State of Urban Water Supply in India

2018

Exhibitions India Group
ISO 9001:2008 · ISO 14001:2004 · OHSAS 18001:2007
Committed to Excellence

WaterAid

WaterAid/ Ronny Sen

State of Urban Water Supply in India

2018

Exhibitions India Group
ISO 9001:2008 · ISO 14001:2004 · OHSAS 18001:2007
Committed to Excellence

WaterAid

Cover photo: WaterAid/ Ronny Sen

नितिन गडकरी
NITIN GADKARI

सत्यमेव जयते

मंत्री
जल संसाधन,नदी विकास,गंगा संरक्षण,
सड़क परिवहन,राजमार्ग एवं पोत परिवहन
भारत सरकार
Minister
Water Resources
River Development,Ganga Rejuvenation,
Road Transport, Highways and Shipping
Government of India

MESSAGE

I am happy to learn that the India Trade Promotion Organisation (ITPO) and Exhibitions India Group are hosting the One Mega Event at Pragati Maidan, New Delhi from 23-25 May, 2018.

The availability of water is not the problem in the country, but people need to learn to manage and conserve it. The government's plan to double the income of farmers by 2022 cannot be achieved sans proper water management. Enhancing drip and pipe irrigation will reduce wastage of water and will be cost effective for farmers.

I congratulate the organisers for hosting the event that will provide an important opportunity to come up with solutions required for India's future.

(Nitin Gadkari)

Date: 3rd May, 2018
Place: New Delhi

Room No. 210, Shram Shakti Bhawan, New Delhi-110 001
Tel. : WR,RD&GR (011) 23711780, 23714663, 23714200, Fax : (011) 23710804
Tel. : RTH&S (011) 23711252, 23710121, Fax : (011) 23719023
E-mail : minister-mowr@nic.in, nitin.gadkari@nic.in

सैयद मसूद हुसैन
अध्यक्ष
तथा पदेन सचिव, भारत सरकार
S. MASOOD HUSAIN
CHAIRMAN
& *ex-officio* Secretary
to the Government of India

सत्यमेव जयते

भारत सरकार
जल संसाधन, नदी विकास
और गंगा संरक्षण मंत्रालय,
केन्द्रीय जल आयोग
Government of India
Ministry of Water Resources,
River Development and
Ganga Rejuvenation,
Central Water Commission

17th May, 2018

MESSAGE

It gives me immense pleasure to note that India Trade Promotion Organization and Exhibitions India Group are jointly organizing 5th Water India 2018 Expo at Pragati Maidan. New Delhi during May 23-25, 2018. During the occasion, Exhibitions India Group in association with their knowledge partner Water Aid India is also publishing a Report titled "Urban Water Supply in India -2018".

India is a fast growing country. We need a reliable supply of water for drinking, agriculture, energy production, industries, etc for sustaining this growth. Keeping in view the limited availability of water and also the fact that its quality is deteriorating day by day, the need for management of water resources in an optimal and sustainable manner becomes very important.

Sustainable, efficient and equitable management of urban water is important in today's world. This is also complex as on one hand, the urban local bodies are struggling for supply of water while on the other hand, collection and disposal of sewage is proving to be challenging. This report offers guidance for cities for managing the urban water cycle in a sustainable manner.

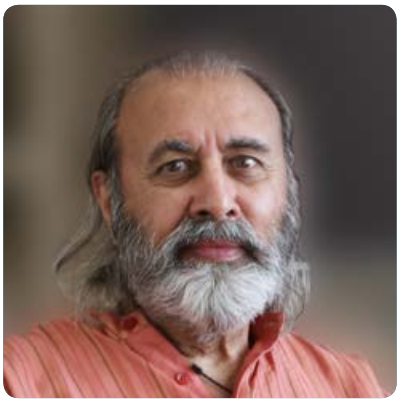
I would like to congratulate Exhibitions India Group and Water Aid India for presenting an objective analysis of urban water practices in cities. The publication will be a useful reference material for water professionals, policy makers and indeed all those interested in urban water management.

I wish all success to India Trade Promotion Organization, Exhibitions India Group and Water Aid India in their endeavor.

(S. Masood Husain)

315 (द), सेवा भवन
आर. के. पुरम, नई दिल्ली-110066
दूरभाष : 011-26715351, 26195415
फैक्स : 011-26108614

315 (S), Sewa Bhawan
R. K. Puram, New Delhi-110066
Tel. : 011-26715351, 26195415
Fax : 011-26108614
Email : chairman-cwc@nic.in



FOREWORD

Exhibitions India Group

Fortunately, the rains have pushed back Cape Town's dreaded Day Zero – the day when municipal water supplies officially run out – fears to 2019. But, the water crisis in the most iconic city on the tip of Africa should serve as a wake up call for the whole world, especially countries like India where water shortages are projected to become increasingly common in urban areas. Alarmingly, Bengaluru is next to go thirsty. India's Silicon Valley is running out of water in so much as experts foresee Bengaluru being evacuated by 2025.

Like Cape Town, India, too, is dangerously low on water. More than half of India's total water supply comes from groundwater resources, which have been severely depleted because of excessive use. The Asian Development Bank has forecast that India will have a water deficit of 50 percent by 2030.

Growth of urban populations and new property developments, coupled with incidences of water mismanagement, below average rainfall patterns and droughts, pose increasing risks to urban water supply with serious implications for the future health and well-being of urban citizens.

In order to avoid the fate of Cape Town, Indian cities will have to look to adopt solutions and technologies to help them address the most critical issues in water networks. Efficient water management is key to building smart cities that expand sustainably, operate efficiently and maintain a high quality of life for residents. Integrating intelligent water technologies allows utilities to manage the overall distribution of water around the city efficiently; identify and manage water loss; predict demand and connect into wider smart city data systems.

