


Consideration of water policies in the urban development plans of Delhi: A collaborative planning perspective

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Abstract

This paper discusses collaborative planning principles as a means to improve water supply systems in the case of Delhi, India, through primary and secondary data analysis. The theory of collaborative planning is a well-established concept applied to obtain effective policies in planning through the collaboration of actors in a shared space. We use this framework to discuss strengths, weaknesses, and scope for collaboration in the current urban development plan formulation process of the city. Some of the principles of collaborative planning we use include communication, collective decision-making processes, and network power in a shared institutional environment. Our findings indicate a lack of consideration of water policies in the urban development plans. This underlines a major gap in the current process of plan formulation and provides evidence that the absence of collaboration between institutions in both sectors contributes to poor water supply for the population in Delhi. At the same time, it emphasizes the importance of collaborative practices between urban development and water institutions for better planning of water service provision in Indian cities.

KEYWORDS

collaborative planning, Delhi, urban development plans, urban water management, water policies

1 | INTRODUCTION

The global call for water security is encouraging governments to develop water policies that are sustainable and that consider the needs of the population in the long term. In urban areas, an effective way to implement water policies is via collaborative planning between the water and the urban development sector as they provide the opportunity to result in mutual gains, increasing trust, knowledge sharing, and effective coordination between institutions (Ansell & Gash, 2018; Ansell, 2012; Kumar & Paddison, 2000; Pubani, 2017; Znudin et al., 2018).

The concept of collaborative planning is drawn from Healey's work on the role of urban policies and their implementation in development plans during the 1980s (Healey, 1997). Her idea of collaborative planning was driven by four concepts: understanding planning as an interactive process, as a governance activity in a complex and dynamic institutional environment, as a means to

maintain and enhance the qualities of places and territories, and as a moral commitment to social justice (Healey, 2003).

Other conceptual and analytical models have been developed around collaborative planning. One model of successful collaborative planning is by Robert and Ryan (Deyle & Wiedenman, 2014). They designed the theoretical model for long-range transportation plans by the metropolitan planning organizations in the United States based on the Innes and Gruber framework that maintains consensus-based collaborative decision-making (Innes & Gruber, 2005; Innes, 2004). Their analysis offered the appropriate conditions for consensus-based collaborative planning surveyed by members of technical advisory committees for 88 metropolitan planning organizations. The model was utilized to draft long-range transportation plans and provide insights into best practices of collaborative theory by planning organizations (United States Code, 2010).

Another collaborative planning model is by Calderon and Westin (2019). The authors used an inquiry-based

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approach where two contrasting cases were discussed. The first case is the project conducted by the Centre of Environment Education in Ahmedabad, India. The second one was in Bloemfontein, South Africa, under the partnership of the Regional Environmental Education Programme and a greening program supported by the mayor of the city. For their analysis, the authors consider two aspects. First, collaborative factors such as inclusiveness, power balance, and consensus building strengthen planning. Second, negligence toward a collaborative approach creates constraints due to a lack of commitments and weak legal frameworks. The Inquiry-Based Approach, also rooted in the collaborative planning theory, was originally developed by the Swedish International Centre of Education for Sustainable Development (SWEDESD) in partnership with several international organizations (Calderon & Westin, 2019; Westin et al., 2013).

In Ahmedabad, through the implementation of the theory of collaborative planning, the project helped bring together experienced stakeholders to a close understanding of the problems faced by the population living around a polluted lake within the city. Collaboration was achieved through stakeholder mapping, deliberative workshops, and multiple interactions. The participants included representatives of the local government, academia, and NGOs and formed a multistakeholder team. The team members, selected from around 20 organizations, were invited to attend an engagement workshop by the Centre of Environment Education. For this project, six process objectives were taken from the predesigned Inquiry-Based Approach (Swedish International Centre of Education for Sustainable Development SWEDESD, 2014) that were based on the collaborative planning principles of inclusiveness, power balance, and consensus building. (Healey, 1997; Innes & Booher, 2004). These principles of collaborative planning resulted in a positive atmosphere of equal decision-making and trust-building among participants.

In the case of Bloemfontein, the second city considered in this collaborative planning model, decisions were driven by patriarchal norms resulting in the lack of collaborative interventions. In this case, while appointing the participants for the planning process, the city's mayor limited the collaborative approach by establishing a process that replicated government or expert-based planning processes. This rigid structure limited the financial resources and the opportunity for the formation of diverse and multi-stakeholder teams. The traditional top-down approach resulted in the lack of participation of junior and female officials in discussions and decisions that, otherwise, would have challenged the hierarchical processes of interaction. The Ahmedabad and the Bloemfontein cases highlight the importance of political support to reinforce communication, commitment, and officials' participation as part of collaborative planning processes.

As discussed in the previous models, in collaborative practice in planning, collaboration is inclusive, informed, and relies on authentic dialogue with outcomes that are durable in nature (Innes & Booher, 2010). Incorporating

accountability and transparency in a planning process provides a favorable environment for collaboration among the different stakeholders. During this process, rules are expected to be clear and stakeholders are expected to be well represented. After alternative planning policies are designed, it becomes mandatory to monitor their implementation. This is possible only when implementation action plans are well-defined and the responsibilities of all actors in the process of collaboration are clear (Day & Gunton, 2003).

Collaborative processes are affected by factors such as value differences between stakeholders, institutional culture resistance, lack of flexibility in agency procedures, power imbalance, and lack of motivation to mention only some of them. To overcome these challenges, leadership and dialogue are essential, timelines to achieve several goals should be agreed upon, and expectations should be managed (Frame et al., 2004).

Collaborative planning has also gained importance because it promotes network power or the power, or influence, of some social actors over others via involvement and coordination within their networks. The concept has manifested from collaboration among participants with significant roles and societal powers and those who are assumed to be powerless (Booher & Innes, 2002). Network power can be developed through communication and collaboration for the benefit of the participants who are a part of common networks that share similar tasks. The three governing conditions for the relationship among the participants in a network power (diversity, interdependence, and dialog) contribute to incorporating diverse views to achieve common goals (Booher & Innes, 2002; Innes & Booher, 1999; Kotter, 1985; Wright, 2017).

In this paper, we discuss collaborative planning in the context of spatial planning and the water policies implemented through the master plan of a city, using Delhi as a case study. We argue that the consideration of water policies in urban development plans through the principles of collaborative planning has the distinct potential to contribute to better water supply services for the growing population irrespective of their socioeconomic status.

The structure of the paper is as follows. After setting the framework of collaborative planning in the first section, Section 2 presents the methodology for the paper. Section 3 covers the background of Delhi and its existing water supply system. This section provides the context of the study by discussing urban planning processes and the role of development plans in India by critically reviewing the three existing versions of the Master Plan of Delhi (MPD) and their consideration of water supply policies along with the preparatory reports drafted before the Plan. Section 4 presents results compiling the responses from urban planners and water officials about the process adopted during the preparation of the MPD and how, and if, water policies were considered in the process. The procedural and institutional frictions faced during the preparation of the Plan among the water stakeholders are also discussed. In Section 5, we present the discussion based on the primary and secondary

findings, and in the last section, we conclude and give recommendations on how collaborative planning can be used to prepare the master plan for Delhi in a shared space between the development authority, Delhi Development Authority (DDA), and the water authority, Delhi Jal Board (DJB).

2 | METHODOLOGY

This paper investigates the consideration of water policies in the urban development plans of Delhi, which, we argue, can be achieved through collaboration among the urban and water sectors. Our methodology includes a detailed literature review of policy, gray and academic documents, including the three versions of the Master Plan of Delhi (1962, 2001, and 2021), and in-depth interviews with officials where we exhibit the insight of urban planners and water officials about the consideration of water policies during the master planning process.

Review of the three versions of the Master Plan of Delhi (1962, 2001, and 2021) specific to water supply policies. We critically examined the chapters specific to the water supply covered in the section “Public Utilities and Services” in MPD 1962 (Government of India, 1962: 32), and “Physical Infrastructure” in MPD 2001 (Government of India, 1962: 42) and MPD 2021 (Government of India, 1962: 227). The three versions of the Plan are publicly available on the official website of the Delhi Development Authority, Government of India.

