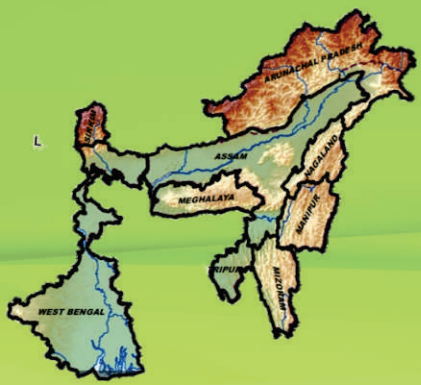
INFORMATION BOOKLET

Department of Science and Technology
Ministry of Science & Technology
Government of India

NMSHE NATIONAL MISSION FOR SUSTAINING THE HIMALAYAN ECOSYSTEM

State Climate Change Cells/Centers for Indian Himalayan Region

N E P A L



October, 2017

Climate Change Programme (CCP)-SPLICE Division,
Department of Science and Technology (DST)
Ministry of Science and Technology,
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FOREWORD

Climate change poses a major threat to humanity and sustainable development and likely to influence frequency and severity of extreme events such as heat waves, drought, heavy rainfall including floods, wind storms, etc. Climate change will have direct and indirect impacts on several socio-economic sectors like agriculture, water, human health, etc. Himalayan region is likely to be threatened much more than Plain areas because they being more fragile and sensitive to global and local anthropogenic changes. This obviously poses concerns for sustenance of Himalayan region. In response to the serious threats posed by climate change to the development process and the limitations that Indian Himalayan Region is facing, the Government of India as part of its comprehensive National Action Plan on Climate Change has a dedicated mission for the Himalayan region, namely the National Mission for Sustaining the Himalayan Ecosystem (NMSHE).

The NMSHE emphasizes on creating knowledge on impacts of climate change and adaptation measures, supporting sub national actions for responding to climate change and strengthening multi-stakeholder platforms for science-policy-practice connect. NMSHE Mission is in its progressive phase, and I am sure in the future, it will develop into a pool of knowledge on which future policy and programmes will rely. I would like to thank the timely inputs from the research teams from the participating institutes who are working under NMSHE Mission.

Climate Change Programme (CCP) of Department of Science and Technology (DST) is coordinating the NMSHE. This report is a step towards consolidating the work which has been undertaken by State Climate Change Cells (SCCC) established at sub-national level in the IHR with support under NMSHE. I hope that it will highlight the efforts of the Government of India and that of the sub national governments in tackling the issues of climate change at the international fora. Climate change programme (CCP), DST would be hosting a specialised side event on "Mountain Ecosystem" at 23rd conference of parties (COP-23) under the United Nations Framework Convention on Climate Change (UNFCCC) Bonn. We are happy to share it with the stakeholders and participants at the India pavilion of the prestigious COP-23.

I wish to compliment the efforts made by the Climate Change Programme, SPLICE Division, DST for bringing out this Information Booklet. I hope this would be useful to the participants of side event organised by DST at the COP-23.

I wish the DST's Side event a grand success

Prof. Ashutosh Sharma
Secretary
October 30, 2017 Department of Science and Technology

CONTENTS

National Action Plan on Climate Change (NAPCC)

National Action Plan on Climate Change emphasizes the overriding priority of maintaining high economic growth rates to raise the living standards. The NAPCC aligns the measures to promote development objectives with co-benefits for addressing climate change effectively. It also advocates strategies that promote, firstly, the adaptation to Climate Change and secondly, further enhancement of the ecological sustainability of India's development measures. India's National Action Plan on Climate Change emphasizes on promoting inclusive and sustainable development strategy sensitive towards climate change so as to protect the poor and vulnerable section of the society. Eight National Missions form the core of the National Action Plan representing multi-pronged, long term and integrated strategies for achieving key goals in the context of climate change. The focus is to promote understanding of Climate Change, framing adaptation and mitigation strategy and promoting energy efficiency and natural resource conservation. While many of these programmes are already a part of the current actions, the Action Plan seeks to enhance them in scope and effectiveness and implement them in an accelerated manner through time bound plans.

The National Action Plan on Climate Change (NAPCC) is a policy document prepared by the Prime Minister's Council on Climate Change. It has been prepared keeping in mind that India's economic need to tap its natural resources needs to be tempered with the need to maintain ecological balance.

The NAPCC is guided by the principles of -

- Protection - of the poor and vulnerable sections of society through what is termed as an inclusive development strategy,
- Achieving national growth - through a qualitative change and economic direction that enhances ecological sustainability,
- Demand side management,
- Better technology - that looks into aspects of mitigation or adaptation,
- Market mechanism - that rewards sustainable development,

- Inclusivity- that invites linkups with civil society and local government institutions

It was found necessary to establish eight national missions which not only espouse to these principles but will form the core of the overall national mission. The technical document, which forms part of the NAPCC, discusses the way forward for each of these missions. These missions are:

- **National Solar Mission:** to increase the share of solar energy (a renewable source of energy) in the total energy mix.
- **National Mission for Enhanced Energy Efficiency:** To boost the efforts taken up under Energy Conservation Act, 2001 for energy saving through efficient use by incentivizing the industries and innovations in energy efficiency area.
- **National Mission on Sustainable Habitat:** to make habitat sustainable through improvements in energy efficiency in buildings, management of solid waste and modal shift to public transport.
- **National Water Mission:** to ensure integrated water resource management helping to conserve water, minimize wastage and ensure more equitable distribution both across and within states.
- **National Mission for Sustaining the Himalayan Ecosystem:** to evolve the management measures for sustaining and safeguarding the Himalayan glaciers and mountain ecosystem.
- **National Mission for a Green India:** To enhance ecosystem services including to carbon sinks to be called Green India.
- **National Mission for Sustainable Agriculture:** to devise strategies to make Indian agriculture more resilient to climate change.
- **National Mission on Strategic Knowledge for Climate Change:** to collaborate national efforts with the international research and technological development.

In order to make India more responsive to Climate change, central government is planning to add four new 'mission' to the National Action Plan on Climate Change (NAPCC). This four mission are related to wind power, coastal resources, waste to energy conversion and impact of climate change on human health. The brief details of the new missions are as follows:

- **Wind Mission:** It is modelled on the National Solar Mission and also

seeks to increase share in renewable energy in India's energy mix. The Wind Mission is likely to be given an initial target of producing about 50000 - 60000 MW of power by the year 2022. There is about 22000 MW of installed capacity of wind energy in the country. Ministry of New and Renewable Energy will look after the implementation of this mission.

- **Mission on Impact of climate change on human health:** To carry out a comprehensive assessment of the effects of climate change on human health in different regions of the country and build the capacities to respond to these and also to health emergencies arising out of natural disasters. Ministry of Health is the working agency for this mission.

- **Mission on India's Coastal Areas:** To prepare an integrated coastal resource management plan to map vulnerabilities along the entire coastline (7200 km long). Ministry of Environment and Forest will look after this mission.

- **Mission on Waste to Energy:** To incentivize efforts towards harnessing energy from all kinds of waste, so as to reduce India's dependence on oil, coal and gas for power production and in turn ensure energy security.

National Mission for Sustaining the Himalayan Ecosystem (NMSHE)

The National Mission for Sustaining the Himalayan Ecosystem (NMSHE) is one of the eight missions under the National Action Plan on Climate Change (NAPCC). NMSHE is a multi-pronged, cross-cutting mission across various sectors. It contributes to the sustainable development of the country by enhancing the understanding of climate change, it's likely impacts and adaptation actions required for the Himalayas- a region on which a significant proportion of India's population depends for sustenance. NMSHE seeks to facilitate formulation of appropriate policy measures and time-bound action programmes to sustain ecological resilience and ensure the continued provisions of key ecosystem services in the Himalayas. NMSHE intends to evolve suitable management and policy measures for sustaining and safeguarding the Himalayan ecosystem along with developing capacities at the national level to continuously assess its health status. Recognizing the importance of scientific and technological inputs required for sustaining the fragile Himalayan Ecosystem, the Ministry of Science and Technology has been given the nodal responsibility of coordinating this mission. However, the mission involves valuable cooperation of Indian Himalayas.

