POLICY BRIEF

The Energy and Resources Institute

The ROCKEFELLER FOUNDATION

CONTENTS

The Energy and Resources Institute
Darbari Seth Block, IHC Complex,
Lodhi Road, New Delhi- 110 003

Tel. 2468 2100 or 4150 4900
Fax. 2468 2144 or 2468 2145
India +91 Delhi (0) 11

www.teriin.org

Road map for mainstreaming urban climate resilience in Uttarakhand

Preface

This policy brief is based on the learning that emerged from TERI's two-year-long program on 'State Level Policy Engagement for Mainstreaming Urban Climate Resilience' in Goa and Uttarakhand, with support from the Rockefeller Foundation under its Asian Cities Climate Change Resilient Network (ACCCRN) initiative. ACCCRN—a 9-year initiative (2008–16) has been instrumental in bringing forth the urban climate change resilience agenda to cities in Asia. In India, with ACCCRN's support, various cities, viz. Surat, Indore, Gorakhpur, Guwahati, Mysore, Bhubaneswar, have developed and demonstrated effective processes and practices for addressing urban climate vulnerabilities using participatory planning as well as implementing targeted intervention projects. The ACCCRN experience, however, has revealed lack of an enabling policy environment, institutional and financial arrangements, and statutory backing;

all these cities are facing challenges in implementing the city resilience strategy in a comprehensive manner (ACCCRN 2013). Given that urban development is a state subject as per the Constitution of India, a state-level policy mandate would be instrumental in building climate-resilient cities. It is in this context that TERI conducted the engagement program in the two states with the objective of generating awareness and interest among state governments and state-level departments, and facilitating a dialogue to bring the agenda of urban climate change resilience in the foreground. The program led to formulation of a policy road map for building urban climate resilience in the two states. This policy brief synthesizes the key messages from the policy road map prepared for Uttarakhand. It may be noted here that although the brief is prepared in the context of Uttarakhand, the over-arching lessons from the program would hold true for many cities in India, especially in the context of hilly states. The brief, therefore, is intended as a reference point for development of similar state-level policy frameworks in other parts of the country.

Need for a state-level policy framework on urban climate resilience

Climate change is one of the foremost emerging global challenges, the impacts of which are increasingly manifesting themselves through highly erratic instances of weather deviations and induced extreme events. While both urban and rural areas are vulnerable to climate change, its impacts on cities and towns are of particular concern due to high concentrations of people and infrastructure in these areas (TERI 2014). While urban centers in India are the new engines of economic growth, yet they are grappling with issues such as infrastructure deficits, inadequate basic service provision, clubbed with multiple climate hazards. Recent climate calamities and the accompanied loss and damage calls for a deeper look at the preparedness and adaptive capacity of the regions that are vulnerable to climate-induced disasters and extreme events. The damage assessment figures for the Cyclone Hudhud in 2014 indicate a total loss of INR 90,000 crore ($20 billion) in Visakhapatnam alone. Similarly, the floods in Jammu and Kashmir in September 2014 caused a total damage of INR 6,000 crore ($1 billion). The floods in Mumbai in the year 2015 caused a direct loss of about INR 550 crore (about $100 million) (TERI 2015). These calamities are grim reminders of the need to factor in extreme events that are predicted to increase with climate.

The state of Uttarakhand, with its fragile terrain, is extremely prone to natural disasters induced by hydro-meteorological events. The history of disasters over the past 20 years shows that Uttarakhand is vulnerable to multiple hazards with an increasing frequency of occurrences of these events. The state is prone to cloudbursts, flash floods, landslides, dam bursts, avalanches, and cold waves, the impacts of which are aggravated due to its location in the seismic zone IV and V, which are the highest seismic risk zones of the country. Every year, Uttarakhand faces enormous losses during the monsoon season due to rains, cloudbursts, flash floods, landslides, floods, hailstorms, and water logging events. During the monsoon period—from June to September—Uttarakhand is extremely vulnerable to cloudbursts (Government of Uttarakhand 2014). Perhaps one of the worst disasters experienced in the state was the 2013 cloudburst. The Working Group II Report of the Fifth Assessment Report (AR5) of the IPCC points to an increasing trend in the frequency and severity of such weather extremes and climate-induced hazards with a high level of uncertainty associated with such extreme events (IPCC 2014).

