

# Mainstreaming Climate Change Adaptation and Disaster Risk Reduction in Development Planning, Gorakhpur

## PROCESS DOCUMENT

Gorakhpur Environmental Action Group (GEAG) is a voluntary organization working in the field of environment and sustainable development since 1975. Ever since its inception, GEAG has been actively engaged in implementing several development projects addressing livelihood issues of small and marginal farmers, particularly women based on ecological principles and gender sensitive participatory approach. Besides, GEAG has accomplished several appraisals, studies, researches at the micro & macro levels as well as successfully conducted a number of capacity building programmes for various stakeholders including women farmers, civil societies groups and government officials etc.

Today, GEAG has established its identity in North India as a leading resource institution on sustainable Agriculture, Participatory approaches, methodologies and Gender. Acknowledging its achievements, efforts and expertise United Nation's Economic and Social Council (ECOSOC) accorded GEAG special consultative status in the year 2000. GEAG has also been recognized recently as North India hub for interSard, South Asia a network to facilitate information sharing on issues of concern.

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# Abbreviations

ACCCRN	Asian Cities Climate Change Resilience Network
CCA	Climate Change Adaptation
CDKN	Climate Development Knowledge Network
CHC	Community Health Centre
DDMA	District Disaster Management Authority
DRR	Disaster Risk Reduction
GEAG	Gorakhpur Environmental Action Group
HFA	Hyogo Framework for Action
IPCC	Intergovernmental Panel on Climate Change
ISET	Institute for Social and Environment Transition
NDMA	National Disaster Management Authority
NIDM	National Institute for Disaster Management
NIUA	National Institute of Urban Affairs
PHC	Primary Health Centre
SDMA	State Disaster Management Authority
SDRF	State Disaster Response Fund
SLD	Shared Learning Dialogue
SREX	Risks of Extreme Events and Disasters to Advance Climate Change Adaptation
UNISDR	United Nations International Strategy for Disaster Reduction

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## FOREWORD

In Gorakhpur district, the rural and urban population is 3601905 and 834370, respectively. The mainstay of the people of the district is agriculture and related small and medium industries and other allied activities. Out of the total cropped area of 264828 hectare, the net sown area is 202592 hectare and the area sown more than once is 152655 hectare. The agricultural activities in the district are mainly dependent on rainwater.

Floods are the major natural calamity of the district and are the main cause behind destruction of property and loss of human lives. The district has witnessed some extreme flood events in the past which had created adverse impacts on industries, infrastructure, developmental programmes along with agricultural production. The rivers of the district Rapti, Ghaghara, Kuano, Rohin, Aami and Gorra had crossed their highest flood level. Due to the rupture in the embankments constructed along these rivers to protect the area from the flood, most of the areas of all tehsils of district along with other parts of state were worst effected by flood. The help from army, air force and PAC were sought for rescue and relief work. In the year 2000, the flood of Rapti river had crossed the highest flood level at Rigauli (Campierganj). The embankment along Rapti river was smashed at six places and at seven places it was at danger level. In 2001, due to heavy pressure of flood water, several embankments in Campierganj, Chauri Chaura, Sadar and Bansaon tehsils were damaged. In 2007 a new nature of flood was witnessed. Though the floods were not as devastating as the previous ones, but their recurrence and repetition for almost four times was a challenge before the district machinery to deal with it and it resulted in loss of agriculture, building and public assets. In 2002 and 2004, there were long dry spells in the district and hence, the state government had declared Gorakhpur as a drought hit district. In 2009-2010, floods inundated the whole district twice in the same year.

On the basis of these experiences of year 1998, 2001 and 2007, a district flood management plan was prepared. The experiences of 2002 and 2004 resulted in the preparation of a district drought management plan. These plans were very useful for the administration & people of district. The establishment of flood posts, relief camps, rescue and relief work, integration of

different departments, timely supply of boats, availability of army help etc. helped in mitigating the risk impacts. The experiences also concluded that due to the changing climate, the nature, pattern, time and prevalence of these natural calamities are also changing. In this view, District Disaster Management Authority had started a research programme during 2012-13 for preparing a District Disaster Management Plan with the help of National Institute of Disaster Management, Government of India, a local organization Gorakhpur Environmental Action Group, Gorakhpur and Institute for Social and Environmental Transition, U.S.A. During this study, various workshops with different departments were organized. On the basis of their outcomes and the directions of the government given from time to time, an attempt was made to prepare a District Disaster Management Plan in 2013-14 by integrating climate change adaptation and disaster risk reduction aspects.

This plan has been formulated with cooperation, collaboration and participation of different departments, public representatives so that the loss during disaster should be mitigated during pre-, during- and post disaster periods. The government orders given by state government of U.P., orders of the commissioner of Gorakhpur Division, the suggestions and observation given by public representatives, officers, NGOs were incorporated and integrated in the District Disaster Management Plan. The work plan of the respective departments such as Irrigation, Medical, Veterinary, Ration and Supply, P.W.D., Forest department, Electricity, Jal-Nigam, Railway, Communication, Army and Air force were also incorporated in this plan for mitigating the losses caused by disaster.

It is envisaged that in view of the changing climate, this plan will seem useful in mitigating the losses caused by flood disasters, water logging and drought and it will be useful to operate the activities during disaster by respective departments. The suggestion, proposition and observation for making this plan more effective will be welcome and will be included in the plan.

**Ravi Kumar N.G.**  
District Magistrate, Gorakhpur



## Climate Change Adaptation and Disaster Risk Reduction

### The Backdrop

There is an increasing recognition that disaster risk reduction (DRR) should include climate change adaptation (CCA). CCA and DRR have similar aims of reducing vulnerability and hazard exposure in order to increase resilience to the potential adverse impacts of climate change. Both DRR and CCA require collaborative and coordinated actions. The integration of the two fields provides opportunities to strengthen the common parts and improve the management of present and future hazards and risks. Moreover, it is commonly accepted that development and sustainable goals may be facilitated by integrating CCA into DRR.

Globally, people seek ways to reduce disaster risks in some ways or the other. But in many cases poverty and marginalization restrict their effectiveness and options, and rural-to-urban migration exposes them to unfamiliar situations in which they lack the knowledge and means to manage new risks. Today, there is increasing awareness that states within their obligation to respect, fulfill and protect human rights, have primary responsibility for reducing disaster risk, and that the international community has a duty to provide support and create an enabling environment for this obligation to be met. By

signing the Hyogo Framework for Action (HFA) at the World Conference on Disaster Reduction in 2005, 168 governments and all leading development and humanitarian actors committed to a 10 year multi-stakeholder and multi-sectoral plan to invest in disaster risk reduction as a means to building disaster-resilient societies. Since the HFA was agreed, many governments have introduced legislative and policy frameworks for disaster risk reduction, established early warning systems and increased their level of preparedness to respond to disasters.

However, the goals of the HFA are still far from being achieved, particularly in terms of addressing the causes of risk and ensuring full participation of at-risk populations in risk assessments, planning processes and programs. A massive effort is needed to bring about change at the heart of each country's 'development system' through the involvement of all sectors and all stakeholders from local to national in disaster risk reduction.

The need to address DRR and CCA simultaneously in order to achieve coordinated actions has been stressed by both UNISDR and IPCC-SREX report. However, till date, the climate change and disaster risk management communities have operated largely in isolation from each other.

## The Hyogo Framework for Action has five priorities for action

1. Prioritizing disaster risk reduction by providing high-profile leadership, establishing relevant policies and programs, and allocating resources to implement them.
2. Identifying, assessing and monitoring disaster risks and improving early warning systems.
3. Creating awareness at all levels of society about risk and providing information about how to reduce it.
4. Reducing social, economic and environmental vulnerabilities and those related to land use through improved development planning and post-disaster reconstruction by all sectors.
5. Strengthening disaster preparedness for effective response at all levels.

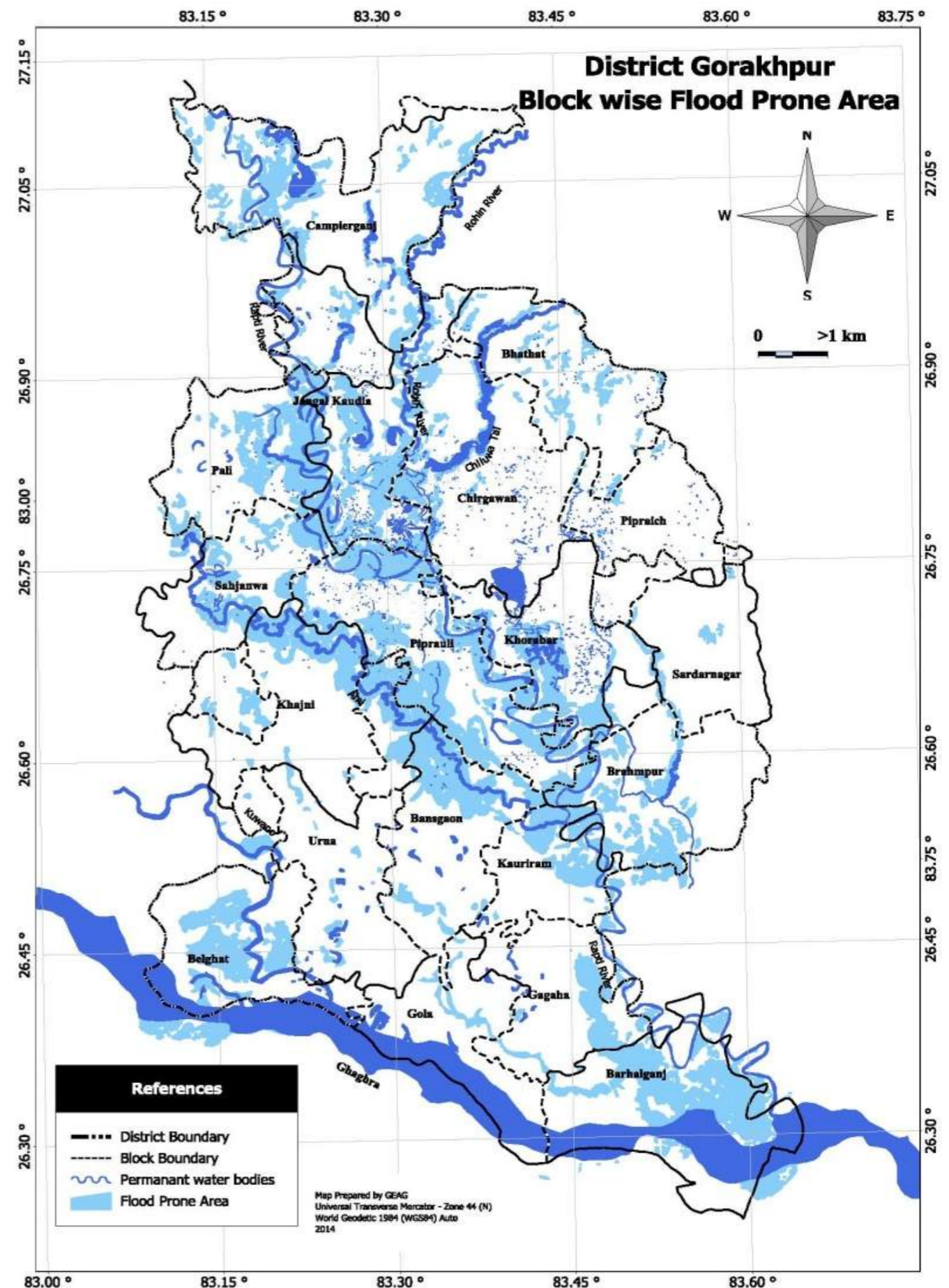
Source : UNISDR (2005) Hyogo Framework for Action 2005-2015  
Building the Resilience of Nations and Communities to Disasters