For both the 1962 and 2001 MPDs, there were preparatory reports known as *work-studies*. This was not the case for the 2021 MPD. We reviewed the section on water utilities and services (Delhi Development Authority, 1962: 265) and physical infrastructure (Delhi Development Authority, 1990: 29-30) in the work-studies to understand if, and how, existing water policies at the state and/or national levels were considered for urban development purposes. This provided us with significant insights to question the current lack of integration of planning strategies and water policies. This further supported our arguments on the importance of collaboration among the key stakeholders involved in the planning process of Delhi.

It is important to note that these work-studies are not publicly available online. Instead, we accessed them at the library of the School of Planning and Architecture, New Delhi, available only for research purposes.

In-depth individual interviews with key informants from the urban development and water sectors to document their views on the consideration of water policies during the master planning process were conducted. These views are based on unstructured interviews with 10 key officials. Interviews were conducted in person between November 2021 and February 2022 and lasted approximately 45–90 min. The interviewees gave their consent, and their names were anonymized. Information was collected as hand notes, audio recordings, and transcripts were prepared.

The interviews informed our study in different ways:

1. First, we used the views of the most experienced interviewees who had contributed to the preparation of the three versions of the Master Plan of Delhi (1962, 2001, and 2021, and the preparation of the draft MPD for 2041) in our overall analyses. Their backgrounds were urban planners and water officials with background as water engineer, head of water resources institution, water project consultant, and think tank water policy expert. These experts led or participated in the plan preparation meetings with other government departments where decisions on the development of the city were taken. For example, decisions on the allocation of different land uses, area allocation for public spaces, development of roads and flyovers, and so on, at every level of the Plan preparation process. The Plan preparation process follows the subsequent hierarchy from top to bottom; this is, from MPD as the higher order plan (single Plan for the city), followed by lower order plans based on various zones or sectors such as zonal or sector development plans.
2. Second, the responses from the interviewees who did not provide inputs specific to water policies and urban planning were used in a limited way. These were expert planners from Bangalore Development Authority, Mumbai Metropolitan Region Development Authority, water scientists from the Indian Institute of Technology, National Institute of Technology, and water policy advocates from the National Institute for Transforming India (NITI Aayog), Government of India.

We divided the views of the five resource persons whose insights were directly referred to our study into two groups:

1. Group 1. It included: (1) A senior official from the Delhi Development Authority (DDA), who led the team in the preparation of the current Master Plan for Delhi 2021 (MPD) (prepared in 2007); (2) the senior official responsible for the water infrastructure planning in the same plan; and (3) the official from the National Institute of Urban Affairs (NIUA) who was responsible for the section of water infrastructure for the draft MPD 2041 published in 2021.
2. Group 2. It included two senior water officials: (1) The Chief Engineer in Delhi Jal Board (DJB) during the time DDA was preparing the MPD 2021. He is the key person responsible for the proposal of the draft Water Policy for Delhi 2012 and an expert adviser for the water policies in the upcoming MPD 2041. (2) Official from the Heritage Division, part of the Indian National Trust for Art and Cultural Heritage (INTACH). He led the team in the preparation of the draft Water Policy for Delhi 2012, and coordinated the inputs from the water section officers from DJB (Table 1) for the water policy, and also actively participated in the preparation of the MPD 2021.

The interviews focused on the overall experiences and challenges faced during the several stages of preparation of

TABLE 1 Organizations and roles of interviewees.

First group—Urban Planners: DDA, NIUA	Second group—Water officials: DJB, INTACH
UP1: Lead-MPD 2021, DDA	DJB1: Senior officer, Chief Engineer- DJB (MPD2021), Expert adviser DMPD2041, DWPD 2012
UP2: Lead-MPD 2021, Water Infrastructure, DDA	INT1: Lead-DWPD 2012, INTACH, and participant during the preparation of MPD 2021
UP3: Lead-Water Infrastructure, NIUA, DMPD 2041	

Abbreviations: DDA, Delhi Development Authority; DJB: Delhi Jal Board; INTACH, Indian National Trust for Art and Cultural Heritage; NIUA, National Institute of Urban Affairs.

the MPD specifically for water policies, frequency of meetings, types of stakeholders involved, and degree of collaboration among them. In our analyses, we highlight the challenges faced by senior officials to address the complexities derived from institutional arrangements and the embedded lack of collaboration among institutions.

Data and information collected during the interviews were cross-validated and triangulated. Table 2 provides the type of questions asked during the interviews.

Based on the primary and secondary information collected, we discuss the potential of principles and tools of collaborative planning to incorporate water policies in the Master Plan of Delhi. These tools can be in the form of coherent policies and institutional collaboration among key participants such as the DDA, DJB, NIUA, and INTACH, and consensus building and trust to pursue common goals in a shared collaborative platform such as the preparation of the Plan.

3 | CONTEXT SETTING

3.1 | Delhi: Background

In December 1911, the capital of India was relocated to Delhi from Calcutta (now known as Kolkata) in the state of West Bengal, by the British Empire. Once Delhi became the capital, it also became the center of all activities. In 1956, it was made one of the eight union territories of the country (Government of Delhi, 2022). In 1991, under the Constitution's sixty-ninth Amendment Act, Union Territory of Delhi or Delhi was formally declared as the National Capital Territory of Delhi (Government of India, 1991). This Act provided Delhi with a legislative assembly of its own.

Delhi is located in Northern India, with an approximate area of 1486.5 km². According to the latest Census of India 2011, Delhi has a population of 16.78 million, representing 1.39 percent of the country's population with a density of population of 11,320 persons/km² (Government of Delhi, 2021). Population estimates by the United Nations World Population Prospects in 2022 indicate that the city's population is much larger: 30.7 million (United Nations, 2022).

Delhi is the most urbanized among all the states and union territories in India with 97.5 percent of the population living in urban areas (Government of India, 2021a). It comprises 11 districts, 33 tehsils¹ sub-divisions, 376 villages (mostly urban villages), and 272 wards (Government of India, 2021a). The local body handling the civic

administration of Delhi is the Municipal Corporation of Delhi (Government of Delhi, 2011).

The neighboring states to Delhi are Uttar Pradesh on the east and Haryana on the other three sides. Due to urban expansion, its urban area has extended beyond its boundaries to include Faridabad and Gurgaon cities in Haryana, and Ghaziabad and Noida cities in Uttar Pradesh (Figure 1).

3.2 | Water resources management in Delhi

The major sources of water for Delhi are the river Yamuna, river Ganga, and raw water from the states of Haryana and Uttar Pradesh that is delivered through canals and channels. River Yamuna is the most important source. It enters from Haryana, crosses the eastern side of Delhi, and exits through Uttar Pradesh.

The supply of potable water in Delhi is the responsibility of the DJB, a state government agency constituted under the Delhi Jal Board Act of 1988. The DJB develops and implements water policies. It is responsible for the production and distribution of water, sewage collection, treatment, and disposal of wastewater in both formal and informal areas. It is also responsible for the supply of potable water through tankers on demand.

A baseline report on physical infrastructure was prepared in 2020 before the draft MPD 2041. It mentions that DJB supplies piped water to 1337 unauthorized or regularized colonies, and aims to supply an additional 129 colonies (NIUA-DDA, 2020). In the areas that are not covered under the distribution network system, the supply is provided through tanker services by the DJB. However, the “Ministry of Housing and Urban Affairs does not consider water supplied through tankers, stand posts, or tube wells under the coverage of water supply system as per the Service Level Benchmarks” (NIUA-DDA, 2020: 9).