With the global policy discourse increasingly stressing on the role of cities for strengthening climate change resilience, TERI's research has strong policy relevance in the absence of any mechanism or mandates at state level that can steer building climate resilience of urban areas. United Nations' 2030 Agenda for Sustainable Development identifies a standalone goal on "Sustainable cities and Communities—Goal 11—'Make cities inclusive, safe, resilient, and sustainable'." Similarly, cities are among the non-nation entities called upon to make efforts to address and respond to climate change as part of the Paris Climate Agreement. As urban India is gearing up for major transformations through the recently launched Smart Cites Mission and AMRUT schemes, it is important that the need to integrate climate resilience be recognized and integrated

into the urban policy and planning process at the state level to equip cities to withstand the impacts of climate change and extreme events.

Uttarakhand primarily consists of small to medium towns, some of which comprise large transitional/ migratory populations and geographically difficult and hilly terrain. According to the 2011 Census, Uttarakhand has an urban population of approximately 31 lakh with six Class I cities that collectively contribute nearly 45 per cent of the total urban population of the state. On the other hand, there are six Class II cities contributing only 11 per cent of total urban population of the state and nineteen Class III towns contributing about 18 per cent of urban population. Urbanization and urban expansion in the state have largely been unplanned, resulting in typical issues such as inadequate and inefficient infrastructure and civic amenities. Various studies post the 2013 disaster in Kedarnath highlighted that the disaster revealed a state of unpreparedness in the form of early warning systems as well as unregulated haphazard development along vulnerable terrains. Moreover, unregulated tourist flow; illegal construction of dams, multi-storeyed hotels, and buildings; poor infrastructure, along with lack of trained medical staff at hospitals further aggravate the situation (Gupta 2013). All these evidences strongly bring out the requirement to mainstream disaster and climate change preparedness in the process of development planning.

Challenges to building urban climate resilience in Uttarakhand

Uttarakhand is one of the pioneering states in India that acknowledges emerging concerns such as climate change and has taken multiple initiatives for climate change adaptation and disaster-risk reduction. Uttarakhand State Action Plan for Climate Change is an important beginning in this direction. Moreover, Uttarakhand State Council for Science and Technology (UCOST) and Uttarakhand Science and Education Research Centre (USERC) lead in setting up Uttarakhand Centre on Climate Change (UCCC) work toward generating awareness and promoting applications of technology for addressing climate change. The Centre has eight core working groups of different sectors for developing database for climate change studies including a "Climate Change & Policy, Governance Linkages and Modeling." Besides, the Disaster Mitigation and Management Centre, Uttarakhand undertook a "detailed investigation of the disaster incidence" in 2013. Nonetheless, there is a growing need to effectively translate them for instituting a "Climate-resilient Development" Agenda at the city level. To this end, the Urban Development Department of Uttarakhand joined hands with TERI to prepare a detailed road map for an urban climate resilience policy framework in the state. However, there are some critical policy and institutional barriers that restrict the city governments to bring in climate resilience as one of the development parameters. These have been listed below:

- **Lack of decision support systems**—Cities do not maintain a comprehensive and up to date data required for urban resilience planning. Besides, the data on infrastructure and assets in a city is scattered with various departments. Similarly, there is a dearth of fine resolution assessments of climate parameters such as change in temperature and rainfall at the city level to base their planning decisions. A knowledge repository of climate data should be established at the state level that can be disseminated to the cities for developing their master plans. It is also important that data and information is spatially translated (e.g., GIS maps) and is utilized for the purpose of urban planning. To create an enabling environment to mainstream climate resilience, it is important that disaster and climate risk assessment are the key inputs to urban and infrastructure planning. To this end, the focus should be on developing detailed hazard, risk, and vulnerability studies. The outcome should be a detailed risk profile of the state in terms of climate impacts and extreme events. It is also important to consider locally identified parameters such as slope gradient, distance from the river, angle of dip, embodied geology, etc. for defining vulnerabilities.
- **Lack of capacity at city level**—Climate resilience is a new concept in India, requiring specific technical know-how and data for cities to draw up their resilience plans, which is currently not available with the urban local bodies. Sensitization and skill

development of urban practitioners and decision makers is an absolute necessity for bringing about requisite changes in the existing urban governance mechanisms and systems.