To improve the efficiency of water management, a collaborative approach involving the local authorities, community and various other stakeholders in implementing short-term and long-term solutions is required.

This report strongly recommends concerted efforts be undertaken to offer incentives for providing reliable and affordable services; reduce nonrevenue water from leaks, theft or metering inaccuracies, etc.; penalise industries that pollute water bodies; ensure strict vigilance and regulations to bring illegal pumping from underground reservoirs under control; amongst others.

Finally, the findings suggest that improving urban water supply in urban India requires innovative governance and institutional arrangements that blend the strengths of public, private and community partnerships.

Prem Behl
Chairman
Exhibitions India Group

FOREWORD

WaterAid India

Cape Town is fast running out of water. The crisis in Cape Town, the second-most populous urban area in South Africa after Johannesburg, did not happen overnight. Rather, it is a result of both climate and manmade crises- three years of low rainfall and drought coupled with a growing population, an increase in water consumption and the fact that 60 per cent of Cape Town residents are not saving any water.

This is a cautionary tale for India. In 2011, about 377 million Indians lived in urban areas and by 2030, the urban population is expected to rise to 590 million. The demand for water is only expected to rise as the country urbanises further. Addressing the multiple challenges facing urban water supply- from access to safe and affordable drinking water to improving service level benchmarks and to stringent regulatory authorities- all need a combination of short-term and medium-term solutions. It becomes crucial, therefore, to create institutions with clearly defined roles and responsibilities along with clear lines of accountability. It also means ensuring leadership role to the community and various stakeholders in implementing the solutions.

It is in this context which is also in sync with the goal of WaterAid to ensure sustainable WASH (water, sanitation and hygiene) services for everyone, everywhere, by 2030 that we are happy to join hands with the Exhibitions India Group for the 5th India Water Expo 2018 with its focus on 'clean water for a sustainable future', as a knowledge partner. This document aims to give a snapshot of the urban drinking water situation from a policy, program and institutional and systems perspective. Every time we produce such reports, dearth of reliable, concurrent and actionable data emerges as a challenge, as it was the case this time too. While the team has attempted to put together the entire challenge of urban water supply succinctly within a small space, I see it as an opportunity to build on it. There is a growing need for the knowledge community, to work together with the governments and other agencies to find a long-term solution for this- by way of allocating resources, conducting research and making the information available in the public domain.

Lastly, I thank Exhibitions India Group for this opportunity and my colleagues for their hard work behind this document.

Avinash Kumar
Director - Programmes and Policy
WaterAid India

Abbreviations

AMRUT Atal Mission for Rejuvenation and Urban Transformation

AUWSP Accelerated Urban Water Supply Programme

BIS Bureau of Indian Standards

CGWA Central Ground Water Authority

CGWB Central Ground Water Board

CPCB Central Pollution Control Board

CPHEEO Central Public Health Environmental and Engineering Organization

CWC Central Water Commission

DJB Delhi Jal Board

GoI Government of India

HRIDAY Heritage City Development and Augmentation Yojana

IDSMT Integrated Development for Small and Medium Towns

JNNURM Jawaharlal Nehru National Urban Renewal Mission

LPCD Litres per Capita per Day

MoHUA Ministry of Housing and Urban affairs

MoUD Ministry of Urban Development

NRW Non-revenue Water

NSSO National Sample Survey Office

PHED Public Health and Engineering Department

PIB Press Information Bureau

PPP Public Private Partnership

SBM Swachh Bharat Mission

SLB Service Level Benchmark

SPCB State Pollution Control Board

UIG Urban Infrastructure Governance

ULB Urban Local Bodies

WSP Water and Sanitation Program

WSS Water Supply and Sanitation

Table of Contents

WaterAid/ Mansi Thapliyal

1.

Executive summary

Water is a natural and economic resource, which is unique and irreplaceable. At the same time, it is unevenly distributed on our planet, which underscores its competing and conflicting nature. A suitable example of the impact of unequal distribution of this scarce resource on an ever-increasing population is the case of India. With

17.74 per cent of the world's population, India has 2.45 per cent of the world's land resources and 4.5 per cent of fresh water resource (*Ministry of Water Resources, December 2008*).

On 28 July 2010, through Resolution 64/292, the United Nations General Assembly explicitly recognised the human right to water and sanitation, and acknowledged that clean drinking water and sanitation are essential to the realisation of all human rights. In India, the right to water is not enshrined as a fundamental right in the constitution. However, both the courts, at the state as well as federal level have interpreted Article 21 of the Indian Constitution, the right to life, as encompassing the right to safe and basic water and sanitation.

Nonetheless, given the mismanagement of water combined with excessive use of groundwater and inefficient use of water in irrigation, the 'right to water' is definitely under threat and calls for urgent attention towards the urban water management challenge. The urban water sector is facing the challenge of water resourcing on one hand, and limited institutional and financial capacity to deliver basic safe water supply to all, on the other.

State of Urban Water Supply in India-2018 seeks to provide readers with a brief overview of the urban water supply conundrum. The publication aims to highlight some key steps that are required to ensure that adequate and safe drinking water supply services can reach the urban poor at affordable rates. The publication also recognises that for urban residents other than the poor, appropriate tariffs should be based on the principle of consumption.

One of the limitations of this report is that it is a secondary study based mainly on literature review and analyses. In absence of updated data, the publication relies on Census 2011, government websites, and reports from a wide variety of organisations. It would also be pertinent to point out that for appropriate decision making for urban water, the quality of information and data will need to improve dramatically from where it is as of now.

WaterAid/ Mansi Thapliyal

2.

An overview of urban water supply in India

In 2011, for the first time since independence, the Census revealed that the absolute increase in population in urban areas was more than that of rural areas, and the urban population is expected to grow to 590 million by 2030. The proportion of urban population to overall population increased from 27.81 per cent in 2001 to 31.16 per cent in 2011 Census (Census of India, 2011). Out of the total 370 million inhabiting urban India, 65.4 million were slum dwellers (Dashi, 2013).

