AGENDA FOR CLIMATE ACTION

EXECUTIVE SUMMARY

Linking the Vulnerability and Risk Assessment for Uttarakhand with policy implications for the state

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INTRODUCTION AND CONTEXT

Uttarakhand is home to forests, glaciers and important rivers. The eastern Himalayan state is also particularly vulnerable to climate impacts including the increased risk of extreme weather events such as flash floods and droughts.[i] Forest and agriculture-dependent livelihoods, as well as development factors such as the rapid expansion of tourism and other infrastructure have exacerbated that vulnerability.[ii]

Recognising the growing threat of climate impacts in India, in 2009, the central government asked all states and Union Territories to develop climate action plans.[iii] The Uttarakhand Action Plan on Climate Change (UAPCC) was prepared in 2011 and endorsed by the Government of India in 2015.[iv]

The UAPCC recognises that "a vulnerability and risk analysis" is an important first step in developing structured research on climate impacts to help prioritise climate action and ultimately integrate climate action in development planning.[v] In 2013, the Government of Uttarakhand requested support from the Climate and Development Knowledge Network (CDKN) for the development of a climate vulnerability and risk assessment (VRA) in the State. Following expert stakeholder consultation, it was decided that while the VRA would provide a top-down evidence base for climate resilient planning, it would need to be aligned with bottom-up community level vulnerability and draw clear linkages between climate impacts and current policies to help policy makers focus on next steps.

The CDKN-supported VRA project therefore includes:

1) A district and block level VRA.[1]
2) Preliminary Participatory Rural Appraisals (PRA) in the district hotspots identified by the VRA.[2]
3) An Agenda for Climate Action linking the VRA impacts and the PRA with current sectoral objectives, providing a guide to decision makers on climate resilient development planning.[3]

The following document primarily focuses on the Agenda for Climate Action. The detailed evidence base, analyses and data provided by the VRA and the PRA can be accessed in the State's upcoming climate knowledge portal.

THE SCOPE OF THE VRA AND PRA

The VRA uses sophisticated model-based projections to predict temperature and precipitation changes in Uttarakhand in the mid and end-centuries. Using secondary climatic and socio-economic data as well as impact assessment models, it then identifies the districts and blocks relatively vulnerable to climate change in five selected sectors – agriculture, water, health, forestry and disaster risk.[vi]

Within these district hotspots identified by the VRA, five villages were selected for the PRA analysis. The PRA team spent approximately a day in each village and using a combination of participatory techniques with different groups of villagers, assessed perceived changes in weather and climate conditions, as well as on-ground vulnerabilities and coping strategies. Figure 1 identifies the composite vulnerability of districts in Uttarakhand and the districts in which the PRA analysis was carried out.

THE AGENDA FOR CLIMATE ACTION

The Agenda for Climate Action focuses on policy implications of current and future climate impacts for the State of Uttarakhand in five sectors of the VRA. It links the scientific model-based VRA and the village level PRA with current policy objectives in these sectors to identify a number of actions that policymakers can focus on within the next five years to build resilience in the state. For each of the five sectors, the Agenda for Climate Action provides the following:

