

Working Paper: 2

**Inclusive Urban Policy
for the Future:
Water & Climate Resilience**

March 2023

INTRODUCTION

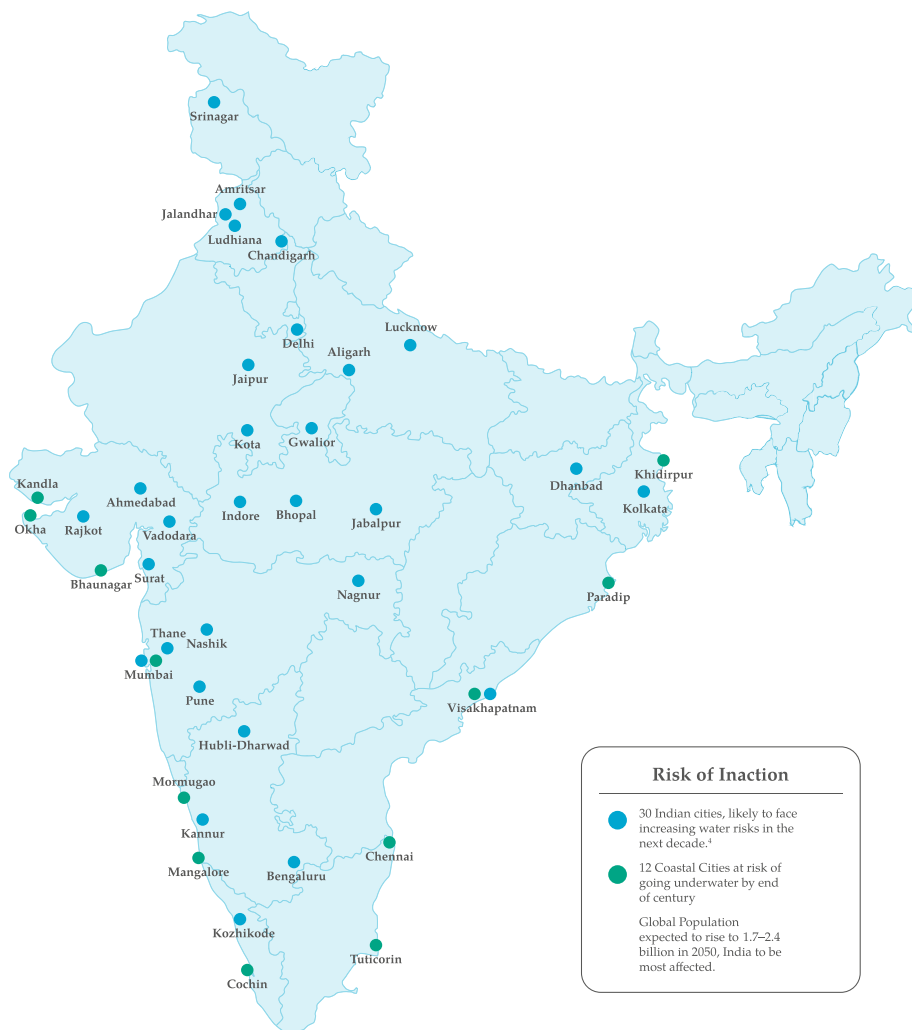
Water is and must be at the centre of climate action. It is well-established that the climate emergency in essence is a water problem. India is rapidly urbanising, however impending water stress, climatic changes and haphazard development are potential brakes for economic growth. Water security is affected by a multitude of factors including depleting freshwater resources; equitable access to the resource; management and water supply; good quality of water for drinking, domestic and other livelihood purposes; sanitation and hygiene; access to information and data; full and meaningful participation in decision-making of water governance; accountability and transparency of urban local bodies. Climate change, a crisis multiplier, is exacerbating water stress and security. There is an increase in water hazards such as flash flooding, droughts, glacier melt, coastal flooding, cyclones and storms, saltwater intrusion and rise in sea level. The resultant impacts are reduced access to clean and usable water, amongst others.

