

Act For Himalayas

मंथन हिमालय

“SECURE HIMALAYA - SAFE INDIA”
“सुदृढ़ हिमालय - सुरक्षित भारत”

SUMMARY REPORT

Himachal Pradesh Climate Change Conclave 2021

Glacier to GLOF | Impact of Climate Change & Disaster Risk Reduction

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Himachal Pradesh Climate Change Conclave 2021

Glacier to GLOF | Impact of Climate Change & Disaster Risk Reduction

18th and 19th December 2021 | Shimla



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Event Summary

The need to reduce the impacts of climate change & disasters risks by way of systematic efforts has been gaining recognition and commitment among Governments, nationwide. Climate Change & Disaster Risk Reduction is a cross-cutting developmental issue and therefore requires the highest level of political & legal commitment apart from expert level inputs. Knowledge sharing and networking amongst partners can play an important role to build communities more resilient towards climate change induced disaster risks and its mitigation. The Department of Environment, Science & Technology (DEST), Government of Himachal Pradesh under "Climate Adaption & Finance in Rural India (CAFRI)" an Indo-German technical cooperation project with the Ministry of Environment, Forest & Climate Change (MoEFCC), GoI & Government of Germany organised a two-day conference focusing on reducing climate change induced risks and vulnerabilities due to GLOF-Glacial Lake Outburst Floods in Himalayas.

This two-day event held in Shimla focused on reducing climate change induced risk and vulnerability. Titled "Secure Himalaya - Safe India", "सुदृढ़हिमालय – सुरक्षितभारत", the conference majorly discussed GLOF (Glacial Lake Outburst Floods) in Himalayas, climate risk, community preparedness, the role of financial institutions, and climate change action plan in the region to reduce climate-induced risks.

The programme started with a high-level inaugural session followed by two important Technical Sessions with eminent experts from the field focusing on Climate Hazard Risk and Vulnerability in North-Western Himalayas and GLOF in the Himalayas. The Additional Chief Secretary (Environment, S&T, Finance & Planning), Govt. of H.P., the Chief Patron of the programme followed by experts, speakers from DST, NDMA, DG CDRI, Director SECMOL, Ladakh. The German Ambassador to India and Hon'ble Chief Minister in the inaugural session laid the ground for the conference and highlighted some of the key aspects of climate-induced vulnerability and risks in the state and the appropriate policy responses. Technical Session I focused on Climate Hazard, Risk and Vulnerability in North Western Himalayas, on important concerns discussing hydrometeorological disasters and associated risks in the Indian Himalayan Region (IHR) and mainstreaming differential vulnerability of Himalayan ecosystem and climate change. Technical Session II focused on Glacial Lake Outburst Floods in Himalayas (GLOF) and also included the experience sharing from Eastern & Western Himalayan Regions.

The second day of the Himachal Pradesh Climate Change Conclave (HPCCC) had three technical sessions followed by the concluding session to come out with a resolution of the conclave. The technical session III, IV & V discussed the Approaches for Mainstreaming





Group photo: Hon'ble CM Shri Jairam Thakur, German Ambassador Mr. Walter J. Lindner, Mr. Sonam Wangchuk, key speakers, and personnel of GIZ at HPCC Conclave 2021.



Titled “**Secure Himalaya - Safe India**”, “**सुदृढ़ हिमालय – सुरक्षित भारत**”, the conference majorly discussed GLOF (Glacial Lake Outburst Floods) in Himalayas, climate risk, community preparedness, the role of financial institutions, and climate change action plan in the region to reduce climate-induced risks.

CCA & DRR at subnational level, Risk Preparedness and Community Response and Financial Instruments for Climate Change and Disaster Risks. Programs like Carbon Finance for Afforestation programmes, Climate Risk Financing, and Modern Insurance Based Solutions were discussed as subtopics. Various financing tools for addressing climate & disaster induced risks through insurance-based solutions were deliberated upon with its limitations.

The takeaways from all the technical sessions were compiled and released in the shape of 14 pointer way forward during the valedictory session titled “Conclave’s Resolution 2021”. Apart from this, during the conclave state also released the poster on revised HP SAPCC’s contribution to the state Sustainable Development Goal (SDGs) and factsheet on CAFRI Project.



1

INAUGURAL SESSION

On Chair

- Hon'ble Chief Minister, Mr. Jai Ram Thakur, HP
- Mr. Walter J. Lindner, German Ambassador to India
- Mr. Sonam Wangchuk, Director, Himalayan Institute of Alternatives Ladakh
- Mr. Prabodh Saxena, IAS, Additional Chief Secretary (Env., S&T, Finance & Planning)
- Mr. Kamal Kishore, Member Secretary, NDMA and Acting DG, CDRI
- Dr. Akhilesh Gupta, Sr. Advisor, DST, Gol
- Mr. Sudesh Kumar Mokhta, IAS, Director, Env., ST & SDMA

Overview

Inaugural Session of HPCC Conclave 2021 SECURE HIMALAYA – SAFE INDIA with an objective of reducing climate change induced risks & vulnerabilities due to GLOF-Glacial Lake Outburst Floods in Himalayas took place on 18th Dec 2021 with welcome of the dignitaries to deliberate on a roadmap to make the Himalayas climate-change & disaster risk resilient.

Hon'ble Chief Minister of Himachal Pradesh Mr. Jai Ram Thakur, inaugurated the conclave in presence of the German Ambassador to India, H.E Mr. Walter J. Lindner. Mr. Prabodh Saxena, IAS, Additional Chief Secretary (Env, S&T, Fin, Planning) set the agenda for two days conclave with his opening remarks followed by expert addresses by Dr. Akhilesh Gupta, Senior Advisor, Department of Science & Technology, Government of India, and Mr. Kamal Kishore, Member Secretary, NDMA cum- Acting DG, CDRI and Mr. Sonam Wangchuk, President, Students' Educational and Cultural Movement of Ladakh. Hon'ble Chief Minister and German Ambassador to India virtually laid the foundation stone for the Digital Climate Change Reference Centre, released the State Action Plan on Climate Change (Version II)2021-2030, and the Guidelines for Himachal Pradesh Knowledge Network on Climate Change and Disaster Risk Reduction followed by launching of the project Climate Adaptation and Financing in Rural India (CAFRI) in Himachal Pradesh.