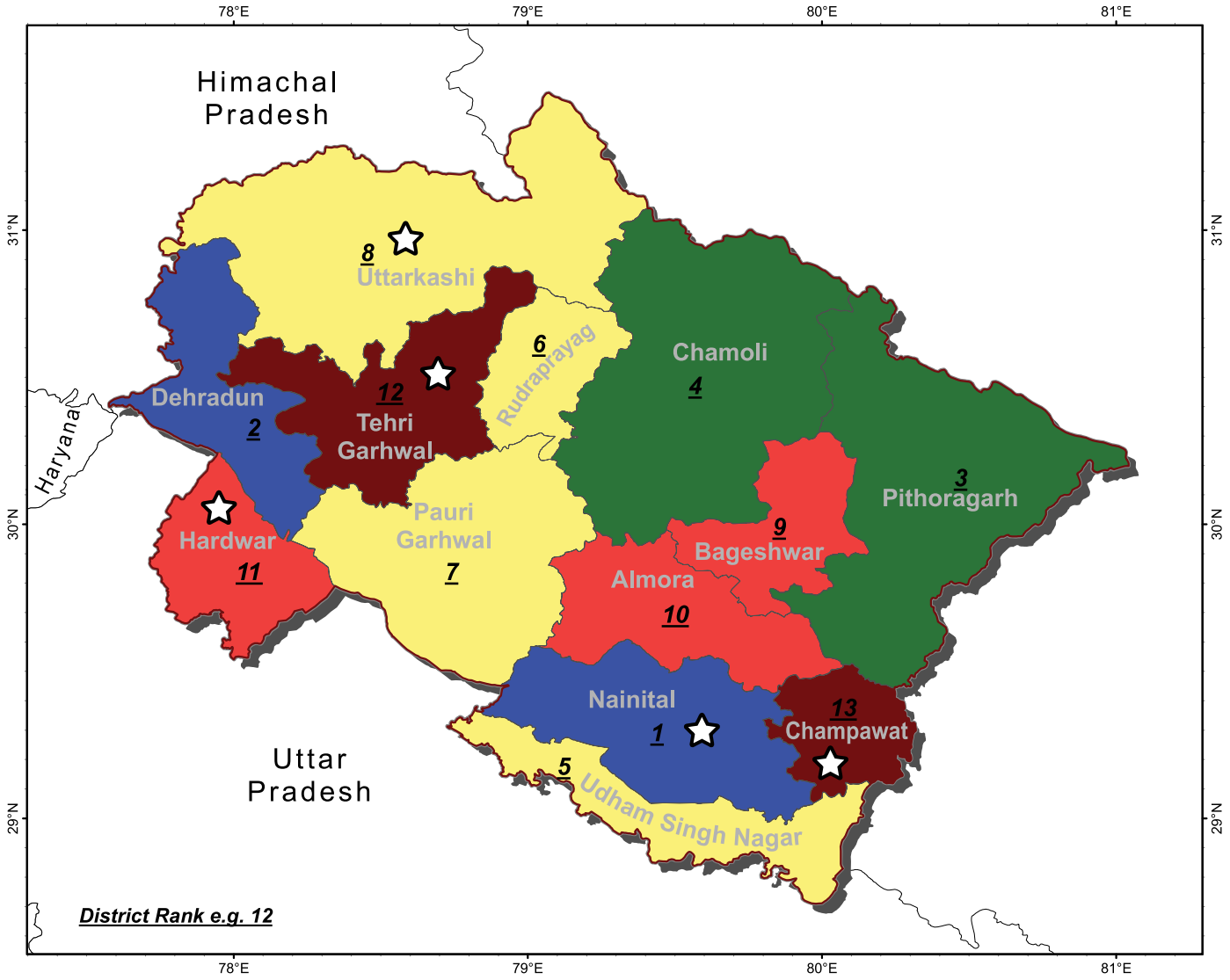
- Identification of sector-based climate impact areas from the VRA
- Recurring themes linked to community insights and perceptions from the PRA
- The sectoral policy landscape linked to relevant state and national policies[4] (See Figure 2)
- Suggested actions in each sector (which together constitute the Agenda for Climate Action)
- Development co-benefits of suggested actions

[1] By Natural Resource Management (INRM) Consultants, Indian Institute of Science, and Geo Climate Risk Solutions

[2] By the Central Himalayan Environment Association (CHEA)

[3] By Acclimatise

Figure 1: District-level composite vulnerability in Uttarakhand, including villages selected for PRAs