Water in Delhi from the four sources is treated in 11 water treatment plants from which it is distributed to the command areas. These sources include river Yamuna with 2454 MLD, river Ganga with 1091 MLD, water wells/tube wells with 368 MLD, and 222 MLD as recycled wastewater for nonpotable uses with a total of 4136 MLD. In addition to this, DJB draws water from 2760 Ranney wells from the Yamuna flood plains. According to the DJB Action Plan, in 2018–19, its total water production was 4136 MLD. However, the demand is 5182 MLD, which results in a deficit of 1091 MLD. Per capita consumption per day is estimated at 227 L (NIUA-DDA, 2020).

TABLE 2 Questionnaire design.

Interview questions	Intended analysis
1 Were the meetings between urban planners and water engineers or officers smooth? If no, what were the reasons for disagreements?	Coherence in policy-making and common data usage
2 How were the international and national agendas of water security attempted to be achieved through the MPD? Any reference made to the Sustainable Development Plans or National Water Policies/Schemes/Programs/Notification etc.? What are the important water policies (international, national, state) that have been referred to?	
3 What was the framework adopted for the preparation of water policies for lower-order plans of NCTD? Were any framework, checklist, or suggestions made for the water planning through lower order plans to the master plan/action plans to specific zones or sectors?	Policy Framework for lower order plans to the master plan/action plans to specific zones, sectors
4 How were the other land use regulations linked with the water strategies through the MDP?	
5 Is there any system designed for monitoring the policies on the ground through zonal plans, strategic plans, and action plans? Was there any checklist provided by the MPD for the strategic implementation of water policies?	
6 How many collaborative meetings were held between the water sector and other sectors with overlapping goals such as transportation, environment, or recreation (parks, gardens, and other public places)?	Coordination between stakeholders and transparent budgetary location
7 Any discussion on the inclusion of budgetary policies during the preparation of the plan?	
8 Did all the stakeholders participate and agree upon the final strategies drawn for water resource management through the MPD?	
9 How was the introduction of innovative solutions such as 'Water Sensitive Planning' (MPD 2041) to water security through urban development plans done? For example, how was the concept of Water Sensitive Planning attempted through the MPD? Was there any detailed program discussed?	Policy program for innovation and preparedness for disasters
10 Any flexibility in water provisions for situations like the pandemic was discussed during the preparation of previous Plan or upcoming Plan?	
11 How was the opinion of marginalized communities, people living in unauthorized areas, farmers, or poor populations included during the process?	Political support and public backing
12 Does politics play a role in the decision-making of the plan? If yes, please elaborate.	
13 Does it affect the preparation of the master plan if the policies are general, not up to date, or upheld, and vice versa?	Synchronization between policy and plan documents
14 The notification and frequency of policy documents (water policies and development plans) are dependent or independent of each other?	
15 Explain the stages in the preparation of the Master Plan for Delhi	Potential stages for collaboration
16 Explain the stages in the preparation of the water supply strategies in the Master Plan of Delhi	

The rapid rate of urbanization in Delhi has resulted in high demand for infrastructure development. So far, there are 112 underground reservoirs, each with corresponding command areas. Water from these underground reservoirs is supplied through 572 km of main pipelines and about 8363 km of distribution pipelines (NIUA-DDA, 2020).

With the increasing demand-supply gap, the city faces many challenges such as inequitable water distribution (Government of India, 2007b), nonrevenue water of about 40% (Government of Delhi, 2021), degrading water table due to over-extraction of groundwater (Government of

India, 2016), inefficiency in reuse and recycling of wastewater, severe river water pollution and frequent events of floods and waterlogging.

3.3 | Draft water policy for Delhi, 2016

The first draft of the water policy for Delhi was prepared in 2012 by INTACH following the vision of DJB's CEO. In 2016, the latest draft was disseminated via the DJB website with a few amendments (INTACH, 2016). The overall prime

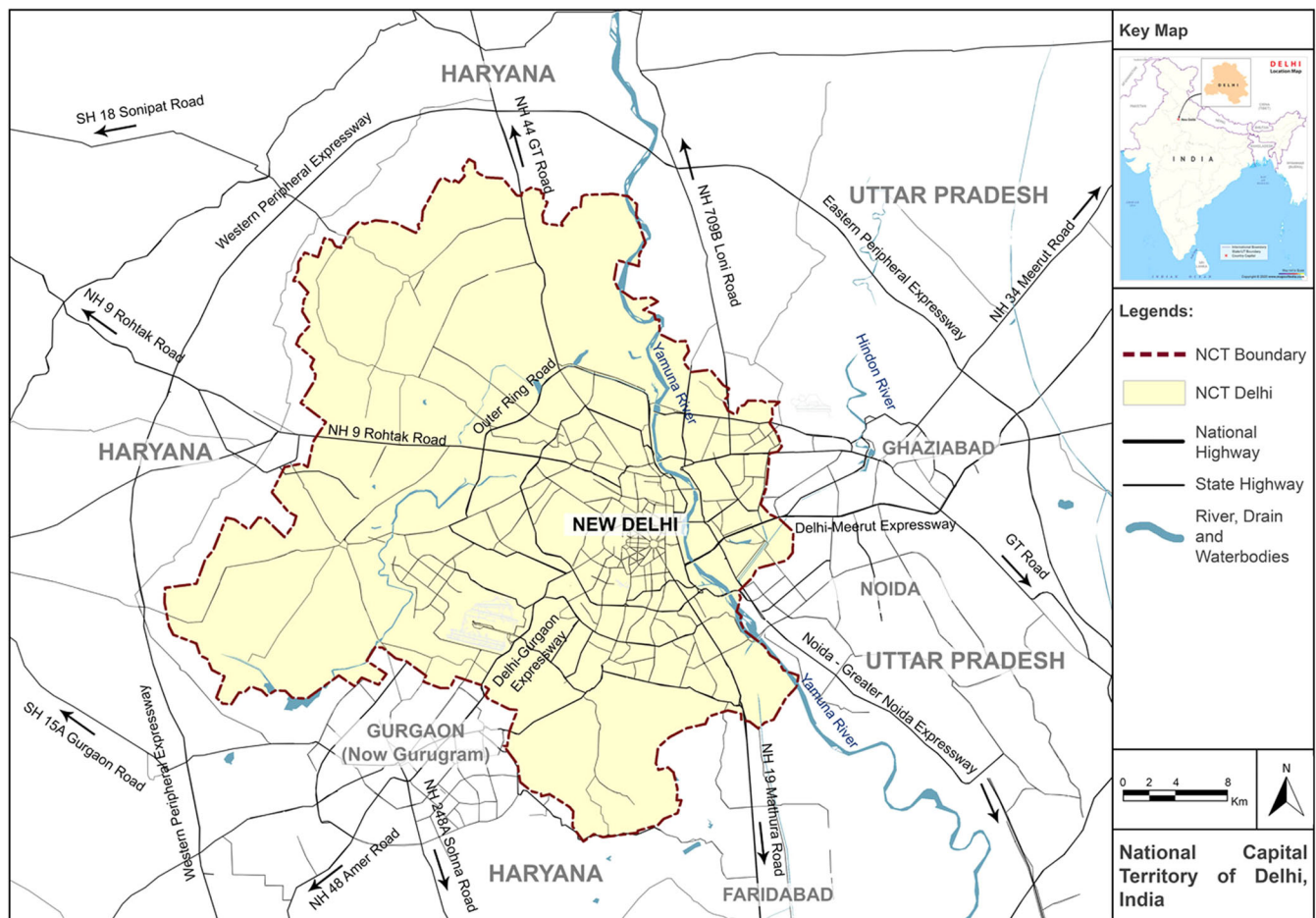


FIGURE 1 Location of Delhi with spatial boundary, major connectivity, and water features. *Source:* Authors.

objective of the policy draws major attention to the long-term water security of Delhi with a few major principles: demand management, optimization of available resources, recycling, augmentation of internal resources, and building resilience to climate change and equity. Based on these principles, the water policy establishes 12 priorities. These priorities and their objectives are provided in Table 3.

3.4 | Urban development in India

This section presents the evolution of urban planning in India and the existing guidelines for planned urban and regional development. It also deliberates the hierarchy of urban development plans in the form of policy documents and their objectives and duration. The changing perception of urban planning is discussed after India became independent in 1947, with the rise in infrastructure development due to the growing population.