All the expert speakers highlighted the need to join hands together to address the impacts of climate change in the Himalayas. Experts lauded the timing of the conclave and hoped that the knowledge networking will be strengthened with deliberations during the conclave and would result in creating a roadmap for addressing the adverse impacts of climate change and disaster risk reduction in the Himalayan region.



Galaxy of experts, professors and scientists have joined us from all over the world and representatives of more than 14 states govt., to primarily discuss prevention and mitigation of climate change-induced risks in the Himalayas and how to handle the GLOF related impacts.

Mr. Prabodh Saxena

IAS, Additional Chief Secretary (Env., S&T, Finance & Planning)

During the inaugural session the discussion points were emerged from:

1. Opening notes from Mr. Prabodh Saxena, IAS, Additional Chief Secretary (Env, S&T, Fin, Planning), followed by our moderators, chairpersons, and experts.
2. Expert speeches of DST, NDMA & Director SECMOL for addressing and reducing climate change induced risks & vulnerabilities due to GLOF-Glacial Lake Outburst Floods in Himalayas.

Key Takeaways from the inaugural session includes:

Mr. Prabodh Saxena, IAS, Additional Chief Secretary (Env, S&T, Fin, Planning) highlighted that prevention and mitigation of climate change-induced issues is the goal of this two-day conclave. Dr. Akhilesh Gupta, Senior Advisor, Department of Science & Technology, Government of India pointed out the emergence of multi-extreme events in the Himalayas. He emphasised on the need for a multi-hazard warning system that can address climate hazards, with improved Centre-State coordination. Mr. Kamal Kishore, Member Secretary, NDMA and Acting DG, CDRI brought forth 6 steps Himalayan states must take for improved climate action:

1. States must be empowered for disaster response with capacity-building by NDRF
2. Communities are the first line of defence and hence extensive capacity-building must be undertaken at the community level

3. All infrastructures must be protected and made climate and disaster resilient
4. Risk reduction measures to be implemented in all hill towns
5. The state disaster and a climate action plan to be integrated and work jointly towards climate and disaster resilience
6. Sound scientific research should be undertaken at the local level



ee Himalayan states must be empowered for disaster response with capacity building by NDRF. The first line of defense must be at the state & community level. The State Disaster & Climate Action Plans must be combined for greater effect.

Mr. Kamal Kishore

Member Secretary, NDMA and
Acting DG, CDRI



ee Institutional Knowledge sharing is the key to ensure tangible impacts in climate change adaptation & mitigation.

Dr. Ashish Chaturvedi

Director, CC, GIZ





Mr. Sonam Wangchuk

Mr. Sonam Wangchuk spoke about the importance of eco-literacy, especially in mountain states like Himachal Pradesh and Ladakh, because real solutions emanate from the areas which are impacted most by these issues. He states, *“We have to come up with original, fundamental solutions for mountainous regions since the challenges and lives are different from those living in New Delhi or New York.”* He stressed on the need of improvement in existing educational/institutional set up with emerging challenges by building upon the knowledge that we have.



H.E Mr. Walter J. Lindner

H.E Mr. Walter J. Lindner, German Ambassador to India lauded the Indo-German cooperation for a better world, especially with regards to climate action. He mentioned how critical it is to reach out to communities in rural areas as they are not responsible of actual change but bear the direct consequences of natural hazards. He made an impactful statement that, *“Climate change manifests in different ways, and support from developed countries is required for developing countries. Germany and India have a long-standing cooperation on climate change including in Himachal Pradesh including forestry, hydropower, and agriculture among others.”*



Need to protect the world for our future generations. In the race towards progress, he spoke about how development is important, but it should not be at the cost of the environment. He hoped that through collaboration and cooperation, we can move forward towards more successful & effective climate action. Further, emphasizing on the adverse impacts of GLOF by saying, *“Glaciers are an integral part of Himachal Pradesh’s ecosystem and are under threat; we should be prepared to protect them or else we will be putting our present and future generations under great risk.”*

Chief Minister Mr. Jai Ram Thakur,
Government of Himachal Pradesh





2

TECHNICAL SESSION I CLIMATE HAZARD, RISK AND VULNERABILITY IN NORTH WESTERN HIMALAYAS

This session was Chaired by Dr Akhilesh Gupta, Senior Advisor, DST, Govt. of India and Dr Anil Kr Gupta, Prof. & HoD, NIDM, New Delhi and moderated by Dr Ashish Chaturvedi, Director-Climate Change, GIZ. In the session following were the expert specialists:

- Prof A.K. Gosain, Emeritus Professor, IIT Delhi, Water Resources Engineering and GIS Expert (virtually) spoke on Impacts of climate change on Indian (North west) Himalayan Region and future of river basins.
- Dr. Kamna Sachdeva, Associate Professor, Department of Natural and Applied Sciences, TERI, spoke on Mainstreaming differential vulnerability of Himalayan Ecosystem and Climate Change with the way forward
- Prof. Rajesh Kumar, Central University of Rajasthan also joined the panel & elaborated on "Changing Climate and Current Scenario of Himalayan Glacier"

Overview

Dr. Akhilesh Gupta & Dr. Anil Gupta gave the overview in the first technical session w.r.t. the key climate induced risks, hazards and disasters in the North Western Himalayas and need for a practical and Actionable Plan and to share knowledge on tools in order to adapt to climate risks and impacts. Dr. Ashish Chaturvedi while moderating the session highlighted that in the North Western Himalayas, acute climate hazards/disasters have always hindered the well-being of the natives, and thereby, rising the risk and vulnerability in this region and set the context for the discussion by the experts.

The experts panel discussed the diverse range of topics related to climate change and made certain measures to cope with climate hazards in the fragile terrain of the Himalayan regions.



Himalayas facing huge impact of climate change in terms of increase in extreme events, biodiversity loss, migration. Need for multi-hazard warning system.