This calls for an urgent change in the situation in which they operate. CCA and DRR policy makers, practitioners and experts should communicate and work in collaboration with others effectively to ensure a comprehensive risk management approach to development at local and national levels. Such collaboration could lead to several benefits such as:

- ♦ Reduction of climate-related losses through more widespread implementation of DRR measures linked with adaptation.
- ♦ Efficient utilization of resources- financial, human and natural.
- ♦ Enhanced effectiveness and sustainability of both CCA and DRR approaches.

### CCA and DRR in Gorakhpur context

In India, it was made mandatory by the government to integrate climate change adaptation in disaster risk management and its implementation at all levels. India started formally acting on this from the year 2005 after forming the National Disaster Management Act (NDMA), 2005 which provisioned constitutionally to set up authorities at national, state and district level under the chairmanship of Prime Minister, Chief Minister and District Magistrate, respectively. These authorities have been established to make plans, implement and monitor in order to ensure effective and timely preparedness and response. Gradually, the



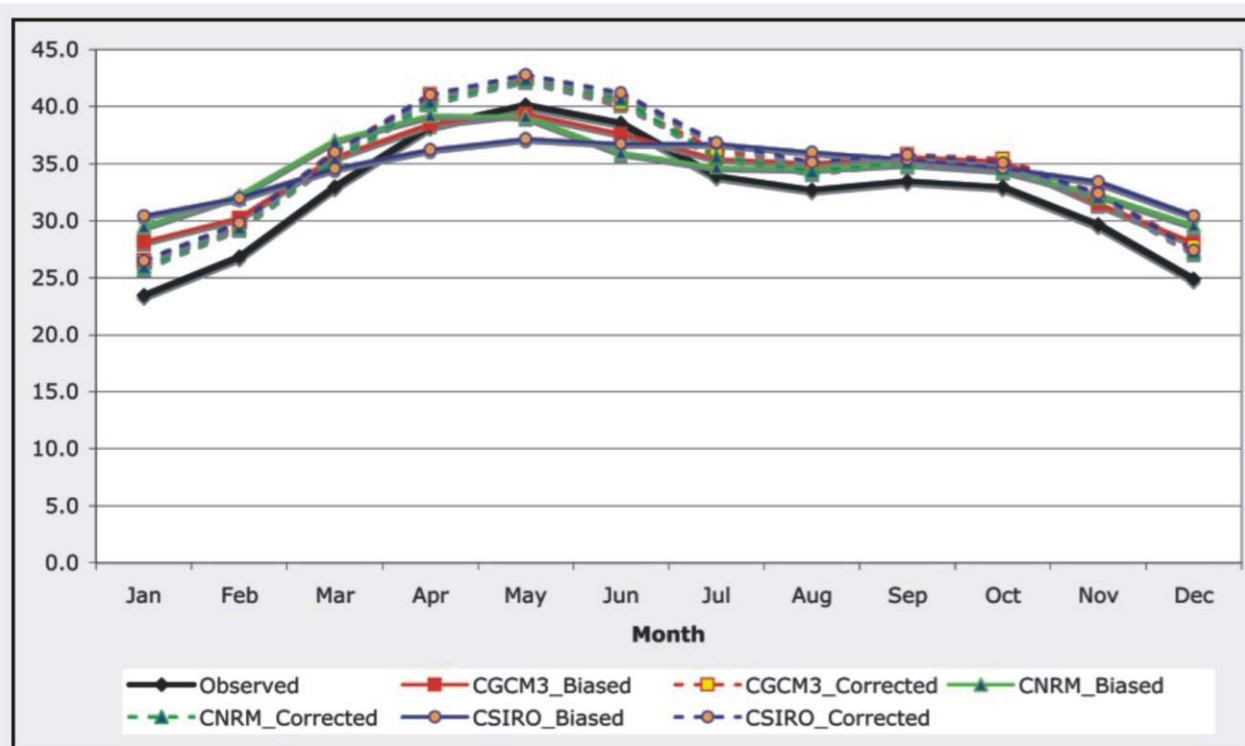
changing nature of disasters and climate change scenario triggered the need for integrating preparedness and post disaster component as well in the disaster response plan.

The District Disaster Management Authority (DDMA), established at the Gorakhpur district level is responsible for formulating the District Disaster Management Plan (DDMP) every year by integrating climate change component in consultation with all the line departments. Likewise every department is also supposed to develop the same at their level.

Since Gorakhpur in eastern Uttar Pradesh lies in the lower catchment area of river Rapti which originates from the hills, it is highly prone to natural disasters. A number of rivers like Rapti, Aami, Rohin, Ghaghra intersect and pass through Gorakhpur. At any time, if any of these rivers flow above the danger line, chances of flood in the catchment areas of other rivers increase. This kind of geographical setting of Gorakhpur makes it vulnerable to floods every year.

Over the years, it has been observed that the process of DDMP formulation had various gaps such as lack of involvement of departments in developing the DDMP, lack of departmental sensitivity and awareness and integration of climate change adaptation component in the district plan. As line departments are not much aware about the impacts climate change and DRR issue, the DDMP is more response-centric rather than addressing preparedness and mitigation measures.

| Figure : 1| Simulated Future Maximum Temperatures in Gorakhpur 2046-65 (Opitz-Stapleton 2009)



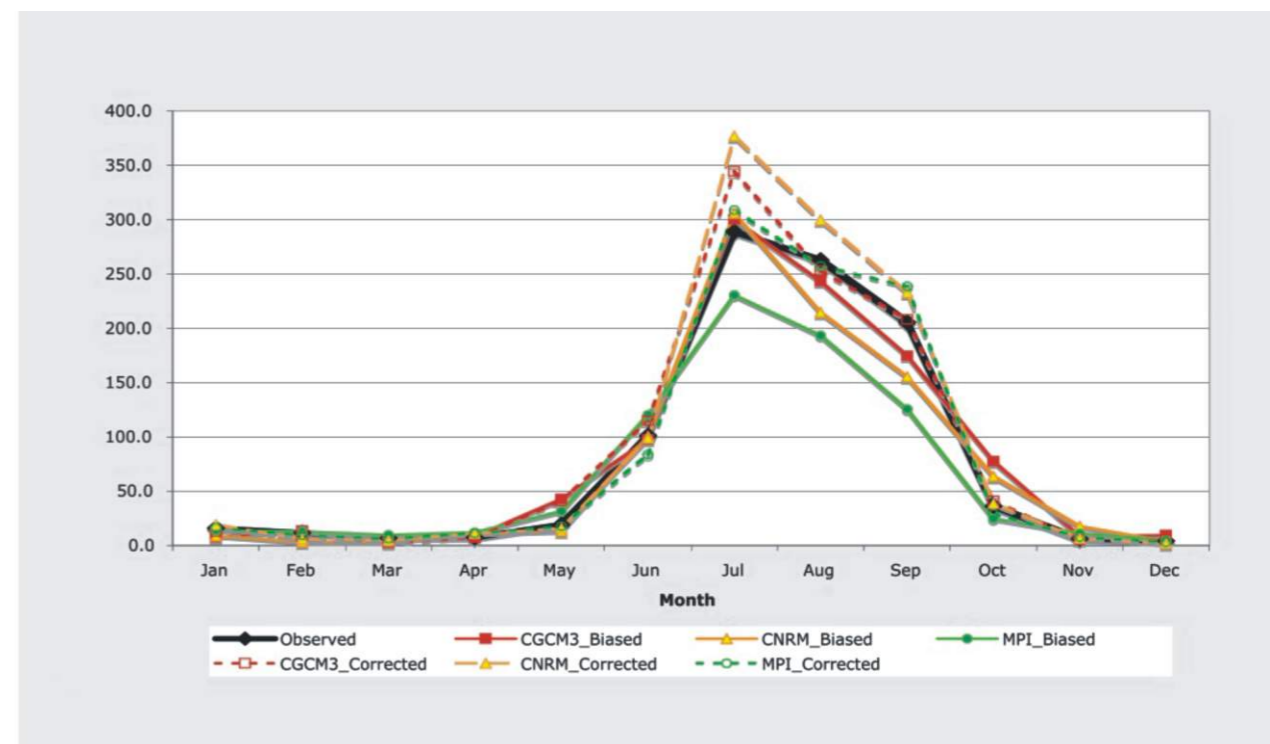
### The Research

Gorakhpur district is situated in the basin of Rapti and Rohin rivers and has proximity to Himalayas because of which the climate and natural characteristics of the region is quite different from other parts of the state. Gorakhpur urban and rural areas are highly susceptible to natural disasters as it has faced severe flood events in 1998 and 2007. Presently, situation has worsened in the region, specifically in Gorakhpur district where flood situation is a repeated event due to its geographical specifications, unplanned development, lack of effective preparedness plan, lack of awareness at departmental level and lack of proper enforcement of policies and government orders.