- **Lack of enabling guidelines and institutional mechanisms at city level**—In the absence of a local mandate and policies at the city level, the mechanisms and institutions are currently not aligned to account for future vulnerabilities such as those of climate change. Various state-level departments are responsible for all matters pertaining to development and management of urban infrastructure under the purview of sector-specific policies and regulations. However, urban climate resilience planning would require multi-sectoral linkages through coordination and dialogues among the concerned departments and agencies, especially with respect to data sharing. Moreover, efforts need to be directed toward improvising the existing state of affairs by updating and refining disaster management plans, climate change action plans, reviewing and formulating improved building bye-laws, and strengthening operational efficiency of state and district emergency centers.
- **Implementation support and enforcement of existing plans, policies, and regulations**—Reinforcing and climate-proofing existing infrastructure requires additional funds; however, presently there are no financial mechanisms marked for urban climate resilience currently at the city or the state level. Therefore, financial allocation for resilience building and adaptation projects also needs to be addressed in the urban resilience policy. At the same time, it is also important to implement and enforce existing plans, policies, and regulations, viz. the State Climate Change Action Plan, State Disaster Management Plan, and Flood Management Plans, which are all effective instruments for climate adaptation planning.

There is a need to address these barriers in a systematic manner by creating clear road maps and action plans, creating mandates and enabling mechanisms, and institutional arrangements. Besides, the considerations of cost and investments, both short- and long-term, are critical to build resilience of cities.

Road map for State Urban Climate Resilience Policy in Uttarakhand

A dedicated component on stakeholder engagement was inbuilt in the program with an objective of understanding and prioritizing the state-specific context and the need for coming up with a policy on urban climate resilience (Figure 1). These stakeholder engagement workshops helped in understanding the following:

- Scoping the relevant sectors in the context of resilience planning in urban areas,
- Role of existing institutions and their functions and mandates,
- Key challenges and barriers to urban climate resilience in the state,
- Feasible approaches and timeline for formulation and implementation for a new resilience policy,
- Key components to be addressed by the new urban climate resilience policy, and
- Mechanisms for implementation and financing.

This stakeholder engagement led to the preparation of the road map to guide the formulation and operationalization of the policy framework on urban climate resilience in the state of Uttarakhand. As per the recommendations given in the stakeholder consultation that took place in April 2015 in Uttarakhand, it was recommended that sector-wise integration points should be identified for policy and institutional frameworks governing urban development at the state level. This was proposed to be in the form of amendments in the sections of its existing policies and acts for each of the sectors. The following sections give a detailed discussion on the action points outlined in the road map.

Integrating urban resilience in the existing policies and regulations

Considering that the resilience options are not independent of the regular sustainability goals and planning needs of the city, it is pertinent to dovetail climate resilience to the urban development framework. This means integrating:

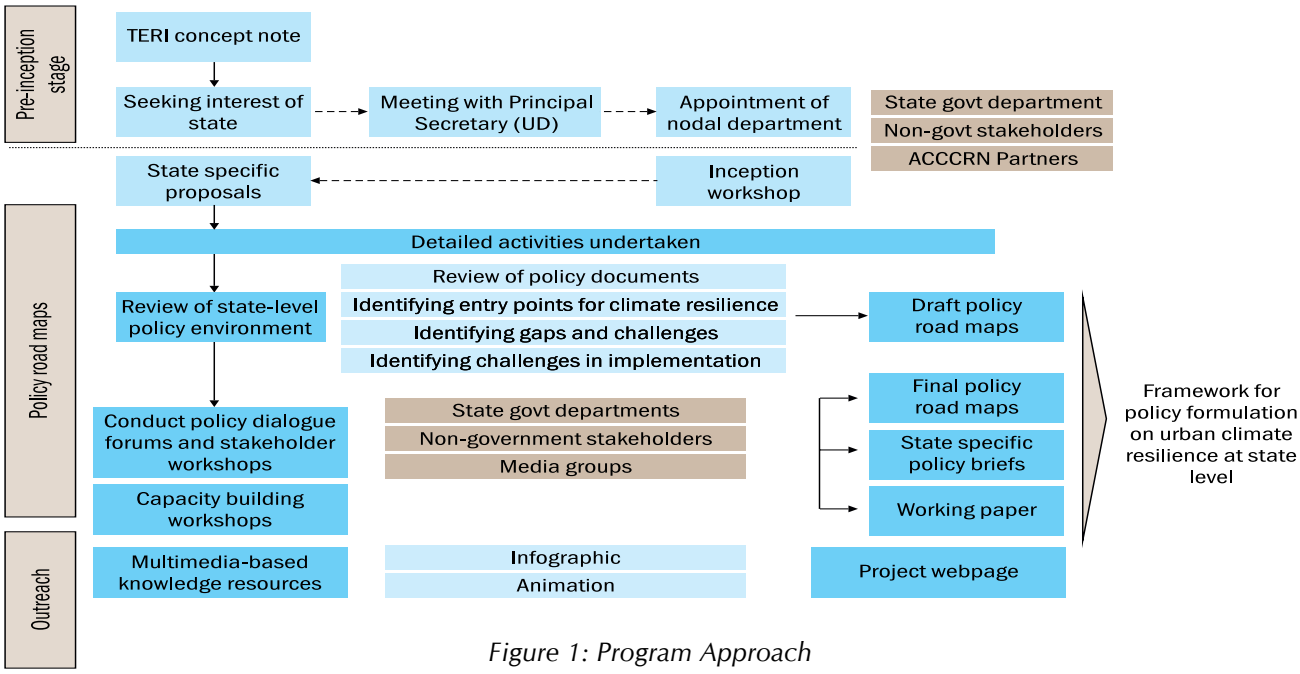


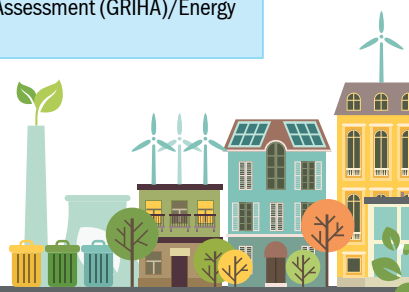
Figure 1: Program Approach

- Climate-related issues and addressing them through the state-level acts and regulations, for example, the State Town Planning Acts could have clauses that integrate climate parameters into master planning processes;
- Resilience interventions could be included into the development regulations of the cities, for example, building by-laws, development controls, and zoning regulations;
- Integrating measures to bring in climate resilience into national and sub-national schemes and plans, such as the town planning schemes and City Development Plans (CDPs) of the cities.

To this end, a detailed review of the present policy environment was conducted by TERI for Uttarakhand. This involved a cross-sectoral assessment of acts, rules , and policies that govern urban development processes in the state, viz. urban planning, urban and transport infrastructure, water supply and sanitation, housing, public health, tourism, disaster management, and power supply sectors. The table below summarizes these recommendations for each sector under consideration for this study.

Urban Planning and Housing	
Regulations	Recommendations
Uttarakhand Urban and Country Planning and Development (Amendment) Act, 2013	■ Chapter III, Section 8 of the Uttarakhand Urban and Country Planning and Development (Amendment) Act, 2013, stipulates the preparation of a master plan for the development area. A chapter on climate change resilience, which includes present vulnerabilities, must be incorporated in the master plan. A climate vulnerability assessment can be conducted in order to draw out the vulnerabilities. Further to reduce the vulnerability, the land-use planning of that area should be revisited and evaluated.
Special Development Areas - Uttarakhand (UP Special Area Development Authorities Act, 1986) Adoption & Modification Order, 2006	■ Chapter III, Section 10 and 11 of the Uttarakhand Urban and Country Planning and Development (Amendment) Act, 2013, stipulates that the master plan after preparation should be submitted to the State Government. It also deals with the procedure to be followed for the preparation and approval of the master plan. Under this provision, the State Government should make climate change considerations and resilience integration mandatory in the preparation and approval process of the master plans.
Regulated Areas–Uttarakhand (UP Regulations of Building Operation Act, 1958) Adoption & Modification Order, 2006	

