

Support for Multi-Hazard Risk Reduction in Urban Local Bodies¹

RIPIN KALRA, UNIVERSITY OF WESTMINSTER, UK

Abstract

India's urban assets and populations are highly vulnerable to a multitude of natural hazards, climate variability and environmental change. This can well impact on the entire nation, as economic output comes primarily from in and around its urban settlements. Empirical evidence from recent disasters, despite some major successes, reinforces the limited preparedness of Indian towns and cities to withstand multiple hazards such as fires, floods, extreme temperatures, earthquakes and strong winds. Unregulated growth and the quality of built environment are among a host of factors that have resulted in this vulnerability to disaster events. The research issue that this paper addresses is that of enabling the Urban Local Bodies (ULB) to implement disaster risk reduction and recovery framework(s) developed and agreed on at the national and sub-national levels. This paper highlights capacity challenges within local government for managing natural disasters amongst wider challenges of service provision. The paper draws upon empirical observations to argue that despite their best intentions ULBs are currently constrained in implementing the extensive comprehensive disaster risk & recovery approach driven by a multiplicity of national and multilateral policies. The paper provides observations from the Kosi River flooding disaster (2008) in Bihar state to illustrate this point. The paper further highlights that while this situation will not change overnight there are a number of practical opportunities to support ULBs in making an immediate start and superimpose risk reduction onto development programmes.

Key words. Urban Local Bodies (ULBs), Multi-hazard Risk Reduction, City Development Plans (CDP), Community-led asset management (CAM), Comprehensive Disaster Risk Management (CDRM).

The role and constraints of ULB in managing risk

Hazard mapping by the Indian Government (BMTPC 2019) gives a comprehensive insight into the risk exposure of the country – estimating that 57% of land is vulnerable to earthquakes (high seismic zones III–V), 68% to drought, 8% to cyclones and 12% to floods. Between 1990 and 2020 there have been 1,000+ events of cyclones, droughts, earthquakes, floods and landslides affecting millions of people and causing billions of US dollars of economic damage both from direct damage and indirect losses.

¹ This article derives from a paper presented at the IIAS 90th Conference, Public Governance for Climate Action (Track B3. Social Innovation, Commons and Administration, International Institute of Administrative Sciences), held in Brussels, on 15–18 December 2020.

India is often known as a country of villages, with 72% of its population estimated to be in rural areas, while 28% are in heavily concentrated urban areas. However, more than half (53.7%) of India's economic output (GDP) relies on the service industry concentrated mostly in and around the urban areas, with industry (29.1%) and agriculture (17.2%) making up the remaining sectors, located in rural or peri-urban settings. During the last 20 years several major disasters, both geo-physical and hydro-meteorological, have affected urban India such as in Uttarakashi, Latur, Bhuj, Mumbai, Vizag, Chennai. Rapidly growing urban areas in India continue to be vulnerable to multiple hazards.

However, the Indian government has taken bold affirmative steps to move away from a culture of *relief and response* towards a comprehensive framework for multi-hazard risk management in line with international practice, involving risk identification, mitigation, risk transfer and early warning/preparedness. India is a signatory to the 2015 *Sendai framework for Action* (and previously to the *Hyogo framework for action 2000-2015*). The *Disaster Management Act of 2005* and the *National Mission on Sustainable Habitat 2010*, although developing within separate institutional structures represents an overhaul in policy and institutional responsibilities on the identification of risks, reducing vulnerability & losses from natural disasters and mitigating climate risks through energy efficiency and waste management as core components of urban development. In all this the national government presents itself in a strategic role attempting to create the right enabling (and regulatory) environment with sub-national governments taking the lead in the design and implementation of the risk reduction strategies. The responsibility for mainstreaming this culture of risk reduction and disaster response thus lies predominantly at the sub-national level, mainly within Urban Local Bodies (ULBs) and District Local Bodies (DLBs). Sarbeswar et al. (2018) also calls for policy integration in transforming the urban and regional development agenda, based on the premise that "*integration of policies across different sectors and different government agencies is of vital importance to stimulating sustainable innovation at the city level ... Indian cities need to realign their vertically spaced institutional setting and replace with horizontally linked sections within Municipal Corporation*", strongly recommending that functions of local utility planning and management are devolved to the municipal level governments.

