department HP Power Corporation Ltd.		
	Him Urja	SH. S.K. Kapila Director HIMURJA		
Disaster Management	State Disaster Management Authority	Name: Dr. R.K. Sood Designation: HoD, Disaster Management Cell Department: HIPA	-	-
	District Disaster Management Authority – Kullu	-	-	-
	District Disaster Management Authority- Sirmaur	-	-	NA
Planning and Finance	Deptt of Planning	-	NA	Sh. Navneet District Planning Officer, District Planning office, Nahan
	Deptt of Finance	-	NA	NA
Knowledge Management	Himachal Pradesh Institute of Public Administration (HIPA)	Satish Chand Sharma Deputy Director HIPA	NA	NA
	State Institute of Rural Dev.	Parvesh Kumar Core Faculty, watershed SIRD	NA	NA
	Deptt of Science and Technology	Hemant Gupta, IFS Nodal officer Council for Science and Technology	NA	NA
Note: NA- not applicable, N- Not interviewed				

Sector	Department	State Level	Kullu District	Sirmaur District
	HPU Shimla	Dr. N.S. Bist Director Population Research Centre, HPU Shimla Dr. Sanjay Sharma & team Faculty Centre for Himalyan Studiess, HPU Shimla	NA	NA
Panchayati Raj	Deptt. of Panchayati Raj	Sh. Kewal Sharma Joint Director Directorate of Panchayati Raj	Sh. Girish Sharma District Panchayat Officer Panchayati Raj deptt, Kullu	Sh. Satish Aggarwal District Panchayat Officer Panchayati Raj Deptt., Nahan, Sirmour
Village			Sh. Kishen Sen Pradhan Village Shamsmi Sh. Karam Chand Thakur Pradhan Village Teju Bhera	
Note: NA- not applicable, N- Not interviewed				

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ANNEXURE 2

10. Annexure 2

Questionnaire for all departments:

All departments managing natural resources and habitats:

- What are the key climate change impacts and associated vulnerabilities relevant to the sector that you are managing?
- Are they being addressed through the various trainings that you are undertaking to implement the programmes aimed at managing the sector?
- If yes - how? And if not, according to you, what elements need to be added in the trainings to address the concerns?

Planning and Finance Department

- Planning Department- Are the processes within the Planning Department ensuring inclusion of climate change concerns in the annual and Five-Year Plans? Are there any criteria set to judge the same?
- Finance Department: Is the Finance Department considering climate concerns as a strategic area where financial prioritization needs to be done?

Questions for the panchayat level

- What are the climate change signals that you are observing?
- How do you think they are affecting your agriculture, horticulture, water availability for agriculture, your health, the energy needs at your home?
- What are the various government programmes that you are accessing?
- How do you think the climate change concerns identified by you are being addressed through these programmes?
- What type of training do you think will be necessary for you to understand the actions required to adjust to these changes?

NOTES FOR READERS

NOTES FOR READERS

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

IHCAP Indian Himalayas Climate Adaptation Programme

Indian Himalayas Climate Adaptation Programme

Swiss Agency for Development and Cooperation
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