Uttarakhand River Valley Protection Act, 2005	■ Chapter V, Section 17 gives the State and Central Government requisite powers to issue directions to the Development Authority to carry out the provisions of this Act. Hence, under the provisions of Section 17, the State Government can direct the Development Authority to make climate change considerations and resilience integration mandatory in their planning, approval, and notification processes. ■ Chapter III, Section 10 (1, 2, and 3) stipulates preparation of a master plan and a sectoral plan for the sustainable development of the river valley. A chapter on climate change resilience, which includes present vulnerabilities, must be incorporated in the master plan. A climate vulnerability assessment can be conducted in order to draw out the vulnerabilities
Uttarakhand Urban Sector Development Investment Program (UUSDIP)	■ The UUSDA will function under the overall control and guidance of the Urban Development Department. Climate-resilient infrastructure should be made mandatory by the Urban Development Department under this program. ■ An inventory of groundwater sources should be made, which can be used as a potential source of water supply and water source for sanitation activities. ■ There should proper measures in place, which undertake effective treatment and disposal of waste water.
Uttarakhand Flood Plain Zoning Act 2013	■ Chapter III, Section 5 deals with surveys and delineation of flood plain areas. Under this provision, the Flood Zoning Authority should strictly enforce establishment of flood plain zones and delineate the areas that are subject to flooding. Flood zoning map should be prepared and duly approved and circulated to development authorities and other departments. ■ Chapter V, Section 12 gives the State Government requisite powers to prohibit and restrict activities in the flood plains in the interest of public health, safety, or property. Stricter enforcement of this provision, restricting human activities and haphazard developments in the flood plain zones should be exercised. ■ Only very limited and that too scientifically designed construction activities should be permitted in flood plains. ■ Construction in flood plain of rivers must be done based on the recommendations of central agencies such as CWC as well as state irrigation department.
The Uttarakhand District Planning Committee Act, 2007	■ Section 9, from a to p outlines the functions the District Planning Committee has to perform under the provisions of this Act. Section 9(a) specifies that the committee has to identify local needs and objectives within the framework of state objectives. Uttarakhand by virtue of its location and topography is highly vulnerable to the impacts of climate change and climate change induced extreme events. Thereby, the objective of the District Planning Committee should entail the need for building climate resilience and climate adaptation planning. ■ Section 9(m) stipulates the District Planning Committee has to ensure participation of voluntary organizations in overall development process. The Committee with the involvement of NGOs and other local organizations can take up measures to integrate climate change resilience. NGOs and other local organizations can sensitize the local population by conducting public awareness programs on climate change impacts, coping mechanisms, and climate adaptation techniques. ■ Section 10 stipulates the District Plan should include subjects enumerated under the UP Municipalities Act, 1916, and UP Municipal Corporation Act, 1959, which include the provision and maintenance of urban infrastructure and services such as construction and maintenance of drains, solid waste management, etc. All these provisions (infrastructure and services) should be planned while keeping in mind the prevalent and future impacts of climate change, i.e. climate-resilient infrastructure.
Building Bye-laws 2011 and amendment 2015	■ Enforcement of sanction and approval of building plans by authorized body, only if that the environmental conditions stipulated in the model building bye-laws are incorporated for the respective categories of buildings. ■ General provision of model bylaws, for the hilly regions should be suitably modified to meet the requirements of fragile nature of the hilly ecosystem. ■ Green building practices in HVAC, power and water supply, and waste management in public and commercial buildings in accordance with the Green Rating for Integrated Habitat Assessment (GRIHA)/Energy Conservation Building Code (ECBC) compliance should be integrated.



Environment, Climate Change, and Disaster Management	
Doon Valley Notification 1989, (under the Environment Protection Act, 1986)	Climate change considerations and disaster risk reduction should be integrated in the zonal master plans
Notification declaring watershed of the Bhagirathi, an eco-sensitive zone, 2012 (under the Environment Protection Act, 1986)	
Uttarakhand State CAMPA Project	■ The CAMPA project looks at conservation of soil cover to arrest soil erosion, floods, and siltation of river and mitigation of landslides that are aimed at enhancing climate change and disaster preparedness. The State Forest Department should assign one wing department exclusively for the speedy completion of the projects concerned with disaster risk reduction and climate change adaptation. ■ The funds allocated toward suppression and management of forest fires under the CAMPA project need to be utilized appropriately to tackle the threat of forest fires. ■ A certain percentage of the funds should be allocated toward urban forestry as it is instrumental in enhancing urban climate resilience.
Uttaranchal Disaster Management Act, 2005	■ The Disaster Management Plan should address the interlinked challenges of disaster risk, climate change, and sustainable development. ■ The Disaster Management Plan should be prepared in consultation with the ULBs, especially of the vulnerable cities to incorporate urbanization challenges, shocks, and stressors. ■ Resources should be allocated and directed toward addressing immediate concerns related to landslide, flood/flash flood, and earthquake threat. ■ ULBs should prepare flood management plans with technical assistance from State Disaster Management Authority and execution and coordination assistance from District Disaster Management Authorities. ■ Participatory approach, to understand coping mechanisms of the society, should be included as an aspect of disaster management. ■ There should be an enhanced understanding of climate vulnerabilities and strategies should be devised to mitigate the vulnerabilities.
Tourism	
The Uttarakhand Tourism Policy, 2001	■ Capacity building and awareness generation of different stakeholders in the tourism sector; property developers, hotel owners, restaurant owners on climate risk the tourism sector is exposed to should be taken up by the Uttaranchal Tourism Development Board. ■ Integrating green building practices in HVAC, power and water supply, and waste management in tourism and allied activities.
Uttaranchal Tourism Development Board Act, 2001	
Uttarakhand Tourism Development Master Plan, 2007–22	
Solid Waste Management	
The Municipal Solid Waste (Management & Handling) Rules, 2000)	■ The State Board grants the authorization for setting up waste processing and disposal facility only after considering the views of other agencies, such as the State Urban Development Department, the Town and Country Planning Department, the Groundwater Board, etc. All these departments should review the proposal in the lens of building climate resilience, and the State Government while granting the authorization should consider their comments. ■ All the ULBs should enforce ban on plastics under the notification of the Nation Green Tribunal. ■ Ensure stricter implementation and enforcement of Section 3 under the provisions of the Uttar Pradesh Plastic and Other Non-Biodegradable Garbage (Regulation of Use and Disposal) Act, 2000, to prevent the chocking of sewerage systems and drains.
Uttar Pradesh Plastic and Other Non-Biodegradable Garbage (Regulation of Use and Disposal) Act, 2000 (applicable to Uttarakhand)	