The main goal of NMSHE is to assess scientifically the vulnerability of the Himalayan region to climate change in physical, biological and sociocultural context. NMSHE also aims to build and support capacities at the central and state levels to assess climate change and formulate adequate response measures to the challenges in the Himalayan region. NMSHE seeks to facilitate formulation of appropriate policy measures and time-bound action programme to sustain ecological resilience and ensure the continued provisions of key ecosystem services in the Himalayas. NMSHE intends to evolve suitable management and policy measures for sustaining and safeguarding the Himalayan ecosystem along with developing capacities at the national level to continuously assess its health status. With these broader objectives and goals, the key deliverables of NMSHE are as follows:

- Networking and strengthening of knowledge institutions
- Start of new centers relevant to climate change in the existing institutions in Himalayan states-
  - ➢ Training in areas relevant to the Himalayan ecosystem
  - ➢ Training system for community-based organizations to relate lab findings to real fieldwork
  - ➢ Training of technical experts EIA
  - ➢ Capacity building programmes (training)
- Development of Observational Network to monitor the health of the Himalayan ecosystem
- Regional cooperation with neighboring countries in Glaciology
- Bi-annual advisories to Himalayan Sustainable Development Forum
- Annual thematic status report

NMSHE OBJECTIVES

One of the key aspects under NMSHE is the component of Governance for Sustaining the Himalayan Ecosystem (G-SHE). This focuses on studies and activities oriented towards contributing to policy formulation for the Himalayan region to facilitate evolution of a policy environment which is conducive for climate-compatible sustainable development. For effective implementation of this component, DST is partnering with the Ministry of Environment, Forests and Climate Change (MoEF&CC).

Primary Objective

The most crucial and primary objective of the mission is to develop a sustainable national capacity to continuously assess the health status of the Himalayan ecosystem, enable policy bodies in their policy-formulation functions and assist states in the Indian Himalayan Region (IHR) with their implementation of actions selected for sustainable development.

This integrated objective would require

a. Scientific assessment of the vulnerability of the Himalayan eco system to short and long term variability in the weather and climate in all its dimensions of physical, biological and socio-cultural aspects

b. Research for framing evidence-based policy measures to protect the fragile ecosystem and

c. Time-bound action programmes at state level in the Indian Himalayan Region (IHR) in order to sustain the ecological resilience and ensure the continued provision of key ecosystem services.

Secondary Objectives

Secondary objectives of the National Mission for Sustaining Himalayan Ecosystem identified within the overall primary objective are:

- Networking of knowledge institutions engaged in studies on Himalayan Ecosystem and development of a coherent data base on the geological, hydrological, biological and socio cultural dimensions including traditional knowledge systems on preservation and conservation of the ecosystem
- Detection and decoupling of natural and anthropogenic induced signals of global environmental changes in mountain ecosystems and prediction of future trends on potential impacts of climate change on the Himalayan ecosystem with a sound S&T backup
- Assessment of the socio-economic and ecological consequences of global environmental change and design of appropriate strategies for growth in the economy of the mountain regions and the lowland systems dependent on mountain resources in the region
- Studying of traditional knowledge systems for community participation in adaptation, mitigation and coping mechanisms inclusive of farming and traditional health care systems
- Evaluation of policy alternatives for regional development plans towards sustainable tourism development, water and other natural resource management for mountain ecosystems in the region
- Creation of awareness amongst stakeholders in the region for including them in the design and implementation of the programme
- Assisting the states in the Indian Himalayan Region with informed actions required for sustaining the Himalayan ecosystem

TASK FORECES

In order to address the various technical thematic issues in the Himalayas,

NMSHE has set up six Task Forces with coordinating institutions for each one. The Task Forces will focus on applying knowledge in the larger societal context and knowledge synthesis for policy formulations related to adaptation actions in the Himalayas considering the development needs of the society. A major challenge before the Task Forces will be the development of a report on common framework for integrated risks and hazards and vulnerability assessment, which is particularly needed for the Himalayas.

DST is supporting pan-Himalaya research and development projects. DST has supported the first-of-its-kind Inter-University Consortium on Cryosphere and Climate Change (IUCCC) with participation from four universities. The consortium is undertaking research on climate change impacts on the cryosphere across various Himalayan states. The study focuses on linkages between changes in glacier fields and their impacts on water availability to communities

STATE CLIMATE CHANGE CELLS/CENTRES

NMSHE engages all the 12 states in the Himalayas in spirit of cooperative federalism for the purpose of strengthening their capacities for planning and implementation of climate change adaptation actions, undertaking vulnerability assessment and spreading awareness among the masses on climate change and its likely impacts. The Himalayan states include 10 hill states- Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, and two partial hill states, namely, Assam and West Bengal. Besides funds under NMSHE, technical assistance is also being extended to the states.

This report highlights the details of eleven centers established under DST, NMSHE: viz Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Manipur, Mizoram, Meghalaya and four recently sanctioned cells viz, West Bengal, Nagaland, Arunachal Pradesh and Tripura.

State Climate Change Cell Himachal Pradesh

INTRODUCTION AND BACKGROUND

Himachal Pradesh is a state, which is and will be severely impacted by climate variability and change at a time when it is confronted with development imperatives. The economy of the State is dependent on sectors like the hydro power generation, horticulture, agriculture, forestry and tourism etc. and these sectors are assumed to be under threat in the present scenario of changing climate. Any change in these sectors due to climate change, in every likelihood, will not only going to affect the livelihood prospects in the agrarian economies of mountain regions, but also everyone living down below in the plains/ foothills adjoin areas. The major issues of concern due to the emerging threat of climate change in Himachal Pradesh are:

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

The State of Himachal Pradesh is strongly committed for ensuring all round sustainable development in environmentally sound management systems in the State. To achieve this ambitious goal, Government of Himachal Pradesh has set up institutional framework with available sources, to start with few number of staff, and infrastructure, now the Department is dealing with the challenge of rising its capacities network of scientific and technical terms with adequate infrastructure to tackle the different elements of the ecosystem protection, climate change challenges etc.

STUDY AREA

The State of Himachal Pradesh (HP) lies in the Western part of the Himalayas within India. The area of the state is 55,673 km^2 covering 12 districts spread across mountainous altitudes ranging from 350m to 6,975m. Five main rivers, namely, Ravi, Beas, Chenab, Satluj and Yamuna flow through HP. The rivers Ravi, Chenab and Beas originate from within HP which are glacier as well as rain fed. About 2554 glaciers exist within the state, with an ice cover and ice reserve of 4160 km^2 and 387.0 km^2 respectively.

WEBSITE URL

http://desthp.nic.in/HPKCCC/welcome.html

OUTCOMES SO FAR

- Climate Change Modelling Infrastructure setup.
- Climate Change Vulnerability Assessment for Kullu & Sirmaur district carried out.
- Training and capacity building programming organized.
- Knowledge Network of research institution being setup.

Quantified Outcome in terms of	
a. Research papers published	-
b. Reports/Monographs/ Internal publications brought out	Information brochures on Water, Biodiversity & Agriculture/ Horticulture Sectors.
c. New techniques/models developed, if any	(i) Village level vulnerability assessment for micro level planning with the help of micro-watershed hydrological modelling.

	(ii) Traditional crop seed banking through women groups. (iii) Crop diversification through contract farming with women groups. (iv) Documentation of traditional knowledge on climate change
d. Patents filed/awarded, if any.	-
e. Details of workshop/ conferences/ seminars/ capacity building programmes organised	Details attached at Annexure
f. Number of personnel trained	Details attached at Annexure
g. Number of post-graduate/ doctoral candidates completed their courses	-
h. Foreign deputation/visit of PI/Co-PIs/students, if any	-

Annexure

List of Trainings/ Workshops conducted under NMSHE-Project (SCCC) so far (Chronological order)

S. N.	Title	Date & Venue	Host Organization/ Institute	Nodal Person	Level of Participation/ Stakeholders	No of participants	Tr. Material if any/ Reports Published
1.	Climate Change Knowledge Exchange Programme with North East Himalayan States of Sikkim & Assam	September 18-23, 2016.	Himachal Pradesh Knowledge Cell on Climate Change	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	IFS Officers of Govt. of Assam and Officials of Sikkim	20 Indian Forest Officers of Govt. of Assam & 25 scientists/ participants of from Govt. of Sikkim	Climate Change related published material distributed among participants

2.	Knowledge Exchange programme to facilitate effective ideas and sharing of green growth & climate change technical know-how by Korean experts of Korea Green Growth Trust Fund (KGGTF) & the World Bank.	November 3-5, 2016.	Himachal Pradesh Knowledge Cell on Climate Change	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	Department of Environment, Science & Technology, Urban Development, Forest Department, University	120 Officials of State Government	Climate Change related published material distributed among participants
3.	Training programme to demonstrate best practices of climate change adaptation.	November 5, 2016	Himachal Pradesh Knowledge Cell on Climate Change	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	Sanjauli College, Shimla HP	400 Students of Sanjauli College, Shimla HP	Information pamphlets on Climate Change Adaptation Practices prepared & distributed among participants.

4.	Training programme on Climate Change Knowledge Capacity Building	November 8, 2016	Himachal Pradesh Knowledge Cell on Climate Change	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	Scientist of IHBT Palampur & Agricultural University.	140 scientists	Climate Change related published material distributed among participants
5.	Training workshop on Climate Change Adaptation Measures For Kullu District	November 17, 2016	Himachal Pradesh Knowledge Cell on Climate Change in association with IHCAP	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	District Administration & Stakeholder Department, Institutes & Non-Government Organization	200 participants	Information pamphlets on Climate Change Adaptation Practices prepared & distributed among participants.