Dr Akhilesh Gupta
Senior Advisor, DST, GoI

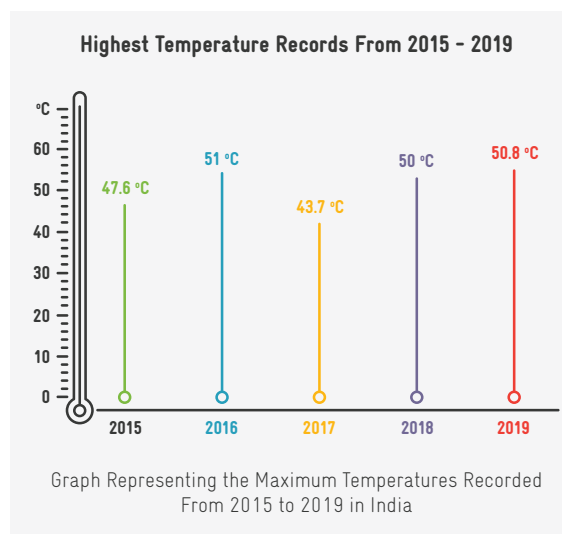
During the inaugural session the discussion points were emerged from

1. Extreme natural hazards, events are the prime reason of concern over the world, especially in the Himalayan region. It was clear that during the recent past, the number of natives affected by climate disasters - droughts, flash floods, landslides, mass movements, debris-flow, and storms has been increasing tremendously. These disasters have clear bearing on climate change. Along with recent developments in climate science, the relationship between global warming and changing weather pattern, outcomes are becoming more tangible. The panel indicated that climate change will further rise the risk and exposure to such climatic disasters. Panel also elaborated on the trends observed clearly indicating in increasing climate disasters in detail.
2. Climate change scenarios provide a solid framework for identifying structural shifts in weather systems. How those shifts are transmitted through to human development outcomes is conditioned by the interplay of risk and vulnerability.
3. Climate risks are not equally distributed, but they are widely disbursed; Droughts, Floods, Storms, and other events have the potential to disrupt natives' lives, leading to losses in income, assets, and opportunities is about exposure to external hazards and people have limited control over this.
4. Vulnerability is a measure of capacity to manage such hazards without suffering a long-term, potentially irreversible loss of wellbeing. The processes through which climate risk is converted into vulnerability in any nation are shaped by the underlying state of human development. It includes the inequalities in income, opportunity, and political power that marginalize the poor. According to studies, developing countries and their citizens who are below the poverty line are most vulnerable to climate change.

Key Takeaways

- During the recent past, the entire Himalayan region has been facing extreme hazards and natural calamities due to changes in climatic conditions, climate triggers, and rise in temperatures. The climate models can help provide valuable insights into these climate change triggers and conditions.
- The mountain terrain of the Himalayas further accentuates the high risk and the vulnerability of climate induced disasters. CRM (Climate Risk Management) methodology can efficiently be utilized as a robust framework for assessing, addressing, and adaptively managing climate risks in mountainous regions.
- The weather conditions, watersheds, temperatures, and dynamics also have an enormous impact including but not limited to, frequent, extended regional rains, rapid soil erosion, and adverse effect on river basins. Hydrological Models like SWAT (Soil & Water Assessment Tool) are dynamic models that can help in assessing water availability, and volume in the soil as well as with watersheds.
- Mainstreaming Differential Vulnerability of Himalayan Ecosystem could be the way forward in Climate Change since Vulnerability is a dynamic and multidimensional concept. Therefore, one solution would not fit all terrains due to the existence of Heterogeneity. So, the first step should be identifying the Vulnerability Hotspots within the agro-climatic geographical zones, followed by the conduction of the perception survey of the distinctive farmer lots, local households, and villages situated on different zones.
- Keeping the Changing Climate and Current Scenario of Himalayan Glaciers in view, there is an emergent need to build capacities and create awareness about Climate Change to address adverse impacts on the environment besides on the local inhabitants. Since Global Warming can trigger the migration of around 3 billion people in Asia over the course of a few decades, we need to practice the imperative measures, like setting up the adequate budget provision for Glacier retention, investing in Early Warning System addressing and addressing the varied factors that further accentuate the climate disasters in the Himalayas.

Highest Temperature Records from 2015-2019



The chart shows the maximum warm temperatures from 2015-2019 in India.



Global Warming can trigger the migration of around **3 Billion People in Asia**



3

TECHNICAL SESSION II GLACIAL LAKE OUTBURST FLOODS IN HIMALAYAS (GLOF)

The session was Chaired by Dr Anil Kulkarni, Divecha Centre for Climate Change, IISc Bangalore and Dr. S.S. Negi, Vice-Chairman, Uttarakhand, RD & Migration Commission, former Director General Forest, Special Secretary, MoEFCC, Gol. The session was moderated by Mr. Saibal Ghosh, Director (Geology) at Geohazards Research & Management Centre, CHQ, Kolkata, Geological Survey of India. In the session following expert gave their remarks

- Dr. SS Randhawa, HIMCOSTE spoke on “Glaciological studies outcome in HP”.
- Dr. D.G. Shrestha, Director, Science & Technology Department, Govt. of Sikkim spoke on “Experience sharing on GLOF management from Sikkim Himalaya”
- Dr. Parmanand Sharma, NCPOR, GOA spoke on “Evolution of critical glacial lakes and its ramification and management –A case study of Chandra basin glaciers, western Himalaya”.
- Dr. Vikram Gupta, Scientist (F) Wadia Research Institute, IHR, Dehradun spoke on Landslide scenario mitigation in NW-IHR

Overview

The chair Dr. Anil Kulkarni & Dr. S.S. Negi gave an overview of the agenda and set the discussion for Glacial Lake Outburst Floods (GLOFs). Dr. Kulkarni said that GLOF are a major hazard for the Indian Himalayan region (IHR). As climate change causes glaciers to recede, lakes tend to be in their wake, held in place by unstable moraines that act as natural dams. Thus, the second technical session was very important to attempt and throw light on the issues considering mountain glaciers and ice caps are melting across the world.

The need of around the need and major implications for the communities which are living in downstream areas. In the Himalayas, the risks posed by Glacial Lake Outburst Floods (GLOFs) must be planned for and reduced.

From the session following discussion points emerged

1. Catastrophic events, such as an avalanche into the lake, could trigger a GLOF-causing wave and result in anything from minor erosion to complete failure of these moraines. Previous studies of potential GLOFs have focused on either dam breaching or general disregard for sediment and debris transport. The current increase in GLOF events and their adverse impacts were deliberated upon.
2. Focused discussions w.r.t. showcasing various scientific and technological advancements that can help assess the risk of GLOF for vulnerable communities in mountain areas were highlighted.



- Advancement in satellite technology are being used to map glacial retreat in the Himalayas.

Dr Anil Kulkarni

Divecha Centre for Climate Change, IISc
Bangalore



- There is a need to study and map the GLOFs. Use of satellite technology in developing an early warning system for glacial lake hazards is gaining prominence.

