Chintan Research Foundation

Dr. Manmohan Singh HP Institute of Public Administration
MSHIPA, Shimla
प्रशिक्षणम् कल्पते कौशलाय



EVENT REPORT

TOWARDS RESILIENT INFRASTRUCTURE PLANNING IN THE WESTERN HIMALAYAS

10 JULY 2026

ABOUT CRF

Chintan Research Foundation is an independent think tank dedicated to shaping policy through rigorous research and thought leadership. With a strong focus on fostering collaboration between policymakers and industry, CRF integrates practical insights into its research and advocacy efforts. It conducts comprehensive research to support informed decision-making and engages with stakeholders through discussions, events, and publications. CRF's research is focused on three core domains – Climate Change & Energy Transition, Economy & Trade, and Geopolitics & Strategic Studies. For more details, refer to the website: www.crfindia.org

ABOUT MS-HIPA

The Manmohan Singh Himachal Pradesh Institute of Public Administration, popularly known as MS-HIPA, was established on January 1, 1974 at FAIRLAWNS, a place about 12 kms. from Shimla on the Mashobara road. The Institute is located in a building with a historical past. The building having serene and picturesque surroundings with well laid out spacious and luxuriant lawns was originally got constructed by Mr. R. Dixon of the foreign office of British India. Later, it was purchased by Nawab Muzaffar Ali Khan Quizzalbash of Malerkotla. On his migration to Pakistan in 1947 the property came to the Government of Punjab State, which converted it into a Circuit House. At the time of re-organization of States in November, 1966 the property was transferred to Himachal Pradesh government, which subsequently selected it for setting up the Institute.

For more details, refer to the website: himachal.nic.in/hipa

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10 July 2026

Dr. Manmohan Singh Himachal Pradesh
Institute of Public Administration (MSHIPA)





Chintan Research Foundation

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EXECUTIVE SUMMARY

The report, "Towards Resilient Infrastructure Planning in the Western Himalayas," presents the proceedings and key findings of the High-Level Workshop organised by the Dr Manmohan Singh Himachal Pradesh Institute of Public Administration (MSHIPA), Shimla, in collaboration with the Chintan Research Foundation (CRF), New Delhi, on 10 July 2026. The workshop brought together policymakers, administrators, scientists, engineers, academicians, disaster management practitioners, civil society representatives, students and HAS probationers to deliberate on the growing risks that climate change and geological fragility pose to infrastructure and development in the Western Himalayan region. The report argues that while infrastructure remains indispensable for connectivity, livelihoods, tourism, public services and economic growth, the region's changing climate and inherent geological vulnerability demand a fundamental shift towards risk-informed and context-sensitive development planning.

Shri Sukhvinder Singh Sukhu, Hon'ble Chief Minister of Himachal Pradesh, in his address, highlighted the State's distinct ecological and geological vulnerability, noting that nearly 90 per cent of the State is hilly and about 68 per cent is under forest cover, leaving very limited land for habitation and development. Recalling the disasters of 2023, including the Kullu cloudburst that left around 75,000 people stranded and the unprecedented snowfall at Chandratal, he stressed the need for climate-resilient development, stronger preparedness mechanisms and infrastructure planning tailored to the State's geography. On the occasion, he announced that the State would develop disaster-resilient infrastructure at an estimated cost of ₹3,500 crore. He also released the MSHIPA report "Towards a Resilient Himachal Pradesh: Lessons and Recommendations from the 2023 and 2025 Hydro-meteorological Disasters" and launched the HIM-SIAMS Portal (Himachal Social Impact Assessment Management System).

Dr V. K. Paul, Former Member, NITI Aayog, delivered the keynote address, describing 2023 as a watershed moment in the State's disaster landscape. He emphasised that the future of Himachal Pradesh must be understood at the intersection of geological fragility, climate change and development imperatives, and that development models designed for the plains cannot be replicated in the mountains. He underlined that communities must be treated as active stakeholders rather than mere beneficiaries, and that accurate and trustworthy communication is essential during disasters. Shri Kamlesh Kumar Pant, IAS, Chief Secretary, Government of Himachal Pradesh, in his special address, stated that resilience is no longer an option but a core principle of governance. He highlighted the World Bank-supported HP-READY project of about ₹2,700 crore benefiting over 2.3 million citizens, AFD-supported disaster risk reduction initiatives, standard operating procedures for disaster response, safety audits of critical infrastructure, and community programmes such as Aapda Mitra and Aapda Rakshak. Shri Deepak Rathore, Vice Chairman, HPSDMA, emphasised scientific risk assessment, nature-based solutions and community participation in disaster management.

Ms Rupali Thakur, IAS, Director, MSHIPA, and Dr Debajit Palit, Centre Head, CRF, provided the institutional vision for the workshop. Ms Thakur emphasised the value of bringing together stakeholders from diverse institutional and professional backgrounds, while Dr Palit highlighted that the central question is not whether infrastructure should be built, but whether it is being planned and designed to withstand the climatic conditions of the future. Context-setting presentations by Mr Prabodh Saxena, Former Chief Secretary, and Er R. K. Singh, Centre Head, GB Pant National Institute of Himalayan Environment, traced the State's evolving disaster profile and the role of environmental safeguards. In the inaugural session, the CRF discussion paper "Rethinking Infrastructure Development in the Western Himalayas: Towards Climate-Resilient Infrastructure" was also released.

The report documents the changing scale of disaster risk in Himachal Pradesh. In 2023, four major spells of intense rainfall triggered about 5,000 landslides, 27 cloudbursts and 83 flash floods, claiming 428 lives, while 2025 recorded comparably severe and record-breaking rainfall. Economic losses were estimated at ₹9,905 crore in 2023 and ₹5,909 crore in 2025, with around 400 lives lost annually between 2021 and 2025. Nearly 25 to 30 per cent of the State lies in high to very high

landslide-susceptibility zones, all 12 districts are landslide-prone, glacial area has declined by about 45 per cent since 1994, and nearly 70 per cent of water sources are reportedly under stress. The report stresses that rising risk is driven not by higher total rainfall but by its concentration into fewer and more intense spells.

The deliberations were organised into three technical sessions. The first session, on Climate Risks and Geological Fragility, moderated by Mr Prashant Sirkek, Additional Director, MSHIPA, highlighted that disaster vulnerability arises from the interaction of hazard, exposure and development, and called for predictive risk modelling using GIS, artificial intelligence and real-time monitoring, mandatory climate and geological screening of projects, and community-based preparedness at panchayat level. The second session, on Urban Planning, Infrastructure Development and Institutional Roles, emphasised that risk assessment, slope stabilisation and drainage must be built into Detailed Project Reports from the outset, that tourism must be guided by ecological carrying capacity, and that coordination among the PWD, Forest and Town and Country Planning departments must be strengthened. The third session, on Policy and Governance Imperatives, called for treating forests as natural infrastructure, developing Himalaya-specific risk indicators, and using infrastructure contracts to embed mountain-specific resilience obligations, given that existing laws lack enforceable climate-resilience mandates. The synthesis of the deliberations identifies five key priorities: mainstreaming climate and disaster risk into development planning; adopting a region-specific development model based on local geology, ecology, hydrology and carrying capacity; strengthening science, technology and early-warning systems; building institutional and community resilience through coordination and capacity building; and strengthening the governance and financing architecture for resilience. The workshop emphasised that expenditure on resilient infrastructure should be viewed not as an additional cost but as an investment that protects public assets for future generations.

In conclusion, the report underscores that resilience in Himachal Pradesh cannot be achieved through post-disaster relief and reconstruction alone. It requires a holistic transformation combining stronger infrastructure, effective institutions, scientific knowledge, technological capability, inter-departmental coordination and empowered communities. The recommendations presented in this report aim to guide policymakers, administrators, planners, engineers and communities towards a development pathway that enables Himachal Pradesh to pursue its aspirations of a Viksit Himachal while remaining safe, sustainable and resilient to the climate and disaster risks of the future.




HIGH-LEVEL WORKSHOP
TOWARDS RESILIENT INFRASTRUCTURE
PLANNING IN THE WESTERN HIMALAYAS
10 July 2026



Introduction

The Western Himalayan region is one of India's most fragile ecological and geological landscapes. As the youngest mountain system in the world, the Himalayas are inherently unstable and highly susceptible to landslides, slope failures, and erosion. Multiple scientific assessments have consistently classified large parts of the Western Himalayas as falling within high to very high landslide susceptibility zones, highlighting the region's structural vulnerability even without the added pressures of climate change. Climate change is now significantly intensifying these underlying risks. Rising temperatures, changing precipitation regimes, and an increase in the frequency and intensity of extreme rainfall events – particularly cloudbursts and short-duration, high-intensity monsoon spells – have led to a marked rise in landslides, flash floods, and infrastructure damage. These hazards have repeatedly inflicted socio-economic losses, disrupted livelihoods, reduced access to essential services, and placed mounting fiscal pressures on disaster response and recovery mechanisms.

A critical and compounding challenge stems from infrastructure-led development pathways, especially road construction, urban expansion, and tourism-oriented projects, often planned according to uniform design standards developed for relatively stable plain regions.

In mountain environments, roads are frequently justified for their developmental value, because they improve access to markets, education, healthcare, off-farm employment, and emergency evacuation, while also supporting hydropower development and strategic connectivity. However, poorly located and inadequately designed roads in steep and geologically fragile terrain have been shown to trigger slope instability, accelerate landslide erosion, disrupt natural drainage patterns, and fragment habitats.

Evidence from mountain regions indicates that landslides occur more frequently along heavily disturbed road corridors, particularly on road cut-slopes, with long-term ecological and social costs. Reduced habitat connectivity, declining water quality, increased sedimentation, and repeated road blockages illustrate how short-term development gains can translate into persistent environmental and economic liabilities. At the same time, there is growing recognition that more sustainable approaches to infrastructure development are within reach. Decision-support frameworks that integrate geological, ecological, and socio-economic indicators can improve road placement, design, and construction practices. Better planning, such as avoiding unstable mid-slope alignments, prioritising ridgelines or valley bottoms where feasible, improving drainage, limiting blasting in unstable substrates, and ensuring safe disposal of excavated material, can substantially reduce landslides, erosion, maintenance costs, and downstream impacts.

However, operationalising such sustainability-oriented approaches remains challenging due to limited local data, fragmented institutional responsibilities, bureaucratic constraints, competing stakeholder priorities, and resource limitations. Overcoming these barriers requires a transdisciplinary and participatory framework that brings together scientific expertise, policy institutions, infrastructure agencies, and local communities to align development goals with ecological and social realities.