Interestingly, the growth rate of cities with less than a million population is faster than large mega cities with more than a million people.

TABLE 1 India's Population in million

	2001	2011	Decadal Growth (%)
India	1,029	1,210	17.58
Rural	743	833	12.11
Urban	286	377	31.81

Source: censusindia.gov.in

This large and rapid population increase in urban areas is presenting urban planners with new and rapidly growing problems pertaining to the delivery of basic services – access to water, sewerage system and sanitation.

Access to safe drinking water is an important measure of the socio-economic status of the household and fundamental to the health of its members by preventing infection, illness and death. In India, the main sources of water supply includes:

TABLE 2 Sources of water supply in India

Primary Sources	Secondary Sources
River	Canals
Pond/ Lake/ Tanks	Dam Reservoirs
Rainwater	Bottled Water
Glacier Melts	Tanker Supplies
Groundwater/ Hand Pump/ Borewell/ Tubewell/ Covered and uncovered wells	Tap water from treated source
Sea Water	Tap water from untreated source
Atmospheric Water	

TABLE 3 Per cent of urban households having access to improved source of drinking water

Survey	Improved source of drinking water (%)	Treated tap water (%)	Untreated tapwater (%)	Total tap water (%)	Covered well water (%)	Uncov-ered well water (%)	Total well water (%)	Hand pump/ tube well (%)
Census 1991	81	-	-	-	-	-	-	-
Census 2001	97.8	-	-	68.7	-	-	7.7	21.4
Census 2011	89	62	8.6	70.6	6.2	-	-	20.8

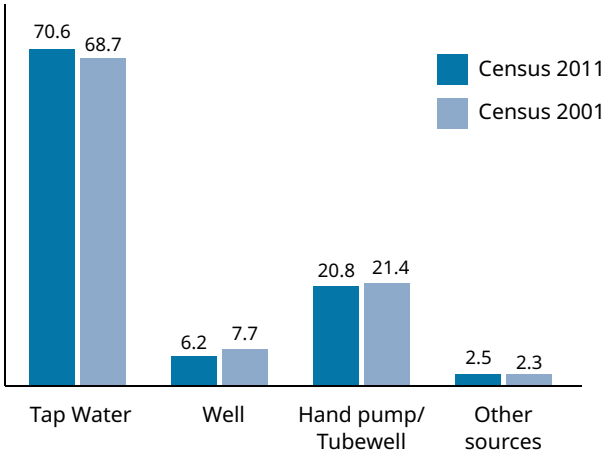
Source: Census of India, 1991 and 2001 and 2011

2.1 Coverage and accessibility of safe drinking water in urban India

There has been a gradual increase from 1991 to 2001 in the percentage of urban households with access to 'improved'[1] drinking water, but then a decline was witnessed in 2011. However, this decline is due to the availability of granular data. Earlier all tap water was taken as 'improved', whereas disaggregated data has been made available in 2011 for treated and untreated tap water categories. Similar is the case with water from wells. If untreated tap water and uncovered wells were included in the improved category, then the proportion of households that have access to improved sources, would be 98 per cent in 2011.

A closer look at the comparative figures of last two Census reveal that the improvement in access to safe drinking water in urban India has been mainly because of increased access to tap water. While in 2001, 68.7 per cent of

GRAPH 1
Distribution of main source of drinking water (urban)



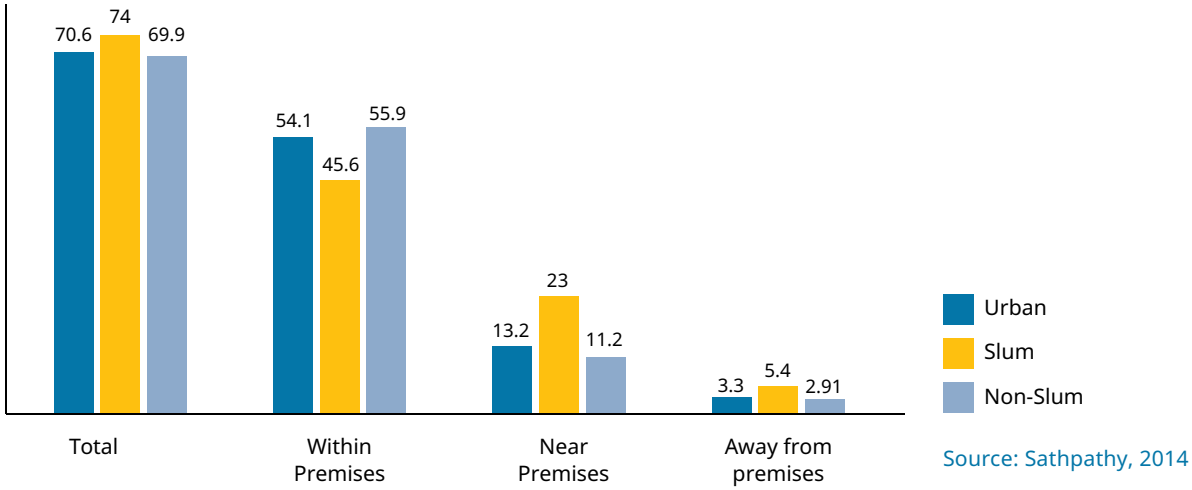
Source: CPHEEO, 2011

the households had **access to safe drinking water, in 2011, it increased to 70.6 percent** (refer to graph 1). Out of these 70.6 per cent households, 71 per cent had drinking water available within premises, 20.7 near premises, and 8.1 away from premises as indicated in graph 2 (*CPHEEO, 2011*).