On the other hand, the analysis of future climate projections has shown that Gorakhpur will be further more affected by the impacts of change in temperature and rainfall patterns. From the analysis of different climate models such as CGCM, CNRM, CSIRO, MIUB, it has been predicted that the maximum temperatures will be most pronounced in winter and summer.

This fluctuation in temperature and its potential impact on precipitation could have significant impacts on agriculture and urban water management for Gorakhpur, while the increased temperature can change the pattern of occurrence of water and vector borne diseases.

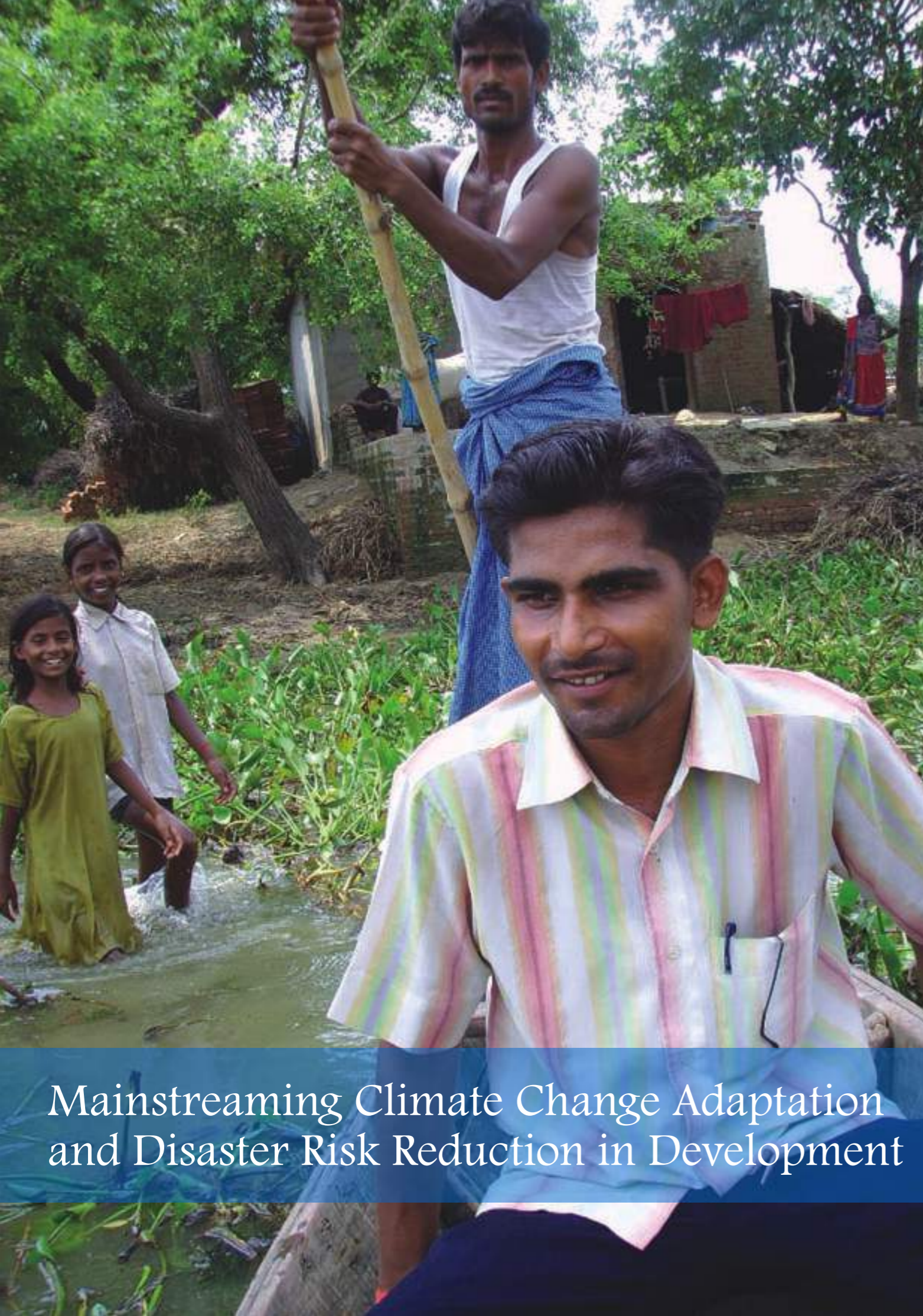
| Figure : 2| Future rainfall scenario in Gorakhpur (Opitz-Stapleton 2009)



A study by Opitz-Stapleton and Gangopadhyay (2008) (in Kull, Singh et al. 2008), conducted in the nearby Rohin River Basin projects potential increases in rainfall during the monsoon months (June-September). Extrapolating the climate change projections from the nearby river basin to the city of Gorakhpur indicates that flooding and waterlogging might potentially increase due to climate change and land use patterns.

Gorakhpur Environmental Action Group (GEAG) took up a pilot research in Gorakhpur in collaboration with National Institute of Disaster Management (NIDM) and Institute for Social and Environmental Transition (I-S-E-T) for facilitating participatory development of DDMP with the integration of climate change adaptation. The DDMA, Gorakhpur also took active part in this initiative. The research was financially supported by CDKN (Climate and Development Knowledge Network).





## Mainstreaming Climate Change Adaptation and Disaster Risk Reduction in Development



### The CCA-DRR-Development Connect

Climate change and disaster risk are fundamental threats to development and the eradication of poverty. The negative impacts threaten to roll back decades of development gains. Building resilient societies means addressing both climate and disaster risks, and integrating these risks, as well as potential opportunities, into development planning and budgeting. Natural hazards destroy lives and livelihoods, and have long-term consequences for human and economic development. The detrimental impacts of these events on development have been seen over and over, with destruction of lives and livelihoods setting back development progress and increasing levels of poverty, or even forcing new groups into poverty.

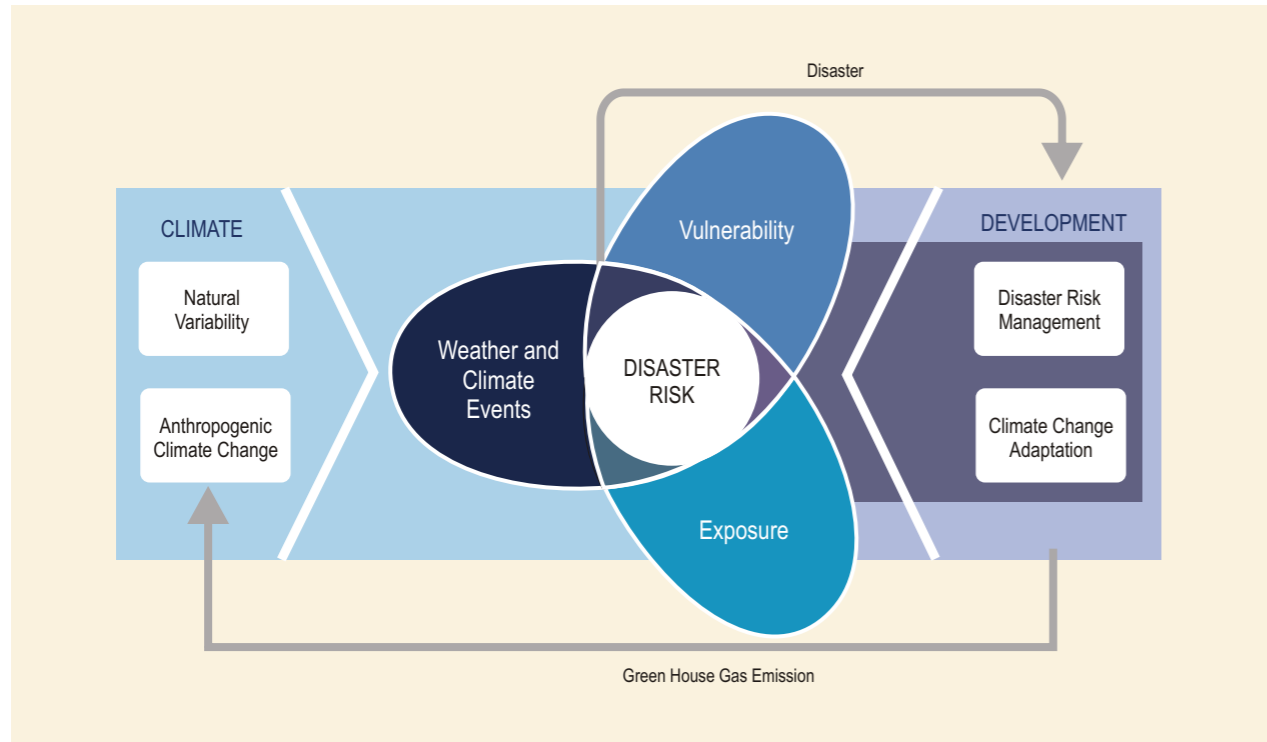
It has been predicted that changes in climate and weather patterns will lead to increased exposure to climatic impacts and enhancement in the vulnerability of people. IPCC 2013 report mentions that increased exposure and vulnerability are generally the outcomes of skewed development processes such as those associated with environmental degradation, rapid and unplanned urbanization in hazardous areas, failures of governance, and the scarcity of livelihood options for the poor. The issues related

to climate change and DRR have indicated negative impact of development pattern in country like India, where development is under transition stage and the parameters related to socio-economic development such as social welfare, quality of life, infrastructure development, livelihood etc. are on stake due to increasing number of disastrous events with increased intensities.

Given the scenario, it has been proved that countries can manage disasters effectively only if they include disaster risk in national development and sector plans and adopt CCA strategies, translating these plans and strategies into actions targeting vulnerable areas and groups. Therefore, closer integration of CCA and DRR measures, along with the incorporation of both into local, sub-national, national, and international development policies and practices, could provide benefits at all scales. Figure- 3 indicates that how exposure and vulnerability to weather and climate events determine impacts and the likelihood of disasters (disaster risk). It evaluates the influence of natural climate variability and anthropogenic climate change on climate extremes and other weather and climate events that can contribute to disasters, as well as the exposure and vulnerability



| Figure : 3| Climate Change- Disaster-Development Connect



of human society and natural ecosystems. It also considers the role of development in trends in exposure and vulnerability, implications for disaster risk, and interactions between disasters and development.