6.	Training programme on paving the way for Gender Responsive Adaptation Practices Approach to Combat climate change impacts in Himalayas	March 8, 2017	Himachal Pradesh Knowledge Cell on Climate Change	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	Women of Mahila Mandal & marginalized rural women of Dhamoon panchayat of Shimla HP	130 participants	Boucher on Climate Change Adaptation Practices prepared in regional language & distributed among participants.
7.	Training programme on paving the way for Gender Responsive Adaptation Practices Approach to Combat climate change impacts in Himalayas	March 10, 2017	Himachal Pradesh Knowledge Cell on Climate Change	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	Women of Mahila Mandal & marginalized rural women of Malyana Panchayat of Shimla, Himachal Pradesh.	150 participants	Boucher on Climate Change Adaptation Practices prepared in regional language & distributed among participants

8.	Exposure visit of farmers on technical and scientific demonstration of various physiochemical characteristics of seeds with reference to climate change adaptation to ICAR-Indian Institute of Soil & Water Conservation, Research Centre, Chandigarh & Centre for Aromatic Plants, Industrial Estate, Dehradun, Uttrakhand.	February 28th to March 3rd , 2017 June 28-30, 2017	Himachal Pradesh Knowledge Cell on Climate Change	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	Farmers of Himachal Pradesh	100 farmers	Climate Smart Adaptation Measures for farming demonstrated to farmers.
9.	Traditional Crop seed distribution among women farmers of Dhamun Panchayat	July, 2017	Himachal Pradesh Knowledge Cell on Climate Change	Principal Scientific Officer -cum-Programme Coordinator (HPKCCC)	Women farmers of Dhamun Panchayat , Shimla District	25 women farmers	Climate Smart Adaptation Measures for farming demonstrated to farmers.

State Climate Change Cell
Jammu & Kashmir

INTRODUCTION AND BACKGROUND

The Department of Ecology Environment and Remote Sensing has been given the responsibility to coordinate the implementation of NMSHE in J&K and will be implementing a 5-year project. The Ministry of Science and Technology, Government of India, has sanctioned J & K State Climate Change Centre under NMSHE for implementation of the programme. The Climate Change Centre J & K has been established with an aim to address the need to better understand how to assess and address climate change related risks in state. This Climate Change Centre is mandated with the responsibility of research, data collection, and public awareness in the field of Climate Change. The Climate Change Centre act as a nodal agency to coordinate with line departments on eight national and eleven state missions. The Centre aims to strengthen its capacity as a single window repository of climate change. The Centre is expected from this programme to build human capacity, generate additional resources for the state and facilitate interfacing with national and international agencies to reduce vulnerability of the state, preserving the ecosystem and enhancing resilience.

STUDY AREA

The State of Jammu and Kashmir is located in the north-western extremity of India, occupying central position in the Asian Continent. Geographical expanse of the State covers an area of 2,22,236 km², which constitutes about 6.74% of the total area of the country. Of the above geographical area of the State, 78114 km² are under illegal occupation of Pakistan and 42735 km² under illegal occupation of China. The study is carried out extensively throughout the state of J & K viz., Jammu, Kashmir and Ladakh divisions for vulnerability

assessment, adaptation and mitigation strategies. The State lies between 32º 15′ to 37º 45′ N latitude and 72º 30′ to 81º 15′ E longitude. It is the northern most state of India and is bounded by China in the East, Afghanistan in the North West and Pakistan in the West. The State has great geo-political significance. Towards south are situated the states of Punjab and Himachal Pradesh. The state is approachable only from south.

WEBSITE URL

www.jknmshe-ccc.org

OUTCOMES SO FAR

Quantified Outcome in terms of	
a. Research papers published	1. Satellite based assessment of the catastrophic Jhelum floods of September 2014, Jammu and Kashmir, India IF 2.140 2. Regional and Sectoral Assessment of Greenhouse Gas Emissions in Jammu & Kashmir-India (Submitted) 3. Assessment of methane emissions from livestock enteric fermentation in Jammu and Kashmir(INDIA) 4. Evaluating the variability and trends in extreme climate events in the Kashmir Valley using PRECIS RCM Simulations
b. Reports/Monographs/ Internal publications brought out	1. Detailed Report on 'Emission Inventory of CO_2 in Jammu & Kashmir-A Sectoral Analysis'. 2. Bulletin on 'Biomass and Forests Carbon Stock Assessment in Jammu and Kashmir'. 3. Bulletin on 'Methane Emissions from Solid Waste and Water Wastes in J&K'. 4. Bulletin on 'Emissions from Agriculture and Allied Sectors in Jammu & Kashmir'.

	5. News Letter 'Climate Times' Climate Change Centre- J & K
c. New techniques/models developed, if any	Nil
d. Patents filed/awarded, if any	Nil
e. Details of workshop/ conferences/ seminars/ capacity building programmes organized	20 No (Please refer to Annexure)
f. Number of personnel trained	Curriculum of a course on climate change is being developed with Central University of Jammu and will be inducted soon
g. Number of post-graduate/ doctoral candidates completed their courses	3 No (Post Graduate)
Foreign deputation/visit of PI/ Co-PIs/students, if any	Nil

Annexure

List of Trainings/ Workshops etc. conducted under NMSHE-Project (SCCC) so far (Chronological order)

S. N.	Title	Date & Venue	Host Organization/ Institute	Nodal Person	Level of Participation/ Stakeholders	No of partici-pants	Tr. Material if any/ Reports Published
1.	World Environment Day	5th June 2015	SKUAST-K	Shri Suresh Chug IFS Director DEERS/	Academicians, Bureaucrats, Scientists, Politicians, legislators& Students	300	CC related material distributed among participants
2.	Forest Food Festival	4th Oct., 2015 Rajbagh, Srinagar	Institute of Hotel Management (IHM)	Shri O.P Sharma IFS Director, DEE & R S/ Majid Farooq Coordinator/PI NMSHE	Academicians, Bureaucrats, Scientists, Politicians, legislators& Students	150	CC related material distributed among participants

3.	Science Express Climate Action Special	17th- 20th Nov., 2015Udhampur Railway Station	Department of Science & Technology, New Delhi	Majid Farooq Coordinator/PI NMSHE	Students	100	CC related material distributed among participants
4.	One Day Workshop on "Climate Change Concerns, Adaptation & Mitigation"	24th Nov., 2015 Jammu	University of Jammu	Shri O.P Sharma IFSDirector, DEE & R S/ MajidFarooq Coordinator/PI NMSHE	Academicians, Scientists, Politicians & Students	300	Boucher on Climate Change Adaptation distributed among participants
5.	World Soil day	5th Dec., 2015 Channi Rama, Jammu	Charitable Home for Destitute Children, Jammu	Shri O.P Sharma IFSDirector, DEE & R S/ MajidFarooq Coordinator/PI NMSHE	Children	50	CC related material distributed among participants

6.	International Mountain Day	11 Dec., 2015 Samba	GHSS, Gurah Salathia Samba	Majid Farooq Coordinator/PI NMSHE	Students	100	CC related material distributed among participants
7.	Republic Day Tableau Display	26th Jan., 2016 M.A Stadium, Jammu	JK DEE & RS	Majid Farooq Coordinator/PI NMSHE	Ministers, bureaucrats, Academicians, Scientists, Politicians & Students	5000	CC related material displayed
8.	World Wetland Day	02 Feb., 2016 Suransar Lake	GGM Science College, Jammu	Majid Farooq Coordinator/PI NMSHE	Academicians, Students	100	CC related material distributed
9.	Spring Festival Workshop on Tree Phenology & Climate Change	12th Feb., 2016 Environmental Park Raika, Jammu	Environmental Park	Majid Farooq Coordinator/PI NMSHES	Officials, Students Academicians	100	CC related material distributed among participants

10.	Forest Flower Festival	5th March, 2016	Department of Botany University of Jammu	Shri O.P Sharma IFS Director, DEE & R S/	Academicians, Scientists, Politicians & Students	500	CC related material distributed among participants
11.	Van Paryavaran Mela (Forest Environment Fair) was organized at	19th March, 2016 Environmental Park Raika Jammu	JK DEE & RS	Shri O.P Sharma IFS Director, DEE & R S/ Majid Farooq Coordinator/PI NMSHE	Students, Scholars, Scientists and Forest Officers	500	CC related material distributed among participants
12.	Earth Day, 2016	22 April, 2016 Environmental Park Raika Jammu	JK DEE & RS	Shri O.P Sharma IFS Director, DEE & R S Majid Farooq Coordinator/PI NMSHE	Students, Scholars, Politicians, Scientists and Forest Officers	300	CC related material distributed among participants