There is enough evidence to show that climate change and global warming have a significant impact on hydrological systems. Globally, the percentage of people living in water scarce areas is expected to increase from 17% in 2020 to 51% in 2050. The Global Climate Risk Index 2021 places India as the seventh most vulnerable nation to weather-related disasters caused by climate change (storms, floods, heatwaves etc.).¹

Water is at the heart of India's growth dreams and potential. In this policy report we look at overarching issues and gaps of urban water management that are compounded by climate change, haphazard growth and mismanagement, to understand where the opportunities may lie as we plan ahead. Too often we forget the interconnected nature of these issues and while we solve for one, the resultant impact in other areas are overlooked. Through this brief we attempt to throw a wide macro lens to understand how various issues and areas of life and governance are connected to questions of water and climate, so that solutions may also be cross-cutting and integrated. This brief is for everyone, just as our water problems affect all, we believe that ideas and answers can, and should, come from a myriad of disciplines.

Risk of inaction

- By 2030, India's water consumption is expected to double – leading to a 6% drop in GDP.²
- India's industrial water use is equal to 13% of total freshwater extraction.
- Water needed for industry and energy is projected to grow by 4.2% per year, from 67 BCM in 1999 to 228 BCM in 2025.³
- 11 out of the 15 major river basins in India will experience water stress by 2025.



Sources: WWF Global Cities at Water Risk Report 2020; Niti Aayog Water Composite Water Index Report 2018 and CPCB Report; Industrial Water Supply- Incentives for Conservation; IPCC Report 2021; Central Water Commission 2021.

WATER AND CLIMATE CHANGE RISKS IN INDIA AT A GLANCE

Population

India, the fastest growing economy, is the second largest urban community⁵ in the world and has experienced about 2.3%⁶ yearly increase in the population since 2017. The increasing population and urbanisation add to the pressure on limited freshwater resources - rivers, lakes, catchments, and groundwater being depleted and/or rendered undrinkable.

Inadequate water management infrastructure, and ground water depletion

Indian cities are either now experiencing water shortages or are unable to meet the rising demand for this essential public resource due to inadequate water management infrastructure. As a result, there is a high dependence on groundwater, which is used by half of India's urban population.⁷ Groundwater is increasingly threatened by pollution and overuse. There is greater reliance on privately pumped groundwater, exacerbating inequalities and deteriorating the resource.

Changing weather

India is experiencing and will continue to experience the repercussions of climate change in shifting precipitation patterns, longer periods of drought, temperature increase, sea level rise, more frequent tropical cyclones, and glacial melt.⁸ Climate change has long-term impacts on the delivery of essential water services, and it is imperative for municipal bodies to urgently prioritise resilience planning.

Climate related migration

The increase in the frequency and severity of disasters has resulted in an upsurge in internal migration and displacement, with more people heading to cities in search of work. From 2008 to 2021, natural events and related disasters including floods and storms have displaced roughly 53 million people within India.⁹

Water-health and overall productivity

Access to reliable water resources is key for employment, productivity, quality of life, health, and well-being, which will ultimately interfere with economic growth. The possibility of negative consequences on the economy can be greatly reduced if climate change risks and adaptation strategies, particularly those involving water, are incorporated into plans for urban growth and development.

PATHWAYS FOR INCLUSIVE URBAN WATER POLICY FOR A CLIMATE SECURE FUTURE



GENDER LENS IN WATER ACTIONS

Gender has a key role to play in water resource management as women are primary stakeholders and water resource managers (as gender roles prescribe) at the household level. Existing social and gender norms continue to reinforce women's unequal role in water management. Due to the unequal distribution of water in urban areas, women in low-income households often spend two to five hours per day collecting water, as is the case in Delhi.¹⁰ Lack of access to clean, safe drinking water for all, access to clean and safe sanitation, access to gender-sensitive and secure relief camps and shelter homes during disaster and relocation, compound and exacerbate women's pre-existing vulnerabilities. Water stress not only affects women's well-being but also deprives them of spending time on income generating opportunities and better quality of life. Studies including by the International Monetary Fund, state that equal participation of women in the workforce could boost India's GDP by 27%.¹¹ Incorporating a gender perspective into urban and climate policy is a positive step toward realising the goals of substantive justice, which call for the elimination of structural inequalities in society.