[1] The World Bank definition of an improved drinking water source includes "piped water on premises (piped household water connection located inside the user's dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection)." Source: https://ourworldindata.org/water-access-resources-sanitation

GRAPH 2

Households using tap water (in per cent)



Source: Sathpathy, 2014

2.2 Pipe water supply in slums

Contrary to the general assumption that the slum population, being the poorest, lacks basic amenities such as drinking water, Census data reveals that slum households have better access to tap water than the non-slum populace. 69.9 per cent of non-slum urban households have access to tap drinking water whereas in slums this figure is 74 per cent. However, if we look into the data carefully, **the slum dwellers' access to tap water was not through individual connections but a community stand-post** (near premises or away from premises). One of the major reasons for the absence of tap water within the premises in slums is due to insistence on providing valid ownership certificates by the departments responsible for drinking water supply in urban areas. Since many slums are still not notified by the government, the slum households' application for piped water connection is rejected by the department.

WaterAid/ Ronny Sen

3.

Governance and regulation

Water supply in India is a State subject. Constitutional provisions enable both, the centre and the state, to perform a crucial role in planning and managing water resources and financing water supply. The states may give the responsibility of managing water supply to municipalities in urban areas, called Urban Local Bodies (ULB). Historically in post-independence era, water supply was entrusted to be delivered by urban local bodies in many states across the country.

However, the responsibility of providing water supply was transferred from local elected bodies to water supply agencies in the decade 1970-80 in many states. At present, states generally plan, design and execute water supply schemes (and often operate them) through their State Departments (Public Health Engineering Department) or state owned Corporations, such as Uttar Pradesh Jal Nigam and Maharashtra Jeevan Pradhikaran, or State Water Boards, such as Tamil Nadu Water and Drainage Board, Delhi Jal Board, and so on. Such approaches help play a central role in governance of water supply and the formulation of water supply policy, while the centre oversees the inter-state distribution of water. This practice has limited the role of ULBs in provisioning of drinking water services since then.

Though Ministry of Housing and Urban Affairs (MoHUA) is primarily responsible for financing urban water supply along with their state counterpart departments for urban development, there are other close connections with ministries, such as Ministry of Drinking Water and Sanitation, Ministry of Water Resources, Ministry of Health and Family Welfare, and Ministry of Environment, Forest and Climate Change, amongst others. The current institutional framework for urban water supply is dogged by multiplicity of institutions responsible for different functions within delivery of urban water supply services with often weak accountability and blurred reporting lines.

The policy framework in urban water sector operates at multiple levels from centre to state and from state to cities and towns.

The overall policy framework is defined by the National Water Policy, formulated by the Ministry of Water Resources, to govern the planning and development of water resources and their optimum utilisation. The first National Water Policy was adopted in September 1987 and was reviewed and updated in 2002 and later in 2012 (PIB, 2012). In January 2012, Ministry of Water Resources, Government of India, released a draft National Water Policy for the consideration and opinion of state governments and other stakeholders.

While improvements towards access to safe water supply are being taken up in government's policies, the alarming vulnerability caused by depleting aquifers remains largely unaddressed due to the lack of political will to address the issue. GoI released a Model Bill for the Conservation, Protection, Regulation and Management of Groundwater in May 2016 and a National Water Framework Bill 2016 to provide uniform national legal framework to manage river water at basin level in a better and efficient way. Both bills could have had a large implication in controlling exploitation of groundwater and managing river water, but in the absence of being enacted, the threat of water shortage and recurring drought situation continues for many cities in India. The key regulatory authority in India for urban water supply are Central Ground Water Authority, Central Water Commission, Central Pollution Control Board and Ministry of Housing and Urban Affairs with their counterpart state departments and institutions.

WaterAid/ Mansi Thapliyal

4.

Key public sector programs

The view that cities are central to the country's economic growth and development has gained wide acceptance in the past two decades. However, this world view was not accompanied initially by adequate and corresponding investments in basic infrastructure, not only to meet today's requirements but of the cities in near future as well.

The first central level efforts to provide drinking water in cities and towns were undertaken through the Integrated Development for Small and Medium Towns (IDSMT,1979) and Accelerated Urban Water Supply Programme (AUWSP, 1992) followed by Two Million Housing Programme (1998–1999), Valmiki Ambedkar Awas Yojana (2001), Total Sanitation Campaign (1992, but renamed Nirmal Bharat Abhiyan in 2012 and as Swachh Bharat Mission in 2014), Urban Reform Incentive Fund (2003), and Pooled Finance Development Scheme (2006) (Bharat and Sarkar, 2016). However, the landmark initiative that brought India's urban agenda to the centre stage for the first time was the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) launched in December 2005. JNNURM was the first massive urban development programme of the country and established the foundation for large scale central assistance to the urban sector. Since its inception, the JNNURM focused on sectors, such as water supply, sewerage, drainage and urban transport under the Urban Infrastructure Governance (UIG) component.

During 2014–15, the central government launched four new schemes to expedite urban infrastructure and service provision. These schemes are: (1) Atal Mission for Rejuvenation and Urban Transformation (AMRUT), that replaced JNNURM, focussing on water supply and sewerage improvement; (2) Smart Cities Mission, aimed at developing smart solutions for selected urban areas; (3) Swachh Bharat Mission – Urban, focussed on waste management and sanitation; and (4) Heritage City Development and Augmentation Yojana (HRIDAY), for addressing the development of heritage cities.

AMRUT

- Under AMRUT, the state-level plans of INR 77,640 crore for 500 cities have been approved.
- Water supply contracts for 494 projects worth INR 19,428 crore have been approved for 500 cities.

Smart Cities Mission

- The list of 99 smart cities in India have been identified.
- Water related topics to be addressed and implemented include smart meter management, leakage identification, preventive maintenance, and water quality modelling.