Dr. S.S. Negi,

Vice-Chairman, Uttarakhand, RD & Migration Commission, former Director General Forest, Special Secretary, MoEFCC, GoI

Major Societal Impacts of GLOF



Environmental Impacts of GLOF



The image shows 4 major adverse environmental impacts of GLOF

Key Takeaways

- Recent advancements in satellite technology, space applications have helped to map and assess changes in glaciers in the Himalayas. Experts highlighted about temperature rise further up in the Himalayan regions, which is causing glaciers melt. With emerging satellite space applications and modelling technologies, the assessment of risks for communities that reside in downstream areas have become easy.
- **LISS-III Satellite data maps and estimates the status of GLOFs in the Himalayan regions in Himachal Pradesh.**
- National Guidelines for the Management of Glacial Lake Outbursts Floods have been introduced and adopted in H.P. in **October 2020**; Governments are also undertaking hazard risk assessment studies.
- Department of Science and Technology, Sikkim is undertaking various activities w.r.t. climate change and glaciers retreat; ranging from the creation of artificial glaciers to the Glacial Lake Management Plan. Mapping of lakes in Sikkim such as the **South Lhonak Lake** has been made possible using satellite technology. This has encouraged **GLOF Mitigation at the South Lhonak Lake.**
- Experts highlighted that if the volume of glaciers reaches a critical level, there are chances of a breach. Many factors control glacial lake outbursts. They also hold water and create a barrage from the sediment transfer. This way they protect hydropower dams that provide energy. But it is very difficult to monitor in-glacial lakes; these could be very dangerous.
- During the discussions, it was mentioned by experts that Chandra Basin, there are 40 glacial lakes on average. **In 2016, National Centre for Polar and Ocean Research (NCPOR) installed the Himansh station in the Chandra Basin for integrated glaciological study.** Technologies and mitigation measures like the Terrestrial Laser Scanner, Artificial Channel Enlargement, and others are helping to mitigate climate risks.
- Multi-hazardous nature of landslides was also discussed during the session. The key suggestion is the classification of hazard zones in the Himalayas. It was also suggested to treat landslides at the initial mapping stage. It is important to decipher naturally occurring landslides.
- Experts also highlighted that while hazards can be predicted, human's association with the environment should be managed to minimise the impact of the natural hazards.



4

TECHNICAL SESSION III

APPROACHES FOR MAINSTREAMING CCA AND DRR AT SUB-NATIONAL LEVEL

Chaired by Dr. RR Rashmi, Former Special Secretary, MoEFCC, Gol and Distinguished Fellow, TERI and Mr. Ashish Tiwari, IFS, Secretary, Environment & Climate Change, Govt. of Uttar Pradesh, the session was Moderated by Dr. Ashish Chaturvedi, Director-Climate Change, GIZ. During the session following were the expert speakers:

- Ms. Vidya Soundarajan, Director-WWF spoke on "Possible approaches for mainstreaming climate change adaptation for DRR in IHR"
- Dr. Shiraj Wajih, President, Gorakhpur Environmental Action Group, spoke on "Experience sharing on Climate & Disaster Resilient Gram Panchayat Development Planning in UP & Bihar"
- Dr. Hari Kumar, Regional Coordinator Geo Hazards International, spoke on "Mainstreaming of recommendations to reduce loss & damage due to climate change in Mizoram".
- Mr. Harjeet Singh, Senior Advisor Climate Impacts at Climate Action Network spoke on "Strengthening of policy instruments at National & Sub-national level to reduce climate & disaster-related Risks & associated impacts"
- Dr. Sher Singh Samant, Director, HFRI, Shimla, H.P. spoke on "Prevailing practices and role of Forestry & Biodiversity in CCA"
- Mr. Sanjay Kumar, Founder and CEO Geospatial World, New Delhi spoke on "Geospatial Knowledge Infrastructure: Advancing Sustainability of Everything"

Overview

The Chairman Mr. R.R. Rashmi & Mr. Ashish Tiwari gave an overview of the session and flow for the panellists while setting the discussion points. Technical Session III largely deliberated upon the importance of mainstreaming CCA (Climate Change Adaptation), Climate Resilience, & DRR (Disaster Risk Reduction) to secure developmental goals at both Sub-National and Regional Level. Since the frequencies and intensities of losses due to climate-induced disasters are on the rise across the Northern parts of the country and are likely to further increase in future due to severe climate change, mainstreaming climate concerns across policy framings becomes non-negotiable



Key to any problem is the integration of identified solutions into policies and institutionalized action.

