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Climate Change and Disaster Risk Reduction in the Indian Himalayan Region (IHR)

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Summary

Climate change is causing and worsening extreme events such as flash floods, cloudbursts, glacial lake outbursts (GLOF), landslides and 'slow' onset meteorological droughts in the Indian Himalayan Region (IHR), affecting 51 million men and women living in the 12 States of Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, Maghalaya, Nagaland, Manipur, Mizoram, Tripura and the hill regions of Assam and West Bengal.

Impacts of these disasters are often across States or international borders and require cross-border research and risk reduction solutions. For instance, the trans-border nature of GLOF and other floods - riverine floods, flash floods, landslide dam outburst floods, rapid snow melt and cloud bursts – are one of the main reasons for massive and long-lasting damage. *In 2000, the landslide that blocked the Yigong River tributary of Yarlung Zangbo (known as river Siang in Arunachal Pradesh) in Tibet led to outburst flash floods that caused extensive damage in China and left 50,000 people homeless in northeast India.*

An integrated preparedness policy dedicated to the region can build safeguards and reduce loss of life and property.

People in the Himalayas are particularly vulnerable to climate shocks and disasters because climate change affects a range of natural systems in the mountain ecosystem - from hydrology and temperature patterns to glaciers and permafrost. There are additional challenges that mountain people face, like living in remote locations and being primarily dependent on climate-sensitive subsistence farming and collecting fodder, water and firewood for cooking and heating Mountain communities lack good communication, energy and transport networks and have fewer income-generation opportunities than people in the plains. Women are especially vulnerable to climate change and disaster risks because dwindling farm productivity and lack of opportunities is leading to a rise in distress male migration, increasing women's care and work burden and widening the already existing gender gap.

Yet, the Indian Himalayan Region can be better prepared given India's strength in scientific and technical research capacity, its well-articulated policy and institutional framework on disaster risk reduction, its national and State-level climate actions plans, decentralized governance systems and active civil society participation. There are also several best practices that can be scaled up. Yet, there are policy-level challenges to preparedness and risk reduction. For instance, there is the need to address inter-state and cross-boundary generation and sharing of scientific data, up-scaling of best practices, addressing local needs for timely and user-friendly data and knowledge and barriers imposed by the socio-economic vulnerabilities of different mountain groups stratified by gender, caste, class, ethnicity and geographical location. Climate policy and disaster reduction policy also need to be dovetailed, from the national to the local level, for people to be better prepared for climate change and disaster reduction risks, including the threatened loss and damage.

The Policy Brief recommends (a) strengthening of current policies; and (b) adopting more transformative policy approaches. It also proposes a macro policy framework encompassing the three main pillars for an effective climate change and disaster risk reduction preparedness policy.

Key Policy Recommendations

1. **Converge climate change and disaster risk reduction (DRR) policies and institutions in each State and the Himalayan region**, for (a) integrated research and data collection; (b) regulated and resilient land use and infrastructure; (c) shifting goalposts from rescue/relief to rehabilitation and reconstruction, especially factoring in loss and damage; and (d) securing livelihoods and provision of basic services in this primarily natural resources-dependent region.

   Responsible Agency: State Level Councils for Climate Change through State Disaster Management Authority and Institutions.

2. **Strengthen State-level climate and disaster risk reduction research**, investing in local scientific and technical research with field-based and anecdotal validation to enable better informed planning and policy decisions and more effective response by local governance institutions to sudden and unpredictable climate shocks.

   Responsible Agency: National Mission on Strategic Knowledge; Departments of Science and Technology; NATCOM Institutions; Independent think tanks; grassroots and civil society organizations.

3. **Create local level risk-related data and knowledge hubs** responsible for generation, exchange and outreach of timely user-friendly scientific, technical and weather information on climate change and disaster risk reduction.

   Responsible Agency: State Level Councils for Climate Change through State-level Disaster Management institutions or agriculture knowledge hubs or web-enabled panchayat offices.

4. **Address social barriers to climate change and disaster risk reduction** because mountain communities require local capacities - skills, knowledge, resources, social networks and authority - to deal with natural hazards that may be unique to their habitat. This is especially true for women who face larger social barriers due to the gender gap.

   Responsible Agency: State Level Councils for Climate Change; State Institutes for Rural Development and Disaster Management; Line departments.

5. **Create a coherent and comprehensive umbrella Indian Himalayan Region Climate Change and Disaster Risk Reduction Plan** to (a) generate and share inter-State research, knowledge and best practices in the region; (b) implement inter-State disaster risk reduction measures across similar topographies; and (c) synergise the National Mission on the Himalayan Ecosystem with the 12 State Action Plans on Climate Change (SAPCCs) with a focus on climate change and disaster risk reduction in the region.