SBM (Urban)

- SBM guideline refers to adequate water supply arrangements to be made for proper functioning of toilets.
- However, toilets with no water supply in urban areas have decreased marginally from 16.5 per cent in 2012 to 11.9 per cent in 2016 (NSSO 2015-16). The numbers have improved thereafter, but SBM-MIS does not report of water availability.

HRIDAY

- The scheme is being implemented in 12 heritage cities with a total outlay of INR 500 crores focusing on service delivery, including drinking water facility and taps.
- Due to be completed in November 2018, only 48 per cent projects have been completed till May 2018.

Overall, JNNURM in the past, and now AMRUT, address the same issues and challenges, but the current missions have adopted a more focussed approach by splitting components across individual missions. Furthermore, the geographical coverage and financial scale of the new missions are greater than those of JNNURM.

5.

Public private partnership (PPP) projects in urban water supply

Historically, almost all water supply provisions have been managed by the public sector through municipal or state-level departments or parastatals. However, benchmarking services show that the government is unable to muster the required finances, competencies and capacities to meet the growing demands of the citizens for the services. As a result, a number of states/ cities have experimented with PPPs in water and sewerage services. The idea was that private

players would not only bring much needed capital, but also introduce efficiency into operations and delivery that would unlock the financial potential of the sector. Besides, both the 2002 and 2012 National Water Policy recognised the importance of PPPs to solve water issues in urban areas.

Against this sector backdrop, some cities began to attempt PPPs in water supply operations in the early 1990s, following economic liberalisation. Many of these early projects failed because of poor enabling frameworks for private investment, poor project preparation, weak financial strength of project proponents, and opposition to private sector participation. Subsequently, in the first half of the 2000s, a shift in focus towards distribution services took place, where a management contract model was explored, and governments started providing funding to meet a significant part of the investment needs while the private sector focused on creating efficiencies (WSP, 2014). As per the World Bank study in 2014, the important lessons drawn from PPP Projects in water sector are:

- projects occurred where bulk water availability was guaranteed;
- there was a lack of information on existing infrastructure;
- the reasons and objective of the project was not always accounted for in PPP design and monitoring;
- and lastly financial sustainability was not addressed in the PPP design.

Among its conclusions, the report recommended that the cities should:

- encourage private sector investment through better project preparation and contracts;
- strengthen public sector institutions to build on contributions from the private sector;
- and build public sector capacity to manage PPPs.

6.

Service delivery levels and benchmarks

6.1 Service level benchmarks

The share of urban population in India is witnessing a rapid growth but basic service levels remain well below the desired levels. A key reason is that investment in infrastructure has not always resulted in commensurate outcomes. As a result, there is a need for a shift in focus from infrastructure creation to delivery of service outcomes. In this context, the service level benchmarks (SLBs) for the urban water and sanitation sector have been formulated and can broadly be defined as a minimum set of standard performance parameters that are commonly understood and used by all stakeholders across the country. This has also become the cornerstone of the urban reform agenda being implemented as part of various centrally sponsored schemes. The principle of benchmarking has been further endorsed by the 13th Finance Commission, which has included SLB as one of the nine conditions for the allocation of performance-based grants to ULBs.

6.2 Reason for benchmarking the water sector

Scarce and poor quality municipal water is arguably one of the most pressing problems facing developing countries, including India, where only 70 per cent of the urban households have access to piped water supply (Census 2011). Though the per capita availability as reported ranges from 90 to 120 litres per day, but no city yet offers continuous water supply (WSP, 2014). More than 40 percent of water produced in many Indian cities does not earn any revenue, be it water lost before reaching the consumer or high volumes of water not being billed for or both, therefore contributing to poor cost recovery and hence poor service quality and coverage (PC Agarwal, April 2008). This is much higher than the non-revenue water (NRW) benchmark of 15 per cent followed in developed countries and the 20 per cent benchmark that is set as the SLB by the MoHUA for Indian cities. All these performance indicators fall well short of the Government of India's (GoI) service benchmarks: 100 per cent water coverage, a 24/ 7 water supply of 135 litres per capita per day (lpcd) and 100 per cent cost recovery.

TABLE 4 Performance indicators for water supply

S. No.	Indicator	Benchmark
1	Coverage of water supply connections	100%
2	Per capita supply of water	135 lpcd (cities)
3	Extent of non-revenue water	20%
4	Extent of metering	100%
5	Continuity of water supplied	24 hrs
6	Efficiency in redressal of customer complaints	80%
7	Quality of water supplied	100%
8	Cost recovery	100%
9	Efficiency in collection of water charges	90%

Source: Ministry of Housing and Urban Affairs (MoHUA), Government of India

6.3 Government of India norms for per capita supply of water

GoI establishes norms for per capita supply of water and are based on classes of cities but most states have their own classifications and norms. GoI norms propose the following urban water supply: (i) 150lpcd for metro-cities (which are all equipped with sewerage systems); (ii) 135lpcd for non-metro towns and cities equipped with a sewerage system; (iii) 70lpcd for towns and cities not equipped with a sewerage system; and (iv) 40lpcd for the population relying on public standpipes.

As per 2011 Census, 70.6 per cent of the urban population in India is covered by individual connections, compared with 91 per cent in China, 86 per cent in South Africa and 80 per cent in Brazil. Duration of water supply in Indian cities ranges from 1 hour to 6 hours, compared with 24 hours in Brazil and China and 22 hours in Vietnam. Per capita supply of water in Indian cities ranges from 37lpcd to 298lpcd for a limited duration, while Paris supplies 150lpcd continuously and Mexico 171lpcd for 21 hours a day (Draft City Sanitation Plan Udaipur, 2014). Most Indian cities do not have metering for residential water connections. These figures reflect that cities and towns of India are visibly deficient in the quality of services they provide. The 120 city sanitation plans being prepared with funding assistance from Ministry of Urban Development (now known as MoHUA) and external agencies like GIZ, JICA, UN Habitat, USAID and WSP, need to be actually implemented on ground and thereafter its progress needs to be monitored and evaluated.