13.	Taxonomic Workshop on Different Plant Groups	14th March., 2016 IIIM, Jammu	Indian Institute of Integrative Medicine (IIIM)	Shri O.P Sharma IFS Director, DEE & R S/ Majid Farooq Coordinator/PI NMSHE	Students, Scholars, Scientists and Forest Officers	150	CC related material distributed among participants
14.	World Environment Day	5th June, 2016 Zabarvan Park, Srinagar	JK DEE & RS	Shri O.P Sharma IFS Director, DEE & R S Majid Farooq Coordinator/PI NMSHE	Academicians, Politicians Students, Scholars, Scientists and Forest Officers	500	CC related material distributed among participants
15.	International Mountain Day	11th Dec., 2016 Meeting Hall, DEE & RS	JK DEE & RS	Majid Farooq Coordinator/PI NMSHE	Officials, Scientists Forest Officers	50	CC related material distributed among participants

16.	State Level Inception Workshop on Climate Resilient Sustainable Agriculture for Rain Fed Farming Areas of JK.	04th March, 2017, Agriculture Department, Jammu	Agriculture Department, Jammu	Shri O.P Sharma IFS Director, DEE & R S/ S/ Majid Farooq Coordinator/PI NMSHE	Officials, Scientists Agriculture Officers, Officers	100	CC related material distributed among participants
17.	World Heritage Day 2017 (International Day for Monuments & Sites)	18th April, 2017 Meeting Hall, DEE & RS	JK DEE & RS	Shri O.P Sharma IFS Director, DEE & R S/ S/ Majid Farooq Coordinator/PI NMSHE	Officials, Scientists Forest Officers	30	CC related material distributed among participants
18.	Earth Day 2017	22th April, 2017 Meeting Hall, DEE & RS	JK DEE & RS	Majid Farooq Coordinator/PI NMSHE	Officials, Scientists Forest Officers	30	CC related material distributed among participants

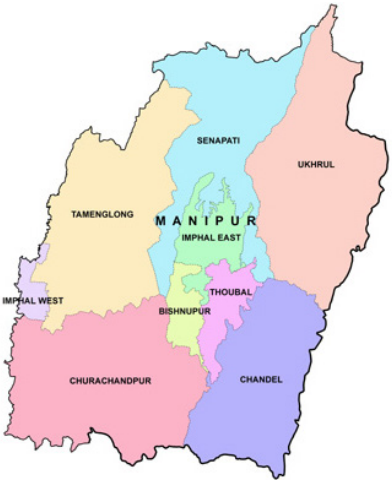
19.	Jammu Mahotsav 2017	April 13 to April 16, 2017, M.A Stadium, Jammu	Department of Tourism	Shri O.P Sharma IFS Director, DEE & R S/ S/	Academicians, Politicians Students, Scholars, Scientists and Forest Officers, Public	2000	CC related material distributed among participants
20.	Training Workshop on Climate Finance and Project Concept Note Preparation	6th October, 2017	JK DEE & RS	Shri O.P Sharma IFS Director, DEE & R S/ S/ Majid Farooq Coordinator/PI NMSHE	HoDs and Nodal Officers of SAPCC	60	CC related material distributed among participants

State Climate Change Cell
Manipur

INTRODUCTION AND BACKGROUND

To meet this need, a dedicated *Climate Change Cell* which function under the roof of Directorate of Environment, Government of Manipur was established in the year 2015 to facilitate and monitor the impact of climate change. This will have a research, advisory and coordinating role on climate change issues. This cell will be a single-window contact for dealing with the state government and other external funding agencies in issues pertaining to uptake of climate change related proposed actions. This will be a multi-stakeholder platform. The center will network with various Central Government Departments like Department of Science and Technology, Department of Earth Science, ICAR, Indian Institute of Tropical Metrology, National Physical Laboratory, Bureau of Energy Efficiency, Forest Research Institute, etc. It will also network with good agencies working on climate change adaptation and mitigation including NGOs, bi-lateral and multi-lateral agencies.

STUDY AREA



The state of Manipur is situated in the northeastern corner of India, with the city of Imphal as its capital. It is bounded by Nagaland to the north, Mizoram to the south, and Assam to the west; Burma (Myanmar) lies to its east. The state covers an area of 22,327 square kilometers located at the latitude of 23°83′N – 25°68′N and longitude of 93°03′E – 94°78′E. Topographically, Manipur may be characterized into two distinct physical regions: an outlying area of rugged hills and an oval-shaped narrow valley. These two areas are distinct in physical features and are conspicuous in flora and fauna. The valley region has hills and mounds rising above the flat surface. The Loktak

lake is an important feature of the valley region. The capital city lies in a valley region which is at an elevation of 790 metres (2,590 ft) above sea level. The state has four major river basins: the Barak River Basin (Barak Valley) to the west, the Manipur River Basin in central Manipur, the Yu River Basin in the east, and a portion of the Lanye River Basin in the north.

The climate of Manipur is largely influenced by the topography of this hilly region which maintain the moderate climatic nature. The maximum temperature in the summer months is 32 °C. In winter the temperature often falls below 0 °C, bringing frost. The state is drenched in rains from May until mid-October and the precipitation ranges from light drizzle to heavy downpour.

WEBSITE URL

http://www.cccellmanipur.com

OUTCOMES SO FAR

- People are more aware of the changing climate due to the workshops, trainings, etc.
- Changes in the agricultural practices, more oriented towards organic farming and sustainable ways.

Quantified Outcome in terms of	
a. Research papers published	
b. Reports/Monographs/Internal publications brought out	Quarterly Newsletter published
c. New techniques/models developed, if any	
d. Patents filed/awarded, if any.	
e. Details of workshop/ conferences/ seminars/ capacity building programmes organized	Attached as Annexure
f. Number of personnel trained	

g. Number of post-graduate/doctoral candidates completed their courses	
h. Foreign deputation/visit of PI/Co-PIs/students, if any	

Annexure

List of Trainings/ Workshops etc. conducted under NMSHE-Project (SCCC) so far (Chronological order)

S. N.	Title	Date & Venue	Host Organization/ Institute	Nodal Person	Level of Participation/ Stakeholders	No of partici-pants	Tr. Material if any/ Reports Published
1.	"One Day Capacity Building workshop with Women society on Role of Women in Climate Change Adaptation"	15th April, 2015 at Manipur University	State Climate Change Cell, Manipur in collaboration with Manipur University		working women from all the districts	65	
2.	Two Days Regional Workshop for North Eastern Region (NER) of India on Climate Adaptation Programme and Sustainable Ecosystem	25-26th April, 2016 Imphal	State Climate Change Cell, Manipur in collaboration with the Ministry of Science and Technology, Government of India				

3.	Workshop amongst the stakeholders and community for development a "Model Carbon positive Eco-Village in Phayeng of Manipur" under National Adaptation Fund for Climate Change (NAFCC)	4th and 8th August, 2016 at Imphal and Phayeng Village	State Climate Change Cell, Manipur in collaboration with NABARD, Regional Office, Manipur		communities		
4.	One Day awareness programme on "Climate Change and Global Warming"	3rd April, 2016 at Laii village	State Climate Change Cell, Manipur in collaboration with CIIRD, Tungjoy and LYSO, Laii				
5.	One Day awareness programme on "Climate Change and Global Warming"	23rd July, 2016 at Tungjoy village	Jointly organised by the Tungjoy Youth & Student Organisation (TYSO) and Centre for Indigenous Integrated Resource Development (CIIRD) under the aegis of State Climate Change Cell, Manipur				

6.	One day training program on Agriculture	22nd June, 2016 at Phayeng	Directorate of Environment		Farmers		
7.	Training on Integrated Pests Management & Integrated Nutrient Management for Paddy Crop	12th August, 2016 at Office of the Pradhan, Phayeng Gram Panchayat, Phayeng			Farmers	66	
8.	Training on Integrated Pests Management & Integrated Nutrient Management for Paddy Crop	16th August, 2016 at Konsang Lampak Community Hall, Phayeng			Farmers	38	
9.	Awareness cum distribution of Plant protection inputs (Pesticides + Fungicides)	21-08-2016 at Phayeng			Farmers	31	

10.	One day training programme on agriculture under Chakpa Phayeng	29-08-2016 at Phayeng			Farmers	21	
11.	Training cum meeting of the beneficiaries at Phayeng Pangamba Mayai Leikai Hall	15-09-2016 at Phayeng			Farmers	35	
12.	Training programme on horticulture	2-10-2016 at Phayeng			Farmers	50	
13.	Training on Improved package of practices of pig husbandry	03-10-2016 at Phayeng				21	
14.	Training and extension programme on 'Plantation under Climatic Adaptation'	20th and 21st August, 2016 at K. Phaizawl village			pineapple cultivators	19	

15.	Three day capacity building workshopon 'Cultivation of winter vegetables with less chemical'	19-21 October, 2016 at ICAR KVK-Imphal West			selected farmers	20	

State Climate Change Cell Mizoram

INTRODUCTION AND BACKGROUND

The Mizoram State Climate Change Cell was created during the year 2014-2015 with the financial support of Department of Science & Technology, Govt. of India under the National Mission for Sustaining Himalayan Eco-System (NMSHE) programme of National Action Plan on Climate Change. It is functioning under the aegis of Mizoram Science, Technology & Innovation Council, Directorate of Science and Technology, Govt. of Mizoram.

