UNPACKING MAINSTREAMING DRR-CCA IN THE SUB-NATIONAL LEVEL DEVELOPMENT PLANNING:

Insights from three states in India

Key Points

The District Disaster Management Plans have been revised to demonstrate mainstreaming DRR and CCA in Development Planning at the sub-national levels. These plans contain insights from one district in each of the three states in India namely Gorakhpur in Uttar Pradesh, Puri in Orissa and Almora in Uttarakhand.

Mainstreaming DRR and CCA in Development Plans at the district level will need understanding sub-national policy, technical capacity and financial support requirements from higher-level government departments at the state and national levels. This brief flags key areas of the support.

While it is important to understand factors such as severity of weather extremes and exposure that directly influence the extent of damage due to disasters, it is equally important to consider the invisible drivers of vulnerability associated with land-use planning and sectoral allocation of resources such as budgets that are linked to appropriate technical and financing norms for the mainstreaming.

Capacity development of government and communities is central to the process of mainstreaming.

1. Introduction

The frequencies and intensities of losses due to climate-related disasters are on the rise and likely to further increase due to climate change (IPCC 2012; World Bank 2013).From 1980-2012, weather-related disasters alone accounted for 87 percent (18,200) and 74 percent (US$ 2.6 trillion) of the total number of disasters and losses globally, respectively (World Bank 2013). In recognition of this increasing risk, the Government of India has made concerted efforts for Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA). The recent National Disaster Management Plan (2016) emphasizes integrating Disaster Risk Reduction (DRR) into development. This succeeds the Disaster Management Act (2005) that evidences a paradigm shift from a reactive and relief-centric to a proactive disaster risk reduction approach. Another significant development in this direction is adoption of the National Action Plan on Climate Change (NAPCC) in 2008. While there is greater integration and capacity at the national level, the sub-national bodies at the state, district and local levels often lack the needed capacity for integrating DRR in development. Further, the underlying factors exacerbating vulnerabilities such as environmental degradation and improper land-use planning, poverty, gender and equity are often not considered in the District Disaster Management Plans (DDMPs).

This brief presents experiences from a project undertaken by Gorakhpur Environmental Action Group (GEAG) and Institute for Social and Environmental Transition-International (ISET-I) in technical collaboration with the National Institute of Disaster Management (NIDM) on integrating DRR and CCA in sub-national level development planning with support from Climate and Development Knowledge Network (CDKN). The project is implemented in one district in each of the three project states; Gorakhpur (Uttar Pradesh), Almora (Uttarakhand) and Puri (Odisha). It demonstrates the integration through application of the Climate Resilience Framework (Tyler and Moench 2012) and the Shared Learning Process in each state. In the brief we discuss the overall approach and salient features of mainstreaming DRR-CAA in development plans at district level and implications for the State and National level development planning.

2. Overall approach

The approach in each state comprised application of the Climate Resilience Framework (CRF) as a guidance tool through a process of Shared Learning Dialogues (SLDs) for understanding various components of vulnerability (the left-hand loop) and identifying actions for building resilience (right-hand loop). Vulnerability is characterized by interactions between climate exposure, systems (physical and natural), institutions and capacity of change agents (community/ government agencies/ civil society/ academia/ private). The resilience building interventions are categorized into characteristics of:

- Systems (redundancy, flexibility and safe failure);
- Institutions (decision-making process, codes, financing norms etc); and,
- Change agents (responsiveness, resourcefulness and capacity to learn).