Water Supply and Sewerage	
UP Water Supply and Sewerage Act, 1975	Section 14 enumerates the functions of the Jal Nigam, which is to render all services in regard to water supply and sewage for the State. Under this provision, the following actions can be undertaken: ■ In cities where sewerage/drainage are not developed and in new developments, the possibility of decentralized systems—Decentralized Waste Water Treatment Systems (DEWATS) at level of residential units/wards should be explored by the Jal Nigam. The State Government should provide incentives/fast track approvals for development of such sustainable systems. ■ In cities where sewerage/drainage exist or are partially developed, the Jal Nigam should revisit the drainage and sewerage systems to ensure disintegration of storm water drains appropriately with the new sewer drains when they are sanctioned for and also look for feasibility of DEWATS.
Road Transport	
Road Maintenance Policy, 2015	■ The norms under routine maintenance looks at cleaning of drains, culverts, and soil erosion control on hill slopes, which should be strictly enforced to prevent the chocking of drains and landslides, respectively, and hence, enhancing the adaptive capacity and climate resilience. ■ The norms under emergency maintenance and special repairs takes care of reconstruction of fully damaged roads due to floods, earthquakes, landslides, and cloudbursts and clearance of landslips, construction of damaged drains, and retaining walls, which should be strictly enforced.
Road Infrastructure Protection Act, 2014	Section 4 stipulates that the Executive Engineer shall prepare a road infrastructure map. Under this provision, a climate and disaster vulnerability mapping of road infrastructure can be conducted, such that the road infrastructure map includes all critical infrastructures and in the process, the criticality of the roads can be determined. The Executive Engineer should be bestowed with this additional responsibility of identifying vulnerable road stretches under this provision.

Overarching recommendations for operationalizing the Urban Climate Resilience Policy framework in Uttarakhand

Action to address climate change in urban areas should be multi-level, involving national-, state-, and city-level governments, as well as multi-sectoral, including sectors such as infrastructure and services, urban planning, transport, disaster risk reduction, and housing and construction. For cities to internalize resilience planning into the urban development process, an effective policy framework will be that which provides for capacity building; facilitating data, tools, and techniques to enable risk assessment and climate projections, implementation and financing mechanisms; and interdepartmental, coordination that would be needed to achieve that (TERI 2014). While it is understood that detailed entry points need to be identified and integrated in the present institutional and regulatory mechanisms for each sector, there are some overarching policy and governance issues that require equal attention by the state and need to be addressed. To this end, this section discusses the broad underlying action points to operationalize the proposed road map.

- **Preparation of a detailed risk profile of the state in terms of climate impacts and extreme events in the context of urban areas and vulnerability analysis of cities:** This requires past climate data and future projections of climate and various other sectoral datasets, to help assess the vulnerability, and coping capacity of city systems to climate events. This would need engagement and communication among various institutions, departments, and stakeholders to complement the multi-sector needs and requirements of such an exercise. While the regional information on climate impacts and its sector-specific connotations could be found from Uttarakhand's state action plan on climate change, the 4 × 4 assessment report of the Ministry of Environment and Forests could also come in handy

in understanding regional climate assessments on which the policy recommendations could be based.