Khosla and Bhardwaj, (2019) and Ahluwalia (2019) point to multiple capacity constraints that are barriers to an effective delivery of their mandates by Urban Local Bodies (ULBs), further highlighting the capacity, data and political capital constraints to creating systems of service delivery and risk management. The most obvious way forward under such constraints is for ULBs to work with development channels such as community-led-models that are essential to implement risk monitoring and mitigation at scale. Khosla and Bhardwaj (2019) draws upon examples of Indian cities to highlight a process of "*superimposition*", where local level officials are managing risk related to climate change by dovetailing adaptation and mitigation activities within established development programmes and familiar official processes. Khosla and Bhardwaj, (2019) explains that "*The advantage of these models is that they already have regulatory support and previously proved to be cost-effective for scaling up programmes of a technical nature.*"

Research approach

The author draws upon published sources of information to review the policy measures and mandate for comprehensive disaster risk management (CDRM) in India. An analysis of the response to River Kosi flooding (2008), one of the largest flooding events in recent history, against the CDRM framework of activities highlights the gaps between the plan and current practice.

The author also draws upon first-hand experience whilst working in Bihar state (and neighbouring Jharkhand) with several ULBs between 2010 and 2019 on projects related to disaster risk reduction, low carbon development and planning capacity development. Therefore observations from these visits illustrate the current constraints and support relevant to ULBs in their journey to implement CDRM.

National and sub-national risk management system(s) in India

In recent decades the country and all its states have started to embark upon an ambitious and elaborate framework for disaster prevention, management, early warning and preparedness, much of which was overhauled in 2002 after a series of major disasters in the 1990s from earthquakes, flooding and cyclones.

The national development policy has witnessed a sea change from disaster response towards disaster prevention and preparedness. India follows a format of five-year plans and its Tenth Five-Year Plan 2002–2007 for the first time had a detailed chapter entitled *Disaster Management: The Development Perspective*. The plan emphasised the fact that development cannot be sustainable without mitigation being built into the development process. Disaster mitigation and prevention were adopted as an essential component of the development strategy. Following this, the *Eleventh Five Year Plan 2007–2012* (Government of India 2008) states,

The development process needs to be sensitive towards disaster prevention, preparedness and mitigation. Disaster management has therefore emerged as a high priority for the country. Going beyond the historical focus on relief and rehabilitation after the event, there is a need to look ahead and plan for disaster preparedness and mitigation in order to ensure that periodic shocks to our development efforts are minimised.

India set out its national and international commitment towards disaster risk reduction by signing the *Hyogo Framework for Action 2005–2015* and enacted the *National Disaster Management Act in 2005* with similar acts implemented at the state government level. India further signed up to the *Sendai Framework for Action* in 2015 and developed the *National disaster management plan* in 2016 (revised 2019). This has led to busy and prolific times for the Indian policy-makers, with a multitude of policies and structures evolving on other issues such as climate change, environmental protection and urban development. Firstly, with the growing prominence of climate change issues, India rolled out the *National Action Plan for Climate Change* in 2008. The NAPCC identifies eight missions², including the *National Mission on Sustainable Habitat*, which aspires to promote disaster management and energy efficiency as a core component of urban planning with due emphasis on public transport

² NAPCC missions are National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for Green India, National Mission for Sustainable Agriculture, National Mission on Strategic Knowledge for Climate Change.

and urban waste management. Separately, a national programme on urban renewal known as the *Jawaharlal Nehru National Urban Renewal Mission* (JNNURM) was also rolled out from 2006 onwards with the aim of maximising the potential of urban areas, as the bulk of India's GDP is produced there, ensuring basic minimum services to urban populations and meeting India's commitments towards the Millennium Development Goals (MDGs).

In the context of even more recent federal programmes, such as AMRUT and Smart Cities Mission, Ahluwalia (2019) writes that *"urban local bodies have come to acquire a host of functions that are new if not unprecedented. These include preparation of a city development plan, city mobility plan, city sanitation plan, e-governance, and meeting the numerous benchmarks set by the Government of India for service delivery."*

Preparing the CDP (City Development Plan) was a core activity for all urban areas selected for funding support under the JNNURM. The JNNURM defined a CDP as:

anchored on the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) goal of creating economically productive, efficient, equitable and responsive cities. As a step to achieving this goal, the CDP focuses on the development of economic and social infrastructure, strategies that deal specifically with issues affecting the urban poor, strengthening of municipal governments and their financial accounting and budgeting systems and procedures, creation of structures for bringing in accountability and transparency, and elimination of legal and other bottlenecks that have stifled the land and housing markets. It provides a basis for cities to undertake urban sector reforms that help direct investment into city-based infrastructure.

Components of a CDP were fully specified within a tool-kit of guidance that included the requirement to address disaster management (as an environmental issue) and the participation of communities as well as private investors in city development in partnership with urban authorities. Thus a CDP provided a wide range of options for the city or town in question and to a large extent legitimised partnerships with communities and the private sector. The CDP was developed by consulting a large number of stakeholders and thus set out a vision for the town or city and estimated the infrastructure and finance requirements for the city to achieve its goal.