India's population almost doubled from 1941 to 1971, from 318 million to 548 million, with 25 percent of people living in urban areas (Government of India, 1971). This phenomenon was known as “over urbanization,” with the growth of the urban population surpassing the national agenda of decentralized industrialization for balanced

regional development (Ramachandran, 1995). This over-urbanization created a scarcity of developed land and resulted in high demand for housing, services, employment, and infrastructure. In response to the rapid urban growth, urban development authorities aimed to develop new towns while preparing comprehensive plans for existing ones. Some 40 development and master plans for approximately 120 towns were prepared within two decades of independence. Three specific features in line with the attempt of planners to shape Indian cities were technical rationality, the postindependence city's relation with historical quarters and rural settlements, and creating a modern and secular India.

Master plans for the largest cities like Delhi and then Calcutta proved to be predominantly driven by a rational planning approach (Kumar et al., 2021). The rational thinking that continues in India even today comprises surveys, analyses, planning, and inputs from empirical experts in infrastructure engineering.

Urban planning in India is under the Ministry of Housing and Urban Development, a federal ministry chaired by the Union Minister. According to the Urban and Regional Development Plans Formulation and Implementation Guidelines (Government of India, 2015), India has four tiers of planning system framework. The scale begins with higher-order plans and moves down towards lower-order plans. The

TABLE 3 Policy statements and objectives of the draft Water Policy for Delhi, 2016.

Policy statement	Objectives
Water allocation	Water allocation in case of shortage should prioritize drinking water and domestic demand followed by other uses such as institutional, commercial, industrial, power sector, environment, wetlands, and the irrigation sector.
Demand management	Reduction of Delhi's per capita consumption of 172 L/capita per day by 10 L (minimum) every 5 years.
Recycled water resources	Decreasing freshwater footprint by increasing the use of recycled wastewater to 35% by 2019, 70% by 2024, and a minimum of 80% by 2026. Other recommendations include the provision of decentralized STPs, and the installment of wastewater treatment plants by the transportation sector, for example.
Promote conservation and efficiency	Implementation of water appliance efficiency rating system, financial instruments to promote efficiency, establish water audit systems for water budgeting, and promote the use of natural soaps to regulate the content of phosphate.
Controlling distribution losses	Curtailling distribution losses at all levels to limit losses to 10% by 2025% and 5% by 2030.
Aquifer management	Regulation of groundwater extraction, and reduce aquifer exploitation by 2022 by drawing an aquifer management strategy.
Database management	Closing massive gaps in the water distribution and water use data, and achieving 100% metering by 2022.
Access to water for all	To ensure access to affordable water supply for all residents of Delhi for minimum requirements as per article 21 of the Constitution and UN Resolution.
Institutional organization	Establishment of the Water Resources Commission with regulatory and monitoring powers. The Commission will coordinate the actions of all agencies concerned with water services.
River related issues	To restore all river bathing quality by 2020, and to implement an ecological approach. Reduction of abstraction of water from Yamuna and Ganga rivers by reducing demand.
Public education and awareness	Encourage the cooperation of the public to attain policy objectives.
Promoting innovation in the water sector	Implementation of the “Report of Sub-committee for Development of National Sustainable Habitat Parameters on Urban Stormwater Management” to enhance the availability of local water resources.

Source: Compiled by the authors based on INTACH, 2016.

order of the hierarchy starts with the Perspective Plan followed by the Regional Plan, Development Plan, and Local Area Plan (Figure 2).

1. The purpose of the Perspective Plan is to develop a vision or perspective for planning urban and regional areas, and the scope is to prepare a policy framework. These plans may vary from the long-term perspective vision document to the concept plan or a mission statement. Its time frame is between 20 and 30 years.
2. The scope of the Regional Plan is to identify the region and its regional resources for development, under which urban or rural settlement plans are prepared and regulated by District Planning Committees or, if it is a metropolitan area, then by the Metropolitan Planning Committee. Their time frame is 20 years.
3. The purpose of the Development Plan is to prepare a comprehensive development plan specifically for urban and peri-urban areas under the control of the respective Development Authority or Metropolitan Planning Committee. These plans have the following categories: district development plan, city/metropolitan development plan, master plan, city utility, and revised development plan. The time frame for the development plan is 20–30 years, with a review every 5 years.
4. The Local Area Plan narrows down to the sub-city land-use planning. It focuses on urban infrastructure, public

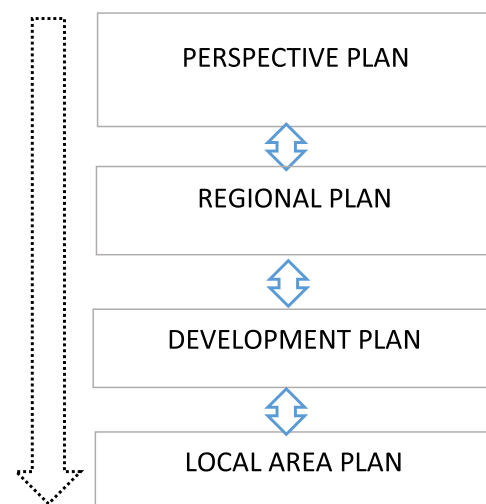


FIGURE 2 Hierarchy of urban development plans. Source: Authors, based on Urban and Regional Development Plans Formulation and Implementation Guidelines, 2015, Government of India.

utility-mobility services, and other recreational spaces. Various plans around this typology are town planning schemes, zonal plan/sub-city plans, ward committee plans, coastal zone management plans, and urban redevelopment plans. The time frame for the Local Area Plan is 5–20 years, with a review every 5 years.

The lower-order plans translate the urban development strategies at smaller scales such as zonal plans, sectoral plans, layout plans, etc. Urban development policies are related to the demarcation of land uses based on densities, types of settlements, provision of physical and social infrastructure, and other utilities and services for the population. In this paper, we focus on the urban development plans of Delhi, officially called MPDs, and their consideration of water supply policies.

3.5 | Review of the master plan for Delhi specific to the water supply policies

The DDA is responsible for the preparation of the urban development plans for Delhi: master, zonal, and layout plans, and urban development policies. This section reviews the master plan for the urban area of Delhi and which aspects of water provision they have considered. The 1981 Master Plan was prepared in 1962. It was revised in 1990 and later on in 2007. The 2007 revision was prepared for the year 2021.

3.5.1 | Work-Study and master plan for Delhi 1981: Public utilities and services

The work-study for MPD 1981 was prepared in 1962. It provided details of available water and reported the inadequacy of the water supply. The total storage at that time was about one-third of the total daily supply. One of the reasons why services were so stretched was because the population doubled in the decade 1941–51, especially after independence in 1947. The average per capita water supply varied for different localities. The new housing construction in the south and the west of Delhi was not suitable when compared to the available water supply. However, urban development continued, resulting in the condition of water scarcity for the residents in the new colonies and the various slums (Delhi Development Authority, 1962: 265). During this period, the Delhi Metropolitan area comprised the Delhi urban area and the ring towns. The Delhi urban area was divided into five zones based on topography to maintain a more or less equitable distribution. The zones in which Delhi was divided were Old and New Delhi, West Delhi, South Delhi, Northwest Delhi, and Shahdara (Delhi Development Authority, 1962: 265). The ring towns were smaller, and the population was also smaller compared to that of Delhi's urban area.

Water supply provision in the Delhi Urban Area (DUA) was classified as Class A, and the ring towns were categorized into two separated classes, Class B and Class C. Class B consisted of ring towns of Ghaziabad, Faridabad, and Ballabgarh, and Class C included Gurgaon, Bahadurgarh, Narela, and Loni. Based on their population, the Plan set out different strategies and services for water supply in Delhi's urban area and ring towns. However, the ring towns now have grown immensely resulting in an increased demand on the physical infrastructure of Delhi.