Action points:

- Including women's voices in the climate discourse and decision-making process, in all aspects of policy including managing floods; improved disaster risk reduction; conservation of natural water ecosystems; and water management and reducing scarcity.
- Collating gender-disaggregated data in urban areas to assess the differential impacts on women and girls.
- Climate and urban policies relating to water must make a shift from considering women as 'victims' to giving them the agency to be drivers of change. Amongst the city climate action plans for example, Mumbai's Climate Action Plan (MCAP) is most gender-aware and has some preliminary gender-based mapping and vulnerability assessments in several sectors, including water. However, the participation and leadership of women in climate action is not yet fully recognized.¹²

RECYCLING AND REUSE OF WASTEWATER

Reuse and recycling of water resources is critical given the decrease in freshwater availability and increase in cost of supplying water, which is usually from a distant source in most Indian cities. In the Union Budget for 2021-22, the Jal Jeevan Mission (Urban) promotes a circular economy and mandates that 20% of water demand be met by reused water.¹³ Within recycling, a critical aspect is separating grey water (wastewater from bathing, washing dishes, laundry, etc) and black water (wastewater from toilets) at the source, as grey water (70-80%) is easier to recycle. It is feasible to use treated sewage water for a variety of purposes, including agriculture, irrigation, road and vehicle washing, firefighting, industrial cooling, flushing toilets, and gardening. The treated sewage/wastewater can lessen pressure on surface and underground water supplies and help conserve raw water. However, according to the Central Pollution Control Board (CPCB) annual report, only 28% of the country's sewage gets treated, despite 44% installed capacity¹⁴ of Sewage Treatment Plants (STPs) and sewage systems under AMRUT and other government schemes.

Action points:

- Proper flow in sewage systems requires adequate water supply. For example, Jaipur's 90 lpcd of sewage water (mpl) is insufficient to service the city's 442 ml/day of sewer infrastructure which results in poor operational capacity of STPs and the frequent clogs of sewer systems.¹⁵ Similarly, Indore, has 80% of its sewers blocked or underutilised and more than 20% of untreated sewage waste is put back into the city's water supply.¹⁶
- Greater funds for the operation and maintenance (O&M) of the sewerage system and STPs.
- De-centralised models such as setting up of STPs in wards, residential complexes, townships, and commercial buildings. The current, centralised models of STPs are both economically and ecologically unsustainable with non-segregation of grey and black water, amongst other issues. Many are also energy intensive. Under the National Water Policy 2012, the guidelines issued by Housing and Urban Affairs, Central Public Health and Environmental Engineering Organisation's (CPHEEO) manuals etc. emphasise decentralised recycling and reusing treated water.
- Home-grown and ingenious technologies for having a decentralised community and household-level system for recharging, harvesting, and recycling will ensure lesser expenditure for urban bodies and higher water security. For example, the Council of Science and Industrial Research in Bhubaneswar¹⁷ uses burnt red clay to purify and make potable raw water.

INFRASTRUCTURE TO ENSURE EQUAL AND FAIR DISTRIBUTION

Studies show that poor planning and management of water resources will cost Indian cities between USD 2.6 billion and USD 13 billion every year.¹⁸ Cities such as Delhi, Bengaluru, Chennai, and Coimbatore amongst others continue to face severe water shortages and loss due to lack of operation and maintenance (leakages and broken pipes), theft, illegal connections, and poor revenue mobilisation techniques.¹⁹ Non-Revenue Water (NRW) ranges from 20-5%. Around 31%²⁰ urban households, primarily in unauthorised colonies and slums, do not have access to piped water. In Mumbai, 40%²¹ of the population live in lower-income neighbourhoods and rely heavily on unofficial water delivery systems such as through tankers. Absence of piped water supply and public supply infrastructure results in inequitable water distribution. The 2020-21 Union Budget has proposed to bridge the estimated gap of 2.68 crore households without potable tap water under the Jal Jeevan Mission (Urban) by 2024.²² While it is an important mission, and over 60% of the target infrastructure has been achieved, the question remains as to where the water will come from? Climate change is predicted to exacerbate the difficulties already faced by the urban water systems in meeting the rising demand.