(Source: *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaption - Special Report of Intergovernmental Panel on Climate Change, Cambridge University Press, USA, 2012*)

The social, economic, and environmental sustainability can be enhanced by disaster risk management and adaptation approaches. There is a need to improvise CCA & DRR measures into developmental policies so that integrated effort for development could take place. Measures such as early warning systems, risk communication, risk transfer, community participation, landuse planning, eco-system management, water & sanitation management, climate & disaster resilient infrastructure development, adoption of diversified agriculture methods, enforcement of building codes and better awareness & training etc. should be adopted for promoting sustainable development. In addition, strengthening of institutional structure by integrating techno-legal framework and good governance etc. may help in promoting better disaster resilience and development.

Despite the urgent need for taking appropriate measures at the national, state and district level to address climate change and DRR issues and

mainstream these into developmental planning, less has been done in this front. Although various steps have been taken at the national level to mainstream DRR into developmental planning, concrete approaches for including CCA and DRR concerns into district level/local level planning is yet to be evolved.

As part of an innovative research, this integration of CCA and DRR into developmental planning was tried out in Gorakhpur district. It was envisaged that based on the experiences generated in this process, an approach would be developed which could be replicated in other districts of India in order to integrate CCA and DRR concerns into development plans.

### Evolving from Response-centric to Risk Reduction and Resilience

The district disaster management plans that used to be formulated were mostly response-centric rather than being focused on preparedness and mitigation. This means that the plan used to focus on what will be done if an area is hit by disaster. Also, who will be responsible for that particular area in such an event. The process of DDMP formation used to include zone mapping, formation of Rapid Action Force (for health), coordination with Army/Airforce, procurement of materials for flood fighting, etc. The main reason behind this is the limited understanding of disaster related issues in government officials because they formulate the plans based on the

previous disaster that their district had witnessed. But, the reasons behind the occurrence of such disasters frequently and what can be the solutions that could be pro-actively taken up to avoid such disasters and so on are never taken into account while formulating the disaster management plan. The reason behind this is the lack of capacity of these officials who do not understand the complex link between disasters, climate change and development. At the district level, there is lack of competent persons who can understand the technicalities of these linkages and develop a plan accordingly. On the other hand, if we do not make flexible disaster management plans taking climate projections into account, then the development interventions may not succeed.

On the contrary, if each department at the district level formulates the plans with in-depth analysis, the disaster risks can be avoided to a large extent. For instance, if we take an example of the health department and do a SWOT analysis of the department, we will come up with certain

strengths, weaknesses, opportunities and threats that the department is facing. Strengths could be its infrastructure, human resource, etc., weaknesses could include inadequate human resource, unavailability of modern facilities, etc., opportunities could be new policies, local support to the department, etc., and threats could include unavailability of timely resources, support from local groups, etc. These aspects can be kept in the climate resilience framework and agents, institutions and systems can be identified through which the plans and actions of the department can be made successful. After this analysis, an action plan can be prepared and accordingly advocacy can be done for resources to make the actions successful towards building a climate resilient community.

Therefore, it is inevitable to develop a disaster management plan based on intensive planning of all line departments by integrating CCA and DRR issues.



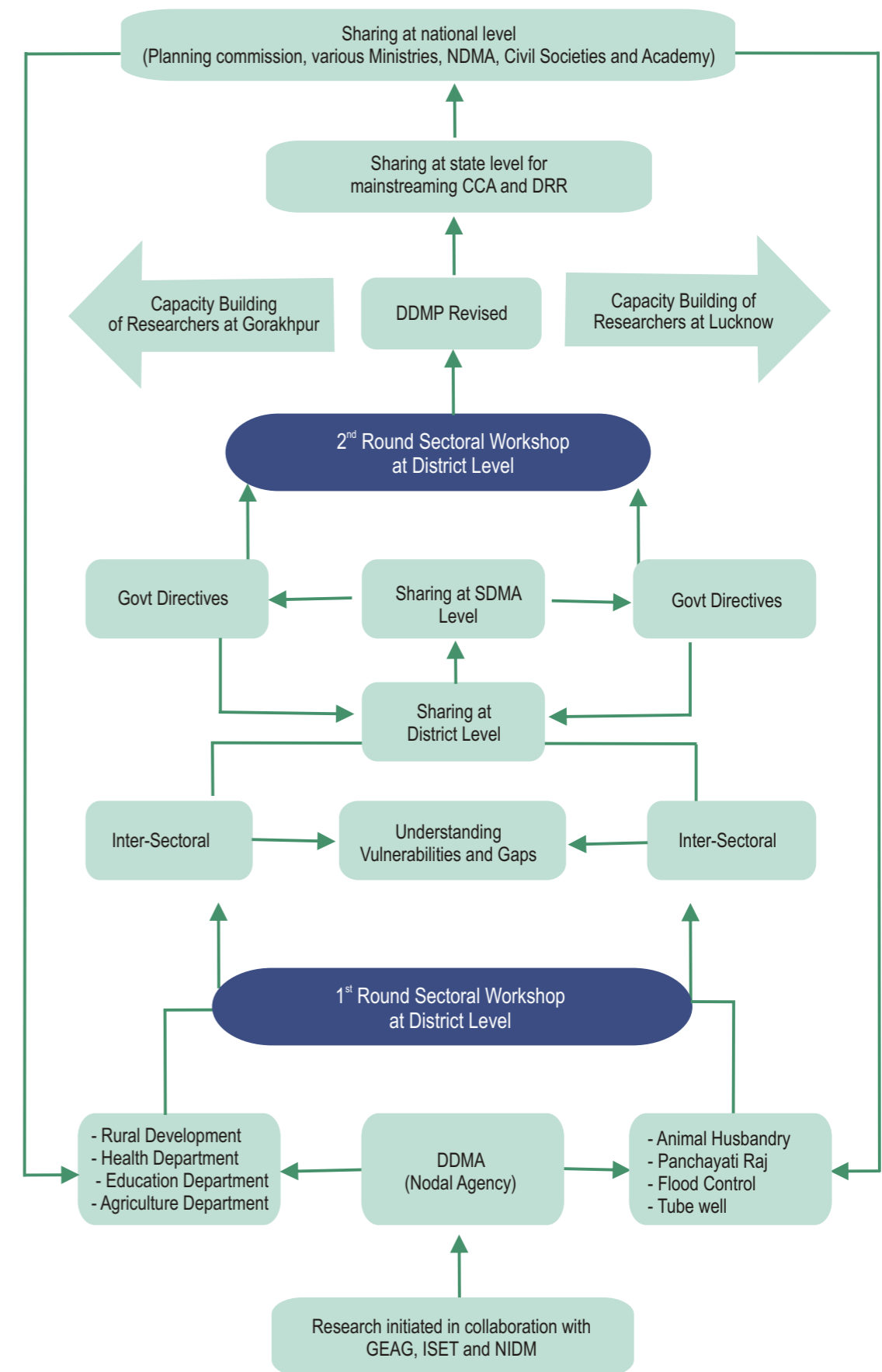
## The Methodological Framework for Research in Gorakhpur

The methodological framework for carrying out the research was developed by GEAG and ISET which involved mapping of key departments, analysis of vulnerabilities under climatic conditions, institutional arrangements and current planning process. To meet out the objectives, specific set of methodologies were developed and adopted. ISET had been involved in resilience

planning processes by using self developed tools and methods on CCA in capacity building of various government departments and civil society organizations. Similar set of tools and methods were used in this project as well such as Shared Learning Dialogue (SLD), mapping of key systems (departments/themes) and current and future vulnerability by using available and projected climate data. The table below outlines the objectives and the methods adopted to meet out those objectives and the data sources used during the course of the study:

Objectives	Data Sources	Methods
To understand the factors within the flood prone districts of Gorakhpur that contributes to resilience or exacerbates vulnerability	<ul style="list-style-type: none"> <li>Review of secondary sources, exposure and fragility of key systems considering the recent events of floods of 2007 and 2008</li> <li>Reports generated on climate change by ISET/GEAG and other local agency</li> <li>Past records on failures across the systems/ departments</li> </ul>	<ul style="list-style-type: none"> <li>Mapping of key departments such as water supply, health, power, communication, housing and agriculture etc. at district level.</li> <li>Analysis of their vulnerability in terms of exposure, fragility or failure rates and risks to flooding under current and projected changes in climate.</li> <li>Overlaying of the climate change projections on current vulnerability mapping for systematic resilience planning process developed by ISET</li> <li>ACCCRN for evaluation of impact of climate change on key systems.</li> <li>Analysis of climate change impacts which causes failure of key natural or social systems.</li> </ul>
To understand specific policy innovations that could help to bridge the vertical gap between the integrated national policy framework and local contexts and the horizontal gap between actions within sectoral development programmes to integrate DRR and CCA practice	<ul style="list-style-type: none"> <li>Collection of District Disaster Management Plans of the districts of Uttar Pradesh</li> <li>Collection of byelaws, codes and regulatory framework of various sectors.</li> <li>Collection of information on various ongoing sectoral programmes</li> </ul>	<ul style="list-style-type: none"> <li>Institutional analysis through shared learning dialogue, workshops, policy roundtables and interactive learning sessions with the government organizations (including DDMA, SDMA, NDMA and allied government departments and Ministries) at state and national levels.</li> <li>Desk review of District Disaster Management Plan of the selected district/s including review of ongoing sectoral schemes, techno-legal framework.</li> <li>Understanding relationship between departmental programmes and reduction/ exacerbation of climate vulnerability by using Causal loop-diagramming tool of GEAG</li> </ul>
To build capacity of scientists and engage young researchers from two key academic institutions for promoting DRR and CCA by seeking contributions development and sharing of knowledge.	Identification of academic and research institutes located in the concerned district/s.	<ul style="list-style-type: none"> <li>Creating a pool of young scientists and researchers engaged in academic institutes and universities.</li> <li>Engaging researchers as interns and involving them in regular interactive sessions organized through workshops in universities on the theme of integration of DRR and CCA in development processes.</li> </ul>
To document and disseminate the lessons learned from the case study		<ul style="list-style-type: none"> <li>Documentation and dissemination of knowledge obtained from objectives (1 to 3) through SLDs as a tool for combining local knowledge with global science on climate change.</li> <li>Workshops at district, state and national levels.</li> </ul>

| Figure : 4| The Research Process





### Planning and Developing Institutional Framework

Planning was carried out in close consultation with various line departments at district level. The district administration was supported by GEAG and ISET for maintaining coordination and preparation of department-wise plan. This support helped government to establish regular communication and facilitate sharing of information between the research team and district level departments. A database was prepared by collecting data on frequency and history of natural hazards and their impacts for analysis of issues and gaps at various levels.