Urban Area of Delhi: In Class A, Delhi Urban Area, the work-study proposed a 24 × 7 water supply and that a water treatment plant would be built to treat at least one-third of the total water supply in Delhi. The supply rate of water was fixed at 189 L/capita/day (Delhi Development Authority, 1962: 262). Contradictions are clear in the Plan as far as hours of water supply are concerned. The Plan once notes 24 × 7 supplies, but it also mentions that at least, an 18-h minimum supply will be maintained.

Ring Towns to Delhi Urban Area: In class B, the Plan suggests that water should be drawn from the ground, infiltration galleries, and wells, if found to be suitable. The treatment of the water is applicable before it is supplied to the public. A per capita supply of 170 L per day was proposed. Contrary to class A, in class B areas, water would be supplied for 18 h. In class C areas, tube wells and infiltration galleries would be used to supply water. However, no indication was made about the treatment of water before it was supplied. Water would be supplied at the rate of 132 litres/capita/day, from 5 a.m. to 11 a.m. and 4 p.m. to 10 p.m., a total of 12 h (Delhi Development Authority, 1962: 262).

The reason for the MDP 1981 to have divided Delhi into three classes (Table 4) is not clear. Water supply in different volumes and at different times resulted in an unequal supply of water in the three areas. Neither the work-studies nor the master plan provides a city-wide standard or time duration for the water supply. This decision seems to be based on the wrong assumption that the ring towns of Gurgaon and Ballabgarh would not develop fast. Therefore, the suggestion is that the water supply would depend on open wells (Delhi Development Authority, 1962: 271).

The section under “Public Utilities and Services” MPD in 1981 (Government of India, 1962:32) proposed 20 acres of land for expanding a purification plant and 40 acres of land for building the Headworks. Water supply to Shahdara, located in the eastern part of Delhi, was suggested to be sourced through tube wells. Land for additional infrastructures, such as pumping stations and reservoirs, was proposed to be obtained from the residential areas and the extensive park areas of the ridge (Government of India, 1962: 36).

3.5.2 | Work-Study and master plan for Delhi 2001: Physical infrastructure

The Work-study for the Delhi Master Plan 2001 was developed in 1981. It elaborates on the provision of water supply, and augmentation of sources, and proposes an estimation of water demand for the year 2001. It starts by looking at the availability of treated water in the year 1981–82, which was supplied at the rate of about 200 L/capita/day, but the actual supply was reported to be less than this amount. One of the reasons stated in the work-study about the supply shortage was the nonuniformity of standards throughout the city. This study underscores that the resettlement colonies² regularized after 1977, and urban villages and new housing development at the periphery of Delhi had limited access to treated water.

TABLE 4 Proposed water supply services for the towns.

Towns	Areas covered	Quantity (in litres per capita per day)	Duration of water supply	Certainty of water supply	Sources
Class A	Delhi Urban Area	189	24	At least 18 h of supply. Must supply between 4 a.m. and 10 p.m.	-
Class B	Ring Towns: Ghaziabad, Faridabad, Ballabhgarh	170	18	Continuous supply from 4 a.m. to 10 p.m.	Groundwater, infiltration galleries (wells should be exploited). The main industries should meet their requirement from bores and small-size tube wells.
Class C	Ring Towns: Gurgaon, Bahadurgarh, Narela, Loni	132	12	Continuous supply from 5 a.m. to 11 a.m. and 4 p.m. to 10 p.m. in domestic areas	Major industries should meet their requirement from tube wells and infiltration wells to avoid mechanical treatment. Road washing and horticulture should use water from local wells and ponds.

Source: Compiled by authors based on MPD 1981-work studies.

River Yamuna has been the main source of water supply for Delhi. The water supply from the Yamuna was estimated at 0.284 MAF,³ but it was proposed that the supply would increase to 0.642 MAF, should water be available, and would be treated with existing and future water treatment plants. This water would be brought through the Western Yamuna Canal, from Bhakra Dam, and Ramganga River. While a supply of 302 L/capita/day was proposed considering Delhi's climate and topography, the immediate objective was to provide at least 132 L/capita/day of treated water to the entire population. The work-study also estimated that Delhi would require a total of 4655 MLD of water for the Plan period. It further proposed to supply an additional 3050 MLD, which required the construction of a new water treatment plant in the northwest of the city with a capacity of 1363 MLD (Delhi Development Authority, 1990: 108–110).

One of the observations in this work-study, in comparison to that in 1962, is that DDA proposed to provide an equal amount of water to the entire city but did not mention the ring towns or the duration on which water would be supplied in residential areas.

The MPD 2001 was published in 1990. Water supply is briefly discussed under the section “Infrastructure: Physical” (Government of India, 1990: 42). According to the Plan, the total amount of water required in 1981 was 2254 MLD, but the availability was only 1150 MLD, and the projected water supply for the year 2001 was estimated to be 5123 MLD. The sources of raw water were the rivers Yamuna and Ganga. Other sources proposed were Tehri Dam in Uttar Pradesh and Kishau, Kakhwar, and Giri Dam in Himachal Pradesh. To supplement the water supply, the Plan also recommended the use of groundwater for nondrinking purposes. An exchange of wastewater from Delhi (presumably treated) with the neighboring state of Haryana was suggested. For the treatment of the estimated 3050 MLD, the existing water treatment plants would not be sufficient. Additional capacity and construction of a new water treatment plant in North-West by the year 2001 was recommended, similar to what was mentioned in the work-study (Delhi Development Authority, 1990: 29–30). The requirement of water supply was estimated at 363 L/capita/day, with 225 L for domestic use. However, the minimum domestic water supply for residential areas was estimated at 135 L/capita/day.

Water is also discussed in the chapter on Environment (Government of India, 1990: 53). The Plan finds that the river Yamuna is highly polluted, mainly as a result of discharges of untreated wastewater from domestic and industrial uses. For this purpose and to improve the health of the river, diversion of wastewater and its treatment was recommended.

3.5.3 | Master plan for Delhi 2021: Physical infrastructure

The MPD 2021 was published in February 2007, and no previous work-studies were carried out. Sub-group reports were prepared, but they were not made public. Water

supply and sanitation are briefly discussed under Physical Infrastructure. Major problems affecting the quality of life of the population and their access to basic infrastructure to provide services, such as water supply, sanitation, power, and solid waste management are discussed. MPD 2021 stipulates that the increasing population has put infrastructure facilities under severe pressure resulting in significant deficiencies (Government of India, 2007a: 227). The Plan indicated that infrastructure problems could become the cause of crises in the future. For the management of water resources, an integrated approach to infrastructure was introduced, proposing the integration of water-sewage-stormwater for recycling, harvesting, and more efficient use. This was named self-sustainable water management and was considered key to sustainable development.

MPD 2021 proposes tools such as capacity building, users' pay approach, and public-private partnerships for institutional strengthening. The Plan also aims to improve efficiency through better community participation and decentralized management. It mentions that the rehabilitation of old built-up areas and areas marked for redevelopment should be prioritized for providing water supply, sewerage, and drainage networks. To improve water supply, the adoption of the Inter-State River Water Allocation was suggested. Emphasis has been placed on the reduction of the unaccounted flow of water.

While the DDA was genuinely concerned about the quantity of water supply in the city, it did not mention the quality of water. The authority also gave little regard to the idea of equity, which is against the concept of sustainable development. The planning agency admitted that “Delhi has an average water availability of 225 L per capita demand, but the distribution is not uniform. Some areas get 24-h water supply, whereas some get hardly one to 2-h water in a day” (Government of India, 2007a: 227). The unequal distribution of water in Delhi affects the poor. MPD 2021 does not even identify these areas. Moreover, the Plan does not make any reference to the national or draft state water policies.