Government of Mizoram has taken the climate change issue very seriously. The State action plan on climate has been prepared and adopted. Climate Change Council of Mizoram under the chairmanship of the Hon'ble Chief Minister and the Executive Council on Climate Change under the chairmanship of the Chief Secretary has been created to develop and monitor the state action plan for assessment, adaptation and mitigation of climate change with an objective to monitor the targets, objectives and achievements of the national missions specified by National Action Plan on Climate Change (NAPCC). The respective missions are attended to by the individual departments who shall strive to attain the listed objectives within stipulated time frames and ensure their vertical integration with the National Mission.

STUDY AREA

The study area includes the whole of the state – Mizoram which is a part of North East India. The geographical location is 21°58′ to 24°35′ N Latitude and 92°15′ to 93°29′ E Longitude. The total geographic area of Mizoram is 21,081 km^2, which is 0.6% of the country. The terrain is hilly and mostly undulating with altitude ranging from 500 to 800 m and maximum altitude is 2,157 m. Average annual rainfall is around 2500mm. During winter, the average temperature varies from 11º C to 24º C and in summer from 18º to 29º C. The forest cover is 18,430 km^2 which constitutes 87.42% of the total geographic area. The climate, terrain and heavy precipitation have

resulted in landscape rich semi-evergreen forests. According to Champion and Seth (1968), the forests of Mizoram can be classified as Tropical wet evergreen, Tropical semi-evergreen and Sub-tropical hill forest. The whole state of Mizoram is targeted as the study area, district political boundaries are used as a unit of measurement for the case of vulnerability and risk assessment.

WEBSITE URL

https://www.mistic.mizoram.gov.in/page/climate-change-study-centre

OUTCOMES SO FAR

- Climate exposure for the state of Mizoram has been generated using SimClim 2013.
- Sensitivity impact projection on Water resources and Health is being in progress
- Policy makers and various Govt. Departments personnel have been sensitized through Climate Change Workshop. (Annexure attached)
- Meteorological Data of Mizoram has been collected from various sources, compiled and published.
- Booklet on Climate modelling for Mizoram has been published internally.
- Photo Competition on Climate Change organized to create awareness.

Annexure

List of Trainings/ Workshops conducted under NMSHE-Project (SCCC) so far (Chronological order)

S. N.	Title	Date & Venue	Host Organization/ Institute	Nodal Person	Level of Participation/ Stakeholders	No of partici-pants	Tr. Material if any/ Reports Published
1.	Meeting on Climate Change Project	20th April, 2015 at Chief Secretary's office Chamber, Aizawl	State Climate Change Cell & Dte of Science & Technology	Dr. R.K. Lallianthanga	Line Govt. Departments	16	No
2.	Meeting on Climate Change Project	12th June, 2015 at Chief Secretary's office Chamber, Aizawl	State Climate Change Cell & Dte of Science & Technology	Dr. R.K. Lallianthanga	Executive Council on Climate Change, Line Department	9	No
3.	Meeting on Climate Change Project	10th July, 2015 at Chief Secretary's office Chamber, Aizawl	State Climate Change Cell& Directorate of Science & Technology	Dr. R.K. Lallianthanga	Executive Council on Climate Change, Line Department	17	No

4.	Meeting and Presentation on Climate Change Project	13th August, 2015 at Chief Secretary's office Chamber, Aizawl	State Climate Change Cell& Directorate of Science & Technology	Dr. R.K. Lallianthanga	NABARD, Executive Council on Climate Change, Line Department	19	No
5.	Workshop on impact of Climate Change in Mizoram	7th June 2016 Aijal club	State Climate Change Cell	Dr. R.K. Lallianthanga	Policy makers, Govt. institutions and Departments	38	Yes
6.	Photo Competition on Climate Change	November 2016 to January 2017 Aizawl	State Climate Change Cell & Mizo Photographers Association	Dr. R.K. Lallianthanga	Open for all	-	Yes
7.	Sensitization Workshop on Climate Change in Mizoram	12th April, 2017 At Lunglei Government College	State Climate Change Cell & Lunglei Government College	Dr. R.K. Lallianthanga	Lecturers and Students	107	Yes
8.	Sensitization Workshop on Climate Change in Mizoram	20th April, 2017 At Government Kolasib College	State Climate Change Cell & Government Kolasib College	Dr. R.K. Lallianthanga	Lecturers and Students	109	Yes

State Climate Change Cell Meghalaya

INTRODUCTION AND BACKGROUND

Meghalaya Climate Change Centre (MCCC) has been established in the State under the National Mission for Sustaining the Himalayan Ecosystem (NMSHE), implemented by the Department of Science and Technology (DST), Govt. of India in October, 2015. The Centre is housed in the Meghalaya Basin Development Authority (MBDA) office at Nongrim Hills, Shillong. Under the overall SAPCC framework, initiatives towards creating awareness on climate change, its impacts and adaptation have been taken under the aegis of MCCC for the cross section of stakeholders from different sectors.

National Mission for Sustaining Himalayan Ecosystem has made significant contribution by creating Meghalaya Climate Change Centre (MCCC). The Centre is the focal point of the climate change actions in the State. Awareness activities and studies to build fundamental knowledge on climate change adaptation in the State have already been initiated by the MCCC. With the presence of Senior Scientists from DST, Govt. of India, further guidance on the activities and coordination with other programmes and institutions under NMSHE is expected.

STUDY AREA

Meghalaya, a state of north east India, blessed with all kinds of natural resources, is having natural beauty with undulating rivers, water falls, sparkling mountain streams and is rich in mineral resources. It is spread over an area of 22423 sq Km and lies between 20.1º N and 26.5º N latitude and 85.49º E and 92.52º E longitude. The North eastern part of India is one of the richest regions in the fish biodiversity especially for ornamental fish

(Biswas et al., 2000). The state is having highest length of rivers and canals with stretch of 5600 Km (26.83%) followed by Assam 4820 Km (23.09%) out of total resources under rivers and canal of North eastern states. The state or region enjoys a temperate climate directly influenced by the South – West Monsoon and northeast winter wind. The four seasons of Meghalaya are: Spring (March, April and May) summer (June, July and August) autumn (September, October and November) and winter (December, January and February). The Monsoon usually starts in the month of May and continues till the end of September or middle of October. Maximum rainfall occurs over the southern slopes of the Khasi Hills covering Sohra and the Mawsyneram platform, which receives the heaviest rainfall in the world. The average rainfall in the state is about 12000 mm.

WEBSITE URL

NA

OUTCOMES SO FAR

Quantified Outcome in terms of	
a. Research papers published	
b. Reports/Monographs/ Internal publications brought out	• The Report on 'Meghalaya State Carbon Footprint Study' by CII Sohrabji Godrej Green Business Centre, Hyderabad. • Submitted a news item on 'People's Perception on Climate Change impacts on Agriculture in Meghalaya' for publication by NMSHE Task Force-6 in the Newsletter for the period October-March, 2017. • "Adaptation to Climate Change in Meghalaya" Green Pages Newsletter of Meghalaya Institute of Natural Resources inVol. 2 / No. 2 Edition of Apr-June, 2016, Meghalaya Institute of Natural Resources.