   Responsible Agency: Himalayan Sustainable Development Forum with implementation through the State Level Councils for Climate Change

6. **Make a temporal shift in the planning period** - from the current 5 years to envisioned mid-term plans for 15 years (till 2030) and long-term plans for 35 years (till 2050), necessary because of the potential shifts in glaciers and the treelines.

   Responsible Agency: State Planning Boards.

7. **Enable a spatial shift in planning** to prioritise **(**a) decentralized and integrated planning, necessary because of remote locations, unique topography of different settlements and cross-sectoral risks; (b) cross-boundary actions to enable use of geospatial and information technologies for joint surveillance, monitoring, real-time data sharing and early warnings across the 12 States in the Indian Himalayan Region.

   Responsible Agencies: District planning committees, panchayat departments and urban local bodies to make decentralised integrated plans; Ministry of External Affairs with Himalayan Sustainable Development Forum for bilateral and multilateral agreements with SAARC (except Sri Lanka and Maldives) countries, China and Tibet .

8. **Move from sector-specific to a 'co-benefit' inter-sectoral approach** that avoids multiplicity of policies and institutions, enabling more synchronized planning and implementation across sectors/ departments; and coming together of areas such as ecology and economy (valuing natural resources), using flood waters to recharge springs; agriculture and forests (afforestation species affect farm productivity); alternative communication systems and escape routes; and multiplicity of governance bodies (responsibilities of village panchayat and van panchayat over the same village forest).

   Responsible Agency: State Level Councils for Climate Change and State Planning Boards.

9. **Institutionalise downward accountability of delivery agencies** based on performance indicators through mandated social and environmental audits and environmental audits of climate change and disaster risk reduction programmes, necessary in mountains where delivery systems face unique challenges due to lack of communication and infrastructure.

   Responsible Agency: State Level Councils for Climate Change; Indian Audit and Accounts Department; Personnel departments; Department of Personnel and Training.

10. **Ensure gender parity** in data collection, resource allocation, capacity building, decision-making because women do most of the work in the Himalayan region but have the least resources, opportunities and authority and are also affected far more than men during and after disasters. *A study reveals that when economic and social rights are fulfilled for both sexes, the same number of women and men die in disasters.*

    Responsible Agency: State Level Councils for Climate Change; Departments of Women and Child Development; State Planning Boards; State Finance Department; line departments.

1. Background

Scientific studies and anecdotal data prove that climate change is leading to **new and uncertain weather patterns and extreme events in the Indian Himalayan Region (IHR).** Home to 51 million people, mostly living off subsistence farming, the Himalayan ranges are more vulnerable than other ecosystems because climate-induced changes are affecting a wide range of natural systems - from hydrology and temperature patterns to glaciers and permafrost.

Natural hazards cause disasters when they affect ill-prepared communities. **Mountain people are more vulnerable than people living in lowlands** because of their remote habitations, quicker weather impacts over the rapidly changing altitudes and an over-reliance on natural resources both to meet their everyday needs and to earn a livelihood. Out-migration of working men from hill societies, always high, is accelerating, putting **higher work and care burden on women.**

Box 1: Drivers of Vulnerabilities in the Indian Himalayan States

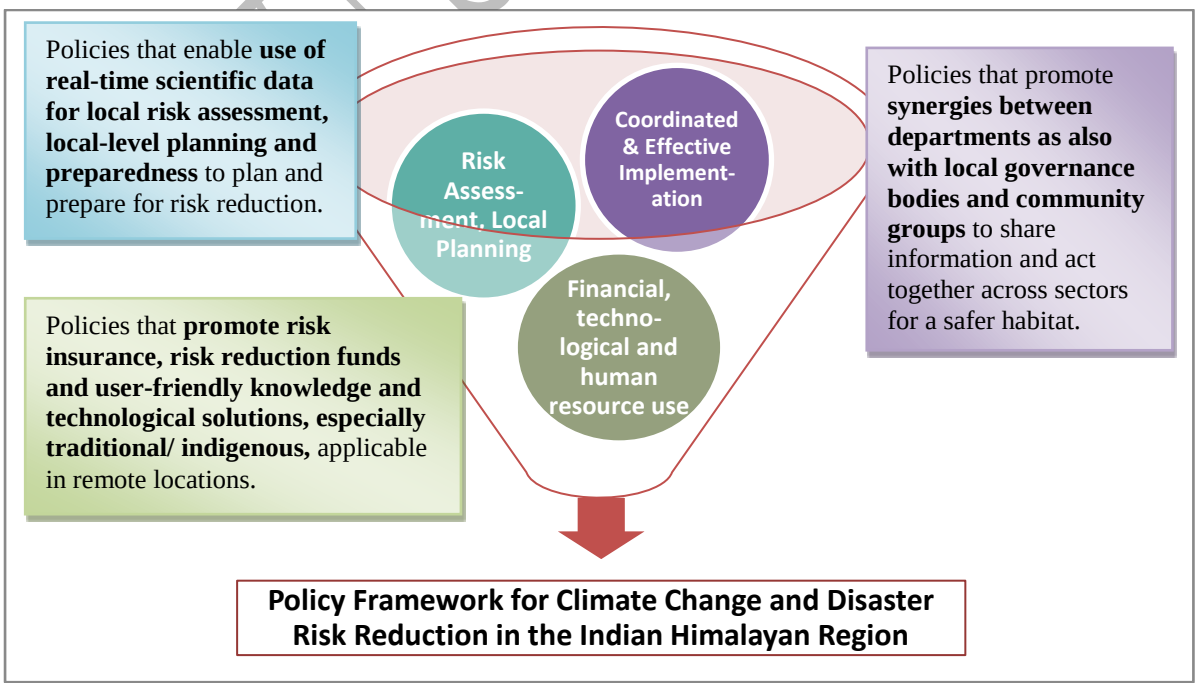
Climate uncertainties and natural hazards lead to loss and disasters when communities are ill-prepared for the consequences.