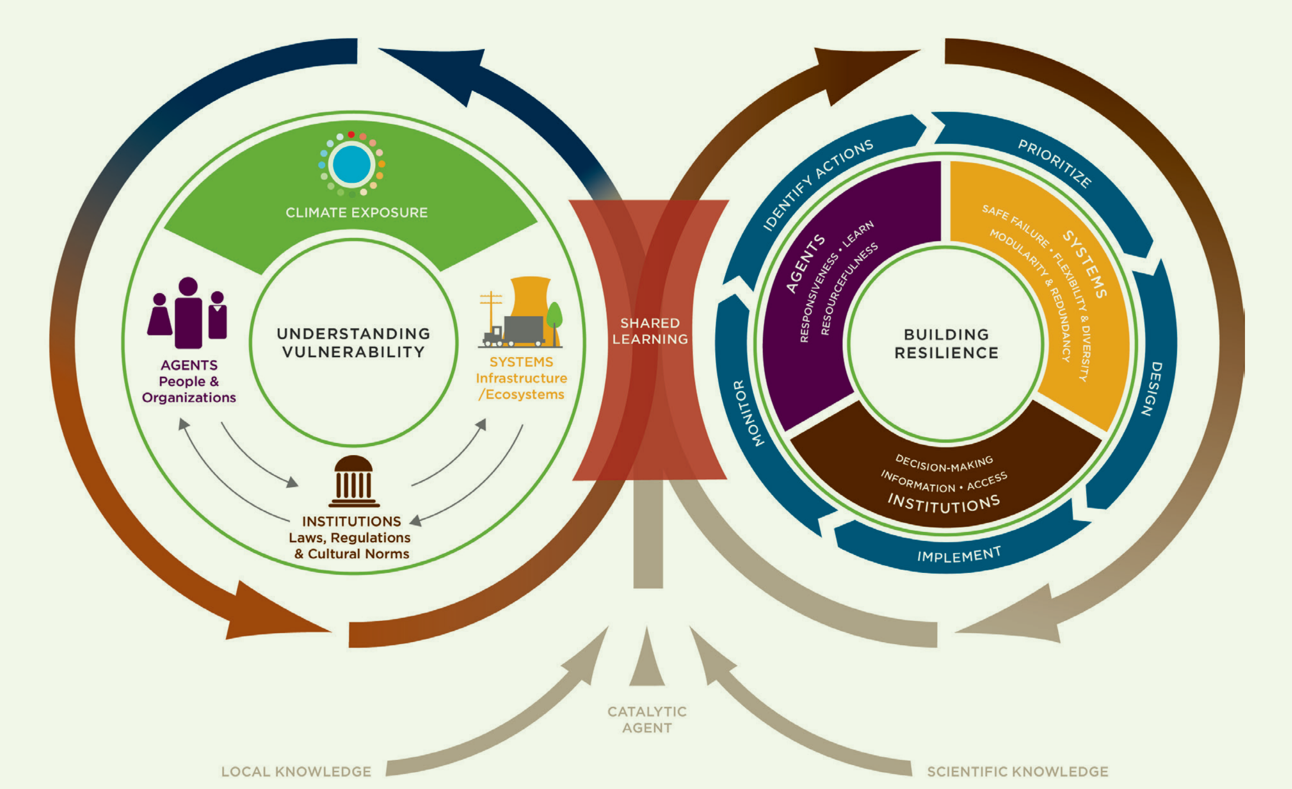


Figure 1: Climate Resilience Framework
(Source: Tyler and Moench 2012)

The SLDs, an iterative approach, is central to the process of inquiry. It brings together local expertise (on linkages between rainfall patterns and stream flows, infrastructure, natural resources, technical norms etc.) and external expertise (climate change, concepts of resilience, mainstreaming theories and practices etc.) to understand vulnerabilities and identify resilience actions. **Figure 2** illustrates how it was implemented in practical terms in the case of Uttarakhand.

The SLD process provided qualitative insights into: the issues of hazard, vulnerability, impacts, risks and capacities across various departments/ sectors; and, aided in identifying options for mainstreaming CCA-DRR in development plans of various departments. This was combined with quantitative data, as available, on the above aspects to draw a comprehensive picture of hazards, vulnerability, risks and capacities.