Within both NAPCC and JNNURM references were made to disaster management, but there was no definition or even reference to the comprehensive risk management framework, leaving it open to the competence of the empanelled consultant authoring the CDP. As an illustration the CDP was required to provide an estimate of investment required in the town to provide basic infrastructure, say drainage or water supply. A consultant engaged to complete the CDP currently did not have to make references (or commission assessment) to locally specific maps showing the hazards that affect the town or conduct assessments on ways to mitigate the risk from these hazards. As a result any estimate of investment required did not have to build in risk mitigation measures. A critical opportunity to assess risk and operationalise risk reduction by recommending an appropriate level of investment for disaster resilient infrastructure was therefore missed. Scores of CDPs were written in India with a variable quality of risk assessment and investment for risk reduction. Each one could have been an opportunity to synthesise and progress the disaster risk, climate and urban agenda.

India's progress report on implementing the Hyogo Framework for Action (2011-13) recognised that huge operational challenges existed in India, where, *"Disaster Management is primarily*

dealt with by State Governments while national government plays a strategic role. State specific rules are to be framed. Dedicated Human Resource Support and funding arrangements need to be made for strengthening these SDMAs and DDMAAs.” Further it recognised that there were multiple policy structures and frameworks that needed to integrate, for instance, a better connection between the climate change mission and the disaster management policy, with eight national missions on climate change intended to dovetail the mitigation and adaptation issues of CC and DRR under implementation by the concerned ministries. This is particularly important because the bulk of responsibility of implementation of all such policies lay at the sub-national level with ULBs and DLBs, and time and resources are limited in handling an increasing flow of responsibility laid out at the national policy level. Clearly the support agenda for the national and state government had to be spelt out in further detail.

India’s “National Progress Report on the *Implementation of the Hyogo Framework for Action (2011-13)*” further highlighted a number of measures to inform and empower governments and communities at the grassroots, including ULBs. It highlighted the *“increasing emphasis to incorporate hazard safety measures at the settlement planning level in Master Plans and City Development Plans CDPs.”* However, it acknowledged that amongst the many challenges were the absence of micro-level risk analysis at the state level and the absence of devolution of power and financial resources to the local authorities. These challenges are also emphasised by Khosla and Bhardwaj, (2019) and Ahluwalia (2019), with the latter pointing to the impact from state level not devolving resources, *“urban local governments have remained hamstrung by the lack of funds and are having to function with unfunded mandates.”*

The 2005 Disaster Management Act proposed a three-tier Disaster Risk Management (DRM) structure in India: a National Disaster Management Authority (NDMA), headed by the Hon. Prime Minister, State Disaster Management Authorities (SDMAs), headed by respective Chief Ministers, and District Disaster Management Authorities (DDMAAs), headed by the District Collector with further micro-planning anticipated at the ward level. The entire framework acknowledges that extensive partnerships at the local government level with trained and well-equipped civil society and communities are essential for DRM to succeed and be scaled up in India.

The following matrix (Table 1) provides an overview of institutions with DRM responsibilities, their roles/power and capacity. It is amply clear that the buck stops with the state government, and the ultimate channels of formal implementation are the municipal (Urban Local Bodies – ULBs) and district level institutions, with vulnerable communities and civil society playing a highly significant role in providing human resource and scaling up both awareness and efforts. In the Indian context, therefore, instruments such as the CDPs provided the best available opportunity to synthesise these partnerships between the administration, communities and the private sector.

Table 1. Disaster Management in India: Key actors and responsibilities

Institutions	Roles/Power	Capacity/Resources	Liability/ Responsibility
National govt. (NDMA)	Sets national policy + guidance + co-ordination mechanism. Regulation on risk transfer (i.e. insurance).	Adequate legislative, financial and research capability.	Responsibility for national policy & co-ordination.
State govt. (SDMA)	Each state sets unique state level policy + guidance. Establish state-level practices for risk identification, mitigation, preparedness, transfer, forecasting, emergency response & recovery/ reconstruction.	States have highly variable resources for adequate knowledge and planning. Lack of capacity and co-ordination amongst state departments to develop and implement plans.	Responsibility for state-wide guidance & co-ordination on risk identification, mitigation, preparedness, transfer, forecasting, emergency response & recovery/ reconstruction.
Local/ District govt. (DDMA)	Take cue from state-wide guidance, procedures and policy on local risk identification, mitigation, preparedness, emergency response & recovery/ reconstruction.	Reliant on state for provision of fiscal resources for adequate knowledge, capacity, planning and implementation. Does not have resources for forecasting. Planning and engineering resources are weak.	Ultimately responsible for implementation.
Private Sector	Own business continuity planning. Certification for public-private infrastructure projects for approval. Role in risk transfer heavily regulated by national government. Philanthropic activities for local risk identification, mitigation, preparedness, emergency response & recovery/ reconstruction. Some micro-insurance activity is permitted.	Variable.	Compliance with legislation for project approval. Informal partnerships with government during major emergencies.
Civil society	Consulted on national and state policy and practice. Involved in partnerships with government (at all levels) on risk identification, mitigation, preparedness, emergency response & recovery/ reconstruction.	Variable. Rely on philanthropic assistance.	Variable. No formal process of monitoring or accountability of their role in DM.
Grass-roots communities	Consulted on district policy and practice. Involved in partnerships with government (at local levels) on risk identification, mitigation, preparedness, emergency response & recovery/ reconstruction.	Variable. Rely on philanthropic and development funding assistance.	Variable. No formal process of monitoring or accountability of their role in DM.
Other (military)	Consulted on national and state level emergency response.	Defence budgets.	As requested, mostly under emergency procedures.
International institutions ¹	Advise national and state government. Provide development assistance.	Provide assistance.	Capacity building and mainstreaming.
Media	Independent and public services broadcasting and awareness.	State/private owned.	Viewer market responsive.

