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Key messages

- The District Disaster Management Plans created as a result of India's Disaster Management Act (2005) can be an effective mechanism for promoting climate-sensitive planning at district level.

- Integrating climate concerns in District Disaster Management Plans can be aided by using the 'Shared Learning Dialogue' process with various government departments at district level. This requires proper facilitation.

- The 'Shared Learning Dialogue' process is critical to developing the capacity of various departments to understand, appreciate, plan and respond to climate risks.

- Climate projections must be appropriately interpreted and presented in a way that fosters understanding of their implications for development programmes across government departments.

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Integrating climate change concerns into disaster management planning: The case of Gorakhpur, India

Gorakhpur District is recognised as one of the most flood-prone districts in Eastern Uttar Pradesh, India. The data over the past 100 years show a considerable increase in the intensity and frequency of floods, which are now recurring every 3–4 years. Gorakhpur District is home to 4.4 million people, most of whom live in rural areas.[1] Roughly 20% of the population is affected by floods, and in some areas, flooding has become an annual occurrence. All of the district's blocks[2] are highly prone to recurrent floods (see Figure 1) causing huge loss of life, health and livelihoods for the poor inhabitants, and extensive damage to public and private property.[3] For example, the flood of 1998 impacted 1.4 million people and 16,000 houses, and agriculture losses amounted to roughly US$15 million.[4]
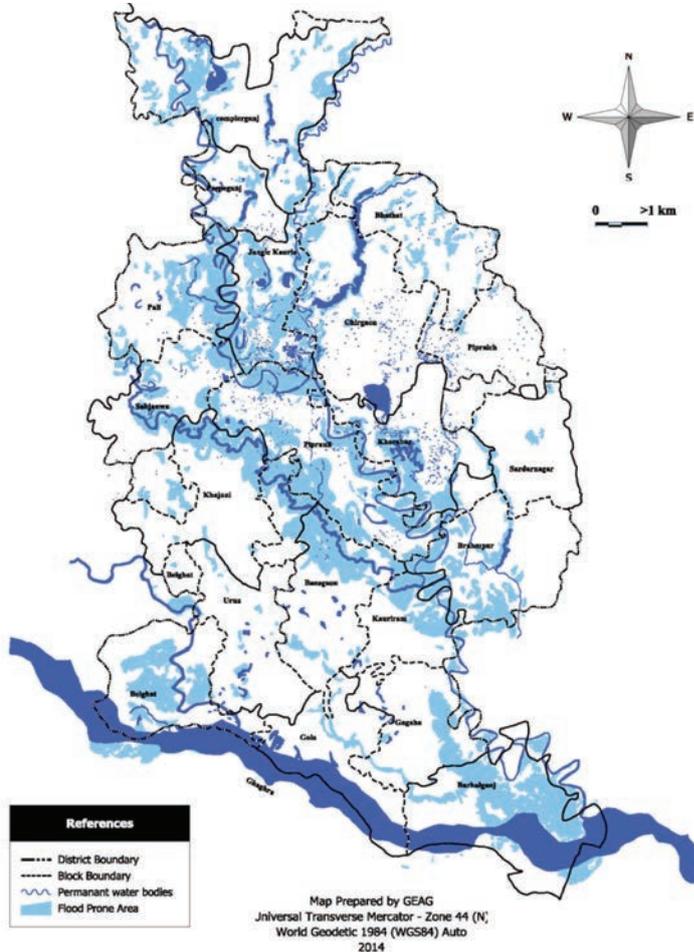
An action research programme managed by START and supported by CDKN is currently addressing many of these issues in Gorakhpur. Jointly implemented by the Gorakhpur Environmental Action Group (GEAG), the Institute for Social and Environmental Transition (ISET) and the National Institute of Disaster Management, the programme aims to effectively incorporate climate change considerations into disaster management planning within Gorakhpur District. This case study describes how the programme was developed, what factors have contributed to its success, and evaluates how a climate-mainstreaming programme such as Gorakhpur's might inspire other local governments in a similar position.