In order to create an institutional framework to facilitate this research process, GEAG & DDMA organized a workshop in which the purpose of the research, implementation plan and expected outcomes were shared with the concerned line departments. 54 government officials from various departments participated in the workshop and expressed their viewpoints on the process. On the behalf of District Magistrate, Additional District Magistrate-Finance and Revenue (ADM-FR) chaired the workshop and facilitated the discussion. Representatives from NIDM, ISET and GEAG were present in the workshop.

The institutional framework that was set up as a key outcome of the workshop was as below :

- ADM-FR was nominated as the nodal officer for anchoring the research initiative from the district
- GEAG to provide technical support to DDMA to manage the research initiative and coordinate with various line departments.
- A Project Steering Committee was proposed to be constituted at the district level consisting of members and officers from DDMA, Municipality, Gorakhpur Development Authority, and representatives from NIDM and GEAG
- Progress review meeting to be held quarterly. GEAG to be responsible for bearing expenses, record keeping and project related documentation and dissemination.

This dialogue was an initial breakthrough where the government welcomed the idea of CCA and DRR integration in district level disaster management plans. On the other hand, it was observed that the departmental capacities were not as strong as expected to take up the preparation of departmental disaster management plans considering specific climate change impacts in their respective departments. Therefore, it was decided to have additional dialogues with each line department which would seem helpful in preparing the disaster management plans with the integration of climate change aspects.



This process was all about building the capacity of government officials in understanding climate change issues and developing plan accordingly. A series of departmental shared learning dialogues were conducted in Gorakhpur in the form of workshop. Departments such as Flood Control, Panchayati Raj, Nalkoop, Jal Nigam, Animal Husbandry, Forest, PWD, minor Irrigation, Agriculture, Education, and Health were separately covered in a series of events.

### Data and Information Collection

Various data and documents related to flood damage, relief distribution, disaster response planning were collected. Several Government Orders from the DDMA were collected and thoroughly analyzed to identify gaps at departmental level. Along with the observation of shared learning dialogues, identified points were used to prepare guiding documents for departments for preparing effective plan.

### Department-wise Workshops

The SLDs had shown that the capabilities of coordination and collaboration are essential to save lives and basic infrastructure in times of disasters, which the government bodies lack at different levels. It also highlighted the role that departments play in disaster risk reduction and the capability requirements that have to be in place at each stage to provide enhanced support to the victims, considering the fact that eastern UP is expected to face more natural disasters in the near future due to change in climatic condition.

Therefore, a series of department-wise workshops were organized for creating an understanding of climate



change issues in disaster management planning and collection of data for sectoral assessment. Departments such as Panchayati Raj, Irrigation and Flood Control, Nalkup, Jal Nigam, Minor Irrigation, Animal Husbandry, Forest, Public Works, Agriculture, Education, and Health were separately covered in a series of events. A detailed discussion on the roles and responsibilities of line departments during various facets of disasters were discussed. During this process, potential gaps were identified and the recommendations were made accordingly which are summarized below:

## Rural Development/ District Administration

### Identified gaps

- ◆ Lack of adequate human resources.
- ◆ Lack of information on fund disbursement to the beneficiaries under the disaster relief fund.
- ◆ Non utilization of funds due to lack of information on disaster management relief fund.

### Recommendations

- ◆ Development programs should be designed keeping in mind the local disaster threats and disaster reduction should be an integral part of the development programs.
- ◆ Coordination between governmental planning and development projects should be established.
- ◆ MGNREGA scheme should be utilized for cleaning of rivers and removal of silt. Several other developmental works can be done through MGNREGA funds in peace time.



## Health Department

### Identified gaps

- ◆ Connecting road to PHCs/CHCs gets damaged during rainy season.
- ◆ Long duration power cuts creates problems in attending the patients in the PHCs/CHCs.
- ◆ Women employees feel unsafe working in the late evening hours in the centers because there is no adequate arrangement of lights on the roads.
- ◆ Caution before floods are not given due to which adequate preparations are not made.
- ◆ Most of the health centres get water logged due to heavy rain.

### Recommendations

- ◆ In the construction of PHCs/CHCs, it is important to include flood resistant techniques along with earthquake resistant techniques.
- ◆ Training on Do's and Dont's at times of disaster should be organized for the members of Village Health and Sanitation Committee.



## Panchayat Raj Department

### Identified gaps

- ◆ Lack of resources for repairing of destroyed public properties
- ◆ Lack of active involvement in planning and implementation process
- ◆ Capacity building of Pradhans and other members are not done at local level.
- ◆ Lack of infrastructures and other facilities

### Recommendations

- ◆ Assessment of flood and other disasters in local areas should be done according to which provision for funds should be made for the maintenance of Panchayat bhawan and other public buildings.
- ◆ Awareness should be brought about among villagers to keep their village surroundings clean and usage of individual, school, Anganwadi and community toilets should be promoted.
- ◆ Awareness campaigns can be done by using motivation groups, street plays, media, etc. Amount of materials should be also increased..
- ◆ Assessment of damage caused to public properties should be done and accordingly the demand for renovation/repair of these properties should be made. This should be implemented at the Gram Panchayat level for which adequate funds should be allocated.



## Education Department

### Identified gaps

- ◆ School premise is often used for shelter and relief centers during flood disaster.
- ◆ Lack of knowledge in students regarding basic disaster preparedness and safety.
- ◆ Many of the schools are not located at elevated land.

### Recommendations

- ◆ In the construction of schools, it is important to include flood resistant techniques along with earthquake resistant techniques.
- ◆ Site selection for construction of schools should be done at a safe and elevated place.
- ◆ Information and awareness on use and management of fire extinguishers installed in the schools should be given not only to the teachers but also to accountants and employees of other departments.
- ◆ In the school campus, the Mark-II hand pumps should have proper water outlet arrangements.
- ◆ Mock programs in the schools should be organized on relief and management of disasters
- ◆ The schools should not be used as disaster relief camps or for storage of food grains. This adversely affects education.

## Saryu Canal Division

### Identified gaps

- ◆ Heavy rains rupture the branch-lets of canals which hampers irrigation facilities.
- ◆ Depletion in the groundwater levels due to which the discharge from tube wells is decreased.
- ◆ Low electricity voltage because of which the tube wells get defunct.
- ◆ In the Kharif season, the pipelines are destroyed at some places by the farmers

### Recommendations

- ◆ Construction and re-establishment related works are done during a fixed time. Considering the geographical and environmental situation of an area, it is important to place bans and restrictions on cultivation of water-intensive crops such as peppermint, etc.
- ◆ Diversity in cropping systems should be strictly implemented
- ◆ The structural designs of various infrastructures which are related to canals are done as per the orders of respective departments. These infrastructures should also be made earthquake proof and flood resistant.
- ◆ As a mechanism to adapt to drought and flood situations, various rivers should be joined so that they prevent floods and help in increasing the groundwater table levels.
- ◆ It is important to have convergence between various departments and Panchayats in order to prevent encroachment.



## Agriculture/ Agriculture Protection Department

### Identified gaps

- ◆ Crops get affected due to untimely rains, extreme cold and hot temperatures.
- ◆ The situation of agriculture go-downs at the block level are not good due to which flood water enters the go-downs and causes damage to the chemicals stored there.
- ◆ Water logging in the crop fields causes problems in controlling pests, insects and diseases. Also, application of pesticides in water logged areas cause water pollution.
- ◆ Problem in storage of crops.
- ◆ Soil structure gets affected and amount of silt increases.
- ◆ Flood negatively affect crop cycles.

### Recommendations

- ◆ Works related to land leveling and construction of farm bunds for the conservation of soil can be done under the MGNREGA program.
- ◆ Promotion of vermin compost and Nadep compost structures under MGNREGA program.
- ◆ Crops get affected due to untimely rains, extreme cold and hot temperatures.
- ◆ Effective coordination should be established between soil conservation department, agriculture department and agriculture protection department.
- ◆ There is a need to bring about awareness among farmers from the flood affected areas to use flood resilient varieties of crops.



## Flood Division and Drainage Division

### Identified gaps

- ◆ Less number of work supervisors in the departments
- ◆ The embankments get cracked in summer season due to high temperatures. Situation becomes even worse if this is immediately followed by heavy rains.
- ◆ Pressure on the embankments increase when all of a sudden, water increases in the rivers which are on the way to Nepal
- ◆ Lack of support and cooperation from Tehsil and local government.

### Recommendations

- ◆ As per the SDRF guidelines, the embankments should be re-established within 45 days. It becomes very difficult to get the work completed within this deadline.
- ◆ It is important to activate the flood protection committees.

## Jal Nigam

### Identified gaps

- ◆ Most of India Mark-II pumps are not functional during disaster
- ◆ Funds for installing hand pumps at elevated lands are not sufficient enough
- ◆ The plan for establishing sewerage system for the city of Gorakhpur is ready but due to non-allocation of funds, the work has not yet started
- ◆ For every scheme, there should be adequate number of regular staff to carry out the tasks

### Recommendations

- ◆ The India Mark-II hand pumps should be installed at a high elevated and safe place. -This can be done with the support of Panchayats.
  - ◆ While construction of buildings, problem of flood should be kept in mind
  - ◆ Renovation of water sources to enable access to water for everybody in the village and ward.
  - ◆ The Panchayat (Local body) should get the defunct hand pumps repaired in time.
  - ◆ For the implementation of schemes, the funds should be made available before the actual work on the ground starts.
  - ◆ System of quick communication, decision and implementation should be established in order to manage disasters effectively.



## Animal Husbandry

### Identified gaps

- ◆ Infertility problem in animals due to extreme temperatures.
- ◆ Non-availability of fodder because of water logging Shelter problem for animals during rains and water logging
- ◆ Water logging leads to diseases.
- ◆ Animals suffer because of unavailability of medicines at veterinary hospitals.

### Recommendations

- ◆ Pre-flood vaccination of animals.
- ◆ Shelter and fodder for animals should be the part of relief package.
- ◆ Ensure availability of medicines at village level.