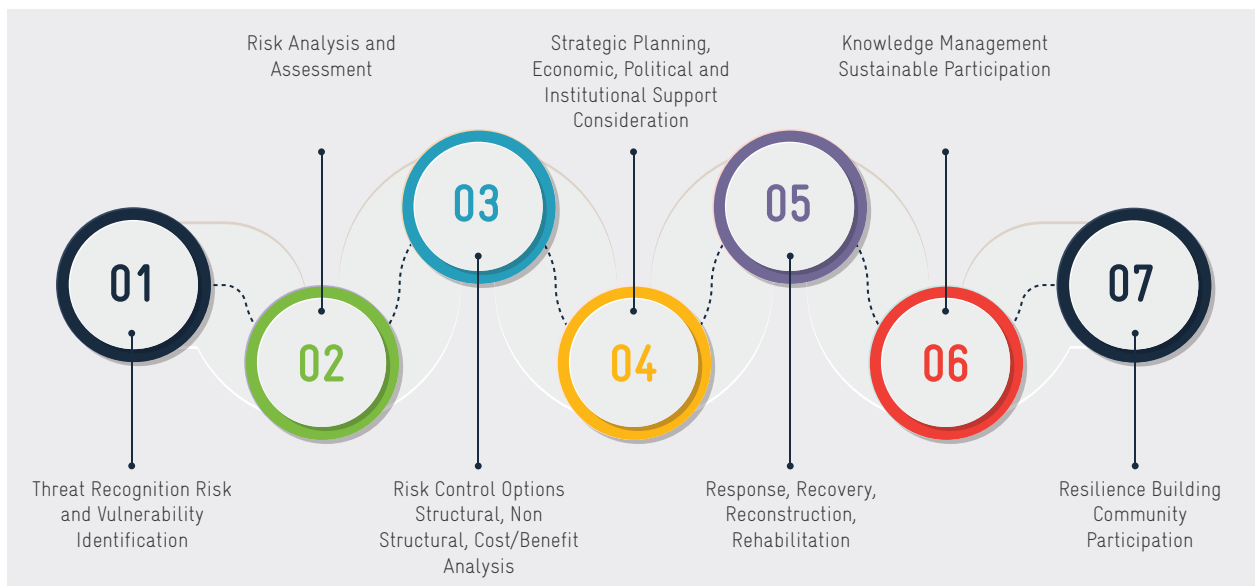
Dr. RR Rashmi

Former Special Secretary, MoEFCC, GoI and Distinguished Fellow, TERI

During the inaugural session the discussion points were emerged from

1. Risk, exposure and vulnerability should be identified to develop Climate/Disaster Risk Resilience models at village level
2. Village developmental plans can act as right entry point to integrate climate concerns and efficiency of rural agricultural, climate and allied activities.
3. Experts highlighted how leveraging the ability of the Internet of things (IoT) and Blockchain, could aid in raising fiscal funds, managing financial flow, and transparent data sharing system for better climate change adaptation options.
4. Experts cited an example of Aizwal, Mizoram being situated 8 kilometres below the river levels and has a 90° cliff, is at a high risk of earthquakes of scale 9, and earthquakes-induced landslides.
5. Displacement Migration was one of the focus areas for discussions during session since, in 2019, around 5 million people got displaced from India due to failure to adapt to adverse weather conditions and changes in the climate.

Disaster Risk Management



After the discussions following takeaways were prioritised

- Safeguarding the critical infrastructures from major catastrophes and disasters is critical and could also be attended by improving construction standards/building codes.
- Creating innovative and locally appropriate solutions and deploying Bankable solutions by bringing in investments is the need of the hour to address the increased vulnerability.
- Studies suggest, during **2030-2033, IHRs might experience excessive water-related hazards**, like droughts, flash floods, and frequent heavy rainfalls, therefore integration of **CCA & DRR in local level planning is critical**.
- One of the major takeaway was Heterogeneity in local issues such as droughts, floods, etc. in **Uttar Pradesh and other states. It was suggested that a robust Local Climate and Disaster Risk Management plan that is closely integrated at GPDP (Gram Panchayat Development Plan) level** should be in place.
- **SFDRR, SDG, Paris Agreement, & National Disaster Management Plan (2019)**, are some of the initiatives that provide guidance at the International and National level.
- The Landslide Risk Reduction Actions Landslide Policy Committee, Landslide Risk Resilience
- Roadmap, Landslide Hazard Zonation Map **1:5000 for Aizwal Municipal Area, Slope Modification Regulations, and First Municipal Corporation to appoint Geologists are few best options.**
- A transformative approach on an economic level is critical as far as migration of communities and slow onset events, such as sea levels, glacial melt, lake outbursts are concerned. There is a need for flexible, decentralised planning for communities by empowering them with the right resources.
- Ecological parameters, topographical ranges, diversity of vegetation, and weather parameters get affected by climate change directly. Rich in diversity from the tropical forests, and high-altitude alpine Forests to unique Fauna and diverse landscapes, the hilly regions can be safeguarded with the right CCA & DRR practises along with community participation at an individual level.
- As suggested by HFRI, the **Indus River Basin can be rejuvenated through Forestry Interventions**. The economy could be benefited at large from the Geospatial Knowledge Infrastructure for building a Resilient Infrastructure in IHR and there is a need to focus on the same.

Overall, the indirect vulnerabilities associated with factors such as high dependence of the community on vulnerable livelihood sources, high environmental degradation, and improper land-use patterns are shaped by past hazards and capacities (inadequacy of human and financial resources for implementing development plans and various phases of Disaster Management Cycle) that are especially driven by department/sector-specific institutional contexts. Physical/Infrastructural Vulnerabilities, which include factors such as aspects of engineering design and extent of periodic maintenance, influence capacities of the departments and communities sometimes leading to increased allocation of budgets on one hand while eroding livelihoods of communities. The lack of capacities, and physical/infrastructural leading to vulnerabilities together make up the overall vulnerability. When this overall vulnerability in the business-as-usual scenario is overlaid on likely intensities and frequencies of future hazards, we arrive at risk. Potential opportunities for mainstreaming CCA-DRR option can be identified for policies, programmes, plans.

5

TECHNICAL SESSION IV

RISK PREPAREDNESS AND COMMUNITY RESPONSE

The session was Chaired by Mr. Sonam Wangchuk, Director, Students Educational and Cultural Movement of Ladakh, and Mr. Ashish Tiwari, IFS, Secretary, Env & CC, GoUP. The session was Moderated by Dr. Anand Sharma Former DDG IMD. In the session following were the expert specialists:

- Dr. Irrfan Rashid, Coordinator, Geoinformatics Department, Kashmir University Spoke on “GLOF scenario and Community Preparedness in J&K”
- Gp Capt Dr. Sanjay Srivastava, Ex-Head & Joint Director, Air Force Centre for Numerical Weather Prediction, Indian Air Force spoke on Extreme meteorological events and risk preparedness over the western Himalayas
- Ms. Mandira Singh Shrestha, ICIMOD virtually joined the panel & spoke on Disaster Risk Reduction and Building Resilience in the Hindu Kush Himalaya
- Himmata Ram Bhambhu, Padma Shri spoke on Unique integrated agro-forestry plantation and biodiversity conservation
- Dr. Majid Farookh, State Coordinator (CC), Dept of Ecology, Environment and Remote Sensing, J&K spoke on Government of J&K Initiatives for Glaciers, GLOFs and associated risk and need for community engagement
- Dr. Sonam Lotus, Director, IMD, Ladakh, spoke on Success Stories of Early Warnings in J&K and Ladakh

Overview

Technical Session IV focused on Risk Preparedness and Community Response in face of climate hazards in mountainous areas. The Chairperson set the context for focused group discussion w.r.t. state specific case studies and local issues. While moderating the session the representative from IMD briefed about the initiatives of IMD in IHR. The speakers from different states deliberated and highlighted the need to not only involve but also understand communities in risk reduction strategies. As communities are the most impacted by these hazards, it is crucial to keep them in the centre of the picture.



जो कोई काटे पेड़, उसे सब मिलकर
झाँटो रे, पेड़ा ने मत काटो रे।
Calamities we are experiencing
is nature's way of showing it's anger.
We should collectively work with
government to plant more trees and
conserve forests.