Action Points:

- Mapping of existing and alternative water resources.
- India's urban water management system is in urgent need to update and replace the existing inefficient water distribution infrastructure ²³Adoption of simple technology solutions such as smart metering and IoT sensors to alert users of water levels, quality, theft, and leakage in India's households, communities, and new housing complexes in cities will be a game changer.
- The Central Water Commission reports that among the 91 largest reservoirs they monitor, storage levels have never been higher than half their maximum capacity.²⁴ To counter this there is a need to invest in more modern infrastructure for storing water and integrate that with greater re-use and circularity in planning.
- Equal and continuous distribution of water supply is important for ensuring water security of the city. The CPHEEO Drink from Tap guidelines provides for a decentralised planning system for 24x7 water supply and highlights NRW computation as a key factor.²⁵ An effective metering needs to be part of the system to counter leaks and theft.

MAINSTREAMING CLIMATE ADAPTATION AND RESILIENCE

Climate change makes cities and towns vulnerable to unpredictable weather patterns, which in turn affects water availability and management in addition to the risks from climate related disasters. To address this a small number of municipalities in India have developed city climate action plans (Mumbai, Chennai) and resilience plans (Tiruchirappalli, Tirunelveli, Coimbatore, Vadodara, Ahmedabad, Rajkot, Siliguri, and Udaipur) to integrate climate considerations into urban development. The cities of Bangalore, Delhi, Ahmedabad, Kolkata amongst others are also in the process of drafting similar blueprints. An early evaluation of these plans reveals a limited comprehension of water as a 'service' versus water as a 'resource' and its interaction with climate change and implication on economic and human security. Much work remains to be done to assess the climate contexts of cities and provide pathways to mitigate, adapt and build resilience.

Action Points:

- In depth study of future urban development through the prism of climate change.
- How we perceive climate risks needs to evolve. The complexity of interconnected risks is not sufficiently considered in planning, which may result in maladaptation and unintended consequences. The current dominant approach isolates risk drivers and their outcomes and uses linear reasoning to build forecasts. For example, Mumbai's Climate Action Plan, addresses the risks of sea-level rise in the city, but does not have its own coastal data to establish a dynamic and cascading risk and impact. Without adequate data that is both integrated and focused, planning is likely to result in maladaptation.
- Address socio-political and socio-economic factors of climate change by mapping and risk analysis, as well as vulnerability assessments of people. Municipal governments can adopt feasible tech solutions such as early warning systems to reduce risk and prevent damages within pre-monsoon plans. IMD data can be utilised to better manage these systems. For example, women in Ahmedabad²⁶ are using a simple alarm to warn themselves of imminent heavy rainfall, allowing them to transfer their belongings and mitigate loss and damage due to flash flooding.
- Water, as a cross-cutting sector, can serve as a model for the transformation of urban governance into climate-resilient cities. An inclusive urban water management can not only improve a city's resilience, but also foster growth and enable intersectoral approaches in other urban governance agendas, such as mobility, energy, health, and housing, to mainstream climate adaptation. There are multiple benefits, from reducing carbon emissions to economic development and human security.