The focus of this project was on the conventional development planning and hence we focused on understanding the process of development planning and its delivery on the ground; and resulting consequences on vulnerabilities, risks and impacts. For this we re-iterate the notions of Indirect Vulnerabilities and Direct Impacts. Through this lens, **Figure**

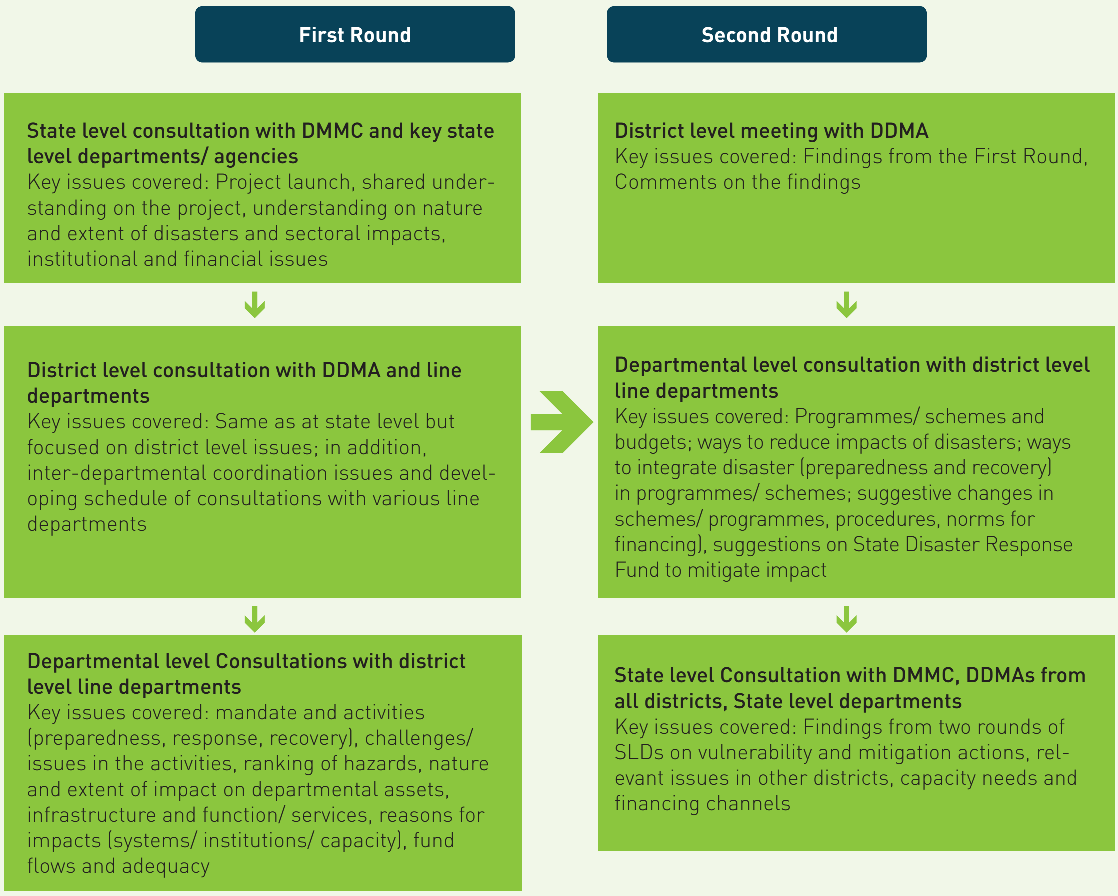
3 shows key information/ data that was collected at the district/ block/ tehsil/ town level as available for rural areas and the largest urban center in the three locations.

In addition, the **Figure 3** illustrates where and how mainstreaming can contribute in the whole inter linked components of:

- The conventional development;
- Current but evolving system of Disaster Management (preparedness and mitigation, response and recovery); and,
- Hazard; Indirect Vulnerabilities and Physical/ Infrastructural Vulnerabilities.