Perspective Plan as annexure to MPD, 2021 suggests that three policy decisions should be taken immediately for the efficient water supply, first as the enactment of the Delhi Water Board Bill (Amendment) of 2002 (Government of India, 2007b: A4-A45). The bill expands the functions of the DJB by amending Section 9-b of the Delhi Water Act 1998 to “Plan for, regulate and manage the exploitation of groundwater in Delhi in consultation with Central Ground Water Authority” (Government of Delhi, 1998: 11). This could empower the DJB to take necessary actions for sustaining groundwater at desirable levels. Prior permission would be required under section 20-4 for “sinking any well for use of groundwater” for which users would have to register. Second, discuss the financial aspects of sustainable and efficient water management. The planning agency argues that funds are not sufficient to develop water infrastructure, and this could be addressed by imposing a levy. However, further details about the amount of levy are not provided. The third aspect is about

increasing theft and wastage of water, which could be corrected by providing measures such as leak detection, metering at all levels, segregation of district metering areas, setting up of pressure gauges, etc., for enforcing curbs on theft or waste. Technology may be used for leak detection and metering at all levels (Government of India, 2007b: A4-A45). According to MPD 2021, “about half of the water that is treated and distributed at public expense is nonrevenue water” (Government of India, 2007b: 230), which questions the efficiency of the system and also points to a lack of accountability. This is due to illegal tapping and water connections. Reducing water losses is cheaper than augmenting water capacity for such losses, but there are no estimates provided for the additional expected cost of supplying additional water to cover the demands of the city (Dewal, 2006). However, for the first time, DDA started taking into account the policies and statutes of the Government of Delhi. This engagement of DDA with DJB needs to be intensified for better collaboration and implementation of water policies.

4 | RESULTS

4.1 | Policymaker's views on the challenges during the preparation of the master plan

This section presents the views of urban planners, and water officials collected during the unstructured interviews and elaborates on the stages of plan preparation considering water policies in Table 5 and the following subsections. The discussions provided different viewpoints compared to those in the plans regarding the challenges faced during the preparation of the master plan, specifically about the inclusion of water provision. These views partially explain the position of urban planners for not being able to include all goals in the policy documents. The interviews unfolded tangible and intangible reasons behind the institutional complexity that resulted in a lack of collaboration among them. At the same time, they also provide a vision and space for institutional collaboration among stakeholders.

4.1.1 | Plan preparation process

The interview discussion started with the process involved in the preparation of the master plan. UP1 and UP3 mentioned that before the MDP was prepared, former plans were normally examined and the limitations were highlighted. Working teams for the preparation of the Plan are divided into groups of professional experts, and each chapter of the master plan report contributes to a final compiled report. This report is then discussed in several meetings with higher officials and undergoes numerous changes (Table 6). The draft document is submitted to a Technical Committee with experts headed by the DDA Vice-chairman and is also released for public comments and objections through the government portal. The

TABLE 5 Summary of the responses from the urban planners and water officials.

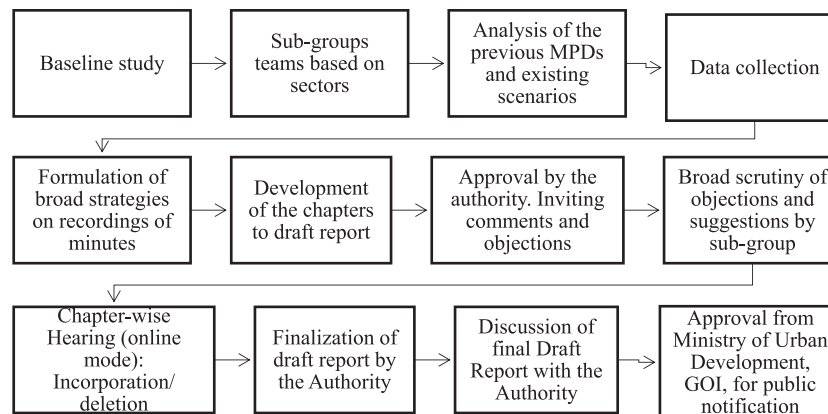
Interview questions	Responses
1 Were the meetings between urban planners and water engineers or officers smooth? If not, what were the reasons for disagreements?	The meetings between the planners and water engineers were not always smooth during the preparation of MPD 2021 due to political pressure. In the case of draft preparation for MPD 2041, meetings were considerably smooth.
2 How were the international and national agendas of water security attempted to be achieved through the MPD? Any reference made to the Sustainable Development Plans or National Water Policies/Schemes/Programs/Notification etc.? What are the important water policies (international, national, state) that have been referred to?	During the preparation of MPD 2021 and draft MPD 2041, the existing policies were discussed but their implementation at the micro-scale (zonal, sector or site layout level) was not considered.
3 What was the framework adopted for the preparation of water policies for lower-order plans of NCTD? Were any framework, checklist, or suggestions made for the water planning through lower order plans to the master plan/action plans to specific zones or sectors?	There was no framework or guidelines designed to consider water supply and utilities in the urban development plans at the city, zonal, or sectoral scale in Delhi.
4 How were the other land use regulations linked with the water strategies through the MDP?	There was no consideration for other land uses to be related to water strategies in the plans.
5 Is there any system designed for monitoring the policies on the ground through zonal plans, strategic plans, and action plans? Was there any checklist provided by the MPD for the strategic implementation of water policies?	There are strategies or monitoring systems to verify the implementation of urban policies on the ground.
6 How many collaborative meetings were held between the water sector and other sectors with overlapping goals such as transportation, environment, or recreation (parks, gardens, and other public places)?	This data could not be retrieved from the Delhi Development Authority even after regular follow-ups. Officials mentioned that the records were not with them and that the files had been transferred to a different location and might be stored as an unwanted use material section. They were thus not available for future reference nor shared with the public.
7 Any discussion on the inclusion of budgetary policies during the preparation of the MDP?	There was no mention of the budget allocation during the plan preparation meetings. Finance and budget teams work separately.
8 Did all the stakeholders participate and agree upon the final strategies drawn for water resource management through the MPD?	It was informed that not all the participating stakeholders agreed on the final planning strategies drawn for the water supply management in the city.
9 How was the introduction of innovative solutions such as “Water Sensitive Planning” (MPD 2041) to water security through urban development plans done? For example, how was the concept of Water Sensitive Planning attempted through the MPD? Was there any detailed program discussed?	During the preparation of the MPD 2021, reports were received from different institutions and departments working in the water sector. However, for the draft MPD 2041, new concepts were introduced such as green-blue infrastructure, water-sensitive designs, etc., with no details on their implementation.
10 Any flexibility in water provisions for situations like the pandemic was discussed during the preparation of the previous Plan or the upcoming Plan?	There were no discussions to consider situations when water demand for domestic or medical use becomes exceptionally high such as during natural disasters (urban flooding) or unexpected events such as Covid-19.
11 How was the opinion of marginalized communities, people living in unauthorized areas, farmers, or poor populations included during the process?	These sectors are not included during the Plan preparation. The Plans are made public through online public notice only after the draft is prepared and approved by the DDA. At this point, people are invited to submit suggestions or objections only.
12 Does politics play a role in the decision-making of the plan? If yes, please elaborate.	Political pressure was experienced during the final decision-making on the future plans of the city, but not during the process of Plan preparation. However, the visions of the politicians are considered while designing the planning policies.
13 Does it affect the preparation of the master plan if the policies are general, not up to date, or upheld, and vice versa?	It was reported that water policies either at the national or state level are general and sometimes too ambitious to achieve. They do not address specific problems and their possible solutions.
14 The notification and frequency of policy documents (water policies & development plans) are dependent or independent of each other?	The release of the water policies and the development plans are independent of each other.
15 Explain the stages in the preparation of the Master Plan for Delhi	The preparation of the Master Plan of Delhi is explained in detail in the next section, Section 4.1.1.
16 Explain the stages in the preparation of the water supply strategies in the Master Plan of Delhi	The preparation of the water supply strategies is explained in detail in the next section, Section 4.1.2.

Source: Authors, primary survey.

TABLE 6 Hierarchy of meetings before the release of the final MPD.

