

POLICY BRIEF

# The Lake City of Bhopal

*January 2025*

Bhopal, with a population of 1.8 million[1] people, is popularly referred to as the 'city of lakes' owing to the vast number of water bodies within the city. There are several water bodies that surround the city as well. Among these, the Upper Lake and the Kolar Reservoir are the main sources of drinking water for the city. Despite its richness in water resources, there are grave concerns regarding their sustainability. The Water4Change project applied a multi-disciplinary lens to analyse the complex challenges facing the urban water system in the city, providing an integrated systems approach in developing interrelated technological, institutional, and financial solutions for sustainable urban water management. The findings of the analysis and the recommendations to address these are provided in the sections below.

## Main findings

The findings capture the key bottlenecks identified in the analysis.

- **Limited public awareness -** There is limited public awareness about the city's pressing water issues. Currently, citizens perceive there to be sufficient water, which negatively affects their willingness to take an active role in improving water governance.
- **Diminishing quality of water -** Rapid urbanisation and operational challenges of the lake catchment areas have led to increased turbidity, faecal coliform contamination, and chemical pollution. Additionally, persistent organic pollutants (from the decommissioned Union Carbide factory) are contaminating the aquifer. These issues have caused the water quality to exceed the WHO safety guidelines[2].
- **Increasing water stress -** Despite housing 18 significant water reservoirs, there are water scarcity concerns in some parts of the city. The Upper Lake alone, which supplies about 25% of the city's water, is severely impacted by urban water use demands[3]. Bhopal is sourcing water from distant locations such as the Kolar Dam, Kerwa Dam, and the Narmada River, putting significant pressure on the city's logistical capacities. In the long term, relying on distant water sources may not be a sustainable solution to meet the city's water demands.[4]
- **Complex institutional arrangement -** In an effort to decentralise, the responsibility for water governance in Bhopal was officially transferred from the state's Public Health Engineering Department (PHED) to the Bhopal Municipal Corporation (BMC). However, the continued operation of BMC staff under the PHED's directive, deviates from the city's vision for decentralised and autonomous governance.[5] This misalignment has created challenges in establishing a clear accountability framework, potentially hindering the effectiveness of water governance.
- **Data available in fragments -** In Bhopal, multiple authorities collect water-related data, each operating within their specific mandate. However, this information is often not updated regularly and remains fragmented, lacking a unified format for comprehensive analysis. Additionally, limited data is publicly accessible, narrowing opportunities for citizen awareness and engagement in local remediation efforts.

# Recommendations

The recommendations are essentially developed for the consideration of urban local bodies - the executive (Commissioner) and political (Mayor) leadership in the city.

## 1. Build citizen awareness

**Strengthen citizen awareness -** To stimulate citizen engagement and participation in water governance, it is necessary to improve their understanding of the risks and challenges facing the water bodies, as well as their role in mitigating or preventing further damage. This can be achieved through advertisements, news articles, radio or television programmes, and social media engagement. Disseminating knowledge on simple, practical, and achievable actions for individuals and communities in water management can enhance meaningful citizen engagement. Additionally, making usable data accessible, along with creating platforms for discussions and knowledge exchange, will foster engagement between citizens, duty bearers, service providers and other key stakeholders.

**Mobilise mechanisms for positive behaviour change -** An integrated approach comprising regulatory measures along with motivational mechanisms should be implemented to encourage citizens to adopt pro-environment behaviours and attitudes. Regulatory measures can include 'metering' of water usage which can make citizens aware of their consumption pattern. On the other hand, rewards and incentives, such as recognising pro-environment behaviour, showcasing best practices, or awarding such initiatives can be instituted. Another way to encourage positive behaviour can also be to capitalise on the city's identity associated with lakes and water bodies. Celebrating the city's water bodies will help citizens better connect with these resources and lead them towards making well-informed choices that will ensure the sustainability of water resources.

**Adapt knowledge to context -** As per priority, relevant knowledge should be adapted and customised for ease of understanding by different communities, enabling them to exercise their rights as citizens and hold duty bearers accountable. This can include translating jargon into accessible language, linking domain knowledge to familiar concepts, and highlighting context-specific challenges and solutions. Increasing visibility, using familiar terminology, advertising, and social media engagement are various ways to target and widely disseminate such content. This can be a joint effort by BMC or a People's Committee (refer to point 3 below). Local NGOs can also play an important role in disseminating knowledge to citizens and facilitating trust building between government actors and marginalised citizens. Educational institutions should mandate awareness programmes and include knowledge dissemination in their curriculum related to water challenges, the impact of individual actions on the water environment, and ways to transform practices.