Vulnerability Scale

Very Low | Low | Moderate | High | Very High

☆ *Districts selected for PRA study*

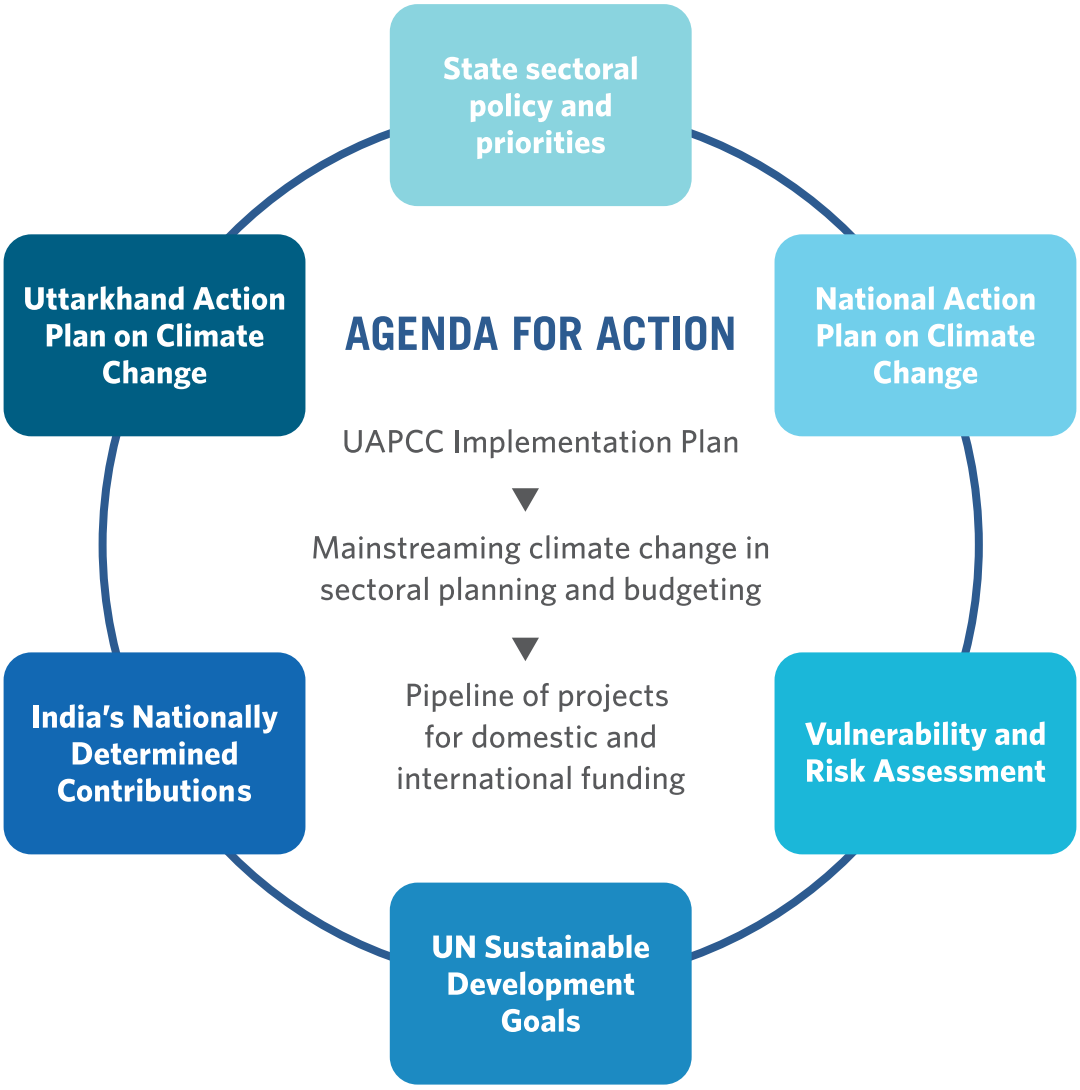
Sector for Indicators: Composite Current Vulnerability comprises of the following Sectors

Social : Indicators - Demography and Infrastructure
Economic : Indicators - Per Capita Income and GDP
Climate : Indicators - Indices for Precipitation and Temperature
Water : Indicators - Water availability, extreme events of Flood and Drought
Forest : Indicators - Current Status of Forest (Vegetation Type, Density , Diversity, Dependency and Fragmentation)
Agriculture : Indicators - Crop Intensity, Yield, Irrigation, Fertilizer use.
Health : Indicators - Frequency and Magnitude of Heat Stress, Malaria Transmission
Natural Disaster : Indicators - Area at risk from Flood and Landslide (for 50 year return period events)

μ
0 30 60 90 120 Km

[4] The policy review includes the UAPCC, state sector policies, latest publicly available Uttarakhand Development Report, relevant missions under the National Action Plan on Climate Change (NAPCC) and India's Nationally Determined Contribution (NDC) to the UNFCCC.

Figure 2: Multi-level policy context for the Agenda for Climate Action



The Agenda for Climate Action is targeted primarily at policy makers, but also development partners, civil society organisations, and research institutions looking to include this evidence base in new and existing projects or programmes. The suggested actions are aimed at the next five years, focussing on the steps to be taken within the State's planning cycle; recognising that timely, cost-effective interventions will have long-term benefits. The actions have been validated by state officials of the inter-sectoral, 'Climate Action Group' in two consultation workshops.

Suggested Actions

The following tables provide a summary of the suggested areas of action to be undertaken in the five sectors over the next five years based on findings of the top-down VRA, a bottom-up review of community trends, and a review of existing state and national priorities.

For a detailed analyses of the climate impacts areas drawn from the VRA, on-ground vulnerabilities, as well as the policy landscape in each sector, refer to the individual sectoral booklets.

AGRICULTURE

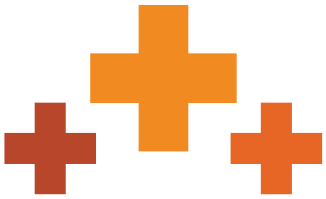
IMPACT AREA	ACTION
Increase in water stress	• Re-evaluate guidlines for irrigation practices in line with the VRA findings • Promote climate smart agricultural technologies
Increased risk of flooding	• Raise awareness of insurance schemes at the farm level • Link the VRA findings with weather-based index insurance by Agriculure Insurance Company of India
Changes in crop yields	• Assess irrigation strategies and conduct studies on crop yields in line with the VRA findings • Conduct supply chain and market analysis for opportunities for new agircultural enterprises
Climate change can undermine development goals	• Focus on an overarching agriculture policy, linking current state objectives and climate vulnerabilities • Build capacity of agriculture extension teams to integrate climate risks and opportunities • Link climate data with Uttarakhand's Agro-Climatic Planning and Information Bank (APIB).