Vulnerability in Bihar and the case of 2008 floods in River Kosi

The Kosi flooding of 2008 is unique in that this major disaster took place in an era of rapid positive reform in India's risk management culture. It can serve to provide a baseline and very valuable lessons on mainstreaming of risk management in India. Bihar is one of the most disaster prone regions in the world, and it is mainly its location and environment that makes it highly susceptible to flooding, extreme heat, humidity and strong winds. According to the state FMIS (Flood management information system) Bihar is India's most flood-prone state, with 76% of the population in North Bihar living under the recurring threat of flood devastation. About 68,000 km² within a total geographical area of 94,160 km² (73.06%) is flood-affected. The plains of Bihar, bordering on Nepal, are drained by a number of rivers that have their catchments in the steep and geologically complex Himalayas and carry a high discharge and sediment load that they deposit in the plains of Bihar. The plains of North Bihar have recorded the highest number of floods during the last 30-40 years, with high magnitudes of floods in the years 1978, 1987, 1998, 2004 and 2007. The total area affected by floods has also increased during these years.

Human activity and poor appreciation of risk accounts a lot for increased vulnerability. The landscape across the state (and including its urban areas) has been heavily modified and obstructed for habitation, agriculture, transport and industry. Such modifications are increasingly being pushed to their designed limit and often (particularly where they are poorly monitored or maintained), when they fail, the result has been disastrous, as evident in the breach of the dykes during the Kosi river flood of 2008.

The Kosi flood (2008) was one of the most destructive in the history of the Indian state with extensive loss of lives and devastation to economic activity in all sectors (services, agriculture and industry). Not surprisingly it was declared a "national calamity". The course of the flooding took both government and people by surprise as the regional modelling had predicted that in the eventuality that the river did flood, it would be in an altogether different direction. It was the non-maintenance of the dykes and the unexpected risk that led to numerous towns and villages being inundated and affected with severe damage and losses. Local authorities were severely under-resourced and unable to monitor and highlight risk factors, such as the strength of the dykes or buildings, even though they are a critical influence on the distribution and magnitude of losses

The flooding affected an estimated 3.3 million people in the northern part of Bihar, with deaths estimated at 1,000 persons. About a million people were evacuated and provided temporary shelter in 360 relief camps set up across the region. The total economic damage³ alone has been placed at 1.5 billion USD, a majority of it in the agricultural sector and loss of housing or transport infrastructure. For years, numerous external agencies continued to provide assistance in the relief, recovery and reconstruction process. These included affected communities as well as hundreds of local and international NGOs. The World Bank (2010) had initially agreed to grant an interest free loan of 250 million USD to the State government repayable over 35 years towards *"recovery efforts through the reconstruction of about 0.1 million houses, 90 bridges and 290 km of rural roads. It also aimed to reduce future-oriented risks by strengthening flood management and monitoring capacity, restoring livelihoods, and*

3 PDNA Kosi Flooding 2008, World Bank

*improving the emergency response capability of the state through a provision of contingency funding."*⁴

The DRM culture emerging from catastrophic Kosi flooding

The *Comprehensive Disaster Risk Management Framework* (CDRMF)⁵ breaks up the hazard cycle into five key components, the *identification* of risk, the *mitigation* of risk, the *transfer* of risk, *early warning and preparedness* and, should a disaster strike, how *recovery* should take place. The latter is often referred to by the United Nations as "building back better". It is interesting to review the Kosi floods of 2008 within this framework as it can reveal where the Bihar state can improve its preparedness and response to major hazards. Bihar has a long established civil society and along with communities they work closely with the municipal, district and state government. Despite such experience and capacity the scale and intensity of the disaster overwhelmed the affected areas. Gupta et al. (2019) further highlight that the Bihar DRR Roadmap envisages Resilient Cities as one of the five components (others include resilient villages, livelihoods, critical infrastructure and basic services), and ward level micro-planning is encouraged.