Progress review meetings chaired by DDA Commissioner Planning	<ul style="list-style-type: none"> • All Additional Commissioner Planning (ACP) • Concerned Directors/Deputy Directors along with team • Consultant engaged for the preparation of MPD (NIUA)
Progress review meetings chaired by DDA Vice-chairman	<ul style="list-style-type: none"> • Commissioner Planning (CP) • Engineer members and Finance member, Planning department • Concerned Additional Commissioner planning/Director Planning • Consultant engaged for the preparation of MPD (NIUA)
Meeting chaired by the Lieutenant Governor of Delhi, also the Chairman of DDA	<ul style="list-style-type: none"> • Vice-Chairman • Chief Secretary Govt. of NCTD • Chief Secretary Govt. of NCTD • Engineer Members/Finance Member, Planning department • Commissioner cum Secretary (Member Secretary) • Commissioner Planning • Chief town planner Town & Country Planning Organization, Government of India • Chairman New Delhi Municipal Council, Commissioner to all Municipal Corporations of Delhi • Authority members (Members of the Legislative Assembly/Counselors)

Source: Authors, primary survey.

**FIGURE 3** Stages of Plan preparation, MPD 2041. Source: Authors, primary survey.

feedback received is incorporated in the draft and is discussed among senior officials from DDA headed by its Chairman, members of the Legislative Assembly, service departments, and politicians from the Ministry of Housing and Urban Affairs. Once the groups come to a decision, it is released as the final master plan. UP1 and UP3 differed as to whether, during the preparation of MPD 2021, the infrastructure sub-group report was prepared but not sent out to the public, but that it was discussed only by the in-house team members. In contrast, during the preparation of MPD 2041 (Figure 3), a set of baseline reports belonging to each section of the Plan were released separately for public suggestions and objections.

Both interviewees agreed that there was a smooth exchange of data between the main institutes, DDA and DJB. They also mentioned that there was never a scarcity of data, but the data sets and information they received from different supporting institutes working in the water sector were overwhelming. One of the challenges in stakeholders' collaboration based on data sharing stated by the

UP3 was: *One of the lessons we learned is we can't give the agencies the wish list, it doesn't work that way. You have to prioritize what the more critical data is, and then you have to make efforts to get that data, that's step one. Once the baseline is done and the issues have been highlighted, then we start preparing the strategies.*

4.1.2 | Perception on planning about water

UP1 explained that during the urban development plan process, the river Yamuna, the main source of fresh water, was considered mainly in terms of economic benefits. Developments on the so-called floodable, vulnerable, and ecologically sensitive biological assets were part of the decadal planning goals to make a profit out of the land along the river in the name of riverfront development, gardens, entertainment activities, and so on. Water resources were sadly treated as a bare minimum commodity. There were some intervening bodies, such as the National Green

Tribunal in 2013, which ordered the regularization of activities along the river, and promoted the protection of water bodies through the National Water Policy 2002 (Government of India, 2002). However, some urban development projects had the support of powerful politicians, and it led to the execution of the projects by the DDA, resulting in the exploitation of the resource. The interviewee also explained that the coordination between the bodies could be a bit tricky sometimes. They depend on how thick the files are and on challenges, such as the agreements or disagreements of the policy proposals between the departments, transfer of officials to other organizations, change of political parties in power, etc., which are common during the process. UP1 further added:

Water was sidelined, and every inch of land was seen as an asset in Delhi. For example, land uses such as sanitary landfills, power stations, and industrial areas were planned along the river Yamuna so that the river became a channel for the drainage of the waste produced from these land uses. There is much pressure on the town planners and we cannot fight with the powerful ministers. Strong vote bank politics drive many decisions. It is a give-and-take relation or a kind of bargaining. DDA planners are also interested in the channelisation of the river for riverfront development.

DJB1 raised an important point regarding the involvement of the beneficiaries in the plan-making process. The interviewee argued that if we are bringing any scheme or policy, it is the end user of the beneficiary who should be heard first. However, *our planning system failed to involve beneficiaries during the planning or while executing the policies. We (DDA and DJB) usually introduce the schemes, the infrastructure engineer draws the network and asks the end user to get the connection, but we fail to ask them about the real issues of the settlement.*

I think the most important stakeholders are the beneficiaries, whom we easily ignore. They should be included in the planning process. DDA or ultimately the public should be included before DJB passes any schemes. The beneficiaries know more than anyone else. There are four key players: first, the beneficiary; second, the contractor who executes the plan (from DJB); third, the government who finances the plan (DDA) and fourth, those who approve the schemes: the politicians in the Government of India or Government of Delhi.

The fact is that there is a play between DDA and DJB. Agreement between both bodies is not easy. The head is different in both cases: one is under the state government (DJB) and another comes under the central government (DDA). This is one of the major challenges. Such as for the extension of Rohini (sub-city in Delhi) phase III, DJB was not prepared and the matter was discussed with DDA after looking at the proposal. But DDA was compelled to reach its target of some lakhs (hundred thousand) of houses/year. Due to these independent targets, we lack integrated planning, and every other resource suffers.

UP3 mentioned that the preparation of the upcoming MPD 2041 was a smooth process. However, the interviewee mentioned that *the degree of cooperation and coordination is still satisfactory in the overall master plan-making*

process, but there is no collaboration between the departments. When the interviewer asked about the situation of inequity in supply in several parts of Delhi and how the upcoming Plan addresses the issue, the interviewee assured that inequitable water supply is a real concern that is noticed by the authority and the provision shall be made for the new development and the redevelopment zones. However, there is no mention nor identification of such areas in the draft MPD 2041.

One of the crucial points raised by DJB1 about the integration of water policies in the urban planning process in practice was the lack of adequate planning. Planning of water supply based on population projections is, and should be, considered the ideal way to calculate water supply. However, the officer stated: *It is not done like this, although this is the ideal way to start with the specification of requirements. What happens is that whenever any scheme is designed such as 227 litres per capita per day, we have designed the catchment on the map, then what is the population of that area multiplied by 225 litres per capita per day = total public demand. Based on this, we designed a water treatment plant for several areas depending on the size. Some places get a good supply, but some lack regular supply, the reason being that the population density varies at different localities. 80-80,000/km² density varies in Delhi. Therefore, every sector should be designed based on population density and not on population size. So now we see the importance of including beneficiaries here.*

The arguments raised by the officials are noteworthy and add critical value to the overall WDPs preparation process and the need for collaborative planning. Although there are inevitable reasons for the imbalance in planning, such as the political pressure and the frequent change of officials, there are also significant collaborative opportunities highlighted by the interviewees, such as the involvement of the beneficiaries as a stakeholder, collaborative framework between DDA and DJB with similar goals in a shared space, and promotion of transparency in planning through public involvement from the beginning (Figure 4).

5 | DISCUSSION

Based on the analysis of the primary and secondary surveys, we argue that there is a lack of collaboration between the DJB and DDA in planning for Delhi's water supply as a part of the urban development process. The evidence is discussed in the form of water policy inclusion in the master plan of Delhi, and the lack of collective decision-making during the preparation of the MPD.

The existing water policies, such as the National Water Policy 2012 (Government of India, 2012), Delhi's draft Water Policy 2016 (Government of Delhi, 2016), and other Central and State government water policies, programs, schemes, and notifications related to water conservation, groundwater, water budgets, etc., have not been referred in any versions of the MPD. Moreover, MPD attaches the service plans prepared by the DJB as an annexure without

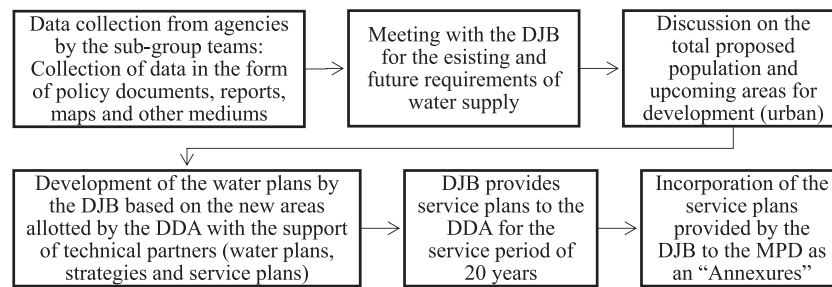


FIGURE 4 Stages in the preparation of the water supply strategies in the MPD 2041. *Source:* Authors, primary survey.

integrating them in the action plan in the chapter on water or with other chapters such as housing, industry, etc.