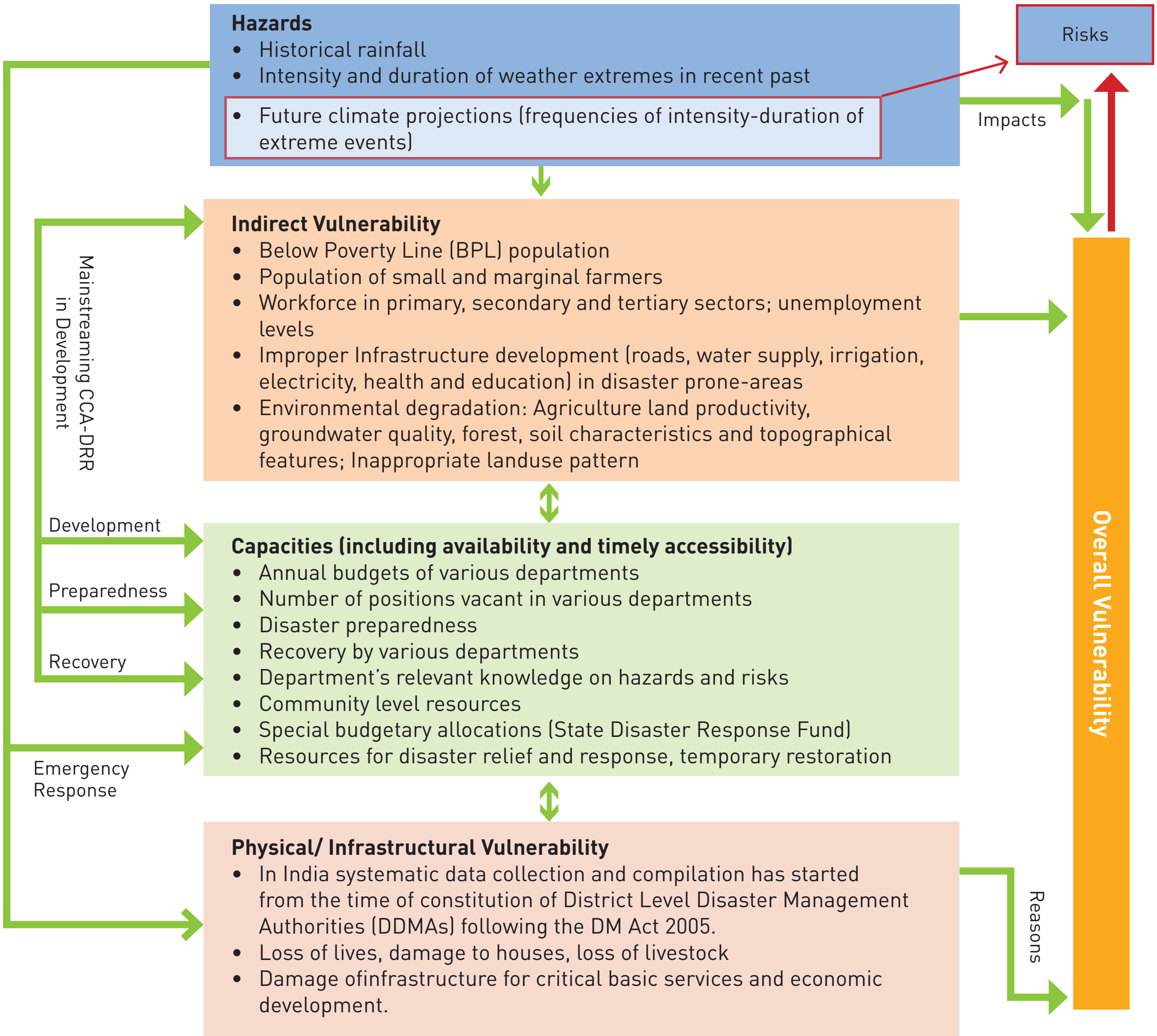
The Indirect Vulnerabilities associated with factors such as high dependence of community on vulnerable livelihood sources, high environmental degradation and improper land-use patterns are shaped by past hazards and capacities (inadequacy of human and financial resources for implementing development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

Figure 2: SLD process in Uttrakhand



The data/information has been collected and analysed, as available, as listed in various boxes in Figure 3(even at the block/ sub-district administrative level).

Figure 3: Key elements of mainstreaming CCA-DRR in Development Planning



3. Methodology and findings from the three project locations

3.1 CONTEXT AND HAZARDS

The three locations were selected in order to capture the diversity of weather-related disasters in India. These locations have experienced extreme surplus and deficit rainfall events, intense cyclones, extreme hot and cold days for long durations and hailstorms manifested in flash floods, riverine and deltaic flooding and water-logging, landslides and droughts impacting all the sectors of economy. At the national level these disasters affect significant geographical areas. Out of 7500 km of coastline in India, 5700 km is prone to cyclones and Tsunamis; forty million hectares (12 percent of the land) is prone to floods and river erosion; sixty-eight percent of cultivable area is prone to droughts; and, large tracts of the hilly region is prone to flash floods (NDMP 2016).