The predominant gaps are in the identification and mitigation of risk. Municipalities and district authorities are poorly resourced financially as well as in terms of skilled staff to monitor local flood mitigation measures within their jurisdiction, such as the condition of dykes and embankments and verifying their ability to withstand a major hazard. This was cited as the key cause of the Kosi flooding. A documented understanding of local risks and vulnerability is in its early stages. A recent survey of households reveals "heavy rain" and "extreme temperatures" to be perceived by households as the biggest causes of disruption to life and business in urban areas. Yet these did not feature in the CDP(s) that had been prepared for town and city development. Then there are less frequent but high-risk hazards such as earthquakes. The last major earthquake in Bihar was in 1934, so there is now little community memory of that, and SDMA is making renewed efforts to remind and prepare the masses for such an event. Mitigation measures such as drainage, acceptable micro-climates and good quality construction can only be realised through a combination of urban planning, green infrastructure, monitoring of buildings design and construction, drainage infrastructure and solid waste management; many of these skills and the resources to undertake them were observed to be lacking in the ULBs. As a result development is vulnerable to damage from hazards.

On the response and preparedness aspects while the army, police and volunteers were deployed in the aftermath of the disaster they were overwhelmed by the scale and intensity of flooding. The landscape is such that early warning and escaping in time to higher land is the only way to avoid certain death from rising waters. In some places piles of sacks indicate that water-levels had exceeded the roads built on raised embankments. Indeed in the district of Supaul (one of the worst affected), there are only a handful of permanent structures visible for miles, demonstrating the difficulty of building accessible emergency shelters here. Here

⁴ Sourced from the World Bank Website www.worldbank.org (last accessed 13 January 2014).

⁵ The World Bank and other international financing institutions are promoting the application of a comprehensive risk management framework which comprises three main elements: identifying hazard and risk exposure, reducing risk by implementing strategies to avoid hazards and resist disaster impacts and transferring or sharing the risks that cannot be reduced.

the only way to build is in the knowledge that much of it will be lost and will need to be built again. Earth and reed are thus the predominant materials for construction for the majority of the population that live here. People rely on media (where there is electricity) and word of mouth to obtain information on impending hazards, a system highly prone to fatal results.

On visiting one of the worst affected towns after the 2008 floods some interesting observations were made. The entire town has an estimated annual revenue of 90,000 USD only. Not surprisingly the ULB is stretched financially, there is not enough to pay the staff, let alone undertake appropriate inspections, design, capital works and maintenance. The author visited the areas worst affected by waterlogging after the rains. The main market for street vendors as well as the access to the railway station suffer the worst waterlogging annually. Undoubtedly both business and access are lost after a downpour. The ULB explained they try to do their best, at least to pump out water using the limited amount of equipment they have. They explained that during the rainy season there is nowhere for the water to go, the surrounding areas being all low-lying, and a drainage plan was needed. Currently the best that can be done is to pump water from one neighbourhood to another, which in itself is an expensive activity requiring resources for the fuel. They want people to build when they do in such a way that they do not disrupt water channels, making the problem worse. Overall, the ULB has little capacity to monitor what is being done individually by the people in the town. In another town close by, we saw equipment for Solid Waste Management in the ULB compound; it looked hardly used. ULB explained that although they had had the equipment for a number of years, the operator had not been appointed, as the job description had not been approved from the head department in the capital. Recruitment decisions could not be made by ULB on their own. This reality demonstrates that both procedure and resources are disrupting the efforts being made for comprehensive disaster risk management in Bihar. It has a long way to go before it can operate as a well-oiled concern capable of managing the expectations from the national and state policy on disaster risk reduction.

Urban infrastructure in Bihar, one of the least urbanised states and third most populous one, is already past its breaking point. While Bihar has low levels of urbanisation (11%) as compared to the rest of India (34%) the percentage of urban population that is poor is among the highest at 33.74%, well above the national average of 23.62%. The poor and their assets in urban areas inhabit sites that suffer adverse impacts from weather related hazards. Drainage, sewerage and other urban infrastructure in towns is poorly managed and cannot cope with even the current levels of variability in climate. Deaths and damage to assets result from recurrent flooding, heat waves, cold waves and high wind. The unhealthy conditions in towns are exacerbated by poorly managed motorised transport and a vast energy deficit resulting in the extensive use of diesel generators. This adds heat, noise and pollutants to the noxious mix. It is the poorest who have the least recourse to affordable means to adapt or escape such conditions. Bihar's progress in improving urban conditions and promoting investment is further threatened by anticipated climate variability and environmental change. Natural and built environments, livelihoods, economic growth and the several million people dependent on these are already suffering the consequences of recurrent flooding and weather conditions such as high wind, extreme summer, winter temperatures and changing seasonality.