	• "Impacts of Climate Change and Adaptation to it: Perception andTraditional Knowledge of the people in Rural areas of Meghalaya" Green PagesNewsletter of Meghalaya Institute of Natural Resources in Vol. 2 / No. 1 Edition of Jan-Mar, 2016, Meghalaya Institute of Natural Resources.
c. New techniques/ models developed, if any	
d. Patents filed/awarded, if any.	
e. Details of workshop/ conferences/ seminars/capacity building programmes organized	See Annexure
f. Number of personnel trained	
g. Number of post-graduate/doctoral candidates completed their courses	
h. Foreign deputation/ visit of PI/Co-PIs/ students, if any	
i. Pamphlets/ Posters etc.	9 number of Posters developed

S. N.	Research component	Partner Institute	Expert associated
1.	Climate vulnerability hot-spots in Meghalaya	IIT Gandhinagar, Gujarat	Dr Vimal Mishra
2.	Impacts of climate change on Forests and Bio Diversity	IISc, Bangalore	Professor N.H. Ravindranath

3.	Carbon footprint in Meghalaya	CII - Sohrabji Godrej Green Business Centre, Hyderabad	Mr.KiranAnanth
4.	Climate change perception and traditional knowledge of the people in rural areas of Meghalaya	Meghalaya Climate Change Centre, Shillong	Meghalaya Climate Change Centre, Shillong

S. N.	Research component	Study Area
1.	Identification of climate vulnerability hot-spots in Meghalaya using high resolution climate projections	The area under study is the State of Meghalaya
2.	Impact of climate change on Forests and Bio Diversity in Meghalaya	
3.	Carbon footprint Study in Meghalaya	
4.	Impacts of Climate Change and Adaptation to it: Perception and Traditional Knowledge of the People in Rural Areas of Meghalaya	

S. N.	Project	Outcomes
1.	Identification of climate change hot spots in Meghalaya using high resolution climate projections	• Data from CHIRPS captures rainfall variability in Meghalaya and can be used to develop a 5km rainfall dataset for the State. • Based on the analysis of rainfall for the period of 1950-2013, the State experienced declining trends in the monsoon (June to September) and annual rainfall totals after 1980. However, increasing trends in rainfall were observed for the period of 1950-1979. • After 1980, district located in the eastern part of the State experienced significant declines in the monsoon season rainfall.

		• Based on observed temperature data for the period of 1950-2013, the State of Meghalaya experienced warming in the winter, pre-monsoon, monsoon and post-monsoon seasons. Significant increases in air temperature in the monsoon and post-monsoon seasons were observed and the State has witnessed an increase of more than 1^0C in many parts. • Number of hot nights has significantly increased during the period of 1950-2013 in the State. • The five best CMIP5 models were selected to develop climate projections at 5km resolution for four 2.6, 4.5, 6.0, and 8.5 RCPs.
2.	Assessment of the impact of climate change on forests and biodiversity of Meghalaya, and adaptation strategies	• Bio-diversity richness status of the State • Analyse change in forest types of the State • Map the current and inherent vulnerabilities of the forests in Meghalaya • Detailed impact assessment on forest and bio-diversity of Meghalaya at a scale of 25x25 km
3.	Meghalaya State Carbon Footprint Study	• A total GHG emission in Meghalaya during the baseline year of 2012-13 was 2.96 million Tons CO2 Eq. • Detailed sector-wise contribution to the total emission (in Tons of CO2 Eq.) was calculated and Industry sector was found to be the major contributor (56.23%).

		• 80% of emissions in Meghalaya arising out of energy, power and industry related sources. Thus, it is imperative for the State to continue to focus on renewable energy strategy to maintain low carbon intensity and lower its overall emission footprint. • Recommended several mitigation options, based on the current emission profile of the State of Meghalaya.
4	Impacts of Climate Change and Adaptation to it: Perception and Traditional Knowledge of the people in Rural areas of Meghalaya	• So far, the study has been carried out in 163 villages spread over 19 Blocks and 10 Districts in the State. • In this on-going survey, over 706 samples have been collected. • A majority of the respondents across the State agreed to changes in climatic variables. • High percentage of respondents perceived that there has been an increase in the occurrence of natural calamities like drought (60%) and storms (57%). • 55% of respondents observed an increase in the incidences of pest attacks on agriculture. • In some parts of the State, the respondents stated disappearance of certain flora and fauna.

ANNEXURE

List of Trainings/ Workshops etc. conducted under NMSHE-Project (SCCC) so far (Chronological order)

S. N.	Title	Date & Venue	Host Organization/ Institute	Nodal Person	Level of Participation/Stakeholders	No. of participants	Tr. Material if any/ Reports Published
Interactive Sessions with in-line State Government Departments							
1	Interactive Sessions with the Directorate of Agriculture, Shillong, Government of Meghalaya	16.05.2016 Conference Room, MBDA, Shillong	Meghalaya Climate Change Centre (MCCC)	Dr. S. Ashutosh IFS, APCCF &Dy CEO (MBDA), Nodal Officer (SAPCC)	Senior officials from the Dept.	9	Presentation on 'Climate change impact on Agriculture'
2	Interactive Sessions withthe Water Resource Department, Shillong, Government of Meghalaya	08.03.2016 Conference Room, MBDA, Shillong			Senior officials from the Dept.	7	Presentation on 'Climate change impact on Water Resources & its adaptation'

3	Interactive Sessions withthe Animal Husbandry and Veterinary Department, Shillong, Government of Meghalaya	03.02.2016 Conference Room, MBDA, Shillong			Deputy Director, Asst. Director and other senior officials from the Dept.	8	Presentation on 'Climate change and livestock in Meghalaya'
Workshops Organized							
4	One day workshop on **Adaptation to Climate Change in Meghalaya-** ***Knowledge Sharing and Learning***	26.04.2017 Conference Hall, ICSSR-NERC, North Eastern Hill University (NEHU), Shillong	Meghalaya Climate Change Centre (MCCC)	Dr. S. Ashutosh IFS, APCCF &Dy CEO (MBDA), Nodal Officer (SAPCC)	**Chief Guest**DrShreeranjan IAS, Addl. Chief Secretary, GoM. Expert panel members included Prof. O.P Singh and Prof. B.K. Tiwari from Dept. of Environmental Studies, NEHU and Shri L.Shabong, Nodal Officer (Director of Soil & Water Conservation) and Officer on Special Duty (MBDA).	65	Pamphlets for climate change awareness.

					Attended by students at post-graduate and Ph.D. level from across 6 departments in NEHU		
5	One day workshop on '**Climate Change and Green Economy**' to celebrate World Environment Day, 2016	10.06.2016 Shillong College, Shillong, Meghalaya	Meghalaya Climate Change Centre (MCCC)		**Chief Guest** Shri C.P Marak IFS, PCCF, **Guest of Honour** ShriDr. K.D. Ramsiej; Expert panel members included Padma Shri Awardee Shri Patricia Mary Mukhim, Professors from NEHU and Project Director of Climate Change Adaptation – North Eastern Region of India (CCA-NER); Attended by students at graduation level from across 32 colleges of Shillong.	100	Climate change awareness materials (audio-visuals and reading) distributed through CDs and pamphlets

6	One day workshop on '**Adaptation to Climate Change in Meghalaya**'	14.04.2016 Hotel Polo Towers, Shillong, Meghalaya	Meghalaya Climate Change Centre (MCCC)		**Chief Guest** Shri Prestone Tynsong, Hon'ble Minister, Forest and Environment & Climate Change, Govt. of Meghalaya, **Guest of Honour** Shri R.M. Mishra, IAS, Development Commissioner & CEO (MBDA), Meghalaya; Scientists from SPLICE Division, DST, GoI, Senior officials from State Government Departments, Professors from various premier Indian educational institutes and print media.	32	

7	One day workshop on **'Expert Consultation Workshop for Prioritizing Actions under the State Action Plan on Climate Change, Meghalaya'**	13.05.2015 Pine Wood, Shillong, Meghalaya	Dept. of Environment & Forest, GoM & MBDA with technical support of GIZ		Inaugural session was chaired by Mr. K.S. Kropha, Addl. Chief Secretary, GoM; Mr. R.M. Mishra, IAS, Development Commissioner & CEO (MBDA), Meghalaya; Dr. S. Ashutosh, Addl. PCCF, GoM; Dr Uwe Scholz, Project Director, GIZ Climate Change Adaptation NER; Prof. N.H. Ravindranath, Dr Rajiv Chaturvedi, IISc Bangalore; Dr Vimal Mishra, Asst. Prof. IIT Gandhinagar; Directors and senior officials from State Government Departments;	65	

					Professors from various premier Indian educational institutes and print media.		

State Climate Change Cell Sikkim

INTRODUCTION AND BACKGROUND

Sikkim State Climate Change Cell is established in October 2014 under Sikkim State Council of Science and Technology, an autonomous organisation of Department of Science and Technology, Government of Sikkim. The Cell is established under National Mission for Sustaining the Himalayan Eco-system (NMSHE), one of the missions under National Action Plan on Climate Change, supported by Department of Science and Technology, Government of India.

The State Cell is presently engaged in database generation for vulnerability assessment on the impact of Climate Change in different areas including rural and urban vulnerability, agricultural vulnerability, human health vulnerability etc. It will help in prioritizing Climate Change Adaptation programme in the state.

The meteorological data is one of the most important component of vulnerability mapping. In Sikkim, the long term meteorological database is available only for two stations of IMD in Gangtok and Tadong in East Sikkim. The database is available for the period of around 49 years from the year back 1966. The State Cell has approached National Data Centre of Indian Meteorological Department at Pune requesting for the available meteorological data in consultation with the IMD Sikkim. At present the IMD Sikkim has around 16 weather monitoring stations in Sikkim. But so far the state Climate Change Cell has not received the data.