Against this backdrop, Chintan Research Foundation (CRF), in collaboration with Dr Manmohan Singh HP Institute of Public Administration (MSHIPA), convened a high-level workshop on '**Towards**

Resilient Infrastructure Planning in the Western Himalayas' to open a structured dialogue on climate change, geological fragility, and development pathways for the Western Himalayas. By foregrounding both the challenges and viable solutions, the workshop sought to advance context-sensitive, climate-resilient, and people-centric approaches to developmental planning suited to fragile mountain regions. It drew together a diverse range of stakeholders from government, bureaucracy, technical and scientific institutions, academia, disaster management agencies, civil society, development organisations, and local communities to deliberate on the emerging challenges of climate change, geological fragility, the rising incidence of disasters, and their consequences for the Western Himalayas. The workshop was conceived to examine the region's inherent ecological and geological vulnerability, which is being compounded by changing precipitation patterns and increasingly frequent and intense hydro-meteorological events, including cloudbursts, flash floods, and extreme rainfall. At the same time, the growing demand for roads, urban infrastructure, tourism facilities, hydropower, and other development infrastructure has heightened the need to ensure that development pathways are aligned with the specific environmental and physical characteristics of mountain regions.

The workshop brought together policymakers, administrators, scientists, engineers, researchers, academics, and practitioners to deliberate on the growing risks that climate change and geological fragility pose to infrastructure and development in the Western Himalayan region. It underscored that while infrastructure development remains indispensable for connectivity, livelihoods, tourism, public services, and economic growth, the region's changing climate and inherent geological vulnerability require a fundamental shift towards risk-informed and context-sensitive development planning.

The detailed agenda of the workshop is provided as an Annexure to this report.

Key Priorities

From the discussions across the three technical sessions and the deliberations during the inaugural and valedictory sessions, five key priorities emerged:

(1) **Mainstream Climate and Disaster Risk into Development Planning:** Climate and geological risk assessments must be embedded from the outset of infrastructure projects rather than treated as post-disaster corrective measures. Roads, hydropower, tourism, urban development, and other infrastructure require climate screening, appropriate site selection, resilient design, slope stabilisation, and robust drainage systems.

(2) **Adopt a Region-specific Development Model:** The workshop made clear that development models designed for relatively stable terrains cannot simply be transplanted onto the mountains. Himalayan infrastructure must account for local geology, ecology, hydrology, topography, and carrying capacity, while drawing upon context-sensitive architecture and traditional knowledge.

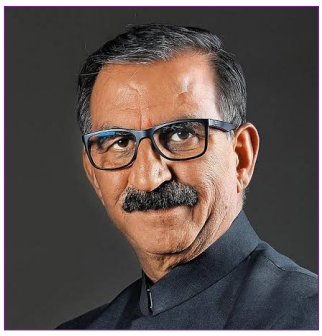
(3) **Strengthen Science, Technology and Early-Warning Systems:** Real-time monitoring, automated rain gauges, glacial-lake monitoring, Geographic Information Systems (GIS), remote sensing, artificial intelligence (AI), and machine learning should increasingly support a transition from mapping past disasters to anticipating future risks.

(4) **Build Institutional and Community Resilience:** Climate resilience requires coordinated action across government departments, scientific institutions, infrastructure agencies, and local communities. Capacity building, community-based disaster preparedness, local knowledge, and stronger inter-departmental coordination are essential to ensure effective preparedness and response.

(5) **Strengthen the Governance and Financing Architecture for Resilience:** Resilience must become a core principle of governance, underpinned by appropriate legal and regulatory frameworks, climate finance, risk-informed contracts, institutional capacity, and long-term investment. The workshop emphasised that expenditure on resilient infrastructure should be viewed not as an additional cost, but as an investment that protects public assets and ensures their continued service to future generations.

ADDRESS BY THE CHIEF GUEST

Hon'ble Chief Minister of Himachal Pradesh, Shri Sukhvinder Singh Sukhu



SHRI SUKHVINDER SINGH SUKHU
Hon'ble Chief Minister of Himachal Pradesh

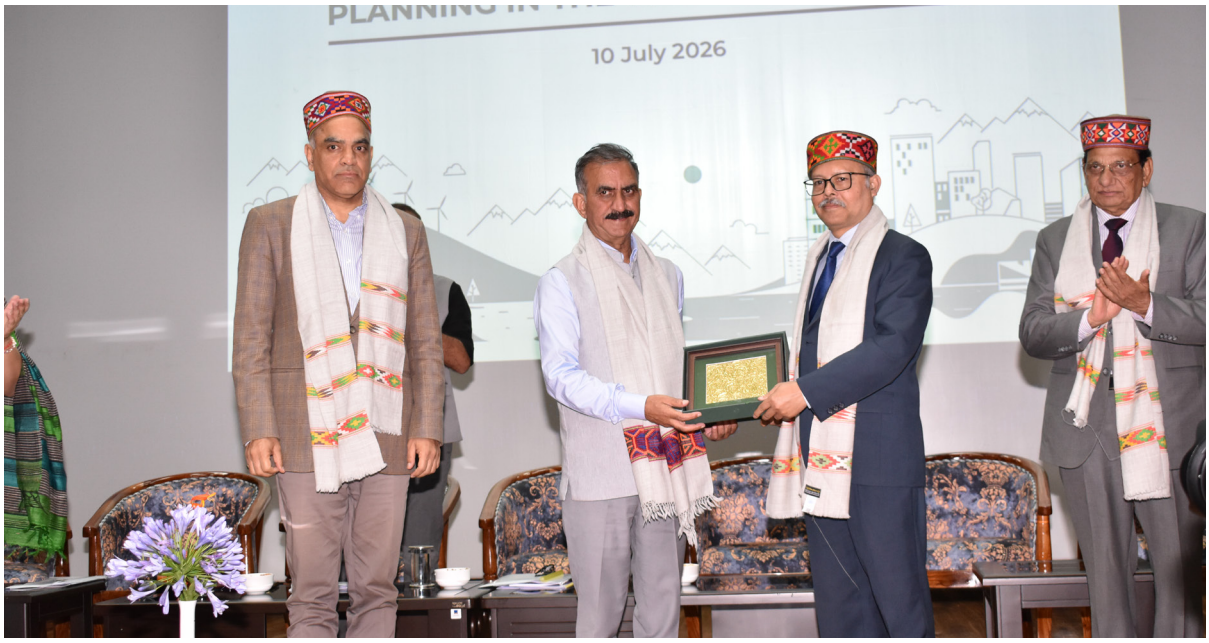
This address was delivered as part of the Valedictory Session, held at the conclusion of the workshop, and is presented here as the Chief Guest's remarks.

The Hon'ble Chief Minister of Himachal Pradesh, Shri Sukhvinder Singh Sukhu, highlighted the State's distinct ecological and geological vulnerability and emphasised the need for a development approach that is attuned to Himachal Pradesh's unique Himalayan geography. He noted that, unlike neighbouring Uttarakhand, which has a significant share of relatively plain terrain, approximately 90 per cent of Himachal Pradesh comprises hilly areas spanning the Shivalik, Middle Himalayan and Greater Himalayan ranges, with only around 10 per cent classified as relatively plain. He added that approximately 68 per cent of the State's area is under forest cover, and that a further 5 per cent comprises riverbeds or land occupied by hydropower projects, leaving a relatively limited share available for habitation and development. Yet it is within this highly constrained geographical space that the State's population of approximately 75 lakh people resides.

Reflecting on the disaster events of 2023, Shri Sukhu identified 7 July as a particularly significant episode of extreme rainfall. A cloudburst in the Kullu region triggered severe flash floods, leaving approximately 75,000 people stranded and disrupting access to essential services, including electricity and clean drinking water. Connectivity to important destinations such as Manali and Kasol was severely affected by a combination of floods and landslides, posing significant challenges for both local communities and tourists.

The Chief Minister noted that the scale of the disruption required the State Government to mount an extensive rescue and relief operation. As families of stranded tourists made repeated attempts to reach them, call centres were set up in Shimla to facilitate communication and coordination. Given the large number of tourists affected, authorities made their evacuation a priority, with the rescue operation continuing for approximately four to five days.

He further described the unprecedented conditions at Chandratal, an area that typically receives very limited rainfall or snowfall in July. During the 2023 episode, the region recorded snowfall of up to approximately six feet, leaving more than 300 people stranded in trekking and camping tents. The extreme weather made it unsafe for the Indian Air Force to conduct landing operations, and communication with the stranded group was maintained through satellite phones, while local authorities in nearby areas coordinated their eventual rescue by road.



The Chief Minister also emphasised the importance of adopting a development model that recognises the environmental sensitivity and carrying capacity of Himachal Pradesh's mountain ecosystems. The devastation caused by the 2023 extreme weather events highlighted the need to reassess construction practices, road development, drainage systems and land-use planning in vulnerable areas. In a State where settlements, tourism infrastructure and essential transport networks are often concentrated along steep slopes and river valleys, development must be informed by geological assessments, hazard mapping and the long-term implications of changing rainfall patterns. Strengthening coordination between government departments, local authorities and scientific institutions is therefore essential to ensure that infrastructure investments reduce, rather than compound, the risks posed by extreme weather.

Building on these lessons, the experience also underscores the need to strengthen disaster preparedness and community-level resilience alongside physical infrastructure. Reliable early-warning systems, effective evacuation plans, robust emergency communication networks and improved coordination among disaster-response agencies can help minimise casualties and reduce disruption when extreme weather strikes. Equally important is the protection of local livelihoods, particularly those dependent on tourism, agriculture and horticulture, which remain vulnerable to prolonged disruptions in connectivity and essential services. A climate-resilient pathway for Himachal Pradesh must therefore bring together ecological conservation, risk-informed infrastructure, institutional preparedness and community participation, ensuring that the State's development priorities remain aligned with the long-term safety and well-being of its people.

WORKSHOP PROCEEDINGS

Inaugural Session

The workshop sought to facilitate an evidence-based and multi-stakeholder dialogue on climate risks, geological fragility, and infrastructure-led development, with a particular emphasis on generating actionable recommendations for State and Union government institutions. The discussions recognised that infrastructure development remains critical for connectivity, livelihoods, access to healthcare and essential services, tourism, emergency evacuation, and regional economic development. However, infrastructure planned without adequate consideration of local geological, ecological, and hydrological conditions can amplify landslide risks, disrupt natural drainage, accelerate erosion, fragment habitats, and drive up long-term maintenance and economic costs. The workshop therefore called for a shift towards context-sensitive, climate-resilient, and people-centric infrastructure planning, grounded in improved risk assessment, scientific evidence, appropriate design standards, and stronger institutional coordination.

The deliberations were structured around three technical sessions, in addition to the inaugural and valedictory sessions, enabling a comprehensive examination of the challenges and potential solutions. The first session, 'Climate Risks and Geological Fragility in the Western Himalayas: Emerging Impacts and Vulnerability Hotspots', brought together experts from government, scientific institutions, and academia to examine the region's evolving climate risks and vulnerability. The second session, 'Urban Planning, Infrastructure Development and Institutional Roles in Building Climate Resilience', focused on the implications of urbanisation and infrastructure expansion and the institutional responsibilities involved in strengthening resilience. The third session, 'Policy and Governance Imperatives for Climate-Resilient Development Pathways in Mountain Regions: Infrastructure Adaptation and Context-Sensitive Planning', explored policy, governance, infrastructure adaptation, and planning approaches capable of responding to the particular vulnerabilities of fragile mountain environments.