Bihar is thus unique in that even with low levels of urbanisation there is growing vulnerability exacerbated by lack of revenues, further reducing the capacity of ULBs to manage the urban

environment. It is truly a vicious downward cycle, and it is difficult not to sympathise with the ULBs that despite their will and best intentions, the lack of resources and appropriate human resource is driving down urban conditions and possibly discouraging potential investors.

It leads us to think that while the overall policy environment is moving in the right direction and rich in its scope and the government has extended several benefits associated with policy implementation there is limited convergence and experience on how these can be translated into practice at the district or town level within the financial and cultural constraints that exist. ULBs and the local communities are well aware of the risks but do not have the means yet to work in a way that resembles the disaster management framework approach; it is still predominantly a culture of reacting and adaptation, whatever best is possible within their means.

The constitution of India does contain mandatory provisions for urban planning by ULBs and the development of DPC (District Planning Committee) and MDC (Municipal Planning Committee), and yet these are not being implemented because of the same constraints as above. How urban planning may be (re)institutionalised within the local political and development processes is an ongoing thought process.⁶ Institutionalising planning in this way is required to enable Bihar ULBs to get access to national planning funds and potentially pave the way for private investment and incentives from urban, public transport and carbon-related finance. This will also go in some way to establish a stable policy and political environment that the private sector and investment community prefers. Interestingly the preparation of tools such as the CDP does potentially offer exactly this sort of opportunity that towns can access central government planning funds.

The State Disaster Management Agency (SDMA) appreciates the challenges of mainstreaming DRM within this context. They anticipate three pre-conditions for mainstreaming DRR within ULBs. Firstly integrating DRR responsibilities within the *municipal act* that sets out the responsibilities of the ULBs; ensuring budgetary approval of each department is contingent on their demonstration that DRR measures have been integrated and budgeted within projects and programmes; building the human capacity and finances at various levels. It is here that the Disaster Risk Management framework promoted by the State Disaster Management Authority (SDMA) should be defined in line with the state DRM strategy ensuring it is fully integrated in the governance and infrastructure strategy for any ULB.

Maskrey (2011) reminds us that CBDRM and LLDRM approaches remain valid and more necessary than ever if the goals of international frameworks such as the Hyogo Framework of Action have to be achieved. However, *“their potential will only be fulfilled when they are nurtured in the context of balanced partnerships between government and civil society, based not only on local participation and ownership but on political and economic support from national institutions.”*

⁶ Several ULBs have appointed “city-managers” who may prove to be a valuable conduit for establishing the skill base in the delivery of urban planning and investment.

Supports for ULBs on risk management

The agenda for mainstreaming CDRM is set out, but what is a ULB to do in the immediate and short-term with its limited capacity? Changing the municipal act, clarifying departmental roles on DRR and agreeing on compliance and building resources and capacity needs to start soon, but it is by no means an overnight task. Enabling the ULBs to access plan funds and build up a systematic culture of planning and design for DRR and low-carbon will also take time. What is to be done in the meantime? The ULBs need to take on practices that have helped other ULBs scale up their programmes despite technical, regulatory and financial constraints. As a first step these could be part of the CDP(s) building up incrementally the capacity of ULBs to mainstream DRR.

Khosla and Bhardwaj (2019) observes that in several Indian cities bureaucracies are applying a practical method of “superimposing” risk mitigation measures upon existing and established processes within the cities. This has allowed measures such as ones concerning climate change to be introduced without extensive change to bureaucratic or urban planning processes.

Here we draw attention to some of the existing models already working within Bihar (and elsewhere in India) that have adapted well to the context and reinforce the capacity of urban local bodies cost-effectively. The selection of models is based on the immediate relevance to risk management and the fact that they are well recognised and transferable in the Bihar context. They draw together exactly the sort of stakeholders, partners and capacity that the ULBs require urgently to create better planning and infrastructure while they develop their own revenue base and capacity over time. They have the added advantage of being already in favour within current government policy.