WATER

IMPACT AREA	ACTION
Seasonal changes in water availability	• Map the availability, supply, and demand of water resources at the basin level • Focus on participatory Irrigation Management (PIM) techniques at the Gram Panchayat level • Promote water saving and re-use schemes
Increased risk of flooding	• Prepare flood plain maps and inundation maps for flood-prone areas guided by the VRA • Assess feasibility of structural and non-structural measures for flood management guided by the VRA
Changes in stream flow	• Use the VRA findings on stream flow dependability to guide investments in run-of-the-river, hydropower, drinking water, and irrigation projects
Implications for dam infrastructure	• Re-assess the design of current water infrastructure in light of the increasing probability of large magnitude flood events, as noted in the VRA Re-evaluate the Central Water Commission (CWC) criteria for new dams guided by VRA

FORESTS

IMPACT AREA	ACTION
Changes in forest types and their range	• Link the VRA findings with conservation measures and state programmes to improve the quality of fragmented forests • Regulate invasive species
Uncertainity in biomass availability	• Review and update the Uttarakhand Van Panchayat Rules in line with VRA findings • Improve mechanisms for better market access of Non Timber Forest Produce • Increase focus on short rotation forestry in line with the VRA findings
Increased risk of forest fires	• Conduct on-ground research on forest fires • Asses regulatory factors governing the management of forest fires
Loss of floral biodiversity	• Conduct research on changes in specific floral species based on historical trends and areas where vegetation changes are projected.



HUMAN HEALTH

IMPACT AREA	ACTION
Increase in heat stress	• Examine capacities of districts to cope with heat stress in line with the VRA findings • Develop a state-level heat action plan based on guidelines by the National Disaster Management Authority • Strengthen State policies aimed at tackling diarrhoea and respiratory tract infections guided by the VRA
Increase in malaria and other vector borne diseases	• Conduct district level studies to assess mosquito breeding patterns, levels of sanitation, and village level sensitisation strategies • Incorporate the VRA and on-ground findings in the annual state and district level anti-malaria action plans
Increase in floods and landslides	• Undertake district-level analyses of disaster prone regions guided by the VRA • Conduct geographical mapping of populations at risk including road connectivity and gaps in critical infrastructure

DISASTER RISK

IMPACT AREA	ACTION
Increased risk of soil erosion and landslides	• Incorporate landslide management techniques in all infrastructure development, focusing on roads • Undertake forest conservation and avoided deforestation measures in disaster prone regions guided by the VRA
Climate change not integrated with current disaster policies	• Review and update state, district, and village disaster management plans linked to the VRA findings • Align the VRA findings with the World Bank supported 'Uttarakhand Disaster Recovery' project
Disasters increase the vulnerability of local communities	• Strengthen community-based disaster management efforts • Aggregate research on available indigenous knowledge and technology to improve disaster resilience • Map infrastructure facilities either as disaster assets or liabilities
Risk of snow melt and GLOFs resulting in flash floods	• Initiate research on temperature impacts on snowmelt and glacial lake outburst floods (GLOFs)
Development and economic goals compromised	• Ensure programmes are sanctioned after conducting comprehensive climate and disaster risk assessments • Ensure projects have sufficient funds to deal with extreme events • Conduct comprehensive risk analysis and safety audits for all existing infrastructure guided by VRA.

CONCLUSION

The Agenda for Climate Action has been developed as a guidance document for climate resilient planning in Uttarakhand, drawing on the findings of the VRA, the PRA, and a review of the existing policy landscape in each sector. The work has been validated through periodic stakeholder engagement in the state. The Agenda for Climate Action recommends a number of high-level actions in each of the selected sectors, and serves as a first step in undertaking more targeted project planning and implementation in the state. Among these actions, several recommendations emerge that are relevant to all sectors, including the need for:

- Further on-ground research to validate the VRA results, initiate research in the areas where VRA models are restricted, and carry out specific impact assessments.
- A detailed review and update of policy objectives, in line with climate evidence.
- Strengthening existing policies and programmes that offer strong adaptation co-benefits and offer solutions that are flexible and robust against a range of future climate outcomes.
- Capacity building at various levels on current and future climate impacts (from government bodies to communities).

Combined with the VRA, the Agenda for Climate Action also serves as a useful evidence base in developing a pipeline of projects and initiatives for domestic and international funding.

REFERENCES

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[v] UAPCC, 2014. p. 54.

[vi] Integrated Natural Resource Management Consultants (INRM), Geo Climate Risk Solutions, and Indian Institute of Science (IISc), 2016. Climate Change Risks and Opportunities in Uttarakhand, India: Technical Report on District (Block) level vulnerability for select sectors. New Delhi: INRM.

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