STUDY AREA

Sikkim is a small State, nestled in the lap of the Himalayas and bounded by some of the highest mountain peaks. Sikkim joined in the Indian union as 22nd State on 16 May 1975. It is located between 27º04'46" to 28º07'48" North latitudes and 88º00'58" to 88º55'25" East longitudes covering an area of 7096 sq.km. With peace and calmness Sikkim derived from a

Limboo word 'su-him', which means happy house, Lepchas refer as paradise, Bhutias call it valley of rice; while Nepalis call it abode of the god. The world third highest mountain Kanchendzonga is located in Sikkim and it is one of the youngest states within the Indian union.

Sikkim is a unique mountainous state bounded by three different international borders with Nepal, Bhutan and China which lie in its West and shares its national borders with Darjeeling district of India. Sikkim is situated in upper part of Tista basin. It extends approximately 114km from North to South and 64km from East to West with altitude ranging from 300 to 8598m.

WEBSITE URL

http://www.dstsikkim.gov.in/SIKKIM%20STATE%20CLIMATE%20CELL.html

OUTCOMES SO FAR

- Consultation workshop of Stakeholders for the preparation of Action Plan for implementation of National Mission for Sustaining Himalayan Ecosystem (NMSHE), Gangtok, Sikkim: 20th November 2015.
- A three days long State level Media Workshop on "Climate Change reporting in the Himalayas" jointly organized by Department of Science and Technology and Climate change, Govt of Sikkim and Centre for Media Studies New Delhi in collaboration with IHCAP-SDC and DST, GOI was held in Sikkim from March 25 to 27, 2017.

Quantified Outcome in terms of

Date	Senior Secondary School Venue	District	No of Participants
17th March 2017	BiraspatiParsi , Ranipool	East District	150
18th March 2017	KalzangGyatso, Kabi	North District	120
19th March 2017	Mamring&Dikling	East District	140, 180
20th March 2017	Rumtek	East District	250
21st March 2017	Yangyang	South District	140
22nd March 2017	Yuksom&Kechopaldri	West District	200, 180
23rd March 2017	Tashiding	West District	120
24th March 2017	Dentam	West District	80
25th March 2017	VCGL,Ravangla	West District	350
28/March/2017	HeeGyathang	North District	150
29/March/2017	Sadam	South District	140
30/March/2017	Sonamati Devi Memorial, Khamdong	East District	80
31/March/2017	Phodong	North District	200
Total			**2480**

State Climate Change Cell Uttarakahand

INTRODUCTION AND BACKGROUND

Though the SCCC, Uttarakhand was established only in 2016, the center has been able to make significant advances over the period of 14 months as outlined below. The institution of SCCC has been supplemented with supporting institutions such as, Climate Action Group (CAG), Sectoral Working Groups on Climate Change (SWGCC), and Knowledge Management Group (KMG). The State is now in a position to integrate the Climate Actions into the development planning process incorporating SDGs and INDCs. In the process, there has been awareness raising and capacity enhancement of major stakeholders.

The State in collaboration with Climate Development Knowledge Network (CDKN) and other partners have now developed Climate Vulnerability and Risks Assessment (VRA) for the entire state to the level of Blocks. The State Climate Change Centre (SCCC) with support from various partners has formulated Climate Actions which emphasize integration of UAPCC, VRA, Sustainable Development Goals (SDGs) and Intended Nationally Determined Contributions (INDCs). Figure highlights multi-level policy context for the Agenda for Climate Action. Sectoral Working Groups on Climate Change (SWGCC) with a total of 22 members representing four sectors - Water, Energy, Forests and Disaster to focus upon initiating Climate Actions within the respective sectors.

Knowledge Management Group (KMG) consisting of 8 members to initiate the process for the establishment of the Climate Knowledge Portal (CKP). It will work towards developing and managing the CKP and includes representatives of State agencies/ institutes such as USAC, UCOST and others.

STUDY AREA

Uttarakhand with an area of about 53,483sq.km borders Tibet to the North, Nepal to the east, the plain of Uttar Pradesh to the west Himachal Pradesh to the north west. It comprises of two main hilly region Garhwal and Kumaon

which is connected by the flatlands called the Tarai in the base. Uttarakhand extends from 28º43″N to 31º27″N longitude 77º4″E to 81º01″E latitude. According to the 2011 Census of India. Uttarakhand has population of 10,116,752, making it the 19th most populous state in India It is blessed with rare bio-diversity, inter-alia, 175 rare species of aromatic & medicinal plants are found in the state. It has almost all major climate zone, making it amenable to a variety of commercial opportunities in horticulture, floriculture and agriculture. It has a vast tourism potential in adventure leisure and eco-tourism.

WEBSITE URL

http://sccc-uk.org/

OUTCOMES SO FAR

- The Climate Change Vulnerability and risk analysis has done in 95 blocks in 13 districts in Uttarakhand with mid and end century projections for the key sector. There Climate Action Agenda constitute the basis for integrating Climate action into the development planning process

Quantified Outcome in terms of:

a. Research papers published	**Not Applicable for this year**
b. Reports/Monographs/Internal Publications brought	The reports that have been compiled and published are; 1. Uttarakhand State Action Plan on Climate Change (UAPCC) – **500 copies *(Published only)*** 2. Handbook on UAPCC – **500 copies – Compiled and published** 3. Reports on Vulnerability and Risk Analysis –**80 copies each for 4 deliverables.**

c. New techniques/models developed, if any	Not Applicable for this year
d. Patents filed/ awarded, if any.	Not Applicable
e. Details of workshop / conferences / seminars / capacity building programmes organized	Several workshops and conferences were conducted on climate change sensitization- 1. Media and Climate Change Sensitization workshop 2. Sensitization workshop on Energy and Climate Change 3. Sensitization workshop on Disaster and Climate Change 4. Sensitization workshop on Water and Climate Change 5. State Council on Climate Change 6. Sensitization workshop on Forest and Climate 7. A work shop on Linking Risk Vulnerability Assessment to Policy for Action
f. Number of personnel trained	Process Initiated
g. Number of Post-graduate/ doctoral candidates completed their courses	Not applicable
h. Foreign deputation/visit of PI/ Co-PIs/students, if any	Not Applicable

ANNEXURE

List of Trainings/ Workshops etc. Conducted under NMSHE-Project (SCCC) so far (Chronological order)

S. N.	Title	Date & Venue	Host Organization / Institute	Nodal Person	Level of Participation/ Stakeholders	No.	Tr. Material if any / Reports Published
1.	Media and Climate Change Sensitization workshop	May 2016, Dehradun	UNDP	Mr. R.N. Jha, CCF, Environment & Climate Change, Uttarakhand	Media Personnel from various agencies operating in the state	47	
2.	Sensitization workshop on Energy and Climate Change	August 2016, Dehradun	UNDP	Mr. R.N. Jha, CCF, Environment & Climate Change, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	29	

3.	Sensitization workshop on Disaster and Climate Change	August 2016, Dehradun	UNDP	Mr. R.N. Jha, CCF, Environment & Climate Change, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	50	
4.	Sensitization workshop on Water and Climate Change	August 2016, Dehradun	UNDP	Mr. R.N. Jha, CCF, Environment & Climate Change, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	26	
5.	**State Council on Climate Change**	September 2016, Dehradun	Secretariat, Uttarakhand	Mr. R.N. Jha, CCF, Environment & Climate Change, Uttarakhand	HoDs, Additional Secretaries, PCCF/s, representatives of International Organisations. The meeting was chaired by Chief Secretary	47	

6.	Sensitization workshop on Forest and Climate	September 2016, Dehradun	UNDP	Mr. R.N. Jha, CCF, Environment & Climate Change, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	32	
7.	A work shop on Linking Risk Vulnerability Assessment to Policy for Action (X2)	October-November 2016, Dehradun	CDKN and Acclimatise	Mr. R.N. Jha, CCF, Environment & Climate Change, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	33+ 39	
8.	Towards Implementation of INDCs: Achievements and Opportunities	2 Feb 2017, Madhuban Hote	SCCC	Aditi Paul, CDKN Mihir Bhatt, CDKN Anu Jogesh, Acclamatise R.N. Jha, SCCC	Stakeholders and Departmental/ Institutional representatives/ HoDs		

9.	Meeting of the Working Groups on Strengthening State Strategies for Climate Actions	19 April 2017, Hotel Pacific	SCCC	Dr. Satpathy, UNDP R.N. Jha, State Climate Change Centre, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs		
10	Assessment of Energy Sector actions on Renewable Energy and Energy Efficiency in Uttarakhand	19 May, 2017, Hotel Madhuban	SCCC & UNDP	Mr. R.N. Jha, State Climate Change Centre, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	94	
11	Workshop on Global Climate Change	22 May 2017, Forest Headquarter	SCCC	Mr. R.N. Jha, State Climate Change Centre, Uttarakhand	British Columbian Students/SCCC-Research Unit		
12	Ground Truthing of VRA for five districts	14 July, 2017, Hotel Madhuban	SCCC	Mr. R.N. Jha, State Climate Change Centre, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	90+	

13	A Work shop on Strengthening Resilience to Climate Change Related Disaster Risk	21 July 2017, Hotel Madhuban, Dehradun	UNDP	Mr. Jairaj, PCCF(Projects), Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs, PCCFs, The Workshop Chaired by Chief Secretary and Chief Guest CM U.K.	100+	
14	Himalayan Diwas	9-10 September 2017, Hotel Solitaire, Dehradun	Govt. of Uttarakhand	Arun B. Shrestha, ICIMOD Dr. P.C. Tiwari, Kumaun University Divya Mohan, IHCAP	Stakeholders and Departmental/ Institutional representatives/ HoDs, PCCFs, The Workshop Chaired by Chief Secretary and Chief Guest CM U.K.		