Proposed actions to strengthen citizen awareness and engagement:

- The Municipal Corporation to facilitate formation of ward- or neighbourhood-level platforms (such as Resident Welfare Associations) and/or make them functional, to hold regular meetings to share with and engage citizens on the status of water in the city, and co-design ways to promote adoption of water sensitive behaviour and practices in the city.
- The Municipal Corporation to partner with civil society organisations to engage and mobilise citizens for the above.

## 2. Protect catchment areas

**Manage catchment areas around water bodies -** Residential and other urban development activities in the Upper Lake catchment area should be limited by increasing policing and imposing penalties. The lake boundary and catchment area should be clearly demarcated with signage to make it easier for builders and developers to be aware of their geographical limitations. The severity of the penalties and the extent of policing could be discussed first with a mixed group of stakeholders, consisting of members from the municipality, NGOs, elected representatives and other citizens, to ensure that the mandates are followed throughout the city without bias. There should be provisions for restrictions and penalties on activities that disturb the ecosystem of the water bodies or areas around the lakes.

Proposed action to protect catchment areas:

- The municipal corporation to convene multi-stakeholder meetings, including representatives from the state government, Bhopal Wetland Authority, Environmental Planning & Coordination Organisation, Civil Society Organisations, and community representatives to share information on lake boundary and catchment areas, the concerned authority to preside over disputes, and the penalties.
- The state government should appoint a third-party body to oversee disputes related to lake boundary and catchment areas (see next point for more details).

## 3. Strengthen local governance structures

**Empower Bhopal Municipal Corporation -** To enhance BMC's effectiveness, its interdisciplinary expertise needs to be strengthened beyond traditional techno-managerial skills. This would involve recruiting specialists in planning, data science, behavioural sciences, ecology, and hydrogeology on longer-term contracts. Establishing a cadre system will provide BMC with greater autonomy and facilitate the appointment of issue-specific stewards to navigate bureaucratic challenges. These stewards would also be responsible for continuously updating BMC's capabilities and approaches to address emerging challenges effectively.

**Establish a third-party mediation group –** To foster open dialogue and collaborative problem-solving amongst various stakeholders, a third-party mediation group - 'People's Committee' - must be created, resolving conflicts and functional overlaps that exist in water management. Functioning as an urban lab, the committee would include government representatives, citizens, NGOs, and third-party experts, and be organised as a Special Purpose Vehicle (SPV) with the specific task of ensuring sensitive water management in the city.

**Create platforms for discussion or encourage discussions within existing platforms –** Robust and secure platforms for continuous citizen engagement must be created for grievance redressal, information dissemination, and to facilitate the co-creation of plans and strategies. This can be achieved by strengthening Mohalla Samitis and implementing similar structures at the ward level, such as Resident Welfare Associations (RWAs). Regular engagement events can be instituted, such as 'Feedback Fridays' on the first Friday of each month, to encourage sustained citizen participation. Furthermore, the possibility of bi-annual exchanges, either in-person or virtually, with other cities undertaking similar initiatives should also be explored to promote a culture of collaboration and shared learning.

**Strengthen feedback channels -** Both online and offline feedback mechanisms should be established—online through a Samagra ID-linked feedback system on the Municipal Corporation's portal, and offline via regular meetings with senior bureaucrats. These channels must prioritise local knowledge and grievances, particularly those from marginalised groups, to ensure their inclusion in decision-making processes.

Proposed action points to strengthen local governance structure:

- The Municipal Corporation to recruit specialists in planning, data science, behavioural sciences, ecology, and hydrogeology on longer-term contracts to adopt a holistic approach to water, beyond infrastructure.
- The Municipal Corporation to use citizen engagement platforms at the ward or neighbourhood level to invite suggestions and feedback on plans.
- The Municipal Corporation to ensure that grievance redressal channels are functional, dedicate resources to make citizens aware of their existence and use, and strengthen these channels in the process.

## 4. Structure data management

**Create a comprehensive water baseline -** To address the problem of a disorganised web of mismatched data, a comprehensive water baseline should be created, including data on water supply and discharge networks, surface and groundwater. This involves collating existing data from various bodies at the national, state, and local levels (such as BMC, Irrigation Department, SMART City Bhopal, MP Pollution Control Board, Central Ground Water Control Board, among others), into a common format, preferably with GIS details for ease of regular updating.

The baseline must include data on water consumption patterns in the city to further contextualise solutions proposed for different areas of the city. Any new data must be collected by credible organisations, following a scientific approach.

**Make water-related data accessible -** To enhance citizen accessibility to water-related data, an online platform must be created. This dashboard will host water-related up to date quantitative data, as well as serve as a repository of qualititative information like water related local cultural practices and best practices of water management. This Bhopal Water Dashboard will ensure that the information will be available in an easy-to-understand format, with pictures and infographics.