Policies must address the following key drivers of vulnerabilities in the Indian Himalayan Region:

- **P**overty;
- **R**emoteness;
- **O**ver-dependence on natural resources;
- **D**istress out-migration, especially male;
- **L**ack of information and **I**ll-preparation;
- **D**isempowerment, especially of women
- **W**eak local governance.
- **L**ow representation of women in local governance bodies and legislatures.

2. Macro Risk Reduction Policy Framework for the IHR

A macro policy framework (see below) for climate change and disaster risk reduction in IHR must be built on existing policies and new policy approaches as discussed in the sections below.



3. Strengthening Risk Reduction in Existing Policies

India's climate change and disaster risk reduction policies, established through National and State-level Action Plans for Climate Change and the National and State-level Disaster Management Authorities, mainstream adaptation and disaster resilience in India's development policy and institutional framework. Development levels in the Himalayan settlements are low and face unique challenges. For instance, mountain communities are less inter-connected with each other, face multiple natural hazards, require timely information based on extensive and hi-tech scientific research and have very few opportunities of shifting to safer habitats. Social barriers are particular important because (a) The region, especially the north-eastern States, is home to several tribal communities who are often on the margins of development; (b) Women play a critical role in the natural resources-based economy but their presence in community-based governance and legislature is negligible; and (c) Long-drawn ethnic conflicts continue to impede and erode development gains in several of the IHR States.

Mainstreaming risk reduction in development policies is a necessary but not a sufficient approach to prepare mountain communities to face climate shocks. This is because *the bedrock of development in the mountains is ecological well-being*. Mountain systems must factor in climate uncertainties, the worsening extreme events and the threatening loss and damage to attain social and economic development. India's long experience of disaster risk reduction is backed by national and State-level legislation, several learnings from on-the-ground best practices and ratification of the United Nations Sendai Framework for Disaster Risk Reduction 2015-2030.

Best Practices

Several government agencies, research institutions and non-government organizations have a wealth of knowledge on resilient development best practices. Some of these are sound policy approaches, like institutionalization of early warning and outreach systems to evacuate people, creation of the National Disaster Response Force and the contributor Disaster Funds in the offices of the Prime Minister and the Chief Ministers. The SAPCCs in the 12 hill States include best practice policy approaches that can be shared and scaled up.

A quick study of other mountain systems (the European Alps, the Blue Mountain National Park, the Peruvian Cordillera Blanca, the Southeast Asian mountains, the Central and South American mountain ranges and the American Rocky Mountains) reveal that several policies adopted are similar to the ones proposed by India's climate and disaster reduction plans though the litmus test lies in stringent implementation. Other best practices include on-the-ground interventions that need to be mainstreamed into resilient development framework in the Himalayan Region for climate change and disaster risk reduction.

1. Must share: Forward-looking Best Practice Policy Approaches in IHR SAPCCs

- The SAPCCs in the hill States too have built on some of the best practices in their policy approaches.A strong gender section in emergency relief (Jammu & Kashmir).
- Standardising the process to collect, assess and share all data, maps, trends of hazards *and* vulnerabilities; hold mock drills and civil defense training of quick reaction teams (Sikkim).
- GIS based resource inventory at the State and district level to list all necessary resources for response (West Bengal).