Shri Himmata Ram Bhambhu
Padma Shri

During the session the discussions focused around following points

1. Adapting to climate change requires a special focus on disaster risk reduction. Some risks can be predicted and planned accordingly as part of ongoing disaster preparedness and health and care programmes. But some specific impacts might not be uniform across the regions, therefore each nation, region, organisation need to assess those risks in partnership with national and regional experts at local levels.
2. The expert panel also discussed the significance of applied knowledge at a local level. They stressed as it would serve as an optimal community engagement effort in resiliency.



After the discussions following takeaways were prioritised

- Assessment of current risks of social vulnerability for the next decade may be helpful for prioritising efforts in preventing, preparing, and responding in following manner:

Prevention – identifying the threat,

Planning – as a form to reduce exposure

Responding – applying lessons learned from past events to significantly improve recovery

- **It was highlighted that communities need to be better informed about the possibility of such hazards.** Robust land-use plans, relevant policy measures, awareness of glacial hazards, and community empowerment are key to mitigating climate change.

- Cascading effects of extreme disasters need to be managed to help communities to mitigate the risks. It was also noted that if people have better livelihood opportunities for economic betterment, they are more likely to listen to climate change information.

- Discussions and usefulness of programmes such as 'Mausam Dekho, Mausam Batao' were discussed in the session which suggest the employment of **Part-Time Weather Observers (PTWOs)** enhance the awareness of climate change in communities and make them part of the action plan to mitigate it.

- For **Disaster Risk Reduction in the Hindukush region**, the mapping and monitoring of glacial lakes, regional flood outlook, community-based flood warning systems, and understanding the indigenous knowledge of communities is important to manage climate change. Both transboundary and regional cooperation needs to be strengthened as part of risk reduction measures.

- **Using diverse techniques like Hydraulic Modelling**, a robust system of maps, mobile apps to log hazardous incidents, experts have been able to map and assess glacial lakes and their related impacts. Early warning systems in mountainous areas could be helpful in reducing the immediate impact of climate hazards.

- Climate Change is real & therefore we need to adapt to the changing climate to better mitigate its impacts. Communication, timely action, and response, thinking and acting locally, focusing on Citizen Science and eco-education are all important steps in this path towards Disaster Risk Reduction.



6

TECHNICAL SESSION V

FINANCIAL INSTRUMENTS FOR CLIMATE AND DISASTER RISK REDUCTION

This session was Chaired by Mr. Kunal Satyarthi, IFS, Joint Secretary, NDMA, MHA, Gol and Dr Ashish Chaturvedi, Director Climate Change, GIZ. The session was moderated by Mr. Manoj Yadav, GIZ India. Following were the expert specialists in the session:

- Ms Girija Biyani, Client Manager (Asia), SwissRe spoke on Climate Risk Financing Tools & Disaster Risk Reduction.
- Mr. C.S.R. Murthy, Chief General Manager, NABARD Headquarter, spoke on Accessing international adaptation finance - experience sharing
- Mr. Ajay Kumar Lal, IFS, Lead Carbon Finance Expert, spoke on Experience sharing on accessing carbon finance for Afforestation programmes
- Mr. M. K. Balachandran, Head of Rural Retail and Micro insurance, SBI General Insurance Company Ltd, spoke on Addressing climate risks through insurance-based solutions

Overview

The Chairperson set the context for discussions with the panellist stating that in the last two decades, Indian Himalayan Regions have experienced an increase in the frequency and intensity of disasters due to extreme weather events. The economic impact of such an event is debilitating for the states and people under the circle of influence. With climate change adaptation, building resilience taking the forefront, there is gaining momentum in securing and planning for the after-event economic setbacks by transferring some risk via market-based financial instruments. The lengthening trail of disasters has led to a gradual realization of an immediate need for implementation of such financial instruments viz. climate bonds, climate risk insurance etc.

The fifth & last Technical session discussed and deliberated several Climate Risk Financing Tools & Disaster Risk Reduction models, along with the significance of Carbon Finance for Afforestation programmes. Learnings from use cases of innovative insurance-based solutions implemented in other regions & Sub-National Action for Climate Resilient Development.



- Lengthening trail of disasters has led to a gradual realization of an immediate need for implementation of such financial instruments viz. climate bonds, climate risk insurance etc.

Mr. Kunal Satyarthi

IFS, Joint Secretary, NDMA, MHA, GoI



- Adaptation plans at local level has a potential to make positive change in resilience.

Mr. Kirtiman Awasthi

Senior Policy, Advisor, CAFRI Team leader

While discussing the financial aspects the panelists also focused discussions on

1. The potential implications of climate change for the financial management of disaster risks, to provide solutions to risks arising from the yearly aggravating climate risk events. Outlining the benefits, capacity, and limitations of insurance as a tool for transfer risks and the market's appetite to absorb and reduce the economic disruption of disaster events.
2. Understanding the policy approach required to support the penetration of climate risk insurance and engaging in regional and global discourses, make use of capital markets to source innovative instruments, and usher international cooperation in risk pooling.
3. How to improve the financial management of disaster risks in the context of climate change and gave definitive shape to the thought process required to elevate beyond a regional discourse.



After the discussions following points emerged for future actions

- Climate change has the potential to increase the frequency and impacts of large-scale natural risks & hazards, it is critical that governments put in place or update actionable, comprehensive, transparent, and inter-ministerial **Disaster Risk Management (DRM)** plans. For these plans to be implementable and cost-effective, governments should include a **Climate and Disaster Risk Financing (CDRF)** strategy as an integral component of their DRM plan.
- Just improving the financial preparedness is not enough and the resilience towards climate change and natural hazards through the development and implementation of **market-based meso and micro insurance schemes is also necessary**. Financial institutions, and relevant stakeholders must act together to resolve, or rather deal with the issue, the programme CDRF can also help develop customized climate and disaster risk financing strategies at state level.
- The importance of **Parametric Insurance (Parametric Disaster Cover)** was highlighted as a capable policy instrument to address (if not resolve) the damage caused due to natural disasters in the Indian Himalayan Regions.
- Parametric programmes currently active in the country like the Nagaland State Parametric insurance cover for rainfall attests to the viability and applicability of insurance to transfer risks to the market. The perils faced by a state can be addressed by means of a co-created product that cushions the shock and helps build the financial and social resilience of a household and in extension the state, in post-disaster recovery.
- Expert proposed climate mitigation as a great method to reduce the risk of loss from the occurrence of any undesirable event in IHRs. This is considered an imperative element for all sorts of insurance businesses to avoid unnecessary losses.
- The affordability of climate risk insurance and the introduction of innovative climate risk financing instruments were discussed. For instance, contingent multilateral debt policies providing Convertible Concessional Finance (CCF) that does not lead to the further indebtedness of vulnerable countries, are considered important approaches that are given, sufficient finance is mobilized to operationalize these instruments in a way that at least partially compensates for loss and damage.
- **Carbon Finance Model for Afforestation** programmes emerged as an upfront investment that assures the flow of funds for the plantation to grow into a forest cover. Since it's a long-term investment, which is high-scaled and has a scope of creating a positive long-term impact on livelihoods, agricultural sectors, and rural communities, now all communities and inhabitants can live in sustainable ecosystems.
- Facilitating scaling up of Climate Financing was also stressed upon where it was suggested that varied FIs (Financial Institutions), including Banks, Insurers and Fund Managers should come together and respond to an unbiased data source to help encourage Climate Financing in higher terrains, small communities, and FPOs, etc.
- Towards the end of the session, panel experts emphasised to promote the finance sector as a much-needed leadership best practice on Climate Change, along with the significance of Insurance Based Solutions to address Climate-induced Risks.