### Department-wise Information Collection and Analysis

Information related to occurrence of floods, response, flood damage, relief distribution, planning document and relevant governmental orders were collected for analysis of gaps at departmental level. The department-wise plans were reviewed and it was observed that departmental plans were primarily *response centric*. These documents were not updated nor based on updated records available at the time of developing the document. There was no document available on flood response/relief or any best practices at departmental level in the district.

### Guideline Preparation and Planning at Department Level

Based on the findings of department-wise meetings and collection of information, a guiding document for preparation of departmental plan (along with planning formats) was prepared. A consultation exercise was again organised for the fourteen departments to review the guidelines, formats and contents. Afterwards, a compiled document on department-wise planning for disaster management was introduced by the district authority, which has got overwhelming response from line departments. A Government Order (GO) was issued by the District Magistrate to all the line departments to mainstream CCA and DRR into developmental plans.

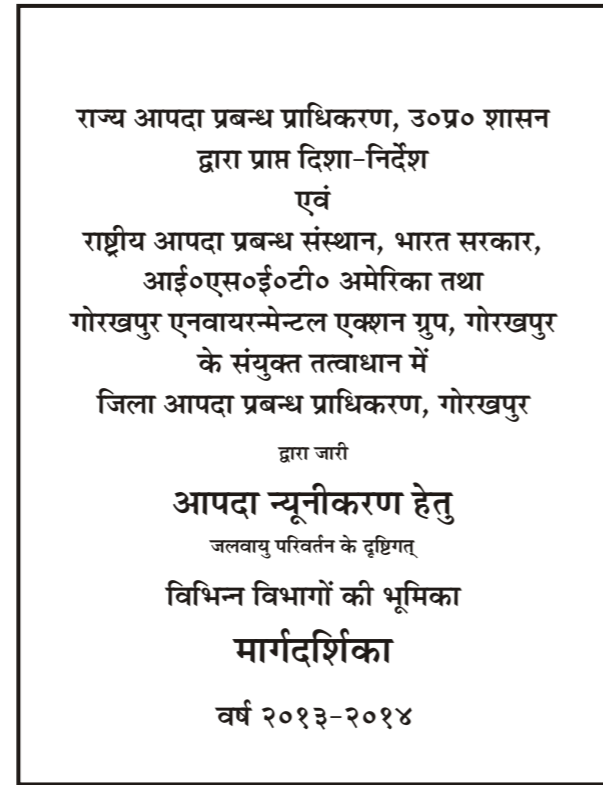
### State Level Sharing Workshop

The State Disaster Management Authority (SDMA) is the apex body that regulates and guides the DDMA. This process of preparation of Disaster Management Plan in Gorakhpur district was shared at the state level workshop which was attended by the Honorable Minister of Revenue and Relief Commissioner of Uttar Pradesh in Lucknow. Senior officials from 24 flood prone districts of UP participated in the workshop. The prime objective of sharing this process was not only to educate the district level officials but also to get the process approved at the state level so that it can be implemented though SDMA in other districts as well. As a result, SDMA issued a letter to districts to follow the process undertaken in Gorakhpur in DDMP preparation.

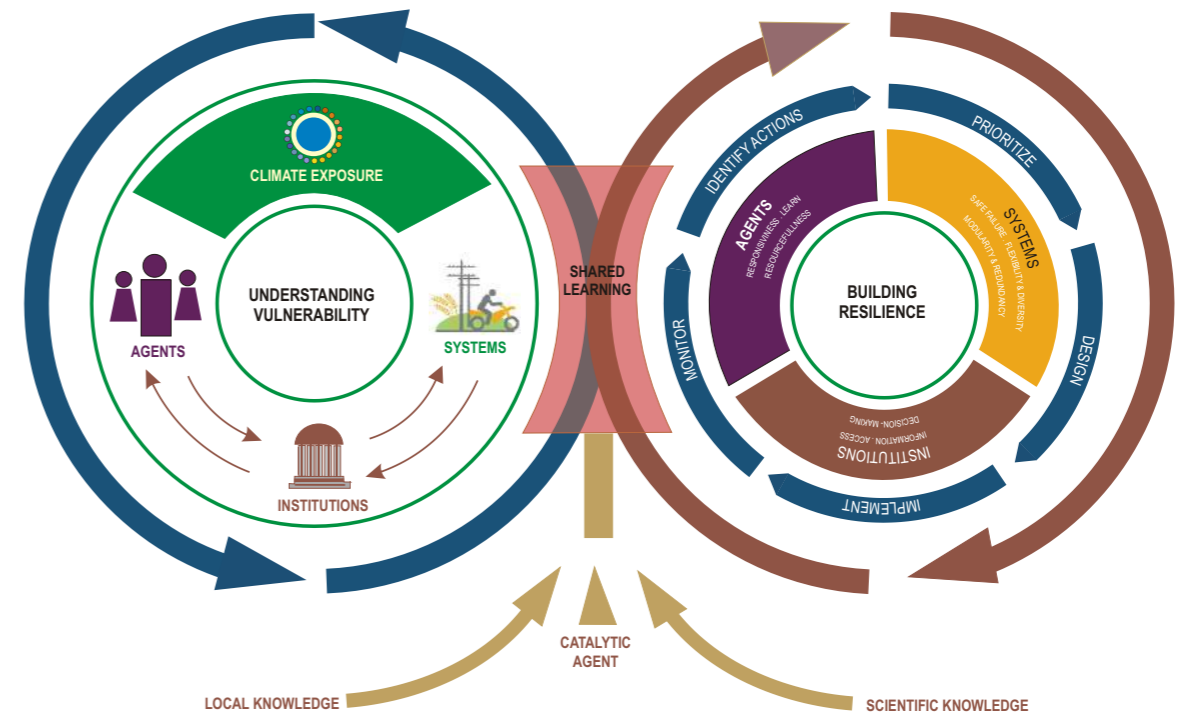


which is developed by ISET International. The framework is a conceptual planning approach to building resilience to climate change. It helped in building a broad understanding of urban resilience by describing the characteristics of urban systems, the agents (people and organisations) that depend on and manage those systems, institutions (laws, policies and cultural norms) that link systems and agents, and patterns of exposure to climate change.

As a result of these dialogues, various points related to climate change were integrated in department level plans. Further, these plans were integrated in district plan document.



| Figure : 5| Climate Resilience Framework



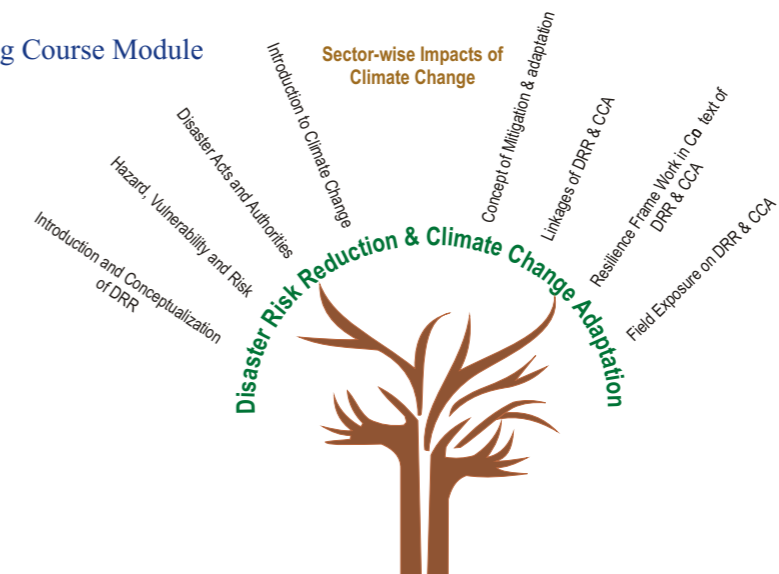
### Capacity Building of Researchers on CCA & DRR

As a part of this research initiative two training courses were organised at district & state level to orient and train potential scholars of relevant streams from renowned institutions of the state on CCA & DRR issues. The purpose of the training was to :

- Build a common understanding in context of current development scenario.
- Provide first hand experiences on understanding of community level assessment of vulnerabilities, sectoral gaps and scope of integrations of CCA and DRR.
- Create a cadre of trained researchers on CCA and DRR concepts.

The training provided an opportunity to the scholars to discuss and understand climate change and the need for risk reduction and adaptation. The training also focussed on how the youth community can be engaged in working towards sustainable and disaster risk free future.

| Figure : 6| Training Course Module





# The District Disaster Management Plan of Gorakhpur



The preparation of the district disaster management plan involved various steps and processes which has been discussed in the previous chapter. However, one of the important steps was department-wise analysis because ultimately, it is the departments which are the implementing agency and they are the ones facing lot of challenges. Therefore, a detailed analysis was done to identify potential gaps in their plans and recommendations were given as has been discussed before. Based on these recommendations, the departments included interventions according to pre, during and post disaster in their plans which were integrated in to the larger DDMP document.

The revisions done in the departmental plans are as below :

## Health Department

- The disaster management plan was split in three stages which included strategies for pre-flood, during-flood and post-flood situations.
- Training and capacity building programmes were included for building the capacities of departmental heads/staff, grassroots level workers/CBOs, etc. as per the capacity building programme outlined in the 13<sup>th</sup> Finance Commission.
- Complete review of infrastructure before flood to be done in all PHCs and CHCs. Maintenance and reconstruction of roads that lead to health centres to be done before the occurrence of floods.

- Coordination with other departments to gain an understanding of areas where the health department could support and contribute in their plans.
- Emergency medical kit to be available with ASHA workers.

## Education Department

- Education department developed a disaster mitigation plan for the first time which was included in the DDMP.
- Provisions to be made so that schools are not affected during floods and the school teachers continue conducting classes for children.
- Specific plan to be made for construction of school building keeping in mind the local area vulnerability to disasters and then submitted to state/national level.

## Forest Department

- Alternate irrigation facilities/techniques required for forest area. Forest department to include plan for plantation and improve irrigation facilities and submit to state office.
- Lack of trained volunteers/staff on climate change and environmental issues who can provide training to the community. Forest department will work on it and mobilize resources from state level.

## Supply Department

- A complete review of the infrastructure, e.g. godowns to be done
- Coordination with neighboring districts to be done for emergency supplies
- Control room to be established
- Suppliers to be identified before-hand.