**Collect real-time data on groundwater -** There is a critical need for reliable real-time data on groundwater quality and quantity in the public domain. This data is required to assess the spatial and seasonal variations in water levels as well as quality and its impact on the environment and public health. This will help to inform decision-making, for instance, on the optimal mix of Nature-Based Solutions (NBS) and traditional 'grey' water infrastructure.[6]

**Re-distribute data management roles to minimize biases -** To facilitate autonomy in the functioning of the BMC, it is recommended that it acts as the nodal agency to host all water-related data. To maintain fairness in data creation, a 'People's Committee' is recommended to be constituted. This committee may consist of diverse city stakeholders like government representatives, citizens, NGOs, and third-party experts in water and allied fields.

Proposed actions for structured data management:

- Utilising data sets of different departments, the Municipal Corporation to own and lead the consolidation of water-related data to create one comprehensive data set. The Municipal Corporation to timely update data and check and resolve data inconsistencies.
- The Municipal Corporation to make data public and share the same on the multi-stakeholder and citizen platforms as part of awareness building.
- The Municipal Corporation to use the data for annual and longer planning purposes.

## 5. Secure funds

**Explore diverse sources of funds -** Grants from the State Government, initiatives such as the Climate Action Plan, and other complimentary plans should earmark a certain percentage for the above-mentioned initiatives, particularly awareness-building strategies (including awareness material costs and staff salaries). Additionally, funding sources beyond traditional tax revenues should be explored, such as crowdfunding to enhance ownership among stakeholders, municipal funding to underline the seriousness of these initiatives, contributions from related programmes such as Smart City projects, and external grants such as Corporate Social Responsibility funds. These should be channelled to minimise biases.

Proposed action points for securing funds:

- The Municipal Corporation to engage the respective line departments to prepare a realistic budget estimate to ensure sustainable and safe water supply and sanitation services to all, covering capital expenditure as well as costs of software interventions such as planning, community awareness, monitoring of services, necessary human resources, and other related costs.
- The Municipal Corporation to engage citizens to prioritise interventions for the short, medium and longer term.
- The Municipal Corporation to consider blended finance to address the funding gap in providing sustainable and safe water and sanitation services to all.

## Endnotes

**1** Census of India. 2011

**2** **a.** Häberli, A. and Toogood, C. 2009. Analysis of chemical contaminants in groundwater and assessment of the qualitative and quantitative drinking water supply situation in the communities surrounding Union Carbide India Ltd. (UCIL) plant site in Bhopal. Bhopal. Available at: **www.bhopal.org/wp-content/uploads/2016/06/BMA-Sambhavna-Bhopal-Water-Report.pdf**

**b.** Johnson, S. et al. 2009. 'Contamination of soil and water inside and outside the Union Carbide India Limited, Bhopal. Centre for Science and Environment, 1-31.

**c.** Wadwekar, M. and Pandey, R. 2021. 'Assessing Groundwater Recharge Potential Through Rainwater Harvesting in Urban Environment: A Case of Bhopal City', Water Management and Water Governance: Hydrological Modeling, pp. 463–479.

**3** **a.** DTCP Madhya Pradesh. 2020. Bhopal Development Plan-2031 (Draft) Volume-I, Existing conditions, studies & analysis.

**b.** CAG India. 2021. General and social sectors for the year ended 31 March 2019, Government of Madhya Pradesh. Report 3 of the year 2019. Available at: **saiindia.gov.in/ag2/madhya-pradesh/en/audit-report/details/115252**

**4** **a.** Everard, M. et al. 2020. 'Can nature-based solutions contribute to water security in Bhopal?', Science of The Total Environment, 723, p. 138061. **doi:10.1016/J.SCITOTENV.2020.138061**

**b.** Wadwekar, M. and Pandey, R. 2021. 'Assessing Groundwater Recharge Potential Through Rainwater Harvesting in Urban Environment: A Case of Bhopal City', Water Management and Water Governance: Hydrological Modeling, pp. 463–479.

**5** **a.** BMC. 2009. Bhopal City Development Plan 2021. Indore.

**b.** CAG India. 2021. General and social sectors for the year ended 31 March 2019, Government of Madhya Pradesh. Report 3 of the year 2019. Available at: **saiindia.gov.in/ag2/madhya-pradesh/en/audit-report/details/115252**

**c.** KPMG. 2018. Green and blue master plan for Bhopal smart city - Final draft green and blue master plan. Bhopal Smart City Development Corporation Limited, Bhopal. Volume 1- Main Report.

**6** Everard, M. et al. 2020. 'Can nature-based solutions contribute to water security in Bhopal?', Science of The Total Environment, 723, p. 138061. **doi.org/10.1016/j.scitotenv.2020.138061**

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