- **City resilience strategy:** While the state-level risk profile will outline the importance of sectoral interventions and would make a case for state-level actions to address regional issues related to climate change that would have impact on urban areas; for example, water availability and flooding; the city-specific resilience strategies must also be facilitated to have context-specific actionable plans for adaptation and mitigation in the urban centers of the State.
- **Region-specific resilience plans:** Uttarakhand comprises two distinctly different topographical and climatic regions, the hilly terrain and the plain region. The topographical and climatic variance within the state poses different set of challenges for both the regions. Further, the stakeholder engagement strongly highlighted the need to come out with separate tailor-made action plans for both plains and hilly region. It is recommended that a thorough detailed scientific study be conducted for devising such region-specific climate resilience action.
- **Data and climate projections:** Resilience planning would entail drawing up extensively from specific datasets such as socio-economic data, climate trends, and sector-specific datasets to enable formulation of strategies. Therefore, there is a need to define an action plan for conducting the climate projections and trend analysis and developing of database management systems. Most cities in India lack the proper information systems required for addressing the various aspects of climate change impacts; for example, data on weather anomalies, frequency, and extent of urban floods. Integrating resilience planning in the urban planning process requires very specific data sets on various local and regional climate parameters. Hence, maintaining a repository of city and region specific data using Management Information Systems would be an essential step, which could be used to develop time series and spatial databases in this regard.
- **Institutionalization plan:** To facilitate all the above, a strong regulatory and institutional backing is required, which also draws out financial mechanisms to support the cause. An important point of consideration is the fact that resilience requires multi-sectoral and cross-sectoral interventions and may not fit into the present divisions of institutional responsibilities. Therefore, while the policy framework can guide the overall mechanisms to support resilience mainstreaming into urban development discourse, it should also identify various entry points within existing institutional mechanisms and regulatory framework (TERI 2014).

The road map recommends exploring inter-linkages with the existing climate change and disaster management set-up to facilitate response mechanisms and preparations for any unforeseen event, such as flood and extreme rainfall. The institutionalization could be achieved through engagement at various levels while also integrating these concerns into development regulations and project planning, and financing activities. Similarly, various other sectors, such as water, infrastructure, transport, etc., would have a bearing on the planning, implementation, and monitoring of the policy. Hence, these relevant sectors have to be integrated within the policy action points and mechanisms for interdepartmental coordination; development of joint adaptation action plans also has to be drawn up.

To this end, the suggestive institutional architecture for climate action in urban areas of the state could start with establishing a state-level climate resilience cell in the ambit of the urban development department of the state. The cell coordinates with the Uttarakhand Centre on Climate Change, the State Disaster Mitigation and Management Centre, and the entire urban development machinery including the state line departments. The Cell also becomes an interface with a state-level high-powered steering committee chaired by the Chief Secretary of the State and having the head of the Departments from other sectors, parastatals, and PSUs. The steering committee would have a key role wherein projects and actions on climate resilience will be developed, and implementation and financing of the same will be sought. The steering committee would also facilitate interface between external aid agencies and technical agencies, such as research institutes, academic institutes that bring in knowledge and

technical capacities for building resilience. If needed, formal approvals and notifications process could be devised for smooth functioning of such an interface between various departments. Besides, there is merit in establishing a nodal body at the city level, for example, the Municipal Corporation, which would have the statutory authority to coordinate and direct the resilience planning and implementation efforts with relevant officials, semi-official, and non-governmental agencies operating there. Capturing local communities' interest and involvement could be one of the responsibilities of the nodal body.