ALMORA (UTTARAKHAND)

Almora district is centrally located in the multi-hazard prone districts of northern Himalayan State of Uttrakhand, spread over 3139 sq km. The population of Almora is 622506 (Census 2011), of which about 90% is rural and agriculture is the major occupation of people in the state. Almora is an important town of the district. The climate of Almora district varies in places depending upon its elevation. In summer, near the river valleys the temperatures can go as high as 40 C, whilst the winter temperatures drop to below 0° C at higher altitudes. The average temperature ranges from 31.2 C in summers to 0.1 C in winters. The average annual rainfall in the district is about 1027 mm.

Hazard profile

Cloudbursts, landslides, flash floods and earthquake are major hazards in the districts. The district experienced some severe devastation in 2010 due to flash floods and landslides caused by cloudbursts. Almora is susceptible to earthquakes and falls under zone IV and V. The district experienced a severe flash-flood event in 2010 caused by cloudburst. Subsequently heavy rainfall and landslide episodes in 2013, and snowfall in 2014, are some major recent disasters making the district vulnerable to multiple hazards.

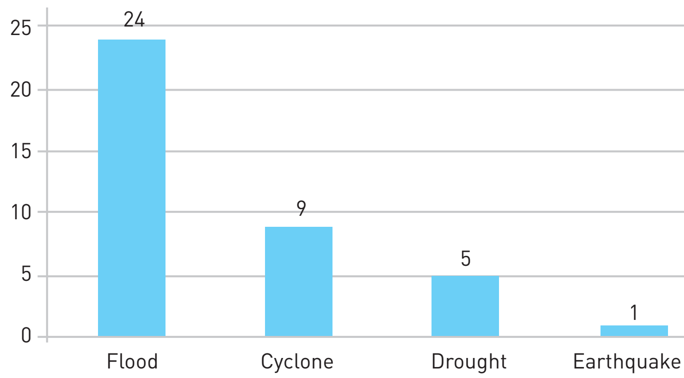
Types of Hazards	Month of Occurence											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flash Floods							↔	↔	↔			
Forest Fires			↔	↔	↔	↔						
Cloud Bursts				↔	↔							
Cold Waves	↔											↔
Hailstorms			↔	↔								
Landslides							↔	↔	↔			

Most of the GCMs models under the RCP 4.5 scenario project an increase in mean monthly rainfall in July (up to 70 percent), August (up to 90 percent) and September(up to 50 percent) in 2040-59 as compared to the corresponding observed mean values for 1986-2005,although very few GCMs indicate a reduction in rainfall too. In addition, winter rainfall is likely to increase.

The maximum and minimum temperatures in summer and winter are likely to increase with the increase more in minimum temperatures as evident from almost all the GCM models.

PURI (ODISHA)

Puri is a coastal district in the eastern State of Odisha spread over 3479 Sq.km and is a major religious destination for Hindus. The population of Puri district is16,98,730 (Census 2011). Puri district comprises 11blocks and four Urban Local Bodies (ULBs) including Puri Municipality. Agriculture remains the main source of livelihood. Puri district enjoys a tropical climate with an average rainfall of 1424 mm. It experiences hot dry weather (March to early June), hot wet weather (mid June to October), and slight cold dry weather (November to February).



Puri: Instances of disasters in past 60 years

Hazard profile

Multiple natural hazards and new types of vulnerabilities are emerging in the district.Floods and cyclones are the most prevalent. Based on the discussions with various departments and the local community, the types of hazards and months of their occurrence are shown in the graphic.