A more systematic approach

India's National Disaster Management Act (2005) provides for the creation of District Disaster Management Authorities, which are entrusted with developing and implementing a District Disaster Management Plan in consultation with all line departments. Accordingly, the Gorakhpur District Disaster Management Authority has prepared a District Disaster Management Plan. At present, the Plan is focused mainly on how agencies can coordinate following a disaster, such as a flood. Mainly, it presents strategies and activities for line departments to prepare

Figure 1. Flood-prone areas by block in Gorakhpur District

Map Prepared by GEAG
Universal Transverse Mercator - Zone 44 (N)
World Geodetic 1984 (WGS84) Auto
2014

References
- - - - District Boundary
- - - - Block Boundary
∿∿∿ Permanant water bodies
▨ Flood Prone Area

for disaster events. However, it lacks a systematic approach to identifying climate and weather-related hazards and vulnerability, and needs more focus on mitigating disaster risks before extreme events happen.

What is more, various recent studies have reported changing flooding patterns in the area,[5] and climate projections indicate that the patterns of extreme rainfall events will significantly change.[6] For example, one analysis shows an increase in the intensity of rainfall events by up to 33%, especially for longer-duration events.[7] This projection is consistent across the six best-fit General Circulation Models for Gorakhpur.[8] To be effective, disaster management planning must include both current and projected climate change impacts.

Also, preliminary gap analysis using the Climate Resilience Framework[9] (See Box 1) – which helps to assess climate exposure, systems, institutions and change agents[10] – shows an oversimplified understanding in the District Disaster Management Plan of vulnerability issues and their root causes. (Hereafter, the Plan is refered to as the DDMP and the District Disaster Management Authority as the DDMA.)

In light of all of this, the objectives of the CDKN-START programme are to:

- understand the systemic factors within the flood-prone Gorakhpur District that contribute to resilience or exacerbate vulnerability
- understand specific policy innovations that could help 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 disaster risk reduction and climate change adaptation practice
- develop the relevant capacities of line departments and researchers on climate change adaptation and disaster risk reduction.
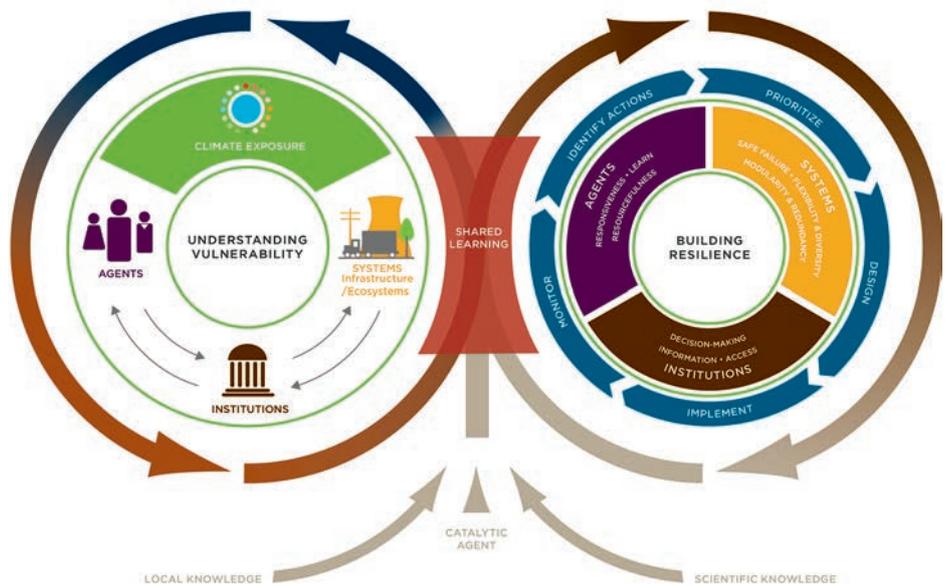
Extent of achievement of programme objectives

ISET and GEAG have been core partners in the implementation of the Asian Cities Climate Change Resilience Network programme in Gorakhpur since the engagement and assessment phase was launched in 2008. Hence, the joint understanding developed in the Climate Resilience Framework, formulated and based on applied research, guided the creation of the programme objectives. These objectives proved valuable in setting the course of implementation and guiding activities toward desired outcomes.