The workshop drew more than 200 participants from government departments and agencies, including environment and climate change, public works, forests, town and country planning, disaster management, higher education, and other administrative institutions, alongside representatives from universities, research organisations, civil society organisations, NGOs, practitioners, and students. The registration-cum-attendance records reflect this broad-based participation, including officials, faculty members, researchers, HPAS trainees, students, technical professionals, and representatives of civil society organisations. This diversity of perspectives strengthened the workshop's objective of bridging scientific evidence, policy priorities, institutional experience, and community-level realities.

In the inaugural session, a discussion paper, titled **'Rethinking Infrastructure Development in the Western Himalayas: Towards Climate-Resilient Infrastructure'**, prepared by the CRF, was launched, reinforcing the workshop's focus on translating evidence-based dialogue into institutional and policy action. The workshop closed with a valedictory session featuring the Hon'ble Chief Minister of Himachal Pradesh, along with special addresses by Dr V. K. Paul, former Member, NITI Aayog, and Shri Kamlesh Kumar Pant, IAS, Chief Secretary, Himachal Pradesh. The session also featured the release of the report prepared by MSHIPA on **'Towards a Resilient Himachal Pradesh: Lessons and Recommendations from the 2023 and 2025 Hydro-meteorological Disasters'** and the launch of the **HIM-SIAMS Portal.**

INAUGURAL SESSION

WELCOME ADDRESS



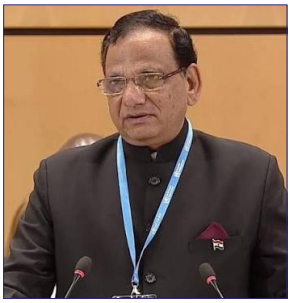
MS RUPALI THAKUR
Director, MSHIPA

OPENING ADDRESS



DR DEBAJIT PALIT
Centre Head, CCET,
Chintan Research Foundation

KEYNOTE ADDRESS



DR V. K. PAUL
Former Member, NITI Aayog

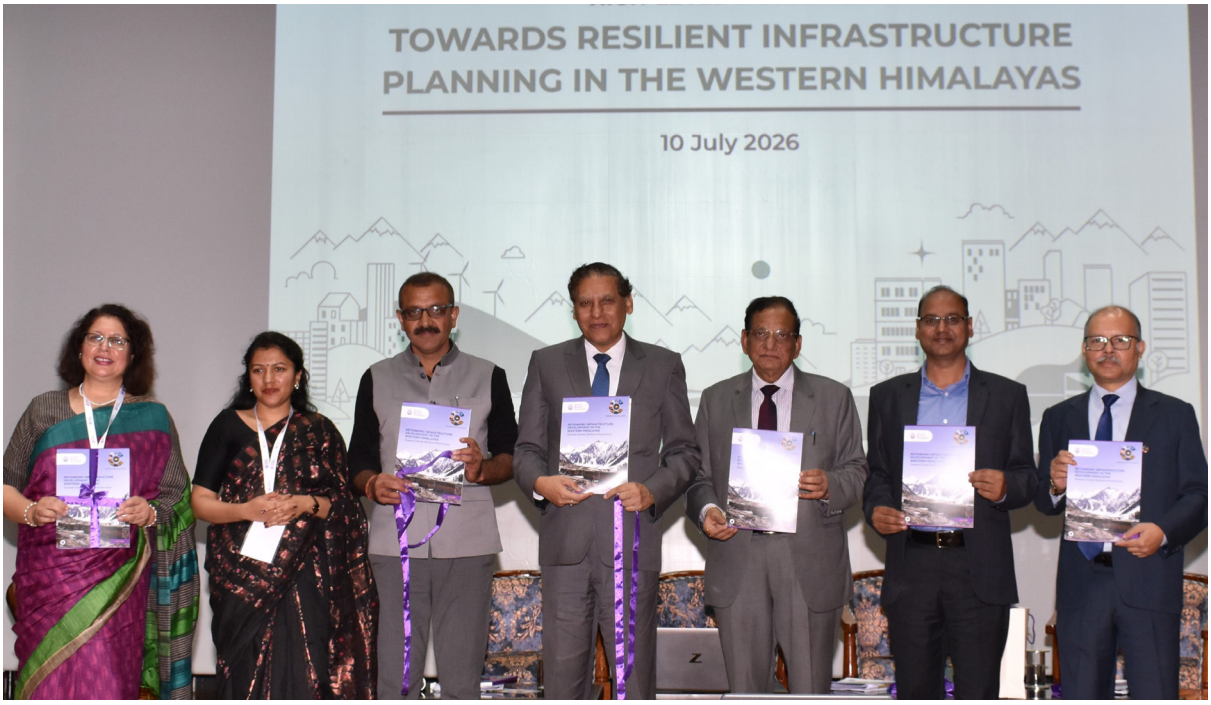
CONTEXT SETTING PRESENTATION



MR PRABODH SAXENA
Former Chief Secretary,
Himachal Pradesh State Electricity Board



ER R. K. SINGH
Centre Head, Himachal Regional Centre,
GB Pant National Institute of
Himalayan Environment



Welcome Address by Ms Rupali Thakur, Director, MSHIPA

Ms Rupali Thakur, Director, MSHIPA, warmly welcomed the distinguished speakers, participants, and guests to the workshop. She welcomed representatives from various line departments, the Department of Climate Science, students, and the Himachal Administrative Services probationers, acknowledging the diverse participation that brought together policymakers, practitioners, researchers, and young professionals.

In her welcome address, Ms Thakur thanked all the distinguished guests and attendees for joining the workshop. She emphasised the value of bringing together stakeholders from different institutional and professional backgrounds to deliberate on the emerging challenges of climate change, disaster resilience, and sustainable development in the Himalayan region.

She concluded by extending her warm welcome to all participants and expressing the hope that the workshop would provide a meaningful platform for knowledge exchange, dialogue, and collective reflection on strengthening climate-resilient development pathways across Himachal Pradesh and the wider Himalayan region.

Opening Address by Dr Debajit Palit, Centre Head, Centre for Climate Change and Energy Transition, CRF

Dr Debajit Palit welcomed all distinguished dignitaries, speakers, and participants on behalf of the CRF and thanked them for their participation in the workshop. He briefly introduced CRF, outlining the organisation's broader areas of work and the three key verticals through which it undertakes research, advances policy engagement, and convenes dialogue. He highlighted CRF's overarching objective of

bringing India's perspectives to the world and the world to India, with its work advanced through research publications, opinion pieces, and policy dialogues.

Dr Palit argued that climate change is a global phenomenon, but its consequences are particularly significant for the inherently fragile Himalayan ecosystem. He noted that climate-induced disasters are increasingly affecting infrastructure across the region, with landslides and related disruptions becoming a recurring threat. Citing the Chandigarh–Shimla National Highway as an example, he observed that travellers can witness the impact of landslides at different points along the route throughout the year, underlining the growing vulnerability of critical infrastructure to changing climatic conditions and geological instability.

Against this backdrop, Dr Palit stressed that climate-resilient infrastructure has become an urgent necessity. He explained that the workshop had been designed to facilitate cross-learning and encourage meaningful discussion on how infrastructure development can adapt to the combined challenges of climate change and geological fragility. Rather than adopting a one-way format of knowledge delivery, he called for the workshop to facilitate two-way interaction between expert panellists and participants, enabling diverse perspectives and practical experiences to inform the discussion.

Dr Palit noted that the workshop was aimed at bringing together policymakers, administrators, scientists, engineers, researchers, and practitioners on a common platform to identify co-actionable solutions to the challenges posed by climate change and the geological vulnerabilities of Himalayan landscapes. He stressed the importance of collaboration across disciplines and institutions in developing resilient, context-sensitive pathways for development.

In concluding his opening remarks, Dr Palit thanked all the distinguished speakers, participants, and guests for joining the workshop, with particular appreciation for their participation despite the rainy weather. He expressed hope for an engaging and productive day of dialogue and exchange.

Context Setting Presentation by Mr Prabodh Saxena, Former Chief Secretary, HPSEB

Mr Prabodh Saxena traced the evolving disaster landscape of Himachal Pradesh by reflecting on changes in the nature, frequency, and geographical spread of disasters over recent decades. Recalling his first experience of a cloudburst during the Baijnath event in 2003, he noted that such events were relatively unfamiliar at the time, when disasters were more commonly associated with road and bus accidents. He recalled the 1975 Kinnaur earthquake, 1997 Chirgaon cloudburst, 2000 Sutlej River flash flood, and 2005 Parechu lake outburst. However, he observed that recent disasters point to a transformation in the State's risk profile.

He identified 2023 as a watershed year, when the entire State was severely affected by a succession of extreme weather events. Four major spells of intense rainfall triggered 5,000 landslides, 27 cloudburst incidents, and 83 flash-flood incidents, claiming 428 lives. Nearly 5,000 houses were completely damaged, and around 10,000 suffered partial damage. Extensive damage was also reported to roads, power infrastructure, and public assets. He emphasised that the experience of 2023 should serve as a roadmap for reassessing disaster preparedness and resilience across Himachal Pradesh.

The pattern continued in 2025, which witnessed five spells of heavy rainfall and nine instances of the highest recorded rainfall since 1901. Kullu-Manali and Mandi were among the worst-affected areas during both years. During July and August 2025, the Pong Dam received 9.68 BCM of water, surpassing the previous highest recorded inflow of 7.70 BCM in 1988. Mr Saxena highlighted this as particularly significant for Kullu, traditionally considered a rain-shadow and relatively water-deficient area, demonstrating the increasing unpredictability of precipitation and hydrological conditions.

He then turned to the interaction between geological fragility, climate variability, and exposure to multiple hazards. Approximately 25–30 per cent of Himachal Pradesh's geographical area falls within high to very high landslide-susceptibility zones, while all 12 districts are considered landslide-prone. The State has 2,554 glaciers covering around 6.8 per cent of its area, and 22 lakes are vulnerable to glacial lake outburst floods (GLOFs). Ten districts are flood-prone, including 59 villages in the Beas basin and 280 in the Sutlej basin. These underlying vulnerabilities are compounded by changes in rainfall intensity and temporal distribution.

Mr Saxena cautioned that declining overall rainfall does not imply declining disaster risk. Instead, rainfall is increasingly concentrated into fewer days and characterised by higher intensity. Six districts experienced declining monsoon rainfall during 1951–2022, even as intense events became increasingly consequential. Between 9 and 11 July 2023, 224 mm of rainfall was recorded against a normal level of around 42 mm, while Kullu received 131 mm in a single day. Shimla has experienced an approximately 17 per cent decline in total rainfall since the 1990s, alongside increasingly prominent intense rainfall spells.

The increase in extreme events was further illustrated by the reported rise in cloudburst incidents from approximately 10 in 2013 to 80 in 2025, while flood incidents increased from around 50 to 250. He underlined the need for resilient infrastructure, improved drainage, stronger early-warning systems, and enhanced local preparedness.