- Have agreements with all project developers for disaster risk reduction (Himachal Pradesh).
- Alternative communication system for early warning (Uttarakhand)
- Invest in reconstruction and recovery (several States)
- Wider awareness generation & capacity building; adoption of the principle of CBDR - community-based disaster reduction (several States).
- Review policy frameworks at regular intervals and upgrade when necessary (Assam).
- Mainstreaming disaster management into development schemes (North-eastern States)

Scale-up: On-the-ground Best Practices in the Indian Himalayan Region

Water Recharge

The award winning **recharge of mountain springs through water harvesting** by the Sikkim government, in collaboration with government research institutions and NGOs, has revived 50 springs and 4 lakes in drought-prone gram panchayats.

Early Warning for Floods

The **Assam Flood Early Warning System (FLEWS)** of the State Disaster Management Authority is a collaborative effort with government agencies and the regional space application centre which gives people 24-48 hours to prepare for floods. Warnings are issued by district authorities based on hydrological models and covering specific river basins. The success rate of FLEWS is about 50% and tributaries are not covered by this model.

A **community-based early warning system** initiated by the Kathmandu-based International Centre for Integrated Mountain Development (ICIMOD) for the Brahmaputra in Assam uses solar-enabled alarm systems, comprising a transmitter and a receiver (cost approx: Rs 60,000) alerts 20-25 downstream villages (Dhemaji and Lakhimpur districts) whenever the electronic sensors set of alarms following a rise in the river waters. Families use mobile phones to send off warnings but the sensors can also be linked with warming alarms of the global system for mobilie communications. Local installations are managed by trained villagers. In 2013, the system saved livestock and property worth Rs 210,000 as well as household items.

The above are highly complementary systems and can be effectively used together in all the hill States though here they are used in the Assam valley.

Early Warning: GLOF

The Data Sharing Policy between India and China saved human loss in 2004 when a landslide blocked the Pareechu River in Tibet in the upper reaches of River Sutlej. The Himachal Pradesh government had time to evacuate 56 villages from Kinnaur to Bilaspur.

Arresting Soil Erosion by Re-greening Barren Slopes

There are scores of examples of participatory management of village forest, with substantial involvement of village women. One such example is the award-winning initiative of the Doodhatoli Lok Vikas Sansthan, a local NGO in the Doodhatoli ranges of the middle Himalayas, 2040 metres above sea-level. Here, extreme drought conditions have been controlled by using voluntary and panchayat funds to dig circular and rectangle contour trenches as dug in

watershed areas in the lowlands, with small circular percolation pits on the slopes. Planted grass on their downhill sides prevented soil erosion and recharged groundwater. This has re-greened barren slopes with broad-leaf trees planted and nurtured by villagers, created the now perennial Gad Ganga river used for irrigation and drinking and revived several mountain springs.

Best Practice Approaches Followed Internationally

Cloud Bursts, Floods, Flash Floods, Glacial Lake Outburst Floods (GLOFs):

- **L**anduse planning.
- **C**onstruction design and regulation codes.
- **C**ross-border early warning systems
- **R**isk financing.
- **C**oordination between government, private agencies; local governments and civil society groups.
- **N**eeds assessment, relief and recovery for people belonging to different strata like gender, age and ethnicity.

Landslides/ Erosion

- **N**ot permitting habitation and construction activities in prone areas.
- **S**tructural solutions: divert stream overflow; build retention walls to break speeding rivers into small rapids (China).
- **D**etailed documentation of past events excellent guides for resilience (China)
- **F**inance to local municipalities, group of muncipalities (Andes mountains)

Droughts

- **F**orecasting
- **R**ejuvinating traditional systems of water harvesting and conservation
- **P**romoting climate change adaptation and disaster risk reduction as a 'social process' for technical changes in land, water and forest management.

4. Paradigm Shift: Planning for the Future

Preparedness to face new climate change and disaster risks in the IHR requires new approaches in planning and to policy making. These include:

- **Mid- to long-term perspective plans** based on 2030 and 2050 regional and sub-regional climate models validated with field-based observations.
- **Moving from local to the global**, enabling new power sharing equations with requisite knowledge, authority and resources at different levels of governance institutions, down to the remotest village and the 'last (wo)man.' Villages and urban centres must frame *Local Action Plans on Adaptation and Preparedness (LAPAPs)*.

- **Collapsing boundaries** for broader and stronger trans-boundary agreements. *For instance, the 12th five-year plan working group on flood management recommended implementation of watershed development jointly between Nepal, Bhutan and India.*
- **Fusing sectors** for more integrated planning for development and preparedness, especially in new areas like ecological economics, multi-disciplinary conservation models and multi-hazard risk assessment and co-benefits of mitigation and adaptation.
- **Shifting disaster management goalposts** to address loss and damage impacts of which will threaten the very safety of mountain ecosystems.
- **Adopting a comprehensive Indian Himalayan Region resilience plan** for institutions and policies to overcome geographical and/or knowledge barriers in an ecosystem that is internally extremely inter-dependent.

Further Reading

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