ECOSYSTEM AND COMMUNITY CENTRED APPROACHES ---

Human settlements have historically occurred near sources of water, where protection of these water bodies becomes an important aspect of city planning and human habitation. An integrated water management system encourages the preservation and restoration of natural ecosystems and corridors within its jurisdiction and in the catchments, as well as the drainage of treated wastewater, and supporting the needs of communities that facilitate these goals in a symbiotic manner. However, water mismanagement is prevalent in urban areas due to the lack of understanding of the hydrology, geomorphology, and ecology of a city, lack of funds and often apathy. Several cities that receive abundant rainfall have poor harvesting means or do not include concepts of circularity in their planning and management. Indore, for example currently pipes water from the Narmada, though it has the potential to be self-sufficient with better rainwater harvesting. Additionally, the sewage treatment plants are often located at a lower gradient, making the treatment and re-use of water energy inefficient and expensive. The failure to adequately understand hydrology has resulted in water shortages and stress, even in cities like Bangalore and Chennai, which have traditionally had an abundance of water.

Action Points:

- The Constitution of India grants Urban Local Bodies autonomy over all 18 essential services (listed in the Twelfth Schedule) that entail urban planning and governance. For a holistic approach to integrated water management, it is crucial that the following municipal functions work in coherence:
 1. Water supply for domestic, industrial and commercial purposes
 2. Public health, sanitation conservancy and solid waste management
 3. Urban forestry, protection of the environment and promotion of ecological aspects
- Cities need to enable natural ecosystems such as wetlands, peatlands, mangroves, lakes and rivers to recover and rejuvenate. We need a strategy for urban biodiversity to revitalise, naturalise, and establish blue-green corridors, to affect the microclimate and improve air quality and water security.
- Implement existing water conservation, urban forestry and urban rainwater harvesting methods for usage and recharge of aquifers with a focus on water-use efficiency.

- Communities play a significant role when it comes to understanding management issues and activities related to urban water. For the purpose of preventing, anticipating, and preparing for future disasters, it is crucial to:
 1. Involve the wider public in ideating, decision-making and implementation to share lived experiences and lessons learnt.
 2. Water insecurity is compounded for those excluded by lack of access to information and public participation in decision-making processes.
 3. Women, being key stakeholders and water managers, need to be an equal part of the conversation to make the process more effective.
 4. Multistakeholder approach through an effective working relationship between the municipal government and organisations in the private and non-private sector.
 5. It is crucial to have the full and meaningful engagement of a wide range of stakeholders in the monitoring and review of policies.

FINANCING CITIES FOR THE FUTURE

To allow cities to build and implement urban plans in the context of climate realities, the municipal governments/Urban Local Bodies (ULBs) need to be financially empowered with sources of self-generated revenues and transfers for strengthening the governance structures.²⁷ Urban governance in India is “crippled financially”, with cities only generating about 2/5th of their revenue, making them highly reliant on the Union and State governments.²⁸ Tax revenue, non-tax revenues, devolution of funds from the state government, grants from the union and state government for development initiatives, and borrowings are the sources of municipal revenue. The devolution of funds and power in this area has been limited despite the fact that state governments have a responsibility²⁹ to devolve funds and provide sources of revenue for municipalities. In essence, this dilutes the objective of the 74th Constitutional amendment to democratically decentralise and create greater accountability between citizens and state by institutionalising local self-governance.

Examples from Union budgets and policies illustrate the financial disparities in water resource management for municipalities and municipal corporations, leading to inadequate implementation. A total outlay of INR 1,41,678 crores was announced for Swachh Bharat Mission (Urban) 2.0 in the union budget 2021-22³⁰ for the next 5 years which includes newly added component of wastewater treatment, including fecal sludge management in all ULBs with less than 1 lakh population. On the other hand, the total outlay proposed for Jal Jeevan Mission (Urban) in the 2021-22 union budget is INR 2,87,000 crore which includes INR 10,000 crore for continuing financial support to AMRUT Mission responsible for providing water supply and

sewerage in urban areas. However, the central funding for cities with a million plus population is only 25% of the project. The AMRUT Mission largely allocates funding on a project-by-project basis³¹ for capital infrastructure; wherein ULBs are responsible for the ongoing costs of operation and maintenance. For large rapidly growing cities that are not financially secure, this is proving to be a hurdle. For example, while there are sufficient STPs in Indore to recycle the city's wastewater, the city is unable to maintain centralised systems due to lack of adequate revenue.³² The city administration considered implementing water taxes, but ultimately decided against it.