The CDKN-START programme was designed as a pure research initiative with the objective of making recommendations on how to incorporate

Box 1: Climate Resilience Framework

The Climate Resilience Framework is a conceptual framework for simplifying and analysing complex relationships among people, systems, institutions and climate change. The framework helps clarify factors that need to be included in the diagnosis of climate vulnerability, structures the systematic analysis of vulnerability in ways that clearly identify the entry points for responding, and supports strategic planning to build resilience to climate change.

Source: ISET International (2014), http://training.i-s-e-t.org
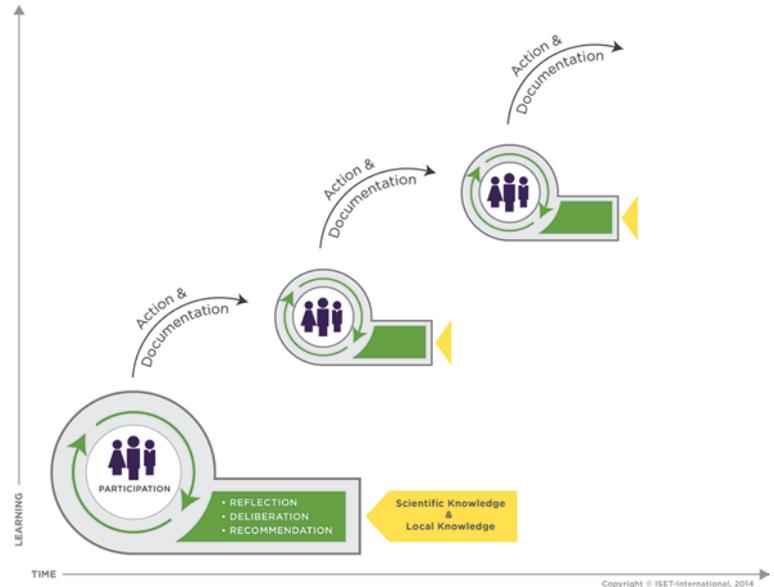

climate change concerns into DDMPs. However, given the higher level of buy-in and effective coordination by the DDMA than expected, the programme went beyond recommendations, publishing a climate-sensitive DDMP for Gorakhpur District. Several key factors contributed to this achievement:

- The long-term work of GEAG in the region on relevant issues provided the needed credibility among government departments.
- Government and other stakeholders recognised the recurring impacts of flooding – and hence the need to address it – as a high priority.
- The programme provided the needed technical support to the district level departments and the DDMA on practical approaches to vulnerability assessment and resilience building.

- The programme helped raise awareness of the ways in which climate change may manifest itself, especially at district level, by providing relevant and scientific analysis of climate change projections in a form that conveys the urgency, relevance and implications of climate change to each department's plans and programmes. The programme team conducted a detailed analysis of extreme events, showing changes in the magnitude and frequency of storm durations (e.g. 1 hour, 2 hours and 24 hours) across various best-fit Global Circulation Models. Many departments found this to be more useful than standard, regional downscaled climate model results, such as the Government of India 50 km x 50 km resolution climate change scenarios for the 2030s.[11]

- By supporting one staff member in the DDMA for the entire project duration, the programme established an effective mechanism for day-to-day coordination of its activities. This helped integrate climate change concerns with existing disaster management activities, including flood risk reduction.
- A better understanding of vulnerability issues at the district level, both intra- and inter-departmental, was achieved through Shared Learning Dialogues (SLDs – see Box 2). This is a structured and iterative process of workshops and round table discussions, with each iteration involving various departments, individually and collectively, and conducted in such a way as to develop an appreciation of issues surrounding vulnerability and resilience building. SLDs foster this understanding both within

BOX 2: Shared Learning Dialogues

Shared Learning Dialogues (SLDs) were a central component in the research approach. Different techniques of shared learning bring together knowledge from different disciplines with that held by individuals and organisations in communities, the government, and other sectors. Shared learning involves structured one-to-one and small group interactions that elicit insights from participants and build their understanding of the views of others and their implications. Many of the techniques are similar to those used in participatory research, but they stand out for their ability to build new knowledge and common understanding. Shared learning processes move research away from outsider-driven, top-down, extractive information gathering toward participatory, bottom-up, and inclusive knowledge generation.