Changes in the cryosphere add another layer of risk, reinforcing the urgency of GLOF preparedness. The reported glacial area declined from 4,021 sq. km in 1994 to 2,199 sq. km in 2021, a reduction of around 45 per cent. The lake associated with the Gepang Gath glacier expanded by approximately 178 per cent between 1989 and 2022, while the number of glacial lakes in the Sutlej basin reportedly increased from 562 in 2019 to 1,048 in 2023. The Central Water Commission has mapped 2,843 Himalayan lakes, including 67 identified as high-risk based on more than 40 per cent expansion.

The 2005 Parechu flood demonstrated the value of preparedness. A landslide in Tibet blocked a tributary of the Sutlej, creating a lake that later breached and threatened Himachal Pradesh and the Nathpa Jhakri hydropower project. Advance monitoring and pre-positioning by the National Disaster Management Authority (NDMA) and the Central Water Commission helped reduce potential impacts. The episode showed that while hazards cannot always be prevented, losses can be substantially reduced through timely warning and preparedness.

Mr Saxena highlighted the considerable human and economic costs. Between 2021 and 2025, 400 lives were lost annually due to disasters. Economic losses were estimated at ₹9,905 crore in 2023 and ₹5,909 crore in 2025, with the Public Works Department (PWD) recording the highest losses, followed by Jal Shakti, agriculture, horticulture, and power. Disasters therefore amount to both humanitarian emergencies and major developmental setbacks. Water security is emerging as another concern. Nearly 70 per cent of the State's water sources are reportedly drying up or under stress, while approximately two-thirds of traditional springs and khuls are at risk. Such stress has implications for drinking water, agriculture, horticulture, and hydropower.

In conclusion, Mr Saxena emphasised that climate change, water stress, cryospheric changes, extreme rainfall, landslides, floods, forest fires, and livelihood disruptions form an interconnected vulnerability landscape. He cautioned against attributing extreme rainfall directly to glacier retreat, noting that glacier retreat and intense precipitation are distinct processes. He highlighted the World Bank-supported Himachal Pradesh Resilient Action for Development and Disaster Recovery (HP-READY) project and the Agence Française de Développement (AFD)-supported Disaster Risk Reduction and Preparedness Programme. He called for climate-resilient construction, technological preparedness, effective early-warning systems, stronger coordination, and anticipatory planning. His central message was that Himachal Pradesh must learn to live with disasters while ensuring that infrastructure, institutions, and communities are prepared to withstand, respond to, and recover from future shocks.

Context Setting Presentation by Er R. K. Singh, Centre Head, Himachal Regional Centre, GB Pant National Institute of Himalayan Environment

Er. R. K. Singh, Centre Head, Himachal Regional Centre, GB Pant National Institute of Himalayan Environment, framed the discussion by emphasising that while climate-induced disasters cannot always be prevented, their impacts can be substantially reduced through mitigation and preparedness. He argued that Himalayan States must balance infrastructure and economic development with the conservation of fragile ecosystems. He highlighted the role of the Ministry of Environment, Forest and Climate Change (MoEFCC) through environmental regulation, research, ecological monitoring, and nature-based interventions.

Mr Singh outlined the regulatory mechanisms through which the MoEFCC seeks to ensure that infrastructure development considers environmental sensitivities. He highlighted the Van (Sanrakshan Evam Samvardhan) Adhiniyam and the Environmental Impact Assessment (EIA) framework as instruments for regulating development in ecologically fragile regions. These frameworks are particularly relevant in the Himalayas, where infrastructure planning must reflect terrain, ecosystems, and local environmental conditions.

He highlighted mountain-specific research through initiatives such as the National Mission on Himalayan Studies (NMHS). Through the Him-CONNECT Forum, research is being undertaken on predictive landslide modelling, disaster-resilient housing, and environmentally sustainable road technologies. IIT Mandi, CSIR-Central Road Research Institute (CSIR-CRRI) and IIT Roorkee contribute to these efforts. Mr Singh stressed that stronger linkages between scientific research and infrastructure planning are essential if engineering solutions are to reflect the distinctive geological and ecological conditions of mountains.

Mr Singh also highlighted the contribution of the GBP-NIHE to ecological monitoring. The Institute manages Long-Term Ecological Monitoring (LTEM) stations across an altitude range of approximately 700 to 3,800 metres in the Western Himalayas. Monitoring tree lines, weather anomalies, and soil erosion provides evidence that can inform the planning, design, and maintenance of mountain highways, dams, and other infrastructure. Such datasets can help bridge the gap between what environmental science observes and what infrastructure decision-making accounts for.

On highway infrastructure, Mr Singh highlighted the importance of incorporating environmental safeguards throughout project planning and execution. Mandatory environmental assessments, restrictions on dumping construction debris into riverbeds, and requirements for slope stabilisation following hill cutting and excavation can reduce vulnerability to mudslides, slope failures, and washouts during extreme rainfall and flash floods. He stressed that environmental safeguards should ensure infrastructure is designed around the ecological and climatic realities of the region.

For hydropower development, Mr Singh highlighted environmental-flow requirements and catchment-area treatment plans as safeguards. Environmental-flow standards require specified proportions of natural river flows to be maintained downstream of hydropower projects to support aquatic ecosystems and downstream communities. He referred to prescribed flows of approximately 30 per cent during the monsoon, 20 per cent during lean periods, and 25 per cent during non-monsoon, non-lean periods, based on a 90 per cent dependable year. Such provisions help maintain downstream ecological functions and support catchment management.

He also highlighted the importance of eco-sensitive zone management and carrying-capacity assessments for Himalayan towns and fragile landscapes. Such approaches can identify limits within which infrastructure, population, and tourism can expand without placing unsustainable pressure on ecosystems. He noted that effectiveness depends on implementation, enforcement, and continuous monitoring.

Mr Singh identified existing policy frameworks and initiatives relevant to Himalayan resilience, including the Forest (Conservation) Act, 1980, the EIA framework, the Governance for Sustaining Himalayan Ecosystem (G-SHE) initiative, and Him-CONNECT. He argued that the principal challenge is effective implementation and coordination. Existing frameworks provide a foundation for climate-resilient infrastructure when environmental and climate considerations are incorporated into project planning. He also drew attention to CAMPA restoration funding, noting reported utilisation or allocation levels of approximately 88 per cent in Uttarakhand, 78 per cent in Himachal Pradesh, 62 per cent in Jammu & Kashmir, and 45 per cent in Ladakh. He argued that financial utilisation must be accompanied by outcome monitoring, with restoration assessed through measurable ecological improvements rather than expenditure alone.

Nature-based solutions were another component. Mr Singh highlighted restoring degraded alpine grasslands to stabilise topsoil, reduce rainfall runoff, and minimise slope failure above settlements. He emphasised glacier and glacial-lake monitoring, including sensor-based early-warning systems for downstream communities and hydropower infrastructure. He called for capacity building among PWD

and Jal Shakti engineers through mountain-specific procedures for drainage, slope management, and road cutting.

Mr Singh further emphasised spring mapping and conservation in Himalayan development planning. He noted that tunnels, dams, roads, and urban expansion can disrupt underground hydrological systems sustaining mountain communities. He therefore advocated systematic spring mapping and revival protocols before major infrastructure and urban-development projects are approved. Incorporating spring systems into project planning would safeguard water security and reduce reactive interventions. In conclusion, Mr Singh emphasised that development and ecological conservation should not be treated as competing objectives. The priority should be to make development compatible with the ecological, geological, and hydrological realities of the Himalayas. Existing frameworks and institutions provide a foundation for this transition. Strengthening implementation, improving institutional coordination, monitoring outcomes, and mainstreaming nature-based and technology-enabled solutions can enable the Himalayas to pursue infrastructure development while safeguarding the ecological systems that underpin the resilience and livelihoods of mountain communities.

Keynote Address by Dr V. K. Paul, Former Member, NITI Aayog, New Delhi

Dr V. K. Paul, Former Member, NITI Aayog, described 2023 as a watershed moment in Himachal Pradesh's evolving disaster landscape and emphasised that the State's developmental future must be understood at the intersection of three interconnected realities: geological fragility, the growing impacts of climate change, and continuing development imperatives. Together, these factors pose a central challenge for Himachal Pradesh as it seeks to sustain economic and social progress while becoming increasingly exposed to climate-related risks.

Dr Paul emphasised that geological fragility is not a new phenomenon. The Himalayas are among the youngest mountain systems in the world and remain characterised by active tectonic processes, with the Indian subcontinent continuing to move northwards and interact with the Eurasian plate. This geological dynamism makes the region inherently vulnerable to landslides, slope instability, and other geological hazards. Development strategies designed for the plains, therefore, cannot simply be replicated in mountain regions. The ecological and geological characteristics of the Himalayas require a distinct development pathway that recognises the limits and sensitivities of the landscape.

At the same time, Dr Paul noted that Himachal Pradesh has demonstrated considerable development success despite these structural constraints. The State has achieved significant improvements in human development, including one of the country's highest life expectancies at birth, and has made substantial progress towards the Sustainable Development Goals. He argued that development within a fragile mountain environment is possible when ecological thresholds are respected. Forests and ecosystems have historically formed an important foundation for the State's development trajectory, making their conservation essential for sustaining future progress.

However, climate change has introduced a new layer of risk onto an already fragile geological landscape. The accumulation of greenhouse gas emissions over decades is increasingly manifesting through changes in temperature, precipitation, and the frequency and intensity of extreme weather events. Dr Paul highlighted the particular concern surrounding warming in the Himalayan region, noting that several assessments indicate that surface temperatures have increased faster than the global average. Climate change is consequently interacting with existing geological vulnerabilities and reducing the capacity of natural and human systems to absorb shocks.

The scale of this interaction became particularly evident during the 2023 disasters. Dr Paul noted that approximately 20 per cent of health facilities were affected, while educational infrastructure also experienced significant disruption. These impacts demonstrate that climate-related disasters are no longer confined to roads, bridges, and other physical infrastructure; they can disrupt essential public services and directly affect human development. When climate change acts upon an already fragile geological and ecological system, the threshold beyond which infrastructure and communities can withstand shocks becomes increasingly narrow.

Dr Paul further emphasised that these challenges are emerging as Himachal Pradesh seeks to accelerate its development ambitions. As India advances towards the Viksit Bharat vision, the State seeks to significantly increase economic prosperity, including raising per-capita income from approximately USD 3,000 to USD 18,000 over the next two decades. Such expansion would require substantial investment in infrastructure, industry, tourism, and other economic activities. However, the scale of this ambition makes it even more important to reconsider conventional development models and ensure that economic expansion does not increase exposure to climate and geological risks.

Tourism offers a particularly important example. As one of Himachal Pradesh's major revenue-generating sectors, tourism is highly sensitive to extreme weather events, landslides, road disruptions, water scarcity, and perceptions of safety. Climate change therefore poses a dual challenge: it can directly damage tourism infrastructure while simultaneously influencing tourist behaviour and local livelihoods. Protecting the State's economic base consequently requires climate resilience to be integrated into sectoral and infrastructure planning.