- **Multi-level engagement:** Resilience planning is successful and apt when an integrated approach to various urban sectoral needs is followed through continuous stakeholder consultations, inter-departmental and institutional coordination, and community participation. The policy should establish a mechanism to institutionalize the process of this multi-stakeholder engagement, for example, the national government could incorporate climate resilience in the reforms agenda and resource planning under national schemes, and bring in incentive mechanisms for states and cities. The state government should support the national government's interventions toward the goal of resilient urban systems by integrating climate resilience into state-level laws and regulations, budgeting for climate resilience, and initiating and implementing capacity-building programs at the state and city levels. Cities would need to assess and understand their vulnerability and develop responses to climate-proof urban systems.
- **Financing urban resilience:** Reinforcing and climate proofing existing infrastructure would require additional funds. Therefore, financial allocation for resilience building and adaptation projects would also be an integral part of the proposed policy. Establishing national- and state-level climate funds and resource planning under various national schemes such as Smart Cities and AMRUT can go a long way in this direction.
- **Capacity building:** Climate resilience is a new concept in India, requiring specific technical know-how and data for cities to draw up their resilience plans. It also needs awareness generation to be built among civil society to foster interest and support (TERI 2014). Therefore, an important milestone in this discourse is to provide for need-based area-specific training for officials at all levels to enable planning for climate resilience and preparedness for dealing with any climate-induced emergency situation. Designing specific training programs to suit local variations and availability of adequate resources for the training programs would be a prerequisite. In addition to building capacity of relevant stakeholders, the policy should call for raising awareness of citizens about the need to include climate resilience in the urban development planning process. The broad objectives of the capacity building would be to:
  - Generate awareness about climate change impacts on urban areas
  - Acquaint stakeholders with the principles of resilience planning and its benefits for the cities' sustainability and development
  - Develop techniques, methods, and tools for assessment of climate risks and vulnerability to climate change in cities. Customized material such as toolkits, guidelines, and case studies can be developed for use in resilience planning
  - Strengthen the role of institutions and governance in fostering climate-resilient development.

Conclusion

This brief draws out possible entry points for integrating resilience measures into the State Urban Planning framework in Uttarakhand. At the same time, the overarching lessons from the program would hold true for many cities in India, especially in the context of hilly states. The brief, therefore, is intended as a reference point for development of similar state-level policy frameworks in other parts of the country. One of the challenges in operationalizing the proposed road map would be in terms of the time taken to institutionalize the recommended action points, given the cross-sectoral purview and the kind of inter-departmental coordination that would be required. TERI realizes that such a change in the governance systems is a complex and time-consuming process. It may also not be possible to bring about all the changes in one go and it is expected that the policy would have a relatively longer gestation period of the outcomes. To this end, an incremental approach is required by identifying priority action points in a time-bound and phased manner in terms of short-, mid-, and long-term objectives and activities to be undertaken. Moreover, by virtue of its varied topography and climate, region-specific measures will need to be adopted for the hilly and plain areas in the State. It is recommended that a thorough detailed scientific study be conducted for devising such region-specific climate resilience action.

Besides, as this study reveals, there is no dearth of guidelines that cities could use to plan the systems effectively; however, there is definitely lack of technical capacity and manpower that needs to be looked at. This will include capacity building of not only the planners and decision makers but also of the local communities. Moreover, involvement of local stakeholders including the affected community will be an integral part of policy formulation and implementation for urban climate resilience in Uttarakhand. This will require effective enforcement of public participation mechanisms such as the Community participation law (CPL), brought in as part of JNNURM reforms. Moreover, inclusion of the poor and marginalized groups in decision making, monitoring, and evaluation will be a key step in reducing the climate vulnerability of the local communities.

References

- ACCCRN, 2013. Background Paper—National Conference on Emerging Mechanisms and Responses of Cities to Climate Change. New Delhi: ACCCRN.
- Government of Uttarakhand, 2014. Uttarakhand Action Plan on Climate Change.
- Gupta, K. 2013. Rebuilding Uttarakhand: Challenges Ahead", New Generation of Risk Reducers. Available at <southasiadisasters.net> (accessed on September 13, 2015).
- IPCC. 2014. "Climate Change 2014: Impacts, Adaptation, and Vulnerability". Retrieved from http://www.ipcc.ch/report/ar5/wg2/ (accessed on May 24, 2016).
- TERI. 2014. Climate proofing Indian cities: A policy perspective. Available at: http://www.teriin.org/policybrief/index.php?a=11 (accessed on May 27, 2016).
- TERI, 2015. Toward a Policy for Climate Resilient Infrastructure and Services in Coastal Cities. Available at: http://www.teriin.org/policybrief/index.php?a=21 (accessed on May 27, 2016).

For more information contact:

Raina Singh

The Energy and Resources Institute (TERI)
Darbari Seth Block,
IHC Complex, Lodhi Road,
New Delhi- 110003

Tel: 24682100 or 41504900
Fax: 24682144 or 24682145
Web: www.teriin.org
E-mail: raina.singh@teri.res.in

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The ROCKEFELLER FOUNDATION