.

WaterAid/ Prashanth Vishwanathan

7.

Water quality

7.1 Water quality standards

Drinking water is water intended for human consumption for drinking and cooking purposes from any source. It includes water (treated or untreated) supplied by any means for human consumption.

Water is defined as safe if it is free from biological contamination (guinea worm, cholera, typhoid etc.) and within permissible limits of chemical contamination (excess fluoride, brackishness, iron, arsenic, nitrates, etc.) as per IS-10500 standard of Bureau of Indian Standards (BIS).

The BIS drinking water specification (IS 10500:1991) was drawn up in 1983 and its most recent revision dates back to July 2010 (Amendment No. 3). The standard was adopted by BIS with the following objectives:

- To assess the quality of water resources, and
- To check the effectiveness of water treatment and supply by the concerned authorities.

Uniform Drinking Water Quality Monitoring Protocol, 2013, recommends qualitative testing for presence of bacteriological pollution to be carried out twice a year - pre-monsoon (May-June) and post-monsoon. All samples that indicate contamination using Field Testing Kits shall be referred to the nearest accredited or government water quality testing laboratory for confirmation.

Urban water supply quality is tested in labs at water treatment plants. Also, in cases of outbreak of water borne diseases, water quality surveillance is done by the health department largely. Besides government testing labs, privately owned labs have come up too.

7.2 Water contamination in major cities of India

Central Pollution Control Board (CPCB) monitors the water quality in India under National Water Quality Monitoring Programme. In a 2014-15 report, CPCB shared that of the 445 rivers monitored, as many as 275 are polluted, a number that has risen steeply from 121 in five years (CPCB, Feb 2015). In most urban water supply and sanitation (WSS) operations, the solution to the problem of rising river pollution has too often been to build wastewater treatment plants, that treat wastewater generated before it is discharged into rivers. However in many cities, only a fraction of the wastewater generated and discharged into sewers actually reach the treatment facilities, as sewers are silted up because of poor maintenance and pumping stations are faced with unreliable power supply. Moreover, only a third of urban houses in India are connected to the sewer system. Therefore, a bulk of our waste eventually find its pathways in our water bodies including *Nallahs* and rivers without undergoing any treatment. Apparently, actions by the Central and State Pollution Control Boards have not gone beyond issuing notices to the states with identified polluted river locations without reaching any logical conclusion. Besides rivers, the pollution has also affected numerous ponds and lakes and other surface water bodies that are also critical sources of water supply in various places. However, the water quality data from them is not available so as to present in this report.

Moving ahead from surface water to groundwater, the figures are not very encouraging here too. The groundwater supply in India is the source of 80 per cent to 95 per cent per cent of rural drinking water and 50 per cent of urban drinking water (The Hindu, 2017). However, agricultural run-offs carrying fertilizers and pesticides severely affects the groundwater quality causing vast tracts of India to be fluoride and arsenic affected. Fluoride problem exists in 276 districts in 20 states in the country with

TABLE 5 Number of districts* with chemical constituents in groundwater beyond BIS norms

Total States	**Fluoride** *(above 1.5 mg/l)*	**Nitrate** *(above 45 mg/l)*	**Arsenic** *(above 0.05 mg/l)*	**Iron** *(above 1.0mg/l)*	**Heavy metals:** **Lead** *(above 0.01 mg/l);* **Cadmium** *(above 0.003 mg/l);* **Chromium** *(above 0.05 mg/l)*
27	276 districts in 20 states	387 districts in 21 states	86 districts in 10 states	297 districts in 24 states	113 districts in 15 states

Source: Central Ground Water Board

*Note: There is no clear demarcation of urban water-contaminated districts in government's website

Rajasthan and Telangana being critically hit (CGWB). High concentration of fluoride in drinking water causes fluorosis resulting in weak bones, weak teeth and anaemia. The presence of arsenic, a cancer-inducing agent in groundwater of the Gangetic belt causes health risks to 40-90 million people in Bihar, West Bengal and Bangladesh (Governance Today, 2015).

8.

Water resourcing issues

Conflicts have always been and will remain an integral part of the water sector. It arises most evidently in regions were water is scarce and the demands from different users are high. In India, water conflicts reach every level and divide every segment of the society- political parties, states, regions and sub-regions within states, industries, farmers and households. These conflicts are logical developments in the absence of proper democratic, legal and administrative mechanism to handle issues that stem from the specific nature of water as a scarce resource.

While traditionally, water conflicts involved agitations and grassroots action, the recent trend is fighting for them in courts. These conflicts could be clubbed under various categories depending on its nature like conflicts around equity or access and allocation, around water quality or transboundary water and interstate conflicts.

While the nature of conflicts mentioned above are broad categories, newer challenges are being witnessed now, especially in South Asia. As the cities expand, it poses serious threats to the peri-urban spaces. Due to the large influx of population mainly due to the expansion of the city as an industrial hub, the peri-urban areas have been often losing out on water access to the more powerful urban population with high paying capacity. This trend is leading to immense water insecurities due to a combination of issues –urban growth induced water scarcity; myopic planning that is not based on available environmental resources; lack of recognition of community water rights and lack of regulation for the protection of diminishing surface water resources.

9.

Key challenges for urban poor

With increasing urbanisation, millions end up living in slums, and conditions for the urban poor are getting worse. Today, one in six urban citizens in India live below the poverty line (Ratan 2016).

As piped water supply in even the mega cities or smaller towns distributes water for not more than a few hours per day, the wealthy customers cope with this erratic service by developing substitutes such as backyard boreholes, boosters, storage reservoirs and purification equipment. On the contrary, the poor who cannot afford these substitutes, suffer most by investing their time in waiting for the water to come, often late at night, or by fetching it from distant sources.