Types of Hazards	Month of Occurence											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Floods						↔	↔	↔	↔			
Cyclones				↔	↔	↔			↔	↔	↔	
Drought						↔	↔	↔				
Sunstroke			↔	↔	↔							
Fire			↔	↔	↔	↔						

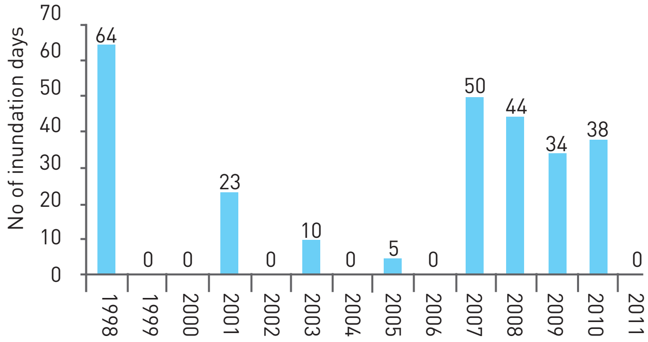
The total number of cyclones is likely to reduce. However, the severe cyclonic storms are observed to rise from seven in pre-warming (before 1950's) to 11 in post-warming era (1950-2010).

Analysis of historical rainfall data shows that the recurrence frequency of cumulative two- and three-day extreme rainfall events is once in two years. These events have historically caused significant flooding/ waterlogging in Mahanadi deltaic areas of Puri district.

GORAKHPUR (UTTAR PRADESH)

Gorakhpur district is located in the eastern part of Uttar Pradesh and covers an area of 3484 Sq km. Gorakhpur city itself is an important religious, cultural, commercial, educational and medical center – serving the hinterland of eastern Uttar Pradesh in the Gangetic plains. Gorakhpur is one of the most populated districts of UP with population of 44,36,275 (Census 2011) of which about 80% is rural and agriculture remains the main source of livelihood. The district comprises 7 tehsils, 19 blocks and 8 ULBs.

The climate of eastern UP varies from semi arid to sub-humid and experiences four seasons. The summers are very hot, while the winters are cool and dry. Currently, the summer average maximum temperature soars to as high as 37.5°C and the winter average minimum is 10.2°C. During the later part of summer season and during monsoon, the humidity levels increase significantly. The mean annual rainfall ranges from 80 cm in the south to 140 cm in the northern parts of the state.



Source: Flood Division, Gorakhpur, 2012

Hazard profile:

Gorakhpur district is majorly affected by flooding from Rohini, Rapti, Aami, Kuano and Ghaghra rivers. It is almost an annual phenomenon. All the blocks of the district are highly prone to flooding. In addition, dry spells during the monsoon season cause drought-like conditions.

Analysis shows an increase in intensities of 24 hr rainfall events for all return periods (2, 5, 10, 20 and 50 years) across all GCMs (Stapleton *et al* 2014); and, losses from one in ten years floods are likely to occur once in five years with one in 100 years losses occurring once in 60 years (Kull *et al* 2008). Overall frequencies of high intensity floods are likely to increase.

3.2 KEY VULNERABILITIES, RISKS AND CAPACITIES

We now present findings from the SLD process in all the three locations as illustrated in **Figure 3** under Indirect Vulnerabilities, Capacities and Physical/ Infrastructural Vulnerability.

Indirect Vulnerabilities: Factors include high population density, poverty levels and concentration of a significant proportion of socio-economically weaker sections of society in disaster prone areas; high dependence of population on agriculture which is vulnerable to weather-disasters – this is combined with low levels of irrigation development and limited diversified livelihood opportunities for communities.

High environmental degradation viz. groundwater salinity, soil erosion and unstable hilly slopes, land productivity; improper land-use that reduces flood buffering/ absorption capacity of natural system; and, reduction in capacities of natural drainage/ rivers/ streams due to improper infrastructure development. For example, jacketing of the rivers by embankments has led to increased siltation in the river which raises its bed, thereby reducing its discharging capacity; and, cross-drainage works in roads mean there is inadequate capacity to channelize runoff generated from even moderately high rainfall events.

Capacities: Very limited capacity of various departments at the field level for assessing loss, implementation and monitoring infrastructure development and restoration, and disaster response; inadequate maintenance and repair budgets; lack of enabling technical norms, guidelines, procedures and unclear financing channels for developing resilient infrastructure especially at and below the state level; lack of coordination between departments with mandates for planning, constructing, maintenance and repairs, and restoration of sectoral infrastructure. For example, between the Irrigation Drainage Division and Puri Municipality, with the former involved in creation and the responsibility of maintaining entrusted to the latter. In addition, there is lack of effective coordination between departments for response, temporary restoration and reconstruction of infrastructure.