Urban resource centres are *One-stop shops* that can provide information and guidance on a wide range of built environment issues to the ULBs. State-wide GIS data centres are already under development and may be equipped to take on this mandate of mapping hazards and vulnerability. Another example of these are the HUDCO building centres, initially launched by HUDCO as early as 1988; there are currently scores of *Building Centres* functional across India serving the districts. They were set-up with a view to propagate, disseminate and promote these innovative and cost effective housing technologies and to transfer them to the field situation. The grass-root level institutional mechanism serves the role of:

- Technology transfer of affordable and cost-effective technologies from lab to land.
- Skill upgrading and training to construction workers on conventional and innovative technologies.
- Production and marketing of building materials and their components.
- Construction of cost effective houses/buildings for various uses.
- Extension of house guidance, counselling and information dissemination.

ULBs are unlikely to afford or manage individual resource centres to identify risk, technologies and guidance on risk mitigation. Resource centres can be developed and managed at the state government level to provide location-specific guidance to ULBs. There are provisions

within central government funds for the creation of such centres. They can also guide ULBs on tools and planning techniques that ULBs can use to substantially reduce the demand for environmental resources – energy, water and cut waste.

Resource-constrained ULBs have also engaged in partnerships to enhance their performance despite the lack of own resources to do so. The most popular form of performance-based contracting is an ESCo, which provides performance and savings guarantees (say in energy efficiency-related services) and directly ties its remuneration to the energy savings achieved. In theory ESCo-based agreements can be applied to risk reduction, such as improved drainage or street lighting. Here is an example from Panchkula (Haryana). As part of its mandate to implement municipal-level DSM (Demand Side Management) BEE⁷ has advised municipal bodies across India to replace their existing inefficient street lighting with products that were more energy-efficient. Municipal bodies, due to the paucity of funds and lack of technical managerial expertise, cannot undertake these measures on their own. In order to meet these obligations, municipal bodies such as Panchkula are forming partnerships with Energy Saving Companies (ESCOs).

Alien Group entered into an ESCo contract for 8 years with the Panchkula authorities (HUDA/HAREDA) and brought in an initial investment of Rs 1.55 crores for replacing the existing street light points. The ESCo will also undertake the maintenance and replacement of such points. The performance and energy-saving assessment of new fixtures is conducted by the technical committee and a maximum energy saving projection determined. The ESCo and the municipal body (HUDA/HAREDA) share the power savings and resulting Carbon Credits in a pre-determined ratio. An Escrow account is set up with the main banker of the municipal body to manage the monthly power sharing between the two parties for the tenor of the contract. The project is eligible for carbon credits, and that will further increase its profitability.

Amongst the promising and vital partnerships is the one ULBs could have with local communities. Local communities know their environment (and recall recent incidents) better than any other institution, and engagement with them is almost essential to minimise risk and deliver CDRMF. One of the key rationales for this is that in India the built environment is primarily created by communities; they are owner-builders. Even an estimated 50% of the community infrastructure is created by communities themselves, including drainage, paved streets, tree plantation and water storage. *Community Asset Management* (CAM) is an approach to the initiation, implementation and operation of community assets by the community, in partnership with other stakeholders, so that they will be appropriate to local conditions and last and in the process contribute to the cultural, economic, psychological, social and spiritual well-being of the community and the sustainability of the environment. In contexts where the people are poor the immediate interest is in livelihood assets, those that ensure that basic needs can be met. Demonstration programmes have been successfully carried out in India, Kenya, Malawi and South Africa.

Notably, it is designated practice to set out a CAM strategy within CDPs. The resulting benefits

7 The Government of India set up the Bureau of Energy Efficiency (BEE) (www.bee-india.nic.in) in 2002 under the provisions of the Energy Conservation Act, 2001. The mission of the Bureau of Energy Efficiency is to assist in developing policies and strategies with a thrust on self-regulation and market principles within the overall framework of the Energy Conservation Act, with the primary objective of reducing energy intensity of the Indian economy. BEE co-ordinates with designated consumers, agencies and other organisations and recognises, identifies and utilises the existing resources and infrastructure, in performing the functions assigned to it under the Energy Conservation Act. Bihar ULBs can benefit from the technical-financial advice that such an organisation can offer.

are better management of assets, cost savings and the generation of livelihoods amongst the user communities, all contributing towards more resilient infrastructure.

Above all, risk and the available capacity to deal with risk needs to feature prominently in the CDP(s) that are being developed for towns and cities as these will reflect disaster reduction within the vision and development strategy of the urban areas. This provides the starting baseline for the future development and financing of ULBs.

Conclusions

With much of India’s GDP concentrated around urban areas, Urban local bodies (ULBs) are critical to the delivery of Disaster Risk Management and climate change adaptation in India. Since 2002, India has taken substantive steps towards developing a suitable policy environment that promotes comprehensive disaster risk management, environmental sustainability and climate resilience.