Often, the high connection charges also act as a barrier for poor people to connect to formal water and sewerage systems. Therefore, (i) there is a need to understand the expenditure incurred on accessing water by the poor as a proportion of their total income; and (ii) the cost of connections cannot be borne in one tranche and so the option provided in several cities of paying the connection charge over multiple instalments should become the norm.

Accumulating the required sum for upfront connection costs, which are usually equivalent to a family's one or two months income, is difficult for people who live from day to day. Simplifying connection procedures and reducing connection costs can go a long way in facilitating urban poor to access formal service systems.

10.

Reforms in urban water supply

Reforms in urban water supply systems in India consisted of gradual movement from groundwater to surface water, using service level benchmarks for performance improvement, universal metering, 24x7 water supply projects and new ways for financing, including public-private partnerships. Enhancing water storage facilities and tap connection within each household, along with affordable water tariffs for urban poor is a key element for sector reforms in urban water supply segment.

While the water sector in India is still awaiting a comprehensive policy framework at the central level, there are several water policy documents that have emerged in the past two decades, at both central and state level. Urban water reforms remain an element of the state water policies in more than 10 states at least. Interestingly, Karnataka and Goa have separate urban water supply and sanitation policy documents. A look at these policy documents reveal that the reforms in urban water have been approached in various ways using different route maps across states. Overall, the reforms in urban water proposed by different states can be broadly classified into two categories: institutional reforms and financial reforms.

Examples of institutional reforms include defining role clarity amongst various state actors; formation of dedicated newer utilities or special purpose vehicles for specific functions; strengthening institutions at the ULB level; building or provisioning technical assistance; seeking partnerships with private sector and establishing regulatory mechanisms. Similarly, financial measures include tariff based universal metering and cost recovering mechanisms, ring-fencing of budget and accountability measures, improved financial systems, and so on. However, institutional reforms for policy making, regulation, and service delivery are yet to deliver better results in the urban water supply sector.

10.1 Priority recommendations

Census 2011 states that 89 per cent of the urban population had access to safe drinking water. However, according to many other publications and assessments, the urban water services are highly unreliable, unaffordable for urban poor and water quality is much below the stipulated standards. Most of the Indian cities have intermittent water supplies. Pipe water supply is erratic and is available for only a few hours per day, regardless of the quality. Raw sewage and industrial effluents often overflow into open drains. In most cities, the non-revenue water (due to leakages, unauthorised connections, billing and collection inefficiencies, etc.) is estimated to be between 40-70 per cent of the water distributed. Keeping these challenges in mind, the priority sector recommendations would call for the following:

1. While funding infrastructure creation and promoting institutional improvements are the first step towards improvement, strong incentives for providing reliable and affordable services need to be prioritised for improvements in urban water service delivery in most of the cities and towns in India.

2. Reduction of non-revenue water and improvement in cost recovery by service providers, efforts to be made towards building up their abilities to serve more people in limited water resources.

3. Central and State Pollution Control Boards need to review the current rules and laws with a view to come out with more stringent laws for reducing municipal, industrial and commercial pollution, also for minimising their carbon, water and ecological footprints.

4. The current groundwater regulation and laws needs to be reviewed from the perspective of its stringent provisioning and implementation, in order to prevent the excessive exploitation of groundwater. Stricter vigilance and regulations by district-level committee needs to be introduced, through measures such as tamper-proof water meters to monitor the quantum of water withdrawn from groundwater reservoirs; levying some bulk water charges for groundwater depletion; and regular monitoring of groundwater quality.

5. For countering the situation of several cities moving towards day zero level and to address the existing challenges of water scarcity in many cities in India, it is recommended to incentivise rainwater harvesting technologies, ensure strong regulation and enforcement of rainwater harvesting for all kinds of urban buildings, and include well defined monitoring plans for the same.

6. Fresh water usage by industries should be reduced by way of initiating partnerships with companies for treatment and reuse of urban wastewater.

7. To ensure availability of basic level of safe water services to all, enhance the financing in urban water sector, both by public and private sector using appropriate partnership models with defined plans and monitoring mechanisms.

8. Addressing the current situation of poor operation and maintenance of water supply schemes, higher leakages and quality concerns are quite critical for improving urban water supply. For this, moving towards 24x7 water supply model will be important starting with smart cities and subsequently scaling up in all cities and towns in a phased and systematic manner.

9. As the majority of urban growth in India is expected to take place in small and medium sized towns which are having limited capacity and resources to develop and maintain necessary infrastructure, it is recommended to prioritise robust planning, institutional capacity building and infrastructure development for safe water supply in small cities and towns.

10. Climate resilient water sector planning, including sufficient investments in capacity development of urban communities in disaster resilience is yet another action to prioritise.

11. Lastly, paucity of data in the urban context is another challenge while trying to understand urban water issues in India. Addressing the dearth in data together by government and other stakeholders will be an important measure in urban planning and decision-making processes.

References

Bharat, Dr Girija K and Sarkar, Dr S K. (Feb 2016). Swachh Bharat Mission (Urban) Towards Cleaning India: A Policy Perspective. Policy Brief, TERI.

Census of India. (2011). 'Rural Urban Distribution of Population', Ministry of Home Affairs, New Delhi.

CPCB, Feb 2015. 'River Stretches for Restoration of Water Quality'. Monitoring of Indian National Aquatic Resources Series: MINARS/37 /2014-15.

Census of India 2011. (2012). Houses, household Amenities and Assets. Govt of India. Data Product No. 00-015-2011-Census Data Sheet E.

Central Public Health and Environmental Engineering Organisation (2011). An Analysis of 2011 Census Data on Household Amenities with respect to Drinking Water Sources and Latrine Facilities in Urban Areas of the Country. Ministry of Urban Affairs.