Turning to the response, Dr Paul emphasised that community engagement must remain at the heart of disaster management. Protocols should not be designed solely at State or district levels but should incorporate preparedness, response, and recovery mechanisms at panchayat and community levels. Local communities are often the first responders during disasters, while their knowledge of local terrain, water systems, and hazards can strengthen preparedness. Building community capacity should therefore be treated as an integral component of the State's disaster-management architecture.

He also underscored the importance of accurate, timely, and trustworthy communication. During disasters, public confidence depends heavily on the credibility of information provided by government institutions and the media. Transparent and truthful communication can strengthen public trust, while misleading or exaggerated information can aggravate panic and adversely affect communities and economic sectors such as tourism. Strengthening communication protocols and ensuring responsible media engagement should therefore form an important part of disaster preparedness.

In conclusion, Dr Paul called for a fundamental shift towards climate-resilient infrastructure and a reimagined development model for mountain regions. This requires not only stronger infrastructure but also greater investment in preventive and mitigation measures addressing landslides, floods, and slope failures. Meeting these challenges will demand substantial financial, technological, and institutional resources, raising the broader question of how Himachal Pradesh can muster the capacity necessary for resilient development.

He emphasised that reimagining development does not mean abandoning the State's development aspirations. Rather, it requires reorienting those aspirations around the ecological and geological realities of the Himalayas and strengthening the State's capacity to sustain this transition. By leveraging local institutional, ecological, technological, and community capabilities, Himachal Pradesh can pursue a development pathway that combines economic advancement with climate resilience, disaster preparedness, and long-term ecological sustainability.

SESSION 1: CLIMATE RISKS AND GEOLOGICAL FRAGILITY IN THE WESTERN HIMALAYAS: EMERGING IMPACTS AND VULNERABILITY HOTSPOTS



The session examined the changing disaster landscape in the Western Himalayas, with particular emphasis on the interaction between climate change, geological fragility, and human development. Panellists mapped emerging vulnerability hotspots across Himachal Pradesh, discussed the role of infrastructure and development pressures in amplifying disaster risks, and highlighted the need to transition from reactive disaster management towards risk-informed planning, predictive technologies, and community-based preparedness.

PANELISTS

MODERATOR



MR PRASHANT SIRKEK
Additional Director, Dr Manmohan Singh
HP Institute of Public Administration



DR PUSHPENDRA RANA
Director, Department of Environment, Science & Technology, Government of Himachal Pradesh



PROF. P. K. JOSHI
Professor, School of Environmental Sciences, Jawaharlal Nehru University, New Delhi



PROF TIKENDER SINGH PANWAR
Professor, Shoolini University, Himachal Pradesh



PROF. ANJAL PRAKASH
Professor,
FLAME University, Pune

Dr Pushpendra Rana highlighted the changing disaster landscape of Himachal Pradesh, noting that the State must reassess whether its existing preparedness mechanisms are adequate to address emerging risks. He identified three interconnected dimensions – climate change, geological conditions, and human development – that shape disaster vulnerability. Using the framework of hazard, exposure, and vulnerability, he noted that their intersection creates vulnerability hotspots, with almost the entire territory of Himachal Pradesh exposed to different forms of disaster. Between 2021 and 2025, the State recorded approximately 460 landslides, 254 flash floods, and 98 cloudburst incidents. He called for improved risk information, risk-informed development, and stronger governance, including greater community participation and disaster-readiness training for local groups such as navyuvak mandals and mela mandals. He also highlighted the importance of Post-Disaster Needs Assessment (PDNA) and the World Bank-supported HP-READY project.

Prof. P. K. Joshi emphasised that the Himalayas are among the most dynamic regions of the planet, owing to their active geological processes and increasing human intervention. He cautioned that development interventions can inadvertently increase disaster exposure. While roads, for instance, improve connectivity, inadequate consideration of terrain and ecological conditions can simultaneously increase landslide risks. He stressed the need to distinguish between a hazard and a disaster: hazards are largely determined by geographical and natural processes, whereas disasters emerge when hazards interact with exposed populations, infrastructure, and other assets. Climate change, he argued, does not necessarily create entirely new hazards in the Himalayas but magnifies existing hazards, increasing their intensity and potentially their impacts.

Illustrating this distinction through glacial change, Prof. Joshi noted that glacier retreat and glacial lake formation are hazards, while GLOFs become disasters when floodwaters interact with settlements, roads, bridges, hydropower projects, and other exposed assets. Experiences from Himachal Pradesh, Joshimath, Sikkim, and Kedarnath demonstrate the need to strengthen the organisational and institutional dimensions of disaster management. He called for more robust and risk-informed decision-making, arguing that technological systems should move beyond mapping past disasters towards anticipating future risks. Geographic Information Systems (GIS), artificial intelligence (AI), and Machine Learning (ML) can support predictive assessments, while community-level sensors and local knowledge can supply critical real-time information from the ground.

Prof. Tikender Panwar argued that extreme weather events are increasingly becoming a new reality for Himalayan communities, requiring preparedness to become an integral part of development planning. He cautioned against categorising every intense rainfall event as a cloudburst, noting the importance of applying established technical thresholds for accurate disaster assessment and communication. He also situated contemporary risks within the broader trajectory of development since the 1990s, arguing that increasingly extractive development practices have placed additional pressure on Himalayan ecosystems. The proliferation of hydropower projects and associated construction activities, particularly in Kinnaur, requires greater consideration of cumulative environmental impacts. He called for comprehensive State-level planning that ensures public institutions and critical infrastructure are not developed in high-risk locations without adequate assessment.

Prof. Anjal Prakash highlighted the climate–geology–human intervention nexus, noting that warming, cryospheric changes, and development pressures can interact to create cascading risks for communities, infrastructure, and ecosystems. He identified several priorities, including integrated real-time monitoring of glacial lakes and rainfall, climate and geological screening of new infrastructure projects, and stronger hazard mapping and early-warning systems linked to climate models. He further emphasised community-based disaster-response planning and local capacity building, alongside dedicated financing mechanisms for rapid response and recovery. Given the persistence of climate-related risks, he stressed that resilience must be treated as a long-term development priority rather than a temporary disaster-response requirement.



SESSION 2: URBAN PLANNING, INFRASTRUCTURE DEVELOPMENT, AND INSTITUTIONAL ROLES IN BUILDING CLIMATE RESILIENCE

The session focused on the imperative of mainstreaming climate resilience into urban planning, infrastructure development, and tourism management across the Western Himalayas. Panellists highlighted the vulnerability of roads and urban infrastructure to landslides and extreme weather events, the consequences of unplanned development and tourism expansion, and the need to move from reactive responses towards risk-informed and proactive planning. The discussion also emphasised the importance of regionally appropriate architecture, carrying-capacity considerations, stronger institutional coordination, and effective implementation of existing planning and regulatory frameworks.

PANELISTS

MODERATOR



DR DEBAJIT PALIT
Centre Head, Centre for Climate Change and Energy Transition, CRF



ER SANJAY SONI
Chief Engineer, Public Works Department, Himachal Pradesh



PROF. MOHAMAD SULTAN BHAT
Professor, Department of Geography and Disaster Management, University of Kashmir



PROF. AMIT GANGOTIA
Professor, School of Tourism & Travel Management, Central University of Himachal Pradesh, Dharamshala



MR PRADEEP THAKUR
Town and Country Planner
Town and Country Planning, Department, Government of Himachal Pradesh

Er. Sanjay Soni highlighted that roads are among the first critical infrastructure assets to be affected by Himalayan disasters, particularly landslides and intense rainfall, even as they remain essential lifelines for connectivity, livelihoods, public services, and emergency response. He argued that resilience must be integrated into road planning from the outset. For rural roads, engineering expertise should be complemented by systematic disaster-risk assessment, while project estimates and DPRs must explicitly provide for slope stabilisation and other resilience measures associated with hill cutting. Failure to incorporate such provisions at the planning stage, he noted, can lead to disputes over contractual responsibilities and significantly higher costs after infrastructure failure.

Er. Soni also cautioned against constructing roads at or immediately adjacent to river levels, advocating elevated structures where site conditions require them. He cited the Kullu-Manali region as an example of the socio-economic consequences of such infrastructure decisions during the 2025 disasters. He further noted that land availability often constrains the alignment of rural roads, sometimes resulting in disaster-risk considerations receiving insufficient attention. Referring to the Chandigarh–Shimla highway, he observed that the original DPR, prepared several years earlier, had not adequately anticipated the landslide risks subsequently witnessed along the corridor. Vertical hill cutting without adequate slope protection contributed to instability, necessitating a separate DPR to address the resulting damage. He argued that this experience demonstrates the higher costs of reactive rather than anticipatory planning.

Prof. Mohamad Sultan Bhat emphasised that climate change is particularly consequential in the Himalayas because it interacts with the region's inherent geological sensitivity and growing human intervention. He highlighted the degradation of wetlands, which historically served as natural buffers against flooding, noting that approximately 40 per cent have reportedly degraded. The expansion of tourism and hotel construction has further altered Himalayan urban landscapes and contributed to environmental pressure and deforestation. He called for cumulative assessment of such interventions rather than evaluating infrastructure projects in isolation.

Prof. Bhat recommended that Himalayan cities undertake systematic risk assessments based on the UNDRR framework and incorporate the findings into land-use and infrastructure planning. Given the region's high exposure and vulnerability, he argued that risk-informed planning should become a routine feature of development rather than a response initiated only after disasters occur.

The Moderator, Dr Debajit Palit, raised the issue of tourism carrying capacity, drawing attention to Bhutan's approach of regulating tourist inflows according to available resources and infrastructure. He suggested that similar principles could be explored for Himachal Pradesh and other Western Himalayan States to balance tourism revenues with ecological sustainability.