However, the analysis of a major disaster event in Bihar and recent observations within the state show that ULBs have severely limited financial and skilled resources and face an uphill task in meeting expectations. India’s progress report on the Hyogo Framework for Action also highlights that while much is being done to plan and implement DRR measures at the state and grassroots level, there are real challenges in devolving powers and resources at the ULB level.

It will take time to overcome these challenges, but in the interim ULBs will need to be “supported” in making a start through models that are already tested and accepted within policy and practice. Such “superimposition” is observed across many cities of India in addressing climate concerns where measures are introduced without the need for extensive change in bureaucracies.

Most of the urban built environment in Bihar is delivered by “owner-builders”. Therefore promoting partnerships with Communities is a necessary first step where ULBs can be supported in implementing CDRMF. Community-led Asset Management (CAM) and community “Microplans” have been tried in India, and City Development Plans (CDP) are already mandated to describe their approach on CAM and take into account community-led “micro-plans”. Both these models can easily include community knowledge of local hazard exposure, vulnerability and risk⁸ until more sophisticated risk models are developed.

The City Development Plan (CDP) also offers a starting point to converge a number of policy ambitions on urban resilience and sustainability and enable ULBs to access several incentives and plan funding that the national government currently offers on low carbon growth, urban renewal and disaster management. It is important therefore that the ULBs are supported in utilising the CDP in the best possible way – as a portal to describe their capacity and approach to mainstream Comprehensive Disaster Risk Management within future growth and investment. This will also be a useful tool to raise financing from public and private sources.

⁸ Multi-lateral agencies such as World Bank and ADB are providing technical supports to ULBs in Bihar for the development of “community microplans”.

References

- Ahluwalia, I.J. 2019. "Urban Governance in India." *Journal of Urban Affairs* 41(1), 83-102.
- BMTPC. 2019 "Vulnerability Atlas of India." *Building Materials and Technology Promotion Council, Government of India*. Available at <https://bmtpc.org/DataFiles/CMS/file/VAI2019/Index.html> (last accessed 22 August 2020).
- Government of India. 2008. "Planning Commission Eleventh Five Year Plan." *Government of India*. Available at <https://niti.gov.in/planningcommission.gov.in/docs/plans/planrel/fiveyr/welcome.html> (last accessed 16 September 2020).
- Gupta, A.K., N. Mani, B.B. Sarkar, S. Singh and S. Katyal. 2019. *Developing Disaster Risk Resilient Cities*. Gorakhpur, UP: Gorakhpur Environmental Action Group (GEAG) and New Delhi: National Institute of Disaster Management, Government of India.
- HUDCO. 2014. *HUDCO's Techno-Financial Assistance for Rehabilitation/Reconstruction Programme for Areas Affected by Natural Disasters and Calamities*. New Delhi: Housing and Urban Development Corporation, Government of India.
- Khosla, R. and A. Bhardwaj. 2019. 'Urbanization in the Time of Climate Change: Examining the Response of Indian Cities.' *Wiley Interdisciplinary Reviews: Climate Change* 10(1), 560.
- Maskrey, A. 2011. "Revisiting Community-Based Disaster Risk Management." *Environmental Hazards* 10(1), 42-52.
- National Disaster Management Authority. 2019. *National Disaster Management Plan*. New Delhi: Government of India.
- Sarbeswar, P., H.H. Jung and S. Hawken. 2018 "Urban Innovation through Policy Integration: Critical Perspectives from 100 Smart Cities Mission in India City." *Culture and Society* 12, 35-43.
- World Bank. 2010. *Bihar Kosi Floods 2008 Needs Assessment Report*. Washington DC: Global Facility for Disaster Recovery and Reduction (GFDRR), World Bank.

Ripin Kalra (kalrar@wmin.ac.uk) is a practitioner-academic working as Senior Fellow at the School of Architecture and Cities, University of Westminster. He qualified in Architecture, sustainable planning, risk reduction and financial management in India and UK. He has worked on sustainable urban planning and infrastructure, climate mitigation, resilience and risk reduction projects in 30+ countries in senior and leadership positions in global engineering and integrated-planning firms. He co-authored the *National Climate Resilience Investment Plan for Belize* (2013-2014), co-led projects in Kenya and India on *Tackling climate change with affordable green housing* (2011-2012), led the *Disaster proofing Indian Smart Cities* (2016-2018) and advised on the *Nepal Urban Resilience Project* (2020-ongoing) as well as conceptualising integrated models for zero carbon zero waste new towns in the Middle East, India, Southeast Asia, Nigeria, Ghana and China. He is a Fellow of the UK HEA Higher Education Academy and Trustee of the Commonwealth Human Ecology Council and Commonwealth Housing Trust. He leads post-graduate teaching on "Urban Risk and Resilience" and "Environmental assessment policy and climate change" at the University of Westminster, London.