Community Data, July 2017. As retrieved from https://community.data.gov.in/drinking-water-quality-testing-laboratories-in-india-as-on-16-11-2016/ on 12 May 2018.

Dashi, DK. (20 Aug 2013). By 2017, India's slum population will rise to 104 million. The Times of India. As retrieved from https://timesofindia.indiatimes.com/india/By-2017-Indias-slum-population-will-rise-to-104-million/articleshow/21927474.cms on 10 May 2018.

Down to Earth (15 April 2016). The 1.75-million-tonne question. As retrieved from: http://www.downtoearth.org.in/coverage/urban-shit-53422 on 22 May 2018.

Draft City Sanitation Plan, as retrieved from http://www.udaipurmc.org/static/Pdf/Ud_CSP_DraftReport.pdf on 9 May 2018.

India Water portal. (2017).An insight into the legal aspect of ground water use by industries and water tax/rate/fee. As retrieved from http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Legal%20Aspect%20of%20Ground%20Water.pdf on 10 May 2018.

Khandekar, Nivedita. (10 May 2018). Why Delhi is facing an acute water crisis today. As retrieved from https://www.dailyo.in/variety/groundwater-alarm-for-delhi-supreme-court-delhi-jal-board-ncr-water-crisis/story/1/24016.html on 9 May 2018.

K.J. Joy et al, 2008.water Conflicts in India- 'A Million Revolts in the Making', Routledge.

Mathur, Aneesha. (13 Aug 2015). Give us report on rainwater harvesting systems: HC. The Indian Express.

McIntosh, A. C. (2003), Asian Water Supplies: Reaching the Urban Poor, IWA Publ., London.

Ministry of Housing and Urban Affairs. (27 Dec 2016). Service Level Benchmarks. As retrieved from http://mohua.gov.in/cms/Service-Level-Benchmarks.php on 10 May 2018.

Ministry of Water Resource. (Dec 2008). Comprehensive Mission Document of National Water Mission, Vol 2, pg iv/2.

Name of the States/Districts from where chemical constituents in ground water beyond BIS Norms have been reported. As retrieved from http://cgwb.gov.in/Documents/Contaminated%20Areas.pdf on 10 May 2018.

Panwar, Manoj & Sunil Antil, Mr. (2015). Issues, Challenges and Prospects of Water Supply in Urban India. IOSR Journal Of Humanities And Social Science (IOSR-JHSS). 20. 2279-837. 10.9790/0837-20526873. PC Agarwal, April 2008. 'Redesigning an Effective Leakage Reduction and Management Program'. Water and Sanitation Programme, World Bank.

Press Information Bureau (6 Feb 2018). Ministry of Housing and Urban Poverty Alleviation. Retrieved from http://pib.nic.in/newsite/PrintRelease.aspx?relid=176273 on 10 May 2018.

Press Information Bureau. (17 Dec 2012). New National Water Policy. Ministry of Water Resources. GoI. As retrieved from http://pib.nic.in/newsite/PrintRelease.aspx?relid=90775 on 10 May 2018.

Presss Information Bureau. (12 Dec 2013). Roof Top Rain Water Harvesting. Ministry of Water Resource.

Ratan, Neel. (6 April 2016).These are the challenges faced by India's urban poor – and how we can solve them. World Economic Forum.

Sathpathy, BK. (14 Feb 2014). Safe Drinking Water in Slums. Economic and Political Weekly. Vol XlIX no 24.

Singh, K & K P Singh, R & Meena, M S & Kumar, Abhay. (2014). Indian National Water Policy: A Review. 10.13140/RG.2.1.4172.6160.

Singh, B., R. Ramasubban, R. Bhatia, J. Briscoe, C. C. Griffin, and C. Kim ;1993; Rural water supply in Kerala, India: How to emerge from a low level equilibrium trap, Water Resour. Res., 29, 1931–1942.

Sivaramakrishnan, KC (2009). 'Drinking Water Supply: Rights and Obligation', in Ramaswamy R. Iyer, edited, Water and the laws in India, Sage Publications.

Srinath P. (13 Feb 2015). Let India's urban poor pay for good water. Livemint. As retrieved from https://www.livemint.com/Opinion/xbu06pHKpBzICZ1THPisZJ/Let-Indias-urban-poor-pay-for-good-water.html on 10 May 2018.

The Hindu. (11 July 2017). The alarming levels of India's groundwater. As retrieved from http://www.thehindu.com/news/cities/mumbai/the-alarming-levels-of-indias-groundwater/article19253949.ece on 10 May 2018.

Wagle, Subodh & Deekshit, Pranjal & Pol, Tejas. (2011). Review of Reforms in Urban Water Sector: Institutional and Financial Aspects. 199-209.

WaterAid 2018. 'The Water Gap - State of the World's Water'.

Water and Sanitation Program. (Jan 2014). 'Running Water in India's Cities: A Review of Five Recent Public-Private Partnership Initiatives', World Bank. As retrieved from https://www.wsp.org/sites/wsp.org/files/publications/Running-Water-in-India-Public-Private-Partnership-Initiatives.pdf on 10 May 2018.

World health organisation (WHO), 2001; Leakage Management and Control – A Best Training Manual. World Health Organization, Geneva, Switzerland.

WaterAid/ Mansi Thapliyal

WaterAid/ Mansi Thapliyal

Wateraid India Country Office

2nd floor, RK Khanna Tennis Stadium, 1, Africa Avenue,
Safdarjung Enclave, New Delhi 110029

Tel +91 11 6612 4400 **Email** waindia@wateraid.org

WWW.WATERAIDINDIA.IN

Exhibitions India Group
ISO 9001:2008 · ISO 14001:2004 · OHSAS 18001:2007
Committed to Excellence

WaterAid