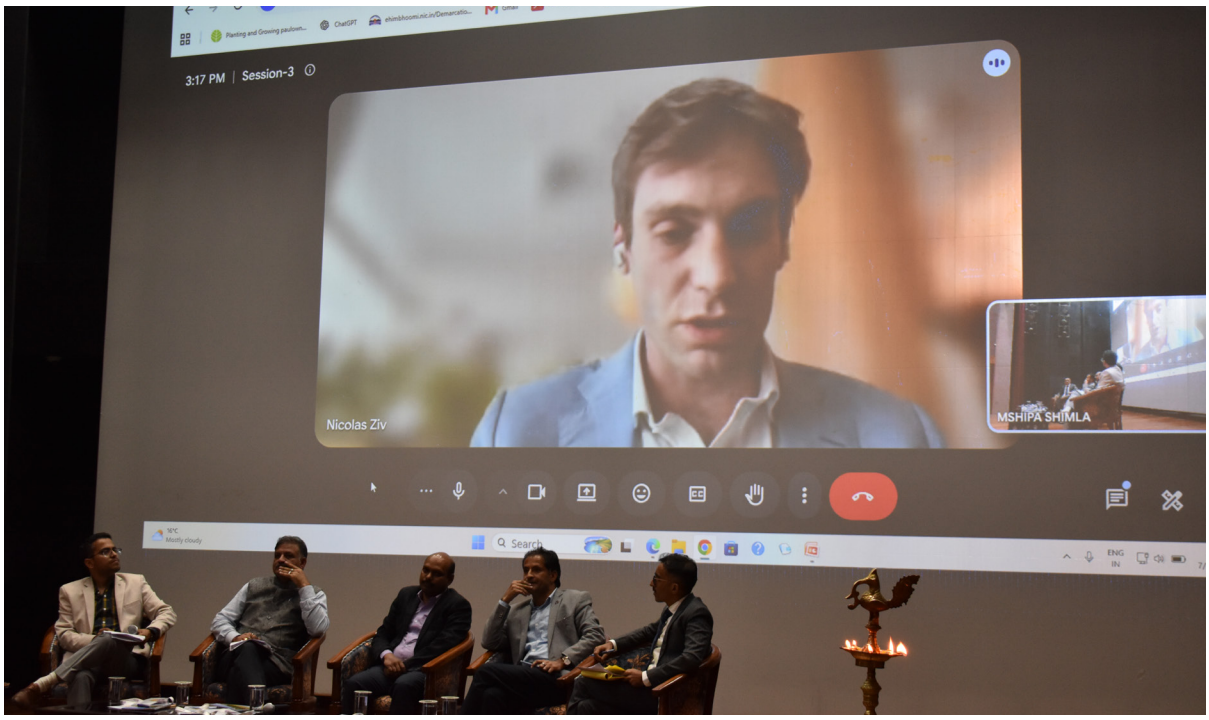
Prof. Amit Gangotia argued that tourism development must operate within the ecological and geological limits of the Himalayas. He called for greater use of regionally appropriate architectural and infrastructure practices, cautioning against the proliferation of concrete-intensive development. He highlighted how traditional Himalayan settlements historically maintained a relationship between glaciers, water systems, forests, villages, and agricultural areas, with natural ecosystems serving as

buffers. Contemporary development, he observed, has increasingly disrupted this spatial relationship. Prof. Gangotia advocated appropriate zoning and segregation of tourism and pilgrimage destinations, recognising their distinct ecological, cultural, and infrastructural requirements. He called for a re-imagination of Himachaliyat through locally appropriate architectural practices, citing the work of architect Rahul Bhushan as an example. He stressed the need to respect geological, legal, and ethical boundaries and shift from reactive to proactive planning.

Mr Pradeep Thakur emphasised that planning and implementation must receive equal attention in building resilient infrastructure. Climate-adaptation measures should be incorporated throughout the infrastructure lifecycle – from project conception and design to construction, operation, and maintenance. He stressed that climate resilience should be treated as a cross-cutting planning principle, rather than as a separate sector.

Mr Thakur further highlighted the need for coordination among the PWD, Forest Department, Town and Country Planning Department, and other line agencies. Existing legal frameworks and scientific knowledge provide a foundation for resilient development, but effective implementation and institutional coordination remain critical. He also emphasised the importance of reliable scientific data and its effective translation into decisions at the implementation stage.

Concluding the session, Mr Thakur noted that the importance of sound planning has deep roots in the Indian context, citing Mohenjo-daro as an example of sophisticated settlement planning. The challenge for contemporary Himalayan development, he argued, is therefore to reconnect modern infrastructure planning with the environmental realities, local knowledge, and context-sensitive planning principles necessary for a resilient mountain future.

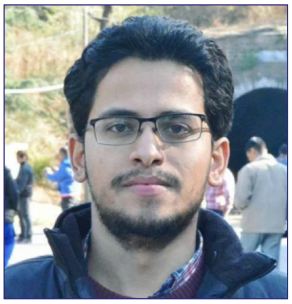


SESSION 3: POLICY AND GOVERNANCE IMPERATIVES FOR CLIMATE-RESILIENT DEVELOPMENT PATHWAYS IN MOUNTAIN REGIONS: INFRASTRUCTURE ADAPTATION AND CONTEXT-SENSITIVE PLANNING

The session focused on the policy, institutional, and legal imperatives for building climate-resilient development pathways in mountain regions. Panellists examined the need to mainstream climate considerations into infrastructure planning across sectors, strengthen inter-departmental coordination, recognise the ecological role of forests, develop regionally specific climate-risk indicators, and address gaps in the legal and contractual frameworks governing infrastructure development. The discussion underscored that climate resilience should be treated as a core development necessity rather than a post-disaster response.

PANELISTS

MODERATOR



DR MAHESH SHARMA
Himachal Pradesh University



DR SURESH C. ATTRI
Chief Scientific Officer, Department of Environment, Science, Technology and Climate Change, Government of Himachal Pradesh



DR KIRUPASANKAR M.
Conservator of Forests, Forest Department, Government of Himachal Pradesh



DR NICOLAS ZIV
Lead Specialist – Transport Sector Resilience, Coalition for Disaster Resilient Infrastructure (joining online)



DR B. R. THAKUR
Associate Professor, Department of Geography, Himachal Pradesh University, Shimla



MR SUKSHAM CHAUHAN
FCIArb (UK), Solicitor of the Senior Courts of England & Wales, Indian Advocate

Dr Suresh C. Attri described climate change as an emerging development challenge for Himachal Pradesh, highlighting changes in rainfall and snowfall patterns, glacier retreat, forest fires, biodiversity loss, and increasing water scarcity. The substantial economic losses experienced during recent monsoon seasons demonstrate that climate change can no longer be viewed solely as an environmental concern; it has significant implications for the State's economy, infrastructure, and overall development trajectory. He therefore raised the critical question of whether existing infrastructure is adequately prepared to withstand emerging climate risks.

Dr Attri stressed that climate preparedness must be incorporated at the planning stage rather than treated as an afterthought. Climate screening should be mainstreamed across sectors, including agriculture, horticulture, energy, roads, and civil infrastructure, from the inception of projects. Such screening should include systematic climate-risk and impact assessments, with their findings subsequently incorporated into project design, implementation, and management. This would enable infrastructure investments to anticipate future risks rather than relying on corrective measures following disasters.

Dr Kirupasankar highlighted the critical role of forests in strengthening climate and disaster resilience. He noted that forests and trees constitute an important component of Himachal Pradesh's landscape and serve as natural buffers against hazards by stabilising slopes, regulating surface runoff, and reducing the impacts of extreme events. Forest ecosystems should therefore not be considered separately from infrastructure and development planning. Instead, their protective and ecological functions need to be explicitly recognised and integrated into the State's development strategy.

Dr Nicolas Ziv emphasised that efficient utilisation of resources must accompany investments in climate-resilient infrastructure. Drawing attention to climate-impact projections indicating growing hydrological challenges across the Himalayan region, he stressed that infrastructure needs to remain functional under changing climatic conditions. This requires not only resilient engineering and design but also the optimal use of financial, technological, and natural resources to ensure the long-term sustainability of infrastructure investments.

Dr B. R. Thakur argued that climate resilience must become an integral component of the broader development agenda. Achieving this would require stronger coordination among line departments and collaboration between policymakers, political leadership, administrators, industry, scientific institutions, and communities. He emphasised that resilience should be regarded as a development necessity rather than an additional or standalone policy objective.

Dr Thakur further called for regionally informed and context-sensitive planning. Frameworks, indicators, and risk assessments developed for other geographical settings cannot simply be replicated in the Himalayas, given the region's distinctive geological, ecological, and socio-economic characteristics. He advocated the development of indigenous and locally relevant indicators capable of capturing mountain-specific vulnerabilities. He also highlighted the need to account for changing demographic and settlement patterns. With rapid urbanisation transforming the nature and scale of human settlements, planning frameworks must evolve accordingly to prevent unplanned expansion into vulnerable areas.

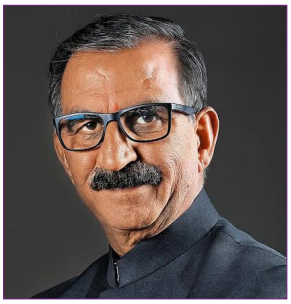
Mr Suksham Chauhan drew attention to the legal and contractual dimensions of climate-resilient infrastructure, highlighting the absence of a comprehensive legal instrument specifically dedicated to climate resilience in infrastructure development. At the international level, he referred to the Sendai Framework for Disaster Risk Reduction as an important guiding framework, while noting its character as a soft-law instrument. At the national level, he observed that the Disaster Management Act provides an overarching framework for disaster management but does not specifically mandate climate-resilience requirements throughout infrastructure planning and construction.

Mr Chauhan therefore argued that the contractual framework governing infrastructure projects could become an important instrument for mainstreaming resilience. Infrastructure projects generally involve contractual relationships between the State and executing agencies or contractors, providing an opportunity to translate resilience objectives into specific project obligations. He observed that standard infrastructure contracts are often applied across different geographical contexts without adequately differentiating between the requirements of plains and fragile mountain terrain.

He consequently called for mountain-specific climate and disaster-resilience provisions to be incorporated into infrastructure contracts, including appropriate technical standards, risk-management responsibilities, and implementation requirements. Scientific, engineering, and climate-risk expertise should inform the drafting of such contracts rather than relying solely on standardised templates. This could help bridge the gap between risk assessments undertaken during project planning and their actual implementation on the ground.

Overall, the session underscored that building climate resilience in the Himalayas requires an integrated governance approach combining climate screening, ecosystem protection, context-specific planning, institutional coordination, efficient resource utilisation, and stronger legal and contractual mechanisms. Resilience must be embedded across the entire infrastructure lifecycle – from policy formulation and project conception to contracting, construction, operation, and maintenance – if development investments are to remain viable under changing climatic conditions.

VALEDICTORY SESSION



SHRI SUKHVINDER SINGH SUKHU
Hon'ble Chief Minister of
Himachal Pradesh



SH. KAMLESH KUMAR PANT
Chief Secretary, Govt of H.P.



DR V K PAUL
Former Member, NITI Aayog



SH. DEEPAK RATHORE
Vice Chairman, SDMA, Himachal
Pradesh



MS RUPALI THAKUR
Director, MSHIPA



DR DEBAJIT PALIT
Centre Head, CRF

Address by Ms Rupali Thakur

Ms Rupali Thakur, Director, MSHIPA, extended a warm welcome to the Hon'ble Chief Minister of Himachal Pradesh, Dr V. K. Paul, Mr Pant, Chief Secretary, Government of Himachal Pradesh, and Ms Deepak Rathaur, Vice Chairman, State Disaster Management Authority (SDMA), for gracing the Valedictory Session of the Workshop. She thanked them for their presence and participation in bringing the workshop's deliberations to a close.

Ms Thakur also welcomed and thanked the CRF and Dr Debajit Palit for conceptualising and successfully conducting the workshop. She acknowledged CRF's efforts in bringing together diverse stakeholders to deliberate on the emerging challenges of climate change, disaster risk, and resilient infrastructure in the Himalayan region.

She noted that the Disaster Management Wing of Himachal Pradesh regularly organises deliberations and programmes on disaster management, reflecting the State's continued efforts to strengthen preparedness and resilience. In this context, she highlighted the value of the present workshop, which brought together an eminent group of panellists and experts from different fields to examine the challenges associated with climate change, geological fragility, and infrastructure development.