Source: ISET International (2014).

and across departments (horizontally), as well as from departmental to district to state and higher levels (vertically).

- The rich experience of GEAG and ISET in designing and conducting the SLDs with the DDMA and its member departments catalysed the joint understanding of key gaps, issues and challenges.
- The key findings of the process at district level were used to promote SLDs at state level, and this further strengthened the district level process. The encouraging support of the Relief Commissioner/State Disaster Management Authority (SDMA), leveraged by the SLD process and presence of dynamic leadership, helped create a favourable environment for replicating the programme processes in other flood-affected districts in the state.

- Generally speaking, real policy impact is possible when an effective network of programme initiatives led by several respected organisations is combined with a high level of government acceptance. In Uttar Pradesh, a similar alchemy occurred during the programme's rollout. The United Nations Development Programme, in close coordination with the state government and SDMA, was supporting a capacity-building project for 9,000 *Gram Panchayats* (rural village councils) in the state to develop Village Disaster Management Plans. The networking fostered by the SLD process in CDKN-START helped sensitise the SDMA on aspects of integrating disaster risk reduction and climate change adaptation. This in turn led to Gorakhpur DDMA's issuing an order for integrating disaster risk reduction

into the departmental annual development plans.

The Climate Resilience Framework offers guidance on resilient design norms, technical codes, decision-making processes and other institutional dimensions to allow agents to promote climate resilience. Some of the features that were possible given the resource and time constraints at the DDMA level have already become part of the DDMP. However, the remaining features have been flagged in the plan as areas to be followed up by higher-level agencies (such as the SDMA, state-level departments or relevant national-level bodies). Two key such recommendations are:

- to initiate a process of regular monitoring and learning mechanisms (periodic meetings) to be conducted by the DDMA to update the vulnerability database and enhance

understanding of core and variable factors of exposure and fragility

- to develop technical design norms for various flood-resilient private and public infrastructure.

In an effort to garner support from higher-level organisations (e.g., the National Disaster Management Authority and various ministries), the programme plans to share its findings in the national high-level policy round table with the leadership of the National Institute of Disaster Management (NIDM). In addition, plans are afoot to foster replication and scaling up by capturing the programme experiences in a training manual to be published by NIDM in collaboration with GEAG and ISET.

Challenges to programme implementation

Because of the key enabling factors highlighted above, the programme was able to exceed its initial goals. But it also faced some challenges at the district level:

1. Lack of comprehensive understanding of vulnerability and its contributing factors, as well as a lack of a clear and systematic plan in departments to collect and synthesise data on vulnerability.

   Strategy: The programme worked with various departments (including the lowest-ranked officers at the village level) directly through the iterative SLD consultations, facilitating joint understanding of vulnerability issues from the Climate Resilience Framework lens, and analysing departmental and inter-departmental issues related to vulnerability. Further, the DDMP and various department

plans have been revised to incorporate data collection on impacts, damages and losses to department infrastructure in all future flooding and waterlogging in the district.

2. Lack of understanding of departmental staff, especially on the implications of climate change for their departmental plans and programmes.

   Strategy: The programme developed this understanding through the structured iterative SLD process. In contrast to stakeholder consultations conducted in piecemeal fashion, the SLD takes participants through a step-by-step process to develop understanding of comprehensive vulnerability issues and identify specific resilience building actions.

3. Lack of effective horizontal coordination among departments.

   Strategy: As part of the SLD process, the programme worked with the DDMA and subsequently with its members in various departments individually to develop joint understanding of inter-departmental issues that influence vulnerability.