Valedictory Session

At the end of all technical sessions a concluding session was chaired by Sh. Sonam Wangchuk, Director, Students Educational and Cultural Movement of Ladakh and Sh. Prabodh Saxena, IAS, Additional Chief Secretary, (Env., S&T, Finance & Planning) to the GoHP. The panel was joined by Mr. Kunal Satyarathi, IFS, Joint Secretary, NDMA, GoI, Dr. Ashish Chaturvedi, Director, Climate Change, GIZ India, Dr. Jonathan Demenge, Head, Swiss Development Cooperation, Delhi, Mr. Sudesh Kumar Mokhta, IAS, Director, Department of Environment, Science & Technology, GoHP

Dr. Ashish Chaturvedi, Director, Climate Change, GIZ India made an adept remark; he said “Everybody is talking about how we bring these messages of climate science to the people? how do we bring the resources to the community members? I would say we need to do this more regularly; bite-sized pieces throughout the year to talk about specific issues such as finance, extreme weather events because that is how we will be able to tackle these challenges and take this knowledge to the communities. Each one of us is moved by what happens on the field. It gives us the courage to come back every year. Without that this would all be meaningless.”

Dr. Jonathan Demenge, Head, Swiss Development Cooperation, Delhi also shared his valuable experience. He said “I came to learn the similarities amongst mountain people, the way they transform with the environmental transitions. People in mountains have very similar ways of doing things. I think they unite much more than they divide.” He also insisted on the fact that the Mountains are splendid but also Fragile & Glaciers mourn and cry when they retreat, thus there is a need for a robust Climate Action Plan & Schemes to help combat the Risk & Vulnerability. He continued saying, “Everything is larger in mountains - the beauty, the life of the people but also climate change.”

The experts’ speeches and notes lead to an instrumental step in delivering the SDGs - the release of the State Action Plan of Climate Change as a positive step.

Emergence of glacial lakes was shown - This was the visible evidence of climate change in the Himalayas of rise in temperatures.

Mr. Kunal Satyarathi, IFS, Joint Secretary, NDMA, GoI, expressed his satisfaction of being part of such a social, critical event for climate change. He said it has been a great learning experience for him. From the NDMA perspective, he made three points:

→ Community involvement for disaster risk reduction

GoI has initiated Apada Mitr scheme - volunteers across the country are provided training in nearest NDRF/SDRF; standard training and kit to respond to disasters; important that the youth of a village respond to a disaster fast; How to train the panchayat reps to tackle disaster in local areas; disaster response should lie in the panchayat bhawan as they are the first responders.

→ One country, one number

112 to respond to all disasters; ERRS scheme; second programme for the early warning - if there is early warning, we will use all means of communications possible; integrate all modes of communications

→ Movement in the sector from being a relief-driven programme

Moving in 4 directions, mitigation, response - capacity building and preparedness, relief, recovery & reconstruction.

“The world is moving towards adaptation. We are trying to prepare the National Adaptation Plan”, he added from Disaster Reduction point of view.



The world is moving towards adaptation. We are trying to prepare the

National Adaptation Plan



Overall, the discussions were focused to conclude what was discussed in all sessions within following points:

1. The panellists discussed and reflected the key takeaways from the two-day event and highlighted the motive of technical sessions.
2. Experts gave 'Thank you notes' and shared their rich experiences during the event, emphasizing on the criticality of Climate Change measures.
3. Following documents were released along with the Resolution 2021:
 - Release of Himachal Pradesh State Action Plan on Climate Change linkages to the Sustainable Development Goal (SDGs) poster
 - Release of CAFRI Factsheet (CAFRI-MoEF & CC Programme)
 - Release of HP Climate Change Conclave's Resolution 2021

The Additional Chief Secretary, Sh. Prabodh Saxena, IAS read out the HPCC Conclave Resolution 2021 of 14 points. He said that these 14 points will be communicated and shared with GoI, NDMA for further adoption in IHR states and development of a common framework to ground these actions.

In his concluding remarks Mr. Sonam Wangchuk said "Proactive steps are very impressive. I think mountain people are not new to preparedness and planning. We need to be more confident. We face disasters regularly and annually. Our winters would be a disaster anywhere else. Any winter like our mountains would kill in thousands. But that doesn't happen here. Because we prepare for the long spell that winters are. We have to invoke the same spirit of being proactive and prepared."

He also made a bold remark saying, "Earthquakes don't kill, it's badly designed buildings that kill. Disasters don't kill. It's a lack of awareness and lack of preparedness that kills. We need to keep that in mind and try to be prepared." "We get to learn a lot from this experience and our ancestors. Using the social capital of the place rather than just para-dropping relief materials. We also need to be confident in our own cultures and traditions of our own regions rather than copy-pasting solutions from other regions. Ancestral wisdom blended with modern tech, using tech without forgetting the depth of our wisdom; When disaster does strike, we hope to see something different and something better," he added.

Finally, the conclave ended with resolution 2021 and vote of thanks from the chair and to the chair and all participants from department of Environment, Science & Technology, Government of Himachal Pradesh.



GoHP is indeed thankful to all the participants/delegates for their contribution in 2 days deliberations to draw a clear Roadmap/ Resolution-2021 for DRR due to impacts of CC.