Ms Thakur provided an overview of the participation at the workshop, highlighting the presence of senior government officials, policymakers, administrators, scientists, academics, researchers, engineers, practitioners, and other stakeholders. She acknowledged the participation of the distinguished dignitaries and experts who contributed to the discussions and emphasised that such diverse representation provided an important platform for sharing knowledge, experiences, and perspectives on building climate-resilient development pathways for Himachal Pradesh.

She concluded by reiterating her appreciation to all the distinguished speakers, panellists, participants, and partner institutions for their valuable contribution to the workshop and for making the deliberations substantive and forward-looking.

Highlights of the Workshop by Dr Debajit Palit

Dr Debajit Palit extended greetings to all distinguished dignitaries present on the dais and provided a brief introduction to the CRF. Presenting the key highlights of the day-long discussions, he emphasised that infrastructure development remains indispensable to socio-economic development. Roads, tunnels, hydropower projects, tourism infrastructure, and urban expansion will continue to play a central role in improving connectivity, generating livelihoods, strengthening strategic preparedness, and advancing India's broader developmental journey.

At the same time, Dr Palit noted that climate change is introducing a new layer of challenges to infrastructure development, with increasing instances of cloudbursts, flash floods, landslides, and other climate-induced hazards posing significant risks to infrastructure and communities across the Himalayan region. Against this backdrop, he highlighted the central question emerging from the workshop: the issue is not whether infrastructure should be built, which it certainly should, but whether it is being planned and designed to withstand the climatic conditions of the future.

Dr Palit explained that it was against this backdrop that the workshop brought together policymakers, administrators, scientists, researchers, academicians, engineers, planners, and practitioners from Himachal Pradesh and other parts of India, alongside an international expert from the Coalition for Disaster Resilient Infrastructure (CDRI). The diverse participation provided a platform for cross-sectoral learning and collective brainstorming on the challenges and opportunities associated with climate-resilient infrastructure development in the Himalayan region.

Reflecting on the discussions across the three sessions, Dr Palit noted that there was a broad consensus that climate resilience cannot be viewed solely as an environmental concern. It is equally a matter of development planning, fiscal prudence, public investment, and long-term economic resilience. The costs of infrastructure failure extend well beyond the immediate physical damage, affecting livelihoods, public services, connectivity, tourism, and the wider economy. Consequently, resilience needs to be embedded within the broader development and investment decision-making framework.

He further highlighted that the discussions repeatedly emphasised that infrastructure development in the Himalayas cannot simply replicate planning and engineering models designed for comparatively stable terrains. The distinctive geological, ecological, and climatic characteristics of mountain regions need to be incorporated from the very conception of a project. Risk assessment, climate screening, appropriate site selection, resilient design, slope stabilisation, drainage, and long-term maintenance therefore need to be considered as integral components of infrastructure development rather than as corrective measures after disasters occur.

Dr Palit emphasised that investment in resilient infrastructure should not be viewed as an additional cost but as an insurance for infrastructure already being created. Investing in resilience today can protect infrastructure from future climate and disaster risks, reduce reconstruction costs, and ensure that assets being created for the present generation continue to serve future generations. In this sense, resilience is not merely a precautionary expenditure but a long-term investment in the durability and sustainability of development.

In concluding the workshop, Dr Palit, on behalf of the CRF, expressed his sincere gratitude to all distinguished dignitaries, speakers, panellists, and participants for taking the time to attend and for their active engagement throughout the day-long deliberations. He also thanked MSHIPA for its collaboration and continued support in organising the workshop and contributing to its successful execution.

Special Address by Dr V. K. Paul

Dr V. K. Paul, in his Special Address, emphasised the need to advance Himachal Pradesh towards the vision of a Viksit Himachal while contributing to the broader national ambition of Viksit Bharat. He noted that the State's existing developmental challenges are well recognised and that ongoing development efforts must continue. However, the emergence of new climate-related risks requires these developmental trajectories to be reassessed and adapted to changing environmental and disaster-risk conditions.

Dr Paul argued that climate concerns, their implications for development, and the socio-economic losses resulting from disasters are deeply interconnected issues and cannot be addressed by any single government department or institution. Addressing these challenges will require a closely coordinated, inter-departmental approach that brings together relevant government agencies, technical institutions, scientific experts, communities, and other stakeholders. He emphasised that collective action and institutional convergence will be essential to developing effective and implementable solutions.
He described the 2023 flash floods and associated disasters in Himachal Pradesh as a major warning that should prompt a fundamental reassessment of the State's development model. While development and infrastructure expansion remain essential, future development needs to account for the State's geological fragility, climate risks, and increasing exposure to extreme events. He called for important policy and institutional decisions that can embed these considerations within the State's long-term developmental framework.

Dr Paul emphasised the need for a holistic framework for climate-resilient development, incorporating legal and regulatory provisions, effective governance mechanisms, climate finance, scientific and technological knowledge, and sensitivity to local communities. Such a framework, he argued, would enable climate and disaster considerations to be integrated across the full development cycle rather than addressed through isolated interventions.

He particularly underscored the central role of communities within this framework. Communities should not be treated merely as beneficiaries of disaster-management and development programmes but as active stakeholders in planning and implementation. They need to be sensitised and informed about emerging risks while also being provided with meaningful opportunities to articulate their concerns and experiences. Local and traditional knowledge, he noted, can provide valuable insights into the changing environmental conditions of the region, and should be incorporated into contemporary planning and resilience strategies.

In conclusion, Dr Paul called for a collective and forward-looking approach to development, in which government institutions, experts, communities, and other stakeholders work together to build a development pathway capable of addressing both existing needs and emerging climate risks. He emphasised that the objective should be to ensure that Himachal Pradesh's journey towards development is not interrupted by disasters but is strengthened through greater resilience, preparedness, and informed decision-making.

Special Address by Mr Kamlesh Kumar Pant, Chief Secretary, Government of Himachal Pradesh

Mr Kamlesh Kumar Pant, Chief Secretary, Government of Himachal Pradesh, stressed the value of policy dialogues that bring together policymakers, scientists, government officials, and practitioners to collectively develop solutions to the ecological and disaster-related challenges facing the State. He noted that such platforms are particularly important for Himachal Pradesh, where the complexity of the Himalayan environment requires greater convergence between scientific knowledge, public policy, and implementation.

He highlighted that the Himalayas have historically nurtured human civilisation, providing forests, biodiversity, water resources, and livelihoods to millions of people. At the same time, the region is among the most fragile ecosystems in the world. The devastating hydrometeorological disasters experienced by Himachal Pradesh in 2023 and 2025, he noted, have provided stark reminders of the growing severity of extreme weather events, which are becoming an emerging feature of the region's risk landscape.

Mr Pant observed that roads collapsed, bridges were washed away, and livelihoods were disrupted during these events, challenging several long-standing assumptions about infrastructure planning and development in the Himalayan region. However, he emphasised that disasters can also provide an opportunity for governments and communities to learn from experience, adapt existing practices, and build back better. In this context, the Government of Himachal Pradesh has consciously sought to move from a predominantly reactive approach to disaster response towards a more proactive approach centred on disaster resilience. The objective, he stressed, is not merely to reconstruct damaged assets but to create infrastructure, institutions, and systems capable of anticipating and withstanding future risks.

He emphasised that resilience is no longer an option but a core principle of governance. Recognising this, the State Government has undertaken several transformative initiatives aimed at strengthening infrastructure and institutional resilience. He highlighted the World Bank-supported HP-READY project, one of the State's major investments in resilience, supported by approximately ₹2,700 crore in financial assistance. The project seeks to reconstruct and strengthen water supply, transport, sanitation, and power infrastructure while benefiting more than 2.3 million citizens across the State. It also places emphasis on disaster-risk financing and insurance mechanisms developed in partnership with international institutions.

Mr Pant also highlighted the support provided through AFD-supported disaster-risk reduction and preparedness initiatives, which seek to strengthen institutional capacity for disaster governance, improve early-warning systems, enhance the capabilities of the State Disaster Response Force, and strengthen scientific approaches to landslide-risk mitigation. He noted that these initiatives demonstrate that resilience cannot be reduced to the construction of stronger roads, bridges, or other physical assets; it also requires strengthening the systems, institutions, and communities that plan, operate, and maintain them.

At the institutional level, Mr Pant highlighted the development of standard operating procedures for disaster response by the State Government to facilitate seamless coordination between departments and district administrations. Regular vulnerability assessments and safety audits of critical infrastructure are also being undertaken across hazard-prone areas to identify risks in advance and enable precautionary measures to be incorporated into planning and implementation.

He further emphasised the importance of integrated and inter-departmental planning. Departments and agencies, including the Revenue Department, State Disaster Management Authority, Jal Shakti Department, Forest Department, Urban Development Department, and district administrations,

are increasingly working together to strengthen preparedness and ensure rapid response during emergencies. Such institutional coordination, he noted, is essential because disaster risks do not conform to administrative boundaries or departmental mandates.

Capacity building was identified as another important pillar of the State's resilience strategy. Through institutions such as MSHIPA, government officers at different levels are being trained in disaster-risk reduction, climate adaptation, and emergency management. Mr Pant stressed that institutions can function effectively only when the people working within them possess the knowledge, skills, and confidence required to respond to emerging risks. Alongside institutional capacity, he emphasised the importance of strengthening the participation of local communities.

He highlighted initiatives such as Aapda Mitra and Aapda Rakshak, which demonstrate the value of community-based disaster preparedness. Community volunteers frequently become the first responders during emergencies, providing support in search and rescue, first aid, and public awareness. Their participation, he noted, has strengthened the State's disaster-response capacity and demonstrated the importance of incorporating local communities into formal disaster-management systems.

Mr Pant also highlighted the growing role of technology in transforming disaster governance. Geospatial hazard mapping, remote sensing, digital information systems, and data analytics are increasingly enabling the government to make more informed decisions. Risk considerations are being incorporated into land-use planning, infrastructure design, and project appraisal. He described the transition from intuition-based to evidence-based planning as one of the most significant governance reforms required for building resilience in the Himalayan region.

In conclusion, Mr Pant described the workshop as an important milestone in this broader transformation of disaster governance and development planning in Himachal Pradesh. He emphasised that building a resilient State requires a combination of stronger infrastructure, effective institutions, scientific knowledge, technological capabilities, inter-departmental coordination, and empowered communities. Such an integrated approach, he noted, can enable Himachal Pradesh to pursue its development aspirations while better preparing itself for the climate and disaster risks of the future.

Special Address by Mr Deepak Rathore, Vice Chairman, SDMA Himachal Pradesh

He emphasised that local geological and climatic realities must be incorporated into development planning in Himalayan States. Climate-risk assessments, geological assessments, and other scientific evaluations should form an integral part of project planning and implementation rather than being considered only after infrastructure has been developed. Such an approach, he noted, would enable development projects to be better adapted to the environmental conditions in which they are located.