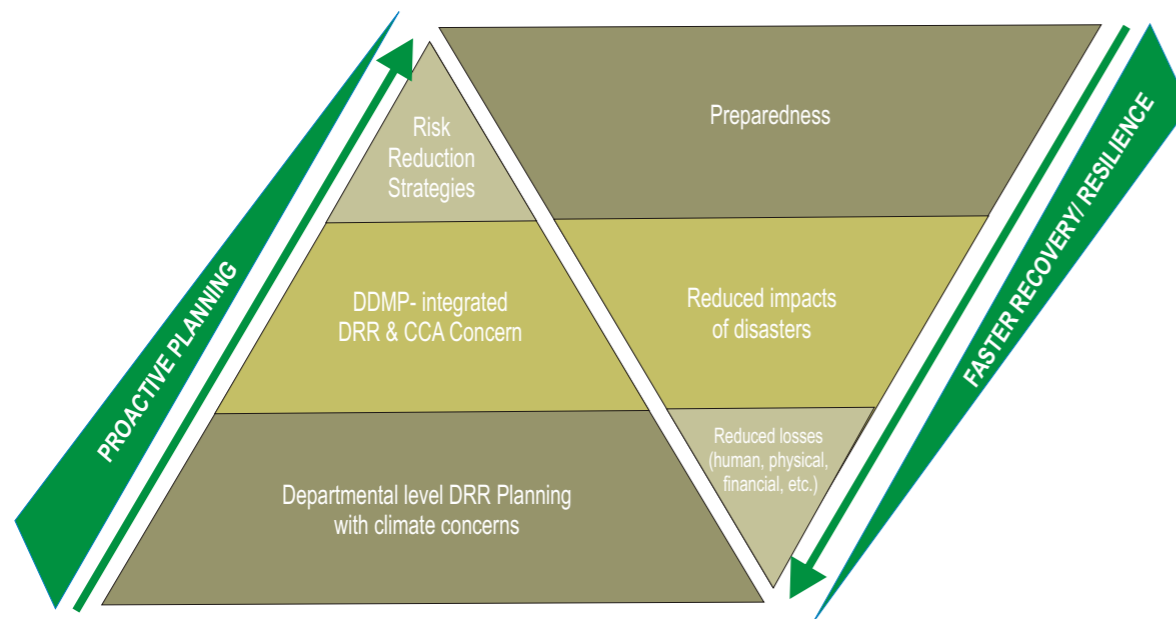
## Animal Husbandry Department

- 100% immunization of animals to be completed before floods.
- Coordinate with departments like irrigation, tubewells, panchayat for water supply in small lakes, ponds, canals during summer season.
- Review infrastructure and shelters for animals before floods .

The entire process helped in gaining understanding of gaps at departmental level and taking corrective actions in planning process. The process followed an approach where proactive planning was done in order to have faster recovery from flood losses and build resilience against disasters. It also led to developing an understanding of the use of communication, coordination and convergence at organizational level, right from planning to the implementation level. The importance of DDMP preparation and the need for considering CCA issues in the process was well recognized by state level officials.



| Figure : 7| The Approach



## DDMP Implementation and Outcomes

As mentioned before, the preparation of DDMP involved revision of departmental plans and inclusion of the same in the DDMP. Since the whole process of preparation of DDMP was done in a participatory way, the departments were well aware of its implementation in their respective areas. Therefore, each department took proactive steps and equipped themselves in a better way to deal with the flood situation in 2013-14. Following are a few case examples where the plan was implemented and the outcomes that were achieved:

### Municipal Corporation

The Nagar Nigam (Municipal Corporation) of Gorakhpur had prepared the disaster risk reduction plan of their department. Based on this plan, the Municipal Corporation collected the resources repaired and modified it and prepared a plan on how these resources can be utilized during times of floods. These pre-flood preparations helped in speedy draining out of the waterlogged areas in Gorakhpur.

### Health Department

The Health department of Gorakhpur had also revised their disaster risk reduction plan which was included in the DDMP. The revised plan included the activities that need to be done before the disaster occurs, during the course of disaster and after the disaster. The officials of the health department admitted that the division of the plan in these three stages helped them sufficiently in

responding to the floods. The department completed the investigation of all the PHCs and other health centers to ensure that there were sufficient mechanisms to deal with the floods or waterlogging situations. Due to these preparations, there were no waterlogging situations in the PHCs. Also, all the PHCs, CHCs and district headquarters had sufficient storage of medicines which were made available during floods which did not allow spread of diseases.

### Education Department

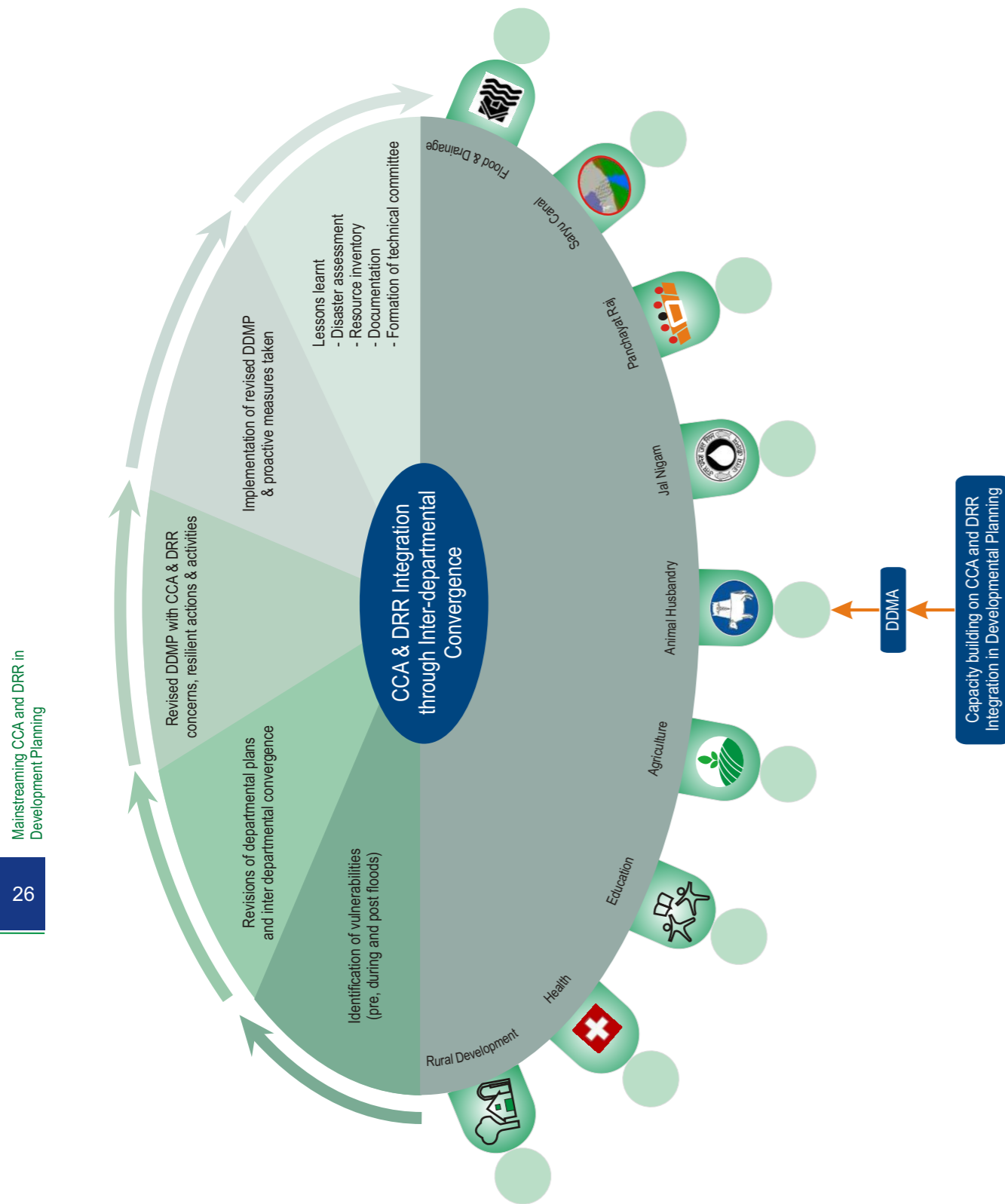
The Gorakhpur Basic Education department had also revised their disaster management plan which was included in the DDMP for the first time. Schools are adversely affected during times of disaster as the school buildings are used for relief camps and rehabilitation work and the school does not function during that time. Also, many a times the school premises get waterlogged due to which the schools remain closed during the entire period. In order to overcome this, the education department identified high level safe areas as alternate places for running the school during times of flood. During the 2013-14 flood events, at few places, the schools ran smoothly even though the problem of waterlogging continued.

### Animal Husbandry Department

Like the other departments, the animal husbandry department also had divided their disaster management plan into three parts, namely, planning for pre-disaster, during disaster and post disaster. Immunization camps were conducted before the occurrence of floods and all the animals were immunized. This yielded very positive results as the animals did not suffer from



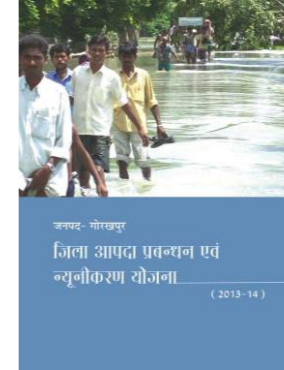
| Figure : 8| CCA & DRR Integration through Inter-departmental Convergence



diseases and there was also no incidence of spread of chronic diseases among them.

**Dissemination of DDMP**

Dissemination of the Gorakhpur DDMP was done by the DDMA by ways of presentations in various workshops and meetings. The State Disaster Management Authority (SDMA), Government of UP has adopted the Gorakhpur DDMP as a model and has circulated it in all the districts of UP with an order to prepare their respective disaster management plans based on the one that has been prepared by Gorakhpur DDMA.