Severely constrained capacity of communities for financing restoration of damaged assets/ houses in a resilient way; and, poor knowledge of disaster prevention, mitigation, preparedness and management.

Physical/ Infrastructural Vulnerability: The critical infrastructure like roads, schools, health, irrigation and electricity are either situated in disaster-prone areas and do not follow resilient design norms or are very old or underdeveloped. At some locations/ sectors it is a combination of all the three. The focus is on constructing new infrastructure as per existing technical norms and replacing the damaged infrastructure, as opposed to adopting technical norms of resilient designs to build-back-better. This approach increases risks in most cases to future disasters. Some anecdotal evidence indicates that reconstruction of infrastructure has been undertaken through adopting higher technical and financing norms, but it is yet to be mainstreamed.

In most cases alternative backup systems, especially at the sub-district/ block levels, are practically absent; hence damage to the main infrastructure causes breakdown of services/ functions designed to be provided by that system. In addition, a significant proportion of housing stock is non-permanent or temporary.

The Government considers damages as the ones happening only to infrastructure while flow-losses (such as reduction in employment, erosion of livelihood base of the communities etc.) are often not accounted for.

Finally, undue consideration of factors of indirect vulnerability combined with incomplete understanding of losses and damages leads to implementing options that do not address the full range of vulnerabilities.

The disaster risk increases substantially considering the above factors and in light of increasing frequency of weather related hazards as highlighted by climate analysis in all the locations.

The findings contributed to revising the District Disaster Management Plans (DDMPs) of the three districts and making recommendations to State Level Departments including the State Disaster Management Authority (SDMA, Odisha; Disaster Management and Mitigation Centre--DMMC, Uttrakhand; and, SDMA, Uttar Pradesh).

4. Recommendations

- The Climate Resilience Framework and Shared Learning Dialogues are useful tools for mainstreaming DRR-CCA in Development;
- DDMP of one district in each of the three states has been revised. These need to be considered as a model for replication in other districts in the states. Interestingly, Uttar Pradesh has already passed the needed Government Order while the State DMMC, Uttrakhand, has declared the revised DDMP of Almora as a model DDMP for replication in other districts.
- Technical norms for designing infrastructure in all sectors need to be revised to the standards needed for resilient designs. Equally important is the need for passing needed Guidelines/ Circulars/ Government Orders to promote resilient designs;
- Necessary and dedicated financing channels need to be established for mitigation and capacity building especially by creating pool of funds from various programmes and plans within each government department at the state level. There is a provision of using 10 percent as flexi fund under all the Centrally Supported Schemes (CSS) but such a fund has not been created. Interestingly, OSDMA expressed interest into passing the needed resolution in the consultation held on 24th October 2016.
- All infrastructure projects need to be screened for potential impacts on environment and vulnerabilities. Specific tools need to be developed for granting financial approvals for such screening.
- Higher allocation of funds for investment in new infrastructure across various administrative divisions (districts/ blocks/ villages/ urban areas) is needed in higher disaster-prone areas;
- Coordination sub-committees should be constituted for activities of each department under the aegis of DDMA to facilitate coordination amongst relevant departments for planning, implementation and monitoring of infrastructure development;
- There is need for enhanced investments for diversifying livelihoods in disaster prone areas in sectors that are less vulnerable to disasters viz. manufacturing and services;

- Women, children and aged generally become more vulnerable especially due to migration of men from disaster prone areas for employment. Thus, concerns of these groups need to be integrated and articulated well in policies, plans and programmes on development and disaster management;
- Investments need to increase in developing capacities of field level staff of departments in Disaster Management;
- Vacant posts, especially at field level, need to be filled with permanent staff in all departments. This will bridge the lack of capacity for field level assessment of loss and reconstruction and monitoring effectively;
- Maintenance and periodic repairs need to be taken up in a timely manner. There is need for increasing the budget of various departments.

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