15	Develop Monitoring and Evaluation Framework of State Action Plan on Climate Change (SAPCC)	12 September 2017, Forest Headquarter	SCCC	Mr. R.N. Jha, State Climate Change Centre, Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	25	
16	Capacity Building workshop on Rainwater Harvesting technique and Spring Rejuvenation for Building Water Security in the state	21 September 2017, Rautke Beli Inter College, Mussoorie – Suakholi – Uttarkhashi Road	SCCC	Heads of Departments of water sectors, Govt. of Uttarakhand	Stakeholders and Departmental/ Institutional representatives/ HoDs	20	

State Climate Change Cell
West Bengal

INTRODUCTION AND BACKGROUND

The Department of Environment is the nodal department for all climate change related activities. A Climate Change Cell has been set up in the Department of Environment. The Climate Change Cell is co-ordinating the Climate Change related activities among different line departments, facilitating upcoming programmes under various missions and maintaining liaison with the nodal persons from respective departments, which are identified as nodal agencies for execution of various projects under different mission.

Department of Science & Technology GoWB (DST) is the nodal agency for carrying out the projects under NMSHE and the Climate Change Cell of DoE, GOWB is closely working with state DST to realise the proposed vulnerability study.

STUDY AREA

In the north of West Bengal: Darjeeling, Jalpaiguri, Alipurduar and Cooch Bihar are the constituent districts of the hilly and terai region of the Himalaya and are anticipated to face the maximum and immediate adversities due to change in climate. The hilly regions of Darjeeling primarily belong to core Himalaya region and is, therefore, selected for the present assessment of vulnerabilities and preparation of adaptation strategies. Darjeeling is the northernmost district of West Bengal. It is located in the eastern Himalayas at an altitude of 6710 feet, extending from 27º 13′ N to 26º 27′N latitude, and

88º 53'E to 87º 59'E longitude covering an area of 3149 Sq. Km. The district is bounded by state of Sikkim in the north, Nepal in the west and Bhutan on the northeast. Geographically the district can be divided into two broad divisions, the hills which are a part of the eastern lower Himalayas and a stretch of the territory lying along the base of the hills known as Terai.

WEBSITE URL

NA

OUTCOMES SO FAR

Data generation yet to be started; Renovation of office along with laboratory is under progress, expected to be completed shortly. There after project will be functional.

State Climate Change Cell
Nagaland

INTRODUCTION AND BACKGROUND

Ministry of Environment and Forests, Government of India and GIZ India, the German Technical Aid agency, provided the financial resources and support by appointing International Resources Group Systems South Asia Pvt. Ltd (IRGSA), who helped in sensitizing the officers, doing the initial field visits and analyzing the government programmes and policies. The Nagaland SAPCC recognizes that the currently available evidence base, vis-à-vis climate change and its impacts on the State, its economy, and its various sectors and communities, is very limited. On this front, the Nagaland SAPCC seeks to fulfill the following outcomes (which are linked to the overall Knowledge Management Strategy under the Nagaland SAPCC):

- Development of detailed climate vulnerability and risk analyses covering all districts, as well as specific analyses pertaining each of the sectors addressed in the Nagaland SAPCC
- Collation of available scientific information and data on climate change pertaining to the State

STUDY AREA

Nagaland is a constituent state of North East India located between latitudes of 25°**06**′ to 27°04′ N and longitudes of 93°21′ to 95°15′ E. The area covered by the state is 1.66MHa. The total percentage of the area as compared to India is 0.50%. The state is bounded by Assam in the north and west; Myanmar and

Arunachal Pradesh in the east and Manipur in the south. The physiography of the state is characterized by elevated ridges and intermountain valleys. The topography of the state is highly undulating with elevation varying from 160 m to 3841 m above mean sea level. In Nagaland state 72 soil families were identified. The average annual rainfall of the state varies from 859.97mm to 2123mm. More than 60.73% of rainfall occurs during monsoon i.e. June to September. Average annual temperature ranges from 18-20°C for higher altitudes and 23-25°C for lower altitudes.

WEBSITE URL

NA

OUTCOMES SO FAR

Seminar conducted by NASTEC: 5th June 2017. Capacity Building on Climate Change with the theme "The need for Climate Change research in India" Kohima, Nagaland.

State Climate Change Cell
Arunachal Pradesh

INTRODUCTION AND BACKGROUND

Department of Environment and Forests, Arunachal Pradesh acted as the State Nodal Agency for the preparation of SAPCC. A State Steering Committee (SSC) was constituted under the chairmanship of the Chief Secretary. Other members in the SSC included Principal Secretaries/ Commissioners/ Secretaries of the various line departments, research institutions, NGOs, academia and the WWF (India). Thereafter, the line departments dealing with the sectors sensitive to climate change constituted the sectoral Working Groups (WGs), with one person designated as the Nodal Officer (NO) of the sector.

To synergize sustainable development and adaptation to climate change, a list of programmes and policies, as perceived by the State, have been identified by state sectoral departments. The newly formed Arunachal Pradesh Climate Change Cell will have a more focused approach to adaptation and mitigation of climate change.

STUDY AREA

Arunachal Pradesh lies between the 26º28′ N and 29º30′N latitudinal and 91º30′E and 97º30′E longitudinal extents. The indigenous tribal people originated with Tibeto-Burmese genealogy are believed to be migrated into the territory in search of agricultural land. The art of cultivation was known to them and they had led their livelihood basically on abundant forest resources. Apart from grazing, hunting, gathering, fishing and weaving, they used to practice shifting cultivation,

a very much crud form of agriculture, which is also known as slash and burn method. On the other hand, the territory was blessed with rich natural resources. Even at the present figure, 62.5% of the total geographical area has forest coverage (Mandal, 2009). The most sparsely populated territory of the country is the abode of a number of flora and fauna that provides a flourishing biodiversity heritage for the region as well as for the country as a whole.

State Climate Change Cell
Tripura

INTRODUCTION AND BACKGROUND

The Department of Science, Technology and Environment has been notified as the Nodal Department in the month of June, 2008 to handle all issues regarding Climate change and Clean development mechanism (CDM) in the state. An Inter-Departmental Committee on Climate Change was constituted with members from Planning, Power, Agriculture, Forest, P.W.D, Urban development and Science, Technology & Environment Department to draw out a road map on Climate Change issues. The newly formed Tripura Climate Change Cell will have a more focused approach to adaptation and mitigation of climate change.

STUDY AREA

Tripura is a state in North-East India which borders Bangladesh, Mizoram and Assam. It is surrounded by Bangladesh on its north, south and west: the length of its international border is 856 km (84 per cent of its total border). It shares a 53 km long border with Assam and a 109 km long border with Mizoram. The state is connected with the rest of India by only one road (NH-44) that runs through the hills to the border of Karimganj District in Assam and then winds through the states of Meghalaya, Assam and North Bengal to Calcutta.

The State of Tripura is located between 22º56′ and 24º32′ North latitude and between 90º09′ and 92º20′ East latitude. Tripura is a landlocked State. The total length of its border is 1018 km. It is connected with the mainland through Assam over a small strip of border of 53 km characterized with unfavorable terrain.

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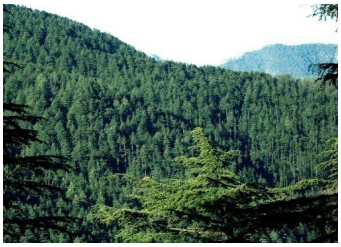
- State Climate Change Cell Meghalaya (SCCC-Me)
- State Climate Change Cell Sikkim (SCCC-S)
- State Climate Change Cell Uttarakhand (SCCC-UK)
- State Climate Change Cell West Bengal (SCCC-WB)
- State Climate Change Cell Nagaland (SCCC-Na)
- State Climate Change Arunachal Pradesh (SCCC-Ar)
- State Climate Change Cell Tripura (SCCC-Tr)



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