Mr. Sudesh Kumar Mohta, IAS
Director, Department of Environment, Science & Technology, GoHP



Proactive steps are very impressive. I think mountain people are not new to preparedness and planning. We need to be more confident. We face disasters regularly and annually. Our winters would be a disaster anywhere else. Any winter like our mountains would kill in thousands. But that doesn't happen here. Because we prepare for the long spell that winters are. We have to invoke the same spirit of being proactive and prepared."

Mr. Sonam Wangchuk

Develop a state level climate resilience strategy that addressed the capacity development needs at multiple levels

Foster climate research at state level and identify district wise climate and disaster risks

Development of Early Warning System protocol as a short term-measure and infrastructure development as long-term measure in region for building disaster resilience and effective response to climate change risk

Enhance capacities of existing institutions in Himalayan region to integrate research on local climate context with practical solutions

Prioritize climate hazard vulnerability assessment with relative risk index

Subnational level/ State governments to be made partners for the issue of warnings and dissemination of meteorological data

Multihazard warning system framework for entire Himalayan region

Integrate eco-literacy and climate literacy into the education system of Himalayan Region focusing on youth engagement

Community level Plan and preparedness on climate and disaster risk

Develop framework for climate research at subnational level based on agro-climatic zones

Development of original, fundamental solutions for mountainous regions



Conceptualize a joint program on climate financing and insurance for risk reduction and community resilience

Creation of special fund for Indian Himalayan Region on climate change mitigation and adaptation and development of mechanism to aid climate response.

Development of Concept Note for Himalayan Region on climate and disaster risk reduction

Foundation of climate insurance solution for subnational level with specific crops and initiate for state specific pilots



**“SECURE HIMALAYA- SAFE INDIA”
Himachal Pradesh Climate Change Conclave 2021**

Contributors

1. Sh. Jai Ram Thakur, Hon'ble Chief Minister, HP
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6. Sh. Kamal Kishore, Member Secretary, NDMA and Acting DG, CDRI
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12. Dr. Jonathan Demenge, Head Swiss Development Cooperation, Delhi

Speakers/Experts-Technical Session

TS 1: Climate hazard, Risk and Vulnerability in North Western Himalayas

1. Dr. Akhilesh Gupta, Senior Advisor, DST, Gol
2. Dr. Anil Kumar Gupta, Prof. & Head of NDMA, New Delhi
3. Dr. Ashish Chaturvedi, Director, GIZ
4. Prof. A.K. Gosain, Emeritus Prof. IIT Delhi
5. Dr. Kamna Sachdeva, Associate Professor, TERI
6. Prof. Rajesh Kumar, Head of Environment Science Department, Central University of Rajasthan

TS 2: Glacial Lake Outburst Floods in Himalayas (GLOF)

7. Dr. Anil Kulkarni, Divecha Centre for Climate Change, IISc, Bangalore
8. Dr. Saibal Ghosh, Director, GHRM Centre, Geological Survey of India
9. Dr. S. S. Randhawa, Principal Scientist, HIMCOSTE, Shimla
10. Dr. D. G. Shrestha, Director, Science & Technology Department, Govt. of Sikkim
11. Dr. Parmanand Sharma, NCPOR, Goa
12. Dr. Vikram Gupta, Scientist (F) Wadia Research Institute, IHR, Dehradun

TS 3: Approaches for Mainstreaming CCA and DRR at Sub-national level

13. Ms. Vidya Soundarajan, Director, WWF

14. Dr. Shiraz Wajih, President, Gorakhpur Environmental Action Group
15. Dr. Hari Kumar, Regional Coordinator, Geo Hazards International
16. Sh. Harjeet Singh, Senior Advisor, Climate Action Group
17. Dr. Sher Singh Samant, Director, HFRI, Shimla, H.P.
18. Sh. Sanjay Kumar, Founder & CEO Geospatial World, New Delhi

TS 4: Risk Preparedness and Community Response

19. Dr. Anand Sharma, Former DDG, IMD
20. Dr. Irrfan Rashid, Coordinator, Geo informatics Department, Kashmir University
21. Gp. Captain Dr. Sanjay Srivastava, Ex-Head & Joint Director, Indian Air Force
22. Ms. Mandira Singh Shrestha, ICIMOD
23. Sh. Himmata Ram Bhambhu, Padma Shri
24. Dr. Majid Farooq, State Coordinator (CC), Department of Environment & Remote Sensing, J&K
25. Sh. Shwetal Shah, Technical Advisor, Climate Change Department Gujarat
26. Dr. Sonam Lotus, Director, IMD Ladakh

TS 5: Financial Instruments for Climate and Disaster Risks

27. Sh. Manoj Kumar, Advisor, GIZ
28. Ms. Girija Biyani, Client Manager (Asia) Swissre
29. Sh. C. S. R. Murthy, Chief General Manager, NABARD, Mumbai
30. Sh. M. K. Balachandran, Head Rural Retail and Microinsurance, SBI General Insurance Company, Mumbai

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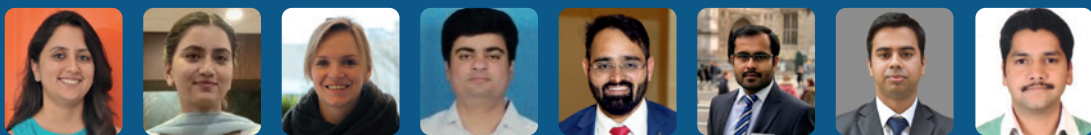
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11. Mr. Mukesh Kumar, Administrative Assitant, GIZ

Documents released

1. State Action Plan on Climate Change (2021-2030) (<http://dest.hp.gov.in/sites/default/files/PDF/SAPCC%202021-30-web.pdf>)
2. CAFRI project Factsheet (http://dest.hp.gov.in/sites/default/files/CAFRI_Factsheet_0.pdf)
3. Report/guidelines on Knowledge Network on Climate Change & Disaster Risk Reduction (<http://dest.hp.gov.in/sites/default/files/GIZ%20-%20HP%20CC%20Knowledge%20Network1.pdf>)
4. CAFRI Project Activity Brochure
5. CAFRI project activity Poster (http://dest.hp.gov.in/sites/default/files/01CAFRI%20Poster_A4.pdf)
6. SAPCC-SDG linkages poster (<http://dest.hp.gov.in/sites/default/files/02SDG%20Poster.pdf>)
7. Foundation Stone Laid for Digital Climate Change Reference Centre to be set up in DEST







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