4. Lack of availability of climate projections, downscaled and interpreted in a meaningful way.

   Strategy: The programme overcame this by using simple-to-decipher results on extreme (precipitation) event analysis from other projects of ISET-GEAG.

5. Damages due to floods are assessed just from the viewpoint of assessing compensation needs. No detailed

analysis is undertaken to understand root causes of vulnerability.

Strategy: The programme used the Climate Resilience Framework that unpacks complex vulnerability issues into four components – systems, institutions, agents and exposure.

Implications of experience for decision-makers and practitioners elsewhere

Climate change is no longer a distant concern, especially for district level government departments and DDMAs. There are four key needs to be addressed specifically in the subnational/district level context:

- One single department or authority needs to have a clear mandate to work on tackling the impacts of climate change at the local level (e.g. the DDMA for Gorakhpur).
- There is a need to bring the scientific and complex knowledge of climate change to the district level in a simple, clear way that highlights the implications of climate change for departmental plans and programmes. This can be achieved by conducting relevant additional analysis (such as extreme event analysis for floods) on the data from available Global Circulation Models and Regional Circulation Models.
- There is a lack of frameworks to analyse vulnerability in a comprehensive way and the Climate Resilience Framework is an effective tool to fill this gap.
- There is a lack of understanding on how to respond to climate change at district level and hence, there is a need to build capacity through training.

Endnotes

1 Census of India (2011). Government of India.

2 Blocks are planning and development administrative sub-units of district.

3 Wajih, S. (2008). Adaptive capacity of community to cope up with flood situation. Published by GEAG with support from Oxfam India. Gorakhpur, India: Gorakhpur Environmental Action Group.

4 Assuming 60 INR ~ US$1. GEAG (2013). District Disaster Management Plan. Published by Gorakhpur Environmental Action Group in collaboration with District Disaster Management Authority.

5 Rana, N.K, (2005). Role of stream dynamics and hydrological modeling in flood mitigation: A case study of Rapti river basin, U.P. Unpublished Ph.D thesis, Department of Geography, DDU Gorakhpur University, Gorakhpur; Wajih, S. (2010). Toward a Resilient Gorakhpur. Resilience strategy report published by Gorakhpur Environmental Action Group under ACCCRN Process funded by the Rockefeller Foundation, 2010. Available at: www.acccrn.org/resources/documents.../towards-resilient-gorakhpur; Gupta, A.K., Nair, S.S., Wajih, S.A and Dey, S. (2013). Flood disaster risk management: Gorakhpur case study (Training Module). National institute of Disaster Management, New Delhi and Deutsche Gesellshaft fur Internationale Zusammenarbeit (GIZ), GmbH, Germany; Singh, B., McMahon, T., Singh, D. and Hawley, K. (2014). Situation Analysis Gorakhpur, India: Climate Change, Flooding and Vulnerability. Working paper developed under CDKN shelter project, published by ISET International. For further information see: http://i-s-e-t.org/resources/working-papers/situation-analysis-gorakhpur.html#sthash.p3KaJHeg.dpuf

6 Opitz-Stapleton, S. (2013). Mehewa Ward, Gorakhpur, India: Extreme Rainfall, Climate Change and Flooding. Policy Brief for the ACCCRN Initiative. Boulder, CO: Institute for Social and Environmental Transition.

7 12–24 hrs; A return period is an estimate of the likelihood of an event. It is a statistical measurement typically based on historic data denoting the average recurrence interval over an extended period of time, and is usually used for risk analysis.

8 Optiz-Stapleton (2013). Op. cit.

9 The Climate Resilience Framework has been developed by ISET International with other partners based on the experience of the Asian Cities Climate Change Resilience Network (ACCCRN) programme in 10 cities across 4 countries in South Asia and South-East Asia. For more details, visit www.i-s-e-t.org

10 Tyler, S. and Moench, M. (2012). A framework for urban climate resilience. *Climate and Development* 4(4): 311–326.

11 MoEF (2010). Climate change and India: A 4X4 sectoral and regional analysis for 2030s. INCCA Report No. 2. New Delhi: Government of India.

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