For instance, the MPD 1990 referred to the condition of river Yamuna being highly polluted due to the discharges of untreated wastewater and suggested the immediate stopping of discharge into the river. However, unfortunately, the untreated wastewater is still discharged into the river from multiple domestic and industrial outlets with the resulting consequences on human and environmental health. It seems that the MPD has many general recommendations but is not ready to prepare a detailed plan of action by considering the suggestions from the experts of the other sectors for the implementation of such recommendations, or is hindered by political interference. One of the aims of the MPD 2021 is “to improve efficiency through better community participation and decentralized management” which seems to be failing within the current environment of the Plan preparation process.

The recent plan preparation process in Delhi through MPD 2041 seems to create an artificial platform where it claims multiple occasions of interaction among the stakeholders vertical as well as horizontal but in reality, the policies through the plans are formulated internally. As it is evident in Plan preparation process and Stages in the preparation of MPD 2041, meetings during the formulation of the first draft of the master plan are limited to the government officials similar to the case of Bloemfontein. Therefore, we can say there is no power balance within the network for collaborative decision-making. Also, once the draft plan is prepared and undergoes all the feasibility criteria for development and decisions are influenced by the politicians, it is then released to the public following a formality to call the process an inclusive one. This restricts the exchange of authentic dialogue among stakeholders and calls for a policy framework where collaboration is not optional but mandatory.

The recent approach of DDA seems to favor an environment of interaction through inviting communication. However, it fails to collaborate through actual planning activities such as workshop discussions and awareness about the policies through regular meetings with stakeholders from the beginning of the Plan preparation similar to the case of Ahmedabad. This approach is failing because of the lack of a collaborative framework from the inception of the Plan preparation process. Collaboration for the

benefit of other participants in the network power also seems to be missing. Network power here refers to the actors involved and the platform of the Plan preparation process through which different sectors are weaved through policies for better functioning of the cities unlike the typical top-down approach represented through a hierarchy of meetings presented.

Since DJB is responsible for water supply in Delhi, it is blamed for the shortage and inequity in supply. However, we question why the planning authority is not challenged for the formulation of development policies without considering the carrying capacity of any area as pointed out by DJB1, and why there is a lack of consensus building between the two bodies while planning the future of the cities based on the findings. It may not be easy to achieve collaboration between institutions in such a large spatial territory, with a population of more than 20 million people, and with different legislative powers as in Delhi. Nevertheless, collaboration could be a continuous practice between actors with different interests in a shared space through planning at every level of government. In the case of Ahmedabad, we learned that the complete set of decision-making processes was brought down to the ground reality through the mapping of the stakeholders and multiple interactions between government organizations and communities.

DDA, along with the NIUA, are trying to make the process of preparation of the draft MPD 2041 an inclusive process by involving several institutions, but it is once again failing to do so. An example is the baseline reports. This time, around 70 agencies were involved in collecting data and documents for the preparation of the maps and analyses. These baseline reports are converted into chapters of the Plan and later on are compiled as a draft report (Figure 3). This compilation process takes around 1–2 years. During this period, the population, as the main beneficiary as pointed by DJB1, is not contacted, and the process remains purely inter-governmental. Regarding the data collection, the type of information collected, and types of questions asked, or surveys done, should be designed specifically to be used by both the DDA and the DJB to prepare the water strategies. However, there is a complete lack of approach during the initial process of Plan preparation. This concern can be connected to the comment by DJB1 that during the extension of sub-city Rohini, “DJB was not prepared, and the matter was discussed with DDA

only after looking at the proposal.” If a survey is done to find out the population density, population size and calculate the water demand of all sectors, it will be more beneficial, as pointed out by DJB1, that “every sector’s needs are designed based on population density and not on population size alone.”

For the MPD 2041, the draft report was prepared and posted online in 2021 for public comments, including objections. One of the interviewees, DDA (MPD 2041), informed that the comments received after the publication of the draft MPD 2041 were overwhelming: 35,000 for the first time in history. These were from various individuals and groups such as Resident Welfare Associations, retired government officers, nongovernmental organizations, people from the industrial sector, expert groups, consultants, project managers, academics, students, etc. It is thus evident that the end-users are interested in the master plan content and willing to contribute to it. On the one hand, stakeholders’ views have the potential to become the strength of the collaborative process. On the other hand, the numerous comments received when the complete draft is ready, are almost impossible to incorporate. This process defeats the purpose of the consultative process because the stakeholders will lose trust and interest in contributing toward this type of initiative in the future once they realize their views are considered only limitedly, or not considered at all.

The principles and approaches to the collaborative planning process such as collective decision-making, and network power in a shared institutional environment are currently lacking in this case. For example, the experts and policymakers confirmed that there was no consideration of other sectors when drafting the water supply policies which resulted in partial agreements between the stakeholders including experts from the environment, transport, housing, and recreation sectors. Similarly, if we refer to the hierarchy of meetings before the approval of the Plan, along with the engineers, a representative of the finance sector was present during the review meeting with the DDA Vice Chairman. Even then, it was mentioned that the budget allocation for the respective sectors during the Plan preparation was not discussed. The shared institutional environment has to be utilized much better for balancing the power in the networks and promoting collective decision-making. Finally, we argue that the strategies and framework based on the existing water policies should be part of the plans at each level of urban development process, i.e., MPD, Zonal Plans and Sector Plans. This framework can become the guidelines for policy implementation and monitoring.

6 | CONCLUSIONS AND RECOMMENDATIONS

This research emphasizes the need for collaborative tools in the planning process in Delhi. The master plan-making process is here used as a platform to perform collaborative actions between the DJB and the DDA. Collaborative planning

can be achieved through creating an interactive environment by the planning authority, inviting the beneficiaries—as the most important stakeholders—to collaborate in the plan-making process from its inception, overcoming the political pressure through collaboration, setting a framework for communication and public support through their participation and buy-in, including cross-sectoral stakeholders, and sharing common data. These collaborative tools are effective only when there is cooperation and a sense of responsibility among and within the institutions, in parallel to political support. Understanding urban planning as a solely inter-government activity is not justified; beneficiaries are the most important elements of the plan-making process, should be able to contribute to it, and should equally be aware of their responsibilities. Preparing a statutory document such as the MPD is a multi-layered process, hence requiring political support and public buy-in. This is possible to achieve when there is a defined framework to achieve collaboration within and among the several institutions.

Interviews and discussions underlined in this study are a rich source of information that could be taken forward for planning and implementation purposes. Principles of collaborative planning are useful for the case of Delhi to implement collaboration and adopt the right approach to collaboration as well. The research findings and suggested approach for collaboration can inform the current urban planning process in Delhi and facilitate an improved water supply system in the city.

The scope of this work is limited to discussing the existing principles and tools of collaborative planning in the urban planning process of Delhi. Through primary and secondary data and information analysis, existing institutional collaboration in the urban planning process is discussed for the water supply sector of Delhi. Further research can be taken forward for other sectors in the planning process and cities other than Delhi.

ACKNOWLEDGMENTS

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

None declared.

ENDNOTES

- ¹ A tehsil is a local unit of administrative division in some countries of the Indian subcontinent that is usually translated to “township”. Source: Bureau, Our (3 May 2006). “Five satellite towns to decongest Bangalore”. *Business Standard India*. Retrieved on 12 October 2021.
- ² Resettlement colonies are defined as squatter settlements mostly located on public land. This land is owned either by DDA, railways, the Central Public Works Department, or the respective municipal corporations of Delhi. Source: Centre for Policy Research, 2015, <https://cprindia.org/wp-content/uploads/2021/12/Categorisation-of-Settlement-in-Delhi.pdf>
- ³ MAF: 1 million feet of water passes a measuring point in a year.

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