Mr Rathore highlighted the continued efforts of the Government of Himachal Pradesh towards disaster prevention, mitigation, and preparedness. He stressed the importance of strengthening scientific approaches to disaster-risk reduction, including climate-risk assessments, disaster-risk assessments,

and the application of technological tools and evidence-based planning. He also emphasised the potential of nature-based solutions to complement conventional infrastructure and reduce the impacts of climate-induced hazards.

He further underscored the importance of community participation in disaster management and prevention. Local communities are often the first to experience the impacts of disasters and can play an important role in preparedness, early response, and mitigation. Their knowledge and participation should therefore be integrated into formal disaster-management systems and development planning.

In concluding his address, Mr Rathore congratulated the CRF and MSHIPA for convening the workshop and bringing together diverse stakeholders to deliberate on climate risks, geological fragility, and resilient development in the Western Himalayan region.

KEY FINDINGS AND ACTIONABLE RECOMMENDATIONS

Session 1 – Climate Risks and Geological Fragility

Examined how climate change, geology and human development interact to create vulnerability hotspots across the Western Himalayas.

Key Finding	Actionable Recommendation
Disaster vulnerability arises from the interaction of hazard, exposure and development; these must be assessed jointly, not in silos.	Prepare integrated district-wise Hazard, Vulnerability and Risk Assessment (HVRA) maps combining hazard, exposure and development data, and make them mandatory reference documents for all development planning.
Hazard mapping must evolve into predictive risk modelling using AI/ML, real-time monitoring and community-based sensors.	Establish a State Disaster Risk Analytics Cell using GIS, AI/ML and remote sensing; expand automated weather stations, rain gauges and low-cost community sensors in high-risk areas.
Climate and geological screening should be mandatory for approving roads, hydropower, railways and tourism projects, with cumulative-impact assessment.	Notify a mandatory Climate and Geological Screening Protocol for all major projects, and introduce cumulative-impact assessment at river-basin and valley level before approval.
Community-based preparedness and integrated early-warning systems need strengthening at the panchayat level.	Constitute Panchayat Disaster Management Committees, prepare Village Disaster Management Plans, link last-mile early-warning alerts to panchayats, and train Aapda Mitras, Navyuvak Mandals and Mahila Mandals.
Long-term financing mechanisms are required for prevention and preparedness, not only post-disaster recovery.	Earmark a fixed share of SDMF and departmental budgets for prevention and mitigation; explore disaster-risk insurance and climate finance through HP-READY and AFD programmes.

Session 2 – Urban Planning, Infrastructure and Institutional Roles

Focused on the vulnerability of roads and urban infrastructure, tourism-driven development pressures and the case for proactive, regionally grounded planning.

Key Finding	Actionable Recommendation
Risk assessment must be built into DPRs and engineering designs from the outset; retrofitting resilience after damage is costlier.	Make a disaster-risk assessment chapter mandatory in every DPR, with budget provision for slope protection and drainage; no technical sanction without it.
Roads, hydropower and tourism infrastructure need site-specific slope stability and drainage measures, not standardised plains-based designs.	Develop Himachal-specific engineering standards for hill-road cutting, slope stabilisation, muck disposal and drainage; avoid road alignments at river level and use elevated structures where needed.
Tourism growth should be capped by ecological carrying capacity, with stronger zoning and construction regulation.	Conduct carrying-capacity studies for Shimla, Manali, Ka-sol and other high-pressure destinations; enforce zoning and building norms and diversify tourism to less-visited areas.
Coordination between PWD, Forest and Town and Country Planning departments remains inconsistent and needs strengthening.	Constitute an inter-departmental Infrastructure Resilience Committee at State and district levels for joint site inspection, approvals and monitoring.
Natural buffers (wetlands, forests) and traditional settlement wisdom should be restored as part of resilience strategy.	Map and protect wetlands, springs, khuls and drainage channels; promote traditional Himachali architecture through building bye-laws and incentives.

Session 3 – Policy and Governance Imperatives

Addressed the legal, institutional and contractual gaps in mainstreaming climate resilience into mountain infrastructure planning.

Key Finding	Actionable Recommendation
Climate-risk screening should apply from project inception across all infrastructure sectors, not just transport.	Extend climate-risk screening to all sectors including ener-gy, water supply, health, education, agriculture and urban infrastructure through a single State-level checklist.
Forests should be treated as natural infrastructure, not separate from development planning.	Integrate forest and ecosystem services into project planning; prioritise slope afforestation, catchment-area treatment and nature-based solutions with outcome-based CAMPA monitoring.
Himalayan-specific risk indicators are needed; frameworks from other regions do not translate.	Develop a Himachal Climate and Disaster Risk Index with local indicators in partnership with research organisations.
Existing laws (Disaster Manage-ment Act, Sendai Framework) lack enforceable climate-resilience mandates for infrastructure.	Frame State-level rules or guidelines making climate-resilience standards binding for public infrastructure, and amend building bye-laws and TCP rules accordingly.
Infrastructure contracts can be used as a practical tool to embed mountain-specific resilience obligations on contractors.	Insert mountain-specific resilience clauses in standard bidding documents covering slope protection, muck disposal, drainage, defect liability and risk sharing, with third-party quality audits.

Annexures

Detailed Agenda

Schedule	Particulars
09:30 – 10:00 AM	Registration **Inaugural Session**
10:00 – 10:10 AM	Deep Prajwalan followed by felicitation of dignitaries by Chintan Research Foundation (CRF) and Dr Manmohan Singh HP Institute of Public Administration (MSHIPA)
10:10 – 10:20 AM	**Welcome Address**: Ms Rupali Thakur, Director, MSHIPA **Opening Address**: Dr Debajit Palit, Centre Head, CRF
10:20 – 10:40 AM	**Setting the Context** Mr Prabodh Saxena, Former Chief Secretary, Himachal Pradesh and Chairman, Himachal State Electricity Board Er. R K Singh, Centre Head, Himachal Regional Centre, GB Pant National Institute of Himalayan Environment
10:40 – 10:50 AM	**Keynote Address**: Dr V K Paul, Former Member, NITI Aayog Followed by the release of the Discussion Paper by CRF
10:50 – 11:50 AM	**Technical Session 1: Climate Risks and Geological Fragility in the Western Himalayas: Emerging Impacts and Vulnerability Hotspots** **Moderator**: Mr Prashant Sirkek, Additional Director, MSHIPA **Panellists:** Dr Pushpendra Rana, Director, Department of Environment, Science & Technology, Government of Himachal Pradesh Prof. P K Joshi, Professor, School of Environmental Sciences, Jawaharlal Nehru University, New Delhi Prof. Tikender Singh Panwar, Professor of Practice, Shoolini University Prof. Anjal Prakash, FLAME University, Pune* Q&A Round: 15 mins
11:50 – 12:20 PM	**Tea and Networking**
12:20 – 1:20 PM	**Technical Session 2: Urban Planning, Infrastructure Development and Institutional Roles in Building Climate Resilience** **Moderator**: Dr Debajit Palit, Centre Head, Climate Change and Energy Transition, CRF **Panellists**: Mr Pradeep Thakur, Town and Country Planner, Mandi, Govt. of Himachal Pradesh Er Sanjay Soni, Chief Engineer, Public Works Department (PWD), Govt. of Himachal Pradesh Prof. Mohd Sultan Bhat, Professor, Department of Geography and Disaster Management, University of Kashmir Dr Amit Gangotia, Professor, School of Tourism & Travel Management, Central University of Himachal Pradesh, Dharamshala

Schedule	Particulars
	Q&A Round: 15 mins
1:20 – 2:20 PM	**Lunch & Networking**
02:20 – 03:20 PM	**Technical Session 3: Policy and Governance Imperatives for Climate-Resilient Development Pathways in Mountain Regions: Infrastructure** Adaptation and Context-Sensitive Planning **Moderator**: Dr Mahesh Sharma, Himachal Pradesh University **Panellists**: Dr Sanjay Sood, Principal Chief Conservator of Forests, Forest Department, Government of Himachal Pradesh Dr Suresh C Attri, Chief Scientific Officer, Department of Environment, Science, Technology and Climate Change, Government of Himachal Pradesh Dr B R Thakur, Associate Professor, Department of Geography Himachal Pradesh University (HPU), Shimla Dr Nicolas Ziv*, Lead Specialist, Transport Sector Resilience, Coalition for Disaster Resilient Infrastructure, New Delhi Mr Suksham Chauhan, FCIArb (UK), Solicitor of the Senior Courts of England & Wales | Indian Advocate, Shimla Q&A Round: 15 mins
3:20 – 3:50 PM	Tea & Networking
	Valedictory Session
04:00 PM	Arrival of Hon'ble Chief Minister of Himachal Pradesh at the Auditorium
04:00 - 04:10 PM	Welcome & Felicitation by Ms Rupali Thakur, Director, MSHIPA
04:10 – 04:15 PM	**Highlights of Workshop** Dr Debajit Palit, Centre Head, CRF
04:15 – 04:25 PM	**Special Address** Dr V K Paul, Former Member, NITI Aayog
04:25 – 04:35 PM	**Special Addresses** Sh. Kamlesh Kumar Pant, IAS – Chief Secretary, Govt. of Himachal Pradesh Sh. Deepak Rathore, Vice Chairman, State Disaster Management Authority, Govt. of Himachal Pradesh
04:35 – 04:50 PM	Release of Report – Towards a Resilient Himachal Pradesh: Lessons and Recommendations from the 2023 and 2025 Hydro-meteorological Disasters Launch of the HIM_SIAMS Portal (Himachal Social Impact Assessment Management System)
04:50 – 05:00 PM	**Address by the Hon'ble Chief Minister of Himachal Pradesh**
05:00 – 05:10 PM	**Vote of Thanks** Sh. Prashant Sirkek, Additional Director MSHIPA
05:10 PM Onwards	Group Photo and High Tea

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By **Rahul Bhandari** - July 10, 2026

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Rs. 3,500 crore disaster resilience infrastructure to be developed in Himachal : Sukhu

July 10, 2026 admin

Chief Minister Thakur Sukhvinder Singh Sukhu today said that the state government would develop disaster resilience infrastructure in Himachal Pradesh at an estimated cost of Rs. 3,500 crore to strengthen the state's capacity to withstand natural disasters and minimize future losses.

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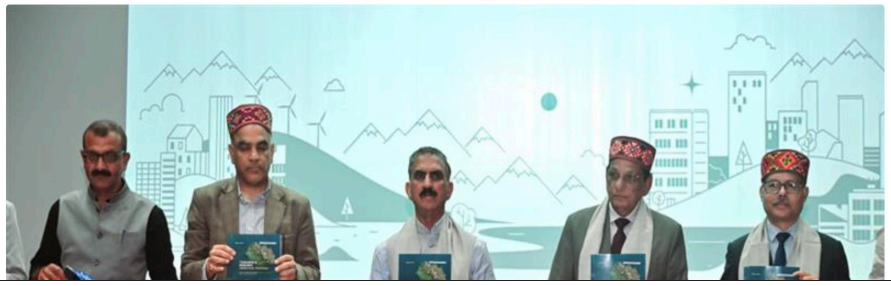
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