The Jal Jeevan Mission (Urban) while promoting Public Private Partnership (PPP)³³ has laid the responsibility with ULBs with million plus populations to take up PPP projects worth minimum of 10% of their total project fund allocation. The mandating of this responsibility on the ULBs without ensuring existing institutional accountability, infrastructural systems and data in place makes it difficult for both private players to invest and bear the burden of delivering urban services and for ULBs to find adequate funding for enabling their water governance. For successful PPP models³⁴, institutional capacities of the ULBs and the state, as well as bridging of gaps between public and private partners on information and understanding, are pre-requisites.

A new analysis from the Reserve Bank of India (RBI)³⁵ reveals that less than half of the 18 responsibilities of local governments generate revenue in some way. The report emphasises the critical need for municipalities to explore alternative sources of revenue such as bond financing and blended financing. The Indore, Lucknow and Ghaziabad municipal corporations have raised INR 490 crore via municipal bonds and green bonds on a private placement basis using the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE) bond platforms. However, the past two decades shows that only large ULBs with technical competencies are eligible for bond issuance however, the smaller ULBs though pool financing under a common bond by sharing resources of several local bodies can access capital market. Allowing for these options has the potential to revolutionise ULB's fiscal arm and improve urban governance.

CONCLUSION

Unequal production and consumption patterns, rapid urbanisation and industrial growth are direct and indirect drivers of water scarcity and stress. Access to clean water is a basic human right including the right to a dignified life and right to livelihood. Allowing nature to exist, thrive, and evolve, is essential to India's pursuit of urban growth if the country is to achieve comprehensive human development in harmony with nature. The Government's new LiFE Mission – Lifestyle for the Environment – emphasises these aspects and rightly places onus on citizens, cities and governance systems alike.

Climate change, biodiversity loss, and pollution all threaten to overwhelm our ecosystems to the point of collapse. Because of the obvious relationship between water and these problems, addressing water issues is crucial. We need to move away from the mindset of considering water as an infinite good or service. What we do with water impacts the climate and biodiversity, both positively and negatively. Water ecosystems and their biodiversity can be restored with the support of more responsible water usage and conservation practices.

As potential future water and climate policy leaders, cities are in a prime position to govern in a way that conserves, secures and values water resources. A comprehensive water conservation strategy to support blue-green corridors and catchment areas along with modernised water distribution infrastructure, enhanced technical skill development, and efficient management need to be integrated into urban water policy. These need to be supplemented with technology, both at a large scale and at the household and community level to support and improve water security, from smart home meters and solar powered water purification systems to decentralised sewage treatment plants, to using AI and satellite imagery to predict and forecast for better risk management.

Tier 2 cities in India are among the world's fastest growing and are therefore ideal candidates to serve as models for climate-resilient cities of the future. Water must be integrated into all elements of urban planning and development, with consideration given to the specific circumstances of each city. Long term-water security is the only way to achieve lasting economic and human security and is possible when broken down to the aspects and sectors outlined above. They are by no means comprehensive or conclusive but are prompts to bring a wider lens to the discussion and allow for more diverse voices to be a part of the solutions. Kubernein Initiative will continue to work with a wide range of actors to achieve these goals. The task is daunting but achievable. The question is if we want to.

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ABOUT KUBERNEIN INITIATIVE

Kubernein Initiative is an independent, female led, geopolitical advisory firm based in Mumbai (India) working to mainstream issues that need greater intellectual capacity and focus. Our vision is to build an organisation that considers critical questions with a perspective that balances traditionally 'western' thought in the field of international relations and diplomacy with new and emerging ideas from the global south. Kubernein Initiative is co-founded by Ambika Vishwanath and Priyanka Bhide, who bring their combined skills of research, analysis and strategic communications to successfully execute projects relating to security, governance, sustainability and development.

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