(District Disaster Management Plan, Gorakhpur, 2013-14)

**National Conference on Risk to Resilience**

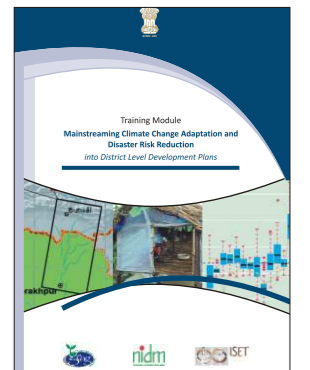
A national conference on “Risk to Resilience 2014” was organised on 28<sup>th</sup> January 2014 by NIDM, Ministry of Home Affairs, Government of India in collaboration with ISET, US and GEAG, Gorakhpur to bring forth critical issues involved in addressing and establishing linkages between natural disasters and climate change related risks. The conference focused particularly on the implications of hydro meteorological disasters and climate change for the decentralised planning and housing themes in India. The conference was successful in addressing some important thematic strands such as recent developments in concepts and insights on disaster risk reduction and climate resilience; practical experiences on decentralised planning to address challenges posed by disaster and climate risks; practical experiences in resilient housing; and, enabling disaster and climate risk reduction through policies, programmes and institutions at multiple scales. The conference had participation from various practitioners and policy makers including

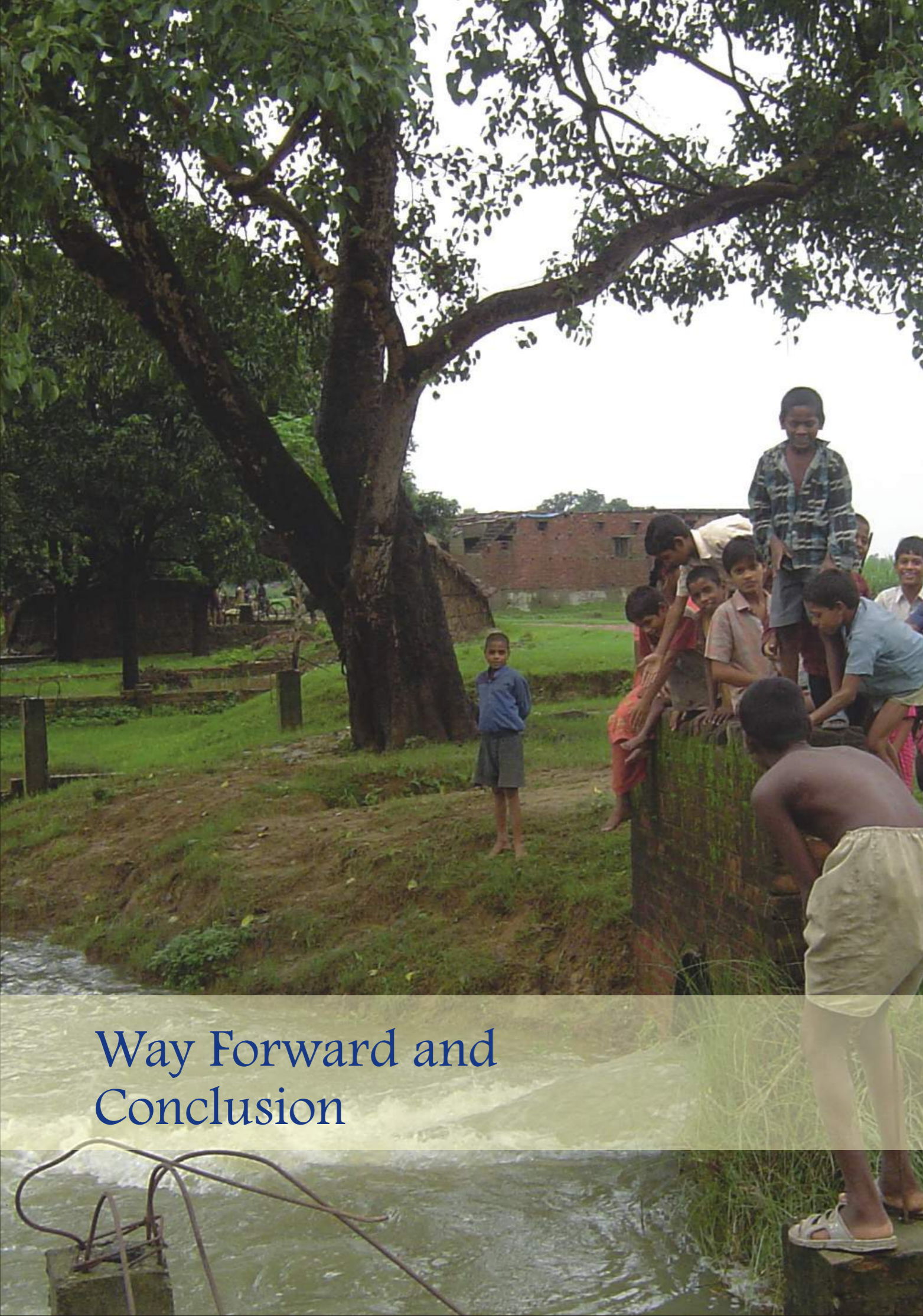
government departments like National Disaster Management Authority (NDMA), National Institute for Urban Affairs (NIUA), select districts affected by hydro meteorological hazards across different states, particularly the DDMA and SDMA, representatives from key Ministries such as Home Affairs, Environment and Forests, Urban Development, Earth Sciences, Planning Commission, key national and international NGOs working on disaster and climate risk reduction, donors and academia.

The conference came up with **Risk to Resilience Declaration, Delhi, 2014** after having deliberated upon the issues of decentralised resilience planning and resilient housing in the domain of mainstreaming CCA and DRR issues. The Declaration outlined the concerns and the strategies required towards mainstreaming climate change adaptation and disaster risk reduction into developmental planning at various levels and to encourage a safer habitat.

**Training Module on Mainstreaming CCA and DRR into District Level Development Plans**

This training module was a key outcome of this research initiative to utilise the lessons learnt during the process of implementation. The training module will be of significant use in training and capacity building related activities, and in promoting knowledge and skills to improve the developmental planning process.





## Way Forward and Conclusion

### Way Forward

This entire research process helped in gaining some of the key experiences which are crucial while integrating CCA and DRR concepts in developmental planning. These experiences are summarised below as key aspects for way forward :

### Assessment of Disasters

Keeping in view the climatic changes occurring in this region, it is very important to do a detailed assessment of all the departments at various levels and then prepare the disaster management plan. While preparing the DDMP, it is important to analyze and evaluate how a weather event took the shape of a disaster. This analysis can help in gaining an understanding on the shortcomings of the previous plan, preventive measures that can be taken to overcome these shortcomings, physical and human resources required for the preparation of the new disaster management plan.

**Before the disaster occurs**, an inventory of resources and information should be documented and kept ready at hand so that it can be readily used to respond to disasters. These resources should be mapped on the district map so that it is easy to understand which resources are available at which places. **During the time of disaster**, it will be helpful to document the relief work which happens so that it will help in developing future strategy. This documentation will further help in understanding the weaknesses or the

limitations of the department and the alternate solutions can be arrived at accordingly. Assessment of damages occurred after the disaster is also equally important and should be done immediately. Usually, this assessment is done after one or two months after the disaster due to which the disaster affected people or communities are not able to get the support that they deserve. Post disaster assessment should include the analysis of the reasons due to which the assets or infrastructure is damaged- whether it is due to heavy rainfall, rise in the river level, due to waterlogging, lack of adequate culverts or because of the carelessness of people.

### Documentation

Keeping in view the frequent changes taking place in the climate and the increasing number of disaster occurrences, it is very important that the DDMA maintains a regular documentation of the physical and human damages being caused by natural disasters such as cyclone, flood, excess rainfall, high temperatures, etc. This kind of a regular documentation will help the DDMA in formulating an effective DDMP.

### Departmental Convergence

Every department at the district level has an important role to play in the disaster mitigation strategies of the district. The disaster can be mitigated only if the department has the capacity in terms of human resources and other physical resources available with

them. The development works get affected due to climatic changes like untimely rainfall, high temperatures, etc. In order to ensure the quality of the developmental work and that it completes in time, it is important that the departments talk among themselves and support each other's tasks so that they are well informed and can take immediate actions at times of disaster.

### Capacity Building of District Officials

It is important to build capacities of officials from various departments on climate change and disaster risk reduction. As of now, the officials have very limited understanding of these issues due to which they are unable to deal with disaster situations. Usually, the trend has been that the disaster management plans are made on the basis of previous experiences of disaster. But, it is equally essential to keep the future projections and predictions of disaster in mind before formulating the disaster management plan. Therefore, the concerned officials should be trained on these aspects.

### Formation of a Technical Committee

At the district level, there should be a technical committee which can analyse the impacts of climate change and suggest ways of disaster risk reduction. The technical committee should include representatives of various departments, educational institutions, scientists, NGOs, etc. The technical committee should play a crucial role in the formulation of the DDMP.

## Conclusion

This research initiative was unique in the way that for the first time in the country, capacity building of government officials from various departments was done on the concepts of CCA and DRR and how to integrate these aspects into developmental planning. Departmental level disaster management plans were prepared which were integrated into the District Disaster Management Plan.

Through this process of research, it was concluded that if the capacities of the government officials are built appropriately, they are receptive to new concepts and ideas which can help to bring positive change in overall development. The DDMP has been well recognized by the state and national governments where the state has disseminated the document in all other districts of UP and encouraged them to follow the Gorakhpur DDMP for integration of CCA and DRR into developmental planning.

This is obviously not the end but just the beginning. Learning of this research has to go beyond local level. The process of formulating DDMP through an exhaustive consultative process as this one, needs to be upscaled and disseminated at state and national level with policy makers and other relevant stakeholders.

## References

1. District Disaster Management Authority, Gorakhpur (2013-14). District Disaster Management Plan, Gorakhpur District.
2. Gupta, A.K., Nair, S.S., Wajih, S.A., Chopde, S., Gupta, G. and Aggrawal, G. (2014). Mainstreaming Climate Change Adaptation and Disaster Risk Reduction into District Level Development Plans. NIDM New Delhi (India), GEAG Gorakhpur (UP, India) and ISET, Colorado (US), p 114.
3. IPCC, 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.
4. Moench, M., Tyler, S., Lage, J., 2011. Catalyzing Urban Climate Resilience.
5. UNISDR (2005). Hyogo Framework for Action 2005-2015. Building the Resilience of Nations and Communities to Disasters.
6. Wajih, S., Singh, B.K., Bartarya, E., Basu, S., ACCCRN ISET Team, 2010. Towards a Resilient Gorakhpur.

